

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



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

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) p	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															
<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															
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											
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															
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.

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