

## Research Article

# Motherhood Plan: Has it Changed in Face of the COVID-19 Pandemics?

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## Abstract

**Background:** The goal for the present study was to investigate whether women seeking fertility care have different perception concerning the impact of Covid-19 on the motherhood plan than a target population.

**Material and Methods:** For this prospective study, a survey through online-platforms was conducted. Participants were randomized by age, in a 1:4 ratio, into: ART-GROUP (n=368), including patients seeking for Assisted Reproduction Treatment (ART), but still didn't start their cycles or INTERESTED-GROUP (n=92), including participants interested in the subject, who accessed the website of a university-affiliated IVF-center. Information on their perceptions in face of the COVID-19 pandemics and the motherhood plan was collected.

**Results:** When asked about the possibility of becoming pregnant, after the beginning of the pandemic, 47.8% of the ART-GROUP stated to believe the pandemic could affect their plans, while only 28.2% of the INTERESTED-GROUP stated the same. The plan to become pregnant was postponed by 41.3% of the ART-GROUP and by 60.8% of the INTERESTED-GROUP. The main reasons that led people to this decision were fear of getting sick, economic reasons and a pessimist view of the future.

**Conclusion:** In conclusion, besides the fear of becoming sick, the economic burdens are the main reason for the delay in the motherhood plan.

**Keywords:** COVID-19; Motherhood plan; Infertility; Assisted reproduction; Pandemic

## Introduction

In December 2019, the incidence of serious pneumonia cases, with no known cause, increased in Wuhan, China. After that, the number of cases rose, spreading throughout the world. The causative agent of the disease was identified as a novel coronavirus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the disease caused by SARS-CoV-2 was formally named coronavirus disease 2019 (COVID-19) by the World Health Organization (WHO).

SARS-CoV-2 belongs to the  $\beta$ -coronavirus family. The outbreaks of severe acute respiratory syndrome (SARS CoV-1) in 2003 and Middle-East Respiratory Syndrome (MERS) have shown the gravity of these viruses [1].

Pregnant women and their fetuses represent a high-risk population during infectious disease outbreaks, due to altered physiology and immune functions, and thus altered susceptibility to infection [2]. Pregnant women are also at increased risk of contracting respiratory illnesses, associated with increased infectious morbidity and high maternal mortality rates [3]. Moreover, maternal pneumonias are associated with several adverse obstetrical outcomes, including premature rupture of membranes and preterm labor, intrauterine fetal demise, intrauterine growth restriction, and neonatal death [4].

Although most human coronavirus infections are mild, the SARS CoV-1 and MERS epidemics have been especially severe, with a mortality proportion in pregnant women ranging from 25 to 30%

[5]. As for COVID-19, serious conditions requiring admission to the intensive care unit and mechanical ventilation are significantly less common when compared with the two previous coronavirus infections (MERS and SARS). Similarly, in a recent published systematic review and meta-analysis, no case of maternal death due to COVID-19 infection was related [5].

Regarding the pregnancy outcomes, Di Mascio et al. [5] described that radiological features suggestive for pneumonia were found in almost all of the hospitalized pregnant women, due to COVID-19, usually presenting with fever, cough, and lymphopenia, similar to the nonpregnant population. However, pregnant women affected by COVID-19 had higher rates of preterm birth, and preeclampsia, while the babies had a 2.4% rate of stillbirth, a 2.4% rate of neonatal death, and higher rate of admission to the intensive care unit. Oppositely, in a retrospective study, evaluating the effect of COVID-19 on pregnancy outcomes and neonatal prognosis in infected women with COVID-19 and women without COVID-19, Zhang et al. (2020), reported no significant differences in fetal distress, meconium-stained amniotic fluid, preterm delivery, and neonatal asphyxia between the two groups [6].

Because there were no known neonatal symptoms, there were no clinical evidence suggestive for vertical transmission, particularly when COVID-19 infection occurs later in pregnancy [5]. These corroborates with another literature review relating that currently, there was no evidence for intrauterine vertical transmission of

COVID-19 from infected pregnant mothers to their fetuses [7].

Despite the large range of investigations and published reports after the beginning of the COVID-19 pandemic, at this time, little is known about the infection, particularly related to its effect on pregnant women and infants, and there currently are no recommendations specific to pregnant women regarding the evaluation or management of COVID-19.

In the earliest stages of the pandemic, the American Society for Reproductive Medicine (ASRM), the European Society of Human Reproduction and Embryology (ESHRE), and the Latam Assisted Reproduction Society (RedLara) independently recommended discontinuation of assisted reproduction cycles except for the most urgent cases.

More recently, with successful mitigation strategies in some areas and emergence of additional data, ASRM and ESHRE have sanctioned gradual and judicious resumption of delivery of full reproductive care [8]. In fact, infertility is time-sensitive, and prognosis worsens with age.

The infertility diagnosis and reproductive treatments possess an inherent psychological burden. On addition, any pandemics pose a challenge to psychological resilience and can lead to heightened levels of stress [9]. The association of the stress inherent in infertility diagnosis with the uncertainty of the consequences of the passage of time in the prognosis of treatments may impact on patient's psychological health. The goal for the present study was to investigate whether women seeking fertility care have different perception concerning the impact of COVID-19 on the motherhood plan than a target population.

## Materials and Methods

### Design

From 22/April/2020 to 25/may/2020, a survey through online-platforms was conducted. Participants were randomized by age, in a 1:4 ratio, into one of the two groups: ART-GROUP (n=368), including patients seeking for Assisted Reproduction Treatment (ART), who already underwent their first interview with the infertility specialist, but still didn't start their cycles or INTERESTED-GROUP (n=92), including participants interested in the subject, who accessed the website of a university-affiliated IVF-center. Participants in the ART-GROUP, were invited *via* e-mail, with a cover-letter outlining the survey and a link to access it. Participants in the INTERESTED-GROUP accessed the questionnaire *via* website. Information on their perceptions in face of the COVID-19 pandemics and the motherhood plan was collected and the responses of patients in ART-GROUP was compared with those in the INTERESTED-GROUP.

The study was an electronic questionnaire survey and was approved by the Institutional Review Board. Participants provide consent for data from the questionnaire to be published.

### Questionnaire

There were three questions regarding demographic data. Participants were asked to provide information about age (open response format), professional activity (open response format), and marital status (response options: marriage, single or common law relationship).

There were four more questions concerning their perceptions in face of the COVID-19 pandemics, all with close response options. The questions and response options were as following:

(i) How do you see the possibility of becoming pregnant after the beginning of the COVID-19 pandemic?

Response options: the same or lower

(ii) How long do you think that suppression strategies will last?

Responses options: Until the end of May, until the end of June, until the end of July, until the end of August, or beyond the end of August.

(iii) Did you postpone your plans to become pregnant?

Responses options: Yes or No

(iv) If you answer yes in question (iii), why was that?

Response options: fear of getting sick, economic reasons, pessimist view of the future, medical advice, the discontinuation of ARTs by determination of government authorities, or other reasons.

More than one answer could be chosen for the last question (iv).

### Statistical analysis

Data were analyzed using the SPSS Statistics 21 (IBM, New York, NY) statistical program. Variables were tested for normality distribution and group homogeneity using the Shapiro Wilk and Levene tests, respectively. The age was compared between the groups using the Student t test while the other variables were compared using the Chi-square.

Age was described as mean  $\pm$  standard deviation and the other variables were described as the percentage  $\pm$  standard deviation. The considered significance level  $\alpha$  was 5%

## Results

There was no difference in age, when the groups were compared ( $38.5 \pm 6.2$  vs.  $37.1 \pm 6.8$ ,  $p=0.064$ , for ART-GROUP and INTERESTED-GROUP, respectively, Table 1). Most patients in the ART-GROUP were married or in a common-law relationship, while a half of women in the INTERESTED-GROUP were in the same situation (Table 1).

When asked about the possibility of becoming pregnant, after the beginning of the pandemic, almost half of the ART-GROUP stated to believe the pandemic could affect their plans, while only nearly one third % of the INTERESTED-GROUP stated the same (Table 1).

Concerning the duration of the suppression strategies, 31.8% of patients in ART-GROUP stated to believe the suppression strategies wouldn't be over by August 2020, while 42.4% of women in the INTERESTED-GROUP believed the same ( $p=0.054$ , Table 2).

The plan to become pregnant was postponed by 41.3% of the ART-GROUP and by 60.8% of the INTERESTED-GROUP ( $p=0.005$ , Table 2). The main reasons that led people to this decision were fear of getting sick ( $60.5\%$  vs.  $64.3\%$ ,  $p=0.410$ , for ART-GROUP and INTERESTED-GROUP, respectively), economic reasons ( $43.4\%$  vs.  $26.5\%$ ,  $p=0.029$  FOR ART-GROUP and INTERESTED-GROUP, respectively) and a pessimist view of the future ( $11.8\%$  vs.

**Table 1:** Distribution of age, marital status and patient's opinion about the possibility of become pregnant among ART-GROUP and INTERESTED-GROUP.

	ART-GROUP	INTERESTED-GROUP	P value
N	368	92	
Age	38.5 ± 6.2	37.1 ± 6.8	0.064
Married or in a common-law relationship	83.4% (307/368)	50.0% (46/92)	<0.001
Pandemic could affect the parenthood plans	47.8% (176/368)	28.2% (26/92)	<0.001

**Table 2:** Opinion about the duration of the suppression strategies and whether the plan to become pregnant was postponed in patients in ART-GROUP and INTERESTED-GROUP.

	ART-GROUP	INTERESTED-GROUP	P value	
N	368	92		
Duration of the suppression strategies	End of May/2020	9.80% (38/368)	3.20% (3/92)	0.033
	End of June/2020	23.60% (87/368)	7.60% (7/92)	<0.001
	End of July/2020	21.20% (78/368)	7.60% (7/92)	<0.001
	End of August/2020	13.0% (48/368)	39.10% (36/92)	<0.001
	Beyond the end of August/2020	31.80% (117/368)	42.40% (39/92)	0.054
The plan to become pregnant	Postponed	41.30% (152/368)	60.80% (56/92)	0.005

**Table 3:** The reasons why patients would postpone the motherhood plan in ART-GROUP and INTERESTED-GROUP.

	ART-GROUP	INTERESTED-GROUP	P value	
N	152	56		
Reasons to postpone the motherhood plan	Fear of getting sick	60.50% (92/152)	64.30% (36/56)	0.41
	Economic reasons	43.40% (66/152)	26.80% (15/56)	0.029
	Pessimist view of the future	11.80% (18/152)	23.20% (13/56)	0.041
	Medical advice	2.60% (4/152)	0.00% (0/56)	NA
	Discontinuation of assisted reproduction treatments by determination of government authorities	46.70% (71/152)	3.60% (2/56)	<0.001
	Other	13.10% (20/152)	17.80% (10/56)	0.392

NA: Not applicable (chi-square is not performed when the value is 0).

23.2%,  $p=0.041$  FOR ART-GROUP and INTERESTED-GROUP, respectively). Medical advice (2.6% vs. 0% FOR ART-GROUP and INTERESTED-GROUP, respectively) was the less common reason (Table 3).

## Discussion

The current COVID-19 pandemic is spreading globally at an accelerated rate. World authorities implemented suppression and mitigation strategies to control community spread, including restrictions to non-urgent medical care.

There have been increasing efforts to encourage assisted reproduction centers to adapt to these restrictions and as a result ASRM, ESHRE, and RedLara recommended discontinuation of assisted reproduction cycles. The decision of reproductive medicine societies was based on the encouragement of social distancing, on avoiding unnecessary intensive care units' admissions, which may overload the health system, and avoiding possible risks for pregnant women and their babies.

In fact, although ARTs are usually safe with no complications, there is a risk of iatrogenic occurrence of Ovarian Hyperstimulation Syndrome (OHSS). Ovarian hyperstimulation syndrome is a rare but serious complication of ovarian stimulation, occurring during

assisted reproduction technologies. The moderate and severe forms may occur in 3% to 10% of all ART cycles [10,11], and may cause serious psychological and physiological complications and, in rare cases, may lead to maternal death [12].

Another concern is regarding the pregnancy during the pandemics, since pregnant women and their fetuses represent a high-risk population during infectious disease outbreaks. Although SARS-CoV-2 could not be isolated from amniotic fluid, placenta tissue, vaginal swabs, cord blood or breast milk, or from neonatal nasopharyngeal and throat swabs in many published reports [13-20], vertical SARS-CoV-2 transmission could not be excluded, since few neonates tested positive on throat, nasopharyngeal and anal swabs [21] or were found to have immunoglobulin M and G against SARS-CoV-2 at birth [22].

On the other side infertility is a serious disease that affects 8-12% of couples of reproductive ages [23], leading to physical and mental damage. Moreover, Infertility is time-sensitive, and prognosis worsens with age.

Female reproductive aging is related to the gradual decline in oocyte quantity and quality. The oocyte yield and embryo quality are the best predictors of reproductive outcome in women. Indeed, age is reported to be the most important contributor to oocyte quality and

embryo ploidy, which directly influence pregnancy outcomes [24].

It has been suggested that the embryo euploidy rate decreases by 2.4% per year with increasing female age, and that the blastocyst euploidy rate drops from 60% before 35 years to 30% after 40 years [25]. In fact, there is broad agreement in the literature that age-related changes in oocyte quantity and quality begin at 35 years of age [26].

In addition, there has been a tendency to delay pregnancy for social and/or economic reasons, resulting in an increasing number of women of an advanced age seeking infertility treatment. The proportion of women seeking pregnancy after the age of 35 is significantly rising, and many of these women will require assisted reproduction, due to age-related infertility, to achieve motherhood [27].

In the present study, we evaluated the perceptions concerning the impact of COVID-19 on the motherhood plan in two different populations, women seeking fertility care, who already underwent their first interview with the physician, but still didn't start their cycles or those interested in the subject, who accessed the website of an IVF-center.

A higher proportion of patients already involved in an ART had their motherhood plan affected by the pandemic when compared with those women only interested in the subject. It could be hypothesized that these women already have a diagnosis of infertility and are aware that, most likely, treatment will be their only chance of motherhood. Moreover, although, the age didn't differ among the groups, patients in ART-GROUP, have already been in consultation with the physician and probably have already been informed about the effect of female age on the chance of conception. This may also be the reason why an increased proportion of women in ART-GROUP didn't postpone the plan to become pregnant when compared with those interested in the ART subject.

Among those who had the motherhood plan postponed, the fear of getting sick were the main reason for both groups of patients, while economic reason was the second main reason for ART-GROUP women, but not for women in the INTEREST-GROUP.

Government implementations in face of COVID-9 pandemic, such as social distancing, self-isolation and travel restrictions have led to a reduced workforce across all economic sectors, caused many jobs to be lost [4]. Therefore, the fear of an impending economic crisis and recession associated with the fact that in Brazil, ART do not qualify for reimbursement can explain why, in addition to fear of getting sick, the economic issue is one of the main reasons why ART patients decided to postpone the motherhood plan.

A smaller proportion of patients in the ART-GROUP answered to having a pessimistic view of the future when compared to the other group. Likewise, regarding the duration of the suppression strategies ART patients seen to be more optimistic. Besides their realist view when it concerns economic issues and changes in the motherhood plan, these patients seem not to have given up on the plan of becoming pregnant. In a previous study of our group, including 877 patients undergoing ART cycles, patients received a questionnaire containing information on faith, religiosity, and spirituality. When asked whether they believed in the success of their treatments, most patients answered 100% [28], suggesting that when undergoing an infertility

treatment, patients tend to be optimistic. It could be argued that the optimistic may depend on the prognosis (i.e age, cause of infertility or number of attempts), however in the present study, although patients were already in contact with the physician, they still haven't started the treatment yet.

Limitations of the present study include lack of adequate opportunities to conduct face to face interview, lack of knowledge of the real state of the website participants concerning infertility or being involved in an ART and self-report method of data collection.

## Conclusion

In conclusion, the present study suggests that patients involved in ART have a different view regarding the impact of COVID-19 on reproductive treatments, than the population interested in the ART subject. Some may have postponed the motherhood plan but most of them have not given up on the plan of becoming pregnant. Besides the fear of becoming sick, economic burdens seen to be the most impeding factor for the delay of their plans, probably due to the impact of the pandemic in the economy and because, in Brazil, ART does not qualify for reimbursement.

## Author's Contributions

DPAFB, ASS, RMMM, AIR and EBJ designed the manuscript, DPAFB compiled the data, ASS performed the statistical analysis, DPAFB, ASS, RMMM, AIR and EBJ analysed, DPAFA wrote the manuscript and EBJ reviewed the final version of the manuscript.

## Disclaimers

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