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Correspondence

**Covid-19 in pregnant women: General data from
a French National Survey**

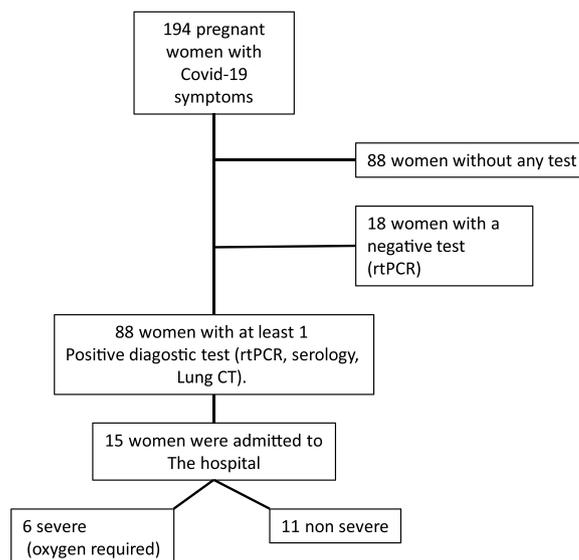
To the Editor

The Covid-19 pandemic is responsible for almost 3 million cases and more than 200,000 deaths worldwide. The risks of Covid-19 on pregnancy are poorly known and to date, the only available data come from women admitted to the hospital.

Di Mascio reported 41 Covid-19 infections during pregnancy [1]. The rates of preterm birth, preterm premature rupture of membranes (pprom) and preeclampsia were enhanced. Cesarean section was performed in 91 %, without any vertical transmission. Della Marca reviewed 51 cases [2]. Symptoms presented were fever, cough, sore throat, dyspnea, fatigue, myalgia, malaise, diarrhea and cholecystitis. Pprom occurred in 26 %. Cesarean section rate was 96 %. In a retrospective cohort study, Chen et al. described 118 cases [3]. Rate of severe form was 8 %. Among the 68 women who delivered 21 % were premature, 93 % underwent Cesarean section and no baby had neonatal asphyxia. The 8 newborn who were tested for SRAS-Cov-2 were negative. Finally, another cohort study [4] reported severe pneumonia in 6.9 % of the 116 cases. Symptoms were fever, cough and fatigue. Preterm birth occurred in 21.2 % cases, including 6 cases with pprom. No vertical transmission was reported.

Here, we present results of a national French survey which collected a “real life” data of pregnant women that were confirmed positive for Covid-19 and who were either treated by their family doctor or required hospitalization. We used an internet platform targeting more than 900,000 French viewers of a television show focusing on pregnancy (“la Maison des Maternelles”). Women were invited to answer an anonymous survey asking if they were pregnant and had been suffering from Covid-19 disease. They gave digital consent to share and publish this data.

Out of 194 pregnant women who had Covid 19 compatible symptoms, 88 were tested positive for the SRAS-Cov-2, either by RT-PCR (n = 84), serologies (n = 10) and/or lung CT-scanner (n = 6) (Fig. 1). Their median age was 31 years old (IQR 28–34) and their median BMI was 22.7 kg/m² (IQR 21–28) (Table 1). Only 3 women were smokers (3.4 %). Seven women had diabetes mellitus before pregnancy (n = 2) or developed gestational diabetes (n = 5). The most frequent symptoms were fatigue (80 %), ageusia and/or anosmia (76 %), cough (63 %), muscle aches (57 %) and fever (50 %).

**Fig. 1.** Flow chart of the survey.

Among these women, 18 were admitted to the hospital (20 %) and 6 (7%) required oxygen therapy and were considered as having severe disease. Women with severe disease were older (34 vs 31 years; $p = 0.009$), with higher BMI (29.2 vs 22.6 kg/m²; $p = 0.002$) and were more likely to have a history of diabetes (50 % vs 4.9 %; $p = 0.006$) than pregnant women without severe disease. Clinical presentation of women with severe disease was also different. They had more gastrointestinal symptoms, such as diarrhea (83 % vs 28 %; $p = 0.011$), nausea (67 % vs 22 %; $p = 0.03$) and vomiting (67 % vs 2 %; $p = 0.005$) (Table 1). The median gestational age at the time of Covid-19 was 27 weeks (ranges 4–34). Women had no maternal and/or fetal adverse obstetrical incidents, with moderate uterine contractions in 17 % of all cases. Among the 88 women, 14 gave birth to a live birth baby between 28 and 41 weeks, with cesarean sections in 5 cases (36 %).

The main limit of this study is the recruitment bias. Women decided by themselves whether to answer the survey and we do not know whether the severity of the disease impacted their consenting to answer. However, the data provided in this letter represents the widest sample of Covid-19-positive pregnant women that were managed either by their family doctor, by their obstetrician, or by an online follow-up platform.

Table 1
Clinical characteristics of pregnant women with Covid-19, according to symptoms severity.

Characteristics	All patients (n = 88)	Non severe N = 82 (93 %)	Severe (requiring oxygen support) N = 6 (7%)
Age (IQR)	31 (28–34)	31 (28–33)	34 (32–40) **
BMI (IQR)	22.7 (21–28)	22.5 (21–27)	29.6 (27–35) *
Obesity (BMI ≥ 30)	15 (17 %)	13 (16 %)	2 (33 %)
Overweight (BMI ≥ 25) (n ;%)	36 (41 %)	31 (38 %)	5 (83 %) *
Smoking (n ;%)	3 (3.4 %)	2 (2.4 %)	1 (16.7 %)
Diabetes (n ;%)	7 (8 %)	4 (%)	3 (50 %) **
Median term at the onset of the disease (range)	27 (4–40)	27 (4–40)	26 (12–34)
Positive Covid-19 PCR (n ;%)	84 (95 %)	78 (%)	6 (%)
Positive Covid-19 (n ;%)	10 (11.4 %)	9 (%)	1 (%)
Positive Covid-19 Serology (n ;%)			
Covid-19 suggestive Chest CT (n ;%)	6 (7%)	2 (%)	4 (%)
Covid-19 features			
Fever (n;%)	44 (50 %)	40 (49 %)	4 (67 %)
Cough (n;%)	55 (63 %)	50 (61 %)	5 (83 %)
Diarrhea (n;%)	28 (32 %)	23 (28 %)	5 (83 %) *
Breath difficulties (n;%)	40 (45 %)	34 (41 %)	6 (100 %) **
Muscle aches (n;%)	50 (57 %)	46 (56 %)	5 (83 %)
Fatigue (n;%)	70 (80 %)	65 (79 %)	5 (83 %)
Nausea (n;%)	22 (25 %)	18 (22 %)	4 (67 %) *
Vomiting (n;%)	14 (16 %)	10 (12 %)	4 (67 %) **
Agueusia and/or anosmia	67 (76 %)	62 (76 %)	5 (83 %)
Disease impact on the pregnancy			
Hospitalization (n;%)	17 (19 %)	11 (13 %)	6 (100 %)***
Need for oxygen (n;%)	6 (7%)	0	100 %
Uterine contractions (n;%)	15 (17 %)	13 (16 %)	2 (33 %)
Delivery (n;%)	N = 14	13	1
Cesarean section	(36 %)	4	1

* p < 0.05 ; ** p < 0.01; *** p < 0.001.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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