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A study of infant deaths in tribal area of Andhra Pradesh, India

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ABSTRACT

Objectives This study aimed to determine the prevalence of neonatal deaths and its underlying correlates in tribal area of Andhra Pradesh, India

Methods We conducted a two phase cross-sectional study (N=230). Semi-structured questionnaire schedules (in the vernacular-Telugu) were used in the initial   qualitative phase, to obtain specific information from mothers who delivered in a one year period prior to the study. Information from the analysed qualitative data was used to construct a questionnaire-schedule for the 2nd phase which used quantitative survey techniques.

Results It was observed that Infant Mortality ratio (IMR) in Vizianagaram district was 239 per 1000 live births *in the tribal areas under study*. This was ten times higher than that reported by the district (22/1000) and 4-5 times higher than SRS data of 2011 for AP. It was observed that 28% of infants died within first day, 68% within first week (including the first day) and 81% within first month.

Conclusions The high IMR observed in the within first month of life in tribal areas, interventions to tackle them should be prioritized in this 'golden period'. The health workers should be re-trained to identify and manage the early warning signs of neonatal complications.

Keywords: Infant mortality, cause of death, prevalence, Prevalence

INTRODUCTION

Globally an estimated 5 million newborn deaths occur annually, of which 98% are in developing countries and the majority in Asia and Africa. [1] About two thirds of infant mortalities occur in the 1st month of life and of these two thirds occur in the 1st week of life.[1] The main causes of early neonatal death are asphyxia, birth trauma, infection, prematurity, and malformation. The other causes of death within 1st month of life are due to sepsis, pneumonia, meningitis, diarrhea and tetanus.[1]

India accounts for 30% of global neonatal deaths as among the 10.7 million children dying each year under the age of 5 years, 4 million die in the 1st week of life.[2, 3] About a third of all neonatal deaths occur on the 1st day of life.[3] The major causes of neonatal death in India resemble the global picture with infections, prematurity, asphyxia being the leading causes.[2] Available data shows that annually,

26 million infants are born and 2.3 million die before reaching their fifth birthdays of whom 1.2 million die in the first month in India.[4] The current neonatal mortality (NMR) is estimated at 44 per 1000 live births accounting for nearly two thirds of IMR and half of the under-5 child mortality.[3]

India is a signatory to Millennium Development goals and has national level goals with respect to reduction in mortalities and the country has to fulfill its commitment in terms of reducing IMR as per established goals. The latest IMR figures for India is 50 per 1000 live births and Andhra Pradesh is 49 per 1000 live births.[5] There are several intra state and intra regional differences in IMR with rural areas for the country reporting around 55 per 1000.[5] As per 2001 census report, Andhra Pradesh has 50.24 lakhs of tribal populations spread over 23 districts,[6] where the IMR is between 50-120 per 1000 live births and under 5 mortality is 15-20 per 1000.[7, 8 6-9]

The proximate determinants of infant mortality are health system factors, delivery factors, neonatal factors and postnatal factors.[9] The difference between death and survival in the neonatal period is dependent upon what responses are given to the newborn needs and to the threats to neonatal health.[9] This study is aimed at studying these factors, specifically to study correlation of neonatal and postnatal factors with neonatal deaths. The study analysed both maternal and neonatal correlates around antenatal check up, delivery and postnatal period. We published the Maternal Health Correlates Of Neonatal Deaths in an earlier paper.[10]

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 were conducted in Telugu (local language). This phase helped to obtain specific information from mothers who had delivered in the one year period prior to the study. Analysis of qualitative data was used to construct a questionnaire schedule which was administered in the second quantitative phase wherein a population-based survey was undertaken. All "women of the reproductive age group (15-45 years) were eligible for inclusion in the study. The total population of 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 of 15-45 years in the tribal area of Vizianagaram District, Andhra Pradesh. Systematic random sampling was used to identify study participants. All nineteen tribal PHC's were included. One subcentre was randomly selected in each PHC area. This was done by preparing the list of all subcenters and selecting randomly. Further, a list of all villages was prepared for each sub-centre and 2 villages per sub-centre were selected randomly. The eight tribal mandals of Parvathipuram Division of Vizianagarm District were selected for study all nineteen PHC's are included in the study. Two sub centers from each PHC and two villages from each sub centre are selected. Further, a list of all villages was prepared for each sub-centre and 2 villages per sub-centre was selected. This was done by preparing the list of all villages and selecting randomly. The data was collected from all the mothers of reproductive age group (15-45 years) who gave birth to children less than 1 year in randomly selected villages.

We used the formula for calculating sample size as follows: [11]

$$n = [DEFF*Np(1-p)] / [(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]$$

For a hypothesized frequency of IMR at 5.5% (We assumed it to be around 55 per 1000 live births for tribal areas and hence 5.5% is derived with plus or minus 5%), a design effect of 2.5 and for a finite population (with finite population correction being done), the number of mothers with infants required is 200. However, we have oversampled the mothers in the particular area to reflect on possible refusals and to incorporate all the villages selected by our design.

Panel 1 Calculation of Sample Size for Frequency in a Population

Population size (for finite population correction factor or fpc)(N):	10,00,000
Hypothesized % frequency of outcome factor in the population (p):	5.5% +/- 5
Confidence limits as % of 100(absolute +/- %)(d):	5%
Design effect (for cluster surveys-*DEFF*):	2.5
Sample Size(n) for Various Confidence Levels	
Confidence Level (%)	Sample Size
95%	200
80%	86
90%	141
97%	245
99%	345
99.9%	563
99.99%	787

Assuming the IMR of 5.5 and 95% confidence intervals, the sample size for the 2nd phase of the study (survey), was calculated as 200 subjects. It was decided to increase the sample size to reflect a refusal rate of 15%. We assumed the refusal rate to be high as we were unaware of the characteristics of tribal area with respect to responding to health surveys. Therefore the final sample consisted of 230 mothers who delivered live born babies in the year preceding the study. We calculated the sample size as illustrated in the panel-1.[12] The calculations were done using Open Source Epidemiologic Statistics for Public Health, Version 2.3, Software validated extensively and used for sample size calculations widely. (**Panel 1**)

In low and middle-income countries, a skilled and trained birth attendant can prevent large proportion of intra partum related neonatal deaths. It is interesting to study the conceptual framework from Mosley and Chen (1984) in understanding socio-economic and proximal determinants, thereby planning appropriate interventions.[9] The determinants were obtained from earlier evidence and were incorporated into the questionnaire based on the conceptual framework. The questionnaire is attached annexure in the manuscript. The questions addressed antenatal, labor and postnatal care. Also, we examined health care seeking pattern. 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. 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 seeking behavior of fatal illness, screening questions to know common causes of deaths and detailed history of age at death, time and place of death and major signs and symptoms of illness. All collected data was coded and entered into a specially designed database. Ethical clearance was obtained from institutional ethical committee, IIPH, Hyderabad. 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). We conducted descriptive data analysis including proportions for all the variables included in the study. Further, we ran specific models to check crude measures of association as stated in our hypothesis.

RESULTS

Table 1 Demographic and Characteristics of newborn babies in Vizianagaram (N=230)

Parameters	Frequency	Percent
Age of baby **at time of study**		
1) <1 Month	10	4.3
2) 1-4 Months	83	36.1
3) 5-8 Months	76	33.0
4) 9-12 Months	61	26.5
Total1	230	100.0
Sex of baby		
1) Male	114	49.6
2) Female	116	50.4
Total	230	100.0

It was observed that 87% mothers were from tribal community. Among the responding mothers, 62.2% of them were illiterate. The sex ratio among the live born was similar (**Table 1**).
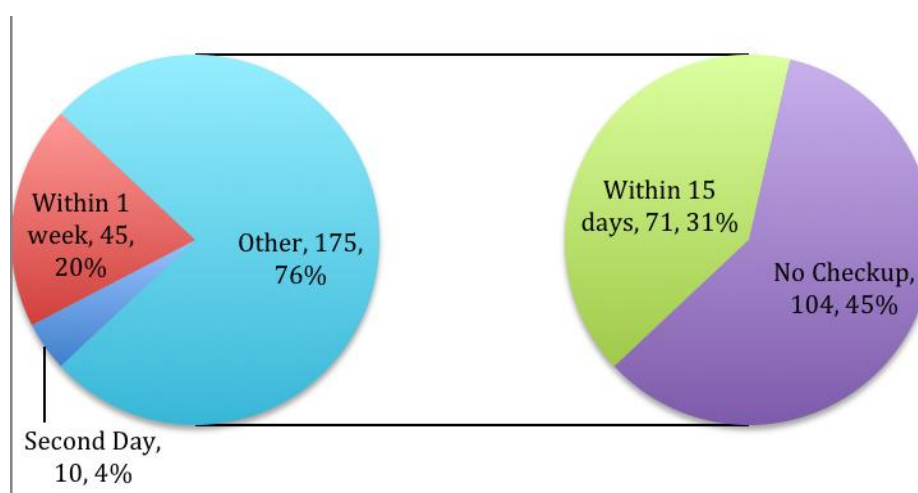
Figure 1 Postnatal checkup after delivery, n=230

Figure Legend: There were only 10 postnatal checkups done on day 2, where as 45 were within a week and 71 were within 15 days. There were no post natal check-ups done after a greater proportion of deliveries (45.2%, N=104)

It was observed that IMR in Vizianagaram is 239 per 1000 live births *in the tribal areas under study* and 74% of babies were breast fed immediately after birth.

Our results showed that 55 infants out of 230 live births died within one year amounting to 239 per 1000 live births *in the tribal areas under study*. Among the infants who died, 28% of them died within first day, 68% within first week (including the first day) and 81% within first month. This shows that majority of the infant deaths are occurring within first month of life and interventions to tackle them should be prioritized in this golden period (**Table 3**).

**Table 2 Characteristics of survival of newborn babies and
Breastfeeding practices in tribal areas in Vizianagaram**

Parameters Interval	Frequency	Percent	95% confidence
Deaths during first year of life			
Total deaths	55	23.91	21.9 – 25.8
No Deaths	175	76.08	74.1 – 78.7
Timing of Death			
Within 24 hours of birth	15	7	3 – 10
Within first 7 days of birth	21	9	5 – 13
Within 28 days of birth	7	3	1 – 05
Other period within 1 year of birth	1	4	2 – 07
Not eligible*	3	1	0 – 03
Not applicable#	174	76	70 – 81
Initiation of breast feeding			
1) Immediately After Birth	171	74	69 – 80
2) After One Day	29	13	08 – 17
3) After Three Days	30	13	09 – 17
Type of feed given before initiation of breast feeding			
1) Plain Water	16	07	04 – 10
2) Glucose Water	31	14	09 – 18
3) Artificial Milk	8	04	01 – 06
4) Others	175	76	71 – 82

There were 3 deaths beyond one year, despite of the careful eligibility criteria. We excluded these deaths from our mortality estimations.
 # Live babies

The results indicate that 74% of mothers breastfed their child immediately after birth, 24% gave pre-lacteal feeds, 45% of women did not have any post natal check up. (Fig.1) Only 4% of women had a postnatal check up on the second day.

Our outcomes on symptoms related to morbidity in the postnatal period indicate that 38% of infants had a fever. 14% did not take feeds. 12% did not cry after birth. Among these infants who had some symptom, 51% had taken care at hospital for any of the symptoms and 32% had taken care at home. Among the infants treated at hospital, 43% were treated by an allopathic, registered Medical practitioner (RMP) treated 30% while 18% did not have any treatment. Our results also indicate that 46% of babies were sick for at least 2 times for some reason before one month, 17% of babies were sick at least four times within one year and 53% of babies had some infection before one month.

Our findings also indicate that 93% of mothers had no knowledge of identifying sick neonatal symptoms and about 4% of infants have birth asphyxia as a cause of death. On finding about the reasons for not using public health care system— 45% of mothers informed that they do not trust the public healthcare system while 51% of mothers informed that they prefer private because of better care assured by their faith and motivation by RMP.

Our results of associations indicated that having more than one child increases the odds for infant death to 69.66 (17.11- 598.4) compared to having just one child. (Can be reverse causation as well); indeterminate results of having institutional delivery prevent the dying infants by odds of .89 (.46-1.72). Our sample did not have enough power to test the hypothesis further. Our results also show that not having even one postnatal health checkup (PNC) had

two times higher odds of their infant dying compared to those who do not have had any PNC (not statistically significant result: 1.19 (.623- 2.33). We also found that infants born to mothers who have not completed at least secondary education are at higher odds dying (OR: 1.60; 95% CI: .70- 3.69) compared to mothers having completed at least secondary education.

Table 3 Morbidity pattern of newborns in tribal areas of Vizianagaram

Indicators Interval	Frequency	Proportion	Confidence
Baby Symptoms			
Fever	89	0.39	0.32 − 0.45
No Cry	29	0.13	0.08 − 0.17
Rigidity	8	0.04	0.01 − 0.06
Drowsiness	10	0.04	0.02 − 0.07
Not Taking Feed	33	0.14	0.10 − 0.19
No reported symptoms	61	0.27	0.21 − 0.32
Place where care was provided			
At Home	73	0.32	0.26 − 0.38
Hospital	118	0.51	0.45 − 0.58
Not applicable	39	0.17	0.12 − 0.22
Person providing care			
Doctor	100	0.435	0.37 - 0.49
ANM	16	0.07	0.037 − 0.10
ASHA	1	0.004	-0.004 − 0.01
RMP	71	0.309	0.25 − 0.36
No treatment given	42	0.183	0.13 − 0.23
Baby symptoms in last one month			
1) Infection	122	0.53	0.47 − 0.59
2) Diarrhea	5	0.02	0.00 − 0.04
3) No symptoms	103	0.45	0.38 − 0.51
Person providing healthcare to sick baby			
RMP	59	0.26	0.20 − 0.31
ANM	5	0.02	0.00 − 0.04
ASHA	4	0.02	0.00 − 0.03
Govt.	44	0.19	0.14 − 0.24
Private	80	0.35	0.29 − 0.41
No response	38	0.17	0.12 − 0.21

Legend:
RMP: Registered Medical Practitioner
ANM: Auxillary Nurse Midwife
ASHA: Accredited Social Health Activist

Table 4 Mortality pattern of newborns in tribal areas of Vizianagaram

Parameters interval	Frequency	Proportion	95% Confidence
Knowledge of cause of death			
1) Yes	16	0.07	0.04 – 0.10
2) No	214	0.93	0.90 – 0.96
Cause of death			
1) Birth Asphyxia	9	0.04	0.01 – 0.06
2) Low Birth Weight	3	0.01	0.00 – 0.03
3) Infection	4	0.02	0.00 – 0.03
4) Indeterminate (Not aware)	39	0.16	0.14 – 0.18
5) Baby alive	175	0.76	0.74 – 0.78

Table 5 Infant Mortality with prevalence Odds ratios

	Prevalence	Odds ratio
Having more than one child	69.66	17.11- 598.4
Prevention of deaths by institutional delivery	0.89	0.46 - 1.72
Not having even one PNC	1.19	0.623 - 2.33
Mothers not completed secondary education	1.60	0.70 - 3.69

DISCUSSION

Our results indicate that IMR in Vizianagaram is 239 per 1000 live births in the tribal areas under study which is 10 times more than that reported by the district (22/1000) and 4-5 times more than Sample Registration System (SRS) data of 2011 for AP (IMR of 55 per1000 lives births in rural areas).[5, 7, 10] SRS data has not focused on specific information on tribal areas regarding IMR and the same limitation extends to the District Level Household & Facility Survey (DLHS) data.[5]

High prevalence of home deliveries and inaccessibility of neonatal care in tribal area indicate 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 lot of improvement can be achieved in reducing IMR and NMR. Through this study, we have focused on simple factors that can be targeted through interventions to reduce MMR and IMR in tribal areas of Vizianagarm 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 several models that are cost efficient and have shown good impact in implementation evidence-based interventions in tribal areas.

However, there are some limitations in our study. This being a cross-sectional study, there is no proof against temporal ambiguity. Secondly, there might be possibility of misclassification of infant deaths due to reasons like interviewer bias, wrong attribution from neighbors and parents, migration etc. There might be selection bias and unknown confounders. Hence data from this study might either underestimate or overestimate IMR. Since our study population was predominantly tribal, the estimated IMR would be different from that reported for the district. However, the study team ensured that validated methodology was used and quality assurance procedures were in place to avoid major discrepancies in reporting.

On the other-hand, there might be specific reasons for under reporting of neonatal deaths by district

authorities. Our results indicate that accessibility to health care services was a significant challenge and lack of awareness about facilities and services was a significant factor responsible for increased neonatal mortality and morbidity. 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.[12-14]

Neonatal deaths in tribal area were mainly due to severe infections, preterm birth and birth asphyxia. It is estimated that nearly three fourths of neonatal deaths occur within 1st week mostly during first 24 hours accounting for early NMR.[15] Also, neonatal mortality constitutes to 2/3rd of IMR and half of fewer than <5 Mortality Rate.[16, 17] Hence, it is very important to study the factors present at the time of birth of baby including the first 24 hours.[18] Lack of skilled care at birth may lead to increase in neonatal mortality rate.[19] They include unhygienic newborn care practices; excessive invasive procedures and lack of preventive essential newborn care services.[20] It is reported that socio-cultural and economic factors are responsible for poor maternal and neonatal health. Further, high prevalence of unskilled home deliveries and inaccessibility of healthcare facilities pose particular challenges in reduction of neonatal mortality. Understanding the socio-economic barriers, proportion of skilled deliveries and accessibility to healthcare services will have significant impact in improving the neonatal health in areas.[14, 21] 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.[6]

Globally, it is estimated that nearly 4 million new born die during first 4 weeks of life each year and neonatal mortality makes up 40% of total child mortality. NMR in low and middle income countries (LMIC) of world is 60% per 1000 live births compared to developed nations such as Sweden's 2-3 per 1000 live births.[22] It is of grave concern to note that 99% of all children who die during first 4 weeks of life in poorer parts of globe like sub-Saharan Africa and south Asia.[23-25]

India accounts for highest births and neonatal deaths globally. Around 1% will have congenital anomalies and 15% of the newborn weigh less than 2.5 kgs.[26] In developing countries, it is estimated that birth asphyxia causes 7 deaths per 1000 live births.[27] 26% of the newborn infants die as a result of infection that occurs around birth.[4] Perinatal mortality is an indicator of maternal health and nutrition.(28) It reflects quality of obstetric and pediatric care available.[28] The NMR is static in India because all government programmes focused mainly on post neonatal period and limited number of public health facilities and lack of skilled persons for managing newborns. Data from demographic and health surveys for 1990-2000 show that in less developed countries, the risk of neonatal deaths in multiple births when compared with single births were six times higher in neonatal period and decreased to 2.2% in post neonatal period. A tribal area has neonatal mortality of around 43 per 1000 and contributes to 65% of all infant deaths.[6, 14]

Our results indicated that 56% births are occurring at home. Observations of safe and clean and delivery practices show that awareness of using a clean blade to cut the cord scoring over breastfeeding practices and HBNC. 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 breastfeeding and Tetanus vaccination. The interventions could be most effective when deliveries are supervised.[21, 23, 26, 29] One of the key strategies in prevention of neonatal deaths is provision of appropriate postnatal care immediately after the birth. In India only 42.3% health professionals attend deliveries.[30, 31] Earlier, 66.4% deliveries occur at home.[32] Proportion of home deliveries is high in rural areas amounting to 75.3%.[33] Among home deliveries, post natal contact with health professional occur only in 2.4 % during 1st two days after delivery and 5.2% during 1st week and 16.5% at any time during 2nd month period.[34]

The reported IMR of 22/1000 for Vizianagaram district conceals the huge IMR differential of 230/1000 in hilly, inaccessible and marginalized section of society in tribal area. It is essential that efforts be made in all tribal and difficult areas within the district to achieve rapid decline in IMR. We contend that epidemiological studies need to provide evidence that would provide data for empowering evidence based public health planning.[35-37] Future studies can focus prospective estimation of neonatal health in tribal areas. However, if cross-sectional study is employed, it might be better include mothers who delivered within a year preceding the study but not including mothers who delivered within a month preceding this study. This might help in improving the estimation of neonatal deaths, especially those who have died within a month.

CONCLUSIONS

Our study shows that there is a huge burden of neonatal ill health in tribal areas. 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. High prevalence of home deliveries and inaccessibility of neonatal care in tribal area indicate 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 lot of improvement can be achieved in reducing IMR and NMR. There should be separate plan of implementing programs for tribal and non-tribal areas. The local cultural values are to be included for tribal areas planning. Also, the review of Maternal and child health (MCH) services should not be based on overall condition of the district but should be specific to the regions.

Appendix 1 QUESTIONNAIRE

District: _____	Mandal: _____
Village: _____	ID no: _____

1)	How long have you been Living in the present place?	_____Years_____Months
2)	What is your date of birth or approximate age?	D D / M M / Y Y Y Y OR AGE_____
3)	What your religion?	1) Hindu 2) Muslim 3) Christian 4) Others Specify_____
4)	What is your caste / tribe (specify the tribe)	1) General 2) OBC 3) SC 4) ST (Specify Tripe)_____ 5) Other Specify_____
5)	What is your education	1) No education 2) Primary 3)Secondary 4) Higher
6)	How long were you married?	In the Year _____ OR _ _ _ _ years
7)	How many women live in this house?	

8)	Among these, How many women are of 15 to 45 years of age are in the house?	_____ No's
9)	How many of them have delivered a baby in the last 1 year?	_____ No's
10)	How many women in the house in the reproductive age group (15 to 45years)?	**a)** No of Pregnant Women? _____Nos.
		b) How Many Delivered Live baby? _____Nos.
		c) Are there any still births? _____Nos.
		d) What is the age of the Baby? _____Yrs _____ Mns
		e) If not alive when did the baby die? 1) 24 hours after birth 2) within 7 days 3) within 28 days 4) within 1 year 5) More than 1 year
FOR FOLLOWING QUESTIONS:- FILL UP DETAILS ABOUT ONLY ONE ELIGIBLE WOMAN WHO HAS DELIVERED RECENTLY		
11)	How many children do you have?	No of Male _____ No of Female _____
12)	Have you adopted any temporary method of contraception? (anytime ever)	1) Yes 2) No
13)	If Yes, what is the type of contraception?	1) Copper-T 2) Oral contraceptives 3) Injections 4) Condoms 5)Others
14)	Have you adopted permanent method of contraception?	1) Yes 2) No
15)	If Yes, what is the type of contraception?	1) Tubectomy 2) Vasectomy 3) Others
16)	What is the age of last (youngest) child?	**Age**_____ Years _____Months
17)	What is the immunization status of the **child?**	Circle Yes or No for each of the following
	1) BCG dose according to Mother's recall	1) Yes 2) No
	2) BCG dose according to Immunization card	1) Yes 2) No
	3) BCG scar present	1) Yes 2) No
	4) OPV Birth dose	1) Yes 2) No
	5) OPV-1	1) Yes 2) No
	6) DPT-1	1) Yes 2) No
	7) OPV-2	1) Yes 2) No

	8) DPT-2	1) Yes　　　　　　2) No
	9) OPV-3	1) Yes　　　　　　2) No
	10) DPT-3	1) Yes　　　　　　2) No
	11) Measles	1) Yes　　　　　　2) No
18)	How is the mother now?	1) Healthy　　　2) Unhealthy　　　3) Died
19)	If she is not alive, when she died?	1) Before delivery　　2) During the delivery 3) Within 28 days of delivery
20)	During your pregnancy, did you go any where for antenatal care?	1) Sub centre　　2) PHC　　3) CHC 4) Asha
21)	How many **times** did you receive antenatal care?	1) Once　　2) twice　　　3) Thrice 4) More than 3 times
22)	Did you receive any care at home?	1) Yes　　　　2) No
23)	If care received, by whom?	1) Asha 2) ANM 3) LHV 4) RMP
24)	Were you immunized with TT injection?	1) Yes　　　　2) No
25)	If yes how many **Doses** of TT?	1) One Dose　2) Two Doses　3) More than Two Doses
26)	Were you **Investigated** for the following?	1) HB %　2) Urine Examination　　3) BP　4) Weight
27)	Were you given **IFA** tablets?	1) Yes　　　　2) No
28)	If, yes how many?	_____no's of tablets
29)	How many did you actually take it?	_____no's of tablets
30)	Were you given supplementary nutrition by AWW?	1) Yes　　　　2) No
31)	Were You advised for proper nutrition?	1) Yes　　　　2) No
32)	If yes, by whom you were advised?	1) ANM　2) AWW　3) Asha　4) LHD　5) RMP
33)	Were you advised institutional delivery?	1) Yes　　　　2) No
34)	Did you meet ANM or Asha during the last three months of pregnancy?	1) Yes　　　　2) No
35)	If so did you receive advice on the following?	1) Breast feeding　　　　2) Keep baby warm 3) Need for clean delivery practicer　4) Spacing 5) Others Specify_____
36)	During your pregnancy did you suffer from any illness?	1) Yes　　　　2) No
37)	If yes, type of illness?	1) Bleeding　　　　　　2) Oedema 3) Convulsions　　　　4) Breathlessness
38)	Where did you deliver?	1) At home　2) RMP　3) Institution – Public or private
39)	Who conducted the delivery?	1) Gynecologist　　2) MBBS doctor 3) ANM 4) RMP　　5) local Dai-Trained or untrained

40)	If home delivery , why you did not go to a health facility ?(specify the reason)	1) Not aware 2) Very far 3) Didn't want to go 4) Not allowed 5) Others. Please write reason_____
41)	If home delivery, were the following done?	1) Disposable delivery kit used 2) Baby immediately wrapped & wiped dry with out being bathed 3) Clean blade used to cut the cord
42)	When did you breast feed the baby?	1) Immediately after birth 2) After one day 3) After three days
43)	If not breast fed, what type of feed was given?	1) Plain water 2) Glucose water 3) Artificial milk
44)	How long after delivery did the first checkup took place?	1) second day 2) After one week 3) After fifteen days 4) No checkup
45)	If yes, who attended post natal health checkup?	1) Asha 2) ANM 3) RMP
46)	How many times you were checked? (specify the no)	_____ no's
47)	Is the baby alive?	1) Yes 2) No
48)	Did the baby developed any of the following symptoms after birth?	1) Fever 2) No cry 3) Rigidity 4) Drowsiness 5) Not taking feed
49)	If so , where was the care taken ?	1)At home 2) Hospital
50)	Who attended the sick baby?	1) Doctor 2) ANM 3) Asha 4) RMP 5) Others Specify _____
51)	How many **Times** did the infant develop illness? (specify)	_____ no of Times
52)	Where did you receive the health care for the illness of the infant?	1) public 2) private
53)	If private the reason is	1) Advised by the Doctor to Visit Private Clinic (Self) 2) Advised by the Doctor to Visit Private Clinic (Others) 3) Lack of required drugs at public health facility 4) Lack of trust 5) Advised by RMP 6) Others
54)	If the infant died do you know the cause of death?	1) Yes 2) No
55)	If yes what could be the cause?	1) Birth Asphyxia 2) Low Birth Weight 3) Infection 4) Hypothermia 5) Others Specify_____
56)	If infant developed any illness within one month , specify the type of illness	1) Infection 2) Diarrhoea 3) Others Specify_____
57)	Where was the condition treated?	1) At home 2) Hospital
58)	Who has treated the condition?	1) RMP 2) ANM 3) Asha 4) Institution - Public or Private
59)	Did the mother cover the baby after delivery?	1) Yes 2) No
60)	Did the mother has the knowledge of recognizing sick neonate symptoms?	1) Yes 2) No

61)	When you or your baby sick and want to get advice or treatment in each of the following – a big problem, a small problem, and no problem?	1) Getting Permission to Go 2) Getting Money Needed 3) Having to Take Transport 4) Finding Attendant 5) Concern that No Health Provider 6) Concern , No Female Health Provider 7) Concern , No Drugs Available 8) Access to Health Facility- Distance
62)	Did you receive JSY?	1) Yes 2) No
63)	When you want to go for treatment which place you will prefer?	1) Public 2) Private 3) RMP 4) Others
64)	If private the reason for ,	1) Faith 2) Good care 3) Motivation by RMP 4) Accessibility 5) Motivation by Health Provider
65)	What is the average health expenditure per month for maternal and neonatal problems?	_____ Amount in Rupees (Aprox.)
66)	Do you smoke? (Type of smoking)	1) Beedi 2) Cigarette 3) Cigar 4) None 5) Others _____
67)	Do you drink alcohol? (Type of drink consumed)	1) Wine 2) Gin 3) Neera 4) Beer 5) Brandy 6) Whisky 7) Rum 8) Othesrs Specify_____
68)	Are you aware of ill effects of smoking?	1) Yes 2) No
69)	Are you aware of ill effects of drinking?	1) Yes 2) No

70)	When you want to go for any medical treatment, which place will you prefer	1) Private 2) Public 3) RMP 4) Traditional
71)	If public hospital is not the first choice the reason?	1) Lack of trust 2) Lack of transport 3) No attendant 4) No health care provider available 5) Others Specify _____

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