

Covid-19 in Pregnancy: Cases of Women Managed in the City of Douala-Cameroon

Bilkissou Moustapha^{1,2*}, Alphonse Nyong Ngalame^{1,3}, Charlotte Nguéfack Tchente^{2,4}, Frederic Victor Okala², Kingsley Ombaku⁵, Humphry Tatah Neng¹, Diane Kamdem¹, Ngo Batta Julie¹, Nkendo Sandrine¹, Darolles Mwadjie¹, Emile Telesphore Mboudou^{1,5}

¹Douala Gynaeco-Obstetric and Pediatric Hospital, Douala, Cameroon

²Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Douala, Cameroon

³Faculty of Health Sciences, University of Buea, Buea, Cameroon

⁴Douala General Hospital, Douala, Cameroon

⁵Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Yaounde, Cameroon

Email: *bilkissoumoustapha@yahoo.fr

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Abstract

Introduction: The SARS-COV-2 virus has been responsible for a health crisis in pregnancy, causing severe acute respiratory distress syndrome. Materno-foetal complications can be observed. Taking into account the materno-foetal risks associated with COVID-19 infection in pregnant women and the low sample size of the first publication in Cameroon, we considered it necessary to conduct an in-depth study on the maternal and foetal prognosis of this condition in pregnant women in three hospitals in Douala. **Materials and Methods:** We conducted a cross-sectional survey with retrospective data collection in the three state tertiary and reference hospitals in Douala (DGOPH, DGH and DLH) from November 1, 2021 to April 30 2022 after obtaining ethical and administrative clearances. All records of COVID-19 pregnant women confirmed by reverse transcription polymerase chain reaction (RT PCR) or COVID-19 rapid diagnostic test (COVID RDT) were included. The survey form contained socio-demographic data, clinical and para-clinical characteristics, management and materno-foetal outcome. SPSS.26 and Microsoft Excel 2016 software were used to analyze the data, and a logistic regression model was used to look for associations between the variables. **Results:** We found in total 96 files that met our inclusion criteria. The most represented sector of activity was the unemployed (44.46%). Patients with a secondary level of education constituted the majority with 47% (45). The main comorbidity found was diabetes (27.2%). The most frequent symptom was fever, found in 87 patients (90.1%). In our series, a chest CT scan was performed in 50 patients. Caesarean section was the most common mode of delivery (58.3%). We recorded 15.6% of maternal deaths, mainly in patients

admitted to intensive care. Factors associated with maternal death were: Maternal diabetes, high LDH and D-dimer levels, and 75% lung involvement on chest CT scan. Oxygen saturation > 94% on admission was a protective factor. Regarding fetal and neonatal outcomes, we registered 30.2% cases of prematurity, 32.3% cases of respiratory distress at birth and 24% neonatal deaths. Factors associated with neonatal death were temperature $\geq 38.5^{\circ}\text{C}$. **Conclusion:** At the end of the study, we can conclude that in pregnant women with COVID-19, fever is the main symptom, 1/3 are admitted to intensive care and caesarean section is the most common mode of delivery. The maternal death rate remains high, especially in diabetic patients admitted to intensive care with altered biological parameters. Fetal complications include prematurity and death.

Keywords

COVID-19, Clinical, Para-Clinical, Materno-Foetal Outcomes, Pregnant Women

1. Introduction

The SARS-CoV-2 pandemic is one of the deadliest pandemics in existence. The first case was diagnosed in December of 2019 in Wuhan, China, followed by the diagnosis of similar cases worldwide [1]. COVID-19 leads to severe acute respiratory syndrome caused by SARS-CoV-2 infection. In Africa, the first case of SARS-CoV-2 infection in pregnancy was reported in Egypt in February 2020 [2]. In Cameroon, a study done at the Douala Gynaeco-Obstetric and Pediatric Hospital from March 24th to July 24th 2020 revealed a 6% prevalence of COVID-19 among pregnant women [3]. In the UK, between the 1st of March and 14th of April 2020, the incidence of COVID-19 in pregnant women was 4.9% [4].

There are various opinions about the clinical manifestations of COVID-19 in pregnant women compared to the general population [5]. At the Douala Gynaeco-Obstetric and Pediatric Hospital, the most frequent symptoms were fever (27.4%), cough (21.5%), dyspnea (15.7%), asthenia (11.8%) and polyarthralgia (9.8%) [3]. However, the clinical diagnosis must be confirmed by laboratory testing for the virus. The gold standard test is the reverse transcription polymerase chain reaction (RT-PCR) test on a nasopharyngeal swab [6]. Rapid diagnostic tests (RDT) were used for mass screening when the gold standard test was not available. Chest CT scans showed frosted glass opacities classified as mild (25% lung parenchyma involvement), moderate (50%) or severe (75%) [7]. Treatment modalities varied from one hospital to another, as there is still no consensus on the management and this has been the subject of several discussions. Some maternal-fetal complications were described such as premature delivery, premature rupture of membranes, acute fetal distress and the risk of caesarean section [8]. Most studies report minor forms in pregnant women that can be managed as an

outpatient with symptomatic treatment [9]. To date, vertical transmission of this condition has not been established and no fetal pathology has been described in cases of covid-19 infection in pregnant women [10].

Also, taking into account the maternal-fetal risks of COVID-19 infection in pregnant women, the mutation of variants, the persistence of the pandemic and the low sample size of the first publication in Cameroon, we considered it important to carry out a much larger and in-depth study on the maternal and fetal prognosis of this condition in pregnant women in three reference hospitals in the city of Douala.

The goal of this study was to assess the maternal and foetal outcomes in COVID-19 infected pregnant women in three hospitals in the city of Douala.

2. Methods

2.1. Study Design

Cross sectional descriptive study with retrospective data collection.

2.2. Study Period

Two years, 1 month period from the 1st of March 2020 to the 30th of April 2022.

2.3. Study Framework

The study was multicentric in three hospitals in the city of Douala, two of which are Category I hospitals; Douala Gynaeco-Obstetric and Pediatric Hospital (DGOPH) and Douala General Hospital (DGH); and one category 2 hospital: Douala Laquintinie Hospital (DLH). These health facilities were chosen because of the large number of patients who use them (DGH and DLH). These hospitals have been designated as the main centers for the management of pregnant women infected with COVID-19 in the city of Douala.

2.4. Inclusion Criteria

All records of pregnant women who had confirmed COVID-19, confirmed by reverse transcription polymerase chain reaction (RT-PCR) test or COVID-19 rapid diagnostic test (COVID RDT).

2.5. Exclusion Criteria

All incomplete records of pregnant women with confirmed COVID-19.

2.6. Sampling

A consecutive and exhaustive sampling method was used. All files of pregnant women diagnosed positive to COVID-19 in the Obstetrics and Gynaecology units of the three study sites and eligible for the study were recruited.

2.7. Variables Studied

The survey form contained socio-demographic data, clinical and para-clinical

characteristics, management and materno-foetal outcome. SPSS.26 and Microsoft Excel 2016 software were used to analyze data. A logistic regression model was used to look for associations between variables.

2.8. Data Collection Tool

A questionnaire was designed, pretested and validated for the collection of data from the patient files. This questionnaire had all the variables described above and these data were used to fill the excel spreadsheet before analyses and interpretations.

2.9. Ethical Considerations

Ethical clearance was obtained from the institutional ethical committee of the University of Douala, and research authorization was acquired from the managers of hospitals where the study was carried out.

3. Results

During the study period, we identified 96 complete files of COVID-19 positive pregnant women out of a total of 4500 files of pregnant women consulted in the three hospitals. A prevalence of 2.3% was found, with a recruitment rate of 92.3%.

The mean age of the infected women was 31.72 ± 5.08 years with a median of 30 years. The most represented age group was 30 - 39 years. A secondary level of education was the most represented with a proportion of 46.9% (45). In our study, the most represented occupation was that of the unemployed, including pupils, students and housewives (45.8%). This was followed by the informal sector (29.2%) and then the formal sector (25.0%) (**Table 1**).

Table 1. Socio-demographic characteristics of our patients.

Variable	Frequency	Proportion
Age range (years)	n = 96	%
[20 - 30[37	38.40
[30 - 40[48	50.49
≥40	11	11.11
Profession	n = 96	%
Formal sector	24	25.0
Unemployed	44	45.8
Informal sector	28	29.2
Level of education	n = 96	%
Primary	11	11.5
Secondary	45	46.9
University	40	41.6

Monofetal pregnancies were the most represented with 89 cases (92.7%), followed by twin pregnancies with 6 cases (6.3%). The women were mostly in their third trimester of pregnancy (54 cases). In this series, 81 patients had co morbidities, with the most common being diabetes, 22 (27.2%), followed by HIV, 18 (22.2%). Eighty seven (87) of the patients were symptomatic (90.1%) and the most represented symptoms were fever 69 (71.9%), cough 65 (67.7%), dyspnea 63(65.6%), poly arthralgia 59 (61.5%), and asthenia 58 (60.4%) (**Table 2**).

Table 2. Clinical characteristics of our patients.

Variable	Frequency	Proportion
Trimester of pregnancy	n = 96	%
First	14	14.6
Second	28	29.2
Third	54	56.2
Type pregnancy	n = 96	%
Twin	6	6.3
Multiple	1	1.0
Monofetal	89	92.7
Co morbidities	n = 96	%
Diabetes	22	27.2
HTN	10	12.3
Asthma	5	6.2
Obesity	14	17.3
Renal disease	1	1.2
HIV	18	22.2
HBsAg positif	11	13.6
None	24	29.6
Others	5	6.2
Symptoms	n = 96	%
Asymptomatic	9	9.4
Fever	69	71.9
Anosmia	25	26
Ageusia	12	12.5
Cough	65	67.7
Headache	22	22.9
Dyspnea	47	49
Dysphagia	3	3.1
Rhinorhea	58	60.4
Polyarthralgia	63	65.6
Pelvic pain	59	61.5
Per-vaginal bleeding	18	18.8

CRP was positive in 90 (93.8%) of the 96 patients. D-dimer and LDH were elevated in 19 and 32 patients respectively.

Chest CT scan was requested in 50 patients with 16 (32.0%) of them having mild, 21 (42.0%) moderate and 13 (26.0%) severe lesions (**Table 3**).

Table 3. Biological and morphological characteristics of our patients.

Parameter	Frequency	Proportion (%)
White blood cells	n = 96	%
<1500	3	3.1
1500 - 10,000	22	22.9
>10,000	71	74.0
Neutrophiles		
<1500	0	0
1500 - 7000	62	64.6
>7000	34	35.4
Lymphocytes		
<1500	2	2.1
1500 - 4000	68	70.8
>4000	26	27.1
Anemia		
<7	2	2.1
7 - 10	77	80.2
>10	17	17.7
LDH	n = 54	%
<140	0	0
140 - 245	22	68.8
>245	32	31.2
CRP	n = 96	%
≤ 6	6	6.2
>6	90	93.8
D-Dimers	n = 38	%
<500	19	50
>500	19	50
Creatinine	n = 90	%
<7	5	5.6
7 - 10	48	53.3
>10	37	41.1
Urea	n = 91	%
<24	7	7.7
24 - 41	40	44
>41	44	48.3
% involvement of Chest CT scan	n = 50	%
25%	16	32
50%	21	42
75%	13	26

A total of 62 patients were managed as outpatients (64.6%) and 34 (35.4%) as intensive care patients, with caesarean deliveries being the most common route of delivery (58.3%). In all, 50% (48) of the 96 patients had premature rupture of membranes, 32.3% (31) had placental bleeding, 17.7% (17) had postpartum hemorrhage and 8.3% (8) had severe anemia. Worth noting that 10 of the 17 patients with postpartum hemorrhage had Sheehan's syndrome (58.8%) and 15 (15.6%) died. We found 30.2% (31) of premature babies, 32.3% of newborns had respiratory distress at birth and 23 newborns died (**Table 4**).

Diabetes; hyper leukocytosis with neutrophile and lymphocyte predominance; increased biological factors LDH and D Dimeres; 75% CT involvement as well as intensive care hospitalization were factors statistically and significantly associated with maternal death. A maternal oxygen saturation of >94% constituted a protective factor against fetal death (**Table 5**).

From **Table 5**, the following factors were significantly found associated with maternal death: Diabetes (OR x4), HIV infection, high LDH and D-dimer levels (OR x16), 75% lung involvement on chest CT scan (OR x6), C/S deliveries (OR 3x) and admission to the intensive care unit. On the contrary, Oxygen saturation > 94% on admission was found to be a protective factor against maternal mortality. On the other hand, factors associated with neonatal mortality were: temperature $\geq 38.5^{\circ}\text{C}$.

Table 4. Pregnancy and maternal-fetal outcomes.

Variable	Frequency	Proportion
Pregnancy outcome	n = 96	%
Vaginal delivery	31	32.00
Cesarean delivery	56	58.00
Spontaneous abortion	9	10.00
Complications of pregnancy	n = 96	%
Premature rupture of membranes	48	50
Placental bleeding	31	32.3
Post partum hemorrhage	17	17.7
Sheehan syndrome	10	10.4
Severe anemia	8	8.3
Foetal outcomes	n = 96	%
Life term delivery	46	47.9
Premature delivery	29	30.2
Respiratory distress	31	32.3
Neonatal infection	11	11.5
Death	23	24

Table 5. Factors associated with maternal and fetal mortality.

Variables	Dead, N (%)	Alive, N (%)	OR (CI)	p-value
Diabète				
Yes	7 (53.8)	15 (22.1)	4.122 (1.20 - 14.13)	0.024*
No	6 (46.2)	53 (77.9)	Ref.	Ref.
SO₂				
≤94	4 (28.6)	41 (64.1)	Ref.	Ref.
>94	10 (71.4)	23 (35.9)	0.224 (0.06 - 0.80)	0.021*
Neutrophiles				
<1500	0	0		
1500 - 7000	6 (40)	56 (69.1)	Ref.	Ref.
>7000	9 (60)	25 (30.9)	3.360 (1.08 - 10.46)	0.036*
LDH				
<140	0	0		
140 - 245	1 (20)	21 (77.8)	0.071 (0.01 - 0.77)	0.029*
>245	4 (80)	6 (22.2)	Ref.	Ref.
D-Dimères				
<500	1 (10)	18 (64.3)	Ref.	Ref.
>500	9 (90)	10 (35.7)	16.20 (1.79 - 147.07)	0.013*
Percentage of lung involvement				
75%	7 (58.3)	4 (13.8)	6.417 (1.09 - 37.74)	0.040*
25%	2 (16.7)	14 (48.3)	0.524 (0.07 - 3.70)	0.517
50%	3 (25)	11 (37.9)	Ref.	Ref.
Management				
Out patient	5 (33.3)	57 (70.4)	Ref.	Ref.
Intensive care unit	10 (66.7)	24 (29.6)	4.750 (1.47 - 15.38)	0.009*
HIV infection				
Yes	8 (42.1)	10 (16.1)	3.782 (1.22 - 11.76)	0.022*
No	11 (57.9)	52 (83.9)	Ref.	Ref.
SO₂				
≤94	15 (57.7)	5 (11.9)	Ref.	Ref.
>94	11 (42.3)	37 (88.1)	0.099 (0.03 - 0.33)	0.010*
Percentage involvement				
75%	9 (40.9)	2 (10.5)	1.80 (0.26 - 12.30)	0.549
25%	3 (13.6)	13 (68.4)	0.092 (0.02 - 0.52)	0.006*
50%	10 (45.5)	4 (21.1)	Ref.	Ref.
Mode of delivery				
Other	9 (18)	0 (0)	-	-
Cesarean section	20 (40)	10 (21.7)	3.333 (1.31 - 8.47)	0.011*
Instrumental delivery	0 (0)	1 (2.2)	-	-
Vaginal delivery	21 (42)	35 (76.1)	Ref.	Ref.

4. Discussion

We found a prevalence of 2.3% of COVID-19 among pregnant women with a recruitment rate of 92.3%. This result is different from the 6% prevalence found by Ngalame *et al.* in 2020 at the Douala Gynaeco-Obstetric and Pediatric Hospital (DGOPH) in 2020 [3]. This difference can be explained by the lack of control of the pandemic in its early stages which subsequently improved over time, hence this decrease in positive cases. In our study, the age of the patients varied between 22 and 43 years with an average of 31.72 ± 5.08 years. This average age is similar to that of 34 years found in the United Kingdom by Knight *et al.* [4]. The most represented age group was 30 - 39 years. It is identical to that obtained by Ngalame *et al.* at the Douala Gynaeco-Obstetric and Pediatric Hospital in 2020 [3].

The most represented sector of activity was that of the unemployed including pupils, students and housewives (44.46%). We justify this result by data in the literature which lists precariousness and promiscuity as risk factors for Covid 19 infection in pregnant women [11]. We found that 92.7% (89) of cases were singleton pregnancies and 56.25% (54) of infected pregnant women were in the third trimester of pregnancy at the time of diagnosis. These results are similar with most available data which demonstrate that pregnant women are mostly diagnosed in the third trimester of pregnancy [12] [13]. Li *et al.* in China in 2020 found 88.2% of monofetal pregnancies [13]. In our study, most of the infected patients (81) had numerous co-morbidities, the most frequent being diabetes (27.2%). Ngalame *et al.* (2020) had also found diabetes as the first comorbidity in pregnant women. This result is different from findings in Senegal in 2020 by Diouf *et al.* [12] who did not find any comorbidity associated with Covid 19 in pregnant women. This can be explained by the low sample size (9 patients) at the time of their study.

Symptoms were found in 87 patients (90.1%). Fever was the most common symptom (71.9%) followed by cough (67.7%). These results are consistent with those found in two cohort studies conducted by Knight *et al.* in the UK and Zaigham *et al.* in Sweden [4] [14]. However, they differ from those found in Senegal by Diouf *et al.* who reported headache as the main symptom [12]. Patients with elevated D-dimer, LDH, PT and aPTT were all between the moderate and severe phases of the disease. This result is the same as those found by Ngalame *et al.*, Yangli *et al.* and Dehan *et al.* in Cameroon and China [3] [15] [16].

Chest CT scans were requested in 50 patients and 16 (42.0%) of them showed mild lesions, 21 (42.0%) moderate lesions and 13 (26.0%) severe lesions. All 50 patients showed a CT image typical of COVID-19 pneumonia. These results give us the impression that pregnancy does not alter the appearance of CT scan lesions in COVID-19 and are similar to those found in two Chinese studies by Li *et al.* who found most patients with typical CT scan images [13].

Caesarean deliveries were the most common (58.3%) with maternal respiratory distress as the main indication. This result is similar to that found in a British multicentric study which found 59% of caesarean sections [14]. Ngalame *et*

al. found 62% of caesarean sections at the Douala Gynaeco-Obstetric and Pediatric Hospital in Cameroon [3], while Dehan *et al.* in China found 66.7% of caesarean sections [16].

In our study, we found 15.6% of maternal deaths, mainly in patients admitted in intensive care. These deaths can be explained by the presence of associated factors including diabetes, elevated D-dimer, LDH, lymphocytes and neutrophils. Our death rate is lower than that found in the United Kingdom by Knight *et al.* in 2020 who found 30% of maternal deaths in intensive care [6] but are different from zero deaths found by Zaigham and al [14], Li *et al.* [13] Yangli *et al.* [16] in Sweden and China. Their results can be explained by the small sample size at the time of the studies and the high level of care in their facilities. In our study, 50% (48) of the 96 patients had premature rupture of membranes and preterm labor. We obtained 24% of neonatal deaths with the main etiology being neonatal asphyxia (32.3%) and a high admission of patients to intensive care. This result is higher than the 22.8% of deaths found by Ngalame *et al.* in the Douala Gynaeco-Obstetric and Pediatric Hospital in 2020 [3]. Our result is different from those obtained by Li *et al.* and Dahan *et al.* in China who did not find any neonatal asphyxia or death [13] [15] in intensive care. Furthermore, we found 30.2% (29) of premature babies, which is higher than the 12% found by Li *et al.* in China in 2020 [13] and lower than the 44% reported by Chen *et al.* in China [17]. This high rate of prematurity was due to gestational complications such as premature rupture of membranes and placental bleeding. We found that an arterial oxygen saturation (SaO₂) > 94% is a protective factor against the occurrence of fetal death.

Despite our interesting findings, there are however some limitations of this study, such as; 1) The relatively shorter period of the study might introduce a selection bias, and 2) Selecting cases only from the three tertiary hospitals of Douala, excludes patients managed at lower health facilities, which take care of the majority of cases. This makes it difficult to generalize our findings.

5. Conclusion

Our study compliments that of Ngalame *et al.* at DGOPH (Cameroon) in 2020. It has the advantage that it allowed us to make an inventory of the socio-demographic, clinical, para-clinical management and maternal-fetal characteristics of COVID-19 infection in pregnant women. It was conducted in three hospitals and had a larger sample size. It identifies factors associated with maternal and fetal death and also protective factors.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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