Effect of Integrating Maternal and Child Health Services, Nutrition and Family Planning Services on Postpartum Family Planning Uptake at 6 Months Post-partum in Burkina Faso, Cote d'Ivoire and Niger: Protocol of a Longitudinal Quasi-experimental Study

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Study protocol

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Abstract

Background : Although several interventions integrating maternal, neonatal, child health and nutrition with family planning have been implemented and tested, there is still limited evidence on their effectiveness to guide program efforts and policy action,on health services integration. This study aims to assess the effectiveness of a service delivery model integrating maternal and child health services, nutrition and family planning services, compared with the general standard of care in Burkina Faso, Cote d'Ivoire, and Niger.

Methods: This is a quasi experimental study with one intervention group and one control group of 3-4 health facilities in each country. Each facility was matched to a control facility of the same level of care and that had similar coverage on selected reproductive health indicators such as family planning and post-partum family planning.

The study participants are pregnant women (with a 6 months pregnancy at maximum) coming for their first antenatal care visit. They will be followed up to 6 months after childbirth, and will be interviewed at each antenatal visit and also during visits for infant vaccines.

The analyzes will be carried out by intention to treat, using generalized linear models (binomial log or log Poisson) to assess the effect of the intervention on the ratio of contraceptive use prevalence between the two groups of the study at a significance level of 5%, while taking into account the cluster effect and adjusting for potential confounding factors (socio-demographic characteristics of women, unevenly distributed at inclusion).

Discussion : This longitudinal study, with the provision of family planning services integrated into the whole maternal care continuum, a sufficiently long observation time and repeated measurements, will make it possible to better appreciate the timeline and the factors influencing women's decision-making on the use of post-partum family planning services. The results will help in increasing the body of knowledge regarding the impact of maternal and child health services integration on the utilization of post-partum family planning, taking into account the specific context of sub-Saharan Africa French speaking countries where such information is very needed.

Plain English Summary

One strategy to improve the utilization of health services by mothers and their children is the integration of maternal and child health services. For instance, a pregnant woman coming for an antenatal care visit would also receive counseling on post-partum family planning services and maternal nutrition. Similarly, a woman coming for her infant’s vaccines would be offered counseling on post-partum family planning, maternal nutrition and breastfeeding.

Although several interventions have been implemented and tested, there is still limited evidence on the conditions and factors required for successful maternal and child health services integration strategies. This study aims to assess the effectiveness of an intervention integrating maternal and child health services, nutrition and family planning services.

For the purpose of the evaluation, 2 distincts groups of health facilities will be selected in each country, one group of 3-4 health facilities where the intervention will be implemented, and another group of 3-4 health facilities with the general standard of care. The study participants are pregnant women coming for their for their first antenatal care visit, who will be followed up to 6 months after childbirth.The analyzes will be carried out to assess the effect of the intervention on contraceptive use prevalence between the two groups of health facilities.

This study will make it possible to better appreciate the timeline and the factors influencing women's decision-making on the use of post-partum family planning services.

Background

In 2017, an estimated 295,000 women died from pregnancy-related causes, half of these maternal deaths occurred in the third trimester of pregnancy, and 2.6 million babies died at birth[1, 2]. The brunt of these deaths is particularly high in Sub-Saharan Africa (SSA) as this region account for approximately 66% of the estimated global maternal deaths in 2017, and about 53% of all under-five deaths in 2019, with a neonatal mortality rate that is twice as high as the rate at the global level (76‰ vs 38‰) [1, 2]. The situation is particularly alarming in the countries of the Ouagadougou partnership, 9 French speaking countries in western SSA. It is estimated that one in 41 women die from maternal causes in these countries, compared to 1 in 54 in developping countries, and 1 in 4,900 in developed countries. Neonatal mortality rates in the region vary from 22‰ (Senegal) to 32‰ (Mali) [2].

Effective interventions to reduce maternal and newborn mortality are well known. Skilled care before, during, and after childbirth can reduce maternal morbidity and mortality [3]. Neonatal mortality can be reduced by skilled birth attendance at delivery, newborn resuscitation,

exclusive breastfeeding, umbilical cord care and management of infections in newborns, and child immunization [4]. Also, births spacing and the use of effective contraceptive methods can improve maternal, perinatal, and neonatal health, by reducing stillbirths, prematurity, low birth weight and neonatal and maternal mortality [5, 6].

Although these interventions are known, their coverage rates remain low [6]. Recent data show that while most women (over 80%) receive at least one antenatal care visit (ANC), only 49.3% receive 4 to 7 visits and 11.3% receive 8 visits [7]. The unmet need for family planning (FP) remains large and is concentrated in the postpartum period. It is estimated that this need, soon after birth, reaches 75% in West and Central Africa [8].

Given the importance of these interventions, delivering them as part of a comprehensive package could help ensure maximum benefits for the mother-child dyad. The importance of integrating maternal, neonatal, and child health and nutrition (MNCHN) with FP is well recognized as a key strategy, particularly for reducing maternal and child mortality [7, 9]. These two areas are integral to successfully achieving the 2030 Sustainable Development Goals for improving maternal, neonatal and child health [7, 9, 10]. In addition, evidence showed that integrating MNCH and FP services would cost approximately $1.5 billion less than providing MNCH services alone [11].

Although, several integrated service delivery initiatives targeting mother and child during pregnancy and early childhood have been implemented and tested [12–16], there is still limited information and evidence to guide policy action, program efforts, and scaling-up strategies on health services integration. Indeed, most of these interventions presented shortcomings not only at the conceptual level but also in terms of the methodology used[17]. In general, these integration initiatives rarely involved more than two services, and nutriton services were generally poorly included among the services offered [18–20]. Then, the evaluations of the effects of these interventions focused mainly on the coverage of services [11, 14, 17]. Finally, the evaluation design used are not always robust; most of them being mere before and after study design without any control group [13, 21].

In order to fill these gaps, we have developed this protocol for a longitudinal quasi experimental study. The general objective of this study is to assess the effectiveness of a service delivery model integrating maternal and child health services, nutrition and family planning services, compared with the general standard of care in Burkina Faso, Cote d'Ivoire, and Niger. Specifically, this study aims at (i) assessing the effects of the intervention on the uptake of post-partum family planning (PPFP) at 6 months post-partum, (ii) assessing the effects of the intervention on the use of integrated health services, (iii) and assessing the effects of the intervention on improving maternal and neonatal health indicators during pregnancy and the immediate postpartum period.

Methods And Study Design

Description of the intervention

The model of integrated health service delivery includes the community level (community contacts with the community health workers), the intermediate level (rural and urban basic health centers), and the central level with the district hospital. The standard model of integrated PPFP / MNCH / Nutrition service delivery has four points of contact where integrated services should be offered in the health facility: antenatal care, childbirth, postnatal care, and infant wellness visits (Figure 1). In the model, these services are delivered during the same client visit based on client needs and standards of care.

Study settings

The study will be implemented in three French speaking countries of sub-Saharan West Africa: Burkina Faso, Cote d'Ivoire, and Niger. Some information related to relevant reproductive health and health service utilization indicators based on demographic and health survey data from Burkina Faso (2010), Cote d'Ivoire (2011-2012) and Niger (2012) are presented in Table 1.

Table 1

Selected indicators on reproductive health and utilization of maternal and child health services Burkina Faso (2010), Cote d'Ivoire (2011-2012) and Niger (2012)

Selected indicators	*Burkina Faso*	*Cote d' Ivoire*	*Niger*
Maternal mortality rate	330 per 100, 000 live births in 2015	614 per100, 000 live births in 2015	520 pour 100, 000 live births in 2015
Neonatal Mortality Rate	23 per1,000	33 per 1,000	28 per 1,000
Child Mortality Rate	42 per 1,000	27 per 1,000	48 per 1,000
mCPR	22.5%	23.5%	11%*
Unmet need of FP	23.3%	39.2%	15%*
Prevalence of acute malnutrition	8.6 %	6%	10.3%
Prevalence of chronic malnutrition	21.2%	21.6%	42.2%
Prevalence of underweight	16.2%	12.8%	-
Early breastfeeding	56 %	37%	-
Proportion of infants under 6 months of age who have benefited from Exclusive Breastfeeding	47.8 %.	23.5%	30%
Proportion of anemia in pregnant women	58 %	64%	55.6%
**Among women in union*			

Type of study

This is a quasi experimental study; in each country, we will have one intervention group of facilities and one control group of facilities. Participants of the intervention group, meaning women attending the intervention facilities, will receive the full package of integrated PPFP / MNCH / Nutrition services, while participants in the control group will receive standard care.

Sites of study

In each country, 3 to 4 health facilities have been identified as the intervention sites including a district hospital, an urban health center, and a rural health center. Each facility was matched to a control facility of the same level of care and that had similar coverage on selected reproductive health indicators such as family planning and post-partum family planning.

Table 2

Sites of study

Country	**Intervention settings**	**Control sett**ings
Burkina Faso	• CMA of Po	• CMA of Kombissiri
	• CSPS niché at the CMA	• CSPS niche at the CMA
	• CSPS of Tiébélé	• CSPS de Toécé
Cote d'Ivoire	• HG district of Agnibilekro	• HG of Adzopé
	• CSU of Damé	• CSU Assikoi
	• CSR of Assuamé	• CSR Ananguié
Niger	• HD of Aguié	• HD Guidanroumji
	• CSI urban of Aguié	• CSU urban of Guidanroumji
	• CSI rural of Débi	• CSI rural of Karazome
	• CS of Zabon Moussou	• CS of Tabouka

HD, CMA, and HG= General Hospital or Health District Hospital // CSPS, CSU, CSR, CSI= Primary Health care facilities (CSU= urban, CSR=rural)

Study participants

The study participants are pregnant women who meet the following criteria :

- Attending maternal health services for ANC;
- Having a 6 months pregnancy at maximum;
- Being a resident of the communities served by the health facility;
- Not planning to travel for more than one month during pregnancy or for six months after childbirth;
- Having the intention from the outset to follow preventive care and childbirth in the health facility.

Participants recruitment process

Participants will be recruited at the ANC unit. All women coming for their first ANC visit will be invited to participate in the study. Women who accept will be screened according to the inclusion criteria. Those meeting the study criteria will be included in the study. In addition, each woman will have a unique identification number which will be entered in the registers to allow follow up, throughout the duration of the study.

Participant follow-up procedures

Women (with a 6 months pregnancy at maximum) will be followed up to 6 months after childbirth, and will be interviewed at each antenatal visit and also during visits for infant vaccination, as detailed in the table 3 below.

Table 3

Participants follow-up schedule

	ANC1	ANC2	ANC3	ANC4	ANC5	ANC6	ANC7	ANC8	Deli-very	Early PNC Day6-10	Late PNC Day42-56	M2	M3	M4	M6
Admission	**X**														
Follow-up		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X	**X**

Outcomes measures

Case-report forms (CRFs) will be developed for collecting data on the outcomes of interest. The primary outcome is the uptake of modern contraceptive methods at six months postpartum (proportion of women using modern contraceptives at six months in the experimental vs. control group). Secondary outcomes are related to health indicators and services utilization, as detailed in the table 4 below. Maternal infections will be considered for clinical signs of postpartum infection in mothers before discharge from hospital. Early neonatal infections will be considered as reported by health care providers in the patient file or based on obvious clinical signs of neonatal infection (fever, hypothermia, jaundice).

Table 4

Secondary outcomes of interest to be measured

Secondary Outcomes of interest		
Health indicators	**Services delivered**	**Services utilization**
Early breastfeeding	Number of individual FP counseling sessions during ANC	Number of ANC visits (retention)
Birth weight	Nutritional advice received during ANC	Number of Post-partum visits
Exclusive breastfeeding 0-6 months	Nutritional advice received during post- natala care	Infant growth monitoring (weighing)
Moderate acute malnutrition		
Severe acute malnutrition		
Vaccine coverage for children 0-6 months		
Vitamin A supplementation and deworming		
Cough		
Diarrhea		
Malaria		
Maternal infections		
Neonatal infections		

Sample size calculation

According to the Population Division of the United Nations Department of Economic and Social Affairs, the modern contraceptive prevalence among married or in union women in 2020 was estimated at 22.4% Cote d'Ivoire, 28.1% for Burkina Faso and 15.1% for Niger [24]. Considering an improvement of 15% in this proportion, attributable to the intervention, with a power of 80%, a significance level of 5%, and finally an intraclass correlation coefficient of 0.015, Cote d'Ivoire will have the largest sample size, about 88 women per cluster. By increasing the size by 15% to take into account any lost to follow-up related to travel, we'll have a size of 102 women per health facility, meaning a total of 306 women per group in Cote d'Ivoire, and 268, and 172 per group in Burkina Faso and Niger, respectively. Details for each country are provided in the table 5 below.

Table 5

Parameters used for sample size calculation

Caracteristics	Cote d'ivoire	Burkina Faso	Niger
Power	80%	80%	80%
modern Contraceptive Prevalence rate	22.4%	28.1%	15.1%
Size of the expected effect in intervention groups	15.0%	15.0%	15.0%
modern Contraceptive Prevalence rate (expected)	37.4%	43.1%	30.1%
Power	80%	80%	80%
Significance	5%	5%	5%
Intercluster Correlation Coefficient	0.015	0.015	0.015
Size per cluster	88	58	37
Size increased per cluster (15% increase)	102	67	43
Number of clusters per group	3	4	4
Final size of groups	306	268	172
Final Size by country	612	536	344

Data collection

Data will be collected through direct interview with health facility clients and extraction of data from health facility registers.

Direct interview with health facility clients: They will be carried out with the study participants at the various follow-up points. Data will be collected from a standardized questionnaire integrated into electronic tablets.Interviews will be carried out in health centers on the day of the woman's consultation at her convenience. Otherwise, the interviewer will get in touch with the participant to agree on a day and place for the interview. In addition, these interviews will comply to barrier measures against Covid-19 (wearing a mask and a maintaining a distance of at least one meter between the investigator and the respondent)

Data extraction: Data will be extracted from health center registers (ANC, Childbirth, post-natal care, Immunization).

Recruitment and training of investigators

Data will be collected by 06 females interviewers per country, with a paramedical profile (nurse, midwife), speaking the local languages.

They will be trained for one week on the study procedures and the content of the questionnaire.

Data quality procedures

Data quality control procedures will be put in place to ensure that accurate data are recorded in the registers and entered into the database. Guidelines for data collection and the establishment of a registration register will be produced. In order to ensure that data will be collected in a standardized way in all participating health facilities, a pilot test of data collection and data management will be carried out before the beginning of baseline data collection. Data quality reports will be produced regularly for each health facility. Site control supervisions in the participating health facilities will be carried out regularly and a verification of the source data will be carried out to ensure that the data collected is accurate, complete, , precise and reliable.

The supervisions will be carried out by the principal investigator and the country co-investigators.

Data analysis

A statistical analysis plan will be developed. Descriptive statistics will be reported by calculating frequencies and percentages for categorical variables and means, standard deviations, and minimum and maximum values for the continuous variables. The distribution of variables will

be examined for outliers as part of quality control and descriptive analysis of the data. Descriptive statistics will be compiled for each group and aggregated between groups.

The analysis will compare the unadjusted and adjusted primary results between the two study groups, i.e. the experimental group and the comparison group. Since the main outcome is contraceptive use, we will use generalized linear models (binomial log or log Poisson) to assess the effect of interventions on the ratio of contraceptive use prevalence between the two groups of the study at a significance level of 5%, while taking into account the cluster effect and adjusting for potential confounding factors (socio-demographic characteristics of women, unevenly distributed at inclusion). All bi and multivariate analyzes will be carried out by intention to treat, including all women, whether or not they continued to visit health centers after inclusion. The unit of analysis will therefore be the woman. The analyzes will be carried out with the Stata software.

Ethics

This protocol has been approved by the Institutional Review Committee of Intrahealth International as well as the respective ethical committees of the selected countries.

To ensure the safety and well-being of participants (healthcare providers and pregnant women) and to ensure no harm to them for this study, the team will take the following measures:

• All women meeting the inclusion criteria will be provided with detailed information on the objectives and procedures of the study and free and informed consent will be required prior to inclusion.

o Pregnant women under 18 who are in union will be considered as emancipated minors and consent will be obtained directly as for an adult.

o For pregnant women under the age of 18 who are not in a union, the consent of an adult parent / legal guardian will be required as well as the consent of the young girl.

• All research investigators and study staff will be trained to clearly communicate and perform the consent process.

There will be no risk to women who decide not to participate in the study. Women who will not consent to participate in the study will receive the same care and access to services as those who have consented to participate in the study. If a condition warranting referral (including domestic violence, substance abuse, etc., HIV counseling and testing, or any other relevant condition) is detected during the provision of antenatal care services (as part of this research) , the study team will ensure that the woman is correctly referred and that the appropriate standard referral procedures are followed.

• The data collected on the tablets will be sent directly to the local IRSS-based server once a week. The server will be protected by a password known only from the Data manager. All research assistants and study staff will be trained to ensure data security.

The published data will be depersonalized, described in a comprehensive manner, if possible and the anonymity of the participants will be preserved at all times.

Study timeline

This study will last 18 months, from July 2021 to December 2022 as follows:

- 4 months for participants recruitment;
- 11 months of follow-up from the last woman included (she will be recruited during the first trimester of pregnancy at earliest, therefore 5-6 months of follow-up while she is still pregnant and 6 months of follow-up after delivery) ;
- 3 months for the report writing.

Discussion

Although significant interest in integrating family planning with other health services emerged during the last 30 years, both for programmatic and political reasons, limited empirical evidence is available on the effectiveness of programs that integrate family planning with maternal, perinatal, and child health [14]. Moreover, there is a paucity of evidence from developing countries in terms of what intervention programs work best for PPFP [11, 14, 25]. Of the relatively very few studies on integration that have been conducted, most were limited by

methodological quality including cross-sectional design, hospital based surveys, non-family planning outcomes as main interest, and also a short duration of observation [25, 26]. Overall, it is recognized that the evidence of the integration of postpartum family planning with other health services remains weak, and well-designed evaluation research is needed [11, 14, 25–27].

Previous studies showed that the results of the implact of integration of PPFP services into maternal health services on uptake of contraceptive methods are mixed. Some studies have found a relationship between ANC and contraceptive adoption in the post-partum but information was missing on whether or not PPFP counseling was provided during the ANC sessions [28, 29]. Other studies did not find any relationship between the integration of PPFP counseling into ANC and the uptake of contraceptive method in the postpartum period, but did rather find an impact of these services integration on women's intention to use contraceptives methods [30]. However, integration of PPFP counseling into delivery care and postnatal care has shown more consistent positive impact on increasing adoption of PPFP [31–33].

As compared to these previous studies, one of the advantages of this intervention is that the provision of PPFP services will not be limited to just a few points of contact, but will rather be integrated into the whole maternal care continuum. In addition, this longitudinal study, with a sufficiently long observation time and repeated measurements, will make it possible to better appreciate the timeline and the factors influencing women's decision-making on the use of PPFP.

As for any multisite study, expected limitations and challenges regarding this study include coordination issues with and between study countries and study sites, political and policy changes, eventual constraints in delivering the intervention with fidelity, and maintaining the intervention timelines [34]. To mitigate these threats, a technical working group is set up in each country to follow the overall implementation of the intervention, including the evaluation study. This technical working group is comprised of several stakeholders including those of the MOH to ensure the country engagement in the study process. In addition, a study coordination team is set up in each country to facilitate coordination between the different countries and study settings. Finally, a journal of events will be held throughout the study implementation to monitor any factor or event that could influence study outcomes, so as to be considered during results analysis.

Our study, also has a number of strengths, primarily the longitudinal design will allow us to assess exposure to postpartum counseling and uptake of contraception at frequent intervals throughout the postpartum period, limiting recall bias. As we will collect information on ongoing pregnancy and health services utilization, we will also limit confounding due to temporal changes that are present when including past births. We therefore believe that the overall strengths of the proposed design outweigh its limitations and the coming results will help in increasing the body of knowledge on this topic, especially for SSA french speaking countries.

Abbreviations

ANC	Antenatal care visit
CMA	Centre Médical avec antenne chirurgicale (Medical center with a surgical unit)
CS	Case de santé (health hut)
CSI urbain	Centre de Santé Intégré urbain (primary health care facility in urban area)
CSI rural	Centre de Santé Intégré rural (primary health care facility in rural area)
CSPS	Centre de santé et de promotion sociale (health and social promotion center)
CSU	Centre de santé urban (primary health care facility in urban area)
CSR	Centre de santé rural (primary health care facility in rural area)
FP	Family planning
HD	Hôpital de District (District level hospital)
HG	Hôpital General (General hospital or district level hospital)
MNCH	Maternal, neonatal, and child health services
MNCHN	Maternal, neonatal, child health services and nutrition
PPFP	Post-partum family planning
SSA	sub-Sahara Africa

Declarations

Ethics approval

This protocol has been approved by the Institutional Review Committee of Intrahealth International under the log number 21004. It has also been approved by the respective ethical committees of the selected countries as detailled below:

- Cote d'Ivoire, approval N° N/Ref: 053-21/MSHP/CNESVS-km;
- Burkina Faso, approval N° 2021-000131/MS/MESRS/CERS;
- Niger , approval N° 53/2020/CNERS

Competing interest

The author(s) declare(s) that they have no competing interests.

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Consent for publication

Not applicable, no individual data was used at this stage of the study.

Availability of data and material

Not applicable, no data or material was used at this stage of the study.

Authors'contributions

DK, AC and SK conceptualized the study project and led the protocol, and led the protocol writing process. MY, LR, and HT reviewed and adapted the study (including the protocol and tool) to each of their country settings. SB and MN reviewed the protocol for editing.All authors read and approved the final manuscript.

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Figures

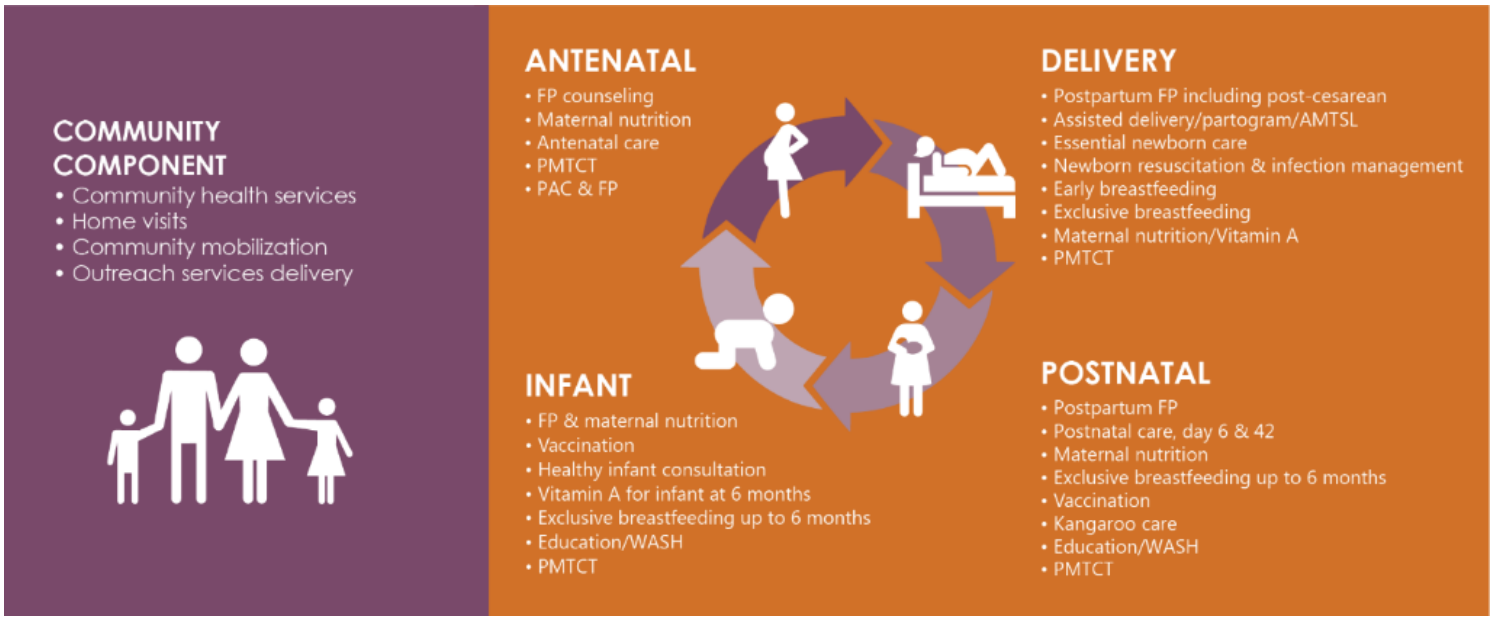

Figure 1

The intervention of integrated health services delivery