CROI 2014 Poster 886

Lay Health Worker Support to Strengthen PMTCT: A Randomised Controlled Trial in South Africa

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Background

In South Africa, PMTCT services need to be strengthened to eliminate pediatric HIV by 2015. Lay health workers (LHWs) can play an important role in supporting the continuity of care in primary health care services in developing countries.

Methods

This pragmatic cluster randomised controlled trial assessed the effectiveness of LHWs in reducing missed opportunities in PMTCT services. The study was conducted in the Free State province, South Africa where HIV antenatal prevalence was estimated at 30% in 2011.

LHWs at 16 intervention clinics provided individual support to pregnant women accessing care, and they hosted in-facility health promotion sessions in the waiting room and external community-based events in shopping malls and taxi ranks, to raise PMTCT awareness. In the clinics with the intervention, LHWs followed up women individually to promote HIV testing and linkage to care. At each antenatal visit, women were offered a one-on-one meeting with a LHW, who provided information on managing HIV during pregnancy and postpartum. Sixteen control clinics offered standard PMTCT services.

Routine data on PMTCT cascade indicators (Table 1) were collected and verified against paper-based registers and clinical records at all sites, from April 2011 to March 2013. Monthly aggregated data were summed across 8 quarters and one-way analysis of variance (ANOVA) was used to test for differences in the mean of each quarter.

Multivariate logistic regression was used to model the effect of the intervention over time (months) for each PMTCT indicator separately. Clustering at the clinic level and correlation between measurements in the same clinic over time was allowed for in the model. The main outcome was PMTCT coverage, defined as the proportion of HIV-infected women who received prophylaxis or ART at delivery.

Table 1: PMTCT indicators collected to monitor LHW intervention

PMTCT indicator	Measurement	
	Numerator	Denominator
Antenatal HIV prevalence	All HIV+-positive pregnant women (excluding women who refused testing but including women who were already known to be HIV-positive)	All antenatal first visits
Antenatal first visit <20 weeks	Antenatal first visit <20 weeks	All antenatal first visits
Antenatal first HIV test	Antenatal clients tested for HIV	All antenatal clients eligible for HIV testing
Antenatal first CD4 test	Antenatal CD4 test completed (results returned)	All antenatal clients tested HIV-positive, including those of known HIV+ status (excluding those already on ART)
PMTCT coverage	Antenatal clients on the PMTCT programme (On AZT or ART)	All HIV-positive antenatal clients
Antenatal re-test at 32 weeks	Antenatal clients retested in current month	Antenatal clients tested HIV-negative3 months prior (assuming mean first visit at 20 weeks gestation)
Nevirapine in labour	Nevirapine given during labour	Antenatal clients on the PMTCT programme (excluding those on ART)
Nevirapine to infants within 72 hours	Nevirapine given to infants within 72 hours of birth (excluding those born before arrival)	Live births to HIV-positive women
Cotrimoxazole to infants ±6 weeks	Cotrimoxazole given to infants around 6 weeks	Number of Polymerase Chain Reactions (PCRs) done around 6 weeks
Positive PCR test	Total number of HIV-positive infant results	Total number of PCRs done around 6 weeks

Table 2: Mean PMTCT indicator outcomes per quarter, all sites (April 2011 – March 2013)

PMTCT indicator	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Q5 (%)	Q6 (%)	Q7 (%)	Q8 (%)
Antenatal HIV prevalence	26.5	26.8	28.3	27.6	26.7	25.2	29.7	28.0
First antenatal visit<20 weeks	42.7	43.3	46.2	46.4	51.5	54.0	53.3	52.2
Antenatal first HIV test	94.9	97.1	99.4	100.0	100.0	100.0	100.0	100.0
Antenatal first CD4 test	93.6	90.8	95.2	99.8	99.9	98.2	99.4	99.5
Antenatal retest at 32 weeks	-	47.6	42.2	47.0	42.4	52.1	52.0	56.1
PMTCT coverage	77.8	76.3	75.1	72.3	76.3	77.7	75.6	85.7
Cotrimoxazole given to infant within 6 weeks	95.9	96.0	100.0	99.3	100	99.9	100	99.0
Positive PCR test	2.2	2.4	1.8	1.9	2.2	2.3	1.0	1.9

Table 3: Logistic regression showing adjusted odds ratio for intervention and control sites and trend

PMTCT indicator	Intervention (reference)/Control		Time (months)	
	AOR	95% CI	AOR	95% CI
First antenatal visit <20 weeks	0.96	(0.80 - 1.13)	1.02	(1.01 - 1.03)
Antenatal first HIV test	0.88	(0.36 – 2.15)	1.44	(1.27-1.63)
Antenatal first CD4 test	0.71	(0.41 – 1.22)	1.17	(1.12 - 1.22)
Antenatal retest at 32 weeks	1.34	(1.01 – 1.77)	0.98	(0.96 – 1.00)
PMTCT coverage	1.12	(0.86 - 1.47)	1.02	(1.00 – 1.04)
Cotrimoxazole given to infant around 6 weeks	2.62	(0.92 – 7.41)	1.18	(1.08 – 1.28)
Positive PCR test	1.05	(0.69 - 1.61)	0.97	(0.02 – 0.06)

Results

There was a 10% increase overall in the proportion of antenatal first visits under 20 weeks gestation, from 43% to 52% (Table 2). By the end of the intervention period, all women were having an antenatal HIV test at presentation (Table 2). Similarly, trends in CD4 count testing increased over time from 93% to 99%, but this was not significantly different between intervention and control sites (AOR: 0.71, 95% CI: 0.41-1.22, Table 3). Table 3 shows that the odds of retesting at 32 weeks were significantly higher in the intervention sites (OR: 1.34, 95% CI: 1.01-1.77), yet this trend did not change much over time (OR: 0.98, 95% CI: 0.96 – 1.00).

There was an increased trend in PMTCT coverage across all sites, from 78% to 86% over the study period. The odds of PMTCT coverage was greater in the intervention sites, however, this outcome was not statistically significant (AOR: 1.12, 95% CI: 0.86-1.47), although the trend was significant (AOR: 1.06, 95% CI: 1.00-1.11, Table 3).

There was no significant difference between intervention and control clinics in the odds of cotrimoxazole being given to infants within 6 weeks (AOR: 2.62, 95% CI: 0.92-7.41, Table 3), but this indicator increased significantly over time when controlling for site (AOR: 1.18, 95% CI: 1.08-1.28, Table 3). The odds of a positive PCR result were higher in the intervention sites, but this was not significant (AOR: 1.05, 95% CI: 0.69-1.61, Table 3), yet the odds of a positive PCR test declined significantly over time (AOR: 0.97, 95% CI: 0.02-0.06, Table 3).

Conclusion

Overall, PMTCT coverage improved from 78% to 86% during our study, although there was no significant difference between intervention and control sites. The greater 32 week re-testing rate in the intervention sites suggests that LHWs positively influenced continuity of care. During our study, PMTCT policy became a national priority, and by increasing eligibility for ART and providing NIMART and outreach services to antenatal services, it is possible that combined with the unexpectedly high baseline rates, the study was under-powered to detect differences in the main outcome.

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CMT was funded for this project by the Monument Trust and USAID / PEPFAR through Johns Hopkins Health and Education in South Africa.

The University of Cape Town was funded for this project by Foreign Affairs, Trade and Development, Canada.