

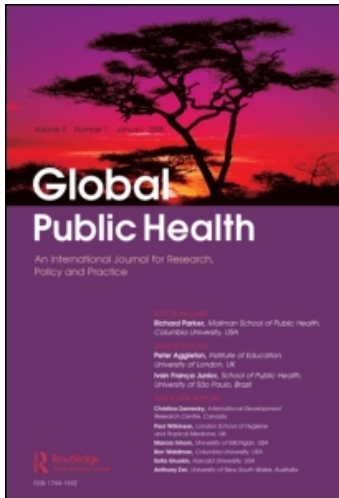
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Integrating quality postnatal care into PMTCT in Swaziland

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Swaziland's prevention of mother-to-child transmission (PMTCT) programme is linked to maternal and newborn health (MNH) services, but is mainly focussed on HIV/AIDS. Existing MNH services are inadequate, especially postnatal care (PNC) of mothers and babies, with delayed postnatal visits occurring at 4–6 weeks after delivery. Fifty-seven percent of staff in seven Swazi health facilities were trained in promoting and providing early PNC. A final evaluation showed a 20-fold increase in the number of visits coming for an early postnatal visit (within the first three days after birth). A direct observation of the client–provider interaction showed a significant increase in the competence of the health workers related to postnatal examinations, and care of mothers and babies ($p < 0.05$ – < 0.01). The percentage of women breastfeeding within one hour of delivery increased by 41% in HIV-positive mothers and 52% in HIV-negative mothers. Cotrimoxazole prophylaxis for HIV-exposed infants increased by 24%. Although, health workers were observed providing counselling, maternal recall of messages was deficient, suggesting the need for additional strategies for promoting healthy behaviours. High-quality integrated PMTCT programmes and MNH postnatal services are feasible and acceptable, and can result in promoting early postnatal visits and improved care of both HIV-positive and HIV-negative mothers and their babies.

Keywords: integrated PMTCT and MNH care; postnatal; Swaziland

Introduction

Swaziland is a land-locked country located in Southern Africa between Mozambique and South Africa. With an area of 17,363 sq km, the country is divided into four administrative regions (Hhohho, Manzini, Lubombo, and Shiselweni), mostly comprised of mountains and hills, and has a total population of about 1,200,000.

The country has one of the highest rates of HIV infection in the world. Pregnant women and their children are most vulnerable to the pandemic. An estimated 39% of pregnant women are HIV-positive, giving birth to 17,000 HIV-exposed infants each year (Swaziland DHS 2007).

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Since 2003, the Ministry of Health and Social Welfare (MOHSW), in partnership with the Elizabeth Glaser Paediatric AIDS Foundation (EGPAF), has made significant progress in scaling up national programmes for the prevention of mother-to-child transmission (PMTCT) of HIV. Because 97% of all pregnant women in the country seek antenatal care (ANC) at least once, integrated ANC and PMTCT services provide an entry point for HIV testing and promotion of prophylaxis with antiretrovirals (ARV) for seropositive women during the last trimester of pregnancy and early labour, as well as for their infants after birth.

However, one of the main challenges for PMTCT programmes is follow-up, care and support of mothers and infants after delivery, which is the fourth prong of the World Health Organisation (WHO) PMTCT strategy (UNICEF, 2009).

In most countries, PMTCT programmes are linked with existing maternal and newborn services. However, they tend to remain vertical, focussing on HIV and AIDS. In many developing countries, routine maternal and newborn health (MNH) services are inadequate, especially those related to the postnatal care (PNC) of mothers and babies.

Very little attention has been given to the postnatal period, especially the first few days, which is the most vulnerable time for mothers and infants. Seventy-five percent of newborn deaths occur in the first week after birth, with 50% occurring in the first 24 hours (Lawn *et al.* 2005). After the first week, deaths are far fewer and more evenly spread in the last three weeks. Therefore, while it would be ideal to have an additional visit in the second week, in view of all the constraints, the priority should be on the first week, mainly on the first 2–3 days after birth. Moreover, there is new evidence suggesting that the biggest impact on neonatal mortality is achieved when the newborn is evaluated within the first two days after birth (Baqui and Wall, e-mail to author, 4 November 2008). Over 60% of maternal deaths also happen within 48 hours of childbirth (Lewis 2004). The estimated neonatal mortality rate and maternal mortality ratio in 2000 in Swaziland were 38/1000 live births (UNICEF 2008) and 370/100,000 live births (WHO 2007), respectively. In Swaziland, puerperal women and their babies are discharged early, usually within 12 hours of delivery. In other countries in the region, mothers and their babies may go home even earlier (some within two hours) and may also not be properly evaluated and counselled at the time of discharge. In addition, the conventional recommendation in these countries for the first postnatal visit is at 4–6 weeks, by which time the vulnerable neonatal period of four weeks with its high mortality is over, and most of postpartum maternal deaths have already taken place.

Recognising the need to improve the care and follow-up of all mothers and infants in the postnatal period, the Swaziland MOHSW, with support from the Horizons Programme of Population Council, Elizabeth Glaser Pediatric AIDS Foundation (EGPAF), the United States Agency for International Development with the Institutionalising Basic Support for Child Survival Project (USAID/BASICS) and the Swaziland Central Statistics Office (CSO), carried out an operations research project to reposition PNC within the context of a high-HIV environment. The objectives of the study were to determine if provision of timely and improved quality reproductive MNH services in the much neglected postnatal period would result in increased utilisation of postnatal services, and improve the care and follow-up of HIV-positive postpartum women and their infants.

Methods

Study design

The operations research used a quasi-experimental pre–post-test design to evaluate the effectiveness of the new PNC services. Since the postnatal visit within one week after delivery did not exist anywhere in the country at the pre-intervention phase, conclusions following the introduction of the new timing of PNC could be drawn using this methodology. The study population comprised of pregnant and newly delivered postpartum women attending ANC and postnatal clinics at selected health facilities. The pre- and post-intervention assessments were cross sectional, and quantitative data were collected from seven purposefully selected sites that were the only sites providing comprehensive PMTCT services supported by MOHSW and EGPAF in 2006. These services included all the components of the four prongs of PMTCT including the diagnosis in HIV-exposed infants (at the time of the study it was serologic at 18 months, currently it includes DNA polymerase chain reaction (PCR)). The sites included three hospitals: Raleigh Fitkin Memorial (RFM) Hospital, Mankayane Government Hospital and Mbabane Government Hospital and four Public Health/Maternal and Child Health (MCH) Units: the King Sobhuza II, and the RFM, Mbabane and Mankayane Clinics. Over 50% of the total population of the country (about 550,000) resides in the areas covered by these facilities (Swaziland High Commission of Ottawa, n.d.).

The intervention was a pilot project based on the request of the MOHSW to focus initially on facilities due to the fact that 75% of deliveries in Swaziland are facility based (Swaziland DHS 2007). Of those deliveries, 88% take place in the above mentioned sites (estimated 12,000 per year). Thus, the study sample was drawn from a large proportion of pregnant and postpartum women in Swaziland. Based on existing country data, 39% of these women were estimated to be HIV-positive (Swaziland DHS 2007). The MOHSW wanted to ascertain that the follow-up of HIV-positive women and their exposed babies after delivery was effective, and to ensure that these were linked to improved quality MNH services existing in these facilities.

To guide the design of the intervention, the MOHSW facilitated field visits by partners to identify current practices at health facilities including the organisational set up of MNH, PMTCT, and family planning services. Discussions with health managers and partners took place to identify key issues related to PNC. Health providers were consulted in order to understand their views about revising the postnatal visit. At pilot study sites, discussions took place with community groups – such as community health workers (rural health motivators) and pregnant and postpartum women – about the acceptability of and potential obstacles to early postnatal visits. The proposal was developed in consensus with the MOHSW and USAID/RHAP (Regional HIV and AIDS Programme) and granted ethical approval by the appropriate section in the MOHSW and the Population Council ethical review process.

Data collection

Baseline data were collected in February and March 2006, and endline data, in May 2007. The following different approaches were used: (a) interviews with

postpartum women and health providers; (b) direct observation of client–provider interactions in antenatal clinics, maternity wards and postnatal clinics; and (c) facility assessments with emphasis on existing resources, gaps and potential organisational changes required to provide appropriate care at postnatal visits.

With the assistance of the MOHSW, 20 data collectors, including nurses, midwives and research assistants were recruited and trained over a period of one week. The research tools were pre-tested, and appropriate changes were incorporated. The client questionnaire was also translated into Siswati. Informed consent was obtained from all respondents, who were assured that the information would be confidential. Supervisors checked all completed questionnaires for data quality and accuracy.

Data collection tools

Table 1 summarises the data collection instruments, and sample sizes used for the baseline and endline evaluations.

Sample size

In the absence of relevant data, the sample size was determined using monitoring data collected at the selected sites. The key indicators for determining sample size were: (a) number of women scheduling for first ANC visit; and (b) child immunisations at six weeks.

Data entry

Data were entered using Epi Info 6.04 and later converted to SPSS 12.0 for analysis. Pearson's Chi square tests were used to determine the significance of differences between the pre- and post-intervention results. A *p*-value of less than 0.05 was used as the threshold for significance.

Table 1. Summary of instruments used and sample sizes for baseline and end line.

Name of instrument	Required minimum sample size	Baseline	End line
Postnatal clinic exit interview (1–10 weeks after delivery)	300	356	346
HIV-positive	120 (30 from each site)	114	136
HIV-negative	180 (45 from each site)	162	191
Unknown status ^a		73	19
Postnatal ward client exit interview (within 24 hours)	60 (20 from each site)	–	94
Provider interview	50 (12 from each site)	54	35
Postnatal clinic observation	48 (12 from each site)	57	117
Maternity ward observation	60 (20 from each site)	61	62
Facility evaluation tool (three public health units, one maternal and child health clinic, and three maternities)	7	7	7

^aPostpartum women were interviewed as they left the facility.

Composite scores

In a number of instances, data were drawn from the client–provider observation tool, and mean scores were computed for each indicator and then aggregated across all indicators to give the composite score for quality of MNH care.

Likewise, data were also drawn from the provider interview, and mean scores were computed to give a composite score for knowledge. This method was used to demonstrate overall improvements in care and knowledge rather than focussing on individual elements.

Socio-demographics and characteristics of the facilities*Providers*

Of a total sample of 54 providers, the majority were female at baseline and endline (94 and 93%), and consisted mostly of registered nurse midwives (59 and 87% at baseline and endline, respectively). Others were nurses with varying levels of training. Fifty percentage of providers at baseline and 57% at endline had worked at their facility between one and three years.

Clients

Table 2 shows the demographic information of clients interviewed at the postnatal clinic at both baseline and endline by HIV status. In both the baseline and endline, and in both the HIV-positive and HIV-negative groups, 60–68% of women were 20–29 years of age. Significantly fewer women were cohabiting and significantly more women had completed secondary education or above.

Facilities

Prior to the intervention, the study sought to assess the availability and functioning of the basic infrastructure necessary for offering quality services even though the MOHSW could not improve some items (such as number of consulting rooms and some equipment) within the intervention period. An inventory checklist was used to generate a mean preparedness score for each facility to see how well equipped they were to provide ANC and PNC. Table 3 shows the availability of the key components.

All pilot facilities generally had the capacity to provide PNC. In general, rooms, equipment, medicines and supplies were available. The pre-intervention system did not encourage early PNC because it was only available separately for family planning (for women) and immunisations (for infants, six weeks after delivery). ANC services constituted a poor model for PNC due to the long hours pregnant women would spend at the facility as they went through multiple contacts.

Intervention

USAID/BASICS provided technical assistance to the MOHSW for implementing the intervention that was designed to provide improved quality PNC. This included

Table 2. Percentage distribution of postnatal mothers interviewed attending postnatal care at the time of the survey by demographic characteristics and HIV status.

	HIV-positive postnatal mothers			HIV-negative postnatal mothers		
	Baseline (<i>N</i> = 114)	End-line (<i>N</i> = 136)	<i>p</i> -Value	Baseline (<i>N</i> = 162)	End line (<i>N</i> = 191)	<i>p</i> -Value
Age						
15–19 years	16%	10%	0.138	21%	21%	0.913
20–24 years	32%	35%	0.727	37%	36%	0.860
25–29 years	32%	33%	0.801	21%	24%	0.565
30 years and older	20%	23%	0.618	21%	19%	0.617
Marital status						
Married	39%	43%	0.296	46%	51%	0.293
Cohabiting	22%	13%	0.047*	17%	11%	0.089
Single/other	41%	44%	0.647	37%	38%	0.899
Education						
Primary or lower	39%	30%	0.123	37%	27%*	0.037*
Incomplete secondary	46%	49%	0.647	36%	36%	0.969
Completed secondary or above	15%	21%	0.194	27%	38%*	0.036*

**p* < 0.05.

the integration of selected aspects of basic care for mothers and babies with HIV and AIDS services.

The intervention package was developed based on discussions with the MOHSW, site visits to the selected hospitals and clinics, EGPAF project reports and the baseline assessment. Health workers had previously received training on some elements of maternal health and family planning. Thus, based on gaps identified in the baseline assessment and due to constraints on time and budget, the package focussed on selected elements of PNC for women and essential newborn care. These included:

Table 3. Summary of health facilities' preparedness at baseline using the facility evaluation tool – distribution of the average score indices for training, services offered, equipment and drugs available.

Indices for key areas	Average score (<i>N</i> = 7)	Average score (<i>N</i> = 3)	Average score (<i>N</i> = 4)
(1) In-service staff training (0–23)	19.14	18.67	19.50
(2) Services offered (0–13)	10.14	7.33	12.25
(3) Equipment available (0–10)	9.14	8.67	9.50
(4) Drugs/vaccinations (0–21)	14.29	11.33	16.50

1. Immediate care after birth (within the first six hours after delivery).
2. Assessment and examination at least once a day during stay in the facility.
3. Assessment, care and counselling at discharge from the facility including provision of a specific appointment for first postnatal visit.
4. Postnatal visits:
 - a. Timing: The recommendations of the MOHSW included a first visit at one week and a second visit at 4–6 weeks. Advocacy was carried out to promote visits within the first three days of delivery and subsequent visits based on the requirements of the mother and baby, with a final visit between four and six weeks.
 - b. Content:
 - i. Selected aspects of maternal health and family planning, and essential newborn care (Narayanan *et al.* 2004a).
 - ii. Counselling on key aspects of preventive care at home, identification of danger signs and appropriate care seeking for the mother and the baby. In this preliminary phase counselling was carried out verbally without the support of visual aids such as counselling cards.
 - iii. Review of selected elements related to HIV and AIDS.

The implementation of the intervention package focussed on three key strategies: (a) capacity building of trainers, supervisors and health providers; (b) activities to facilitate organisational changes; and (c) supportive supervision, and monitoring and evaluation.

In order to maintain continuity and quality, the approach used for capacity building was a modified cascade method. Selected members of the trainers-of-trainers group continued to be involved in the capacity building of health workers in subsequent workshops together with the USAID/BASICS trainers to avoid some of the challenges of the cascade system. Due to the short duration of the intervention, while selected elements of service delivery such as some aspects of ANC, labour and delivery, family planning, PMTCT and HIV and AIDS care and treatment were included, the focus on this phase of the intervention was on components of essential newborn care as they were the newest elements.

Table 4 shows the characteristics of the participants and the timings for the trainings. In addition to those providers from project pilot sites, the MOHSW invited selected health care providers from non-intervention sites to participate in the training in order to facilitate the expansion of the intervention at a later stage. An initial link with the community was established through orientation of the national trainers of the Rural Health Motivators, where their potential role in PNC was discussed. Similarly, advocacy was carried out to integrate these activities with improved child survival and paediatric HIV services. However, in this preliminary phase, based on the request of the MOHSW, activities were focussed at facility level where three quarters of the deliveries were taking place.

The organisational changes facilitated during the intervention were: (a) assigning a room where the mother and the baby could be evaluated and cared for together including provision of immunisations for the baby and family planning for the woman; (b) provision of basic equipment and supplies needed for the postnatal services; (c) improvement of client flow by shortening waiting time as a result of

Table 4. Participants and timing of PNC training.

Level	Participants	Dates of training	Number
Central level	<ul style="list-style-type: none"> • Reproductive health programme manager 	July 2006	24
MOHSW core group of trainers or supervisors from central and regional level	<ul style="list-style-type: none"> • PMTCT focal person • MOHSW focal person for adolescent health • community health supervisors • Health promotion unit: Health education coordinator • Regional health focal persons • Regional matrons • Clinic supervisors • <i>Intervention sites</i>: Senior staff (matrons/sisters in charge) • <i>Academic institutions</i>: School of Midwifery, University of Swaziland, Nazarene Nursing School, Good Shepherd Nursing School 		
Pilot sites	<ul style="list-style-type: none"> • midwives, nurses, nursing assistants and community health nurses (attached to the clinics and trainers of community health workers in their area) 	August–September 2006; October 2006; January 2007	81
Pilot sites	<ul style="list-style-type: none"> • Physicians 	September 2006	15
Regional	<ul style="list-style-type: none"> • RHM trainers (all regions) 	March 2007	12

providing various services in one place by a single health worker who attended to both mother and baby at the same time; and to some extent; (d) appropriate allocation and limited rotation of the trained staff. Advocacy meetings with authorities from the MOHSW took place to request equipment and supplies, and to limit staff rotation, which happened very often.

Monitoring and evaluation consisted of two major processes. The first included a baseline and endline evaluation noted under data collection; the second approach, facilitated by USAID/BASICS, was an ongoing monitoring of quality of care as a part of monthly supportive supervisory visits by national supervisors. The health providers were evaluated for their competence using pre-defined checklists of key tasks such as implementation of the pre-discharge package, counselling and content of the postnatal consultations. Gaps identified were strengthened by appropriate on the job mentoring. Relevant data from the clinics and hospital registers were also collected. Inputs were given to add necessary information to the MCH card and the registers which had incomplete data on PNC. However, this could be done only to a limited extent as tools had a strong bias towards documenting care related to PMTCT.

Results

As the data base was very large, this report focusses on the most representative results. These are based on the tools that evaluated knowledge and attitudes of mothers and providers (through interviews), utilisation of services by clients (hospital and clinic registers) and competencies and skills of providers (client-provider interaction observations with predefined supervisory checklists).

Capacity building

A total of 132 health providers (57% of the sites' staff) were trained in the postnatal package. One hundred percent of the providers trained were providing maternal and child health (MCH) services. Training of the sites' remaining staff was not possible due to other conflicting activities resulting in the postponement of training programmes. Nine workers were brought in by the MOHSW from non-intervention sites to facilitate later expansion of the intervention. Among the personnel that were not trained, 77% reported that information was shared with them by their trained colleagues.

Providers' knowledge on PNC was evaluated using a multiple choice questionnaire as part of pre- and post-tests during the training sessions. The test results obtained showed that providers' scores improved by 16% after training. Participants expressed satisfaction with the content, methods, and facilitators and commented that their expectations were met by the training.

Organisational changes

The staff organised physical space at hospitals and clinics to provide discharge and PNC, respectively. The staff repeatedly highlighted the lack of equipment as a barrier to initiate the new postnatal package of services. Although, there was a system in place to procure equipment, it was perceived as such a lengthy procedure that health care providers rarely put in a formal request through it. However, with advocacy and repeated mentoring during supervisory visits, the staff began to perceive that most of the equipment required such as sphygmomanometers, weighing scales, and thermometers and furniture such as examination tables, was available at MCH clinics and warehouses and only required internal re-allocation/procurement.

Attendance at postnatal clinics

As shown in Figure 1, data collected from the postnatal registers during supervision indicated that postnatal visits within three days increased 20-fold and visits between four and seven days increased six-fold. Visits between two and six weeks after delivery increased four-fold; many of these were probably due to repeat visits, which cannot be corroborated since the clinic register design did not permit this differentiation. Anecdotally, women mentioned to providers that they felt that there was an improvement in the quality of care, which they greatly appreciated.

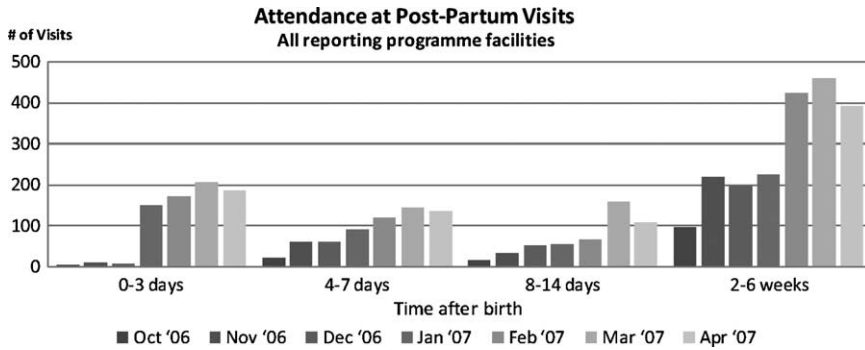


Figure 1. Attendance at post-partum visits.

Improvement in providers' knowledge

Essential maternal and newborn care

The results from health provider interviews demonstrated significant improvement in their knowledge of care and counselling related to the health of mothers and babies during their stay in the hospital and at discharge. There were significant increases (from 28 to 80% ($p < 0.01$)) among health providers who said they observed the breastfeeding technique before discharge, as well as those who said that they made sure that there was proper attachment of the baby at the breast (from 22 to 51% ($p < 0.01$)).

There was an improvement in providers' knowledge on some aspects of essential newborn care. For example, knowledge of the steps to maintain the baby's temperature at birth increased significantly, as shown in Figure 2. In addition, more providers said they would advise women on delaying the first bath. This increased from 22% at baseline to 49% ($p < 0.01$). Increase in knowledge of other elements of essential newborn care was not statistically significant (i.e., cord care 48–54%, eye prophylaxis 19–31%). Providers' knowledge of newborn danger signs also improved, from an average composite score of 1.78 at baseline, to 3.03 at endline (scale 0–5, $p < 0.01$).

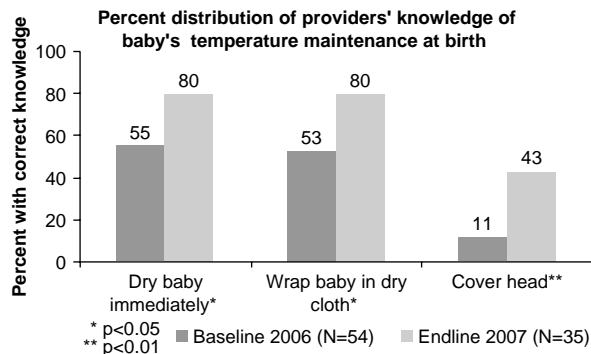


Figure 2. Percentage distribution of providers' knowledge of the baby's temperature maintenance at birth.

HIV and AIDS prevention, care and treatment

There were improvements in the providers' knowledge related to counselling of HIV-positive postpartum women on, for instance, regular monitoring of CD4 counts (from 41 to 74%, $p < 0.01$), follow-up in the early postpartum period for herself (from 2 to 49%, $p < 0.01$) and for the baby (from 24 to 51%, $p < 0.01$), and initiation of cotrimoxazole prophylaxis for the infant at 4–6 weeks of age (from 19 to 43%, $p < 0.05$).

Improvement in providers' competencies and skills*Antenatal visits*

Client–provider interactions were observed at antenatal visits in order to assess whether health providers were giving sufficient information to prepare pregnant women for the delivery and the postnatal period. Advice on infant feeding in the first antenatal visit increased significantly, from 35 to 63% ($p < 0.05$). There was a significant increase in pregnant women who were observed being advised to come for an early postnatal check up after childbirth (from 22 to 81% $p < 0.01$).

Postnatal care (PNC)

Among the interactions observed between the health providers and mothers who recently delivered, a number of positive trends were demonstrated. In almost all of the sessions (93%), women were assured of privacy, and in 68% of sessions they were greeted courteously. In 54% of consultations, women were specifically assured of confidentiality. During the majority of the observations, mothers were asked how they felt (96%) and were encouraged to ask questions (68%). The health care provider responded immediately to the problems of mothers and babies (68 and 64%, respectively).

As seen in Table 5, there was a significant improvement in the providers' assessment of the postpartum woman during consultations. Direct observation indicated that basic elements of the physical examination were carried out by a significantly higher proportion of providers at the endline.

Prior to the intervention, examination of the newborn was not carried out and was therefore, not assessed at baseline. At the endline, 97% of providers examined the infant, including weighing the infant (95%), measuring temperature (46%), assessing the cord (85%) and checking eyes for signs of infection (72%). Around two-thirds (67%) of providers were observed examining the newborn specifically for danger signs.

Provider performance was also monitored through the use of monthly post-training follow-up and supervisory visits. As shown in Figure 3, during these visits checklists that included sets of predefined tasks for each of the priority areas were used for evaluation. For each type of activity during the consultation, the health provider was expected to perform a predetermined number of tasks. The mean number of these tasks refers to the average number of actions performed correctly over the total number expected to be carried out. The results indicated that the health providers performed consistently well in the implementation of key activities related to the PNC of mothers and infants.

Table 5. Observations of providers care to postpartum clients – percentage of evaluated providers performing the task correctly (using the client–provider interaction observation checklists).

	Baseline (<i>N</i> = 50)	End line (<i>N</i> = 117)
Examination of the mother		
Blood pressure taken*	22%	78%
Temperature taken*	8%	30%
Palpation of uterus*	8%	77%
Breast examination*	12%	78%
Family planning		
Provider asks preferred method*	32%	82%
Client receives preferred method*	28%	70%
Counselling on maternal danger signs		
Broken perineal scar/tear*	25%	40%
Foul smelling vaginal discharge*	2%	53%
Excessive bleeding*	6%	54%
Counselling on newborn danger signs		
Red/pus around umbilicus*	2%	64%
Feeding difficulties*	10%	74%
Fever*	10%	78%
Hypothermia*	2%	48%
Breathing difficulty*	2%	53%
Counselling on STI/HIV		
Presence of STI/HIV*	2%	17%
Effect of STI/HIV in postpartum period*	6%	25%
Use of condom*	16%	46%
Information on PMTCT*	20%	54%
Counselling and testing partner*	14%	70%
Verification of care for STI/HIV		
Client on ART*	4%	15%
Newborn received nevirapine*	8%	32%
Mother received NVP in labour*	12%	32%
Mother CD4 tested since birth*	4%	26%

**p* < 0.01.

During these visits, the providers' knowledge and skills were reinforced on site by the supervisory team particularly where gaps were identified. It was also noted that trained staff shared information with other staff who had not received the formal training. Supervisors also included them in their on the job mentoring and capacity building.

Direct observation of client–provider interactions showed that health workers were more actively counselling mothers on different topics both at discharge and in the postnatal clinics. The proportion of health workers counselling and providing preferred family planning methods increased significantly, as shown in Table 5.

There was a significant increase in health workers counselling mothers about danger signs in themselves and in their babies. Table 5 shows the detailed indicators

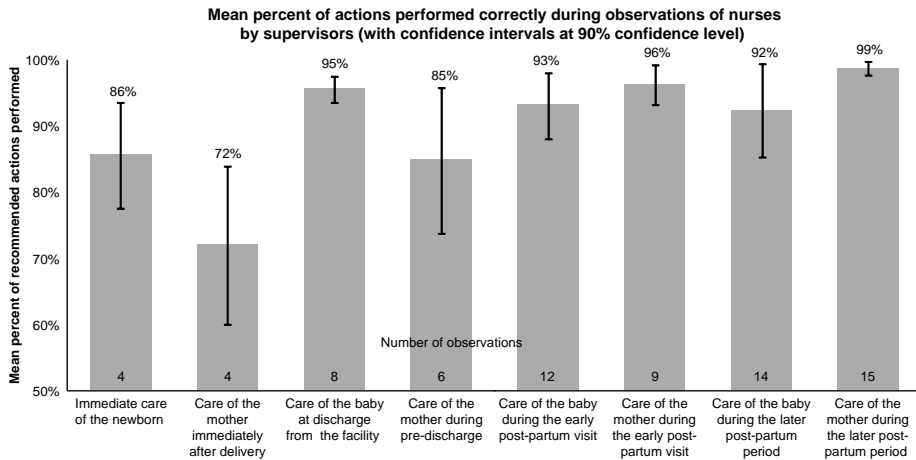


Figure 3. Mean percentage of actions performed correctly during supervisory visits (with confidence intervals at 90% confidence level).

for counselling on specific components of maternal danger signs. The table shows that there were also significant increases in the proportion of providers counselling for individual danger signs in the newborn.

Counselling on exclusive breastfeeding improved significantly (from 18 to 79%, $p < 0.01$). Provider performance regarding advice for other components of essential newborn care, such as temperature maintenance (46%) and cord care (62%), were only measured at the at endline assessment. Almost all women (93%) were counselled at discharge from the facility to return for the early postnatal consultation at the clinic and a specific appointment was given in 82% of cases.

HIV and AIDS

As shown in Table 5, there were notable increases in counselling and verification of care and treatment for HIV and AIDS during the postnatal clinic visit.

The proportions shown in the table regarding the use of prophylactic nevirapine (NVP) do not represent the total national coverage. They only show the proportion where providers verified that HIV-positive women received NVP during labour and discussed/counselled them on cotrimoxazole prophylaxis for themselves and their infants. The national NVP prophylaxis coverage during the study was 84–89%.

The proportion of HIV-exposed babies on cotrimoxazole prophylaxis in Table 5 is very low, probably because the analysed sample consisted mostly of women less than six weeks postpartum and therefore, the infants were not eligible to start prophylaxis yet.

Mother's knowledge and practices

There was a significant increase in the proportion of mothers who breastfed their babies within one hour of birth, both among HIV-positive and HIV-negative women (Figure 4). Among HIV-negative women, there was also a statistically significant

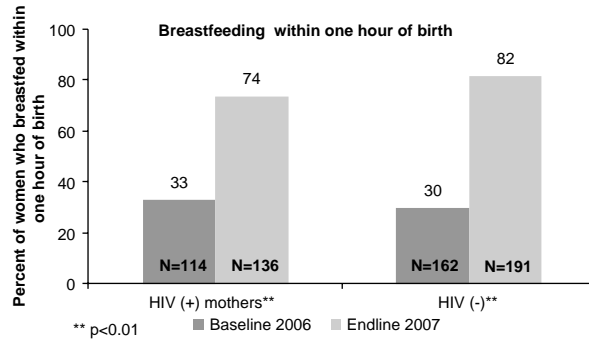


Figure 4. Proportion of postpartum women who breastfed within one hour of birth.

increase in the proportion practicing exclusive breastfeeding (from 49 to 65%, $p < 0.01$) and a decrease in the proportion giving replacement feeding to their infants (from 22 to 7%, $p < 0.01$). There was a reduction in the proportion of HIV-positive women that were giving mixed feeds, from 17–6% ($p < 0.01$). A significant increase (from 1 to 37%, $p < 0.01$) was found among the women who could recall that the health care provider in the antenatal clinic advised them to come back for an early postnatal visit.

Interestingly, even though there was an observed increase in counselling by providers, recall by mothers on having received information on basic care and danger signs for themselves and their infants showed no significant improvement. For example, at baseline the percentage of mothers who recalled being advised by health providers on hypothermia as a danger sign in the baby was 4% and it was almost unchanged at endline (7%). Similar results were obtained regarding receipt of advice on exclusive breastfeeding on demand (69% at baseline and 70% at endline).

HIV and AIDS

There was a statistically significant increase in the proportion of postpartum women (from 88 to 98% ($p < 0.01$)) and their partners (from 28 to 56% ($p < 0.01$)) getting tested for HIV. In addition, as seen in Figure 5, there was a significant increase in the proportion of HIV-positive mothers and their exposed infants who had started cotrimoxazole prophylaxis as recommended ($p < 0.01$).

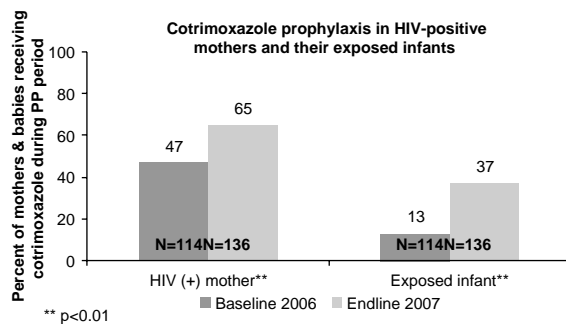


Figure 5. Use of cotrimoxazole prophylaxis for HIV in the postnatal period.

Discussion

Reduction in the large number of maternal and neonatal deaths in the first few days of delivery can be accomplished by proper care at birth, careful evaluation during the stay in the facility, assessment and counselling at discharge and early follow-up visits. There is recent evidence being reviewed for publication suggesting that an evaluation of newborns within two days after birth has significant impact on mortality (Baqui and Wall, e-mail to author, 4 November 2008).

The critical early postnatal period, with its large number of deaths, presents a number of challenges. Typically in Swaziland, as in most developing countries, postnatal visits take place late, at 4–6 weeks after birth. This has been influenced by two major factors. One is the set of existing cultural practices, which keep the mother and her infant in seclusion in their homes during this period. Even in the case of facility births, mothers and babies are discharged early and spend the subsequent period at home; the early discharge of mothers and babies is further compounded by the fact that they are not assessed adequately and counselled appropriately at this time. The other influencing factor has been that in the past, mothers have actually been called for the postnatal check-up only between four and six weeks. This visit in most cases tended to focus on advice for family planning and on immunisations for the infant.

This study has shown that by improving the quality of services in the facility, a careful assessment and counselling at discharge with provision of a specific appointment for an early visit resulted in a 20-fold increase in attendance at the postnatal clinic within the first three days. It has also shown that at the postnatal visit it is feasible for the mother and the newborn to be evaluated and cared for by the same provider at the same encounter within 72 hours, and once again at six weeks. It is possible that an even earlier first evaluation at two days and an additional visit at the end of the first week would be valuable.

The emphasis on careful evaluation of mothers and babies by a health provider before discharge presents an excellent opportunity to identify and address problems, counsel on essential care, and specifically provide the first follow-up appointment for the early visit. The first postnatal consultation also provides a valuable opportunity to assess and strengthen infant feeding, identify and address danger signs, reassure and counsel the mother on essential preventive care for herself and the baby, and promote appropriate care seeking for subsequent problems. As shown in the study, it also presents an opportunity to promote family planning and care and follow-up for both HIV-positive and HIV-negative (or unknown status) postpartum women and their infants.

While formal capacity building through a conventional workshop and on the job training are useful, as shown in this study and in earlier experiences in a Senegal USAID/BASICS newborn health programme (Ndoye *et al.* 2004), the follow-up, supportive supervision, and mentoring are essential. Use of predefined checklists clearly outlining all critical steps and activities related to specific tasks has been found to be extremely useful. Such checklists have also been found to be useful as learning guides (Ndoye *et al.* 2004).

Improved quality of care and support had a benefit on some of the maternal behaviours, such as breastfeeding. Breastfeeding is culturally a part of Swazi life, but the HIV epidemic has created confusion, particularly as feeding recommendations

have changed over the last decade. Although, replacement feeding is indicated in appropriate cases, very often in many of the countries in this region, it is not acceptable, feasible, affordable, sustainable and safe (AFASS). The highest risk of mother-to-child transmission of the HIV virus during breastfeeding is related to mixed feeding practices. The level of mixed feeding was significantly reduced by appropriate counselling in this study. Ideally, such counselling, including discussions on infant feeding options for the HIV-positive mother, should be an essential topic for discussion during the entire ANC period. The mother is then likely to be more prepared at the time of delivery to avoid unnecessary delays in making a suitable choice, and commencing breastfeeding early where relevant. Early initiation of breastfeeding is a very important strategy, as recent studies have shown that 16% of neonatal deaths could be saved if all infants were breastfed from day one and 22% could be prevented if breastfeeding started within the first hour (Edmond *et al.* 2006). A similar study in rural Ghana clearly showed an association between early breastfeeding and the reduction of newborn mortality from sepsis, which is the leading cause of death in the newborn period (Edmond *et al.* 2007).

One of the most challenging findings in this study was that postpartum women were not always able to recall receiving information given to them during the postnatal consultations. Despite the fact that there was a significant increase in health provider counselling on key messages related to essential care and danger signs in the postnatal period, there were many instances in which women could not repeat the information provided at the consultations. This finding has not been uncommon in other programmes. Findings from USAID/BASICS' earlier work in Senegal (Ndoye *et al.* 2004), showed that mothers' recall could be improved by mobilising additional less skilled staff such as the *matrones* and other community health workers such as the *relais* to reinforce messages, using visual aids such as counselling cards and other tools. It is also possible that mothers may relate more readily to less skilled workers and community health agents, with whom they may feel more comfortable to ask questions and discuss some of their concerns. Additional support to interpersonal communications through mass media was also found to be beneficial. It is also important to improve the counselling skills of all categories of health workers; merely informing mothers and families may not be enough, and time needs to be spent on negotiating the desired healthy behaviours both at the facility and community levels.

For the reasons already outlined above, this study focussed on facility-based activities. However, there is need to address the above issues at the community level for both home deliveries and for mothers discharged after facility births. Besides appropriate care at delivery, the mother and baby should be carefully assessed by the birth attendant before he or she leaves the home. This should be followed by at least one early assessment (within 48–72 hours) ideally by a skilled health provider, or at least by a trained community health worker/volunteer. Follow-up visits should be instituted as required. Thus, the capacity of community health workers, such as the Swaziland Rural Health Motivators, should be strengthened to enable them to provide suitable services in the postnatal period. These could include counselling during home visits focussing on preventive home care, identification of danger signs and appropriate care seeking. Community mobilisation strategies (Osrin *et al.* 2004) and linking of community and facility-based activities can go a long way in promoting healthy behaviours. There used to be a functioning network of about 2000

traditional birth attendants (TBA) in Swaziland trained by the MOHSW a decade ago. Results of that intervention were not available for review. A recent meta-analysis has shown that training TBA does not have an impact on maternal mortality, but some improvement in newborn outcomes was demonstrated (Sibley and Sipe 2004). Therefore, further evaluation is required to determine the types of community-based interventions that will be most appropriate for the country. Following this study and based on advocacy from implementing partners, the MOHSW has accepted including community-based activities in the follow-up programmes.

This study has highlighted the benefits and feasibility of integrating PMTCT programmes with *improved quality* MNH services. Improvements in HIV/PMTCT services during ANC have been documented by the MOHSW and can be attributed mainly to the existing national PMTCT programme. However, some aspects of care and treatment after delivery improved as a result of the integration of PMTCT and routine MNH services during the postnatal period. For instance, during the study, nearly all postpartum women reported knowing their HIV status and a significant proportion of their partners were tested. There was also a significant improvement in the uptake of cotrimoxazole by HIV-positive mothers and their exposed infants. Services should be further extended to have an integrated programme with quality child survival interventions and paediatric HIV services as a part of family centred care.

Even as evidence shows that maternal deaths related to HIV are rising (Gray and McIntyre 2005, McIntyre 2005), in most countries the main causes of maternal deaths in the early postpartum period are still postpartum haemorrhage, sepsis and eclampsia, all of which remain grossly unaddressed. The neonatal period is unique in that, although, HIV infection in the mother will impact the health of the baby, practically all deaths in this period are due to non-HIV causes, and include sepsis, asphyxia and complications of prematurity. In this context, it becomes critical that the investment made in PMTCT programmes to prevent transmission of the virus to the baby should not be lost by a high proportion of babies dying of other far more common causes in the critical newborn period (Narayanan *et al.* 2004b).

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References

- Baqui, A. and Wall, S., 4 Nov 2008. e-mail to author.
- Edmond, K.M., Kirkwood, B.R., Amenga-Etego, S., Owusu-Agyei, S., and Hurt, L.S., 2007. Effect of early infant feeding practices on infection-specific neonatal mortality: an investigation of the causal links with observational data from rural Ghana. *American Journal of Clinical Nutrition*, 86, 1126–1131.
- Edmond, K.M., Zando, C., Quigley, M.A., Amenga-Etego, S., Owusu-Agyei, S., and Kirkwood, B.R., 2006. Delayed breastfeeding initiation increases risk of neonatal mortality. *Paediatrics*, 117, 380–386.
- Gray, G. and McIntyre, J., 2005. HIV and pregnancy. *British Medical Journal*, 334, 950–953.
- Lawn, J.E., Cousens, S., and Zupan, Z., 2005. 4 million neonatal deaths: when? where? why? *The Lancet*, 365, 891–900.
- Lewis, G., 2004. *Confidential enquiries into maternal deaths: beyond the numbers: reviewing maternal deaths and complications to make pregnancy safer*. Geneva, Switzerland: World Health Organisation.
- McIntyre, J., 2005. Maternal health and HIV. *Reproductive Health Matters*, 13 (25), 129–135.
- Narayanan, I., Rose, M., Cordero, D., Faillace, S., and Sanghvi, T., 2004a. *The components of essential newborn care*. Arlington, VA: BASICS II.
- Narayanan, I., Rose, M., Cordero, D., Faillace, S., and Sanghvi, T., 2004b. *Safeguarding investment in PMTCT programs by incorporating essential newborn care*. Arlington, VA: BASICS II. Available from www.basics.org [Accessed 3 June 2008]
- Ndoye, A., Fall, M., Mbacke Mboup, B., Narayanan, I., Thiam, A., Plowman, B., Rose, M., Barry, H.L., Sarr, C., Toure, S., Sow, M., Diop, B., and Cisse, M., 2004. *Newborn health interventions in Senegal: the early implementation phase*. Senegal and Arlington, VA: MOH (Senegal) and BASICS II. Available from: www.basics.org [Accessed 12 June 2008]
- Osrin, D., Mesko, N., Shrestha, B.P., Shrestha, D., Tamang, S., Thapa, S., Tumbahanqph, K.M., Shrestha, J.R., Manandhar, D.S., Standing, H., de, L., and Costello, A.M., 2004. Reducing childhood mortality in poor countries: implementing a community-based participatory intervention to improve essential newborn care in rural Nepal. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 97, 18–21.
- Sibley, L. and Sipe, T.A., 2004. What can a meta-analysis tell us about traditional birth attendant training and pregnancy outcomes? *Midwifery*, 20, 51–60.
- Swaziland Central Statistical Office and Measure DHS, 2007. *Swaziland demographic and health survey 2006–2007 preliminary report*. Mbanane, Swaziland: Central Statistical Office, Swaziland Ministry of Economic Planning and Development. Available from: <http://www.measuredhs.com/pubs/pdf/FR202/FR202.pdf> [Accessed 4 June 2008]
- Swaziland High Commission of Ottawa, 2008. Available from: <http://www.magma.ca/~mali/swaziland/main.htm>
- UNICEF, 2008. *State of the World's Children Report 2008: Swaziland*. Available from: http://www.unicef.org/infobycountry/swaziland_937.html [Accessed 3 June 2008]
- UNICEF, 2009. *Children and HIV and AIDS*. Preventing Mother-to-Child Transmission (PMTCT) of HIV. http://www.unicef.org/aids/index_preventionyoung.html [Accessed February 2009]
- WHO, 2007. *Maternal mortality in 2005*. Estimates developed by WHO, UNICEF, UNFPA, and the World Bank. Available from: http://www.who.int/reproductive-health/publications/maternal_mortality_2005/mme_2005.pdf [Accessed 5 February 2009]