Maternal mortality from COVID 19 among South African pregnant women

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ABSTRACT

Objective: To determine the COVID 19 related maternal deaths among South African pregnant women at Ekurhuleni health district in South Africa and to compare with similar studies.

Study design: Retrospective review of all maternal deaths from all health care facilities from April to September 2020 were conducted using COVID registers and maternity case records. Human Research Ethics Committee of the University of Witwatersrand approved the study. Data included total live births, maternal mortality ratio (MMR), age, ethnicity, place of admission, parity, pregnancy status, antenatal complications, gestational age (GA) at delivery, GA at COVID 19 diagnosis, GA at death, symptoms, comorbidity, investigations (HIV, platelets, lymphocytes and LDH), and fetal outcome. Descriptive statistics (mean ± standard deviation, number and percentages) were calculated.

Results: Six women died from COVID. All were African. Mean age was 33.5 (SD ± 4.3) years majority (83%) were multiparous. The mean GA at the time of diagnosis was 35 (± 5.8) weeks. All had dyspnea at presentation. All had hypertension. HIV rate (50%) was higher than the national rate. High lactic dehydrogenase was the commonest laboratory abnormality. Rate of macerated stillborn (66%) was very high.

Conclusion: To date, there are no African studies reporting on maternal mortality from COVID-19. This study provided valuable insight into maternal deaths due to COVID among South African women. COVID 19 is a novel cause of maternal death that has increased the death rate among South African pregnant women. Hypertensive women are at increased risk of death. They should be routinely tested for COVID. Women are at risk of death during the third trimester of pregnancy. High rate of stillborn is a concern. Decision to deliver earlier should be an option. High HIV rate and LDH count should alert health care workers to perform these tests among all COVID positive mothers.

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KEYWORDS
COVID 19; maternal mortality; Africa; pregnancy; fetal

Introduction

South Africa (SA) has the highest COVID 19 infection and death rate in Africa [1]. Ekurhuleni Health District (EHD) is located in Gauteng province in SA with a population of about 3.9 million [2]. District had 48,116 cases and 785 deaths by 30 September 2020 implicating the death rate of about 1.6% in general population [3]. During the pandemic, hospitals including tertiary, regional and district hospitals, community health centers (CHC) and primary health care clinics continued to provide comprehensive maternal health services including managing pregnant women who presented with COVID 19. EHD established three COVID isolation centers to help manage the pandemic in the district. All health facilities and COVID centers kept registers of COVID 19-related patient information in addition to the routine capturing of pregnancy-related information in maternity case records (MCR) which were kept in CHCs and hospitals after the women were discharged following delivery.

Case studies and reviews have reported COVID 19 related maternal deaths [4–6]. To date, there are no African studies reporting on maternal deaths resulting from COVID-19. This study aimed to determine COVID-19 related maternal deaths within the EHD, SA.

Methods

Retrospective reviews of all maternal deaths from April to September 2020 at the EHD were conducted using COVID registers and MCRS. Ethics clearance was obtained from the Human Research Ethics Committee of the University of Witwatersrand. Data included total...
Live births, maternal mortality ratio (MMR), age, ethnicity, place of admission, parity, pregnancy status, antenatal complications, gestational age (GA) at delivery, GA at COVID-19 diagnosis, GA at death, symptoms, comorbidity, investigations (platelets, lymphocytes and LDH), and neonatal outcome. HIV was included as recommended [7]. Investigations were not done for all women which was a limitation. Descriptive statistics (mean ± standard deviation, number and percentages) were calculated using Pass software (NCSS, Kayesville, UT, USA).

**Results**

A total of 103 pregnant women were COVID positive and six (6/103, 5.8%) died from it. Among maternal deaths, five were COVID positive. One was not tested. She died soon after arrival to the hospital, presenting with symptoms suggestive of COVID. The incidence of COVID-19 in pregnancy was 0.21% (103/48116). EHD had 33 maternal deaths (including COVID death) and 29,690 live births during the study period. The proportion of maternal deaths to total deaths in general population was 0.76% (6/785). The proportion of COVID-19 maternal deaths to total maternal deaths was (6/33) 18%. Overall MMR was 111. MMR due to non-COVID causes and COVID-19 was 91 and 20 respectively. All (100%) women were black African. Age and parity are described (Table 1).

All women were booked. Mean (± SD) gestational age (GA) at booking was 13.0 (± 3.0) weeks with a range of 9–17 weeks.

In terms of symptoms, five (83%) of the women presented and subsequently died in hospitals, presenting with symptoms of severe dyspnea and cough. The 6th patient initially presented with mild symptoms but progressed to severe dyspnea and died while at the CHC. Five (83%) and one (17%) women was antenatal and postpartum respectively at the time of diagnosis. The mean GA at the time of diagnosis was 35 (± 5.8) weeks among antenatal women. Three (50%) women had no co-morbidities and 1 had multiple co-morbidities (Table 1). All (6, 100%) women had an HIV test and three (50%) were HIV positive and the remaining three (50%) HIV negative (Table 1). There was only one antenatal complication in the form of preterm labor in one (33%) of the women. Three (50%) out of the six women died after delivery and all three had spontaneous vaginal delivery. Mean (± SD) GA at delivery was 37 (± 4.41) weeks. The mean (± SD) weight of the newborn was 2766.7 (± 813.8) grams. Two (67%) women delivered macerated stillborn and only one (33%) baby was born alive.

**Discussion**

The study was conducted mainly among Black Africans which reflected the population in the study area. Other studies included other ethnic population [6,8,9]. The proportion of maternal deaths to deaths in general population was higher than other studies [6,8]. MMR was not reported in other studies. Unlike other studies which were hospital based, the study population were from all levels of care and more reflective of the burden of COVID infection within the healthcare system. Inclusion of patients only from hospitals in other studies might raise a probability of including severely ill patients leading to an erroneous conclusion of high maternal mortality.

The incidence of COVID-19 in pregnancy was lower than other studies [9–10]. Majority of women were multiparous which was higher than other study conditions.

<table>
<thead>
<tr>
<th>Table 1. Age, parity and comorbidity (N = 6).</th>
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<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Parity</th>
<th>Comorbidity*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>33.5 (± 4.3)</td>
<td>Mean (SD) 1.3 (± 1)</td>
</tr>
<tr>
<td>Minimum</td>
<td>26</td>
<td>Minimum 0</td>
</tr>
<tr>
<td>Maximum</td>
<td>38</td>
<td>Maximum 3</td>
</tr>
<tr>
<td>Primigravidae N (%)</td>
<td>1 (17%)</td>
<td>P 1–3 N (%) 5 (83%)</td>
</tr>
<tr>
<td>Laboratory investigations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets (N = 4)</td>
<td>Mean (SD) 100 (± 46.4) × 10^9/liter</td>
<td>Mean (SD) 1.2 (± 0.5) × 10^9/liter</td>
</tr>
<tr>
<td>Lymphocyte (N = 4)</td>
<td>Mean (SD) 6.5 × 10^9/liter</td>
<td>Mean (SD) 755.3 (± 69.3)</td>
</tr>
<tr>
<td>LDH (N = 3)</td>
<td>Mean (SD) 166 × 10^9/liter</td>
<td>Mean (SD) 831 × 10^9/liter</td>
</tr>
<tr>
<td>Normal count N (%)</td>
<td>1 (25)</td>
<td>2 (50)</td>
</tr>
<tr>
<td>Low count N (%)</td>
<td>3 (75)</td>
<td>2 (50)</td>
</tr>
<tr>
<td>High count N (%)</td>
<td>0</td>
<td>3 (100)</td>
</tr>
</tbody>
</table>

*One woman had combined PIH and Diabetes.

Platelet count of less than 150 × 10^9/liter was used to diagnose thrombocytopenia.

Lymphocyte count of less than 1 × 10^9/liter was used to diagnose lymphocytopenia.

LDH count of more than 400 U/liter was used to diagnose high LDH count.
The most common co-morbidity was hypertension followed by Diabetes mellitus. None of the women were asthmatic or obese which were commonly reported co-morbidities in other studies [6, 9, 11]. Other studies included hypothyroidism and advanced maternal age as co-morbidities which may not have any relevance for COVID-19 and falsely raising co-morbidity rate [6]. About 50% women were HIV positive which was higher than national HIV rate (30%) of SA [12]. The incidence of thrombocytopenia and lymphocytopenia was high and this was in keeping with other studies [6]. High LDH was the commonest laboratory abnormality observed. Other studies did not report HIV and LDH. The only antenatal complication was preterm labor occurring to one woman which was much lower than that (57%) of other study [6]. Unlike similar study [6] where majority of women delivered by cesarean section, women in this study had normal vaginal delivery. The incidence of MSB was much higher than reported in other study [6].

In conclusion, this study provided valuable insight into maternal deaths due to COVID among South African women. COVID-19 is an important cause of maternal deaths which has increased the death rate among South African pregnant women. COVID positive pregnant women with hypertension and diabetes mellitus are at increased risk of death. This was a similar finding among COVID positive general population in South Africa [13]. These group of women should be routinely tested for COVID. The third trimester of pregnancy confers an increased risk of dying. The reason for this is currently not clear. Although the numbers were small, the high rate of stillborn reported in this study is a cause of concern that needs further investigation. Aggressive fetal monitoring and early delivery might prevent this tragedy. It is not clear whether the HIV infection and high LDH level is prognostic of the severity or disease progression. It might be beneficial to perform these tests in the current situation among all COVID positive mothers in order to determine any association for future patients.

Acknowledgments

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Disclosure statement

No potential conflict of interest was reported by the author(s).

References