Maternal Health Correlates Of Neonatal Deaths In A Tribal Area In India
G Babu, S Ramachandra, U Garikipati, T Mahapatra, S Mahapatra, S Narayana, H Pant

Citation

Abstract
ObjectivesIn tribal areas of India, the coverage of antenatal care service is poor and rate of home delivery is very high. Moreover, most of these deliveries are either unattended or attended by unskilled traditional birth attendants. Evidences suggest that the rate of neonatal mortality is also very high in these areas. The aim of the current study was to explore maternal factors, explicitly focusing on antenatal care and maternal health seeking pattern in relation to neonatal health in tribal areas of Andhra Pradesh, India.

Study designThis community based study was conducted in two phases: the first phase involved use of qualitative methods and aided in obtaining relevant information in the quantitative phase from mothers who had delivered in the one year period prior to the study.

MethodsInformation from analysis of qualitative data was used to construct a questionnaire, which was administered in the subsequent quantitative phase wherein a population-based survey was undertaken. Reported infant deaths were investigated through verbal autopsy. Multi-stage systematic random sampling was used to identify study participants. The study recruited 230 subjects for the quantitative study. All women of the reproductive age group (15 – 45 years) in the tribal areas of Vizianagaram district of Andhra Pradesh state were eligible for the study.

ResultsAmong the 230 women studied, 74% utilized public health facilities for antenatal care (ANC) and the provision of ANC services was good with high coverage of Tetanus toxoid (97%) and excellent provision of IFA tablets (93%). Our results also show that 56% of women delivered at home, 38% at a public health facility and 5.2% could avail private facility. Qualified doctors conducted only 10% of deliveries and 29% were conducted by ANM. Age of mother, total number of women in the house, total number of children born to the mother, year since marriage, mother’s smoking status and alcohol use, were all significantly associated with neonatal deaths. ConclusionsIn our study, both the proportions of pregnant women having ANC checkups and undergoing deliveries at home were high. Currently, while appropriate emphasis is being given in promotion of institutional deliveries under NRHM, it is still in a phase of transition and relevant policies are needed to be implemented more stringently. Our study underlines the importance of not neglecting safe home deliveries, especially in inaccessible tribal areas. Alternatively, better communication trainings to local health workers can address cultural values and taboos for convincing tribal women to deliver at hospitals.

INTRODUCTION
Globally, it is estimated that, around 5 million newborn deaths occur each year, of which 98% occur in developing countries and the majority occur in Asia and Africa. India accounts for 30% of all neonatal deaths globally. Neonatal mortality rate is defined as the number of deaths during the first 28 completed days of life per 1000 live births in a given year or any other specified time period. India is a signatory to the Millennium Development Goals and has national level goals with respect to reduction in Infant Mortality Rate (IMR). Therefore, the country has to fulfill its commitment in terms of reducing IMR as per established goals.

According to the conceptual framework from Mosley and Chen (1984) of understanding proximate determinants of infant mortality, the proximate determinants are divided into five categories: maternal factors, health system factors, delivery factors, neonatal factors and postnatal factors. The distinction between death and survival in the neonatal period is dependent upon the emphasis provided to each of these...
Maternal Health Correlates Of Neonatal Deaths In A Tribal Area In India

factors. Our study aimed at exploring maternal factors, explicitly focusing on antenatal care and maternal health seeking pattern in relation to neonatal health.

Several factors such as women’s status in the society, nutritional status at the time of conception, early child bearing, closely spaced pregnancies and harmful practices such as inadequate cord care, not keeping baby warm, discarding colostrum and feeding other foods contribute to this. The most common causes of neonatal deaths are prematurity (25%), infection (36%), birth asphyxia (23%) and neonatal tetanus (4%). In India, it is reported that time of seeking antenatal care by mothers is usually delayed owing to the lack of awareness and recognition of early signs of pregnancy and the need of antenatal care. The delay is usually aggravated by cultural, socio-demographic and logistic factors. According to NFHS-III, it is evident that inappropriate newborn care practices are highly prevalent in India. It is also known that in India, residents of remote tribal areas with poor transportation facilities suffer from inadequate access to health care facilities, poor quality of care and lack of knowledge regarding health services.

It has long been established that health workers and the community have independent as well as collective roles in preventing neonatal deaths. Albeit most women are uninformed and/or unaware of health facilities, there is abundant evidence that home-care strategy by health workers reduces neonatal mortality by more than a third and improves key maternal and newborn-care practices. In the areas with high burden of infant mortality, it is often reported that health workers at the preventive cadre lack or retain inadequate skills to meet the required standards of newborn care. On a dissimilar platform, educated or informed mothers may ensure better access to and have better chances of using health systems and consequently can have better health indicators.

Globally, the tribal people are in minority and their health status is often neglected due to several reasons. With 84.3 million tribal populations belonging to recognized groups, India has almost half of the world’s tribal population and adds to 1 million neonatal deaths annually. Indian tribal people follow traditional norms, are socially and economically weaker and are conservative in nature, apart from being under-privileged. Habitually, they live in areas with scarce resources and are often deprived of medical facilities. In tribal areas, about 80% deliveries occur at home and are attended by unskilled traditional birth attendants. It is reported that tribal areas have high neonatal mortality of around 43 per 1000 and contribute to 65% of all infant deaths in those areas.

As per 2011 census report, Andhra Pradesh has 50.24 lakhs of tribal population spread across 23 districts. These areas, there are eight integrated tribal development agencies for implementation of developmental programmes under the control of Commissioner of Tribal Welfare. The tribal division of Parvathipuram agency area has scattered and remote habitations including endemic and epidemic prone areas. This region is also influenced by Naxalism/Maoism. The tribal population of Vizianagaram district has low literacy rate, traditional life styles with varied cultural values and taboos. Water contamination, poor sanitation, illiteracy, lack of personal hygiene, lack of awareness of endemic diseases are all reflecting on poor health indicators. It is vital to understand the socio economic barriers, proportion of skilled deliveries, accessibility to healthcare services and their determinants as each of these will subsequently have a role in improving the neonatal health in tribal areas. In this study, we aimed to explore specific determinants in deterring provision of quality neonatal care services in Vizianagaram District in Andhra Pradesh, India. The current study also examined maternal factors, explicitly focusing on antenatal care and maternal health seeking pattern in relation to neonatal health in tribal areas of Andhra Pradesh, India.

METHODS

This community-based study was conducted in two phases. The first phase involved use of qualitative methods (semi-structured and open-ended in-depth interviews) conducted in local language, Telugu. This phase aided in obtaining relevant information from mothers who had delivered in the one year prior to the study. Information from analysis of qualitative data was used to construct a questionnaire schedule which was administered in the subsequent quantitative phase wherein a population-based survey was undertaken. Reported infant deaths were investigated through verbal autopsy. Additional information was also obtained from relatives. The verbal autopsy tool included identification particulars, verbatim open ended history, care and knowledge regarding health services. It is reported that tribal areas have high neonatal mortality of around 43 per 1000 and contribute to 65% of all infant deaths in those areas.

As per 2011 census report, Andhra Pradesh has 50.24 lakhs of tribal population spread across 23 districts. These areas, there are eight integrated tribal development agencies for implementation of developmental programmes under the control of Commissioner of Tribal Welfare. The tribal division of Parvathipuram agency area has scattered and remote habitations including endemic and epidemic prone areas. This region is also influenced by Naxalism/Maoism. The tribal population of Vizianagaram district has low literacy rate, traditional life styles with varied cultural values and taboos. Water contamination, poor sanitation, illiteracy, lack of personal hygiene, lack of awareness of endemic diseases are all reflecting on poor health indicators. It is vital to understand the socio economic barriers, proportion of skilled deliveries, accessibility to healthcare services and their determinants as each of these will subsequently have a role in improving the neonatal health in tribal areas. In this study, we aimed to explore specific determinants in deterring provision of quality neonatal care services in Vizianagaram District in Andhra Pradesh, India. The current study also examined maternal factors, explicitly focusing on antenatal care and maternal health seeking pattern in relation to neonatal health in tribal areas of Andhra Pradesh, India.

METHODS

This community-based study was conducted in two phases. The first phase involved use of qualitative methods (semi-structured and open-ended in-depth interviews) conducted in local language, Telugu. This phase aided in obtaining relevant information from mothers who had delivered in the one year prior to the study. Information from analysis of qualitative data was used to construct a questionnaire schedule which was administered in the subsequent quantitative phase wherein a population-based survey was undertaken. Reported infant deaths were investigated through verbal autopsy. Additional information was also obtained from relatives. The verbal autopsy tool included identification particulars, verbatim open ended history, care and knowledge regarding health services. It is reported that tribal areas have high neonatal mortality of around 43 per 1000 and contribute to 65% of all infant deaths in those areas.

As per 2011 census report, Andhra Pradesh has 50.24 lakhs of tribal population spread across 23 districts. These areas, there are eight integrated tribal development agencies for implementation of developmental programmes under the control of Commissioner of Tribal Welfare. The tribal division of Parvathipuram agency area has scattered and remote habitations including endemic and epidemic prone areas. This region is also influenced by Naxalism/Maoism. The tribal population of Vizianagaram district has low literacy rate, traditional life styles with varied cultural values and taboos. Water contamination, poor sanitation, illiteracy, lack of personal hygiene, lack of awareness of endemic diseases are all reflecting on poor health indicators. It is vital to understand the socio economic barriers, proportion of skilled deliveries, accessibility to healthcare services and their determinants as each of these will subsequently have a role in improving the neonatal health in tribal areas. In this study, we aimed to explore specific determinants in deterring provision of quality neonatal care services in Vizianagaram District in Andhra Pradesh, India. The current study also examined maternal factors, explicitly focusing on antenatal care and maternal health seeking pattern in relation to neonatal health in tribal areas of Andhra Pradesh, India.

METHODS

This community-based study was conducted in two phases. The first phase involved use of qualitative methods (semi-structured and open-ended in-depth interviews) conducted in local language, Telugu. This phase aided in obtaining relevant information from mothers who had delivered in the one year prior to the study. Information from analysis of qualitative data was used to construct a questionnaire schedule which was administered in the subsequent quantitative phase wherein a population-based survey was undertaken. Reported infant deaths were investigated through verbal autopsy. Additional information was also obtained from relatives. The verbal autopsy tool included identification particulars, verbatim open ended history, care and knowledge regarding health services. It is reported that tribal areas have high neonatal mortality of around 43 per 1000 and contribute to 65% of all infant deaths in those areas.
Inclusion Criteria: All women of the reproductive age group (15-45 years) were eligible for inclusion in the study. The total population in the tribal areas of the district (study area) was 4,18,670. The sample setting includes 19 tribal primary health centres (PHC’s). Our sampling frame included mothers in the age group of 15-45 years in the tribal area of Vizianagaram District, Andhra Pradesh.

Sampling Technique: A multi-stage systematic random sampling was used to identify study participants. All nineteen tribal PHC’s were included. One sub-centre was randomly selected in each PHC area. This was done by preparing the list of all sub-centres and selecting one sub-centre randomly. Further, a list of all villages was prepared for each sub-centre and 2 villages per sub-centre were selected.

Sample Size: Based on the IMR and 95% confidence intervals, the sample size for the 2nd phase of the study (survey), was calculated as 135 subjects. It was decided to increase the sample size to reflect a refusal rate of 20%. Based on our protocol, the interviewers collected information from a desired minimum of 20 women per habitation or till all the women get covered in the habitation in a systematic random method. As a result, a final sample of 230 were selected, who delivered live babies in the year preceding the study.

Study Population: The district of Vizianagaram is situated on the north coastal border of Andhra Pradesh, between Srikakulam and Visakhapatnam districts with Orissa state on the Northwest.

FIELD WORK

Written informed consent was obtained from all the participants by trained interviewers, and all data was recorded in a specially designed format, which was administered in the local vernacular. The questionnaire was prepared in English, translated into Telugu and back translated to English independently for standardization. The questionnaire-schedule was used to collect detailed information regarding history of ante natal care (ANC), intrapartum and postpartum care, contraceptive methods, infant morbidity and mortality and on health seeking behavior of mothers. All collected data was coded and entered into a specially designed database. Ethical clearance was obtained from institutional ethical committee, IIPH, Hyderabad

Statistical Analysis: After data collection and data cleaning, analysis was done using Stata SE (Stata Corporation, 10.1 for Macintosh TX USA) and MS Excel (Microsoft Corporation, USA). Descriptive data analysis including, proportions for all the variables included in the study were conducted. Further, specific models were run to check crude measures of association.

RESULTS

Figure 1
Table 1: ANC service uptake, frequency and provider details among tribal antenatal women

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Frequency</th>
<th>%</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Antenatal Care (ANC) Place</td>
<td>32</td>
<td>31.7</td>
<td>38.2-25.0</td>
</tr>
<tr>
<td>2. ANC facility</td>
<td>89</td>
<td>89.9</td>
<td>95.0-85.0</td>
</tr>
<tr>
<td>3. ORG</td>
<td>23</td>
<td>23.1</td>
<td>30.6-15.6</td>
</tr>
<tr>
<td>4. ANM</td>
<td>27</td>
<td>27.1</td>
<td>34.6-19.6</td>
</tr>
<tr>
<td>5. Private</td>
<td>34</td>
<td>34.3</td>
<td>41.8-26.8</td>
</tr>
<tr>
<td>6. 3 Days visit to Go</td>
<td>75</td>
<td>75.0</td>
<td>81.5-68.5</td>
</tr>
<tr>
<td>7. 1 Day</td>
<td>35</td>
<td>35.0</td>
<td>42.5-27.5</td>
</tr>
<tr>
<td>8. 2 Days</td>
<td>33</td>
<td>33.0</td>
<td>40.5-25.5</td>
</tr>
<tr>
<td>9. 1 Week</td>
<td>33</td>
<td>33.0</td>
<td>40.5-25.5</td>
</tr>
<tr>
<td>10. 2 Weeks</td>
<td>33</td>
<td>33.0</td>
<td>40.5-25.5</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Around 74% of women utilized public health facility but 10% of women are still not availing any ANC services. Among the 74% women who utilize public health facility, only 32% mothers had 2 ANC visits and 23% had 1 ANC visit. Further, 87% received ANC care at home, out of which, 63% women were given ANC by ANM and 23% by ASHA workers.

Figure 2
Table 2: Antenatal care services provided at health institutions in Vizianagaram

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Frequency</th>
<th>%</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tetanus Toxoid (TT) injection</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2. Hemoglobin, Urine and Blood Pressure (BP)</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3. Given Iron and Folic Acid (IFA) Tablet</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>4. If Yes, How Many IFA</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>5. Compliance to IFA</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>6. Advised for Institutional Delivery</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The provision of antenatal care services was good with high coverage of Tetanus toxoid (97%), better inclusion of diagnostics such as Hb and Blood pressure readings (80%)
and excellent provision of IFA tablets (93%). A very high proportion of pregnant women (83-91%), were advised to deliver at public health institutions (Table-2). 63.9% mothers had received health checkup in the last trimester by Anganwadi Worker (AWW) (Fig.1). 23.9% of mothers were examined by ANM, 12% by ASHA (Fig.2).

Our results suggest that 56% of women delivered at home, 38% at public health facility and 5.2% could avail private facility. It was reported that 55% deliveries had safe delivery practice by using clean blade for cord cutting; other practices were not known and implemented by TBAs in tribal areas (Fig.3).

Qualified doctors conduct only 10% of deliveries and 29% were conducted by ANM. 45% were not willing to go to a health facility and / or were not allowed by the family. 28% show reason of inaccessibility. Mothers were unaware of usage of Disposable Delivery Kit (DDK). Only 4% knew that DDK was used. Also, 32% of women did not know the importance of keeping baby warm after birth. 55% mothers knew that new blade was used (Table 3). The results indicated that whereas antenatal services were good in Vizianagaram (Table 1), and reasonable enactment by local health authorities (Table 2), majority of the women nevertheless delivered at home, often in unhygienic environment (Table 3).

Figure 3
Figure 1: Type of Health Worker and frequency of visits in last trimester, n=230

We asked mothers regarding when the baby was sick and wanted to get advice or treatment, what would be their option (Table 4). Majority of the mothers answered in affirmative of having knowledge in recognizing symptoms of a sick neonate. On exploring the actions in terms of, whether they would take the sick baby to hospital, there were several important determinants. Interviewers would code the answers to this section as “significant problem” if mothers provided answers as to this was the only problem that impedes them from taking the sick baby to hospital and could not be overcome easily only with her efforts. The answer would be coded as a “minor problem” if sometimes this posed a problem but could be overcome by mother without any challenges. It would be coded as “no problem” if this was not a challenge at all for mother to handle.

Figure 5
Figure 3: Safe delivery practices usage, n=230

Note: Does not arise is inclusive of services not available, no access, not aware and others
As an example, we asked questions regarding mother getting permission to visit hospital. It would be coded as significant problem if mother was never permitted by husband or mother-in-law to go to hospital and she could not convince them at all. It would be a minor problem if there were opposition, but agreed after explaining without much effort. These determinants were access to health facility being very distant, concern that no female health provider will be present and no drugs available. Mother’s smoking status and mother’s alcohol use was also significantly associated with infant deaths (Table 4).

Age of mother, total number of women in the house, total number of children the mother has, and years since marriage were significantly associated with infant deaths (Table 5).
Maternal Health Correlates Of Neonatal Deaths In A Tribal Area In India

Though statistically not significant, the relative odds of babies that develop symptoms and were delivered by local Dai was almost twice (OR:1.64, 95% C.I: 0.765-2.465) compared to those delivered by gynecologists. Mothers that did not complete at least secondary education were at higher odds of (OR: 1.60. 95% C.I: 0.70- 3.69) having infant deaths compared to mothers who have completed at least secondary education (results not shown). This result was not found to be statistically significant.

DISCUSSION

It is estimated that about 80% of deliveries occur at home in tribal areas. (19) Analogously our study reported that 55% women endure the arduous process of childbirth at home. The home deliveries are conducted often with the aid of locally available traditional attendant excepting few opportune women who can avail services of Skilled Birth Attendants (SBA). The neonatal deaths in tribal area are mainly due to severe infections, preterm births, birth asphyxia and neonatal tetanus. It is estimated that nearly three fourths of neonatal deaths occur within 1 week, mostly during first 24 hours accounting for early Neonatal Mortality Rate (NMR). (28) Also, neonatal mortality constitutes to 2/3rd of Infant Mortality Rate (IMR) and half of under-five mortality rate. (28) It is very important to study the factors associated around the period of birth of baby including the first 24 hours. Lack of skilled care at births may lead to increase in neonatal mortality rate. They include unhygienic delivery practices, unhygienic newborn care practices and excessive invasive procedures and lack of essential preventive newborn care. There is a need to focus on early neonatal mortality and the states need to effectively implement early newborn care by upgrading the skills of health workers and community participation. (19)

The records of District Medical and Health Officer (DM&HO), Vizianagaram shows that about 90% of deliveries occurring in this district do occur at home in this district and the district has an IMR of 22 per 1000. The data of the present study showed 57% of deliveries occurred at home and at least 70% - 80% infants were exposed to infection, diarrhea and other illnesses. Also, our results from earlier paper indicate that IMR in Vizianagaram is 239 per 1000, (29) ten times more than reported by the district. We have reported the IMR of 230 infant deaths per 1000 live births discussing all the limitations and caveats in our earlier paper. Even assuming that there might be some overestimation, there are several important aspects of maternal factors, which deserve attention. (29)

Firstly, we conducted a cross-sectional study and hence do not have any temporality attached to the study design. Hence, one cannot claim or verify any causal inferences out of the results from our study. Secondly, we consider that there might be a possibility of misclassification of infant deaths due to many reasons such as: interviewer bias; migration and others. The study might additionally be vulnerable to selection bias, residual confounding by unknown factors and lack of generalizability. Hence the validity of the data from field might either underestimate or overestimate the IMR results. Third, the selection of sample was such that only hilly and remote tribal areas are included in the study while most of the plain tribal and other areas of the district were not taken into account. This will definitely provide a different estimate than that of the reported IMR by the district, and was higher in our study results. We are confident that our estimates are representative of the true IMR burden due to rigorous care taken during methodology and implementation to represent the true source population of study question.

On the other-hand, it can be reasoned that there might be specific reasons for under reporting of neonatal deaths by district authorities. Vizianagaram District has got a tribal division, which is geographically the border of Andhra Pradesh and Orissa states. (17, 18) There is migration of tribal population from Orissa to Vizianagaram district and Vice-Versa. This could be one reason for lacunae in reporting of infant deaths.

Most of the tribal girls get married at an early age: between 15-20 years, ensuing early pregnancy leading to teenage pregnancies coupled with lack of knowledge of safe motherhood practices. We infer that early marriage, lack of awareness and lack of services has led to increased NMR in this tribal area. Similar findings have been obtained by the study conducted by Kushwala P et al, (11) wherein they reported higher incidence of LBW Neonatal morbidity and mortality being associated with adolescent and teenage pregnancies. (11) We explored our data and found that the adoption of both permanent and temporary contraceptive methods was very low among tribal women due to cultural and social barriers. This might result in high fertility and increase in number of births. High fertility and low couple protection rate is associated with high IMR and NMR. (30, 31)

We argue that encouraging institutional deliveries is imperative and is intended to return rich dividends in terms of reducing IMR in other areas of the country. However,
there are several contextual constraints, which would limit this objective such as in the case of our study population. We discuss on three important aspects in understanding why tribals did not prefer to deliver at hospitals even when they are provided with free transportation and assistance.

First, as the ANC coverage is high and most of pregnant mothers had health worker contact: it can only be assumed that the communication skills of workers in convincing the husbands, mother in laws and the pregnant mother for institutional delivery were not sufficient. Also, contact by health worker in last trimester of pregnancy is low due to which timely referral of some high-risk pregnancies might not have taken place.

Second, 57% of births are still occurring at home in the study area. It is reported that two thirds of infant deaths occur in the immediate neonatal period and hence efforts at reduction of NMR should be coupled with efforts that improve maternal care during pregnancy, delivery and postnatal period. The important interventions recommended are practicing clean delivery, basic newborn resuscitation when needed, prevention of hypothermia, early and exclusive breast-feeding and Tetanus vaccination. The interventions could be most effective when deliveries are supervised. Our results are in conformity with other research in India.

Third, the reach of Anganwadi workers (AWW) was high and they could play a greater role in communicating and convincing the family members to accept institutional delivery.

In Conclusion, high prevalence of home deliveries and inaccessibility of neonatal care in tribal area indicate there is a need to develop and promote home based neonatal care practices. The ASHA/TBA are the anchor workers at village level. By improving the skills of these health workers at community level, a lot of improvement can be achieved in reducing IMR and NMR. There should be separate plans of implementing programs for tribal and non-tribal areas. The local cultural values and taboos need to be considered while planning for tribal areas. The review of MCH services should not be based on overall condition of the district. Region specific strategies are to be planned and implemented.

Through this study, we have focused on simple factors that can be targeted through interventions to reduce MMR and IMR in tribal areas of Vizianagaram district. In summary, this study revealed a huge burden of neonatal ill health. A key challenge for effective implementation of neonatal intervention packages is developing and sustaining constructive linkages between families, communities and health facilities through engaging existing cadres of community health workers in neonatal health. There are proven models that are cost efficient and have shown good impact in implementing evidence-based interventions in tribal areas. We recommend that Government of Andhra Pradesh adapt such culturally appropriate innovative interventions to improve neonatal health in the state. It is crucial for the development of effective regional specific strategies to save newborn lives.

An integrated package of antenatal, intra-natal & postnatal services that reduce newborn deaths should be implemented. This is the very basis on which, Integrated Management of Neonatal Childhood Illnesses (IMNCI) was introduced in India. However, the progress of IMNCI is very slow at least in the tribal areas of the Vizianagaram district. To aid the revival of an efficient program, we have outlined some points, which can be used as pointers towards improving provision of neonatal health services in tribal areas. There can be renewed inter-sectoral coordination for comprehensive approach in tribal areas for better awareness and information. Demand from community to receive quality health services from public health facility should be encouraged by way of creating awareness regarding national programs, responsibilities and available resources. The Government should ensure provision of high quality training and supportive supervision to TBA, front line health workers and supervisors regarding upgrading their skills. Better communication trainings to be given to AWW and ASHA in gathering acceptance of tribal families for institutional deliveries (and thereby for effective newborn care in the first 48 hours). It might be helpful to also mandate home visit to newborns within 24 hrs by ASHA/Community Health Worker (CHW)

In our study, both, the proportion of pregnant women who deliver at home and proportion having ANC checkups was very high. This indicated that there are several opportunities to convert the antenatal visits into institutional deliveries. In the absence of intensive interpersonal communication strategies, it is high time that the policy makers reconsider improving delivery services at home. Increased visits of ANM to houses, training ASHAs for facilitating normal delivery can be some of important options to be considered at least in tribal areas.
We have conducted an important study in an inaccessible tribal area. The extrapolation of results from this study are applicable only locally, but yet may have important influence on policy makers to re-visit the issue of managing deliveries in tribal and other such areas where institutional deliveries are low. (28, 35, 36) Currently, while appropriate emphasis is being given in promotion of institutional deliveries under NRHM, our study underlines the importance of not neglecting safe home deliveries. Even with greater momentum in terms of greater emphasis in resource allocation and reviews by central and state Governments, it is evident that institutional deliveries are still in a state of transition towards uptake and improvement. There are several reasons for the varied results including non-availability of doctors and equipment. It might be important that during this transition phase, adequate attention is also paid for creating human resources (Skilled Birth Attendants) who can be helpful in decreasing IMR. NRHM should consider allocation of resources for building capacity of birth attendants.

Future studies done with rigorous epidemiologic methods and new public health programs can warrant community participation and family centered approach while planning health services in such inaccessible areas. (18, 19, 28, 36-38) It is also equally imperative that adolescent girl child and community gets better education regarding safe motherhood practices.

ACKNOWLEDGEMENTS

We thank Public Health Foundation of India (PHFI) for institutional support offered to authors for carrying out this work. We thank K Shanth Kumar for technical check and help with manuscript completion.

References

4. India Pco. 11th five year plan 2007-2012- Report by working group on integrating nutrition with health 2006.
28. Ramani K, Mavalankar D, Joshi S, Malek I, Puvuar T, Kumar H. Why Should 5,000 children die in India every day? Major causes of death and managerial challenges.
Author Information

Giridhara R Babu
Assistant Professor, Public Health Foundation of India, Indian Institute of Public Health

Srikrishna Sulgodu Ramachandra
Associate Professor, Public Health Foundation of India, Indian Institute of Public Health

Ushashree Garikipati
Indian Institute of Public Health, PGDPHM

Tanmay Mahapatra
Department of Epidemiology, University of California

Sanchita Mahapatra
Department of Epidemiology, University of California

Siddhi Narayana
Indian Institute of Public Health, PGDPHM

Hira Pant
Lecturer, Indian Institute of Public Health