

Maternal outcome of pregnant women admitted to intensive care units for coronavirus disease 2019



OBJECTIVE: The novel coronavirus, or severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has caused a global pandemic of coronavirus disease 2019 (COVID-19) with over 10.3 million confirmed cases and more than 500,000 deaths by early July 2020.¹ Several case series and case reports have been published on the outcome of pregnant women who are critically ill from COVID-19, but estimates of case fatality rate (CFR) have been limited by the small number of women in each report. Our goal was to estimate the CFR of pregnant women infected with SARS-CoV-2 admitted to the intensive care unit (ICU) through a systematic review and metaanalysis of the existing literature.

STUDY DESIGN: Eligible articles published on MEDLINE, Embase, and CINAHL databases between March 4, 2020 and June 4, 2020 were identified through medical subject headings, key words, and word variants for coronavirus, COVID-19, and pregnancy. We included English-language case reports, case series, retrospective studies, systematic reviews, and metaanalyses. Articles were restricted to those describing cases of pregnant women in at least the second trimester with confirmed COVID-19 admitted to the ICU, in which maternal vital status was reported. For case reports or case series of maternal deaths, authors were contacted to determine the number of other pregnant women admitted to the ICU with confirmed

TABLE
Outcomes of critically ill pregnant women with COVID-19

Author	Country	Number of pregnant patients in the ICU	Fatalities	Comments
Ahmed et al ²	United Kingdom	1	1	BMI+35, T2DM, asthma Developed PE and basilar artery thrombosis
Alzamora et al ³	Peru	1 ^a	0	T2DM
Blauvelt et al ⁴	United States	1	0	Asthma, obesity, gestational diabetes
Collin et al ⁵	Sweden	13 ^a	0	Data from the national ICU registry; 5 times more pregnant women than nonpregnant women of same age admitted for ventilation
Elshafeey et al ⁶	Egypt	17	1	ECMO (1/17)
Govind et al ⁷	United Kingdom	2 ^a	0	ECMO (1/2)
Hantoushzadeh et al ⁸	Iran	9	7	4 cases of IUFD (1 set of twins); 1 case of NND (twins); 3 cases of twins; 2 di-di twins via IVF; ARDS and MODS
Huang et al ⁹	China	3	0	1 case of twins
Liu et al ¹⁰	China	1	0	ECMO NND
Pierce-Williams et al ¹¹	United States	20	0	Mean BMI=34
Savasi et al ¹²	Italy	6	1	Increased BMI
Schnettler et al ¹³	United States	1	0	Mild myotonic dystrophy, bicuspid aortic valve, previous CVA
Taghizadieh et al ¹⁴	Iran	1	0	ATN
Vallejo et al ¹⁵	United States	1	1	BMI=30, MODS
Yan et al ¹⁶	China	8	0	—

ARDS, acute respiratory distress syndrome; ATN, acute tubular necrosis; BMI, body mass index; CVA, cerebrovascular accident; di-di, dichorionic diamniotic; ECMO, extracorporeal membrane oxygenation; ICU, intensive care unit; IUFD, intrauterine fetal demise; IVF, in vitro fertilization; MODS, multiple organ dysfunction syndrome; NND, neonatal demise; PE, pulmonary embolism; T2DM, type 2 diabetes.

^a Corresponding authors contacted to confirm data.

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COVID-19 during their study period; these studies were excluded from analyses if the authors did not respond to our request. CFR was calculated as the number of maternal deaths divided by the number of critically ill women, estimated with 95% confidence intervals (CIs) using a Huber-White sandwich estimator to account for within-study correlation.

RESULTS: Our search retrieved 541 articles, of which 15 described maternal outcomes in pregnant women with confirmed COVID-19 admitted to the ICU (Table). Of 85 reported cases, 11 women admitted to the ICU during pregnancy or within 1 week of delivery died, corresponding to a CFR of 12.9% (95% CI, 5.8–20.1). In addition, 7 of the 11 deaths were from a single report from Iran⁸; if this study is excluded, the CFR would be 5.3% (95% CI, 2.1–10.3). There was no difference in the management of the women in the latter study compared with other studies.

CONCLUSION: Previous reports have concluded that pregnant women were not at increased risk of critical disease compared with the general population of patients with COVID-19.¹⁰ In a recent study,¹⁷ the CFR of nonpregnant patients who were critically ill was 34.5% within 28 days. The CFR of pregnant women in our report was much lower even if the report from Iran was included. However, this does not take into account the fact that, in general, nonpregnant patients who were critically ill tended to be older and of male gender and have comorbid conditions compared with women of reproductive age.¹⁷ The CFR observed in critically ill pregnant women remains highly concerning. Knowledge of the maternal course of the disease and the degree of increased risk associated with pregnancy is vital in determining management of pregnant women with COVID-19, especially as we prepare for a potential second wave of infections. ■

Clara Nam Hee Kim, BSc
Faculty of Medicine
University of British Columbia
Vancouver, British Columbia, Canada

Jennifer Hutcheon, PhD
Julie van Schalkwyk, MD, FRCSC
Gerald Marquette, MD, FRCSC
Department of Obstetrics & Gynaecology
British Columbia Women's Hospital and Health Centre
University of British Columbia
4500 Oak St., C 420
Vancouver, British Columbia V6H3N1, Canada
skoll.marquette@shaw.ca

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