

Delivery of Maternal, Neonatal and Child Health Services in District Kaushambi, Uttar Pradesh (2011-2015): A Descriptive Report

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Abbreviations

ANM	Auxiliary Nurse Midwife
ANC	Ante- Natal Care
ARI	Acute Respiratory Infection
ASHA	Accredited Social Health Activist
AWC	Anganwadi Centre
AWW	Anganwadi worker
AYUSH	Ayurveda, Yoga, Unani, Siddha and Homeopathy
BCC	Behaviour Change Communication
BCG	Bacillus Calmette Guerin
BP	Blood Pressure
BPL	Below Poverty Line
CBO	Community Based Organization
CEAHH	Cost Evaluation and Assessment House Hold Survey
CHC	Community Health Centre
CRS	Catholic Relief Services
DH	District Hospital
DPT	Diphtheria Pertussis Tetanus
DOB	Date of Birth
IEC	Information Education Communication
IFA	Iron Folic Acid
IMR	Infant Mortality Rate
JSY	Janani Suraksha Yojana
LPV	Liquid Pentavalent Vaccine
MDG	Millennium Development Goals
MNCH	Maternal, Neonatal and Child Health
NFHS	National Family Health Survey
NGO	Non Government Organization

OBC	Other Backward Caste
OPV	Oral Polio Vaccine
ORS	Oral rehydration solution
PHC	Primary Health Centre
PGIMER	Post Graduate Institute of Medical Education and Research
PNC	Post Natal Care
PSU	Primary sampling Unit
RI	Routine Immunization
RMP	Rural Medical Practitioner
RSBY	Rashtriya Swasthya Bima Yojana
SBA	Skilled Birth Attendant
SC	Schedule Caste
ST	Schedule Tribe
Sub Centre	Sub-Centre
SPH	School of Public Health
TBA	Trained Birth Attendant
TT	Tetanus Toxoid
USAID	United States Agency for International Development
U5MR	Under-Five Mortality Rate
NMR	Neonatal Mortality Rate
MMR	Maternal Mortality Rate
CMR	Child Mortality Rate

Executive Summary

- As part of the ReMiND project, an m-health application developed by the Dimagi Inc was used by Accredited Social Health Activists (ASHAs) in two intervention blocks (Manjhanpur and Mooratganj) of district Kaushambi, Uttar Pradesh. This project was supported by the Catholic Relief Services (CRS) and implemented by Vatsalya (a non-governmental organization) in partnership with the district health services. Remaining 6 blocks of the district continued to deliver routine MNCH services through ASHA workers without m-health application.
- We undertook this study to evaluate the cost effectiveness of ReMiND project. The present report is a descriptive analysis of the delivery of maternal, neonatal and child health (MNCH) services in district Kaushambi. The report does not analyze the impact of the ReMiND project as the same will require controlling for other factors which influence utilization of health care services between the intervention and control areas.
- Data of Annual Household Survey (2011) and the household survey undertaken by the PGIMER, henceforth referred to as PGI study (2015), were analyzed to assess coverage of various MNCH services in two intervention and control blocks each. The MNCH services evaluated include antenatal care (ANC), institutional delivery, postnatal care (PNC), routine immunization, and treatment for complication during pregnancy or illnesses during neonatal period. Out-of-pocket expenditure on account of seeking curative care is also analyzed.
- Overall, preliminary results show that there is a significant improvement in various health indicators in both the intervention and control areas of district Kaushambi from 2011 to 2015. There is an increase of 24% and 18.5% in pregnancy registration in intervention and control areas respectively. Coverage of TT injections, full ANC coverage, institutional delivery, early initiation of breast-feeding and full immunization coverage rose by 20.1%, 5.6%, 34%, 52% and 41% respectively in the two intervention blocks of Manjhanpur and Mooratganj. Similar levels of increase in coverage of services were also observed in control blocks of the district.

- All the mothers in intervention area were counseled on how to recognize danger signs in a sick newborn while only 31.7% women in control area could recall advice for the same. Similarly, nutrition advice during pregnancy was recalled by all the women in intervention area while in control area only 71% could correctly recall any advice for nutrition given during pregnancy.
- There was statistically insignificant difference in the percentage of women receiving three or more ANC visits in both intervention (34.20%) and control areas (31.60%) in 2015.
- Less than 20% of women received six or more visits from ASHA within 42 days of delivering the baby in both intervention and control areas in 2015. Similarly, while only 2% increase in 3 ANC contacts was observed in intervention area from 2011 to 2015, the coverage declined by about 5% in control area.
- An overall increase of 30% (from 60% to 91%) was noticed in the proportion of women who delivered in a health facility - public or private.
- Similarly, there is an overall seven times increase in the coverage of full immunization, i.e., from 7.4% to 52.3% from 2011 to 2015 in district Kaushambi. This increase was observed in both intervention and control areas.

Table 1: Coverage of key maternal and child health indicators in intervention and control blocks of district Kaushambi in 2011 and 2015.

Indicator	Coverage (%)								
	Intervention			Control			Total		
	2011	2015	Difference	2011	2015	Difference	2011	2015	Difference
Proportion of pregnancies registered	69.8	93.9	24.1	78.2	96.7	18.5	74.4	95.3	20.9
Women with 3 or more ANC	32.4	34.2	1.8	36.9	31.6	-5.3	34.7	32.9	-1.8
100 or more IFA tablet consumptions	0.9	0.8	-0.1	3.1	0.6	-2.5	2.0	0.7	-1.3
Two or more TT injections	55.6	75.7	20.1	60.9	84.2	23.3	58.3	80.0	21.7
Full ANCs	0.0	5.60	5.6	4.9	12.6	7.7	2.5	9.2	6.7
Institutional delivery rate	56.0	90.0	34	62.7	91.9	29.2	59.4	91.0	31.6
Initiation of breastfeeding within 1 hour of delivery	19.6	71.5	51.9	23.1	72.2	49.1	21.4	72.0	50.6
Full immunization	7.7	49.0	41.3	7.1	55.5	48.1	7.4	52.3	44.9

* 2011-Annual Household Survey data; 2015- PGIMER Household Survey

1. Introduction

Globally, maternal and child mortality is declining, although the pace of decline is not sufficient to attain Millennium Development Goals (MDGs) 4 and 5 in almost 128 out of 137 developing countries.¹ Significant progress has been made in India for maternal and child health survival. The MMR has decreased from 487 maternal deaths per 100,000 live births in 1990 to 190 maternal deaths per 100,000 live births in 2013. In terms of child mortality, since 1990, the under-five mortality rate has decreased from 126 deaths per 1000 live births in 1990 to 53 in 2013². Nearly two-thirds of the total maternal and child deaths in India are contributed by few states including Assam, Uttar Pradesh (UP), Uttarakhand, Rajasthan, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand and Odisha.³ Not surprisingly, the coverage of key Maternal, Neonatal and Child health (MNCH) services in these states have been very low. In UP, the coverage of institutional deliveries, full antenatal care (ANC) and full immunization are 45.6%, 29.6%, and 45.3% respectively in year 2011-12.⁴

Since the introduction of National Rural Health Mission (NRHM) in 2005, a number of interventions have been introduced to bolster the coverage of services such as institutional delivery, immunization, antenatal and postnatal care.⁵ While on one hand NRHM focussed on the supply side through strengthening of the government health care system; on the other hand it initiated steps to generate demand through community mobilization by creation of a new cadre of community health workers called Accredited Social Health Activist (ASHA). ASHA act as village level grass root workers and help in generating demand for services.⁵ An evaluation of ASHAs in year 2011 found that although a 23-day training schedule has been developed by Ministry of Health and Family Welfare (MoHFW), but the quality and quantity of training needs to be strengthened in order to improve the performance of ASHA.⁶

For supplementing Community Health Workers (CHW) training and retention of knowledge, mobile technology has been considered as one of the effective and sustainable methods in developing countries.⁷ With the widespread use of mobile phones in the rural areas of the country, the reliable health information can be easily made accessible even to the remotest areas. These in-built tools with health messages in the mobile phones can be used by the health workers for counselling and communicating health care messages to beneficiaries. A study conducted in rural areas of Tamil Nadu to assess the feasibility of text messaging in delivering maternal and child health care showed that mobile health messages were better perceived and accepted in the community. Knowledge about

the minimum number of ANC visits increased from 10% to 37 % after receiving text messages for health promotion on mobile phones.⁸

In this context, ReMiND (Reducing Maternal and Newborn Deaths) project was introduced in two blocks of district Kaushambi in Uttar Pradesh. As part of this project, an m-health application which runs on an open source CommCare technology was introduced as job-aid for ASHA workers. This m-health platform tracks and supports clients for ASHA workers and provides individualized service and counselling needs. It replaces paper registers and flip charts with open source software that runs on inexpensive phones. During home visits, it aids ASHAs to register clients and provides real-time guidance through key counselling points, decision support, and simple referral algorithms.

2. Objectives

The overall objective of the present study is to assess the impact of the m-health application for ASHA workers on utilization of MNCH service coverage. Secondly, we aim to assess the cost effectiveness of this m-health intervention in terms of incremental cost per disability adjusted life year (DALY) averted for delivering the intervention as compared to routine services. Cost effectiveness will also be assessed in terms of incremental cost per unit increase in composite service coverage indicator. Finally, we will assess the cost of scale up for m-health application as in ReMiND project.

In this report, we present a descriptive analysis of the coverage of key maternal, neonatal and child health services in the intervention and control blocks of district Kaushambi. The coverage is assessed at two time points, 2011- using the Annual Household Survey data; and 2015- using the data collected for this study (PGI study).

3. Methodology

3.1 Study Setting:

The study was conducted in Kaushambi, a district of Uttar Pradesh. As per the data available on the official website of the district administration, it had a population of 1.2 million with the literacy rate of 48.2%. The maternal and child health indicators were very poor in the district with maternal mortality ratio and infant mortality rate being 366 per 100,000 live births and 80 deaths per 1000 live births respectively, which are quite low even in comparison to both national and state average.^{4,9}

Under the project named, ReMiND (Reducing Maternal and Neonatal Death) , Catholic Relief Services (CRS) an international NGO with the help of another NGO Vatsalya introduced a m-health tool called CommCare to 259 ASHAs in the two intervention blocks of district Kaushambi (Manjhanpur and Mooratganj blocks) in 2012. The ASHAs were provided with basic Java based mobile phones operating on open-source CommCare software. Extensive trainings of ASHAs were done in two blocks for the use of these phones. The ReMiND application had tailored content, and guides ASHA through the course of a woman's pregnancy and newborn child care. ASHAs use the application;

- To register each pregnant woman,
- Updating her Antenatal Care (ANC) record during home visits on the mobile application,
- Tracking her from pregnancy into the postpartum period,
- Tracking the health of the newborn,
- Tracking status of routine Immunization till 2 years of age
- Providing appropriate counselling and support at each of these steps

The phones contained locally-relevant audio and visual prompts to help ASHAs to navigate through the application. The application used the data entered about the pregnancy to guide the ASHA to provide timely and appropriate health information; helped to prioritize home visits, and employed algorithms to assist in the early identification, treatment, and/or rapid referral for any danger signs among pregnant woman or neonate to appropriate care. While ASHA have many tasks assigned to them, the key ones are to identify pregnant women and visit them throughout the course of their pregnancy, seeing them through a safe facility based delivery and appropriate newborn care.

Data recorded by ASHA for the services due and utilized by pregnant women was pooled on a common server. The sector facilitators monitored all the ASHAs working in their area using the data. The data was also shared with the Health Education Officer (HEO) at Primary Health Centre during the monthly meetings.

3.2 Study Design

Overall, the study adopts a quasi-experimental design comprising of pre and post observation with a control to assess the impact of ReMiND project. Data from the Annual Health Survey undertaken by the Registrar General of India (RGI) in district Kaushambi in 2011 is used for baseline or pre-intervention assessment. A household survey for Cost Evaluation and Assessment (CEAHH) was undertaken in 2015 in two intervention blocks and two matched control blocks from district Kaushambi to assess the coverage of various MNCH services which represents the post intervention status. Together these two surveys will be analyzed to assess the impact of ReMiND m-health intervention using a difference in difference analysis on propensity score matched dataset of cases and controls (from intervention and control blocks) between 2011 and 2015.

3.3 Study Area for CEAHH Survey (PGI Study)

The study area included two intervention blocks of Mooratganj and Manjhanpur and two control blocks namely, Kara and Chail of district Kaushambi. The control blocks were selected based on matching for three health service utilization indicators viz., average number of ANC checkups, percent of women receiving 3 or more ANC checkups and percent of institutional deliveries.

3.4 Sampling

The primary sampling unit (PSU) for the CEAHH survey was village. For selection of PSUs, a list of all villages from the intervention and control blocks was prepared. A total of 69 PSUs were randomly selected each from intervention and control areas using probability proportional to size (PPS) method.

After the selection of villages, in each PSU, a household enumeration was undertaken to identify all mothers with children in the age group of 1-6 months; or between 12 to 23 months age on the date of

survey. This list served as the sampling framework to randomly select the required number of mothers in each category for interview. The number of clients to be interviewed per PSU was again selected by PPS method based on the relative size of the PSU. The clients (mothers with child in 1-6 months age and 12-23 months age) within each PSU were again selected using systematic random sampling.

If more than one child in a respective age category were present in a given household, i.e. then one of them was selected randomly. If both the category of clients were present in same household, i.e. one child each in both 1-6 months and 12-23 months category, then each child formed part of sampling frame and had equal probability of getting selected as any other child of sampling frame.

3.5 Sample Size

Two categories of individuals were identified in each PSU. First, women with children of age 1-6 months and second, women with children of age 12-23 months. The sample size for each category was estimated to detect a difference in coverage of 2 key MNCH services (institutional delivery and full immunization coverage) and neonatal & child morbidity rate for severe disease. While neonatal & child morbidity rate and institutional delivery coverage was used to determine sample size for mothers with a child in the age of 1-6 months, difference in rates of full immunization coverage was used to assess sample size of mothers with children in the age of 12-23 months age in both intervention and control areas.

We calculated sample size based on a 5% change in the coverage of MNCH services and neonatal & child morbidity rate, considering a power of 80% and an alpha error of 5%. Baseline coverage of 15.1 % and 30.8% for institutional delivery and full immunization coverage in control area was assumed. Similarly, a neonatal morbidity rate of 18.9% for severe neonatal disease was assumed in the control area. Considering these parameters, a sample size of 1053 women with a child in the age of 1-6 months, and 1391 women with child in the age of 12-23 months from intervention and control area respectively were considered appropriate.

3.6. Data Collection

For the purpose of data collection, two separate tools were developed for the two categories of the women selected. Academy of Management Studies, Lucknow did the data collection and data entry for the study from the month of April to July, 2015.

Basic socio-demographic data, such as religion, caste, education status, occupation of mother, number of live and still births etc were collected from both the categories of clients. Additionally, mothers of 1-6 months old children were interviewed for utilization of health services for antenatal care, institutional delivery and postnatal care. The information was collected on number of ANC visits, tetanus toxoid injection, iron-folic acid supplementation and type of health facilities used for ANC care and institutional delivery. Out-of-pocket expenditures incurred at public or private health facilities for ANC care and institutional delivery was also enquired. The mothers were also interviewed for any illness during the neonatal period, its symptoms, treatment sought, type of health facility and out-of-pocket expenditures (OOP) incurred.

Mothers of children in the age of 12-23 months age were interviewed for immunization received by the child. Besides immunization status, the mothers were interviewed for any illness in the last 15 days or a hospitalization in the last 365 days. For latter two events, information on place where treatment was sought and the OOP expenditure incurred were sought. Additionally, mothers in both the categories were interviewed in the intervention and control area about the extent and quality of services offered by the ASHA workers during the antenatal and postnatal home visits. Specific questions were asked from mothers in intervention area to assess the usage of mobile application and the client satisfaction based on this mobile assisted counselling.

3.7. Data Analysis

The Annual Health Survey data for Kaushambi district was collected for year 2011-2012, which is before the ReMiND project was started. This data is used as the baseline data for the ReMiND project. For the 2015, PGI conducted the study and the data collection and data entry were done by Academy of Management Studies, Lucknow from April to July 2015. The statistical analysis is carried out using MS Excel and SPSS software and R-package. Prevalence and proportions of various indicators are computed and compared between year 2011 and 2015. The present report consists of descriptive analysis of the study and results are presented in form of tables and graphs. The detailed analysis will be further worked on and submitted later.

4. Results

The data for annual household survey (AHS 2011) and PGI study (2015) were analyzed. PGI study data comprised of women who were surveyed in two blocks as intervention (Manjhanpur and Mooratgunj) and control blocks (Kara and Chail) each. The AHS 2011 comprised of 1508 women in district Kaushambi who gave live birth in reference period from January 2011 to Dec 2011. Out of those 1508 women, 225 women were interviewed in our intervention area and control area each.

The PGI Study (2015), on the other hand, comprised of two categories of women i.e. women having children 29 days to 6 months (for information regarding pregnancy and neonatal health) and women with children in the age group of 12-23 months (for immunization and infant health) in both intervention and control areas. Out of total 2041 women in former category, 1013 women belonged to intervention area while 1028 were resident of control area. Similarly, a total of 1418 and 1475 women with a child in 12-23 months age group were interviewed in intervention and control area respectively.

The extent to which data was found missing in any of the field among the women interviewed in PGI study ranged from 2.60% to 6.30%. The reason behind the missing data was the absence of the mother during the interview, recall problem or inability of the mother to understand the questions.

Average age of respondents in the AHS 2011 survey was 33-34 years while in PGI 2015 study; it was 28-29 years. Majority of the respondents belonged to hindu religion (>80%) and the other backward castes (>50%) were in majority in the present study. As far as the educational background is concerned, majority of the respondents in both the surveys were illiterate. In 2011 survey, around 60% of the respondents were illiterate while in 2015 survey; the percentage was around 50%. The majority of the respondents were white card holder (47-48%) in both the study and the intervention areas.

Section A: Socio-demographic Profile of study populations under AHS 2012-13 and PGI Study 2015 in Kaushambi

Table 2: Socio-demographic Profile of the study populations under Annual Health Survey, 2012-13 and PGI Study, 2015 in the intervention and control blocks of district Kaushambi.

Indicator	Categories	AHS (2011)				PGI (2015)							
		Intervention	Control	Total	P-value	Women with children having age 29 days to 6 months				Women with children having age 12-23 months			
						Intervention	control	Total	p-value	Intervention	Control	Total	p-value
Average age of respondent in years		33	34	-	-	29	28		-	29	28	-	-
Religion	Hindu	81.3	78.8	80.1	0.573	86.5	84.4	85.4	0.132	88.1	84.3	86.2	0.014
	Muslim	18.7	21.2	20.0		13.3	15.6	14.5		11.8	15.6	13.8	
	Others	0.0	0.0	0.0		0.2	0	0.1		0.1	0.1	0.1	
Caste*	SC	53.5	30.6	42.1	<0.001	26.0	16.9	21.4	<0.001	14.7	4.5	9.5	<0.001
	ST	0.0	0.6	0.3		3.1	3.0	3.0		12.6	36.5	24.8	
	Others*	46.5	68.8	57.7		71.0	79.6	75.4		72.8	59.0	65.7	
Education	Up to 5	9.4	9.6	9.5	.005	13.3	10.5	11.9	<0.001	14.2	9.8	12	<0.001
	Up to 6-8	6.90	10.0	8.5		10.7	11	10.8		8.8	13.2	11	
	Up to 9-10	4.7	6.8	5.8		6	9.6	7.8		7	8.7	7.8	
	Up to 11-12	4.0	4.8	4.4		7.4	11.1	9.3		6	8.4	7.2	
	Graduate and above	2.8	2.9	2.9		5.1	7.2	6.2		3.4	6.1	4.8	
	Literate but not formally educated	3.90	4.50	4.2		5	6.3	5.7		5.5	7.9	6.7	
	Illiterate	68.2	61.3	64.8		52.4	44.1	48.3		55.1	46	50.5	

	diploma	.1	.1	.1		-	-	-		-	-	-	
Occupation of the Father	Self Employed	38.20	37.40	37.80	<0.001	21.9	25.4	23.7		20	24.3	22.2	<0.001
	Wager	25	13.40	19.2		62.5	61.4	61.9		63.9	63.8	63.8	
	Regular Salaried	1.50	1.80	1.7		12.4	12.1	12.2		12.9	11.3	12.1	
	Unemployed	2.70	3.10	2.9		3.2	0.7	1.9		3.1	0.7	1.9	
	Others	32.7	44.3	38.5		0	0.4	0.2		0	0	0	
Economic Category**	White card	Na	Na	Na	<0.001	45.2	49.1	47.2	<0.001	46.1	51.7	48.9	<0.001
	Yellow Card	Na	Na	Na		18.5	11.6	15		15.7	9.4	12.5	
	Pink Card	Na	Na	Na		5.3	2.3	3.8		4.5	3.7	4.1	
	No Card	Na	Na	Na		31	37	34		33.8	35.2	34.5	
RSBY card#	Available and valid	Na	Na	Na		2.3	3.5	2.9	0.046	4	3.8	3.9	0.757

*Na-Not available- Data not available for the survey for analysis

RSBY Cards for rest of the cases were either not available or have expired beyond the specified date of validity.

Section B: Antenatal Care

Table 3: Provision of Antenatal Care in Intervention and Control areas in District Kaushambi in 2011 and 2015

Indicator	Categories	Coverage (%)					
		AHS (2011)			PGI (2015)		
		Intervention	control	Total	Intervention	Control	Total
Pregnancies registered		69.80	78.20	74.0	93.90	96.70	95.30
Place of registration	Public	83.40	84.10	83.8	75.7	72.7	74.18
	Private	11.50	9.70	8.60	7.9	14.1	11.02
	Others	5.10	6.20	5.7	11.1	2.7	6.9
*Number of Antenatal checkups received among registered women	0 ANC	Na	Na	Na	0.10	0.00	0.10
	1ANC Check up	9.60	5.10	7.4	19.00	17.90	18.50
	2 ANC checkup	43.90	47.70	45.8	41.40	45.60	43.50
	3+ ANC Checkup	32.40	36.90	34.7	34.20	31.60	32.90

*In AHS data, the women who have received at least one ANC were considered as registered women.

Na - Not applicable

More than 90% of the pregnancies were found to be registered in both the intervention and control areas in the PGI study, 2015. However, the relative percentage increase was more in intervention area (from 69.80 % to 93.90%) than in control area (78.20% to 96.70%). There has been a slight increase in the utilisation of 3+ANC checkups from 2011 to 2015 in the intervention (i.e., from 32.40% to 34.20%) and a slight decrease in the control (from 36.90% to 31.60% women) blocks of district Kaushambi.

Figure1: Type of Public health facility availed for registration of ANC in Intervention and control areas of district Kaushambi in 2011 and 2015.

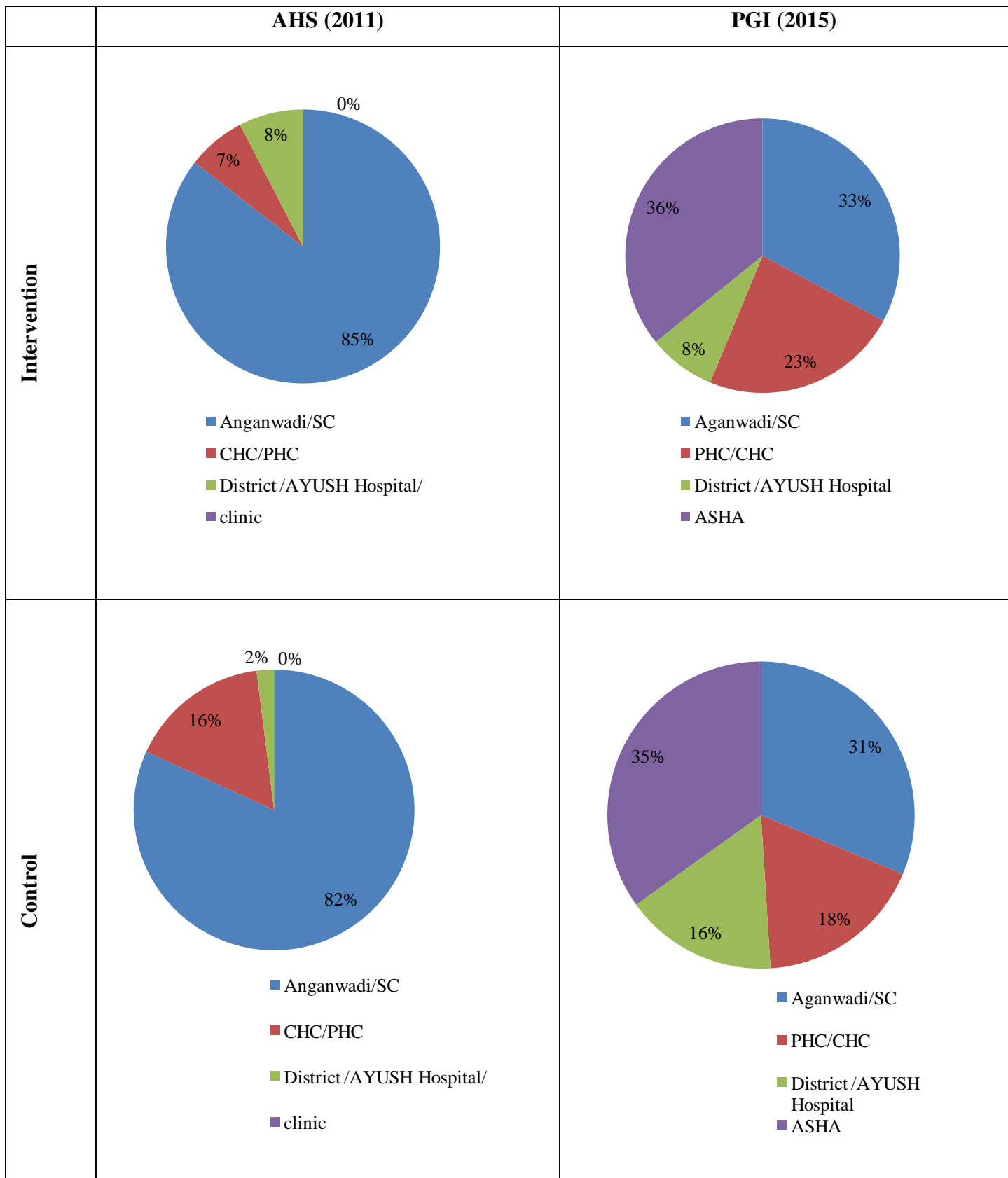
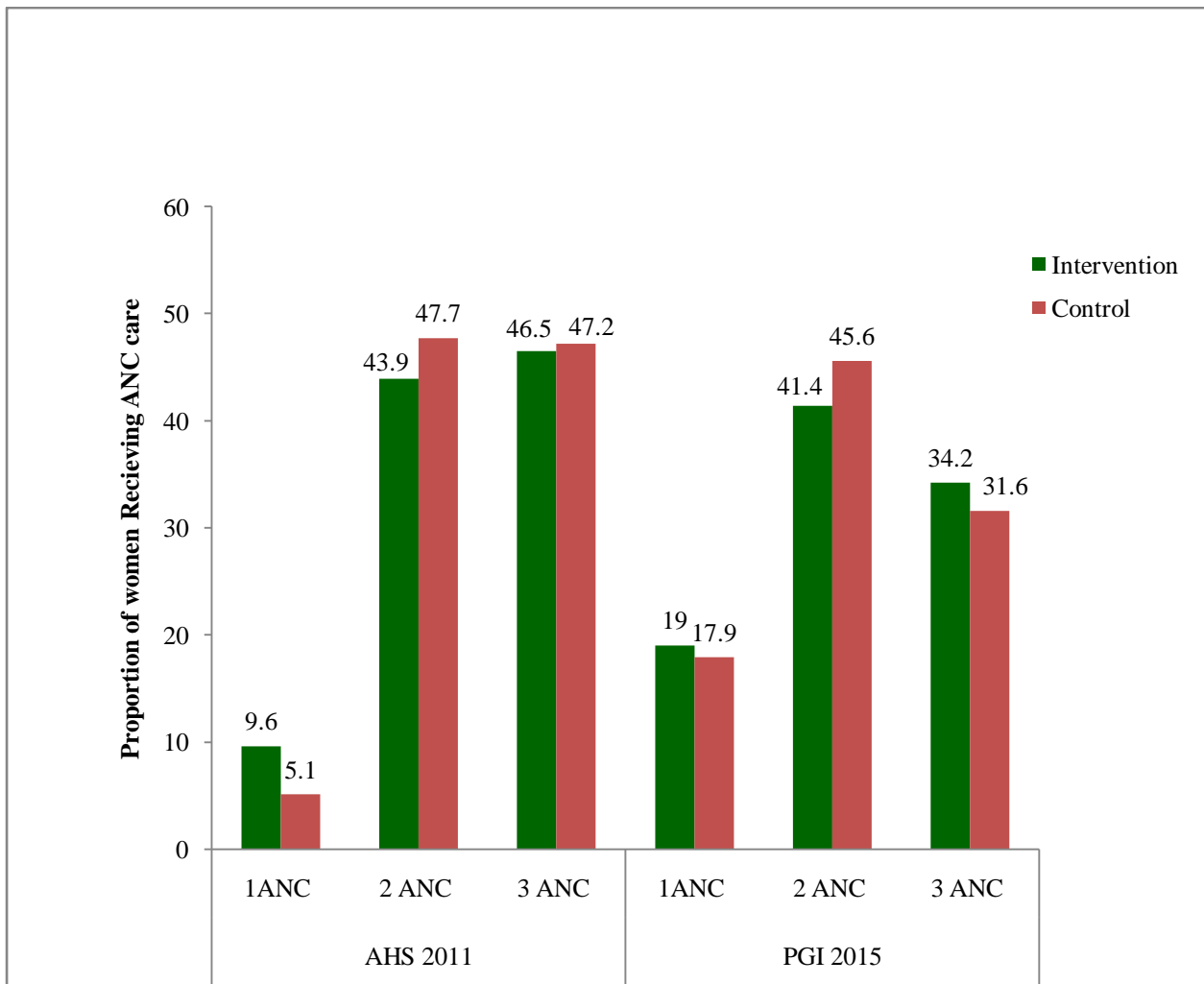


Figure 2: Extent of antenatal care provision in intervention and controls blocks of district Kaushambi in 2011 and 2015.



Quality of care during Antenatal Checkups

Table 4: Quality of antenatal care in intervention and control areas in district Kaushambi in 2011 and 2015

Service		Coverage (%)					
		AHS (2011)			PGI (2015)		
		Intervention	Control	Total	Intervention	Control	Total
Weight Measurement		35.70	30.70	33.2	73.20	77.80	75.60
Height Measurement		Na	Na	Na	16.00	11.40	13.60
Abdominal Examination		82.80	85.20	84.0	67.00	62.30	64.50
BP Measurement		25.50	25.60	25.6	51.40	45.20	48.20
Blood Test performed		21.70	18.80	20.3	57.90	55.90	56.90
Urine Test performed		19.10	26.70	23.0	53.10	51.40	52.20
Ultrasound performed		21.70	20.50	21.1	42.70	32.90	37.60
Proportion of women receiving IFA tablets. #		Na	Na	Na	82.10	87.40	84.80
IFA tablets consumption #	0 or none	62.70	54.70	58.7	2.80	3.40	3.10
	0—30 tablets	28.40	16.40	22.4	45.30	30.80	37.80
	31-60 tablets	4.40	12.90	8.7	28.80	30.40	29.60
	61-100 tablets	3.60	12.90	8.3	22.20	34.90	28.80
	>=100 tablets	0.90	3.10	2	0.80	0.60	0.70
Coverage of Tetanus toxoid Injection #	No injection	32.90	24.00	28.5	6.60	3.10	4.90
	1 TT injection	11.60	15.10	13.3	14.70	12.40	13.50
	2+ TT injections	55.60	60.90	58.3	75.70	84.20	80.00
	Don't remember	Na	Na	Na	3.00	0.30	1.60
Full ANC done ^{\$}		0.00	4.90	2.5	5.60	12.60	9.20

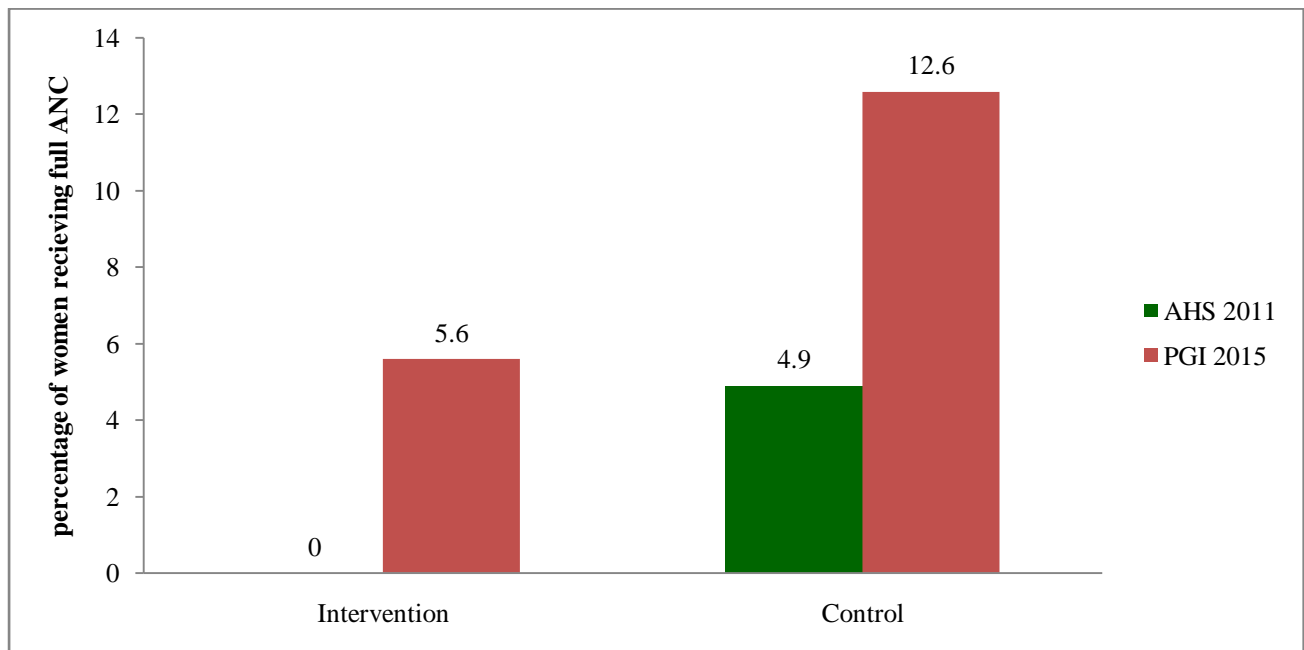
Information about IFA and TT was asked from all the mothers irrespective of their status of pregnancy registration.

\$ Full ANC includes women who have had at-least 3 ANC visits, taken 2 TT injections and consumed 100+ IFA Tablets.

Na-Not applicable- Data not available for the same in AHS.

The proportion of women receiving two tetanus toxoid injections has increased from 2011 to 2015. The coverage of two TT injections was found more in control area (84.2%) than intervention area (75.7%) in PGI study. The proportion of women receiving full ANC care is also more in the control area than the intervention area. The full ANC coverage increased in intervention area from 0.00 to 5.6% while in control area it rose from 4.9% to 12.6%. As far as quality of care received during ANC is concerned, the percentage of women receiving urine, blood and other ANC examinations increased from 2011 to 2015. Abdominal examination during ANC care declined in both the intervention (82.8 to 67.0) and control areas (85.2-62.3).

Figure 3: Percentage of women receiving full antenatal care in intervention and control areas of district Kaushambi in year 2011 and 2015



Utilization of mobile technology by ASHA workers in Intervention blocks

Table 5: Extent of use of mobile phones by ASHA workers for counselling during ANC care in intervention area of district Kaushambi, 2015.

Indicator	Categories	Coverage (%)
		Intervention area
Use a mobile with images and sounds by ASHA in intervention block	Yes but no images and Sounds	11.3
	Yes with images and sounds	54.3
	No use of mobile	33.3
	Don't know	1.2
Understanding the information	Yes	59.4
	No	16.3
	No explanation	24.4

The women in the intervention areas were asked questions specifically to know the use of mobile phones by ASHAs. About 54.3% women recalled the use of mobile phones by ASHA s and having seen both audio and visual message. On the other hand one –third women denied having received any counselling using mobile phones. Around 60% women felt that the application had resulted in the better understanding of information given to them.

Table 6: Recall of counselling given by ASHA to the pregnant women in the intervention area in district Kaushambi, 2015

Indicator	Category	Coverage (%)		
		Immediate Reply by women		
		Intervention	Control	p-value
Counseling given by ASHA to pregnant women	Antenatal Care	99.8	87.4	<0.001
	Tetanus-toxoid injection	100	96.8	<0.001
	Iron tablets	100	93.4	<0.001
	Advice on nutrition and rest	100	78.3	<0.001
	Complication during pregnancy	100	54.5	<0.001
	Essential newborn care	100	39.5	<0.001
	Danger signs in newborn	100	31.7	<0.001
	Birth preparedness	100	33.1	<0.001

Table no 6 shows that women in the intervention area remembered the topics and counselling given to them significantly better than the women in the control area. Seventy eight percent women in control area could recall the advice given for nutrition and rest during pregnancy whereas the recall was 100% in the intervention area. Similarly all women interviewed in the intervention area could recall about Essential newborn care while in control area, the percentage was 39.5%.

Care seeking behaviour for complications during pregnancy

Table 7: Care seeking behavior for complications during pregnancy in Intervention and control areas in District Kaushambi, 2011 and 2015.

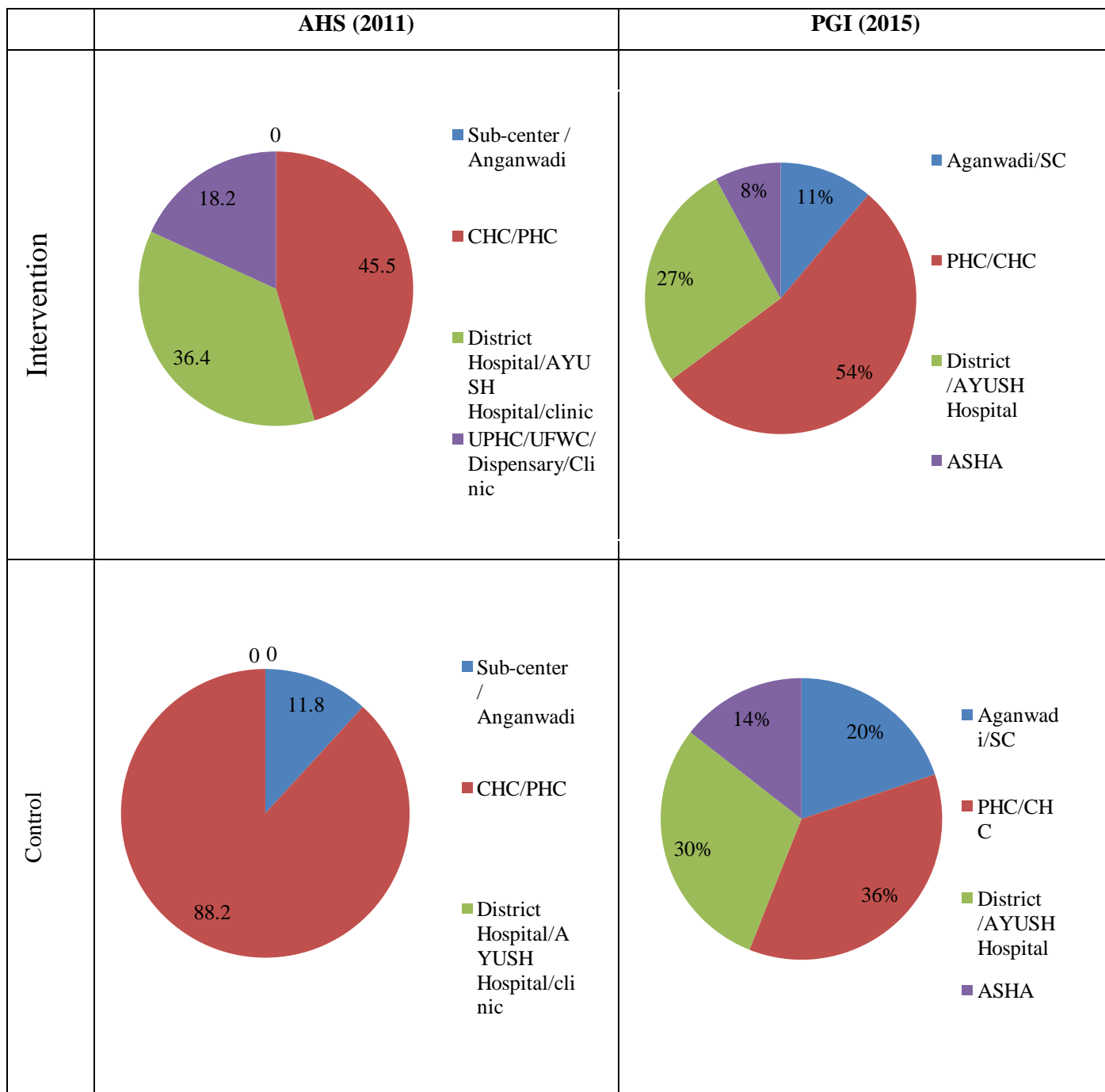
Indicators	Categories	Coverage (%)					
		AHS (2011)			PGI (2015)		
		Intervention	Control	Total	Intervention	Control	Total
Women ever received ASHA visit		Na	Na	Na	89.00	85.00	87.00
Place of meeting with ASHA	At Home	Na	Na	Na	87.90	85.30	86.60
	At ASHA's Home	Na	Na	Na	5.40	3.10	4.20
	Sub-center	Na	Na	Na	0.80	1.30	1.00
	PHC	Na	Na	Na	1.20	0.40	0.80
	CHC	Na	Na	Na	0.10	0.20	0.20
	Other	Na	Na	Na	4.70	9.60	7.30
Number of home visits by ASHA	No visit	Na	Na	Na	1.30	1.60	1.50
	1 visit	9.6	5.1	7.4	15.80	10.30	13.10
	2 visit	43.9	47.7	45.8	32.60	34.30	33.50
	3visit	20.4	22.2	21.3	26.10	29.80	27.90
	4 visit	26.1	25	25.6	23.10	23.50	23.30
	Don't remember	Na	Na	Na	1.00	0.50	0.70
Proportion of women experiencing complications	-	42.20	46.20	44.2	80.90	72.40	76.60
Treatment sought for complications	Yes	57.90	59.60	58.8	71.90	46.20	57.40
Place of treatment	Public health centers	20.00	27.40	23.7	49.6	32.7	42.0
	Private health centers	52.70	54.80	53.8	54.7	71.7	62.5
	Home	27.3	17.7	22.5	2.5	0.4	1.5

Na- Not applicable, Data not available for the respective categories in AHS data.

Some of the information in this section was not available from AHS data. Over 85% of pregnant women met ASHA at least once in PGI study 2015. In majority of the cases, ASHA met the pregnant women at their home (>85% cases).

Care seeking Behaviour: the number of women experiencing complications during pregnancy has almost doubled in the last 4 years in both the intervention and control areas. The percentage increase is more in the intervention area (42.40% to 80.90%) than the control area (46.20 to 72.40%). The increase could be due to increased knowledge about the complications. In the intervention area, 71.90% women took the treatment for the complication while in control area only 46.20% women sought the treatment. In intervention area, there was an equal inclination on accessing public and private health facility while in control area, private (71.7%) health facilities were preferred over public (32.7%) facilities.

Figure4: Type of public health facility sought for treatment of complication during pregnancy in 2011 and 2015.



Services during delivery and Post natal care

Table 8: Provision for delivery and post-natal care services in intervention and control areas of District Kaushambi, 2011 and 2015

Indicator	Category	Coverage (%)					
		AHS (2011)			PGI study (2015)		
		Intervention	control	Total	Intervention	Control	Total
Type of Delivery	Institutional Delivery	56.00	62.70	59.4	90.00	91.90	91.00
	Home delivery	42.70	33.30	38.0	7.30	7.20	7.30
	Others	1.30	4.00	2.7	2.70	0.90	1.80
Place of delivery	Public health Institutes	50.70	53.30	52.0	79.00	73.30	76.10
	Private health Institutes	5.30	9.30	7.3	11.00	18.60	14.90
	Home	42.70	33.30	38.0	7.30	7.20	7.30
	Others	1.30	4.00	2.7	2.70	0.90	1.80
Knowledge about free Government ambulance services		Na	Na	Na	91.70	93.10	92.40
Usage of free Ambulance service		2.40	1.40	1.9	71.90	71.90	71.90
Accompanied by ASHA during Institutional delivery		Na	Na	Na	73.50	74.50	74.00
ASHA stayed in health facility till delivery		Na	Na	Na	97.20	98.80	98.10
Receipt of financial assistance under JSY [@]		82.50	80.90	81.7	81.70	77.20	79.40
Money received under JSY					99.50	99.10	99.30
Stay in health facility after delivery	Less than 6 hours	Na	Na	Na	24.10	22.10	23.10
	6 - 12 hours	Na	Na	Na	36.40	25.00	30.70
	12- 24 hours	Na	Na	Na	31.50	42.80	37.20
	24 - 48 hours	Na	Na	Na	4.30	5.20	4.70
	48 -72 hours	Na	Na	Na	1.60	1.70	1.60
	More than 72 hours	Na	Na	Na	2.00	3.20	2.60

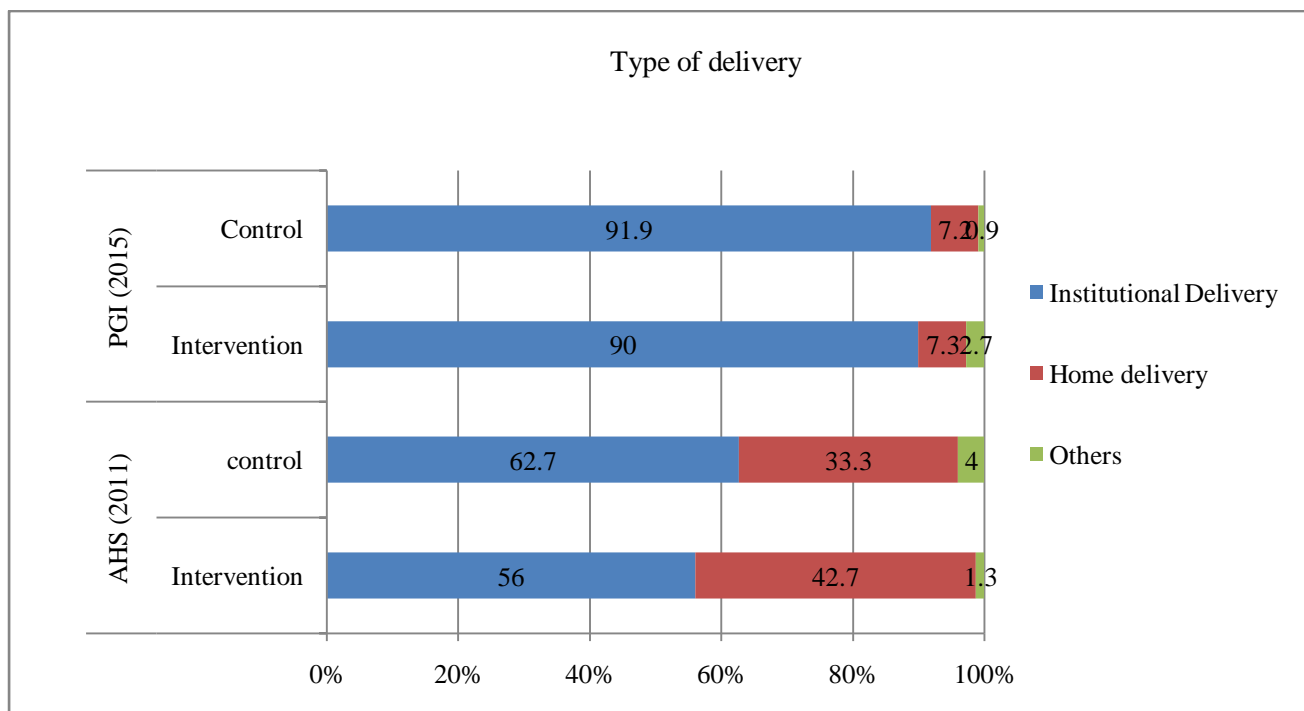
@ Only for those women who had institutional delivery in public sector.

Na-Not applicable- data is not available in the respective category in the AHS data.

The proportion of institutional deliveries was found to be more than 90% in both the areas in PGI study. Over 70% of these institutional deliveries were in government health facilities, mostly at the level of PHC and CHC (80% in intervention area and 71% in control area. The use of ambulance service had increased enormously in last 4 years in intervention areas(from 2.4 % to 72%) and control area (1.40 to 71%). As per *Janani Suraksha Yojana (JSY)* is concerned, 81% and 77% pregnant women availed this facility in intervention area and control area respectively.

Regarding ASHA accompanying the women to health facilities, data was not available from the AHS questionnaire. The 2015 study highlighted that in around 74% of cases; ASHAs accompanied pregnant women to the health facility and among these cases, ASHAs stayed there till the end of delivery process in 95% of the cases. Most of the mothers and new born stayed for less than 24 hours in health facility. Less than 8% and 10% of women stayed more than 24 hours in intervention and control areas respectively.

Figure 5: Type of delivery conducted, in intervention and control areas of District Kaushambi in 2011 and 2015.



Services during Post-Partum care

Table 9: Provision of Postnatal care by ASHA in intervention and control blocks of district Kaushambi during 2011 and 2015

Indicator	Category	AHS (2011)			PGI (2015)		
		Intervention	Control	Total	Intervention	Control	Total
Post Partum complication during first 6 weeks after delivery.	Any health problem	32.00	35.10	33.6	45.50	33.10	39.00
	Foul Smelling vaginal discharge	0.9	0.7	0.8	11.50	7.10	9.10
	Excessive Vaginal bleeding	0.4	0.2	0.3	27.70	5.90	15.60
	Convulsions	2.10	2.20	2.2	26.10	19.90	22.70
	Blurred vision/Severe headache	3.10	1.60	2.4	50.90	24.40	36.30
	Giddiness/Loss of Consciousness	4.3	4.2	4.3	26.70	6.00	15.30
Whether Treatment sought	Yes	87.50	77.20	82.4	72.30	61.50	67.30
Place of choice for seeking treatment	Public	30.20	36.10	33.2	38.00	41.50	39.50
	Private	44.40	42.60	43.5	60.20	58.50	59.50
	Others	25.40	21.30	23.4	1.80	0.00	1.00
Out of pocket expenditure during treatment for complication	Yes	Na	Na	Na	78.30	38.30	61.00
Postnatal care visits within 42 days of delivery		Na	Na	Na	65.80	66.80	66.30
PNC visits done by	ASHA	Na	Na	Na	94.90	95.20	95.10
	ANM	Na	Na	Na	2.10	1.00	1.50
	AWW	Na	Na	Na	0.80	2.50	1.70
	Local Dai	Na	Na	Na	1.00	0.60	0.80
	Others	Na	Na	Na	1.20	0.70	0.90

ASHAs first home visit to check the baby after birth	Within 24 hours of birth after birth	Na	Na	Na	39.30	45.10	42.40
	1-6 days after birth	Na	Na	Na	41.70	36.00	38.70
	>=7 days after birth	Na	Na	Na	18.10	17.80	17.90
	No visit by ASHA	Na	Na	Na	0.50	1.10	0.80
Number of ASHA's home visit in the first week	< 3 visits	Na	Na	Na	79.40	76.30	77.70
	>=3 Visits	Na	Na	Na	20.60	23.70	22.30
Number of ASHA's home visit within the 42 days of birth	< 6 visits	Na	Na	Na	82.70	81.00	81.80
	>=6 visits	Na	Na	Na	17.30	19.00	18.20

*Na- Not applicable- data not available in AHS survey in the respective mentioned category.

Around 45% women in postpartum period suffered from one or more health problem in intervention area while 33% women in control area suffered any postpartum complication, as found in PGI study. More women sought treatment for these health problems in intervention area (72%) than in control area (61%). Private sector health facilities were the choice of treatment for seeking care in both the intervention (60.20%) and control (58.50%) areas. Seventy eight percent women spent out of pocket for seeking treatment for complications in intervention area while in control, 38.3% women spent out of pocket.

As far as postnatal care visits were concerned, over 65% of mothers and new born received the PNC visits in the first 42 days after delivery in both intervention and control areas. Out of total women receiving postnatal care, ASHA made home visits in 95% cases to provide the postnatal care to mother and newborn.

In 80% of the cases, ASHA made her first home visit within first seven days after birth. Only 20% women received six or more visits from ASHA within 42 days of delivering the baby in both the intervention (17.3%) and control areas (19.0%) as per 2015 study.

Breastfeeding

Table 10: Initiation of breastfeeding of infants in intervention and control areas of Kaushambi in 2011 and 2015

Indicator	Category	AHS (2011)			PGI (2015)		
		Intervention	Control	Total	Intervention	Control	Total
Proportion of kids ever breastfed		Na	Na	Na	97.50	99.50	98.50
Initiation of breastfeeding	within 1 hours	19.60	23.10	21.4	71.5	72.23	72.0
	1-12 hours	43.60	43.60	43.60	12.4	6.965	-
Fed anything other than breast milk on first day of birth.	-	Na	Na	Na	54.4	41.8	45.9

Na- Not Available- data not available for the respective sections

As per PGI study 2015, the proportion of children ever breastfed was more than 90% in both the intervention (97.5%) and the control area (99.50%). The percentage of early initiation of breast feeding (i.e., breastfeeding within first hour of birth) had increased from year 2011 to 2015. In intervention area, 71.5% of women breastfed their children within first hour of birth as per PGI study against 20% women in 2011. In control area also, the increase was from 23% women breastfeeding their child within one hour of birth in 2011 to 72% in 2015.

More than fifty percent of women in intervention area had fed their babies with something other than breast milk on first day of birth while in control area the percentage was 42%.

Illness episodes in children (29 days to 6 months)

Table 11: Illness episodes in newborns in the first 28 days of birth in Intervention and Control areas in district Kaushambi in 2011 and 2015

Indicator	Category	Coverage (%)		
		PGI (2015)		
		Intervention	Control	Total
Proportion of children suffering from illness within 28 days of birth	Yes	35.7	34	34.9
Medical care sought	Yes	96.3	97.0	96.7
Place of treatment	Public	15.3	7.4	11.6
	Private	84.7	92.6	88.4
Type of treatment sought	Hospitalization	2.8	6.2	4.4
	Out-patient care	93.4	90.1	91.8
	Both	3.9	3.7	3.8

*Above mentioned data was only available for PGI study. Data was not available for the respective sections in AHS data.

The PGI study reported that an average 35% of newborns fell ill within first 28 days of the birth. The proportion of parents who sought care for their ill newborn was more than 95% in both the intervention and the control blocks. The choice of place of treatment for newborn illnesses was private health facilities. Eighty four percent people in intervention area and 92.6% in control area sought medical care in private health sector. Most of the newborns (>90%) got outpatient consultation and only an average of 4.4% (2.8% in intervention area and 6.2% in control area) were hospitalized for the neonatal morbidities.

Illness episodes in 12-23 months old children

Table 12: Illness episodes and hospitalization in first year of birth in the intervention and control areas of district Kaushambi in 2011 and 2015

Indicator	Category	Coverage (%)			
		PGI (2015)			
		Intervention	Control	Total	p- value
Any illness episode in last 15 days before the date of survey		71.70	66.20	68.90	0.002
Symptoms reported reported among those who fall ill within last 15 days	Fever	63.50	52.90	58.10	<0.001
	Cough and cold	53.50	42.80	48.00	<0.001
	Weight Loss	22.70	17.80	20.20	0.003
	Diarrhea	25.60	18.50	22.00	<0.001
	Vomiting	22.50	8.70	15.50	<0.001
	Blood in Stool	1.10	0.20	0.70	0.009
	Difficulty in Breathing	4.80	1.00	2.90	<0.001
	Chest In drawing	6.30	0.50	3.40	<0.001
	Fast breathing	6.90	1.40	4.10	<0.001
	Convulsions	3.40	1.60	2.50	0.004
	Wheezing	9.40	2.60	5.90	<0.001
	Skin rashes	2.30	3.20	2.70	0.19
	Not responding to voice	0.40	0.10	0.20	0.15
	Pale Palms	0.10	0.10	0.10	0.618
	Jaundice	1.10	1.60	1.30	0.372
Place for seeking treatment	Public	15.20	4.80	10.10	<0.001
	Private	83.60	95.20	89.30	
	Others	1.20	0.00	0.60	
Public Sector facilities sought for treatment	Subcentre/Anganwadi	9.30	14.30	10.40	0.109
	CHC/PHC	49.30	45.20	48.40	
	ASHA	2.10	9.50	3.80	
	District Hospital/AYUSH hospital /Clinic	39.30	31.00	37.40	
Type of treatment sought (In both private and public facilities)	Out Patient care	2.40	1.70	2.10	<0.001
	In Patient Care	87.00	95.90	91.30	
	Both	10.60	2.40	6.60	
Type of treatment sought In Public facilities	Out Patient	0.00	7.10	1.60	0.005
	In Patient	87.90	85.70	87.40	
	Both	12.10	7.10	11.00	

Out of pocket expenditure (in both public and private health facilities)	Yes	94.90	96.60	95.70	0.06
Out of pocket in public health facilities.	Yes	88.60	69.00	84.10	
	No	10.00	31.00	14.80	
	Don't Know	1.40	0.00	1.10	
Hospitalization in last 1 year except		9.80	6.00	7.90	<0.001
Average number of hospitalizations	One hospitalization	66.70	87.60	75.70	0.002
	Two hospitalization	26.50	11.20	19.90	
	Three or more hospitalizations	6.80	1.10	4.40	

*the above mentioned data is available only for the PGI study 2015.

Around 72% children in the age group of 12-23 months have suffered child morbidities in the last 15 days at the time of survey in the intervention area while 66% of children in control area suffered one or more symptoms. The major morbidities being fever and cough in both areas. Private health facilities were the major choice for seeking treatment in both the areas.

Figure6: Type of public health facility availed for treatment of childhood illnesses (12-23 months)

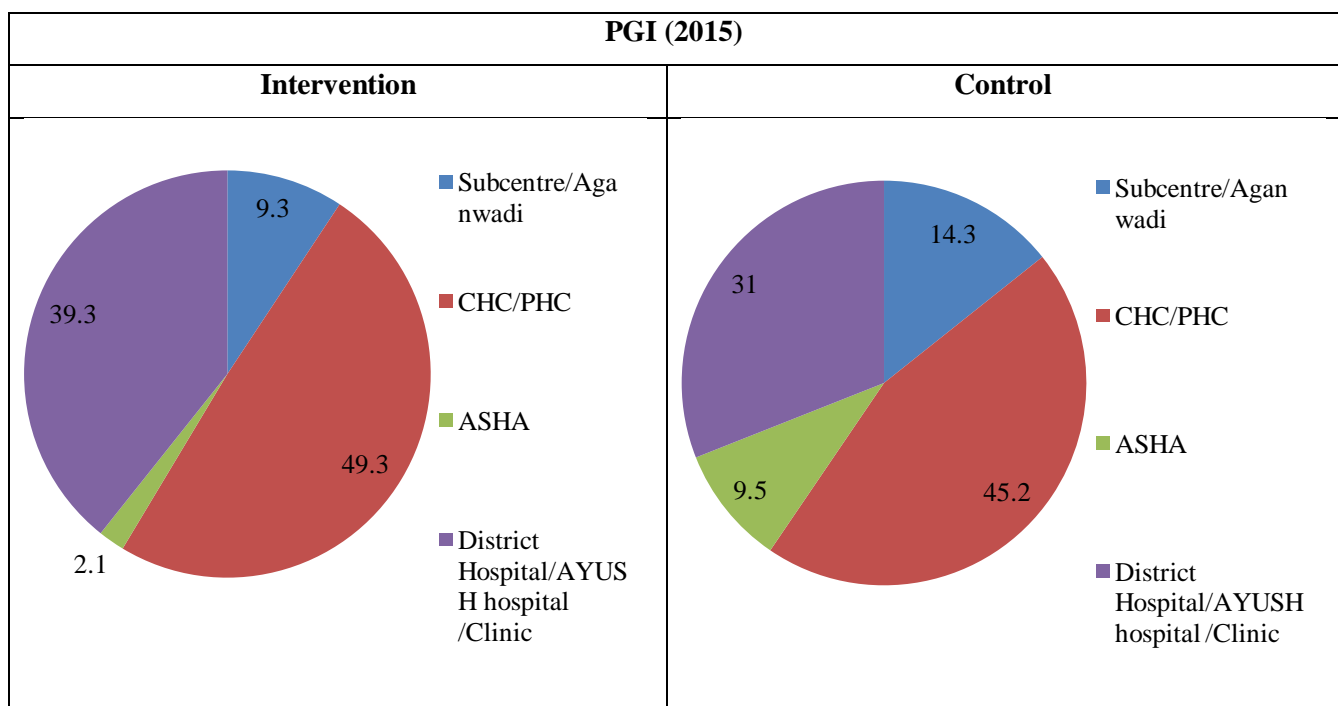


Table 13: Vaccination coverage status of the children in the intervention and control blocks of district Kaushambi in 2011 and 2015

Indicator	Categories	Coverage (%)						
		AHS (2011)			PGI (2015)			
		Intervention	Control	Total	Intervention	Control	Total	p-value
Availability of immunization cards with families	-	52.90	60.90	56.9	53.0	60.1	56.6	<0.001
Full immunisation*	-	7.7	7.1	7.4	49	55.5	52.3	<0.001
Drop-out rates	BCG-DPT1	NA	NA	NA	10.30	7.0	8.60	0.005
	DPT1-DPT3	NA	NA	NA	8	7.3	7.7	0.561
	DPT3-Measles1	NA	NA	NA	11.10	9.00	10.00	0.128

*children with all 8 vaccines- BCG, OPV 1,2,3, DPT 1,2,3 & measles

NA- Not Analysable as the relevant data is not available

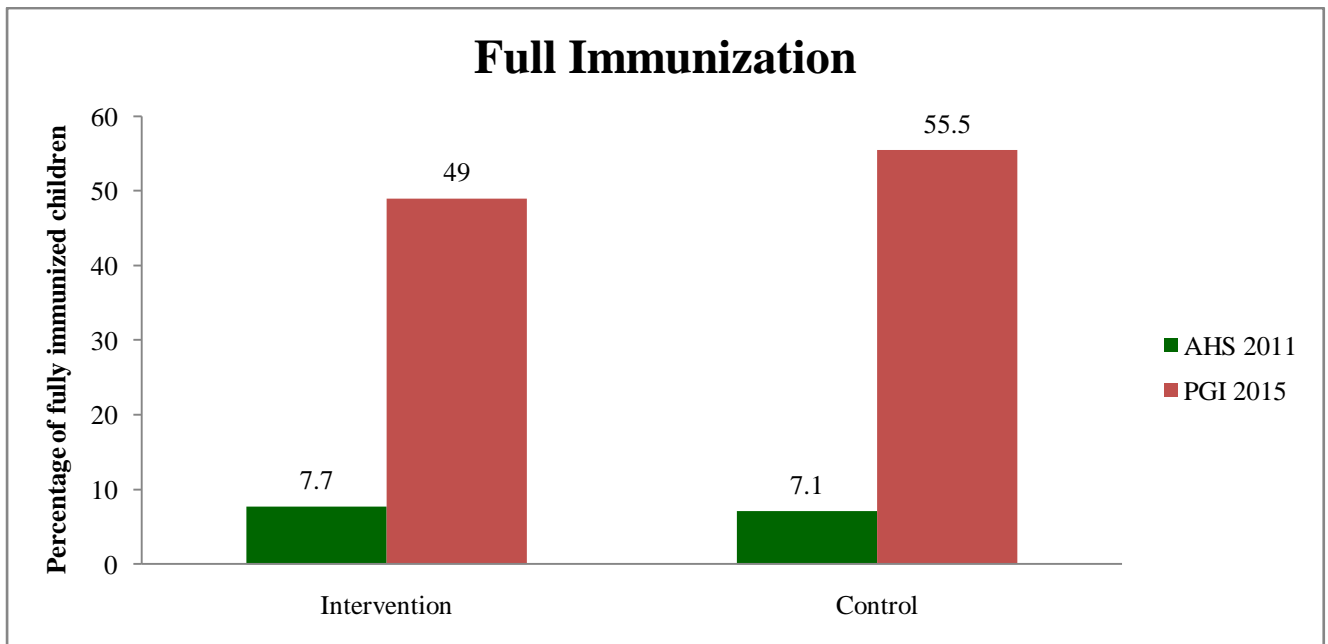
As per descriptive analysis, there is not much change on the availability of child's immunization cards with the families in both study areas from 2011 to 2015. An increase of 41.3% and 48.4% was noticed in the proportion of fully immunized children in intervention (from 7.7% to 49%) and control area (7.1% to 55.5%) from 2011 to 2015.

Drop-out Rates: The drop-out rates indicate the number of children who could not receive a subsequent vaccine after receiving another vaccine previously. An example of how this rate is calculated is:

$$\text{BCG-DPT1 drop-out rate} = \frac{\text{children who received BCG} - \text{children who received BCG as well as DPT1}}{\text{Children who received BCG}}$$

The drop-out rates are a little higher in the intervention area than the control area. A drop out of 10.30% was noticed from BCG to first dose of DPT in the intervention area against a 7% drop out in the control area.

Figure 7: Percentage of fully immunized children in the intervention and control areas of district Kaushambi in year 2011 and 2015.



**Since the dates for data collection of Annual Health Survey 2011 were not available so the age of children at the time of data collection could not be ascertained. As a result the comparative analysis could not be executed.

Out of Pocket Expenditure

Table 14: Out of pocket expenditure during institutional deliveries in public and private health facilities in Kaushambi, 2015

Indicator	Category	Intervention		Control	
		Mean (INR)	Standard Error	Mean (INR)	Standard Error
Institutional Delivery	Public health facilities	861	75.4	610	31.5
	Private health facilities	16900	2984	13000	942.2

As per PGI study, average total amount of INR 861 and 610 were spent during institutional deliveries in public health facilities in intervention and control blocks of Kaushambi. The total amount of expenditure includes hospitalisation charges, fees for doctors/nursing staff, transportation, medicines, and diagnostic tests, boarding or lodging for attendants, transportation and any other expenses. The average amount spent on institutional deliveries in private hospitals was 16,900 INR in intervention area and 13,000 INR in control area in Kaushambi.

Table 15: Out of pocket expenditure for seeking care for newborn and childhood illnesses in public and private health facilities in Kaushambi, 2015.

Indicator	Categories	Newborns illnesses				Childhood illnesses (in last 15 days)			
		Intervention		Control		Intervention		Control	
		Mean (INR)	SE	Mean (INR)	SE	Mean (INR)	SE	Mean (INR)	SE
Type of treatment sought	Out-Patient consultation								
	-Public health facility	1399	504.4	283	162.0	661	78.4	1365	571.2
	-Private health facility	800	153.1	769	151.5	828	60.3	540	44.5
	Hospitalisation								
	-public health facility	380	120	2357	2322	594	191.5	450	150
	-private health facility	1000	0	5164	1084	1271	277.9	1050	256.8

For newborn illnesses, an average amount of 1399 INR was spent on out-patient consultation in public sector while 800 INR were spent in private sector health facilities. The averages include total average amount spent on hospitalisation charges, fees for doctors/nursing staff, transportation,

medicines, and diagnostic tests, boarding or lodging for attendants, transportation and any other expenses.

In control area, an average amount of INR 283 and 2357 were spent on the out-patient consultation and hospitalisation respectively in public health facilities. The expenditure in private health facilities for seeking care for newborn illnesses was INR 769 for outpatient consultation and INR 5164 for hospitalisation.

While in case of childhood illnesses in intervention area, the out of pocket expenditures in public health facilities were INR 661 for out-patient consultation and 594 for hospitalisation. In control area, out of pocket expenditure was INR 828 on out-patient consultations and INR 1271 on hospitalisations.

Table 16: Out of pocket expenditure during hospitalisations for childhood illnesses in public and private sector health facilities in Kaushambi, 2015.

Indicator	Category	Intervention		Control	
		Mean	Standard Error	Mean	Standard Error
Hospitalisation in last one year	Public health facilities	2227.3	640	5550	2090
	Private health facilities	3800	563.4	9974.6	2109

As per PGI study, average hospitalization expenditures for childhood illnesses in public health facilities were INR 2227 and 5550 in intervention area and control area respectively. While in case of private health facilities, the expenditure was INR 3800 in intervention area and INR 9975 in control area.

***Remarks: Out of pocket expenditure as per AHS Data 2011.**

The mean amount spent on transportation and others expenses during institutional delivery in intervention area was 64.34 INR (0- 2000) and 116.02 INR (0-1600) respectively while in control area 142 INR (0-3000) and 365 INR (0-8000) were spent on transportation and other expenses respectively.

Conclusion

Preliminary findings suggest an overall improvement in performance of various maternal, newborn & child health (MNCH) indicators from 2011 to 2015 in both intervention and control areas. There is a significant improvement in the proportion of pregnancies registered in both the intervention and control areas from 2011 to 2015. In intervention area, the increase is around 24% i.e. from 69.80% to 93.90% while in control area, an increase of 18.5% (78.20 to 96.70%) was observed.

Notable improvements were found in the rates of institutional deliveries which have risen from 56% to 90% in Intervention areas and 62.70% to 91.90% in control areas from 2011 to 2015. Around 45% women in postpartum period suffered from one or more health problem in intervention area while the same is 33% in control area. More proportion of women in intervention area sought treatment (72%) than control area (61%). Private sector hospitals were the choice of treatment of complications.

Over 65% of mothers and new born received the PNC visits in the first 42 days after birth and in 95% of cases, ASHA made the home visits. Over 80% of the first visits were made in first seven days after birth. More than or equal to six visits were made by ASHA within 42 days of birth in only 20% of the cases.

As per the preliminary descriptive analysis, there is a status quo on the availability of immunization cards with the families in both the intervention and control areas from 2011 to 2015. The increase of more than 40% is noticed in both the study areas (from 7.7% to 49% in intervention area and 7.1% to 55.5% in control area) for the proportion of children who are fully immunized.

Around 35% of the newborns suffered illness in the first 28 days of life in both the intervention and control areas. Seventy two percent children in the age group of 12-23 months have suffered child morbidities in the last 15 days at the time of survey in the intervention area while 66% of children in control area suffered one or more symptoms. The major morbidities being fever and cough in both areas.

Average total amount of INR 861 and 610 were spent during institutional deliveries in public health facilities in intervention and control blocks of Kaushambi. The total amount of expenditure includes hospitalisation charges, fees for doctors/nursing staff, transportation, medicines, and diagnostic tests, boarding or lodging for attendants, transportation and any other expenses. The average amount spent

on institutional deliveries in private hospitals was 16,900 INR in intervention area and 13,000 INR in control area in Kaushambi.

As per the present study, average hospitalization expenditures for childhood illnesses in public health facilities were INR 2227 and 5550 in intervention area and control area respectively. While in case of private health facilities, the expenditure was INR 3800 in intervention area and INR 9975 in control area.

The results are described on the basis of descriptive analysis of Annual Health survey-2011 and PGI study data-2015. The present report does not include the impact assessment as it will require controlling other factors which influence utilization of health care services between intervention and control areas.

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