

Estimating risk factors for maternal death, stillbirth, and low birth weight amongst high-risk pregnant women: retrospective cohort, Port-au-Prince, Haiti



J Schuurmans<sup>1</sup>, E Borgundvaag<sup>1</sup>, P Finaldi<sup>1</sup>, R Senat-Delva<sup>1</sup>, F Desauguste<sup>1</sup>, C Badjo<sup>1</sup>, M Lekkerkerker<sup>2</sup>, R Grandpierre<sup>3</sup>, G Lerebours<sup>4</sup>, C Ariti<sup>5</sup>, A Lenglet<sup>2</sup>

<sup>1</sup>Médecins Sans Frontières (MSF), Port-au-Prince, Haiti; <sup>2</sup>MSF, Amsterdam, The Netherlands; <sup>3</sup>Ministère de la Santé Publique et de la Population, Port-au-Prince, Haiti; <sup>4</sup>National Bioethics Committee, Port-au-Prince, Haiti; <sup>5</sup>Centre for Trials Research, Cardiff, UK

Background

- Haiti: poorest country in Caribbean and highest maternal and neonatal mortality in the Western hemisphere.
- High prevalence of (pre-) eclampsia and poor uptake of antenatal care (ANC).
- Between 2011 – 2018, MSF operated CRUO in Port-au-Prince, an obstetric emergency hospital and neonatal care unit, targeting women with high-risk pregnancies.
- Limited evidence around negative maternal and neonatal outcomes in Haitian women and their offspring.

Aim

- Examine risk factors for maternal death, stillbirth and low birthweight.
- To inform healthcare policies to mitigate risk factors.

Results

Descriptive analysis	Maternal death	Stillbirth	Low birthweight
<ul style="list-style-type: none"><li>Inclusion of 31,509 women and 24,983 deliveries.</li><li>204 (0.6%) maternal deaths (648 per 100,000 women giving birth).</li><li>1,962 (7.9%) stillbirths.</li><li>11,008 (44.1%) low birthweight neonates.</li><li>34.9% of all admissions (n=10,991) were women with pre-eclampsia.</li></ul>	<ul style="list-style-type: none"><li>More likely when undergoing a C-section compared to women with a normal vaginal delivery in complicated pregnancies and (pre-) eclampsia (Table 1).</li></ul>	<ul style="list-style-type: none"><li>More likely in women ≥35 years in complicated pregnancies and (pre-) eclampsia (Table 1).</li><li>Reduced risk in women having C-sections in complicated pregnancies and (pre-) eclampsia.</li><li>Not attending ANC was a risk factor in women with a complicated pregnancy.</li></ul>	<ul style="list-style-type: none"><li>Lower risk in women &lt;20 years when they experienced (pre-) eclampsia (Table 1).</li><li>Multiple pregnancy was a risk factor in women with a complicated pregnancy and women with (pre-) eclampsia.</li><li>Not attending ANC was a risk factor in women with a complicated pregnancy.</li></ul>

Risk factor	Maternal death						Stillbirth						Low birthweight					
	Complicated pregnancy/delivery			(Pre-) eclampsia			Complicated pregnancy/delivery			(Pre-) eclampsia			Complicated pregnancy/delivery			(Pre-) eclampsia		
	Deaths	Multivariate analysis		Deaths	Multivariate analysis		Stillbirth	Multivariate analysis		Stillbirth	Multivariate analysis		LBW	Multivariate analysis		LBW	Multivariate analysis	
	85 (0.6%)	OR (95%CI)	p	119 (1.1%)	OR (95%CI)	p	896 (9.3%)	OR (95%CI)		1,033 (10.0%)	OR (95%CI)	p	4,992 (50.8%)	OR (95%CI)	p	6,016 (58.6%)	OR (95%CI)	p
Age Group									<0.001			<0.001			0.07			<0.001
<20	4 (0.3%)	*		11 (1.0%)	*		71 (7.5%)	0.78 (0.60 - 1.01)		67 (6.7%)	0.74 (0.57 - 0.97)		512 (54.2%)	1.22 (1.06 - 1.40)		504 (50.7%)	0.73 (0.63 - 0.83)	
20-34	58 (0.5%)	reference		87 (1.2%)	reference		628 (9.1%)	reference		640 (9.3%)	reference		3,472 (50.3%)	reference		4,053 (59.2%)	reference	
≥35	23 (0.7%)	*		21 (0.8%)	*		230 (11.6%)	1.31 (1.12 - 1.55)		326 (13.4%)	1.43 (1.24 - 1.65)		1,008 (50.9%)	1.04 (0.94 - 1.15)		1,459 (60.0%)	1.04 (0.95 - 1.14)	
Multiple pregnancy															<0.001			<0.001
Singleton	28 (0.3%)	reference		81 (0.8%)	reference		884 (9.4%)	reference		1,001 (10.1%)	reference		4,617 (49.3%)	reference		5,668 (57.4%)	reference	
Multiple	2 (0.4%)	*		7 (1.8%)	*		45 (10.0%)	*		32 (8.1%)	*		375 (83.0%)	5.09 (3.97 - 6.53)		348 (99.6%)	5.68 (4.15 - 7.77)	
Delivery procedure			0.003			<0.001			<0.001			<0.001						
Normal vaginal	4 (0.1%)	reference		28 (0.5%)	reference		444 (10.9%)	reference		759 (14.4%)	reference							
Complicated non-instrumental	1 (0.3%)	2.73 (0.30 – 24.46)		0 (0.0%)	*No maternal deaths		49 (13.1%)	1.20 (0.87 - 1.65)		52 (26.5%)	2.11 (1.52 - 2.93)							
Instrumental vaginal	0 (0.0%)	*No maternal deaths		0 (0.0%)	*No maternal deaths		1 (3.6%)	0.30 (0.04 - 2.21)		4 (12.1%)	0.80 (0.28 - 2.28)							
Caesarean section	25 (0.5%)	4.78 (1.66 – 13.76)		60 (1.2%)	2.36 (1.51 – 3.71)		435 (8.1%)	0.71 (0.62 - 0.83)		218 (4.5%)	0.29 (0.25 - 0.34)							
Ante-natal care									<0.001			<0.001			0.02			
Yes	78 (0.6%)	reference		113 (1.1%)	reference		865 (9.05)	reference		1,003 (10.0%)	reference		4,876 (50.7%)	reference		5,867 (58.5%)	reference	
No	7 (0.4%)	*		6 (2.1%)	*		64 (31.8%)	4.82 (3.55 - 6.55)		30 (12.2%)	*		116 (58.8%)	1.40 (1.05 - 1.86)		149 (60.8%)	*	

Table 1. Multivariate risk factors for maternal death, stillbirth and low birthweight

\* Not maintained in the final multivariate model

Conclusion

- Women with (pre-)eclampsia have the highest risk of maternal death, stillbirth and low birthweight neonates in urban Haiti.
- Attendance of ANC services is associated with a decrease in adverse neonatal outcomes and can prevent and treat pregnancy complications, especially in a context with high rates of (pre-) eclampsia such as Haiti.
- We advocate for improved access to maternal and neonatal healthcare facilities in Port-au-Prince.

Methods

- Retrospective cohort study on pregnant women admitted to CRUO and their neonates.
- Estimating associated risk between maternal death, stillbirth, low birthweight and:
  - Age group
  - Singleton vs. multiple pregnancy
  - Delivery procedure
  - Antenatal care services
- Risk factors assessed in two maternal groups:
  - Women with a complicated pregnancy and/or delivery (excluding (pre-) eclampsia
  - Women with (pre-) eclampsia
- Calculating odds ratios (ORs) and their 95% confidence intervals (CI) using univariate and multivariate logistic regression.

Acknowledgements

We thank Médecins Sans Frontières, the ‘Ministère de la Santé Publique et de la Population’ (MSPP) and the National Bioethics Committee for their support of this research. We also thank the CRUO hospital staff involved in data collection for their dedication and hard work.

