Saving Mothers and Newborns in Communities: Strengthening Community Midwives to provide high quality essential newborn and maternal care in Baluchistan, Pakistan in a financially sustainable manner

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1. INTRODUCTION

Pakistan is one of six countries contributing to over two-thirds of all maternal deaths worldwide [1]. A large body of evidence suggests high levels of skilled birth attendance is a pre-requisite to the reduction of this maternal mortality [2]. The implementation of community midwifery has been a significant factor in the decline of maternal and neonatal mortality in Sweden during the late 19th century, and in Sri-Lanka and Thailand during the twentieth century [3,4,5,6]. In recent history, Bangladesh has shown vast improvements in maternal mortality ratios due to their emphasis on pro-poor strategies, such as provision of free community-based skilled birth attendance [4].

Drawing on these past experiences, the Government of Pakistan (GOP) has introduced a new cadre of village-based skilled birth attendants – known as community midwives (CMWs). With the objective of providing skilled birth attendance to women living in under-served areas, the program has trained more than 8000 CMWs between 2007 and 2012 [7]. Women were recruited based on selection criteria stipulated in PC-1 (2007-2012); these criteria included the selection of women aged 18 to 40, preferably married, with experience working in their community and an education with matriculation in the sciences [7]. To ensure a geographically wide and equitable CMW presence in rural areas, the program aimed to deploy one CMW per 10,000 population, translating into two CMWs per Union Council – the smallest administrative unit which consists of a population of 20,000. Each CMW was also required to be a permanent resident in the area from which she applied. The recruits were provided with 18-months of midwifery training and subsequently deployed back to their home villages. Intending to support CMWs in establishing their own home-based, private practices in their communities, the Ministry of Health (MOH) provided CMWs with a small stipend for three years after graduation from the program. During this period, the CMWs were to be supervised by the District Department of Health (DOH), and assisted by referral linkages with Emergency Obstetric and Neonatal Care (EmONC) facilities within the district.

However, recent research suggests that these CMWs have yet to emerge as a significant maternity care provider in rural Pakistan [8]. Four years after the deployment of the first group of CMWs in Punjab, a survey of 1,457 women showed that 12.7% of deliveries in the Jhelum district, and 3.4% of deliveries in the Layyah district, were attended by a CMW [8]. In Baluchistan, the rates of CMW coverage are much lower – a survey of 2,216 women conducted in May 2014 in districts Lasbella, Gwader and Ziarat indicated a CMW coverage of 0%, 0.4% and 0.7%, respectively [8].

A growing body of research offers several causes as to why government CMWs have largely failed to establish midwifery practices in their communities. These include: 1) the selection of women who were not interested in practicing midwifery. As mentioned above, one criterion for CMW selection involved their matriculation in the sciences – an average education of 10 years. Women's education in Pakistan is greatly restricted to higher socio-economic classes, while the practise of midwifery is viewed as a polluting, low-status occupation [8]. Newspaper advertisements and word-of-mouth recruitment in government health departments, coupled with nepotistic practices, further biased recruitment processes in favour of relatively wealthy women. Particularly in Baluchistan, the

program struggled to recruit women who met the minimum education requirements. To meet targets, the majority of CMW were recruited from urban areas [9]. Given their financial stability and the gender norms of the country, many CMW recruits were not interested in, nor were they expected to earn wages; 2) the few CMWs interested in practicing midwifery faced great difficulty in garnering the community's trust in their skills; 3) in many areas, young CMWs were not able travel to patients' homes without a chaperone, having to be accompanied by a woman during daytime visits, and at night by at least two men in addition to a women; 4) many CMWs' lacked the necessary business skills required to establish private practices; and 5) many CMWs lacked the financial support essential in developing a practice infrastructure and its accompanying logistics [8].

To transform the trained and deployed, but non-functional, government CMWs into high-quality and sustainable providers, the *Saving Mothers and Newborns in Communities* (SMNC) intervention has been implemented in Quetta, Gwadar, and Kech districts of Baluchistan [8]. The intervention aims to recruit the previously trained, registered and deployed government MNCH program CMWs to: (1) Offer them a 4-week clinical skills upgrading course; (2) Provide them with business-skills training and small loans (offered through a micro-finance institute) which will enable CMWs to establish self-sustaining private practices; (3) Generate a demand for and acceptance of CMW services through an awareness-building campaign, which will employ cellular phone SMS technology and existing women's support groups. This campaign will be undertaken by CMWs, in partnership with the local area Lady Health Workers (LHWs) – a category of community health worker providing preventive and promotive health care at the community level; and (4) Increased access to emergency transport services through a revolving transport fund, called the Mamta Fund [8]. CMWs will work closely with their communities to establish this fund.

The SMNC initiative was launched in (May 2013). CMWs who met the initiative's selection criteria were invited to participate. In the initiative's first year, a total of 50 CMWs were recruited. These recruits were provided with clinical and business-skills training, and access to microloans. They were supposed to start practicing in December 2013. In the second year, 49 CMWs, 22 in Quetta, 7 in Gwader and 20 in Kech met the selection criteria and agreed to participate in the initiative. This batch of SMNC-CMWs were supposed to start practicing in August 2014.

To assess whether the SMNC initiative enabled participating CMWs to provide essential maternal and newborn healthcare to women and children living in their catchment areas – in a financially self-sustaining manner – an operations research study was embedded within the initiative. Led by the University of Alberta, Canada, the research aims to investigate: (1) whether the SMNC initiative is having an impact on CMW service uptake in districts Quetta, Gwadar, and Kech Districts; (2) if any increased CMW service uptake is attributable to the SMNC initiative; (3) whether the SMNC initiative will enable CMWs to develop financially self-sustainable practices; and (4) the level of quality of care the CMWs are providing.

The research study was launched in May 2014, with the collection of baseline survey data for the quasi-experimental arm taking place in Quetta and Gwader districts, and the collection of survey data for the pre-post arm taking place in Kech district (Module 1). Baseline financial data was collected from Quetta and Gwader districts (Module 2). This document reports findings of the baseline survey in the three districts, Quetta, Gwadar and Kech. Given that the launch of the operations research was delayed nearly a year – the research was launched one year after the commencement of the SMNC project, and five months after the first batch of SMNC-CMWs began working – this report provides a baseline survey of 49 SMNC-CMWs from the second batch of recruits. These CMWs were recruited between January and February 2014, and began working in August 2014.

2. METHODS

2.1 Setting and Population
Data for the baseline survey of the quasi-experimental arm was collected in districts Quetta and Gwader, and for the pre-intervention baseline in district Kech.

1) **District Quetta** is located in the north-east of Baluchistan, with its western boundary touching Afghanistan [10]. The district is designated as a 'city district' under the latest revision of the local government system in 2001. A 'city-district' in Pakistan is a district consisting primarily or entirely of a major city or large metropolitan area. Quetta city district is divided into two towns (or tehsils): Chilton town and Zarghoon town. The towns are further subdivided into union councils [10]. Given that Quetta is a city district, all union councils are urban. Annex 1 lists the union councils by town.

2) **District Gwader** is a coastal district along the Arabian Sea. It is subdivided into five tehsils: Gwadar, Jiwani, Ormara, Pasni and Suntsar. Gwadar and Pasni tehsils have four union councils each, while Jiwani and Ormara each comprise two union councils [11]. The city of Gwadar is the district headquarters; in 2011 the city was designated the winter capital of Balochistan province [11]. Although somewhat remote from Pakistan's major urban centers, Gwader is strategically located near the Strait of Hormuz and the key oil shipping routes entering and exiting the Persian Gulf. Gwadar Port is a strategic warm-water, deep-sea port developed jointly with China, and officially opened in 2007 [12]. One of the only modern ports in Pakistan, Gwader city is a free-trade port city. As a special economic zone, a free-trade port allows goods to be landed, handled, manufactured, reconfigured or re-exported without the intervention of the customs authorities [12]. The city is linked with Karachi via the Makran Coastal Highway, and to Pakistan's motorway system via M8. The port and associated development prospects have attracted a large migrant population to Gwadar city. As a result, the city is in transition from a marginalized backwater area to an urbanized economy with access to world markets. Gwader district is the second most urbanized district

of Balochistan, with 54% of the district population living in four urban localities (Jiwani, Gwadar, Pasni and Ormara) [11].

3) **District Kech** is located north of district Gwader, and bordered on the west by Iran. Two important mountain ranges – the Makran Coast range and the Central Makran range – stretch from north-east to south-west [13]. The district is divided into four tehsils (Turbat, Buleda, Tump and Dasht) and 98 union councils. The city of Turbat is the only city in the district, although eight villages had populations of greater than 5,000 in 2007 [13]. Overall, there is a paucity of documentation surrounding the district's geography, economic structures, political administration and health services availability.

BOX 1   **Urbanization in Pakistan**

The definition of 'urban area' in Pakistan is a matter of intense debate, and there is currently no agreed-upon definition. Two definitions are currently in use: an administrative definition and population density-based definition.

1) Administrative definition: Prior to 2001, Pakistan was administratively divided into rural and urban areas. This system was replaced in 2001 after the promulgation of Local Government Ordinance 2001. Based on these definitions, about 32% of Pakistan is urban.

2) Population density-based definition: According to this, an urban area is defined as a cluster of 50,000 persons or more, with a density of 150 persons per square kilometer and within 60 minutes travel time to the core of the cluster. It is also recommended that at least 66% of the male population should be related to a non-agriculture profession [13]. According to this revised definition, but based on the 1998 census data, over 50% of Pakistan is urban [14].

However, while all these categorizations may have been an adequate way of defining 'urban' and 'rural' some decades ago, they are imprecise and oversimplified today. Life has changed in a variety of dimensions that have rendered these conventional definitions obsolete. The idea of 'rural' and 'urban' as contrasting images - isolated farms, hamlets, cultivated fields, villages, versus, the thriving city, skyscrapers and slums- does not reflect the reality of Pakistan today. Contemporary Pakistan is a country of intensive cultivation, villages and small market towns, larger towns, small cities and major cities. In addition, ribbons of development between cities, towns, industrial satellites and along highways have grown and densified; in the more rural areas, densities are increasing along major road corridors; and, the population which has physically not moved to the cities, has adopted urbanism as a way of life, reflected in the changing pattern of consumption and use of services [15]. A case is also made that there is no reason to restrict analyses to just two categories of urban and rural. Ali has introduced the concept of an 'urbanizing area', an area that does not yet meet the definition of urban, and yet has an urban core and overall higher population density than villages and farmland [15].

The last census in Pakistan was conducted in 1998. Given the high population growth rates and major social, economic and cultural changes that have taken place in the last 17 years, classification of geographic areas as rural/urban is at best, an estimate [15].

2.2 Sampling and sample size

In the original proposal, we planned to collect data from women living in the catchment areas of the SMNC-CMWs and government CMWs (henceforth called controls) in Quetta and Gwader districts for the quasi-experimental arm, and in SMNC-CMW catchment areas in Kech district for the pre-launch survey. According to the PC-1 (2006-12), there must be a minimum of one CMW for each union council [7]. Based on this requirement, we defined a "SMNC intervention cluster" as a SMNC-CMW in addition to the women living in her catchment area. The control group was to consist of non-SMNC-CMW catchment areas. The control clusters were to be separated from SMNC-CMW clusters by at least one union council. This separation was designed to reduce contamination of the controls, while ensuring sufficient matching of socio-economic characteristics.

The reality on the ground was vastly different from information provided in documents. In all three districts, neither Mercy Corps (MC) nor government program databases identified CMWs by union council, instead simply providing the CMWs name and an approximate neighborhood. In fact, when MC launched SMNC, the Government of Pakistan could not provide the initiative with any contact address of its CMWs, as it had lost all contact with them. Only after the launch of SMNC did the government seek technical assistance to reconnect with its CMWs and update their contact addresses. By the time operations research was launched, the CMWs contact address lists were prepared and shared with the Research Team (RT). As a first step in Quetta district, the RT identified the union councils of all CMWs (based on their residential neighborhood), using a map of Quetta City provided MC. Annex 1 lists the unions councils of Quetta city. Annex 2 is a hand-drawn map that shows the distribution of all CMWs (both SMNC-CMWs and non-SNMC-CMWs) in Quetta city. It should be noted that this hand-drawn map does **NOT** align with any formal map of Quetta city district. The distribution of CMWs (both SMNC and controls) could not be mapped for Gwader and Kech because: 1) Gwader CMWs contact addresses were based on wards. In Kech, the addresses were even vaguer and simply named as a neighborhood; and 2) we were not able to locate any maps describing wards, union councils, or neighborhood details from MC, government or Google maps.

As discussed above, delays in the launch of operations research meant this baseline survey is the baseline of the second batch of SMNC-CMWs. The SMNC-CMWs database, shared with us by MC, showed the initiative had recruited 22 CMWs in district Quetta, 7 in district Gwader, and 20 in district Kech. Our proposed sample size required we randomly select 26 intervention (SMNC) CMWs and 26 control (government) CMWs (in the quasi-experimental arm, resulting in a total of 52

clusters), and 400 respondents in district Kech. The sampling process was therefore modified as follows:

1. **Quetta:** Given that there were only seven SMNC-CMWs in district Gwader, we had to select the remaining 19 CMWs from Quetta to meet the required sample size of 26. The 19 CMWs were randomly selected from a list of 22 SMNC-CMWs available in Quetta. These 19 CMWs were found to be located in 11 union councils. A control group of 19 non-SMNC-CMWs was also randomly selected from the government lists. If a selected control-CMW was located in the same union council of a SMNC-CMW, she was replaced by another randomly selected non-SMNC-CMW. Due to security concerns, two CMWs were replaced with CMWs living in safer areas. The 19 control CMWs also emerged from 11 union councils. Table 1 below lists the SMNC-CMWs and control CMWs by name of neighborhood, the general socio-economic status of inhabitants in this neighborhood (as understood by Quetta locals), and approximate distance from health facilities in terms of driving time. Figures 1a, 1b, 1c and 1d are snapshots of Google maps locating the CMWs precise location within Quetta City. These maps also show the location of various health facilities in the city.

The maps indicate that all CMWs, except one, are concentrated in urban Quetta (Fig 1b). Since MC selected its intervention CMWs from the government CMWs, they are, by extension, limited to urban Quetta. Fig. 1a and 1c demonstrate that both the SMNC-CMWs and control CMWs are scattered throughout the city. Most live in proximity of a health facility, often the major hospitals such as Bolan Medical Complex, Civil Hospital and the Combined Military Hospital. A map to show the distribution of the CMWs in Quetta and its outlying areas indicates that only one CMW is located in union council Panjpai, which is an approximately 90 minute drive from Quetta city. (Fig 1d).

Table 1: List of Sampled CMWs in Quetta

| No	CMW	Address	Union Council	General socio-economic status of residents	Health facilities	LHW data
1.	Aliya	Killi Mubarak	Ahmed Khanzai	Upper, middle and lower middle class	Bolan Medical Complex (BMC) Civil Hospital nearby, Ahmed Khanzai BHU Dr. Sakni Lashari maternity home	Yes
2.	Anum Mir	Killi Ismail Near Jinnah town	Killi Ismail	Upper, middle and lower middle class	Bolan Medical Complex (BMC) Civil Hospital reachable Taraqi Trust Hospital, FPAP Family Health Centre	Yes
3.	Farida Mahraj	Mengal Street	Killi Ismail	Upper, middle and lower middle class	Bolan Medical Complex (BMC), Civil Hospital reachable, Taraqi Trust Hospital, FPAP Family health centre	Yes
4.	Farzana Aziz	Killi Sardar Nabi Bukhsh	Panjpai	Unknown	Unknown	Yes
5.	Fatima Abdul Hakeem	Killi Ibrahimza	Pashtoonbaag	Afghan middle and lower class	BMC is 10-15 minutes drive Musa Memorial Hospital	Yes
6.	Mahjabeen	Bashir Chowk, Sariab Road	Qambrani	Mix of upper, middle and lower class	AL Khidmat Hospital and a govt hospital 7-10 minutes drive from MC office	Yes
7.	NazBibi	Qurban Ali Street	Pashtoonbaag	Afghan middle and lower class	BMC is 10-15 minutes drive Musa Memorial Hospital	Yes
8.	Rukhsana Arshad	Street# 3 Muhala Faizabad, KilliSamugli	Shaboo	Middle and lower middle class	BMC hospital - 20 min drive Two private maternity hospitals	Yes

9.	Ruqaya Shabir	Killi Khayzi	Shaboo	Middle and lower middle class	BMC hospital - 20 min drive Two private maternity hospitals	Yes
10.	Sadaf Naz	Wapda Colony	Nawa Killi	Lower and middle class	Mission Hospital -15-20 minutes CMH Quetta Cantt	Yes
11.	Sadaf Yaqoob	Gulbaran Chock Bashir Abad	Nawa Killi	Lower and middle class	Mission Hospital -15-20 minutes CMH Quetta Cantt	Yes
12.	Sadiqa Rustum	Teen town Faiz Abad Road	Sirki	Middle class	Civil hospital- 7-8 minutes drive from Lady Dufferin hospital - 5 minutes BHU nearby	Yes
13.	Saeeda Irum	A1 city	Pashtoonbaag	Upper and middle class	BMC 5 min drive away	No
14.	Saeeda Kareem		Mariabad	Largely government housing colony- middle and lower middle class	BMC hospital – 7-8 min drive Near MC office	Yes
15.	Sajida Shameem	Essa Negri, Golli Mar Chowk, Brewery Road	Mariabad	Largely government Housing colony- middle and lower middle class	BMC hospital – 7-8 min drive Near MC office	Yes
16.	Samina Ramzan	Near Wahid General Store, Killi Ismail	Killi Ismail	Mix of upper and lower middle classes	Taraqi trust Hospital, FPAP Family health centre BMC is nearby Mission Hospital and Civil Hospital are also reachable	Yes
17.	SanoberNaz	Shahzaman Street, Arbab Karam Khan Road	Arbab Karam Khan Road	Upper and Upper middle class –	Civil hospital - 10 min drive Akram Hospital, Sajid Hospital and Saleem complex each one at 5 min drive away	
18.	Shahida Azad	Zarghoonabad Phase 2, Nawa Killi	Nawa Killi	Lower and middle class	Mission Hospital -15-20 minutes Combined Military Hospital, Quetta Cantt.	
19.	Zahida	Quetta Cantt	Quetta Cantt	Mostly Army and police officials	Combined Military Hospital - 15 minutes drive Mission 3-4 minutes drive	

	GOVERNMENT CMWS (CONTROLS)					
20.	**Name of CMW**	**CMW address**	**Union Council**	**General socio-economic status of residents**	**Health facilities**	**LHW database used**
21.	Husun Bano	Podgali Chowk, Killi Ferozabad	Wahdat Colony	Upper and middle class	BMC 10-15 minutes drive – BHU 5 minutes	
22.	Rasheeda	Peon Colony Quetta	Chaman Patak	Mix of upper, middle and lower class	Civil hospital 5 minutes drive Lady Dufferin 10 minutes drive Mission Hospital 10 minutes drive	
23.	Farida Ashraf	Joint Road, Quetta	Railway housing society	Middle and lower middle class	Civil hospital 10-15 minutes drive Akram Hospital, Sajid Hospital and Saleem complex each one 6-7 minutes drive away	
24.	Murad Bibi	Chaman Park, Quetta	Chaman Patik	Mix of upper, middle and lower class	Benazir Hospital (govt) 7 minutes drive Shahid Zaman hospital 5 minutes drive Mission Hospital 10 minutes	
25.	Najma Akhtar	Quaidabad Quetta	Alamdar	Middle and lower class	Benazir Hospital (govt) 7 minutes drive Shahid zaman hospital 5 minutes drive Mission Hospital 10 minutes	
26.	Ruth Anwar	Christan colony Quetta	Killi Kasi	Lower class, mostly sweepers	Mission Hospital 4-5 minutes drive Civil is 6 minutes drive away	
27.	Saiqa Zahoor	Killi Shahozai Brewery Road, Quetta.	Wahdat Colony	Upper and middle class	BMC 10-15 minutes drive BHU nearby	
28.	Farida Maraj	Patel Road, Quetta	Patel road	Middle and lower class	Civil hospital 6-7 minutes drive Alshifa hospital and Lady Dufferin hospital 6-7 minutes drive	
29.	Rukhsana Gulzar	Killi Chakar Khan Shahzaman Road	Wahdat Colony	Upper and middle class	BMC 10-15 minutes drive , BHU nearby	

30.	Sareeta Kumari	Ram Ji Line Masjid Road Quetta	Poodgalli	Middle and lower class-mostly Hindu community	Civil Hospital 2 minutes drive, Lady Dufferin Hospital 6-7 min drive, Mission Hospital 10 min drive	
31.	Hanifa	H.No.E-40, Wahdat Colony	Wahdat Colony	Upper and middle class	BMC 10-15 minutes drive, BHU nearby	
32.	Margrate	Edon Road, Shahzaman Road,	Patel Road	Middle and lower class	Civil hospital 6-7 minutes drive Alshifa hospital and Lady Dufferin hospital 6-7 minutes drive	
33.	Saima	Fatima Jinnah TB Sentorium Hospital Quetta	Deba	Middle and lower middle class	BMC 10 min drive	
34.	Abida Nigar Ahmed	Faqir Mohammad Road Quetta	Faqir Muhammad	Upper, middle and lower middle class	Civil hospital 10 minutes drive Alshifa hospital, Akram hospital and Imdad hospital 10 minutes driving distance	
35.	Mehraf	PandraniSabzal Road Quetta	Sabzal	Middle and lower class	BMC 15 minsdrie	
36.	Farkhanda Yousaf	Muslim Town Gali No.7 Quetta.	Sabzal road	Upper and lower middle class	BHU and BMC is 6-7 minutes drive Dr.NajmaSher's clinic also in this area	
37.	Riffat Bashir	Barma Hotel Sariab Road, Quetta.	Sabzal	Middle and lower class	BMC 15 minutes drive away	
38.	Sonia	Spinny Road Near Baba PehalawanZiarat.	Hudda	Upper and lower middle class	BHU and BMC is 6-7 minutes drive Dr.NajmaSher's clinic also in this area	
39.	Zar Bano	Jail Road Hudda Quetta	Hudda	Upper and lower middle class	BHU and BMC is 6-7 minutes drive Dr. Najma Sher's clinic also in this area	

Figure 1a: Google map of Quetta listing SMNC-CMWs and health facilities
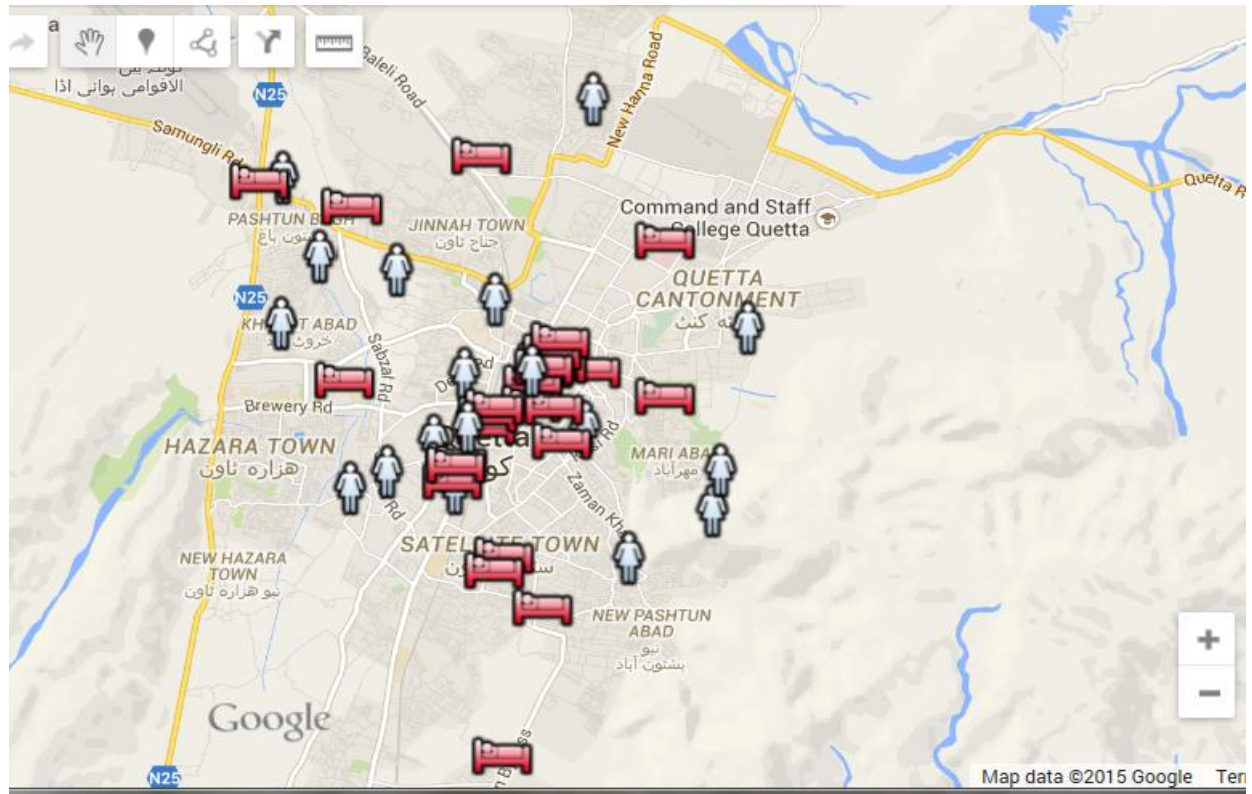
* Only 18 CMWs have been mapped. The 19th CMW was located in Panjpai, a rural area that is approximately a 90 minute drive from Quetta (shown in Figure 1d).

Figure 1b: Google map of Quetta listing control (non-SMNC) CMWs and health facilities

Figure 1c: Google map of Quetta listing SMNC-CMWs and control (non-SMNC) CMWs and health facilities

Key:
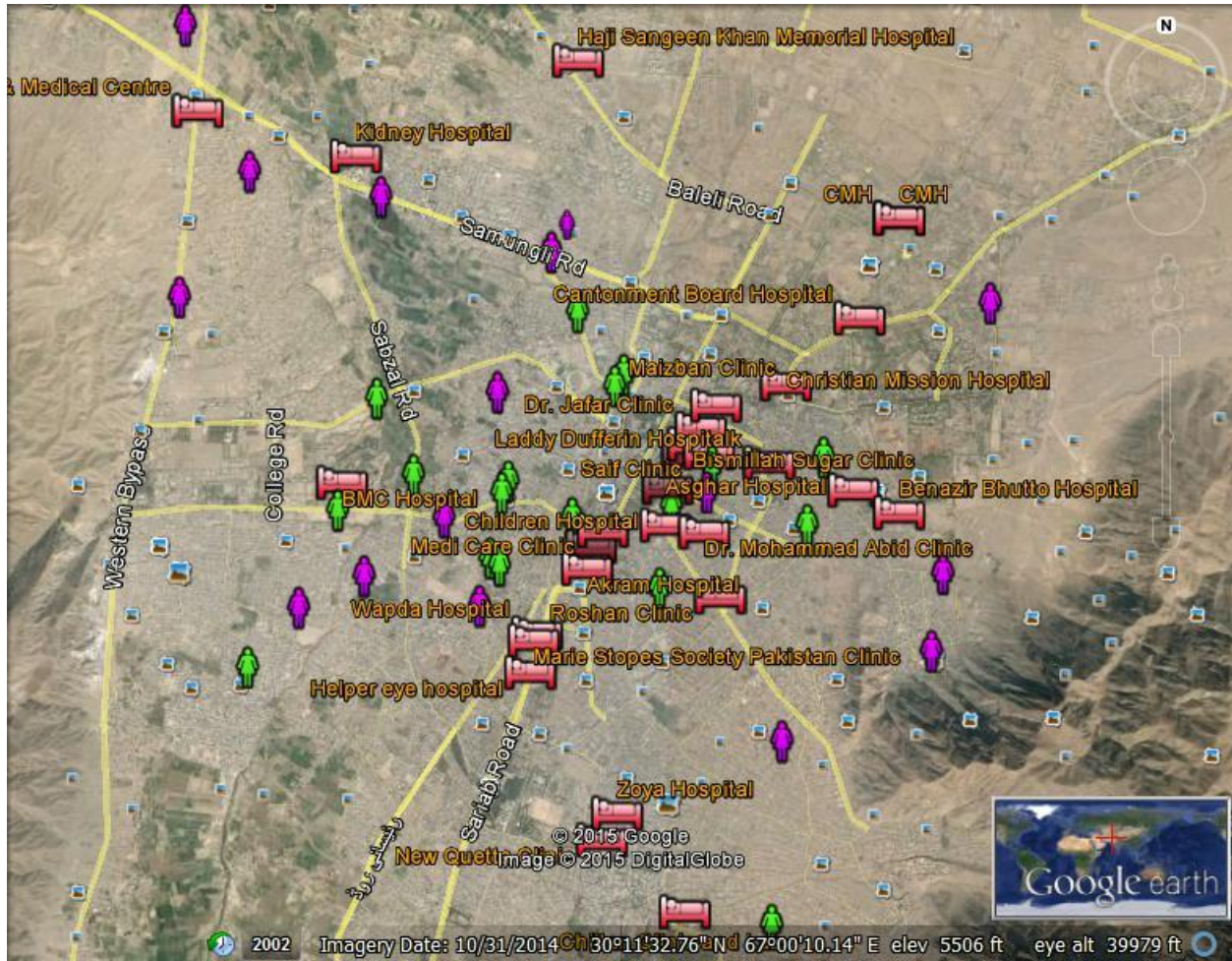
* Green figures: Control (non-SMNC) CMWs

* Purple figures: Intervention (SMNC) CMWs

Figure 1d: Google Earth map of Quetta listing SNMC and control CMWs and Health facilities- by health facility identity (zoomed out)

Key:

* Green figures: Control (non-SMNC) CMWs

* Purple figures: Intervention (SMNC) CMWs

2) **Gwader:** all 7 SMNC-CMWs available were sampled. Seven control non-SMNC-CMWs were randomly selected from lists provided by MC. All the CMWs, with the exception of one SMNC-CMW in Ormara, were based in Gwader city. Annex 3a lists the SMNC-CMWs and control CMWs by th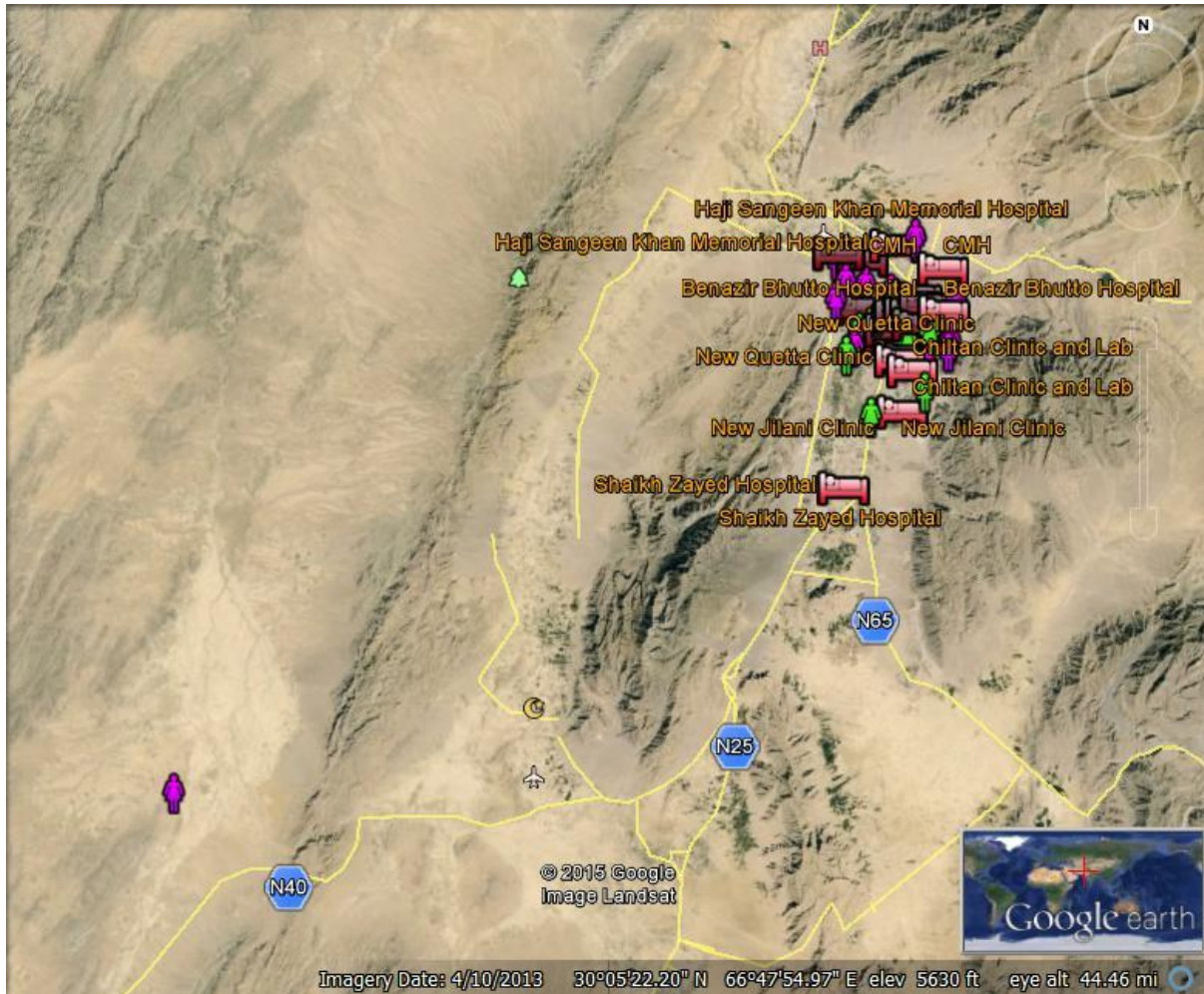eir residential address. We could not locate these CMWs on google maps (as done for Quetta) because the CMWs addresses here were based on wards (as provided by MC office). Gwader district office did not share with us the administrative map of Gwader city (and district), the MC-map of union councils is too gross to describe the wards and the Google map does provide street names (as it does in Quetta).

3) **Kech:** a pre-post study was conducted, as the objective of the baseline survey was to assess coverage of maternal and newborn care before the launch of the SMNC initiative. A simple cross-sectional survey was carried out in areas where the SMNC intervention was to be launched (Batch 2 only). There were no control sites. Security challenges in Kech were much greater than Quetta and Gwader. Although there were 20 SMNC-CMWs in the district, only 7 were located in areas accessible from a security perspective. As a result, these 7 'accessible' CMWs were sampled. All were located between 4 and 40 km from Turbat city (as determined by the costs of transporting the enumerators). As for Gwader above, we were unable to locate the CMWs on Google or administrative maps of Kech, for identical reasons.

2.3 Sampling of women respondents

As stated above, a cluster was defined as a CMW and the women of reproductive age living in her catchment area, who had given birth within three years of the survey. We chose to use the Lady Health Worker databases to identify eligible women because 1) geographically defined catchment areas of the SNMC-CMWs were **NOT** available and 2) the CMW addresses only named the general neighborhood. There was no specific address available that could pinpoint the exact house. In the case of SNMC-CMWs, a phone number was available and these CMW would arrange to meet the RT in a nearby market. The control CMWs could NOT be contacted at all since no phone numbers were provided to the RT. In the absence of a geographically defined catchment areas with only the name of neighborhood to go by, the next best option was contacting the LHWs of that general area and requesting her lists of children born in the past three years. Use of existing lists and databases to identify eligible respondents is valid alternative. The Canadian Community Health Survey (CCHS) uses telephone directories. EPI lists have been used to collect data from women who had been pregnant in the year prior to the survey to assess the impact of a health education tool in Baluchistan [17]. We have successfully used LHW databases to identify eligible women in Punjab [8].

As a first step, the RT contacted the LHW supervisor of the union council in which a sampled CMW was located to identify all LHWs serving in the neighbourhood in which the selected CMW was supposed to be deployed. In Quetta and Gwader districts, all sampled clusters except one had functional LHWs (37/38 in Quetta and 10/14 in Gwader). These LHWs also functioned as polio workers, and had extensive knowledge of which households had children less than three years of

age. Most had recorded between 15-20 births. Based on the LHW databases (often 2 per cluster), lists of all women who had given birth in the last three years within the union council were developed. In each cluster, 28 eligible women were randomly selected from these lists. In Kech district, none of the selected clusters had a LHW. Instead, polio workers in the neighborhoods of the CMWs residence were asked to develop lists of eligible households. To meet the required sample size of 400 women, 56 eligible women per cluster were selected.

In all sites, the LHWs and polio workers also helped the RT identify the exact location of eligible houses and introduced the RT to women. This introduction was extremely helpful, as it facilitated the enumerators' entry into the houses, which has become difficult in the current climate of insecurity in Baluchistan, and Pakistan more generally. This introduction also reduced probability of refusal.

A total of 1,521 eligible women were interviewed for the quasi-experimental study and 415 women for the pre-post study. These numbers are further broken down as follows: 1,112 women in 38 clusters (19 SMNC-CMW catchment area and 19 controls) in Quetta district, and 411 women in 14 clusters (7 SMNC-CMW catchment area and 7 controls) in Gwader district.

2.4 Questionnaires

The primary data collection tool for the survey was a questionnaire with close-ended questions. The content of the questionnaire was based on USAID MCHIP Rapid Knowledge, Practices and Coverage (KPC) survey of maternal care, child spacing, newborn care and breast-feeding. Questions related to use of CMW care and social exclusion were added to address the objectives of the study. These questions have been validated in a previous survey in Punjab [8]. The questionnaire was presented to MC Islamabad office for final approval. It was then translated into Urdu, Pushto, Balochi and Brevi by MC-hired, Quetta-based translators. All questionnaires were piloted and pre-tested in Hudda, a neighborhood in Quetta city, selected because of its diverse population and languages. Since the translators could not attend the piloting meetings, MC staff in Quetta who knew the languages volunteered and provided the necessary corrections in translations.

The questionnaire was used to collect information from ever-married women, aged 15-49, on the following topics:
- Socio-demographic characteristics (education, marital status, etc.)
- Antenatal, delivery, and postnatal care (type of provider, place of delivery, cost of care)
- Knowledge and use of a Community Midwife
- Newborn care, breast-feeding (clean cord cutting, thermal care, immediate breastfeeding of newborns).
- Knowledge and use of family planning
- Behaviour change communication
- Patient satisfaction with their maternity care provider

2.5 Training enumerators

The RT interviewed and hired enumerators and coordinators in Quetta from a list of applicants provided by MC. In Gwader, the entire applicant pool consisting of 6 applicants were recruited as enumerators by MC staff. The Kech team was recruited directly by the RT. One Quetta supervisor and one Gwader supervisor were replaced after training, when it was realized they did not meet competency requirements. One and half day training sessions were held in:

1) Quetta MC office for 12 enumerators and 2 supervisors

2) Gwader DHQ for 6 enumerators and 1 coordinator

3) Kech for 6 enumerators and 1 supervisor

Training consisted of didactic training and mock exercises. The trainer provided the training in person in Quetta and Gwader. The Kech team was trained via Skype from Islamabad, as security concerns prevented the trainer from travelling to Kech. The following subjects were dealt with in the training sessions:

Day 1
1) Introduction to: Community Midwives (CMW), the SMNC intervention, objectives of the research, research design – 45 minutes
2) Introduction to the questionnaire – Introduction to key terms used in the questionnaire, meaning of the questions
3) How to conduct an interview
4) Field and interviewing etiquette
5) Effective interviewing techniques

Day 2
1) Recap of Day 1
2) Respondent selection
3) Roles of the interview team
4) Mock exercise: A team of two participants filled out two questionnaires by switching the roles of interviewer and interviewee. The survey supervisors monitored the data interviews and gave feedback to the participants.

Detailed training notes from each site are available in Annex 3.

2.6 Data Collection

Data collection was supervised in person by Afshan Bhatti in Quetta, and by supervisors in Gwader and Kech. Supervisors developed lists of eligible women to be interviewed and with the help of the local LHW, accompanied the enumerators to the house and introduced the enumerators to eligible women. To check the quality of interviewing, supervisors observed any randomly selected enumerator collecting data, checking to ensure: the questions were stated exactly as instructed, explaining questions and answers that were not being properly interpreted, and that particular responses were not being induced.

In Gwadar and Kech, Afshan Bhatti (AB) remained in close contact with the RT through phone and Skype. The RT members were randomly called on phones and asked to put the phone on speaker while collecting data in the households. AB was also available on her phone for any queries from the RT during the data collection, and responded their queries as and when required.

At the end of each workday, the team reviewed all the questionnaires they had completed. Each enumerator checked that all questions had been answered and were legible. They verified the consistency of answers and filled in questions that they had marked aside (i.e. a woman may list a number of post-partum symptoms, however, if the enumerator was unsure of where to enter these symptoms, she would write them out and then fill out the appropriate choices in the questionnaire.)

2.7 Data cleaning and data entry

The completed questionnaires were transported to Islamabad. AB and a research assistant reviewed each questionnaire, checking for completeness, consistency and legibility of answers. Data was entered twice using SPSS. The two files were merged and any non-matching data checked to identify the source of inconsistency. The final dataset file was uploaded on the cloud to be analyzed by the Canadian team at the University of Alberta.

2.8 Data Analysis

Data in Canada were analyzed using Stata 13.0. The key socio-demographic characteristics were categorized as follows: women and their husband's education were categorized as – no education, primary education (1-5 years of schooling), secondary education (6-10 years of schooling), and post-secondary education (11 plus years of schooling). Women's occupations were categorized as – professional, skilled workers, agricultural laborer on other's land, and unskilled workers. Men's occupations were similarly categorized, but included unemployed as one additional category.

To assess socio-economic status, the Material Asset Index was developed. Based on literature from Pakistan, context-specific variables of material assets, such as type of house-building material, source of water, availability of electricity, type of cooking fuel and ownership of TV, cars, telephone and

livestock were used. The Material Asset Index was developed using the Pakistan Poverty Score developed by the World Bank [18]. While the Pakistan Poverty Scorecard scores on a scale of 1-100 using 10 indicators, we chose to score on a scale of 1 to 10 on 46 variables. For example, the building material for walls of a house were given a score of 10 if it was constructed of cement bricks, and 0 if it was constructed of cardboard, cloth or plastic. Similarly, if a household had tap water supply, it was given a score of 10. See Annex 4 for a list of variables included in the index.

Indicators for maternal and newborn case use included antenatal care (1 and 4 or more visits), type of antenatal care provider, type of birth attendant (with CMW as a separate category), place of delivery, total cost of childbirth care, current use of a family planning method, clean cord cutting, active management of third stage of labour, post-partum visit for the mother, thermal care (immediate drying and wrapping), immediate breastfeeding of newborns, and patient satisfaction levels with their maternity care provider.

Univariate analyses were done to assess distribution of the respondents by key socio-demographic characteristics and levels of maternal and newborn care and practices. Bivariate analyses with chi-square testing were done to measure the significance of any differences in the distribution of maternal health care practices between the intervention and control groups.

2.9 Data Security

Collecting only the necessary information ensured respondent privacy and confidentiality. All data and any confidential information, such as names and other identifying information that were known to the researchers, were put into password-protected documents on the research project computer. Only the researchers had access to the list of participants' names. The hardcopies of the survey questionnaire, qualitative data transcripts and consent forms are stored in a locked cabinet in the project office in Islamabad.

2.10 Ethical Concerns

Ethics approval was obtained from the University of Alberta Health Research Ethics Board and the National Bioethics Committee, Pakistan. Confidentiality, voluntary, informed participation and safety of participants were given priority during the research process. All formal interviews required participant consent following a clear presentation of their rights as well as risks/benefits of study participation. Oral consent was obtained from the respondents because the research was conducted in an area with low levels of education. Requests for signatures in this context are viewed with a high degree of suspicion, as it indicates that a legal document is being signed, over which they perceive they will have little control.

3. FINDINGS

3.1 Overall socio-demographic characteristics

Overall, the mean age of our sample of 1,936 women was 27.9 years. Almost all are currently married (98.75) and have an average of 3.14 children. Most have never attended school (49%), with only 16% reporting post-secondary education. Their husbands are better educated, with 36% reporting secondary education and 30% post-secondary education. Following these levels of education, nearly half of respondents (49%) reported their husbands worked in professional occupations and 34% in skilled labour occupations (see Table 2).

3.2 Socio-demographic characteristics by district

Table 2 also lists the socio-demographic characteristics of our respondents by district. The mean age of women in Quetta, Gwader and Kech districts was 27.7, 27 and 29.4 years, respectively. Nearly all are currently married. Respondents in Quetta have a mean of 3.2 children, 2.7 in Gwader and 3.4 in Kech. More women in Gwader and Kech have never attended school compared to Quetta (58% and 59% vs. 43%). Correspondingly, more respondents in Quetta have a high school or post-secondary education compared to respondents in Gwader. Nearly 58% of respondents in Quetta reported their husbands worked in professional occupations, while 35% and 42% did so in Gwader and Kech, respectively. The next greatest husband occupation reported was skilled workers. Only a minute proportion of husbands work in the agricultural industry or unskilled occupations in Quetta and Gwader, while nearly 24% did so in Kech.

The Material Asset Index closely reflected the level of husband's occupations in the three districts. In Quetta, over 50% of women were categorized in the third or fourth quartile (wealthy) of the Material Asset Index. In Gwader, a larger women proportion of women, 65%, were categorized in the third and fourth quartiles. By contrast, only 32% of women were categorized in the third and fourth quartiles in Kech. Here more women (68%) were categorized in the first (poor) and second quartiles. Overall, these socio-demographic characteristics indicate a sample of an urban, educated and largely well-off population in Quetta and Gwader, but a more poor, less educated population in Kech.

Table 2: Socio-demographic characteristics, overall and by district (baseline round 1)

Indicators	Baseline Round 1			
Socio-demographic characteristics:	Quetta	Gwader	Kech	Total
N (number of respondents):	1110	411	415	1936
Woman's age (mean):	27.7	27.0	29.4	27.9
Currently married (%):	99.0	99.5	96.9	98.7
Mean number of children:	3.2	2.7	3.4	3.1
Woman's education (%):				
No Education (0)	42.5	57.5	58.8	49.2
Primary or less (1-8)	11.7	12.5	5.1	10.5
High School or less (9-12)	28.7	17.9	21.0	24.8
More than High School (12+)	17.1	12.2	15.2	15.6
Husband's Level of education (%):				
No Education (0)	21.3	50.0	35.4	30.4
Primary or less (1-8)	4.7	4.7	3.6	4.5
High School or less (9-12)	34.4	20.6	22.8	29.0
More than High School (12+)	39.7	24.8	38.1	36.2
Women's employment (%):				
Yes	11.2	4.1	23.9	12.4
If employed, type of work (% of employed women):				
Professional	24.8	60	18.8	24.6
Skilled workers	70.1	33.3	54.2	61.0
Agricultural labourers on other's land	1.7	0	3.1	2.2
Unskilled workers	3.4	6.7	24.0	12.3
Husband's occupation (%):				
Professional/landowner	57.3	34.7	42.0	49.2
Skilled worker	26.1	56.3	30.8	33.5
Agricultural labourer on other's land	3.8	0.8	15.8	5.7
Unskilled worker	8.6	3.0	7.6	7.2
Not working/ unemployed	4.3	5.3	3.8	4.4
Agriculture land ownership (%):	9.0	8.3	12.5	9.6
House ownership (%):				
Own the house and land	54.7	77.9	65.1	61.8
Own house, but not land	3.2	2.4	2.2	2.8
Not own house	42.1	19.7	32.8	35.3
Material Asset Index:				
First quartile (poorest)	24.4	12.9	36.1	24.5
Second quartile	24.3	22.6	31.8	25.6
Third quartile	23.0	35.5	21.9	25.4
Fourth quartile (non-poor)	28.3	29.0	10.1	24.5

3.3   Maternal and newborn health status – overall sample

Table 3 outlines the uptake of maternal health services in the three districts. Overall, 63% of the respondents reported 4 or more ANC visit during their last pregnancy. The most common ANC providers were the physicians (83%) followed by non-physician skilled birth attendants (LHW, midwives, nurses) at 9.4%. ANC care from a *Dai* was reported by 5.4% and from a CMW by 2.1%. Eighty seven percent reported use of iron supplements during pregnancy, but only 26% reported receiving two doses of tetanus injection.

Over 80% of all births took place in a facility, either in the public (50%) or the private sector facility (31%). Only 17% of births took place at home and 2.6% in a CMWs house. Physicians attended 64% of all births, followed by non-physician skilled birth attendants at 21%. D*ais* attended 12% of the birth and CMWs 2.5%.

Nearly 70% of the respondents reported that their attendant used a clean delivery kit, and 87% reported their cord was cut cleanly with a sterile instrument. Only 7% reported hygienic cord care. Thirty five percent reported active management of third stage of labor.

As shown in Table 3, the nearly 94% of women reported their newborn had been wrapped and immediately dried. Sixty percent reported delayed bathing and 33% skin-to-skin contact. Only 21% reported the baby had been put to the breast immediately after birth and 65% reported exclusive breast-feeding.

Overall, 57% of respondents reported current contraceptive use. The most common methods were the condom (21%) and pill (17%). Only 1.4% reported female sterilization, possibly reflecting the young mean age of the sample.

3.4 Maternal health status by district

When stratified by district, 70% and 72% of women reported at least 4 ANC visits in Kech and Gwader respectively while 58% did so in Quetta. In all three districts the doctor was the primary antenatal care provider (Quetta 89% and Gwader 72%). The vast majority of women used iron supplements during pregnancy.

Over 80% of women in Quetta and 78% in Gwader had a facility birth. The most common birth attendant was a physician: 72% in Quetta and 57% in Gwader. Eighty one percent of the respondents in Quetta and 97% in Gwader reported clean cutting of the cord. Only 6% in Quetta and 7.6% in Gwader reported hygienic cord care. Active management of labour was reported by 38% of women in Quetta and 40% in Gwader (see Table 3).

Table 3: Maternal and Newborn Health care indicators in Quetta, Gwader and Kech (baseline round 1)

Indicators	Baseline Round 1			
	Quetta	Gwader	Kech	Total
Maternal Health Indicators:				
Antenatal Care (%):				
ANC (1 visit):	99.4	99.8	93.6	98.2
ANC (4 visits):	57.9	72.5	70.2	63.6
Type of ANC provider:				
Doctor	89.1	71.7	78.3	83.1
Non physician skilled birth attendant	4.1	26.3	6.9	9.4
CMW	0.6	0.3	8.1	2.1
Traditional Birth Attendant	6.2	1.7	6.7	5.4
Used iron supplements during pregnancy:	86.9	92.9	85.4	87.8
Received two doses of tetanus vaccination:	55.9	0.4	1.2	26.4
Childbirth:				
Type of childbirth attendant:				
Doctor	71.6	57.2	52.3	64.4
Non physician skilled birth attendant	13.2	32.6	30.8	21.1
CMW	0.2	1.5	9.9	2.5
Traditional Birth Attendant	15.1	8.8	7.0	12.0
Place of delivery:				
Government health facility	50.4	45.5	52.2	49.8
Private health facility	31.4	38.2	23.7	31.1
Home (home and *dai* home)	17.8	15.8	14.0	16.6
CMW clinic/home	0.5	0.5	10.1	2.6
Used Clean Delivery Kit:	68.5	85.4	54.8	69.3
Hygienic Cord Care:				
Cord cut cleanly	80.9	96.8	95.0	87.6

Hygienic cord care	6.1	7.6	8.8	7.0
Active Management of the third stage of labour (AMTSL):	38.7	40.1	18.8	34.6
Birth Preparedness:				
Total amount of money spent on last delivery (PKR):				
<2000	18.9	9.0	8.2	14.5
2,000 to < 5,000	31.7	25.4	16.2	27.0
5,000 to < 10,000	18.1	40	36.5	26.7
>10,000	31.3	25.6	39.1	31.8
Set aside this money in case of an emergency:	67.8	36.3	69.6	61.5
Postnatal Care:				
PNC (1 visit)	57.0	67.4	57.8	59.4
Type of postnatal care provider:				
Doctor	86.7	72.9	85.0	83.0
Non physician skilled birth attendant	6.6	26.0	2.9	10.5
CMW	0.2	0	10.4	2.3
Traditional Birth Attendant	6.5	1.1	1.7	4.2

3.5   Newborn health indicators by district

Table 4 lists the rates of key newborn health indicators by district. While over 90% of newborns in all three districts were immediately dried and wrapped, rates of delayed bath were much lower. Sixty seven and 63% of women reported delayed bath in Quetta and Gwader, respectively, but only 39% did so in Kech. In contrast, more women (45%) reported skin to skin contact in Kech while only 27% and 30% did so in Quetta and Gwader. Rates of immediate breastfeeding were also low, with 17% and 18% of women in Quetta and Kech reporting immediate breastfeeding.

Table 4: Newborn healthcare indicators in Quetta, Gwader and Kech (baseline round 1)

Indicators	**Baseline Round 1**			
	Quetta	Gwader	Kech	Total
Newborn health indicators: **Thermal Care:**				
Immediate Drying	95.2	97.1	87.7	93.9
Immediate Wrapping	96.2	95.9	90.2	94.8
Delayed bath	67.1	62.6	39.2	60.3
Skin to skin contact	27.4	30.7	44.8	32.7
Baby was weighed:	54.4	68.9	47.0	55.8
Breastfeeding:				
Baby put to breast immediately after birth	17.7	31.9	18.1	20.8
Baby fed colostrum	86.1	80.9	83.6	84.4
Baby exclusively breastfed	46.8	84.4	83.7	64.6

3.6 Knowledge and demand for essential maternal and newborn care

Table 5 lists rates of knowledge of and demand for maternal and newborn health care by district. Overall, knowledge of danger signs during pregnancy, labor or in the postnatal period were highest in Quetta and lowest in Kech. Only about 1 in 4 women in Kech was able to correctly state at least two danger signs during pregnancy, labour and in the post-natal period. Only 4% were able to identify any risks associated with a birth to pregnancy interval of less than 24 months.

Regarding satisfaction with services, women in Gwader were most likely to report high levels of satisfaction, while women in Quetta and Kech less so (see Table 5).

Table 5: Knowledge of risk factors and satisfaction with Maternal and Newborn care in Quetta, Gwader and Kech (baseline round 1)

Indicators	Baseline Round 1			
	Quetta	Gwader	Kech	Total
Knowledge and Demand for Essential Maternal and Newborn Care:				
Knowledge of at least 2 danger signs during pregnancy	73.9	55.8	24.1	59.0
Knowledge of at least two danger signs during labour	68.9	56.6	28.0	57.7
Knowledge of at least two danger signs in the post-natal period	73.9	55.8	23.0	59.0
Knowledge of Healthy Timing & Spacing of Pregnancies	81.6	93.8	78.0	83.5
Knowledge of Risk Associated with Birth to Pregnancy Intervals Less than 24 Months	40.5	38.7	4.0	32.4
Satisfaction with the Quality of ANC Care:				
Satisfaction with number of antenatal visits:				
Very satisfied	42.5	87.81	27.9	49.1
Satisfied	56.1	10.94	66.4	48.6
Dissatisfied	1.4	1.25	5.9	2.3
Satisfaction with elements of ANC care:				
Very satisfied	42.1	89.1	27.8	49.1
Satisfied	56.5	9.6	67	48.8
Dissatisfied	1.4	1.29	5.2	2.3
Satisfaction with CMW behavior:				
Very satisfied	43.2	89.3	30.3	50.3
Satisfied	55.2	9.45	58.1	46
Dissatisfied	1.6	1.25	11.6	3.7
Satisfaction with quality of childbirth				

Care:				
Satisfaction with provider competency:				
Very satisfied	41.7	93.17	28.2	49.8
Satisfied	56.1	6.83	63	47
Dissatisfied	2.2	0	8.9	3.2
Satisfaction with compassion of provider:				
Very satisfied	39.1	93.43	36.2	50.1
Satisfied	55.2	6.56	58.1	45.4
Dissatisfied	5.8	0	5.7	4.5
Satisfaction with provider concern for privacy and dignity:				
Very satisfied	42.8	93.66	35.7	52.2
Satisfied	54	6.34	56.6	44.3
Dissatisfied	3.2	0	7.7	3.6
Family Planning Indicators:				
Current contraceptive use:	51.8	69.8	57.1	56.8
Type of contraceptive:				
Female sterilization	1.7	0.2	1.7	1.4
Male sterilization	0.6	0.2	0.2	0.5
Pill	12.1	28.2	23.4	17.9
Injection	7.0	5.1	18.6	9.1
IUD	1.1	5.4	1.5	2.1
Condom	24.1	24.6	11.3	21.4
Rhythm	0.5	2.0	0.0	0.7
Withdrawal	4.7	4.9	0.5	3.8

4. QUASI-EXPERIMENTAL STUDY

4.1 Socio-demographic characteristics by Intervention Status

Table 6 lists the socio-demographic characteristics of our respondents by intervention status. No statistically significant differences are noted in women's age, marital status, mean number of children, women's employment, type of work they do if employed, their husband's occupation and Material Asset Index. Statistically significant differences are noted in women's education, husband's education and house ownership. Women and their husbands have lower levels of education in the SMNC-catchment areas compared to controls.

Table 6: Socio-demographic characteristics by intervention status

Baseline Round 1			
Socio-demographic characteristics	SMNC	Control	p value
Woman's age (mean):	27.4 (27.1, 27.8)	27.6 (27.2, 28.0)	0.98
Currently married (%):	99.4	98.9	0.87
Mean number of children (per woman):	3.1 (3.0, 3.2)	3.1 (2.9, 3.2)	0.68
Woman's education (%):			0.007*
No Education	49.7	43.0	
Primary or less	12.8	11.1	
High School or less	24.1	27.6	
More than High School	13.4	18.3	
Husband Level of education (%):			0.022*
No Education	30.9	27.0	
Primary or less	5.3	4.0	
High School or less	31.6	29.6	
More than high school	32.2	39.5	
Women's employment (%):			
Yes	90.1	91.4	0.381
If employed, type of work (%):			0.983
Professional	30.6	26.7	
Skilled workers	63.9	68.3	
Agricultural labourers on other's land	1.4	1.7	
Unskilled workers	4.2	3.3	
Husband's occupation (%):			0.256
Professional/landowner	50.9	51.4	
Skilled worker	32.9	35.7	
Agricultural labourer on other's land	3.5	2.4	
Unskilled worker	7.3	6.9	
Not working/ unemployed	5.4	3.7	

Agriculture land ownership (%):	10.2	7.4	
Yes			0.055
House ownership (%):	65.0	56.6	0.003*
Own the house and land	2.5	3.6	
Own house, but not land	32.5	39.8	
Not own house			
Material Asset Index (%):			0.886
First quartile (poorest)	21.8	20.7	
Second quartile	23.1	24.7	
Third quartile	26.4	26.3	
Fourth quartile (non-poor)	28.7	28.2	
Multi-dimensional Poverty Index (%):			0.207
First quartile (poorest)	23.0	19.4	
Second quartile	25.3	23.7	
Third quartile	25.1	28.1	
Fourth quartile (non-poor)	26.7	28.8	

4.2 Maternal health care by intervention status

Table 7 lists the maternal health care status of our respondents by intervention status. No statistically significant differences are noted in most indicators including type of ANC provider, birth attendant, whether a clean delivery kit was used at last birth, or family planning. However, statistically significant differences are noted in a number of key indicators including 4 ANC visits, use of iron supplements, type of birth attendant, place of delivery, whether the baby was weighed, or whether the baby was exclusively breastfed. Just as women and their husbands have lower levels of education in the SMNC-catchment areas, most of these indicators were lower in the SMNC intervention sites compared to control sites. However, although significantly different, most of the differences in rates are marginal. For example, ANC levels are 64.81% vs. 59%, p=0.021 in control and intervention groups, respectively. Importantly, uptake of CMW care in both sites is very low, less than 1%.

Table 7: Maternal health status by intervention status

Indicators	Baseline Round 1		
Maternal Health Indicators:	SMNC Total	Control Total	p value
Antenatal Care (%):			
ANC (1 visit):	99.5	99.4	n.s
ANC (4 visits):	59.0	64.8	<0.05
Type of ANC provider:			n.s
Doctor	83.6	85.3	
Non-physician skilled birth attendant	9.6	10.7	
CMW	0.8	0.1	
Dai	6.0	3.9	
Used Iron supplements during pregnancy:	86.8	90.4	<0.05
Received two doses of Tetanus vaccination:	30.3	35.7	n.s
Childbirth:			
Type of childbirth attendant:			<0.001
CMW	1.0	0.0	
Doctor	64.9	70.8	
Skilled birth attendant	17.5	19.4	
Dai/TBA	16.6	9.8	
Place of delivery:			
Home (home and dai home)	20.8	13.4	<0.001
CMW clinic/home	0.7	0.3	
Government	50.9	47.1	
Private	27.6	39.2	
Used clean delivery kit:	71.3	76.7	n.s
Hygienic Cord Care:			
Cord cut cleanly	84.9	84.5	n.s
Hygienic cord care	6.8	5.8	n.s
Active Management of the third stage of labour (AMTSL):	35.1	43.3	0.02*
Birth Preparedness:			
Total amount of money spent on last delivery (rps):			
<2000	18.1	14.3	n.s
2,000 to < 5,000	29.9	30.0	
5,000 to < 10,000	23.2	25.0	
>10,000	28.9	30.7	
Set aside this money in case of an emergency:	59.3	59.2	n.s
Postnatal Care:			
PNC (1 visit):	59.5	60.2	n.s
Type of postnatal care provider:			
Physician	81.7	83.5	n.s

Non physician SBA	13.2	11.8
CMW	0.2	
TBA	4.9	4.8

4.3 Newborn health care by intervention status

Table 8 lists the newborn care status of our respondents by intervention status. No statistically significant differences are noted in most indicators including immediate drying and wrapping, skin to skin contact, putting the baby to breast immediately and feeding colostrum. However, statistically significant differences are noted in two indicators: whether the baby was weighted and exclusively breastfed. Moreover, the trends in these rates follow the trends in maternal health care indicators, and are lower in the SMNC-catchment areas compared to control areas. Newborns were more likely to be weighed in control sites than in intervention sites (65% vs. 52%, p=0.001).

Table 8: Newborn healthcare by intervention status

Indicators	Baseline Round 1		
Newborn Health Indicators:	**SMNC Total**	**Control Total**	**p value**
Thermal Care			
Immediate Drying	95.3	96.1	n.s
Immediate Wrapping	96.0	96.2	n.s
Delayed bath	61.9	70.2	n.s
Skin to skin contact	29.3	26.3	n.s
Baby was weighed	52.3	65.2	<0.001*
Breastfeeding:			
Baby put to breast immediately after birth	22.2	20.7	n.s
Baby fed colostrum	83.4	85.9	n.s
Baby exclusively breastfed	49.1	62.2	<0.05

4.4 Knowledge of risk factors and satisfaction with maternal and newborn care by intervention status

Table 9 lists knowledge of risk factors and satisfaction with maternal and newborn care by intervention status. No statistically significant differences are noted in most indicators of knowledge of at least 2 danger signs during pregnancy, labour or during the postnatal period, or family planning methods. Although there appear to be statistically significant differences between satisfaction with quality of care, there is no particular trend indicating greater satisfaction in the intervention or control sites for any particular element of ANC or childbirth. Annex 5 shows the same data expanded by district.

Table 9: Knowledge of risk factors and satisfaction with maternal and newborn care by intervention status

Indicators	Baseline Round 1		
	SMNC Total	Control Total	p value
Knowledge of risk factors:			
Knowledge of at least 2 danger signs during pregnancy	66.5	66.7	n.s
Knowledge of at least two danger signs during labour	66.0	64.6	n.s
Knowledge of at least two danger signs in the post-natal period	69.8	67.6	n.s
Knowledge of healthy timing and spacing of pregnancies	86.2	83.4	n.s
Knowledge of risk associated with birth to pregnancy intervals less than 24 months	41.9	37.9	n.s
Satisfaction with the Quality of ANC Care:			
Satisfaction with number of antenatal visits:			<0.001
Very satisfied	56.79	52.78	
Satisfied	40.84	46.94	
Dissatisfied	2.37	0.28	
Satisfaction with elements of ANC care:			<0.001
Very satisfied	56.96	52.7	
Satisfied	40.68	47.02	
Dissatisfied	2.36	0.28	
Satisfaction with CMW behavior:			<0.05
Very satisfied	58.29	53.06	
Satisfied	39.47	46.25	
Dissatisfied	2.24	0.69	

Satisfaction with Quality of Childbirth Care:			
Satisfaction with provider competency:			<0.05
Very satisfied	56.38	54.84	
Satisfied	41.2	44.34	
Dissatisfied	2.42	0.82	
Satisfaction with compassion of provider:			n.s
Very satisfied	54.52	53.07	
Satisfied	41.27	42.84	
Dissatisfied	4.2	4.09	
Satisfaction with provider concern for privacy and dignity:			<0.05
Very satisfied	57.53	55.53	
Satisfied	39.29	42.97	
Dissatisfied	3.19	1.5	
Family Planning Indicators:			
Current contraceptive use	55.6	57.8	n.s
Type of contraceptive:			
Female sterilization	0.9	1.8	n.s
Male sterilization	0.6	0.4	n.s
Pill	16.2	16.6	n.s
Injection	6.2	6.8	n.s
IUD	2.8	1.6	n.s
Condom	22.1	26.5	<0.05
Rhythm	1.0	0.8	n.s
Withdrawal	5.2	4.2	n.s

5. PROJECT INDICATORS

This section describes the project indicators by intervention and control sites for each district.

5.1 Socio-demographic characteristics of study population by intervention status and district

Table 10: **Socio-demographic characteristics of study population by intervention status and district**

Indicators	Baseline Round 1						
		SMNC			CONTROL		
	Kech	Gwader	Quetta	Total	Gwader	Quetta	Total
N (number of women):	404	206	500	706	203	550	753
Woman's age (mean):	29.4	26.8	27.6	27.3	27.1	27.8	27.6
Currently married:	96.5	100	99.0	99.3	99.0	98.9	98.9
Mean number of children:	3.37	2.66	3.21	3.05	2.81	3.16	3.07
Woman's education:							
No Education	58.8	62.8	45.2	49.7	52.2	39.5	43
Primary or less	5.06	10.8	13.5	12.8	14.2	9.9	11.1
High School or less	21.0	17.2	26.6	24.1	18.5	31.1	27.6
More than High School	15.2	9.3	14.8	13.4	15.1	19.5	18.3
Husband's level of education:							
No Education	35.4	53.9	22.7	30.9	46.0	19.7	27.0
Primary or less	3.6	4.4	5.7	5.3	5.0	3.6	4.0
High School or less	22.2	21.8	35.1	31.6	19.3	33.5	29.6
More than High School	38.1	19.9	36.5	32.2	29.7	43.2	39.5
Women's employment:							
Yes	23.9	4.9	11.7	9.9	3.4	10.6	8.6
If employed, type of work (% of employed women):							
Professional	18.8	55.6	27.0	35.0	66.7	22.2	26.7
Skilled workers	54.2	44.4	66.7	63.9	16.7	74.0	68.3
Agricultural laborers on other's land	3.1	0	1.6	1.4	0	1.9	1.7
Unskilled workers	24.0	0.0	4.8	4.2	16.7	1.9	3.3

Husband's occupation:							
Professional/landowner	42.0	35.5	56.4	50.9	34.0	58.2	51.4
Skilled worker	30.8	55.6	24.9	32.9	57.0	27.3	35.7
Agricultural laborer on other's land	15.8	1.0	4.3	3.5	0.5	3.1	2.4
Unskilled worker	7.6	2.0	9.2	7.3	4.0	8.0	6.9
Not working/ unemployed	3.8	6.1	5.2	5.4	4.5	3.3	3.7
Agriculture land ownership:	12.5	7.8	11.0	10.2	8.8	6.8	7.4
House ownership (%):							
Own the house and land	65.1	79.6	59.8	65.0	76.0	49.1	56.6
Own house, but not land	2.2	2.4	2.6	2.5	2.4	4.0	3.6
Not own house	32.8	18.0	37.6	32.5	21.5	47.0	39.8
Material Asset Index:							
First quartile (poorest)	38.6	18.9	25.6	23.9	12.7	24.8	21.4
Second quartile	31.1	31.6	24.7	26.5	21.5	24.6	23.7
Third quartile	16.1	30.1	23.5	25.3	41.0	22.5	27.7
Fourth quartile (non-poor)	14.2	19.4	26.1	24.4	24.9	28.0	27.2

5.2 Maternal health indicators by intervention status and district

Table 11: Maternal health indicators by intervention status and district

Indicators	Baseline Round 1						
	Kech	**SMNC**			**CONTROL**		
		Gwader	Quetta	Total	Gwader	Quetta	Total
Antenatal care:							
ANC (1 visit)	93.6	100.0	99.3	99.4	99.5	99.4	99.5
ANC (4 visits)	70.2	71.2	54.5	59.0	73.2	61.5	64.8
Type of ANC provider:							
Doctor	78.3	73.7	87.0	83.6	69.8	91.4	88.36
Non-physician skilled birth attendant	6.9	25.6	4.1	9.6	27.3	4.1	10.7
CMW	8.1	0.5	0.9	0.8	0.0	0.0	0.0
Dai/TBA	6.7	0.5	8.0	6.0	2.9	4.3	3.9
Used Iron supplements during pregnancy:	85.4	90.7	85.4	86.8	95.1	88.5	90.3
Received two doses of Tetanus vaccination:	1.2	0.7	50.5	30.3	0	62.1	35.7
CHILDBIRTH							
Type of childbirth attendant:							
CMW	9.9	2.9	0.3	1.0	0	0	0
Doctor	52.3	54.4	68.6	64.9	60.0	75.0	70.8
Non-physician skilled	30.8	31.1	12.7	17.5	34.2	13.6	19.4

Dai/TBA	7.0	11.7	18.4	16.6	5.9	11.4	9.8
Place of delivery:							
Home (home and *dai* home)	14.0	18.4	21.7	20.8	13.1	13.5	13.4
CMW clinic/home	10.1	1.0	0.5	0.7	0	0.4	0.3
Government facility	52.2	49.5	51.4	50.9	41.4	49.2	47.1
Private facility	23.7	31.1	26.4	27.6	45.6	36.9	39.2
Used clean delivery kit:	54.8	84.3	66.0	71.3	86.3	71.6	76.7
Hygienic cord care:							
Cord cut cleanly	95.0	94.7	81.9	84.9	100	79.2	84.5
Hygienic cord care	8.8	9.1	6.1	6.8	5.0	6.1	5.8
Active Management of the third stage of labour (AMTSL):	18.8	43.5	32.0	35.1)	36.6	46.0)	43.3
BIRTH PREPAREDNESS							
Total amount of money spent on last delivery (PKR):							
<2000	8.2	10.2	20.9	18.1	7.8	16.8	14.3
2,000 to < 5,000	16.2	27.7	30.7	29.9	23.0	32.8	30.0
5,000 to < 10,000	36.5	36.4	18.5	23.2	43.6	17.7	25.0
>10,000	39.1	25.7	30.0	28.9	25.5	32.8	30.7
Set aside this money in case of an emergency:	69.6	34.9	67.9	59.3	37.6	67.6	59.2
POST NATAL CARE							
PNC (1 visit):	57.8	65.5	57.4	59.5	69.3	56.6	60.2
Type of postnatal care provider:							
Physician	85.0	71.9	85.6	81.7)	73.9	88.0	83.4
Non-physician skilled birth attendant	2.9	28.2	7.2	13.2	23.9	6.0	11.8
CMW	10.4	0	0.3	0.2	0	0	0
Dai/TBA	1.7	0.0	6.9	4.9	2.1	6.0	4.8
birth attendant							

5.3 Newborn health indicators by intervention status and district

Table 12. Newborn health indicators by intervention status and district

Indicators	Baseline Round 1						
	Kech	SMNC			CONTROL		
		Gwader	Quetta	Total	Gwader	Quetta	Total
Thermal Care:							
Immediate Drying	87.7	96.8	94.8	95.3	97.3	95.6	96.1
Immediate Wrapping	90.2	96.4	95.8	96.0	95.3	96.6	96.2
Delayed bath	39.2	61.1	62.2	61.9	64.0	72.6	70.2
Skin to skin contact	44.8	42.1	25.4	29.3	12.5	31.0	26.3
Baby was weighed:	47.0	62.0	48.8	52.3	75.9	60.8	64.2
Breast feeding:							
Baby put to breast immediately after birth	18.1	32.0	18.7	22.2	31.7	16.5	20.7
Baby fed colostrum	83.6	78.6	85.1	83.4	83.1	87.1	85.9
Baby exclusively breastfed	83.7	82.1	38.5	49.1	86.8	54.8	62.2

5.4 Knowledge and demand for essential maternal and newborn indicators by intervention status and district

Table 13. Knowledge and demand for essential maternal and newborn care indicators by intervention status and district

Indicators	Baseline Round 1						
	Kech	SMNC			CONTROL		
		Gwader	Quetta	Total	Gwader	Quetta	Total
Knowledge and demand of essential maternal and newborn indicators:							
Knowledge of at least 2 danger signs during pregnancy	24.1	55.8	70.3	66.5	50.2)	73.1	66.7
Knowledge of at least two danger signs during labour	28.0	60.4	68.2	66.0	52.8	69.7	64.6
Knowledge of at least two danger signs in the post-natal period	23.0	59.2	73.8	69.8	52.3	73.9	67.6

Knowledge of healthy timing and spacing of pregnancies	78.0	94.5	83.3	86.2	93.0	79.7	83.4
Knowledge of risks associated with birth to pregnancy intervals less than 24 months	4.0	44.0	41.2	41.9	33.5	39.7	37.9
Satisfaction with the Quality of ANC Care:							
Satisfaction with number of antenatal visits:							
Very satisfied	27.9	85.4	46.7	56.8	90.2	38.0	52.8
Satisfied	66.3	12.1	51.0	40.8	9.8	61.6	46.9
Dissatisfied	5.8	1.52 (3)	2.5	2.3	2.4	0.4	0.3
Satisfaction with elements of ANC care:							
Very satisfied	27.8	85.9	46.8	57.0	92.2	37.0	52.7
Satisfied	67.0	11.6	50.9	40.7	7.8	62.6	47.0
Dissatisfied	5.2	2.5	2.3	2.4	0.0	0.4	0.3
Satisfaction with CMW behaviour:							
Very satisfied	30.3	86.9	48.2	58.3	91.7	37.8	53.1
Satisfied	58.1	11.1	49.5	39.5	7.8	61.4	46.3
Dissatisfied	11.6	2.0	2.3	2.2	0.5	0.8	0.7
Satisfaction with Quality of Childbirth Care:							
Satisfaction with provider competency:							
Very satisfied	28.2	88.8	44.9	56.4	97.6	38.3	54.8
Satisfied	63.0	11.2	51.8	41.2	2.4	60.6	44.3
Dissatisfied	8.9	0.0	3.3	2.4	0.0	1.1	0.8
Satisfaction with provider compassion:							
Very satisfied	36.2	89.8	42.0	54.5	97.1	36.0	53.1
Satisfied	58.1	10.2	52.3	41.3	2.9	58.3	42.8
Dissatisfied	5.7	0.0	5.7	4.2	0.0	5.7	4.1
Satisfaction with provider concern for privacy and dignity:							
Very satisfied	35.7	89.3	46.3	57.5	98.1	39.0	55.5
Satisfied	56.6	10.7	49.4	39.3	2.0	58.9	43.0
Dissatisfied	7.7	0.0	4.3	3.2	0.0	2.1	1.5
Family Planning Indicators:							
Current contraceptive use:	57.1	75.5	48.5	55.6	63.9	55.5	57.8
Type of contraceptive:							
Female sterilization	1.7	0	1.2	0.9	0.5	2.3	1.8

Male sterilization	0.2	0	0.9	0.6	0.5	0.4	0.4
Pill	23.4	33.0	10.3	16.2	23.4	14.0	16.6
IUD	1.5	7.3	1.2	2.8	3.4	1.0	1.6
Injection	18.6	5.8	6.4	6.2	4.4	7.8	6.8
Condom	11.3	23.3	19.6	20.6	24.4	24.8	24.7
Rhythm	0	1.5	0.9	1.0	2.4	0.2	0.8
Withdrawal	0.5	4.4	5.5	5.2	5.4	3.8	4.2

6. DISCUSSION

The findings of the baseline survey indicate that the rates of women's education, their husbands education, husbands work in the professional or skilled-labour occupations, and socio-economic status are higher than rates reported in the Baluchistan demographic health surveys.

These socio-economic characteristics are also reflected in our respondents reported maternal and neonatal heath care use patterns. They have a high uptake of ANC and skilled birth attendance. The majority reported doctors as their birth attendant. In this context, the *dais* and CMWs provide a minute proportion of the care, the latter between 0% and 1.5%.

These findings suggest the CMWs, both SMNC and non-SMNC, are living and working in neighborhoods populated by educated, professional and economically well-off populations which is well-served by health services. This finding is supported by google maps depicting the location of the CMWs in Quetta (Figures 1a-1d). All CMWs, with the exception of a couple, are located in urban areas of Quetta and Gwader. Kech CMWs could not be mapped, but based on remuneration of travel costs of transporting the survey teams, most were located between 4-40 km of Turbat city. Within these urban areas, there exist a range of health services, from teaching hospitals (Bolan Medical complex) to a range of private sector providers and military hospitals.

Table 14 compares the rates some key indicators measured in the present survey with those conducted by the IMNCH survey (conducted by *Save the Children* (Pakistan) around the same time period in districts Gwader, Lasbella and Ziara [19] The data are also compared with DHS 2013 and the UNDP MDG report (2011), for province-wide Baluchistan comparison [20, 21]. Both the INMCH survey and the DHS surveys are cross-sectional survey, and include both rural and urban areas. INMCH is assumed to represent the entire districts of Gwader, Lasbella and Ziara, while the DHS survey represents the entire province of Baluchistan.

Table 14. Comparing with INMCH (2014) and DHS (2013) datasets

	CMW study (2014)		INMCH –Save the Children study (2014)		DHS 2013/UNDP MDG Report – Baluchistan (2011)	
	Gwader	Quetta	Gwader	Lasbella	Urban	Rural
Women's education:						
No Education (0)	57.5	42.5	66.1	31.1	71.5 (overall)	
Primary or less (1-8)	12.5	11.7	70.6	63.6	16.7	
High School or less (9-12)	17.9	28.7	75.8 (middle) 77.1	87 &29	4.1	
More than High School (12+)	12.2	17.1	81.8	41.7	2.3	
Husband's education:						
No Education (0)	50.0	21.28	Not available		50.2	
Primary or less (1-8)	4.66	4.69			21.0	
High School or less (9-12)	20.59	34.36			11.2	
More than High School (12+)	24.75	39.68			8.5	
Socio-economic status:						
Land ownership	8.27	9.01	Urban – 15 Rural – 40.8	Urban – 13 Rural – 24	Not measured	42.6
House ownership	77.9	54.7	Urban – 89.2 Rural – 97.7	Urban – 67.6 Rural – 78.2	35.6	51.1
Material Asset Index:						
First quartile (poorest)	12.9	24.41	N/A	N/A	10.5	52.5
Second quartile	22.63	24.32			15.0 & 29.8	22.7 &13.5
Third quartile	35.52	22.97			27.0	7.5
Fourth quartile (non-poor)	28.95	28.29			17.7	3.9
Maternal Health Care:						
ANC (4 visits):	72.46	57.85	Urban – 74.4 (1 visit) Rural – 64.2	Urban – 45.6 Rural – 26.1		
ANC provider:					N/A	N/A
Doctor	71.71	89.14	49.9	29.9		
Non physician skilled birth attendant	26.3	4.09	20.7	4.5		
CMW	0.25	0.56	0.2	0.2		
Traditional Birth Attendant	1.74	6.22	2.4	1.3		
Birth Attendant:						
CMW	1.46	0.18	0.0	0.4		
Doctor	57.18	71.62	51.3	42.1		
Non physician skilled birth attendant	32.6	13.15	20.4	11.6		

Traditional Birth Attendant	8.76	15.05	21.4	41.5

The finding that CMWs are largely located in urban areas is supported by previous research [9,22]. and interviews with policymakers in the Baluchistan Department of Health [8]. Qualitative research from Jhelum and Layyah revealed that the majority of CMWs belong to middle and higher socio-economic status families. This occurred because of

1) The recruitment criteria of a minimum of 10 years education. Only members of middle and high socio-economic classes have the economic and social resources to educate their daughters and have their sons employed in the public sector.

2) Advertisement of the program in newspapers (initially in English dailies only) and word of mouth by government health department employees. These modes of information are only accessed by non-poor people.

3) The practice of *sifarish*. A difficult to translate word, *sifarish* refers to a nepotistic exchange of social favours that result in unwarranted preferential and treatment of the recipient, bypassing merit and need. According to one local program manager in Layyah, up to 40% of CMW recruitment was nepotistic. According to one Government of Baluchistan personnel who was a member of the CMW admissions committee, 90% of CMWs were recruited based on these special favours. These findings have important implications for the SMNC intervention.
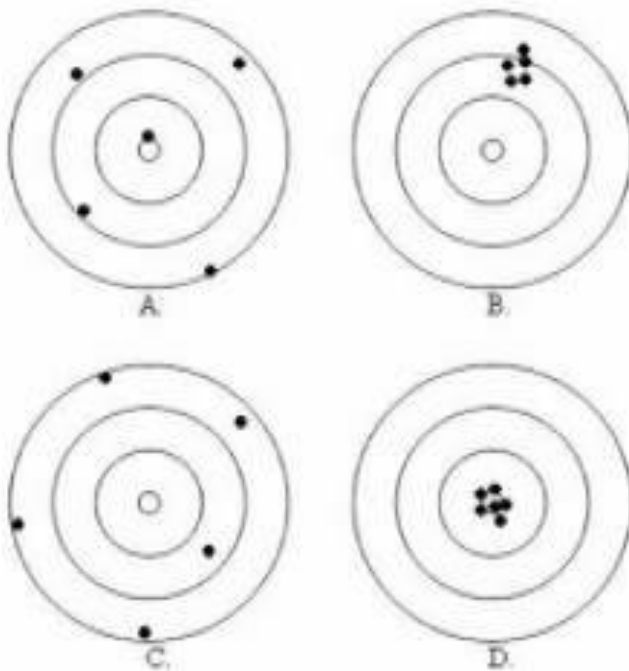
7.0 Quality Assurance

Given the security challenges of collecting data in Baluchistan – AB could not supervise the enumerators during data collection in the field in Gwader and could not even visit Kech for training or supervision of enumerators - concerns about data quality emerged. This was heightened with reports that enumerators in Gwader had acted independent of their supervisor during a field visit to Ormara. Although the Ormara data was recollected, to alleviate these concerns, a quality assurance exercise was undertaken in Gwader in September 2014, about 3 months after the original survey conducted in May 2014.

Ms. Afshan Bhatti, Mr. Naveed, Monitoring and Evaluation Officer MC, Dr. Saeedullah, Head of MC Quetta, Ms. Sumaiya, an enumerator representing MC visited Gwader and Ms Anjum, the supervisor of the original University of Alberta field team conducted the quality assurance exercise. Twelve randomly selected respondents, four in each of the three randomly selected clusters - Gazarwan Ward, Tubagh Ward and Koh bun Ward, were re-interviewed using the same survey questionnaire. The respondents were identified by Ms Anjum, the U of A supervisor. Ms. Bhatti conducted the interviews and filled the questionnaires while Ms. Sumaiya observed the interviews. Mr Naveed and Dr. Saeedullah accompanied the team, but did not enter respondent homes out of respect to gendered norms of this conservative region. A total of 11.5 questionnaires were completed. One questionnaire could not completed fully because a father became unhappy with the presence of the team.

Data were analysed using Stata 11. Table 15 below lists inter-question agreement and an explanation of disagreements of 10 **randomly** selected questions in the 12 questionnaires. The inter-question agreement is the percentage of agreement between answers as provided in the original survey and the repeat survey by the same respondent. The sex of the child was not randomly selected, but analysed since this is one indicator that is easy to understand by respondents and is not going to change with the passage of time.

A word about theory of validity and reliability of survey questions. When assessing the ability of a question to capture the information the researchers are seeking, it is important that the questions are valid and reliable. An analogy of a target and how close we get to the bull's-eye (Figure 2) is helpful in understanding these concepts. If all our shots land together, we have good precision or good reliability. Circle B represents a situation of good reliability but not accuracy (validity). Circle C demonstrates neither accuracy nor precision. In D, the black dots are both valid and reliable.

Figure 2 [23].

In a survey questionnaire reliability refers to the degree to which questions used in the survey elicit the same type of information each time they are used under the same conditions. In the context of our quality assurance exercise, reliability is a more important measure because the same question can

mean different things to different people and even to the same person at different times. The variability in responses varies by the subject of the question, prevalence of the condition, the respondent understanding of the question, the number of options available (dichotomous options have lower variability than multiple options) and who is asking the question. How a respondent is feeling at the time they are interviewed also determines their answers. If a person is feeling bad at the time they fill out the questionnaire, their answers will be more negative. If the person feels good at the time, then the answers will be more positive. Because of inherent variability in responses, Landis and Koch (1977a, 165) suggest the following qualitative labels for numeric values of inter-rater agreement [24].

Percentage agreement	Qualitative interpretation of agreement
0.0 – 20%	Slight
21-40%	Fair
41-60%	Moderate
61-80%	Substantial
80-100%	Almost perfect

Table 15: Inter-rater agreement in the survey questionnaire

Question	Percentage agreement	Explanation
1) Child's sex	100% (12/12)	This is a highly reliable indicator for the notion of the sex of the child is 1) easy to understand and 2) does not change. The 100% agreement indicates the enumerators did actually collect the data and did so reliably.
2) (q2-15) Did the health care provider discuss with you about family planning? YES.......................................1 NO.......................................2	42% (5/12)	3/12 respondents stated 'Yes' in the first survey and 'No' in the repeat survey, and 4/12 the reverse. While large, this variation also indicates the question itself may have low reliability. It depends on women's recall of a message that may not be the most important issue for a pregnant woman early in her childbearing career in a highly pronatalistic context.

3) (q5_5) Are you still breastfeeding (NAME)? YES…………………………...……1 NO……………………………..2	66.7% (8/12)	The four women (4/12) whose answers changed did so from a 'Yes' in the first survey to a 'No' in the repeat survey. This is a valid change and reflects the possibility that the women had stopped breastfeeding in the 3-months between the two surveys. It would have been concerning if the answers had been reverse. The question is also easy to understand and reflects a current practice, and thus has no recall bias.
4) (q4_20) Was (Name) placed on your bare chest soon after the delivery? YES…………………………...……1 NO……………………………..2	75% (9/12)	This question can also have a low reliability for it is entirely possible that a respondent can understand the question as 'was the baby put to the breast' (*bare chest*)
5) (7_15) Do you own following (please also fill with the help of your observation): Refrigerator YES………………………...1 NO………………………2	100% (12/12)	This is also a question that is easy to understand. While it turned out that all the answers were identical in the two surveys, a change would also have been equally possible for people can purchase or loose a fridge in a 3-month period.
6) (q2_4) If the respondent is aware of the presence of CMW but she was not the provider of choice for antenatal care then ask, why she was not chosen? CMW UNAVAILABLE…………....……………1 TOO EXPENSIVE………………………………2 SHE WAS NOT WILLING TO COME TO MY PLACE………………..…...……………………3 HOUSE/CLINIC IS UNCOMFORTABLE…………..………………4 SHE IS NOT COMPETENT..…………………5 SHE IS TOO FAR AWAY………………..……6	It was impossible to discern any trend in agreement because there 30 reasons reported (others).	The question also has low reliability as women's reported reason for not having sought a CMWs care can vary. There may be a number of reasons, but at different times, she may report one or the other.

I WANTED MY CARE BY THE ABOVE MENTIONED MAIN PROVIDE………………7 BOVE MENTIONED MAIN PROVIDER IS EASILY ACCESSIBLE………..………………8 I DON'T TRUST CMW………………………..9 MY FAMILY DOES NOT TRUST HER……………………10 OTHER _____...............11 (SPECIFY)		
7) q3_2 If yes, when? (the question was a follow-up of q3_1 "Have you or any member of your household ever received any SMS related to the mother and child health?") DURING THE CURRENT MONTH……………1 LAST MONTH……………………………………2 DURING THE LAST SIX MONTHS……………3 LATER THAN SIX MONTHS……………………4 DON'T KNOW……………………........................99	Data not available	The question was not asked at this baseline survey since the system of SMS messages was not in place.
8) (q4_7) Was the Health care provider present during the entire labour from the time of first contact until after the delivery? YES…………………………...1 NO………………………2 DON'T KNOW……………………99	91.6% (11/12)	Again, this is a reliable indicator for the presence or absence of the provider is something easy to understand and given its importance for a woman in labour, easy to recall. One respondent did however respond 'No' in the original survey, but 'Yes' in the repeat survey.

9) (q2_19) Before the pregnancy with (Name), how many times did you receive a tetanus injection? ONE………………………………………………1 TWO………………………………..………………....2 THREE OR MORE………………..…………….3 DON'T KNOW…………………………………..99	Two observations available for 6 out of the 12 respondents. 66.7% agreement (4/6)	This question needs to be contextualized in the finding that only 0.4% of women in Gwader reported receiving two doses of TT vaccine during pregnancy. This question is referring to TT vaccination **before** pregnancy, making it an even more rarer event. Moreover most women were unaware of the notion of TT vaccination as they all answered 'Don't know'
10) (q7_43) What is your husband's occupation; that is what kind of work does your husband mainly do? PROFESSIONALS (TEACHERS, HEALTH WORKERS,OFFICE WORKERS ETC.)………………………….…………1 LANDOWNERS…………………………………………..2 SKILLED WORK (MISTRI, ROOF MAKER, MARBLE FITTER, STITCHING AND EMBROIDERY, ETC.)……………………………………3 AGRICULTURAL LABOUR IN OTHER PEOPLE'S LANDS (NOT OWN LAND)…………………………….4 UNSKILLED LABOUR (WORK IN PEOPLE'S HOUSES, AT WEDDINGS OR FUNERALS)…………………………………………5 OTHER ……………………………................6	91.7% (11/12)	The one respondent who changed her answer had originally reported her husband was 'unemployed' and in the repeat survey as working in an 'unskilled occupation'. It is entirely valid that her unemployed husband was working in an unskilled occupation after 3-months. Again, this is a reliable question as it is easy to understand and the responses did not change significantly.

Overall, the percentage agreement for the majority (70 percent) of the 10 questions analysed was "substantial" (61-80 percent) according to the scale developed by Landis and Koch (12). If we exclude the 2 questions for which data was not available or could not be analysed, this percentage increases to 87%. Of these, 57% were deemed "almost perfect". These values suggest the quality of data collected is acceptable. They compare favourably with agreement rates of survey questions tested for reliability.

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Annex 1: List of tehsils and unions councils in the city district of Quetta.

Tehsil:	Union Council:
Chilton:	Aghbarg , Ahmed Khan zai, Almo, Arbab Karam Khan, Baleli, ChashamaJeo, Deba, Forest Nursary, Hudda, Ismail, Jaffar Khan Jamali, KechiBaig, Kuchlak, Lore Karz, Manoo Jan, PashtoonBagh, Panjpai, Poodgali, Qambrani, Railway Housing Society, Raisani Road, Rajab, Sabzal, Satelite Town, Shahbo, Shadinzai, Sheikh Manda, Tirkha, Wahdhat Colony, Zarkhoo
Zarghoon:	Afghan, Alamdar, Baldia Dispensary, Balochi Street, Barech, ChamanPhatak, Faqir Muhammad, GhafoorDurani, Ghilzai, Gool Masjid, Haji Ghaibi, Haji Quddus, Hanna,Imdad, Industrial, Kakar, KillaKansi, Kotwal, Labour Colony, Liaqat Bazar, M. A. Jinnah, Malik Akhter, Marriabad, Muhammad Ali Shaheed, Mulla Salam Road, Nasirabad, NawaKilli, Patel, Saddiq Shaheed, Saidabad, Samandar Khan, Sara Ghurgai, SardarEssa Khan,Share Iqbal, Sirki, Tareen, Zulfiqar Shaheed

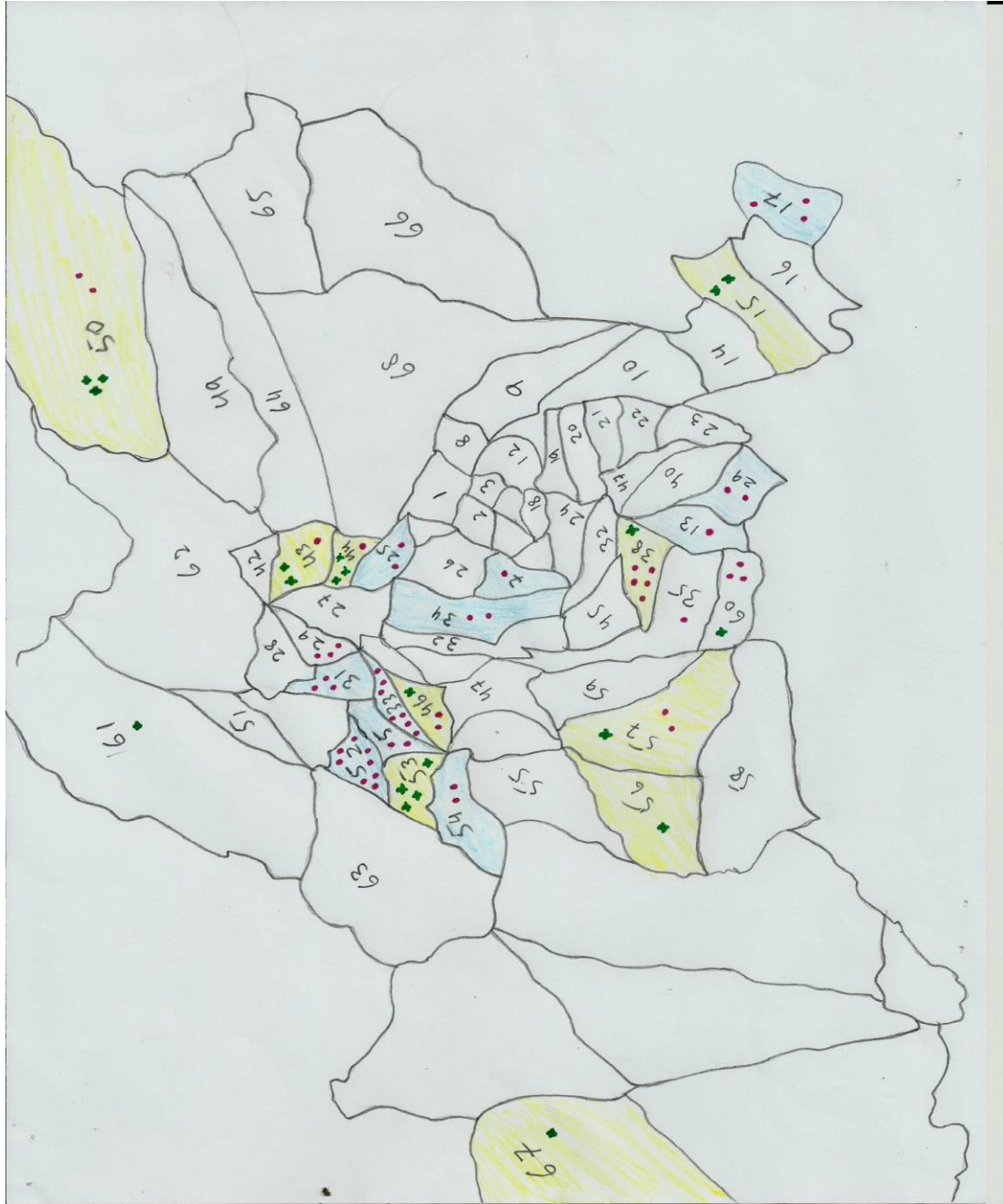**Annex 2: Map of Quetta with union council boundaries**

Key:
Yellow shaded – Intervention union councils
Blue shaded – Control union councils
Green crosses – SMNC-CMWs
Red dots – non-SMNC-CMWs

Annex 3a: List of sampled CMWs in Gwadar

	CMW	Address	Union Council	LHW Data
2	Gulnisa	Guzzi lane Ormara		no
3	Nadia	Sohrabi Ward Gwadar	UC Gwadar Central	yes
4	Khalida	Girls school ward Gwadar	UC Gwadar Central	yes
5	Sakeena	Baloch ward Gwadar	UC Gwadar Central	yes
6	Tahera	Bakshi Colony Gwadar		yes
7	Sahazia	Kohbun Ward Gwadar		yes
8	Hafeeza	New Town		no
1	Humera	TTC Colony Gwadar		no
2	Anila	Gazarwan ward Gwadar		yes
3	Sameena	Usmani Ward Gwadar	UC Gwadar Central	yes
4	Tasleema	Gwatri Ward Gwadar		yes
5	Sumaiya	Meer Laal Bakhsh ward Gwadar	UC Gwadar Central	yes
6	Zakya Ibrahem	Tubag Ward Gwadar	UC Gwadar Central	yes
7	Nida Shaukat	Fish Harbor Colony		no

Annex 3b: List of sampled CMWs in Kech

	CMW	Address	Union Council	LHW data
1	Zuhara	Zor bazar , Malik abad		no
2	Gulshon	Absor balochi bazar, Kulwahi bazar		no
3	Sameera	Koshklat, Aliabad		no
4	Nazeera	Noklat		no
5	Shereen	Kalatuk, Ziarat bazar		no
6	Nagina	Shay Khan Cheri bazar, Dabuk, Dale Bazar		no
7	Sharaf jan	New sole Band Bazar		no

Notes of Training session in Quetta, Gwader and Kech

DAY 1

I. Training Overview (introductions, objectives, agenda, and training rules) – 45 minutes

1) **Welcome**: Participants were welcomed to the session by sharing the purpose of the training.
    a. Purpose: Enable the participants to conduct the base line survey of the operations research component of *Saving Mothers and Newborns in Communities* project.
2) **Introductions:** The trainers and enumerators introduced themselves (name, work experience and language skills) to each other one by one. The participants were then divided into three groups according to their native language.
3) **Agenda:** The agenda was reviewed and agreed upon with the participants.
4) **Training Rules:** Following training rules were finalized:
    a. Punctuality
    b. Turn off cell phones
    c. No one should leave the training hall except in a dire need
   d. Everyone should pay attention to the training
    e. Ask stupid questions

II. Intro to the project "Evaluating the Improving Mother and Newborn Health initiative: Are community midwives increasing quality essential newborn and maternal care in Quetta, Gwadar, and Kech districts in Baluchistan and are they doing so in a financially self-sustaining manner?' – 20 minutes

1) **Objectives of the Research?**
    a. **Empirical**
        i. Develop evidence that the *Saving Mothers and Newborns in Communities* initiative has led to increased coverage of high quality maternal and neonatal health care by trained, private-sector community midwives in remote, sparsely populated, insecure districts of Baluchistan.
        ii. Explore whether CMWs access to business-skills training, small loans, and infrastructural support enabled them to develop financially sustainable private midwifery and neonatal practices. To enhance empirical understanding of the process through which these interventions led to financial sustainability of the practices.
        iii. Map the quality of care CMWs provide, both from evidence-based best practice perspectives and women's perceptions.
    b. **Knowledge Transfer**
        i. Support MercyCorps in the implementation of *Saving Mothers and Newborns in Communities* by providing on-going, contextually relevant information on program outputs.
        ii. Contribute to the evidence-base of innovative maternal and neonatal health care provision by community-based health care providers.

        iii.   Inform positive developments in maternal health policy, service design and care delivery in Baluchistan, Pakistan, and more generally and elsewhere.

2) Research Design
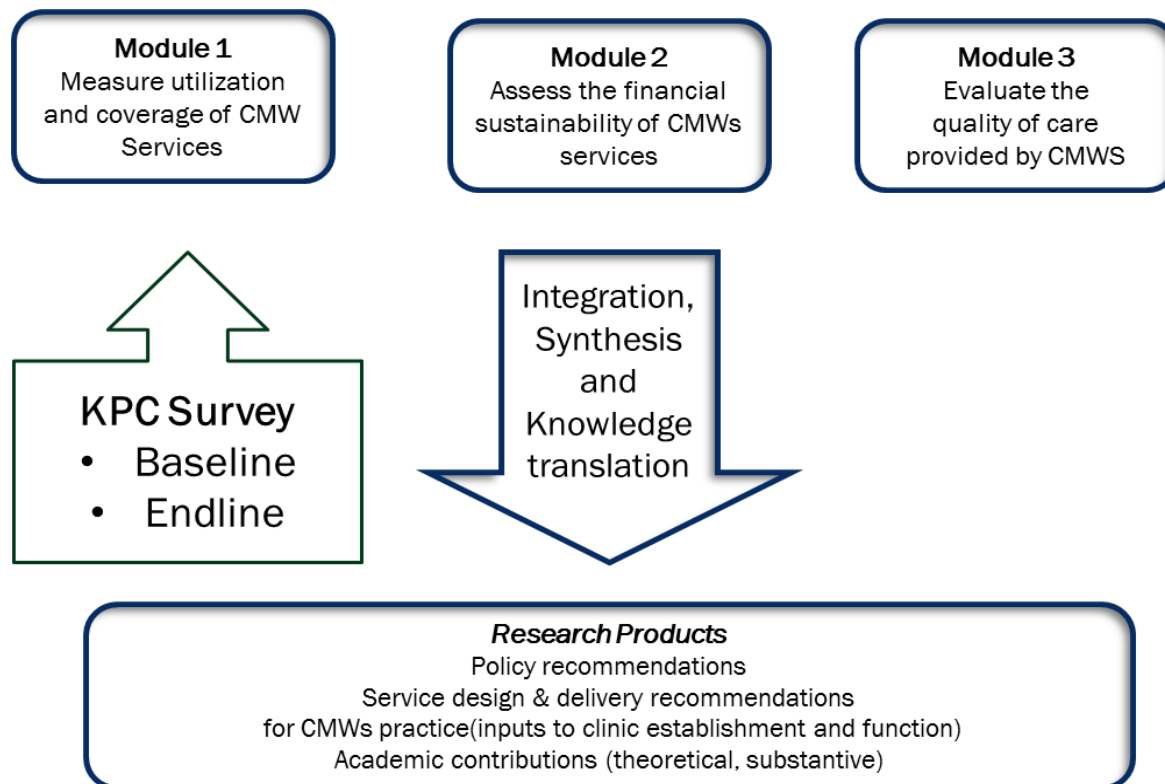
3) Methodology
    a. We will use a cluster quasi- experimental impact assessment
    b. PROBE → does anyone know what quasi-experimental means?
    c. We have randomly selected 19 CMWs catchment areas from the all of the areas where the project is intervening, and an equal number from the remaining CMWs of the MNCH program. In each of these areas, we will select at least 28 women who gave birth in the three years prior to the survey.
4) Strategic Relevance of the study: The Baluchistan Department of Health requires urgent technical assistance to develop and test a model that utilizes CMW resources (before this cadre dies out), and to incorporate lessons learned into a budgeted five-year strategic plan for the MNCH program.
5) Introduction to Community Midwives (CMW): The participants were introduced to skilled birth attendance, its importance for maternal mortality and the salient features of the CMW program.
6) Introduction to key terms used in the questionnaire: The participants were asked to define and elaborate key terms used in the questionnaire. They were also encouraged to make corrections in each other's definition.

III. Introduction to the questionnaire.

1) Introduction:
    a. Questionnaires were handed out to the participants according to their language groups.
    b. The participants were informed that the questionnaires have been translated into Urdu, Balochi, Brahvi and Pushto to cater the diverse population of Quetta.

2) Exercise:
    a. Every group was asked to focus on the language of their group and make necessary corrections with the help of the facilitator of that language, provided by Mercy Corps.
    b. The trainer read the questionnaire in Urdu and asked every group to check their language and share their concerns with the facilitators. The facilitators wrote down any changes required to the questionnaire.
    c. The exercise was done until all the questions were checked and necessary changes were agreed upon and noted by the facilitators.

IV. How to interview.

1) Introduction – Why interviewing is important?
        i. Sound programming decisions depend on reliable data.
        ii. Reliable data depends on getting good information from local respondents.
        iii. Getting good information from respondents depends on conducting effective interviews.

2) Field and interviewing etiquette
    a. Change your attire according to the native people of the selected area, and follow the concept of 'Go Native' (adopt the local lifestyle and outlook).
    b. Ask permission before entering a house and do not enter unless you are invited.
    c. Do not accept or ask for lunch or tea (unless it is rude to refuse the offer).
    d. Do not ask for or accept any gift from the interviewers.
    e. Take some time to thank the interviewee at the end.

3) Effective Interviewing Techniques
    a. Introduce yourself and the study (participants were asked to introduce themselves in their respective groups in local language and a feedback was provided to everyone).
    b. Tell the interviewee about the time required for the questionnaire.
    c. Take oral consent from the interviewee and sign the oral consent component of the questionnaire.
    d. Maintain confidentiality.
        • Do not interview the respondent in the presence of others (unless he/she indicates otherwise).
        • Explain that all answers will be kept confidential.
    e. Ask questions exactly as written.
    f. Wait for a response; be silent, then probe.
        • If the respondent doesn't understand or the answer is unclear, ask the question again, making no changes to the wording of question.
        • Do not suggest – by tone of voice, facial expression, or body language – the answer you want.

- Try not to react to answers in such a way as to show that you approve or disapprove.
- If one answer is inconsistent with another, try to clear up the confusion. (explained with the examples in the questionnaire).
- Try to maintain a conversational tone of voice; don't make the interview seem like an interrogation.
- Know the local words for sensitive/delicate topics.
- Use neutral probes (e.g., anything more?)

V. Personal safety and security.

    a. The participants were informed that their safety and security will be the priority.
    b. They were asked to pay full attention to their personal safety, and in case of any expected harm, told they should inform the supervisor and leave the place immediately.

VI. Wrap-up and questions.

1) Participants were asked following questions;
    a. Do they need to review material from today?
    b. Do they want to have something included tomorrow that's not already in the agenda?
    c. Anything else?

Result: The translated questionnaires needed a lot of changes, and therefore, the mock exercise was delayed for two days until the questionnaire was ready to share.

DAY 2

I. Day 1 Recap:

1) Introduction to the project purpose and objectives.
2) Sampling framework was revised.
3) Questions from last day was answered.
4) Revised questionnaire was shared.
5) Probing for understanding related to the interviewing techniques and informed consent was done.

II. Women selection:
1) The supervisors will have contact details of the LHWs of that catchment area.
2) The LHWs will be asked to provide a list of women who gave birth in the three years prior to the survey in their catchment areas.
3) The supervisors will randomly begin selecting women out of that list until they reach the sample size.
4) If one LHW's area has less than the required number of women, then the neighboring LHW will be requested to provide her list.
5) In case there is no LHW in the sampled area, then the one administering polio drops in the area will be asked to develop the list of required women.
6) The supervisors will be responsible for the selection of women and the enumerators will follow their selection.

III. Roles of the interview team.

1) The survey supervisors will lead the process and communicate with the LHW.
2) The LHW house will be the starting point for data collection.
3) The survey supervisor will monitor every enumerator during data collection.
4) The Research Manager will also monitor the data collection through surprise visits and random selection of enumerators during the data collection.
5) The enumerators should hand over their forms to the survey supervisor who will review this for any errors. If the supervisor finds any errors, she should show it to the enumerator and the enumerators should go back to the house to clarify responses.

IV. Mock exercise.

1) Teams consisting of two participants were made, and each team was asked to practice the questionnaire. Every team filled two questionnaires by switching the roles of interviewer and interviewee.
2) The survey supervisors monitored the data interviews and gave feedback to the participants.
3) The trainer also went to each team and looked at the interviews.
4) The participants provided their feedback on the questionnaire and asked questions which were clarified by the trainer.
5) At the end of the mock exercise, every filled questionnaire was reviewed by the trainer and feedback was provided to the participants.

V. Wrap-up and questions.

1) Discuss any questions the participants have. Remind the participants of where they should meet the next day!

Annex 4: List of variables included in the Material Asset Index

1. Building material of the house: walls, roof and floor.

2. Source of drinking water, availability of electricity.

3. Type of fuel for cooking.

4. Availability of a toilet, and whether they can use it.

5. Ownership of material goods - number of charpoys, radio, television, refrigerator, mobile telephone or a landline telephone, washing machine, sewing machine, camera, personal computer, bicycle, motorcycle/scooter, animal drawn cart, car, truck/tractor/trolley.

6. Ownership of animals: buffalo, milk cows, camels, donkeys or mules, goats, sheep, chickens, bulls, horses.

7. Ownership of House and Land.

8. Ownership of Land (Agriculture).

Annex 5

Table 5: Socio-demographic characteristics of study population by intervention status and district

	Baseline Round 1						
	SMNC			CONTROL			Kech
Socio-demographic characteristics	Gwader	Quetta	Total	Gwader	Quetta	Total	
No. of Sites (one CMW per site):	7	19	26	7	16	23	8
N (number of respondents):	206	582	788	205	528	733	415
Woman's age (mean):	26.8 (26.1, 27.5)	27.6 (27.2, 28.1)	27.4 (27.1, 27.8)	27.1 (26.3, 27.9)	27.8 (27.3, 28.2)	27.6 (27.2, 28.0)	29.4 (28.8, 30.0)
Currently married (%):	100	99.1	99.4	99.0	98.9	98.9	96.9
Mean number of children (per woman):	2.7 (2.5, 2.9)	3.3 (3.1, 3.4)	3.1 (3.0, 3.2)	2.8 (2.6, 3.0)	3.16 (3.0, 3.3)	3.1 (2.9, 3.2)	3.4 (3.2, 3.6)
Woman's education (%):							
No Education (0)	62.8	45.2	49.7	52.2	39.5	43.0	58.8
Primary or less (1-8)	10.8	13.5	12.8	14.2	9.9	11.1	5.1
High School or less (9-12)	17.2	26.6	24.1	18.5	31.1	27.6	21.0
More than High School (12+)	9.3	14.8	13.4	15.1	19.5	18.3	15.2
Husband Level of education (%):							
No Education (0)	53.9	22.7	30.9	46.0	19.7	27.0	35.4
Primary or less (1-8)	4.4	5.7	5.3	5.0	3.6	4.0	3.6
High School or less (9-12)	21.8	35.1	31.6	19.3	33.5	29.6	22.8
More than High School (12+)	19.9	36.5	32.2	29.7	43.2	39.5	38.1
Women's employment (%):							
Yes	95.2	88.3	90.1	96.6	89.4	91.4	76.1

If employed, type of work (% of employed women):								
Professional	55.6	27.0	30.6	66.7	22.2	26.7		18.8
Skilled workers	44.4	66.7	63.9	16.7	74.1	68.3		54.2
Agricultural labourers on other's land	0.0	1.6	1.4	0.0	1.9	1.7		3.1
Unskilled workers	0.0	4.8	4.2	16.7	1.9	3.3		24.0
Husband's occupation (%):								
Professional/landowner	35.4	56.4	50.9	34.0	58.2	51.4		42.0
Skilled worker	55.6	24.9	32.9	57.0	27.3	35.7		30.8
Agricultural labourer on other's land	1.0	4.3	3.5	0.5	3.1	2.4		15.8
Unskilled worker	2.0	9.2	7.3	4.0	8.0	6.9		7.6
Not working/ unemployed	6.1	5.2	5.4	4.5	3.3	3.7		3.8
Agriculture land ownership (%):	7.8	11.0	10.2	8.8	6.8	7.4		12.5
House ownership (%):								
Own the house and land	79.6	59.8	65.0	76.1	49.1	56.6		65.1
Own house, but not land	2.4	2.6	2.5	2.4	4.0	3.6		2.2
Not own house	18.0	37.6	32.5	21.5	47.0	39.8		32.8
Material Asset Index:								
First quartile (poorest)	16.0	23.9	21.8	9.8	25.0	20.7		36.1
Second quartile	27.2	21.7	23.1	18.1	27.3	24.7		31.8
Third quartile	26.2	26.5	26.4	44.9	19.1	26.3		21.9
Fourth quartile (non-poor)	30.6	28.0	28.7	27.3	28.6	28.2		10.1
Multi-dimensional Poverty Index:								
First quartile (poorest)	18.5	24.6	23.0	12.2	22.2	19.4		38.1
Second quartile	30.6	23.4	25.3	19.5	25.4	23.7		30.1
Third quartile	28.6	23.9	25.1	41.5	22.9	28.1		17.4
Fourth quartile (non-poor)	22.3	28.2	26.7	26.8	29.6	28.8		14.5

Table 2: Maternal and child health indicators at baseline by district.

Indicators	Baseline Round 1						
	SMNC			Control			Kech
MATERNAL HEALTH INDICATORS	Gwader	Quetta	Total	Gwader	Quetta	Total	
Antenatal Care (%):							
ANC (1 visit):	100.0	99.3	99.5	99.5	99.4	99.4	93.6
ANC (4 visits):	71.7	54.5	59.0	73.2	61.5	64.8	70.2
Type of ANC provider:							
Doctor	73.7	87.0	83.6	69.8	91.4	85.3	78.3
Non physician skilled birth attendant	25.3	4.1	9.6	27.3	4.1	10.7	6.9
CMW	0.5	0.9	0.8	0.0	0.2	0.1	8.1
Traditional Birth Attendant	0.5	8.0	6.0	2.9	4.3	3.9	6.7
Used Iron supplements during pregnancy:	90.7	85.4	86.8	95.1	88.5	90.4	85.4
Received two doses of Tetanus vaccination:	0.7	50.5	30.3	0.0	62.2	35.7	1.2
Childbirth:							
Type of childbirth attendant:							
CMW	2.9	0.3	1.0	0.0	0.0	0.0	9.9
Doctor	54.4	68.6	64.9	60.0	75.0	70.8	52.3
Non physician skilled birth attendant	31.1	12.7	17.5	34.2	13.6	19.4	30.8
Traditional Birth Attendant	11.7	18.4	16.6	5.9	11.4	9.8	7.0
Place of delivery:							
Home (home and *dai* home)	18.4	21.7	20.8	13.1	13.5	13.4	14.0
CMW clinic/home	1.0	0.5	0.7	0.0	0.4	0.3	10.1
Government	49.5	51.4	50.9	41.4	49.2	47.1	52.2
Private	31.1	26.4	27.6	45.6	36.9	39.2	23.7
Used Clean Delivery Kit:	84.3	66.0	71.3	86.3	71.6	76.7	54.8
Hygienic Cord Care:							
Cord cut cleanly	94.7	81.9	84.9	100.0	79.2	84.5	95.0
Hygienic cord care	9.1	6.1	6.8	5.0	6.1	5.8	8.8
Active Management of the third stage of labour (AMTSL):	43.5	32.0	35.1	36.6	46.0	43.3	18.8
Birth Preparedness:							

Total amount of money spent on last delivery (rps):							
<2000	10.2	20.9	18.1	7.8	16.8	14.3	8.2
2,000 to < 5,000	27.7	30.7	29.9	23.0	32.8	30.0	16.2
5,000 to < 10,000	36.4	18.5	23.2	43.6	17.7	25.0	36.5
>10,000	25.7	30.0	28.9	25.5	32.8	30.7	39.1
Set aside this money in case of an emergency:	35.0	67.9	59.3	37.6	67.6	59.2	69.6
Postnatal Care:							
PNC (1 visit):	65.5	57.4	59.5	69.3	56.6	60.2	57.8
Type of postnatal care provider:							
Doctor	71.9	85.6	81.7	73.9	88.0	83.5	85.0
Non physician skilled birth attendant	28.2	7.2	13.2	23.9	6.0	11.8	2.9
CMW	0.0	0.3	0.2				10.4
Traditional Birth Attendant	0.0	6.9	4.9	2.1	6.0	4.8	1.7
CHILD HEALTH INDICATORS							
Thermal Care:							
Immediate Drying	96.8	94.8	95.3	97.3	95.6	96.1	87.7
Immediate Wrapping	96.4	95.8	96.0	95.3	95.6	96.2	90.2
Delayed bath	61.1	62.2	61.9	64.0	72.6	70.2	39.2
Skin to skin contact	42.1	25.4	29.3	12.5	31.0	26.3	44.8
Baby was weighed:	62.0	48.8	52.3	75.9	60.8	65.2	47.0
Breast feeding:							
Baby put to breast immediately after birth	32.0	18.7	22.2	31.7	16.5	20.7	18.1
Baby fed colostrum	78.6	85.1	83.4	83.1	87.1	85.9	83.6
Baby exclusively breastfed	82.1	38.5	49.1	86.8	54.8	62.2	83.7
FAMILY PLANNING INDICATORS:							

Current contraceptive use:	75.7	48.5	55.6	63.9	55.5	57.8	57.1
Type of contraceptive:							
Female sterilization	0.0	1.2	0.9	0.5	2.3	1.8	1.7
Male sterilization	0.0	0.9	0.6	0.5	0.4	0.4	0.2
Pill	33.0	10.3	16.2	23.4	14.0	16.6	23.4
Injection	5.8	6.4	6.2	4.4	7.8	6.8	18.6
IUD	7.3	1.2	2.8	3.4	1.0	1.6	1.5
Condom	23.8	21.5	22.1	25.4	26.9	26.5	11.3
Rhythm	1.5	0.9	1.0	2.4	0.2	0.8	0.0
Withdrawal	4.4	5.5	5.2	5.4	3.8	4.2	0.5
Knowledge and Demand for Essential Maternal and Newborn Care:							
Knowledge of at least 2 danger signs during pregnancy	55.8	70.3	66.5	50.2	73.1	66.7	24.1
Knowledge of at least two danger signs during labour	60.4	68.2	66.0	52.8	69.7	64.6	28.0
Knowledge of at least two danger signs in the post-natal period	59.2	73.8	69.8	52.3	73.9	67.6	23.0
Knowledge of Healthy Timing and Spacing of Pregnancies	94.5	83.3	86.2	93.0	79.7	83.4	78.0
Knowledge of Risk Associated with Birth to Pregnancy Intervals Less than 24 Months	44.0	41.2	41.9	33.5	39.7	37.9	4.0
Satisfaction with the Quality of ANC Care:							
Satisfaction with number of antenatal visits:							
Very satisfied	85.35	46.7	56.79	90.2	37.98	52.78	27.89
Satisfied	12.13	50.98	40.85	9.8	61.63	46.95	66.33
Dissatisfied	2.53	2.32	2.37	0	0.38	0.28	5.79
Satisfaction with elements of ANC care:							
Very satisfied	85.86	46.81	56.96	92.2	37.02	52.7	27.79
Satisfied	11.62	50.88	40.68	7.8	62.59	47.02	67
Dissatisfied	2.54	2.3	2.37	0	0.39	0.28	5.21

Satisfaction with CMW behavior:							
Very satisfied	86.87	48.22	58.29	91.67	37.79	53.06	30.3
Satisfied	11.11	49.47	39.48	7.84	61.43	46.25	58.13
Dissatisfied	2.02	2.32	2.24	0.49	0.78	0.7	11.58
Satisfaction with Quality of Childbirth Care:							
Satisfaction with provider competency:							
Very satisfied	88.78	44.91	56.38	97.56	38.26	54.84	28.15
Satisfied	11.22	51.82	41.2	2.44	60.6	44.34	62.96
Dissatisfied	0	3.28	2.43	0	1.14	0.82	8.89
Satisfaction with compassion of provider:							
Very satisfied	89.81	41.97	54.52	97.07	35.98	53.07	36.21
Satisfied	10.19	52.33	41.27	2.93	58.34	42.83	58.13
Dissatisfied	0	5.71	4.2	0	5.68	4.09	5.66
Satisfaction with provider concern for privacy and dignity:							
Very satisfied	89.27	46.29	57.53	98.05	39.02	55.53	35.73
Satisfied	10.74	49.4	39.28	1.95	58.9	42.97	56.57
Dissatisfied	0	4.32	3.19	0	2.09	1.5	7.69