Validation of Postnatal Care Health Data Reported Under Health Management Information System by the Primary Health Centers of Rural Vadodara, Gujarat

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ABSTRACT

Background: Postnatal care (PNC) is a part of maternal and child health (MCH) and important for the good health of both mother and child. Therefore, the present study was conducted with the aim to study the PNC data reported by primary health center/subcenter (PHC/SC) and validate them at the village level and assess quality of care given. **Material and methods:** A sample of 20 PHCs, 13 rural and seven tribal, was selected using stratified random sampling. For every PHC, 2 SCs and for every SC, one village were selected. Data on PNC were collected from the PHC/SC records and validated by interviewing five beneficiaries from the village. **Results:** The district availability of PNC was 31.8%, while the overall accessibility was 52.2%. Adjusted utilization for the district was 74.7% for SBA and 14.7% for TBA. Effective coverage, adjusted for quality of care, for the district was 25.2%. **Conclusions:** The gap between the reported and validated data ranged from 15% to 51% of the reported.

Keywords: Postnatal care, validation, Health Management Information System, primary healthcare

India has adopted the concept of primary healthcare, as declared in Alma Ata Conference (1978), whereby the state provides healthcare to the population, through a network of primary health centers (PHCs) and subcentres (SCs). The community outreach services are provided by the SCs. Under the National Rural Health Mission (NRHM), every health facility is expected to formulate their local health plans based on their local health priorities. For planning, monitoring and evaluation purposes, the manager at the health facility needs data regarding population distribution, disease burden, beneficiaries for different health services and many others too. Health Management Information System (HMIS) was defined by the World Health Organization (WHO), at Conference on Health Information System, 1973 as, "a mechanism for the collection, processing, analysis and transmission of information required for organizing and operating health services, and also for research and training". HMIS, thus, is an information system that is especially designed to assist in the management and planning of all health programs. Poor information systems do not only fail to portray the real health situation, but are themselves barriers for scaling-up health services.

In any community, mothers and children constitute a priority group. They comprise, 71.14% of the population of the developing countries. In India also, women of childbearing age and children under 15 years of age comprise 57.5% of the total population. By virtue of sheer numbers only, they are the major consumers of healthcare services. They are also a vulnerable group, as far as health is concerned, and improving their health can significantly contribute to the health of the general population.

The time of highest risk of death is the same for mothers and for newborns—on the day of delivery and

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over the next few days after delivery. These data offer compelling evidence that integrated maternal and newborn postnatal care (PNC) during the first few days after delivery should be provided to all newborns and their mothers as a concerted strategy to improve survival of both. This exercise was carried out to assess and understand the status of PNC activities in Vadodara district of Gujarat by validating the records using the format and guidelines as proposed in the Border District Cluster Strategy (BDCS). The tool, based on John Hopkins's monitoring steps, was developed by the UNICEF to monitor minimum intervention package of Reproductive Child Health (RCH) activities in BDCS districts.

OBJECTIVES

- To study the data pertaining to PNC in terms of availability, accessibility, utilization, coverage reported, validate and compare them between tribal and non-tribal areas at the SC/village level.
- To assess the progress or low performance of the indicators and analyze the possible causes of major bottlenecks for effective coverage.
- To assess the quality of care being provided as evident from the technical competence of the health provider and client satisfaction.

MATERIAL AND METHODS

Study Area and Sampling

The district can be divided into tribal and non-tribal zones - Four talukas (blocks) form the east area, which is hilly and tribal; rest are a part of the plain of middle Gujarat. Sample size was selected based on consultation with UNICEF. The health indicators and other related parameters differ widely in tribal areas as compared to non-tribal areas. So, stratified sampling was done so as to proportionately select 20 PHCs with tribal: Non-tribal distribution of 1:1.7. Two separate lists were made, one for the PHCs in the tribal blocks and the other containing the PHCs in the non-tribal blocks. With the help of Epi-Info 6 - Version 6.04d software, 7 PHCs from tribal blocks and 13 PHCs from non-tribal blocks were randomly selected.

For each of the PHCs, 2 SCs were selected, one situated near and the other distant from the PHC. From each of the SC, 1 village was selected. Thus, this exercise was carried out in 20 PHCs, 40 SCs and 40 villages of Vadodara district (Rural). Validation exercise was then conducted in each of these villages where five beneficiaries were interviewed who got the PNC services.

Data Collection

Study was conducted between April 2009 and August 2009. Reference period for the study was taken from April 2008 to March 2009.

Data was collected in the prescribed formats for PHCs and SCs. It was checked for errors, entered and analyzed using Microsoft Excel software. District estimates for each of the interventions were then calculated using the monitoring tools described later. The guidelines used were the same as used by UNICEF for monitoring under the BDCS strategy. However, some modifications were made, incorporating the newer policy changes.

Tools for validation included: Availability, accessibility, utilization, adequate coverage and effective coverage.

Ethics

The study was approved by the Institutional Review Board Committee of the Institute.

Data Collection for Natal and Postnatal Care

Target Population

Cumulative number of deliveries conducted during the reference period in the PHC area was the target population. To calculate the target population, the formula used was:

$$\text{Target population} = \frac{\text{Crude birth rate (CBR)} \times \text{Population}}{1000}$$

Coverage Steps

Availability

This was defined as percentage of days disposable delivery kits (DDKs) were available in adequate quantity during the reference period. Stock register maintained at PHC provided the statement on date and quantity of items received and issued during the reference period. Based on stock register, availability was calculated as:

$$a) \quad \frac{\text{No. of days DDKs available}}{365} \times 100$$

In order to ensure clean delivery, DDKs are provided to the pregnant women and are expected to be used in case of home delivery. Therefore, proportion of home deliveries was taken in the denominator, while calculating the adequacy of DDKs. The district coverage for home delivery - 40%, was used for calculating adequacy.

$$b) \quad \frac{\text{Total number of DDKs available}}{\text{Target population} \times \text{proportion of home deliveries}} \times 100$$

Lower of these percentages was taken as the availability figure for the study PHC.

Validation at SC: Whether the female health worker/trained birth attendant (FHW/TBA) received DDKs as mentioned in the PHC stock register was checked and it was confirmed whether she was using it and/or gave them to TBAs/families.

Accessibility

Both skilled and trained birth attendants were considered separately. Even if FHW/FHS/MO (female health superviser/medical officer) were conducting deliveries, but not staying at the headquarter or vice-versa, accessibility was taken as zero.

$$\text{a) Accessibility for skilled birth attendant (SBA)} = \frac{\text{No. of SC/PHCs with FHW/LHV/MO residing in their area of posting and conduction on an average at least one delivery in a month}}{\text{Total number of PHC and SCs in the PHC area}} \times 100$$

$$\text{b) Accessibility for TBA} = \frac{\text{No. of villages with resident TBA and conduction of at least one delivery in alternate months}}{\text{Total number of villages}} \times 100$$

Validation at PHC, SC and village: In order to validate these data, the birth registers were checked for the deliveries, conducted by SBAs and TBAs.

Utilization

The initiation of the service is taken as the utilization. For intranatal care, utilization for SBAs was defined as percentage of deliveries attended by SBAs, i.e., MO/FHS/FHW at institution or at home. This included deliveries conducted at private hospitals/nursing homes by doctor or nurses.

$$\text{a) Utilization for SBA} = \frac{\text{Total number of deliveries conducted by auxiliary nurse midwife (ANM)/LHV/MO}}{\text{Target population}} \times 100$$

For TBA, utilization was defined as percentage of deliveries attended by TBAs.

$$\text{b) Utilization for TBA} = \frac{\text{Total number of deliveries conducted by TBAs}}{\text{Target population}} \times 100$$

This data was available at PHC from the RCH Form-7, which is collated from Form-6 of all the SCs.

Validation at SC and village: Form-6 of any month of the SC was taken. The data were validated as explained earlier. Client satisfaction was assessed as described for earlier indicators.

Adequate Coverage

It indicates the continuity and complete utilization of services. For intranatal care and PNC, adequate coverage was defined as the percentage of women delivered by skilled attendant, newborn-weighed within 48 hours and received at least three PNC within 10 days. The district estimate was calculated for each of these three indicators by averaging the values obtained for each PHC.

$$a) \quad \frac{\text{Cumulative number of women delivered by SBA}}{\text{Target population}} \times 100$$

$$b) \quad \frac{\text{Cumulative number of women received PNC 3}}{\text{Target population}} \times 100$$

$$c) \quad \frac{\text{Cumulative number of newborn weighed}}{\text{Target population}} \times 100$$

Validation at SC and village: Form-6 of any month of the SC was taken and the data validated in a similar fashion as explained earlier. Client satisfaction was also assessed.

Correction factors, thus calculated, were multiplied with the averaged estimates to give adjusted values for all the indicators. The lowest of the figures was taken as the district coverage.

Effective Coverage

It indicates the quality of services. For monitoring, effective coverage was defined as the percentage of pregnant women adequately covered by FHWs skilled to manage third stage of labor and gave basic newborn care. Depending upon her performance and knowledge, her skills were assessed. Correction factor for quality was calculated at the district level based on findings of all SCs.

Adjustment of District Estimates based on Validation Exercise

After the completion of monitoring and validation exercise in all the PHCs (or proportion of PHCs), district coverage was estimated and adjusted based on the PHC and SC data as explained in Table 1.

The formula for adjustment is:

Availability = Average of PHC availability

Accessibility = Average of SC accessibility

Adj. Utilization-SBA = Average of PHC Utilization-SBA × correction factor (CF) for SBA

Adj. Utilization-TBA = Average of PHC Utilization-TBA × correction factor for TBA

Adj. Adequate coverage = Minimum of (Average of PHC Coverage SBA/PNC3/Newborn weighed × correction factor for that indicator)

Effective coverage = Adj. Adequate coverage × CF for quality Natal and PNC services

RESULT

Natal and Postnatal Care

Availability

This is defined as percentage of days DDKs were available in adequate quantity during the reference period. Minimum of periodicity or adequacy was taken as availability for the PHC.

For DDKs, adequacy was higher than periodicity. Both were higher for non-tribal areas. The availability estimate form the district was 31.8%. It was higher for non-tribal areas (33.3%) as compared to tribal areas (28.5%) (Fig. 1).

Accessibility

Accessibility was taken as proportion of MO/FHS/FHW/TBA residing at the head quarter and conducting at least one delivery a month. It was assessed separately for SBA and TBA. The estimates for accessibility were as follows:

The district estimate for accessibility of SBA was 30.9%. The SBA accessibility was higher in non-tribal (33.2%) as compared to tribal areas (12.1%). The estimates of accessibility of TBA were higher than those for SBA. Accessibility of TBA for the district, tribal and non-tribal areas was 52.2%, 55.1% and 50.6%, respectively (Table 2).

Utilization

The initiation of the service was taken as the utilization. For intranatal care, utilization for SBA was defined as percentage of deliveries attended by SBAs, i.e., MO/FHS/FHW at institution or at home. This also included deliveries conducted at private hospitals/nursing homes by doctor or nurses. For

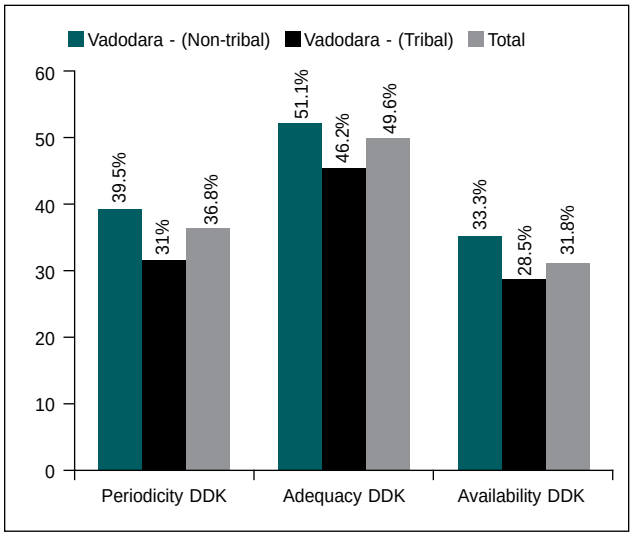

Figure 1. Periodicity, adequacy and availability of DDKs.

Table 1. District Summary Sheet for Adjustment

	SC_1				SC_2				SC_k				Total				Correction factor
Accessibility for delivery and PNC	Z_1				Z_2				Z_k				Average (Z_1, Z_2, ...Z_k)				
Intervention	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**Sum A**	**Sum B**	**Sum C**	**Sum D**	**(Sum D x Sum B) (Sum C x Sum A)**
Delivered by SBA																	
Delivery by TBA																	
PNC3 within 10 days																	
Birth weight within 48 hours																	
FHW manage third stage of labor properly and give basic newborn care	S_1				S_2				S_k				Average (S_1, S_2,...S_k)				Avg (S_1, S_2,...S_k)

TBA, utilization is defined as percentage of deliveries attended by TBAs. The estimate of utilization of SBA, based on the reported data, for the district, tribal and non-tribal areas was 87.9%, 86.5% and 88.6%, respectively. The estimate of utilization of TBA, based on the reported data, for the district, tribal and non-tribal areas was 14.7%, 18.8% and 12.6%, respectively.

Following validation, 85% of the data was validated for deliveries conducted by SBA. Proportion validated was similar in both tribal and non-tribal areas. For, the deliveries conducted by TBA, 100% validation was considered. Accordingly, the adjusted estimates thus obtained, for SBA were: District (74.7%), non-tribal (75.4%) and tribal (72.7%); and for TBA were: District (14.7%), non-tribal (12.6%) and tribal (18.8%) (Table 3).

Table 2. Accessibility of SBA and TBA

Region	Accessibility (in %) - SBA	Accessibility (in %) - TBA
Vadodara (Non-tribal)	33.2	50.6
Vadodara (Tribal)	12.1	55.1
Vadodara	30.9	52.2

Adequate Coverage

It indicates the continuity and complete utilization of services. For intranatal care and PNC, adequate coverage was defined as minimum of the percentage of women delivered by skilled attendant, newborn-weighed within 48 hours and received at least three PNC within 10 days. PHC coverage was estimated based on the reported data. District estimates were calculated by averaging the PHC coverage for all the three indicators. Depending upon the extent to which the reported data was validated, a CF was calculated. Adequate coverage estimated was multiplied with this CF to obtain adjusted adequate coverage. Minimum of the four adjusted coverage was taken as the district estimate. Minimum adjusted coverage for the district, tribal and non-tribal areas was that of PNC3. Adjusted adequate coverage for the district was 37%. The coverage for non-tribal and tribal areas was 38.2% and 33.8%, respectively (Table 4 and Fig. 2).

Effective Coverage

It indicates the quality of services. Effective coverage was defined as the percentage of pregnant women adequately covered by FHWs skilled to manage third stage of labor and gave basic newborn care. The skill assessment showed that FHWs of

Table 3. Utilization and Adjusted Utilization for SBA and TBA

Region	Utilization (in %) - SBA	Correction factor	Adj. utilization (in %) - SBA	Utilization (in %) - TBA	Correction factor	Adj. utilization (in %) - TBA
Vadodara (Non-tribal)	88.6	0.85	75.4	12.6	1	12.6
Vadodara (Tribal)	86.5	0.84	72.7	18.8	1	18.8
Vadodara	87.9	0.85	74.7	14.7	1	14.7

Table 4. Adequate and Adjusted Coverage of Components of Natal and Postnatal Care

Region	PNC3 coverage (%)	CF	Adj. PNC3 coverage (%)	Newborn weighed (%)	CF	Adj. newborn weighed coverage (%)	Adj. coverage SBA (%)
Vadodara (Non-tribal)	74.1	0.52	38.2	92.4	0.58	53.8	75.4
Vadodara (Tribal)	78.3	0.43	33.8	97.3	0.55	53.1	72.7
Vadodara	75.6	0.49	37	94.1	0.57	53.6	74.7

Table 5. Adjusted and Effective Coverage for Natal and Postnatal Care

Region	Adj. adequate coverage (%)	Correction factor	Effective coverage (%)
Vadodara (Non-tribal)	38.2	0.71	27.2
Vadodara (Tribal)	33.8	0.63	21.3
Vadodara	37	0.68	25.2

non-tribal areas scored better than those of the tribal areas. Effective coverage for the district, non-tribal and tribal areas was 25.2%, 27.2% and 21.3%, respectively (Table 5 and Fig. 3). Most of the beneficiaries were satisfied with the services provided.

DISCUSSION

It is well-established that giving birth in a medical institution under the care and supervision of trained healthcare providers promotes child survival and reduces the risk of maternal mortality.

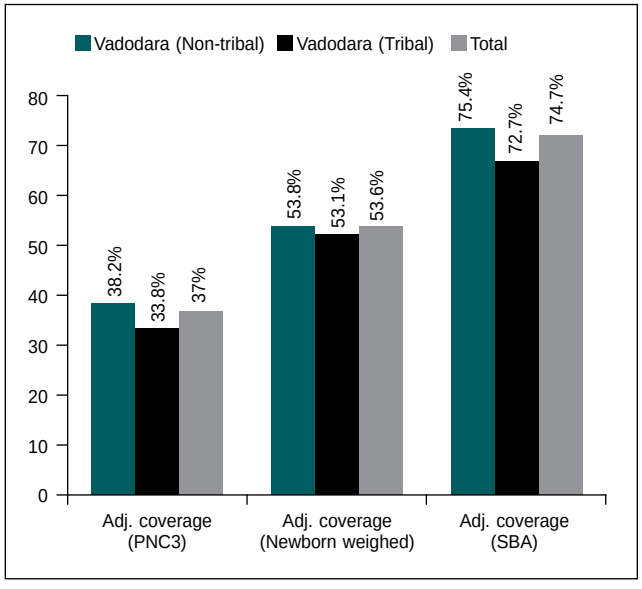

Figure 2. Adjusted coverage for PNC3, newborn weighed and SBA.

Despite the many benefits associated with institutional delivery, India's maternal and child health programs have not aggressively promoted institutional deliveries, except in high-risk cases. Evidence from Bangladesh indicates the majority of maternal deaths occur between the third trimester and the end of the first week after pregnancy.

Safe deliveries, which are greatly reflected by births attended by skilled personnel, though increasing, are still much below the desired level. NFHS II estimates that the proportion of births attended by skilled health personnel was 42% during 1998-99, an increase from 33% during NFHS I (1992-92).

The proportion of births attended by skilled health personnel in rural areas of India is only 31.1%. The institutional deliveries amount to 39.1%. Gujarat estimates were better than the national estimates at 42.2% and 54.6%, respectively.

Institutional deliveries increased across the district but the improvement was lower than the national average. In Vadodara, on the contrary, proportion of institutional deliveries is on the decline. A similar study was carried out in Surat, which showed that the adequacy for DDKs was lower (33.9%) as compared to our study (49.6%). The accessibility for SBA and TBA in that study was 38.9% and 56.1%, which were similar to our estimate of 30.9% and 52.2%, respectively.

The adjusted utilization for SBA and TBA were found to be 9.9% and 30.7%, while those in our study were observed to be 74.7% and 14.7%, respectively. Adjusted

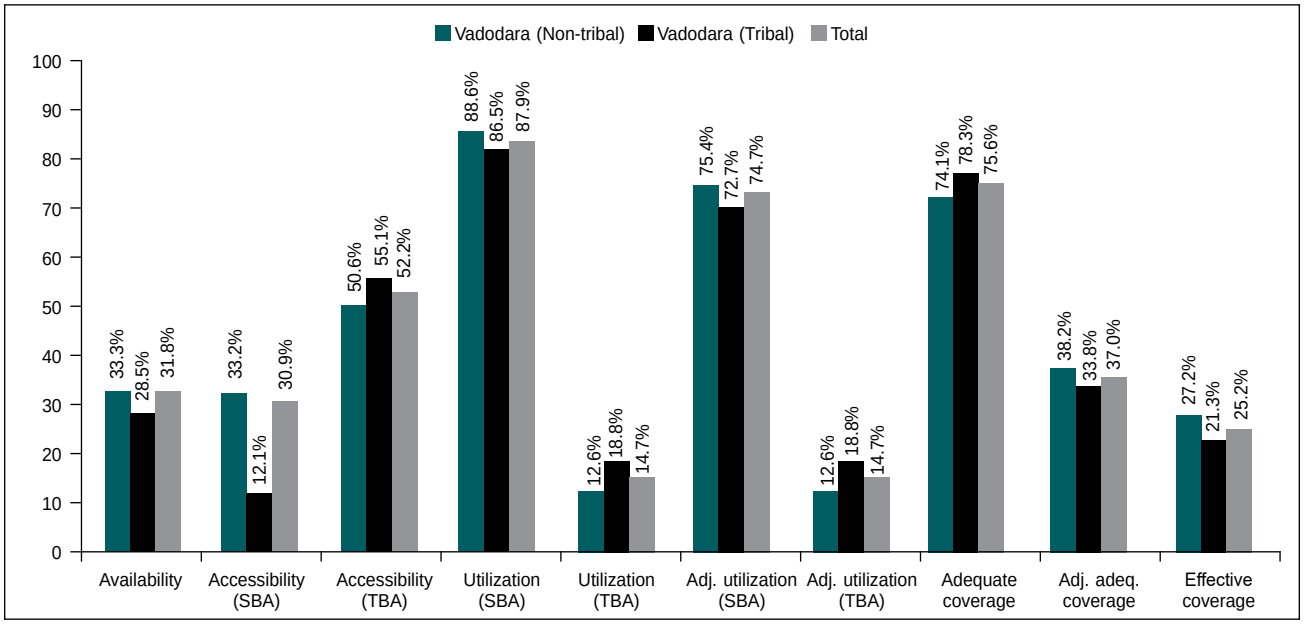

Figure 3. Natal and postnatal care - all indicators.

adequate coverage was estimated at 10.3% against our finding of 37%. Effective coverage was 6% against our estimate of 25.2%. Another study carried out by Patel et al regarding data validation of vitamin A and data validation of immunization data were also shown the over reporting of the data.

Availability

The data regarding the DDK stocks was not available from 4 (2 tribal and 2 non-tribal) of the 20 PHCs. The overall periodicity and adequacy were both low and showed wide variations. Availability, though higher for the non-tribal areas, was accompanied with a wider variation.

Some of the reasons for the low availability were:

- Stock keeping of DDK kits was not there at many places
- Those issued were immediately distributed to the SC. Hence, there was nil stock for many months
- The kits are never distributed to the mothers. Whenever required, the TBA takes the kits for delivery. FHW may also use them fully or components thereof as per her needs.
- Although stock was found to be inadequate/absent at few places, the MOs opined that these kits were always available in plenty, wherever and whenever required
- At a few centers, some kits beyond the expiry date were also noted.

Accessibility

The overall accessibility for SBA was low. It was lower in tribal areas as compared to the non-tribal, whereas the converse was true regarding the accessibility for the TBA.

Some Observations

- As observed, the accessibility was very low for SBA. The reason being that in spite of 60% of institutional deliveries, the FHW or MO were not staying at the center. Thirty percent of the posts of FHW were vacant. Also, the post of MO was vacant at 25% of the selected PHCs (2 in non-tribal and 3 in tribal). This is an issue of deep concern, known to all.
- The issue was more acute in tribal areas where very few posts (FHS, FHW, MPW-M, LT, Pharmacist) were filled. Forty-one percent posts for FHW and 45% posts of MO were vacant. Consequently, there was a wide variation across the PHCs leading to a wide CI.
- Of the filled posts, very few MO (25%) and FHW (30%) were staying at the headquarter. Some of the reasons cited for not staying at the Headquarters:
  - No subcenter building/livable quarters
  - No good/English medium schools in the village for Child's education (most common)
  - Salary not enough/No incentives to sacrifice the comforts of city life.
- The accessibility for TBA was around 50%. When asked, most of the MOs said that there was at least 1 TBA per village. However, the details regarding her training were often not clear and the same could not be validated. Also, many did not conduct one delivery every alternate month. The main focus now is on convincing the mothers for institutional deliveries.

When asked, why the HW did not stay at the HQ, one of them said, my son is in 11th. There are no higher secondary schools in the village. Where will I get tuitions for him in this village… we are asked to stay in the village, but they don't provide any facilities.

Utilization

The utilization for SBA was same for both tribal as well as non-tribal areas, while that of TBA was higher in tribal areas. There were almost no deliveries at the SC. The FHW at the SC used to deliver the child at the PHC premises only.

The overall number of deliveries conducted across the district was higher than the target. Two of the PHCs had much higher number of deliveries (125% of target) than expected as per the target population. Utilization calculated after omitting that data showed very little difference. The deliveries conducted by SBA are thus higher than the district estimate of 60% for the previous year. Institutional deliveries are increasing, but the difference between the two figures is best explained by two different targets selected. Eighty-five percent of the reported data could be validated.

Variability was higher for TBA utilization as few places recorded over 90% institutional deliveries and consequently very low TBA utilization.

Some Observations

- In some cases of deliveries by SBA, it was observed that the mother was delivered at institution, but not by the FHW, as claimed by her.
- Sometimes though the delivery was conducted by the TBA, it was counted as an institutional delivery conducted by a SBA.

- One of the reasons for lower TBA utilization is focus on institutional deliveries. Lots of factors have improved rates of institutional deliveries. Even the TBAs dissuade home deliveries. Their primary role now is to motivate and escort for institutional delivery.

One of the MOs explained: "…nowadays, we don't ask TBA to conduct deliveries…. the TBA are now assigned the responsibility of motivating the clients for institutional delivery and escorting them. The deliveries conducted by them have significantly gone down. Lot of women now prefer institutional deliveries..."

Adequate Coverage

The coverage values for PNC3 were the minimum. Only 49% of the reported data for PNC3 could be validated. Adjusted coverage was slightly better in non-tribal areas as compared to tribal.

Some Observations

- Low-adjusted rates were due to false reporting. One of the MOs justified, off the record, that March is the month where we have to set data to reach anywhere near to the given targets and hence there is a higher degree of false reporting.
- If the parents knew the weight of the child, then the FHW would enter it as newborn weighed within 48 hours, without even weighing the child herself.
- All births taking place in institution were taken as newborn weighed in 48 hours.
- Also almost all women, especially those delivered at some institution were taken as having given three PNC. The first visit, in such cases, was considered done. At the most, one more visit was paid to these women but rarely three.

One FHW, regarding recording of newborns weighed in 48 hours, said: "all those delivered at institutions are always weighed. Hence, we take all institutional deliveries as newborn weighed in 48 hours."

Effective Coverage

Over an assessment score of 10, the observed quality of care for natal and post-natal services was rated at 6.8, full quality being 10. This, too, was slightly better for the non-tribal areas. Some of the observations made when FHWs skills were assessed:

- All knew the minimum number of visits required, but a few (12.5%) were unable to give correct information for the schedule in case the newborn was underweight
- Few (12.5%) did not weigh the child during post-natal visits
- Most (87.5%) did not know the things to look for, during the postnatal visit
- Many (75%) did not counsel the mothers regarding hygiene and nutrition during the visits
- Regarding essential newborn care (ENBC), all knew about the basic CLEANS. Many (87.5%) did not know the correct order/method of resuscitation to be taken during delivery.

CONCLUSION

- The gap between the reported and validated data ranged from 15% to 51% of the reported, for various indicators.
- PHCs in non-tribal area performed better on all the indicators except those for SC clinic, where the reason could have been vacant posts of MO that lead to greater utilization of FHW for curative services.
- The posts of various health workers are vacant across all the PHCs. The problem is more severe in tribal areas as compared to non-tribal areas. This shortage has affected service availability, accessibility, utilization and coverage. Stock keeping and data recording are affected the most.
- FHW are entrusted with added responsibilities of fund management and various activities not related to healthcare. This has been given as one of the reasons, by the FHWs, for lack of focus on proper service delivery and quality care.
- During assessment of quality of care, the FHW were found to be lacking in skills for multiple elements. Many of the errors and irregularities of the FHWs were being perpetuated due to lack of monitoring and supervision of the superiors.
- Very few health providers are staying at the HQ. To some extent, this is due to lack of infrastructure, facilities and incentives.

Acknowledgment

We would like to acknowledge the UNICEF for giving training on data validation of MCH data.

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