ORIGINAL ARTICLE

Evaluation of Maternal Health Component of Reproductive and Child Health (RCH) II Programme in Beed District, Maharashtra, India 2013

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Abstract:

Introduction: Situation analysis of Reproductive and Child Health programme of Government of India in Beed district of Maharashtra state in India indicated lack of achievement of targeted maternal health indicators. Evaluation of the utilization of maternal health services component of Reproductive and Child Health (RCH) II programme in Beed district of Maharashtra state in India was undertaken. *Material and Methods:* A cross sectional survey in the rural area of Beed district using cluster sampling method was conducted. The information about the utilization of maternal health services was collected from mothers who delivered between 1st April and 30th June 2013. A facility survey using pre tested check list was undertaken. Analysis of the data using Epi Info Version 3.5.3 and proportion for selected maternal health care indicators were calculated. *Results:* Out of the 374 mothers included in the study, 122 (33.0%) had registered within first trimester of pregnancy; nearly 50% had received more than three antenatal care (ANC) visits and 90% had institutional delivery. Of the 70 mothers, who made phone call for ambulance service, 56 (80%) utilized ambulance from their residence to the hospitals. Of the 183 mothers who delivered in Government hospitals, 103 (56.3%) utilized it to reach home from hospitals after delivery. Of the eligible women, 96 (76.2%) were registered for Janani Suraksha Yojana (JSY) scheme of the Government and 67 (69.8%) received the benefit. In all 46 (16.4%) Auxiliary Nurse Midwives (ANMs) were trained as Skilled Birth Attendant (SBA). Of the 22 facilities, 14 (63.6%) had delivery kits and in 6 (27.3%) facilities maternal health services were monitored by medical officers. *Conclusion:* The utilization of maternal health care services and knowledge and implementation regarding JSY Scheme and ambulance service utilization among mothers was less than desirable. The coverage of training of ANMs as SBA was low. Provision of antenatal services in every village regularly, training of ANM, awareness regarding JSY scheme and better sensitization and utilization of ambulance service are needed.

Keywords: Maternal health, Janani Suraksha Yojana, Auxiliary Nurse Midwives, Skilled Birth Attendant, Beed

Introduction:

Globally, every day approximately 800 woman die from preventable causes related to pregnancy and child birth. About 99% of all maternal deaths occur in developing countries [1]. India accounts for one fifth of the global burden of maternal mortality [2]. Optimal use of maternal health services can reduce maternal morbidity and mortality [3]. To improve maternal health, the Reproductive and Child Health (RCH) phase II programme was launched in India in April 2005. The maternal health programme, a component of the RCH programme, provides essential and emergency obstetric care to prevent maternal deaths especially due to preventable causes. The main objectives of the programme are to improve access to skilled obstetric care, improve coverage and quality of antenatal care and postpartum care. To fulfill these objectives, three main strategies of essential obstetric care, emergency obstetric care and timely referral are implemented [4].

The lifetime risk of mortality during motherhood has been gradually diminishing in India mainly due to expansion of reproductive healthcare facilities and services through government operated programmes. From 33% deliveries attended by skilled personnel in 1992-93, the proportion has increased to about 47% in 2005-06 and 52% in 2007-08 [5, 6].

According to Millennium Development Goals (MDGs), India is required to reduce maternal mortality ratio (MMR) to 109 per 100,000 live births by 2015 [7]. Maternal mortality ratio in India was reported to be 212 per 100,000 live births in 2007 – 2009 and it decreased to 178 per 100,000 live births in 2010 – 2012; a reduction of 34 points over a period of three years[8]. The MMR MDG target has been achieved by the state of Maharashtra where the recent MMR is reported to be 87 per 100,000 live births (2010 – 2012), showing a reduction of 17 points in three years and is currently ranked 2nd best in India[8].

Low utilization of maternal health services was observed during review of monthly reports of Beed district despite wide spread availability of services. In Beed district, 55.0% mothers had haemoglobin level of less than 11 gm%; higher than the state (48.9%) and national (35.3%) estimates. About 39.0% mothers delivered in public facilities, lower in comparison with state (47.8%) and national (61.2%) estimates. Total 49.0% mothers received postpartum check up within 48 hours after delivery which was also lower than the state (61.8%) and national (67.3%) averages [9, 10]. It was therefore felt important to understand the reasons for suboptimal utilization of maternal health services in Beed district of Maharashtra, India.

The evaluation of maternal health component of RCH II programme in Beed district of Maharashtra for various pre-defined input, process, output and outcome indicators was undertaken.

Material and Methods:

Study Design:

A record review, beneficiary survey and facility survey was undertaken.

A review of the records available at the district level between 1st July 2013 and 30th September 2013 was undertaken.

A population based cross sectional beneficiary survey in the rural area of Beed district between 1st July 2013 and 30th September 2013 was undertaken.

A facility survey in the Beed district between 1st July 2013 and 30th September 2013 was undertaken.

Study Population, Sample Size and Sampling Strategy:

Record review:

The review of records at the district level for the reference period of 1st April 2012 and 31st March 2013 was done.

A sample size of 374 mothers was calculated with a presumption of 63% ANC registration within the first trimester of pregnancy, at 95% confidence interval with absolute precision of 7 and design effect 2. A line list of all mothers who delivered between 1st April 2013 and 30thJune 2013 was prepared. Considering sub centre as a cluster, and following cluster sampling, 34 clusters out of 281 were selected using linear systematic sampling probability proportional to size (LSS-PPS) method. Within each cluster, 11 mothers were selected using simple random sampling.

Facility survey:

Twenty two out of total 50 primary health centres were selected from 11 blocks of Beed district for the facility survey. One good performing and one poor performing, primary health centre, from each block was selected, based on their reported performance in maternal health indicators in the previous year (2012-13).

Data Collection:

Record review:

A logic frame of indicators on input, process, output and outcome was prepared. A review of the records available at the district health office for various indicators and collected information regarding infrastructure, human resource, training of health care providers, funds and maternal health services utilization using data abstraction form was undertaken.

Beneficiary survey:

A semi-structured questionnaire was developed and modified based on experience during pilot testing to improve its quality. A training of the interviewers was taken on uniform data collection for socio demographic characteristics, antenatal, intranatal and postnatal care service utilization by mothers in the local language.

Facility survey:

A health facility survey was conducted using a check list and collected information on infrastructure, training, logistics and availability of services at the facility level was recorded.

Data Analysis:

Record Review

We analysed the data using Epi Info version 3.5.3 software. The proportions were calculated for qualitative data and appropriate tests of

significance were applied.

An approval from the Institutional Ethics Committee, ICMR School of Public Health, National Institute of Epidemiology Chennai was obtained and permission from the District Health Officer (DHO), Beed district of Maharashtra was taken to conduct the study. Informed consent was obtained from all the participants of the study. The confidentiality of collected data was maintained by removing personal identifiers and assigning unique identification numbers.

Results:

Record review:

It was observed that 47 (94.0%) primary health centres (PHC) and 223 (79.6%) sub centres (SC) were functioning in government buildings and had functional labour rooms. Of the approved personnel, 88 (86.3%) Medical Officers (MO), 19 (38.0%) Lady Health Visitors (LHVs), 272 (82.4%) Auxiliary Nurse Midwives (ANM) and 1904 (100.0%) Accredited Social Health Activists (ASHAs) were in position. All PHCs (50) had at least one medical officer trained in Basic Emergency Obstetric Care (BEmOC) and one LHV or ANM or Staff Nurse (SN) trained as a Skilled Birth Attendant (SBA). Only 46 (16.4%) Sub centres (SC) had at least one ANM trained as SBA. From the available budget, Rs.45,000 (37.5%) were utilized for RCH camps and Rs.56,30,000 (61.5%) were utilized for JSY during the period of 2011-12. Of the 51,387 pregnant mothers, 32,616 (63%) mothers were registered within the first trimester of pregnancy and 41,732 (81%) mothers received three antenatal care (ANC) visits. Injection Tetanus Toxoid (TT) or booster was received by 44,113 (86%) mothers and Iron and Folic Acid (IFA) tablets were received by 25,719 (50%) mothers. Among those who were tested for haemoglobin, 28,286 (55%) mothers had their haemoglobin level less than 11 gm%. The record review suggested that almost all the deliveries 48,363 (99%) were conducted at hospitals and 23,683 (49%) mothers received postpartum check up within 48 hours after delivery.

Beneficiary Survey:

Out of the 374 mothers recruited in the survey, 98 (26.2%) mothers were below or equal to 21 years of age, 49 (13.1%) were illiterate and 97 (25.9%) were from Schedule Caste (SC) or Schedule Tribes (ST) categories. Among the 374 surveyed mothers, 101 (27.0%) were from families living Below Poverty Line (BPL) and 123 (32.9%) were pregnant for the first time (Table 1).

Table 1: Sociodemographic Characteristics of Mothers Delivered between 1st April and 30th June 2013 in Beed District, Maharashtra, India 2013 (N = 374)

Characteristics		Number	Percentage	95% CI
Age (Years)	< 22	98	26.2	21.9 - 30.8
	22 - 23	105	28.1	23.7 - 32.8
	24 - 25	103	27.5	23.2 - 32.2
	> 25	68	18.2	14.5 - 22.3
Educational level of Mother	Illiterate	49	13.1	9.9 - 16.9
	Primary	140	37.4	32.5 - 42.6
	Secondary	133	35.6	30.7 - 40.6
	Higher Secondary & Above	52	13.9	10.6 - 17.8
Educational level of Husband	Illiterate	36	9.6	6.9 - 13.2
	Primary	83	22.2	18.2 - 26.8
	Secondary	154	41.2	36.2 - 46.4
	Higher Secondary & Above	101	27.0	22.6 - 31.9
Religion	Hindu	325	86.9	83.1 - 90.1
	Muslim	32	8.6	6.0 - 12.0
	Others	17	4.5	2.8 - 7.3
Caste	SC / ST	97	25.9	21.6 - 30.7
	Others	277	74.1	69.3 - 78.4
Income (Rs.)	< = 3000	153	40.9	35.9 - 46.1
	> 3000 - 4000	85	22.7	18.6 - 27.4
	> 4000 - 5000	76	20.3	16.4 - 24.8
	> 5000	60	16.0	12.6 - 20.2
Occupation	Agriculturist	212	56.7	51.5 - 61.7
	Home maker	43	11.5	8.5 - 15.3
	Daily wager	108	28.9	24.4 - 33.8
	Others	11	2.9	1.6 - 5.4
Type of House	Pucca	139	37.2	32.3 - 42.3
	Semi Pucca	134	35.8	31.0 - 40.9
	Kaccha	101	27.0	22.6 - 31.9

Total Persons In Household (< = 6 persons)		203	54.3	49.0 - 59.4
Possession of BPL card		101	27.0	22.6 - 31.9
Head of Family	Husband	127	34.0	29.2 - 39.0
	Father in Law	221	59.1	53.9 - 64.1
	Mother in Law	21	5.6	3.6 - 8.6
	Self	2	0.5	0.1 - 2.1
	Others	3	0.8	0.2 - 2.5
Total Children before this pregnancy	Zero	123	32.9	28.2 - 37.9
	One	167	44.7	39.6 - 49.9
	Two	61	16.3	12.8 - 20.5
	Three or Above	23	6.1	4.0 - 9.2

Out of 370 (98.9%) mothers who were registered at the Government facility for this pregnancy, 122 (33.0%) were registered within the first trimester of pregnancy. In all, 176 (47.1%) mothers were aware about JSY and among those who were eligible, 96 (76.2%) were registered for JSY scheme. First time ANC check up within 12 weeks of gestation was completed for 116 (31.4%) mothers and more than three ANC visits were completed by 185 (50.0%) mothers. Among the surveyed, mothers 309 (83.5%) and 360 (97.3%) received 100 IFA tablets and Inj. TT respectively. Total antenatal care was received by 333 (90.0%) mothers from female health care providers. Total 172 (46.5%) mothers had received information from heath care providers regarding the danger signs of pregnancy (Table 2).

Table 2: Utilization of Antenatal Care (ANC) Services by Mothers Delivered between 1st April And 30th June 2013 in Beed District, Maharashtra, India 2013

Variable		Number Availing Services	Total Women Surveyed	Percentage	95% CI
Registered for ANC in Govt. Facility		370	374	98.9	97.1 - 99.7
Time period of ANC registration	Within 12 wks	122	370	33.0	28.3 - 38.1
	Bet. 12 wks - 20 wks	201	370	54.3	49.1 - 59.5
	Bet. 20 wks - 28 wks	36	370	9.7	7.0 - 13.3
	After 28 wks	11	370	3.0	1.6 - 5.4
Availability of MCH Card		331	374	88.5	84.8 - 91.6
Know about JSY		176	374	47.1	41.9 - 52.3
Registered for JSY		96	126	76.2	67.8 - 83.3
Time period of ANC check up	Within 12 wks	116	370	31.4	26.7 - 36.4
	Bet. 12 wks - 20 wks	207	370	55.9	50.7 - 61.0
	Bet. 20 wks - 28 wks	36	370	9.7	7.0 - 13.3
	After 28 wks	11	370	3.0	1.6 - 5.4
Frequency of ANC check up	One time	53	370	14.3	11.0 - 18.4
	Two time	132	370	35.7	30.8 - 40.8
	Three or more times	185	370	50.0	44.8 - 55.2
Received 100 IFA tablets		309	370	83.5	78.4 - 86.3
Time period of received 100 IFA tablets	Within 12 wks	47	309	15.2	11.5 - 19.8
	Bet. 12 wks - 20 wks	169	309	54.7	49.0 - 60.3
	Bet. 20 wks - 28 wks	79	309	25.6	20.9 - 30.9
	After 28 wks	14	309	4.5	2.6 - 7.7
Consumed 100 IFA tablets		293	309	94.8	91.6 - 96.9
Taken Inj. T. T. during ANC		360	370	97.3	95.0 - 98.7

Time period of taken Inj. T. T. during ANC	Within 12 wks	61	360	16.9	13.3 - 21.3
	Bet. 12 wks - 20 wks	208	360	57.8	52.5 - 62.9
	Bet. 20 wks - 28 wks	68	360	18.9	15.1 - 23.4
	After 28 wks	23	360	6.4	4.2 - 9.6
Place of ANC check up	Home	24	370	6.5	4.3 - 9.6
	Sub centre	173	370	46.8	41.6 - 52.0
	PHC	21	370	5.7	3.6 - 8.7
	Rural Hospital	34	370	9.2	6.5 - 12.7
	District Hospital	14	370	3.8	2.2 - 6.4
	Private Hospital	95	370	25.7	21.3 - 30.4
	Medical College	9	370	2.4	1.2 - 4.7
ANC care provider	Male	37	370	10.0	7.2 - 13.6
	Female	333	370	90.0	86.5 - 92.9
Information given about danger signs of pregnancy		172	370	46.5	41.3 - 51.7
Reporting appearance of danger signs		30	370	8.1	5.6 - 11.5
Taken treatment for danger signs		28	30	93.3	77.9 - 99.2
Place of treatment for danger signs	Sub centre	2	28	7.1	0.9 - 23.5
	PHC	2	28	7.1	0.9 - 23.5
	Rural Hospital	2	28	7.1	0.9 - 23.5
	District Hospital	1	28	3.6	0.09 - 18.3
	Dispensary (private)	3	28	10.7	2.3 - 28.2
	Nursing Home	14	28	50.0	30.6 - 69.3
	Medical College	4	28	14.3	4.0 - 32.7

Awareness about using ambulance transport services for reaching to hospitals for deliveries was reported by 227 (60.7%) mothers. Of the 158 (69.6%) participants who knew the phone number of the call centre, 70 (44.3%) mothers actually made phone call to the call centre. Of these, 56 (80.0%) received the ambulance transport facility to reach the hospital for delivery. About 154 (41.2%) mothers delivered in private hospitals while 37 (9.9%) delivered at home. Of the 374 mothers, 335 (89.6%) delivered normally. Of the183 mothers who delivered at the Government hospitals, 144 (78.7%) and 121 (66.1%) mothers received free treatment and free diet respectively during their period of hospitalization. Of the183 mothers who delivered at the Government hospital; 103 (56.3%) got ambulance transport facility from the hospital to home after delivery. Out of 337 mothers who delivered in hospitals, 195 (57.9%) mothers were discharged within 48 hours of childbirth (Table 3).

Table 3: Utilization of Intranatal Care Services by Mothers Delivered between 1st April and 30th June 2013 in Beed District, Maharashtra, India 2013

Variable		Total Women Surveyed	Number of Utilized Services	Percentage	95% CI
Aware about ambulance facility for delivery		374	227	60.7	55.5 - 65.6
Know about call centres phone number		374	158	42.2	37.2 - 47.4
Called to call centre for ambulance facility		158	70	44.3	36.4 - 52.4
Got ambulance from home to hospital		70	56	80	68.7 - 88.6
Place of delivery	Home	374	37	9.9	7.1 - 13.5
	Subcentre		7	1.9	0.8 - 4.0
	PHC		26	7	4.7 - 10.1
	Rural Hospital		60	16	12.6 - 20.2
	District Hospital		54	14.4	11.1 - 18.5
	Private Hospital		154	41.2	36.1 - 46.3
	Medical College		36	9.6	6.9 - 13.2

Reason for not going to facility for delivery	Facility to far	37	3	8.1	1.7 - 21.9
	No female provider		1	2.7	0.1 - 14.2
	Doesn't trust facility		1	2.7	0.1 - 14.2
	Abrupt delivery		25	67.6	50.2 - 82.0
	No transport		2	5.4	0.7 - 18.2
	Other		5	13.5	4.5 - 28.8
Mode of delivery	Normal	374	335	89.6	86.0 - 92.5
	LSCS		39	10.4	7.6 - 14.1
Conduction of deliveries	Doctor	374	222	59.4	54.2 - 64.3
	ANM		116	31	26.4 - 36.0
	TBA		4	1.1	0.3 - 2.9
	Relatives		27	7.2	4.9 - 10.5
	Others		5	1.3	0.5 - 3.3
Free treatment during hospitalization		183	144	78.7	72.0 - 84.4
Free diet during hospitalization		183	121	66.1	58.8 - 72.9
Received blood transfusion		337	10	3	1.5 - 5.6
Frequency of	One time	10	8	80	44.4 - 97.5
blood transfusion	Two times		1	10	0.3 - 44.5
	Three or more times		1	10	0.3 - 44.5
Initiation of breast feeding	Within half an hour	374	258	69	64.0 - 73.6
	Within 24 hours		89	23.8	19.6 - 28.5
	After 24 hours		27	7.2	4.9 - 10.5
Complications during delivery		374	13	3.5	1.9 - 6.0

Types of complications	Abnormal presentation	13	12	92.3	64.0 - 99.8
	Still birth		1	7.7	0.2 - 36.0
Place of treatment	District Hospital		3	23.1	5.0 - 53.8
for complications	Private Hospital		8	61.5	31.6 - 86.1
	Medical College		2	15.4	1.9 - 45.4
Time of discharged from hospital after delivery	Within 48 hours	337	195	57.9	52.4 - 63.2
	After 48 hours		142	42.1	36.8 - 47.6
Got ambulance from hospital to home		183	103	56.3	48.8 - 63.6

Total 157 (42.0%) mothers received post-natal care visits within 14 days after delivery by ANM or ASHA; however, only 38 (24.2%) of them were visited within 48 hours after delivery. Three or more than three PNC visits within 14 days after delivery were received by 17 (10.8%) mothers. Amongst 96 mothers who registered for JSY, 67 (69.8%) mothers received JSY benefit (Table 4).

Table 4: Utilization of Postnatal care (PNC) Services by Mothers Delivered between 1st April and 30th June 2013 in Beed District, Maharashtra, India 2013

Variable		Numbers Receiving Services	Total Women Surveyed	Percentage	95% CI
PNC visits of ANM/ASHA within 14 days after delivery		157	374	42.0	37.0 - 47.2
Time period of PNC visits	Within 48 hours	38	157	24.2	17.7 - 31.7
	Between 48 hours to 14 days	119	157	75.8	68.3 - 82.3
Frequency of PNC visits	One time	31	157	19.7	13.8 - 26.8
	Two times	65	157	41.4	33.6 - 49.5
	Three times	44	157	28.0	21.2 - 35.7
	Four or more times	17	157	10.8	6.4 - 16.8

Mothers got JSY benefit		67	96	69.8	59.6 - 78.7
Amount of JSY benefit got	Rs. 500	3	67	4.5	0.9 - 12.5
	Rs. 600	1	67	1.5	0.0 - 8.0
	Rs. 700	62	67	92.5	83.4 - 97.5
	Don't know	1	67	1.5	0.0 - 8.0
Time duration of getting JSY benefit	Within 48 hours	3	67	4.5	0.9 -12.5
	Within 1 week	9	67	13.4	6.3 - 24.0
	Bet. 1wk & 14 days	20	67	29.9	19.3 - 42.3
	After 14 days	35	67	52.2	39.7 - 64.6
Mothers ill during PNC period		50	374	13.4	10.2 - 17.3
Place of treatment for illness	Govt. Hospital	13	50	26.0	14.6 - 40.3
	Private Hospital	37	50	74.0	59.6 - 85.4
Ambulance utilized during PNC period		0	50	0.0	

Facility Survey:

The facility survey was conducted in 22 PHCs. About 20 (90.9%) PHCs had their own buildings with functional labour room and operation theatre. 19 (86.4%) PHCs had facilities for normal delivery and 14(63.6%) had standard surgical sets for minor procedures like episiotomies stitching. Among the 22 surveyed PHCs, 17 (77.3%) had emergency trays in their labour rooms. Total 12 (54.5%) PHCs had necessary equipment and reagents for essential laboratory services; 5 (22.7%) had facilities for blood grouping and Rh typing and 17 (77.3%) had HIV testing facility. Only 2 (9.1%) PHCs were monitoring every delivery through partograph. About 21(95.5%) PHCs had ambulance facility services for referral. The proportion of monthly visits to the sub centres by medical officer and weekly visit by HA or LHV were less than desirable (27.3% and 45.5% respectively). The association between facilities having availability of blood grouping and Rh typing ($P = 0.03$), rapid test for HIV ($P = 0.03$), equipment and reagents for essential laboratory services ($P = 0.01$), and standard surgical set for minor procedures like episiotomies stitching ($P = 0.01$), and performance indicators was found to be statistically significant($p < 0.05$) (Table 5).

Table 5: Facility Survey with Reference to Maternal Health Services in Beed District, Maharashtra, India 2013 (N = 22)

Characteristics		Number of PHCs with Facility	Percentage
Infrastructure	PHC with own building	20	90.9
	Labour room	20	90.9
	Operation theater	20	90.9
	Laboratory room	16	72.7
	Electricity backup	19	86.4
	Water facility	19	86.4
	Toilet facility	20	90.9
	Separate public utilities for males and females	11	50.0
	Separate wards for males and females	14	63.6
	Ambulance	21	95.5
	New born corner	6	27.3
Training	PHCs with at least one MO trained in BEmOC	22	100.0
	PHCs with at least one LHV/ANM/SN trained in SBA	22	100.0
Investigations	Blood grouping and Rh typing	5	22.7
	Rapid test for HIV	17	77.3
	Equipment / reagents for essential laboratory services	12	54.5
Equipment	A labour table	20	90.9
	Suction machine	19	86.4
	Oxygen cylinder	19	86.4
	Delivery kit	14	63.6
	Equipment for assisted forceps / vacuum delivery	1	4.5
	Standard surgical set (for minor procedure like episiotomies stitching)	14	63.6

Drugs	Inj. Magnesium sulphate	17	77.3
	Tab. Methyl ergometrine	3	13.6
	Tab. Fluconazole	14	63.6
	Tab. Methyldopa	9	40.9
	Emergency drug tray	17	77.3
Services	Facility for normal delivery available for 24 hours	19	86.4
	Deliveries being monitored through partograph	2	9.1
	Facility for MTP (abortion) available	3	13.6
	Visits of medical officer to all sub centres at least once a month	6	27.3
	Visits of HA / LHV to sub centre once a week	10	45.5

Discussion:

Majority of PHCs were housed in the government owned buildings and functional labour rooms. Only a few had facilities for blood grouping and Rh typing and equipment for assisted deliveries. Majority of the posts of medical officers, ANM and ASHA were occupied while some posts of LHV in the district were vacant. Majority of the staff except ANM at the sub centres was trained. Utilization of funds for RCH camps was poor. Utilization of services with respect to use of 100 IFA tablets, injection of TT and institutional deliveries was satisfactory. However, utilization of services for ANC registration within the first trimester, more than three ANC visits during the ante-natal period, awareness about ambulance service, monitoring of delivery using partograph and PNC visits within 14 days of delivery was less than desirable. Utilization of JSY scheme was poor. Monitoring of maternal health services was 27.3 percent.

PHCs and SCs were mostly located in Governments owned buildings and had functional labour rooms which provided favorable environment for provision of antenatal and intranatal care. The equipment for assisted forceps or vaccum delivery was not available in most of the PHCs. As this might affect the quality of intranatal care for mothers delivering in the facilities, some attention is required to improve this component of MCH services. Procurement of equipment through funds available at the PHC level might help the medical officers to practice skills achieved during BEmOC training and help in reducing complications.

We noted that the majority of the sanctioned positions of medical officers; ANM and ASHA were occupied except for LHVs. LHVs play a crucial role in supervision and monitoring of

ANM and ASHA. Availability of LHVs can ensure adequate and complete implementation of maternal health services to beneficiaries. Recruitment of LHV has to be expedited because they represent permanent staffs of the government machinery and play a crucial role of monitoring the work of subordinate contractual staff. Staff trained in ANC forms one of the tracer items to monitor readiness to deliver specific services [11].

Every PHC had at least one medical officer trained in BEmOC and the SN, LHV, or ANM trained as SBA which is critical for administering quality intranatal services to mothers and reducing the maternal and newborn complications. Training of ANMs is expected to be completed on SBA, however; most of the ANMs working at the sub centre level were not trained as SBA. This can negatively affect identification of danger signs and timely referral of mothers seeking maternal care at the sub centres. Medical science keeps growing; hence new knowledge is generated every day. One time training may not be sufficient and refresher training as well as continuing medical education may be considered for capacity building and skill building of the staff members involved in the RCH programme.

Availability and accessibility of drugs at the PHC and SC level also have an impact on utilization of maternal health services. Adequacy of essential drugs for maternal health services at most of the PHCs was encouraging. To ensure continuous availability of drugs, procurement can be done through untied fund of Rogi Kalyan Samiti (RKS).

RCH camps initiative at the PHC level ensures checking of mothers for early danger signs by a qualified obstetrician, blood and urine investigations and advice regarding institutional delivery. It can ensure early registration of mothers and full antenatal care. Our study indicated that funds were poorly utilized for RCH camps and JSY. JSY is an intervention initiated by National Health Mission (NHM) to ensure safe motherhood. It promotes institutional delivery by providing a cash incentive to mothers who deliver in a health facility. High awareness among beneficiaries and adequate utilization of funds can reduce maternal mortality resulting from non-institutional deliveries [12]. The availability of adequate amount of funds at the PHC and SC levels and regular review of RCH camps and JSY beneficiaries may help in better utilization of funds.

Antenatal care is an important component of maternal health services. The ANC registration and first time ANC check up within the first trimester of pregnancy were observed to be less than desirable in our study area. The utilization of at least three antenatal check-ups by mothers was poor in the district. Utilization of 100 IFA tablets and Inj. T.T. were satisfactory and the findings were consistent with other studies done in Maharashtra and Uttarakhand states as well as reports of the National Family Health Survey round3 (NFHS-3) findings [13-15]. About half of the mothers fully availed the recommended antenatal care and this was more than that reported in other studies in Madhya Pradesh, Rural India and NFHS-3[3, 13,

16]. Overall antenatal care was poorly utilized by mothers and this might increase the antenatal and intranatal complications in mothers. The antenatal care services need to be improved through regular antenatal services in every village. Birth Preparedness and Complication Readiness (BPCR) plan for every mother needs to be developed in the early ANC period.

Majority of mothers who delivered in hospitals and the observed proportion was more compared to other studies done in Uttarakhand [14] and Maharashtra [15]. Despite having trained medical officers and staff, only few deliveries were conducted in primary health centres and sub centres and this finding was similar to another study done in Maharashtra [15]. Focused efforts are needed for increasing proportion of institutional delivering in PHCs and SCs. The deliveries conducted in public facilities were less compared to those in private facilities quite in contrast to the experience in South Asia and Sub-Saharan Africa [17]. It was encouraging that, majority of deliveries were assisted by health personnel and this trend needs to be sustained. Similar findings were noted in other studies done in Madhya Pradesh, Maharashtra and South Asia and Sub-Saharan Africa [3, 17, 18]. Data from the Demographic and Health Surveys conducted in Bangladesh, India, Pakistan, Kenya, Nigeria, and Tanzania showed that more than half the births in these countries occurred outside the health facilities and most of these were home deliveries [17]. Our study reported lesser number of home deliveries. Abrupt unexpected delivery was reported to be the reason for not delivering in the health facilities compared to other reasons reported in studies done in Uttarakhand, South Asia and Sub-Saharan Africa and Kenya. Other reported reasons in other studies were absence of felt need for delivering in a hospital (60%), high costs (30%) and lack of transport (21%) [14, 17, 19]. More than half of the mothers were discharged from the hospital within 48 hours of childbirth which was consistent with the observations made in studies from Rajasthan and Madhya Pradesh and the third common review mission report of Government of India [20-22]. Knowledge of mothers regarding utilization of ambulance was low and this might have resulted in poor utilization of ambulance services from home to hospital for delivery and vice versa. Well organized efforts are needed to improve awareness and utilization of ambulance services.

Postnatal care often gets neglected by health care providers and mothers [23]. Post natal care is crucial to avoid maternal as well as neonatal complications and this can be effectively provided through postnatal home visits. Postnatal visits coverage was found to be low in our study. This was consistent with similar reports from Madhya Pradesh, NFHS-3, Uttarakhand and Rural India [3, 13, 14, 16]. Focused attention should be given to improve the maternal and neonatal health indicators. Regular involvement of ASHA in postnatal care should be enhanced through some additional incentives depending

on postnatal visits. Awareness and utilization of JSY scheme was much lower than that reported in rural areas of 5 states in India including Bihar, Madhya Pradesh, Rajasthan, Orissa and Uttar Pradesh [12]. Monitoring and supervision of maternal health services by medical officers and health staff were found to be poor.

Limitations:

Our study had certain limitations. Beneficiary survey could have some recall bias for information on antenatal care service utilization resulting either in over or under utilization. We used a recall period of one year and attempted to minimize the problems related to recall by cross checking the interview captured information with ANC cards of mothers.

Conclusion:

We conclude that although the infrastructure; human resource and training were adequate at majority of PHCs, there was need to improve logistics and non availability of drugs and non-utilization of funds. The utilization of services with reference to 100 IFA tablets, Inj. TT., institutional deliveries and delivery assisted by health care personnel were high while it was low for all others namely antenatal, intranatal and postnatal care. In majority of health facilities the equipment for assisted deliveries was not available and ANMs at sub centre level were untrained as SBA. The knowledge of mothers regarding the JSY scheme and ambulance service as well as utilization of ambulance services was low. Monitoring and supervision of maternal health services by health care providers were low. We recommend sustainability of RCH II programme by improving infrastructure, human resource and logistics. For improvement in maternal care we recommend that regular review of PHCs regarding the availability of equipment and kits at the PHC level needs to be done. ANMs working at the sub centre level need to be trained in skilled birth attendant. RCH camps should be arranged as per the norms so that funds can be utilized appropriately. The implementation of antenatal care, intranatal care and postnatal care services needs to be improved and better supervised through regular review meetings between ANM and ASHA. Involvement of ASHA especially in postnatal care should be increased through some incentives. Awareness and utilization regarding JSY scheme and ambulance service among various stakeholders of maternal health should be improved through IEC activities. Regular monitoring and supervision of maternal health services at the field and sub centre levels can be improved through regular weekly and monthly review meetings of health supervisors and medical officers. Further studies are needed to explore the factors associated with early discharge (within 48 hours) of mothers from hospital after delivery, home delivery and evaluation of JSSK.

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