



Impact of the contraceptive implant on maternal and neonatal health in a rural population on Karkar Island, Papua New Guinea

AUTHORS: Gupta, S¹, Ramsay, P¹, Mola, G², McGeegan K², Bolnga J³, Kelly-Hanku A⁴ & Black K¹.

¹ Department of Perinatal and Women's Health, The University of Sydney, NSW, Australia | ² Department of Obstetrics and Gynaecology, Port Moresby General Hospital, Port Moresby, Papua New Guinea | ³ Department of Obstetrics and Gynaecology, Madang General Hospital, Madang, Papua New Guinea
⁴ Institute of Medical Research, Goroka, Papua New Guinea | Contact: Dr Sarika Gupta, email: sarika.gupta@traamee.ranzog.edu.au



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Background

Contraceptive prevalence is lowest throughout rural Papua New Guinea where maternal morbidity and mortality remain high^{1,2}. Since 2012, community outreach programs have inserted 3527 levonorgestrel (150mg) sub-dermal contraceptive implants amongst women in a rural population on Karkar Island³.

Objectives

We aimed to investigate the impact the implant program had on maternal characteristics and perinatal outcomes in a large, rural and isolated population in Papua New Guinea.

Methods

We used a retrospective observational cohort study to compare birth record data for all births (>20 weeks) occurring between 2010-2012 (pre-implant) and 2014-2016 (post-implant). Data were collected from three sites where over 2/3 of all deliveries on the island occur.

Primary outcomes compared the crude birth rate, the maternal morbidity (severe haemorrhage necessitating hysterectomy or ≥5 units of packed cell transfusion, peri-partum infection necessitating intravenous anti-biotics or need for readmission), the neonatal morbidity (low birth weight <2500g and prematurity <37 weeks gestation) and maternal and neonatal mortality rates.

Secondary outcomes compared the number of women between the pre and post implant period who birthed with inter-pregnancy interval <12 months and high order parity (≥4). Interrupted time series analysis using segmented regression was used to assess whether trends in birth outcomes on Karkar changed after introduction of the contraceptive implant.

Results

Table 1: Demographic data and population estimates for Karkar island 2010—2016 using facility recorded births and expected numbers of unsupervised births.

	Pre-implant (2010—2012)	Post-implant (2014—2016)	P value
Total births (recorded + estimated)	2783	1679	0.003**
Crude birth rate	50.9	27.9	<0.0001**
Total fertility rate	4.4	2.1	0.003**
Mean age in yrs (maternal)	25-34	25-37	0.883
Mean parity	2.48	1.36	0.034*
Mean gestation at birth (weeks)	36.51	37.12	<0.0001**
Mean inter-pregnancy interval (months) for parity ≥1	12.35	14.02	<0.0001**
Mode of delivery (%)			0.284
Vaginal	88.5	89.5	
Instrumental	6.8	6.9	
Caesarean	4.6	3.5	

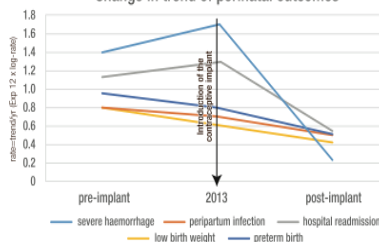
CBR= crude birth rate = (number live births/estimated population at mid-year) x 1000; expressed per 1000 population; ASFR= number of live births to women in specified age group/number of women in same age group x 1000; TFR=total fertility rate= sum of ASFR x 5; expressed per woman; * P<0.05, ** P<0.01

Table 2: Average rate reductions for perinatal outcomes and maternal characteristics pre and post implant

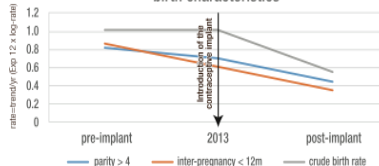
	Avg rate reduction pre and post implant (%)	P value
Morbidity		
Severe haemorrhage	88	<0.0001**
Peripartum infection	66	<0.0001**
Hospital readmission	85	<0.0001**
Low birth weight (<2500g)	64	<0.0001**
Preterm birth (<37 weeks gestation)	63	<0.0001**
Mortality		
Maternal	64	0.416
Neonatal	54	0.131
Pregnancy Characteristics		
Parity ≥4	59	<0.0001**
Inter-pregnancy interval <12months	70	<0.0001**

* P<0.05, ** P<0.01

Change in trend of perinatal outcomes



Change in trend of crude birth rate and high risk birth characteristics



Conclusion

For any population, our study is the first to demonstrate that introduction of the contraceptive implant was associated with a significant reduction in maternal and neonatal morbidity and a reduction in the number of women with high risk pregnancy characteristics giving birth. Importantly, we observed that the crude birth rate, severe haemorrhage rate and hospital readmission rate began to decrease only after the device was introduced. For the remaining perinatal outcomes and high risk pregnancy characteristics, the rate of decline had commenced prior, but was significantly accelerated following introduction of the implant. Reductions in maternal and neonatal mortality did not reach significance due to the small total number of recorded deaths.

References: 1. Papua New Guinea Demographic and Health Survey 2006. National Statistics Office, Port Moresby; 2009. | 2. Bolnga J. Insights into maternal mortality in Madang Province, Papua New Guinea. *International Journal of Gynaecology and Obstetrics*, 123:127-2014. | 3. Gupta S, Mola G, Ramsay P, Bolnga J, Jenkin G, Stein W and Black K. Twelve month follow up of a contraceptive implant outreach service in rural Papua New Guinea. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, April 2017