

**Summer Training at
National Health Mission, Gujarat**

Assessment of Causes of Infant Death in District Bharuch, Gujarat

**By
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**Under the guidance of
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**MBA Hospital & Health Management
2017-2019**


Institute of Health Management Research
The IIHMR University, Jaipur
2018

CERTIFICATE

This is to certify that **Vertika Jain** has undergone summer training NHM, Gujarat from 2nd April 2018 to 1st June 2018.

The candidate herself completed the project assigned to her during summer training. Her approach to the project was sincere and proactive. This summer training is in partial fulfillment of the course requirement recommended for the award of MBA in hospital and Health Management.

I wish her success in all her future endeavors.



Dr. Seema Mehta

Professor

IIHMR University, Jaipur


for Col. (Dr.) Ashok Kaushik 21.6.18.

Dean (Academic & Student Affairs)

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DATE : 01/06/2018

TO WHOM IT MAY CONCERN

Dr.Vertika Jain has completed her summer training in District Program Management Unit under District Health Society, Health Branch, District Panchayat, Bharuch (Gujarat) from 02/04/2018 to 01/06/2018 under National Health Mission as a “ Summer Trainee ”

During her working tenure within National Health Mission programme she has been sincere, loyal, punctual and hardworking. She is talented, dedicated & focus in her pursuits. She consistently seeks out constructive feed back to improve her work. I am certain that Vertika is going to continue to do great & creative things in her future. If any further queries are to be discussed, you can feel free to contact.

Place: Bharuch

Date : 01/06/2018

**District R.C.H. Officer
District Panchayat Bharuch**

The Certificate is awarded to

Dr. Vertika Jain

In recognition of having successfully completed her

Internship in the department of

**Health and Family Welfare Department Gandhinagar,
At District Bharuch**

And has successfully completed her Project on

**ASSESSMENT OF CAUSES OF INFANT DEATHS IN 3 TALUKAS
OF DISTRICT BHARUCH, GUJARAT**

2nd APRIL 2018 to 1st JUNE 2018

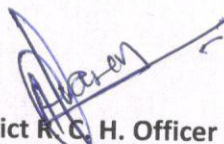
She comes across as a committed, sincere and diligent person

who has a strong drive and zeal for learning

We wish her all the best for future endeavors

Date : 01/06/2018

Place : Bharuch



**District R. C. H. Officer
District Panchayat Bharuch**



**Chief District Health Officer
District Panchayat Bharuch**

Acknowledgments

No project is done alone and cannot be completed without the support of a team.

I would like to take this opportunity to extend my gratitude to Dr. V. S Tripathi (CDHO, Bharuch), Dr. Anil P. Vasava (RCHO, Bharuch), for their advice, support, encouragement, and guidance throughout my training. It would not have been possible to complete this project without the support of Dr Keshav Kumar (THO, Bharuch) who co operated with me continuously. His valuable contribution and guidance have really helped my project.

I owe a whole hearted thanks and appreciation to the DPMU and RBSK team, Bharuch for their unconditional support throughout my training.

I would like to extend my sincere thanks to my mentor Dr. Seema Mehta for her constant support and encouragement that helped me to complete this project. Without her guidance, this work would not have materialized.

Lastly, I wish to thank all the people and colleagues whose insights and experiences have shaped the content of this report.

I hope I can build upon the experience and knowledge that I have gained and make a valuable contribution towards public health in coming future.

(Dr. Vertika Jain)

TABLE OF CONTENT

LIST OF ABBREVIATIONS.....	
LIST OF FIGURES.....	
LIST OF TABLES.....	
1. ABOUT THE ORGANISATION.....	6
2. BACKGROUND.....	10
3. INTRODUCTION.....	11
4. REVIEW OF LITERATURE.....	13
5. AIM.....	15
6. OBJECTIVE.....	15
7. METHODOLOGY.....	15
7.1 STUDY DESIGN AND AREA	
7.2 SAMPLING DESIGN AND SIZE	
7.3 DATA COLLECTION PROCEDURE	
8. FINDINGS.....	16
9. DISCUSSION.....	22
10. SWOT ANALYSIS OF INFANT MORTALITY.....	23
11. INTERVENTIONS	24
12. SUGGESTIONS.....	25
13. REFERENCE.....	26
13. ANNEXURES	

LIST OF ABBREVIATIONS

NRHM	National Rural Health Mission
NUHM	National Urban Health Mission
NHM	National Health Mission
RMNCH+A	Reproductive, Maternal, Newborn, Child and Adolescent Health
PHC	Primary Health Centre
CHC	Community Health Centre
SC	Sub Centre
UHC	Urban Health Centre
DH	District Hospital
RCH	Reproductive and child health
FBNC	Facility-Based Newborn Care
NBCC	Newborn Care Corners
SNCU	Special Newborn Care Units
NBSU	Newborn Stabilization Units
HBNC	Home-based Newborn Care
SAM	Severe Acute Malnutrition
FRU	First Referral Unit
CMTC	Child Malnutrition Treatment Centre
NRC	Nutrition Rehabilitation Centre
IMR	Infant Mortality Rate
DPMU	District Programme Management Unit
CRS	Civil Registration System
PMCC	Program Management Control Committee
ARC	ASHA Resource Centre
PCPNDT	Pre-conception and Pre-natal Diagnostic Technique

LIST OF FIGURES

Fig 1.1. Administrative map of Gujarat
Fig 1.2. District map of Bharuch
Fig 1.3. Health pyramid of Bharuch
Fig 8.1 Number of infant deaths occurring in APL or BPL family according to sex
Fig 8.2 Time pattern of infant death
Fig 8.3 Place of death and birth
Fig 8.4 Causes of death in accordance with sex.
Fig 8.5 Number of deaths vis a vis number of ANC visits taken during pregnancy
Fig 8.6 High-Risk Status (in %)
Fig 8.7 Timing of the breastfeeding to the infant
Fig 8.8 Type of birth attendant (in %)
Fig 8.9 Number of deliveries in APL or BPL family by type of birth attendant
Fig 8.10 Place of delay according to respondents (in %)

LIST OF TABLES

Table 1.1 Demographic indicators of Gujarat and Bharuch
Table 1.2 Health indicators of Bharuch
Table 3.1 Taluka wise infrastructure information
Table 8.1 Crosstab of place of death and birth place
Table 8.2. Cause of neonatal deaths

ABOUT THE ORGANISATION

NATIONAL HEALTH MISSION

National Rural Health Mission (NRHM) started its journey on April 12, 2005, with the idea to provide quality healthcare that is accessible and affordable to the rural population of the country.

Another component, National Urban Health Mission (NUHM), was launched on May 1, 2013, with the mission to meet the healthcare needs of the urban population focusing more on the urban poor.

NHM, with both its sub-components, is focusing on health system strengthening, RMNCH+A and communicable and non-communicable diseases.

VISION

Attainment of Universal access to equitable, affordable and quality healthcare services, accountable and responsive to people's need, with effective inter-sectoral convergent action to address wider social determinants of health.

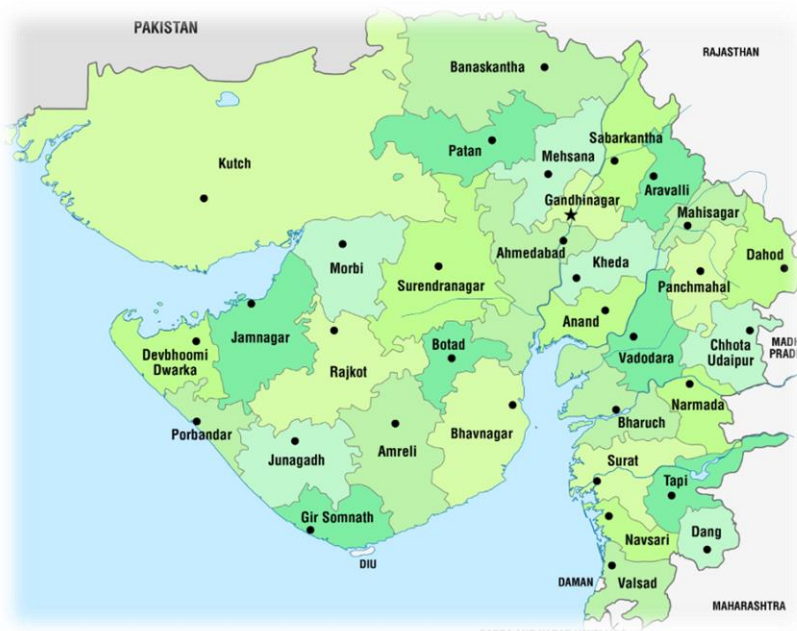


Fig.1.1
Administrative
map of
Gujarat

Bharuch is a district that comes in the southern part of Gujarat and comes under Vadodara region. The district is surrounded by Narmada district in the east, Gulf of Khambhat in the west. The northern boundary is made by Vadodara District while Surat district covers the southern part.

DEMOGRAPHIC PROFILE OF GUJARAT AND BHARUCH

Indicator	Gujarat	Bharuch
Total Population (Census 2011)	60439692	1551019
Crude Birth Rate	21.8	21.66
Crude Death Rate	6.7	6.8
Natural Growth Rate	19.17	13.14
Sex Ratio (census 2011)	919	924
Child Sex Ratio (census 2011)	890	920
Total Literacy Rate (%) (Census 2011)	79.31	81.51

Table 1.1. Demographic indicators of Gujarat and Bharuch

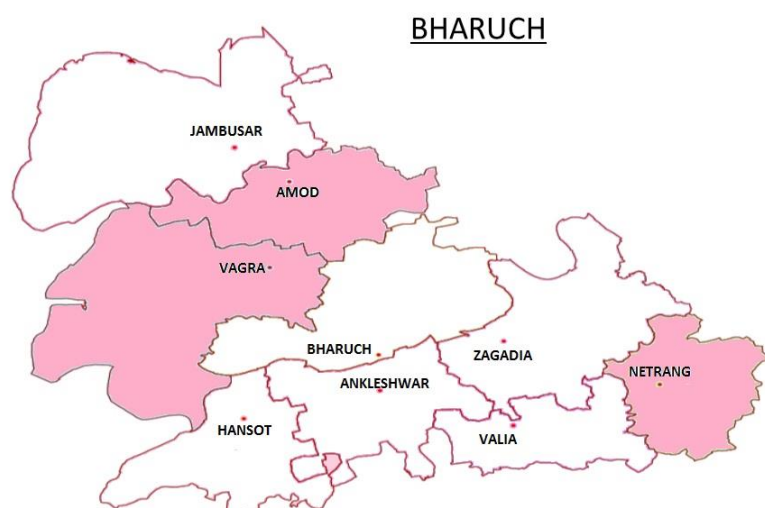


Fig.1.2
District map
of Bharuch

HEALTH PROFILE OF BHARUCH

Post-independence, India built its health model as a nationwide network of effective and efficient health services based on primary health care approach. Keeping rural India as the primary point of concern, the services were laid out in a pyramid shape. The Bharuch, Gujarat health model follows the same approach.

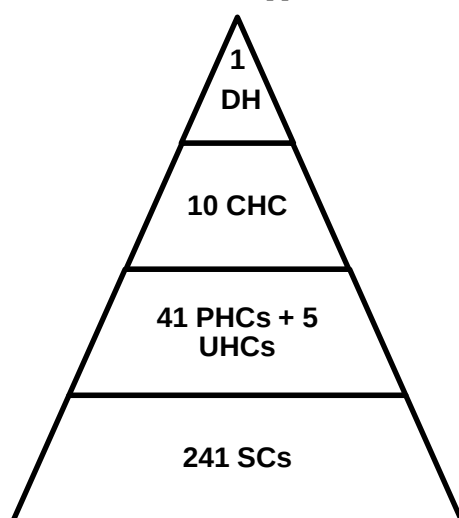


Fig 1.3 Health pyramid of Bharuch

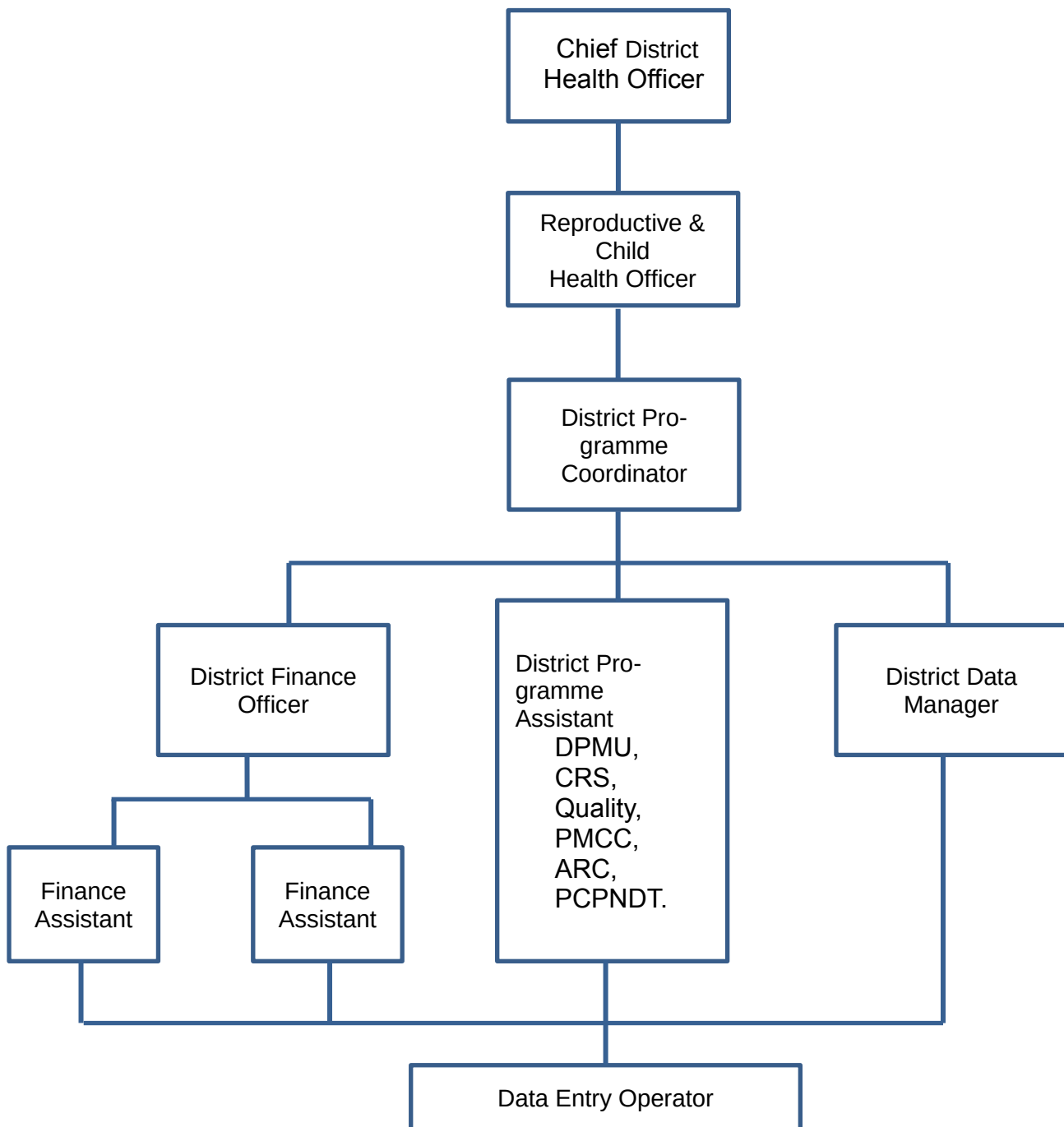
HEALTH INDICATOR STATUS, BHARUCH

S.NO	INDICATOR	2012-13	2017-18
1	Infant Deaths	332	513
2	Maternal Deaths	19	21
3	Under-five Children Deaths	57	513
4	Institutional Deliveries (In %)	91.73	99.90
5	Public Institutional Deliveries (In %)	37.72	42
6	Full Immunization (In %)	90.39	100

Table 1.2. Health indicators of Bharuch

Source: DPMU, Bharuch

ORGANOGRAM OF NHM, Gujarat (DPMU)



BACKGROUND

The reproductive and child health programme was conceived on October 15, 1997, with the major aim of reducing IMR, MMR and child mortality rates. The programme had both successful and failed outcomes.

The RCH programme entered its second phase in April 2005 with the same objectives and further additions like i) reduction in total fertility rate and unmet needs for birth spacing, ii) improving coverage for institutional delivery and childhood immunization and iii) increasing use of contraceptives.

The child health program amalgamates interventions that help in better child survival and acknowledge factors that contribute to child and infant deaths. Along with continuum of care, ensuring the availability of critical care at all possible levels has been a strategy of the programme. Interventions like Facility Based Newborn Care (FBNC), Newborn Care Corners (NBCC), Special Newborn Care Units (SNCUs) and Newborn Stabilization Units (NBSUs) have further been implemented to strengthen the child health.

The major thrust areas of child health programme are

1. Neonatal care
 - Newborn care unit at delivery points
 - FBNC
 - HBNC
2. Nutrition
 - Promotion of feeding habits
 - Supplementary nutrition including vitamins
 - SAM child management
3. Management of childhood illness
4. Immunisation programme

INTRODUCTION

The child and infant mortality can safely be assumed as an indicator of the quality of life and development of a country, thereby making the reduction of child mortality an important thrust area in the healthcare industry. Socio-economic conditions, biological and environmental factors, quality of healthcare and cultural norms have a remarkable role in child mortality. Healthcare in India has various delivery platforms through national and international organizations.

Low birth weight, premature birth, birth injury/difficult labor, Sepsis, and congenital anomalies have been suggested as the major causes of neonatal deaths by various studies while diarrheal disease, respiratory disease, and infections top the list for post-neonatal or infant deaths. The key observation here is that most of these causes are avoidable if proper maternal care, delivery care, and postnatal care are done. Interventions like delivery by a skilled doctor, well-equipped facility, vaccinations, tracking high-risk mothers and providing them with ANC and PNC regime etc. can surely help in further reducing the IMR.

The 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. Neonatal deaths can be further classified into
i) early neonatal death (death within first seven days of life) and
ii) Late neonatal death (after seventh but before the 28th day of life)

Infant mortality rate is defined as the number of deaths of children during the first year of life per 1000 live births in a given year.¹

According to Census 2011, children of age 0-6 contribute to approximately 13 percent of the total population of India and around 12.7 lakh of them die within five years of age. Amongst this, 81 percent deaths (10.3 lakh) happen within one year of birth. Furthermore, 57 percent of these under-five deaths (7.4 lakh) happen within the first month of birth.

The IMR of Gujarat is 30, the early neonatal mortality rate is 16, and late neonatal mortality rate 5, the post-neonatal mortality rate is nine against India's 34, 20, 6, and 13 respectively.²

¹ World Health Organisation

² SRS 2016

TALUKA WISE INFRASTRUCTURE INFORMATION

INDICATOR	TALUKAs		
	AMOD	ANKLESHWAR	BHARUCH
Population	93819	315596	452517
No of VILLAGES	53	60	96
No of CHCs	1	1	1
No of PHCs	3	5	6
No of SCs	17	25	34
No of 24 x 7 PHCs	0	2	2
No of FRUs	0	0	1
No of CMTC/NRC	1	1	2
No of NBSU/SNCU	0	0	1
No of NBCC	21	31	41
No of KHILKHILAHAT	1	0	2
No of 108	2	2	2

Table 3.1. Taluka wise infrastructure infor-

REVIEW OF LITERATURE

Out of the 6.3 million under-five child deaths that occur globally annually, about 44% occur in the neonatal period. Millennium Development Goal 4, which requires a reduction of two-thirds in the under-five mortality rate by 2015, cannot be achieved without a substantial reduction in the neonatal mortality rate (NMR).³

Approximately 1.44 million infant and 9,40,000 neonatal deaths occurred in India during 2007. More than 60% of these Under 5 child deaths occurred in five states: Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan and Andhra Pradesh. The children living in rural areas, in the central Indian states, in the lowest 20% of wealth index have the highest risk of death in India.⁴

In a district hospital in Himachal Pradesh, India, 96% of neonates were admitted with the clinical diagnosis of septicemia or pneumonia. Similarly, 82% of neonates admitted to a sub-district hospital had septicemia, pneumonia, meningitis, or cellulitis as the main diagnosis. The probable reasons for such a high proportion of deaths due to infections in our study were poor hygiene in rural homes, a high proportion of reproductive tract infections in mothers, 42% of neonates being LBW, and the traditional custom of not breastfeeding for the first 3 days, thus depriving the baby of colostrum.⁵

The infant mortality rate in Gujarat in NFHS-4 is estimated at 34 deaths. The infant mortality rate in rural areas (39 deaths per 1,000 live births) is higher than in urban areas (27 deaths per 1,000 live births).⁶

Exposure to particulate matter like active and passive smoke that leads to respiratory vulnerability may result in low birth weight, intra-uterine growth restriction, and preterm birth.⁷

³ (Sankar, M J, C K Natarajan, R R Das, R Agarwal, A Chandrasekaran, and V K Paul.)

"When do newborns die? A systematic review of timing of overall and cause-specific neonatal deaths in developing countries", *Journal of Perinatology*, 2016.

⁴ Chandrakant Lahariya. "Causes of Child Deaths in India, 1985–2008: A Systematic Review of Literature", *The Indian Journal of Pediatrics*, 10/06/2010.

⁵(*Journal of Perinatology*, volume25, pagesS29–S34 (2005).
Doi:10.1038/sj.jp.7211269)

⁶ NFHS 4

The exact reason of deaths of neonates in developing nations is unknown but it is proposed that pneumonia, tetanus, and diarrhea are the major defaulters. Numerous factors contribute to such high incidence of infections and consequent mortality. These include immediate causes such as lack of antenatal care, unsupervised or poorly supervised home deliveries, unhygienic and unsafe delivery practices and cord care, prematurity, low birth weight, lack of exclusive breastfeeding, and delays in recognition of danger signs in both mother and baby. Underlying factors such as health system inefficiencies, infra-structural, logistic, or economic constraints also contribute to high rates of infection and infection-associated mortality.⁸

Not only medical but also many social causes and delays result in a child death. These social delays include (i) Delay in recognition of the seriousness of the problem; (ii) Delay in taking the decision to seek appropriate care; (iii) Delay in arranging transport/money to reach the nearest health facility and (iv) Delay in receiving appropriate care at the health facility. Hence, for effectively addressing child mortality through appropriate Behaviour change Communication strategies, medical and social causes need to be viewed and addressed together.⁹

⁷ (James M Tielsch, Joanne Katz, Ravilla D Thulasiraj, Christian L Coles, S Sheeladevi, Elizabeth L Yanik, Lakshmi Rahmathullah). Exposure to indoor biomass fuel and tobacco smoke and risk of adverse reproductive outcomes, mortality, respiratory morbidity and growth among newborn infants in south India, *International Journal of Epidemiology*, Volume 38, Issue 5, 1 October 2009, Pages 1351–1363

⁸ (The Pediatric Infectious Disease Journal: January 2009 - Volume 28 - Issue 1 - p S3-S9. doi: 10.1097/INF.0b013e3181958755)

⁹ (Nandan D, Misra S K, Jain M, Singh D, Verma M, Sethi V). Social Audits for Community Action: A tool to Initiate Community Action for Reducing Child Mortality. *Indian J Community Med* 2005;30:78-80

ASSESSMENT OF CAUSES OF INFANT MORTALITY

AIM:

To assess the causes of infant deaths to implement appropriate infant survival interventions in district Bharuch of Gujarat

OBJECTIVES:

- To assess the causes of infant mortality in three talukas of Bharuch district.
- To design the interventions to prevent the infant deaths.

METHODOLOGY:

STUDY DESIGN AND AREA: A retrospective, quantitative study was done for three months (January 2018- March 2018) in three talukas i.e. Amod, Ankleshwar and Bharuch of District Bharuch, Gujarat. A tool was developed and tested in the field. Finally, a verbal autopsy was conducted at all the households where an infant death was recorded in the study period.

SAMPLING TECHNIQUE AND SIZE: Due to time constraint, three talukas out of nine in district Bharuch were randomly selected for the study. A purposive sampling was done and 44 deaths were tracked that happened during the study period.

DATA COLLECTION PROCEDURE: A complete list of infant deaths in the period of three months that happened in the three Talukas (Bharuch, Amod, and Ankaleshwar) was collected from DPMU, Bharuch. The primary quantitative data was collected through verbal autopsy tool that was designed in consultation with the Reproduction and Child Health Officer, Bharuch. The consistency of the infant age, cause of death, place of death etc. were cross verified with the data registered in DPMU. The in-depth interview was conducted with the family member of the deceased.

FINDINGS

Figure 8.1 shows that 34 percent of infants belonged to APL family while the rest of them were of BPL families. Amongst them, the number of female deaths is almost 2.5 times (21) than the male deaths (8) in the BPL families, while the male deaths are higher in APL families.

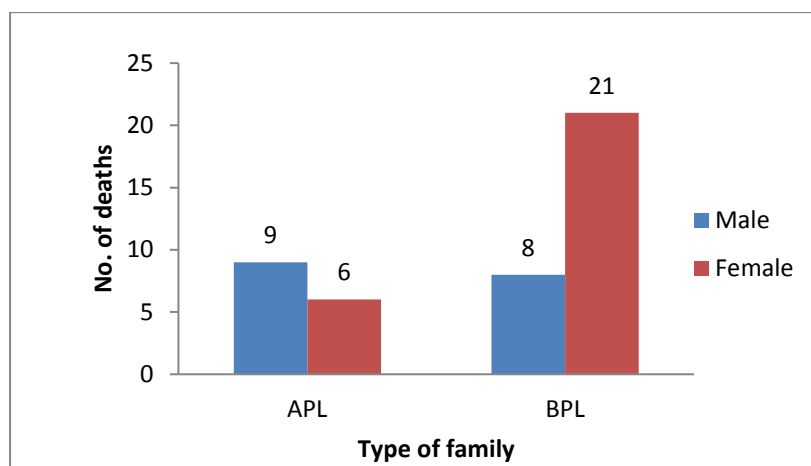


Fig.8.1
Number of infant deaths occurring in APL or BPL family according to sex .

Figure 8.2 indicates that 16 percent of deaths occurred within twenty-four hours of delivery while 30 percent of them were early neonatal deaths. Twenty-nine percent were unable to survive for a month and one-fourth of the infants i.e 25 percent lost their lives after the 1st month but before one year.

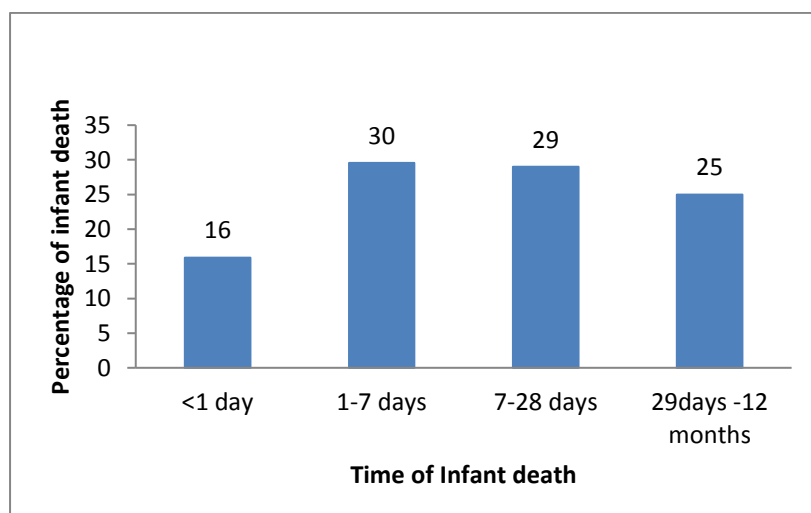


Fig.8.2
Time pattern of infant death

Place of death and the birth place of all recorded infant deaths is shown in table 8.1. Almost 95% deliveries were institutional with only 5 % that happened in transit. Sixty seven percent infants were whose birth place and death place was same i.e. health facility. Additionally, around 21% of neonatal deaths with the birth place as hospitals had occurred at home while 12% had occurred in transit.

Birth-place	Death Place			
	Home	In transit	Hospital	Total
In transit	1	1	0	2
Hospital	9	5	28	42
Total	10	6	28	44

Table 8.1. Crosstab of place of death and birth place

In addition, figure 8.3 indicates that though all the deliveries were institutional but a little less than one-fourth deaths happened at home. Additionally, it can also be noted that though the deliveries were more in the public health facility, deaths occurred more in private. This may suggest that the first choice for the delivery is a public hospital but for the treatment either private hospital is preferred or the patient is referred to it.

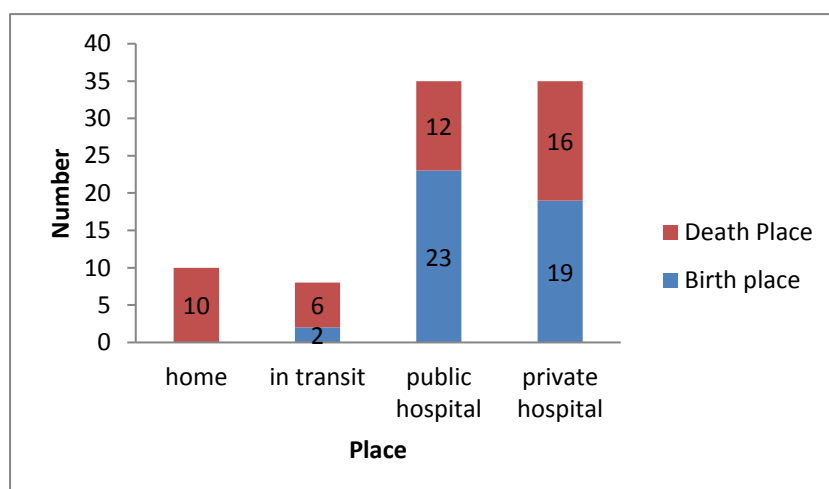


Fig.8.3
Place of death
and birth

Table 8.2 suggests that among major causes of infant deaths, Low birth Weight stands out with a share of 50 percent and it is preventable. Further, one-fourth infants lost their life to respiratory diseases, almost 8 percent died of congenital deformities while around 7 percent suffered some kind of head injury. Aspiration, leukemia, jaundice etc were recognized as other causes of infant deaths. Figure 8.4 gives a picture of the cause of death with respect to the sex of the child.

Disease	Number	Percentage
Respiratory diseases	11	25
Birth asphyxia	4	
Pneumonia	7	
Congenital diseases	5	11.3
Low birth weight	23	52.3
Head injury/ hemorrhage	3	6.8
Leukemia	1	2.3
Jaundice	1	2.3

Table 8.2. Causes of neonatal deaths

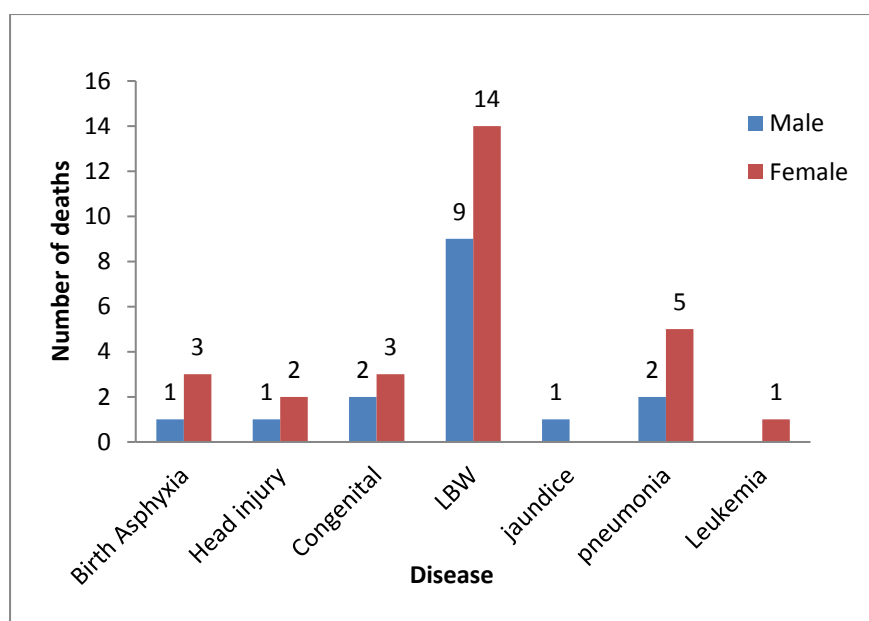


Fig.8.4
Causes of death
in accordance to
sex.

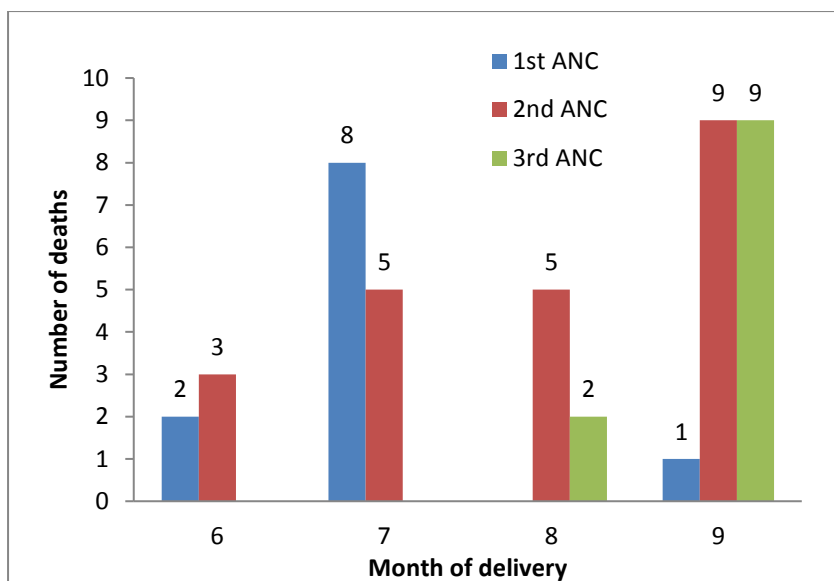


Fig.8.5
Number of
deaths vis a vis
number of ANC
visits taken
during pregnancy

Figure 8.5 exhibits the number of ANC visits taken by the mother and month of delivery with respect to a number of deaths. Out of 44, 19 infants were born at the completion of 9 months, but for 39 of them, mothers completed their 2nd trimester. Only 23% mothers had taken all the three ANC visits. But half of them (50 percent) had taken two visits.

Figure 8.6 suggests that more than half i.e 57 percent of the mothers were under high-risk category.

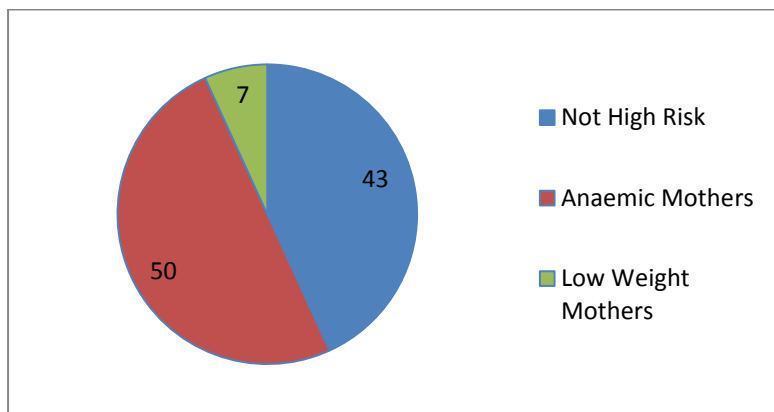


Fig.8.6
High Risk Status
(in %)

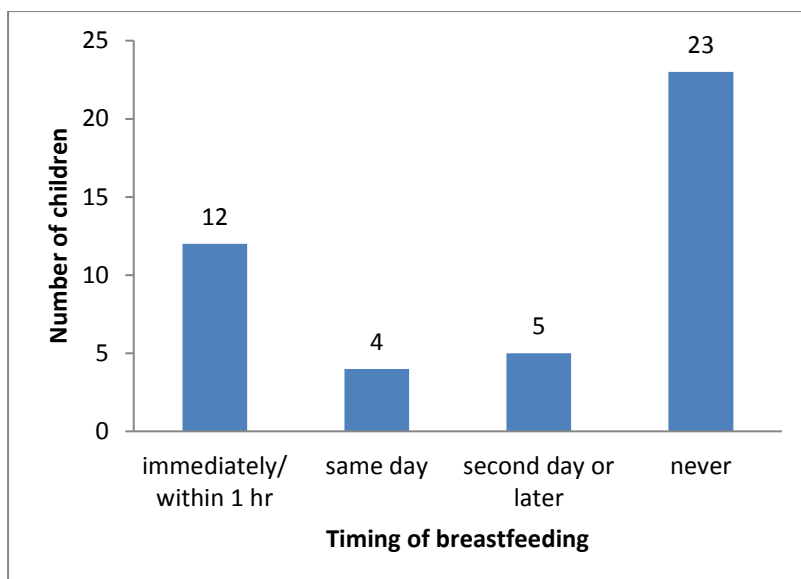


Fig.8.7 Timing of the breastfeed-
ing to the infant

Figure 8.7 tells about the breastfeeding habits of the respondents. A little more than half of the infants were never breastfed while only a little more than one-fourth were breastfed within 1 hour of birth. A small measure i.e. 9 percent was breastfed the same day followed 11 percent that was breastfed on the second day or later.

This causes a major concern over the exclusive breastfeeding of the infants and its role in reducing infant mortality.

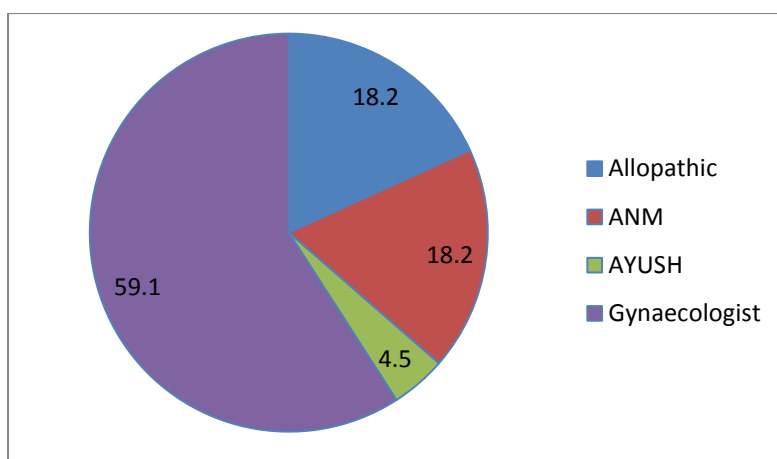


Fig.8.8
Type of birth
attendant (in %)

Figure 8.8 gives a picture of the type of birth attendant present at the delivery. Only 59 percent deliveries were conducted by gynecologist followed by around 18 percent each by Allopathic doctors and ANMs. This shows lack of gynecologists at the facility level in Bharuch.

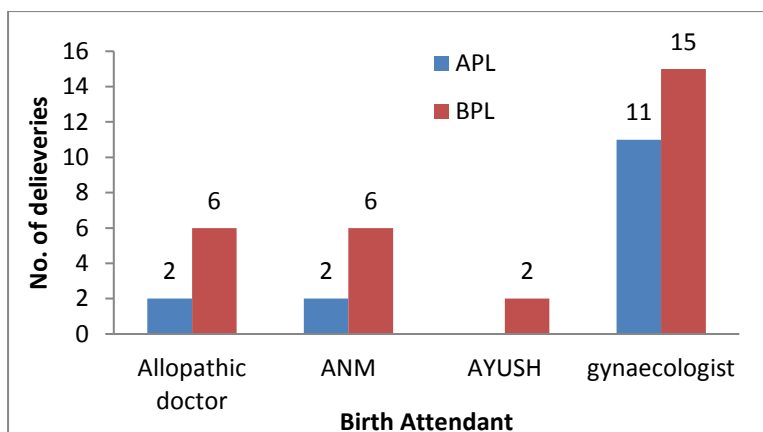


Fig.8.9
Number of deliveries in APL or BPL family by type of birth attendant

Furthermore, figure 8.9 gives an idea of deliveries conducted by the type of birth attendant with respect to family status. 11 out of 15 births in the APL families were assisted by a gynecologist in comparison to BPL where only 15 out of 29 were assisted by gynecologists.

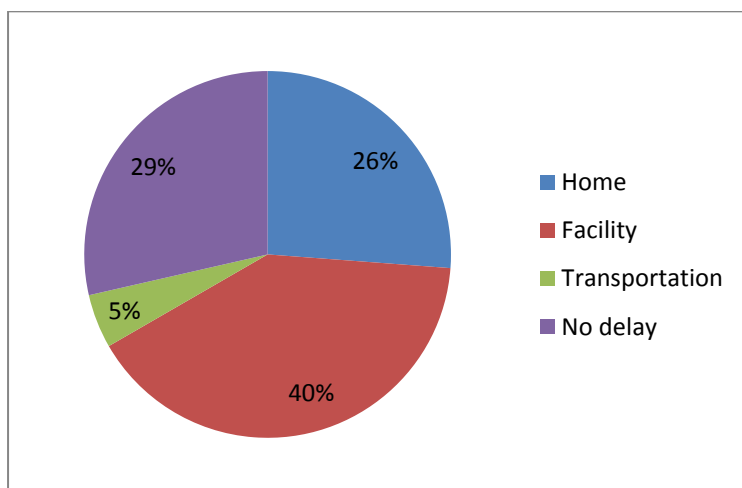


Fig.8.10
Place of delay according to respondents (in%)

Additionally, on interviewing the respondents, it was seen that almost 40 percent believed that their child could have been saved if the facility was well equipped while a more than one fourth said that the delay was at the home level. Five percent believed that lack of transportation was to be blamed while a little less than one third said that there was no delay in terms of facility, transportation or home.

DISCUSSION

This study has been done to assess the causes for infant deaths in the district Bharuch and suggest interventions to bring the IMR down. According to the study, the number of deaths in the BPL population was almost twice as that in the APL population which can be accounted to the socio-economic and cultural factors. The institutional deliveries were almost 95 percent and hospitals were a place of death for around 67 percent raising a concern for the quality of care given to the newborn child. Though the rate of high-risk mothers was more than half, yet ANC wasn't done properly. Majority of deaths (30 percent) occurred in first seven days of birth followed by deaths within one month of age (29 percent). Seventy-five percent infant deaths occurred within first 28 days of birth. A major cause of death was found to be low birth weight and preterm babies which is preventable by timely ANC checkups and corticosteroid administration. According to the findings, the majority of women did not receive timely antenatal care services, although there were ASHAs and community workers in the villages. The current system needs to focus more and intervene on the healthcare services during the ANC and PNC period to reduce the burden of infant deaths.

Just about 59 percent deliveries were done by the gynecologist. This percentage further drops for the BPL population. The many cases of neonatal deaths in the hospitals due to preterm delivery shed light on the incompetence of hospital-based services to deliver required treatment to increase the survival chance of the neonates. Imbalanced health provider and factors like unavailability of doctor and lack of infrastructure acted as an added cause of neonatal death. A trained person in resuscitation should also be available at the health facilities.

More than half of the infants were never breastfed which points out the gap in giving the expressed breast milk to the infant. Almost 40 percent respondents believed that the child died due to delay in facility indicating lack of infrastructure at the PHC and CHC level on observing, it was also found that most of the children were referred twice, causing wastage of time in transportation, calls for a serious intervention.

The observer also noted lack of remorse within mothers which led to casual attitude and lack of urgency in child health care. So proper counseling sessions can be conducted to build a strong mother-child bond.

SWOT ANALYSIS OF INFANT MORTALITY IN BHARUCH

STRENGTH

- Full immunization
- Kasturba Poshan Sahai Yojna
- Bal Sakha Yojna
- Better HBNC since four years
- Trust Hospitals like Sewa Rural and Jayaben Modi Hospital
- Reporting system i.e. E-MAMTA

WEAKNESS

- SNCU at District Hospital is under construction
- NRC at District Hospital is underdeveloped
- Low follow up of infant health
- Delay at facility level due to lack of a regular pediatrician
- Lack of breastfeeding
- Bal Sakha Yojna only for BPL

OPPORTUNITY

- Strengthen the SNCU and NRC
- Strengthen the available facilities
- Strengthen the ASHAs and ANM better in terms of their responsibilities
- Technological advances like TECHO+

THREATS

- Illiteracy and low socio-economic status
- Under-reporting and lack of follow up of the migratory population
- Myths among people and non-compliance
- Tobacco and smoking prevalence in the population

INTERVENTIONS

The following interventions may be taken into consideration to reduce the infant mortality rate in district Bharuch.

For preterm babies and high-risk mothers

- Strengthen the coverage rate of screening of both high-risk infant and mother. This can be done in a 2 tier system. First by ASHA workers followed by the Medical officers and RBSK team.
- Strict follow up of High-Risk Mothers by the medical staff at the PHCs
- Early ANC detection and increase in the percentage of ANC registration at all Taluka level
- Appointing a regular Paediatrician at the facility level

For a good infant care

- Strengthening of RBSK team by regular training and knowledge assessment of the staff
- Strengthening of NBCC at all delivery points by ensuring the availability and maintenance of infrastructure.
- Strengthening of HBNC coverage by ensuring that the kits are delivered to the families
- Skilled personal for neonatal resuscitation and diagnosis which will help in timely referral and treatment

SUGGESTIONS

- A better reporting for the industrial area should be done.
- Some counseling measure should be taken to aware the mother regarding her and her child's health because it was observed that the mothers were not too sorry for the deaths of their children.
- The older women of the village can be counseled to further motivate the pregnant ladies to be conscious of her child's well being.
- Community participation can help in a great deal.
- Improving the infrastructure at PHC level and sensitizing ASHA workers.
- Education and encouragement sessions for the employees related to Mother and child-care should be kept timely.

Awareness is the key to reduce the infant mortality rate in Bharuch

REFERENCES

SRS 2016 data
Data from DPMU, Bharuch
censusindia.gov.in
Pubmed
NHM website

ANNEXURE I

INFORMED CONSENT FORM

Assessment of causes of infant death and interventions in the Bharuch and Ankaleshwar Taluka of Bharuch District, Gujarat.

My name is Dr. Vertika Jain and I am from IHMR University, Jaipur. I am conducting a research to learn about the causes of infant death in the district Bharuch of Gujarat state. If you have lost your child before he/she reached his/her first birthday, I humbly request you participate in this research study.

Your participation in this research study will require approximately 15-20 minutes of your time and involves answering survey questions about the mother's and child's health. This is a brief, anonymous survey. Participation in this research study is voluntary. You may withdraw at any time or decline to answer any question you choose. You will not be identified in the study.

Proceeding to the survey and answering the questions will serve as your consent to participate in the research study. If you have any questions regarding this research, feel free to ask Dr. Vertika Jain, MBA Health, and Hospital Management, Jaipur. Contact no. 9198336465.

Signature of the interviewer

Signature of the interviewee

ANNEXURE II
QUESTIONNAIRE

I. Background Information

1. Name of the Child :
2. Date of Birth (if available)
3. Age (in completed months)
4. Sex: Male (1) Female (2)
5. Name of the mother :
6. Address:
7. Name of Area PHC
8. Name of Area Sub-centre
9. Order of Birth: 1 2 3 4 5 or more
10. Where was s/he born?
 1. Home
 2. On way
 3. Sub Centre
 4. PHC/CHC/RH
 5. DH
 6. Medical College
 7. Private Hospital
 - 8.. Other, Specify.....
 9. DNK
11. Does the family have a Below Poverty Line (BPL) card: Yes (1) No (2)
12. Immunization Status (as per Mamta card)
 - 1.BCG
 - 2.DPT 1
 3. DPT 2
 4. DPT 3
 5. Measles
 - 6.HiB 1
 7. HiB 2
 8. HiB 3
 9. Measles Booster
13. Weight at birth (if recorded in the MCP card): Kg
14. Growth Curve (check MCP card):
 - a. Green zone
 - b. Yellow Zone
 - c. Orange Zone
15. Date of Death:

II. Verbal Autopsy Form: Infant Deaths

Name of the respondent

Relationship of the respondent with the deceased:

- | | | |
|----------------------------|--------------------|-------------------------|
| 1. Brother/Sister | 2. Mother/Father | 3. Neighbor/No relation |
| 4. Grandfather/Grandmother | 5. Other relatives | |

1.1. Did the child meet with an accident? Yes (1) No (2)

1.2. If yes, what kind of injury or accident?

- | | | |
|-------------------------|---------------------|---------------------|
| a. Road traffic injury | b. Fall | c. Fall of objects |
| d. Burns | e. Drowning | f. Poisoning |
| g. Bite/sting | h. Natural disaster | i. Homicide/assault |
| j. Other, Specify _____ | | |

1.3. Do you think the child died from an injury or accident? Yes (1) No (2)

Details of pregnancy and delivery:

2.1 How many months long was the pregnancy? (in completed months)

2.2 Mother's age:

2.3 Were there complications during the pregnancy or labor? Yes (1) No (2)

2.4 If yes, what complication(s) occurred? (Check all that apply)

1. Mother had fits
2. Excessive (more than normal) bleeding before/during delivery
3. Water broke one or more days before contractions started
4. Prolonged/difficult labor (12 hours or more)
5. Operative delivery (C - Section)
6. Mother had fever
7. The baby had the cord around the neck
8. Instrumental Delivery/Assisted
9. DNK

3. Who attended the delivery?

1. Untrained traditional birth attendant 2. The trained traditional birth attendant
1. ANM/Nurse 4. Allopathic Doctor 5. Other, Specify.....

6. DNK

4. Was it a live/stillbirth: Live birth (1) Stillbirth (2)

Details of the baby after birth

5. Were there any bruises or signs of injury on child's body after the birth?

Yes (1) No (2) DNK (3)

6. Did baby had any visible malformations at birth?

Yes (1) No (2) DNK (3)

7. When was the baby first breastfed?

1. Immediately/within one hour of birth 2. Same day child was born
3. Second day or later
4. Never breastfed (go to section III)
5. DNK

8. Was the baby ever given anything to drink other than breast milk?

Yes (1) No (2) DNK (3)

8.1. If yes what was given (specify) _____

III A Neonatal Death (0-28 days)

Details of sickness at the time of death

1. Did baby had fever?

Yes (1) No (2) DNK (3)

2. Did baby have any difficulty in breathing?

Yes (1) No (2) DNK (3)

3. Did baby have diarrhea (frequent liquid stools)?

Yes (1) No (2) DNK (3)

4. Did baby have spasms or fits (convulsions)?

Yes (1) No (2) DNK (3)

5. Did baby become unresponsive or unconscious?

Yes (1) No (2) DNK (3)

6. Were the child's hands, legs or lips discolored (blue, other color)?

Yes (1) No (2) DNK (3)

Interviewer's Signature:

Interviewer Name:

Date:/...../.....

Assigned cause of death*

III B: Post-Neonatal Death

Details of sickness at time of death

1. Did the child had fever?

Yes (1) No (2) DNK (3)

1.1. Was the fever accompanied by chills/rigors?

Yes (1) No (2) DNK (3)

2. Did the child have convulsions or fits?

Yes (1) No (2) DNK (3)

3. Was the child unconscious during the illness that led to death?

Yes (1) No (2) DNK (3)

4. Did the child develop stiffness of the whole body?

Yes (1) No (2) DNK (3)

5. Did the child have a stiff neck (demonstrate)?

Yes (1) No (2) DNK (3)

6. Did the child have diarrhea (more frequent or more liquid stools)?

Yes (1) No (2) DNK (3)

7. Was there blood in the stools?

Yes (1) No (2) DNK (3)

8.1 Did the child have a cough?

Yes (1) No (2) DNK (3)

8.2. If yes, for how many days?

a. < 1 day b..... Days

8.3 If yes, was there blood?

Yes (1) No (2) DNK (3)

9. Did the child have breathing difficulties?

Yes (1) No (2) DNK (3)

10. During the illness, did child have abdominal pain?

Yes (1) No (2) DNK (3)

11. Did the child have abdominal distention?

Yes (1) No (2) DNK (3)

12. Did the eye/skin colour change to yellow

Yes (1) No (2) DNK (3)

13. Was the rash all over the body?

Yes (1) No (2) DNK (3)

14. Was this measles (use local term)?

Yes (1) No (2) DNK (3)

15. During the weeks preceding death, did the child become very thin?

Yes (1) No (2) DNK (3)

16. During the weeks preceding death, did the child have any swelling of hands, feet or abdomen?

Yes (1) No (2) DNK (3)

17. Compared to other children of the same age, was child growing normally?

Yes (1) No (2) DNK (3)

18. Did the child have multiple illnesses?

Yes (1) No (2) DNK (3)

19. If yes, what were the symptoms associated with these illnesses? (Check all that apply)

- | | | |
|----------|-------------|------------------------|
| 1. Cough | 2. Diarrhea | 3. Ear discharge |
| 4. Fever | 5. Rashes | 6. Other, Specify..... |
| 7. DNK | | |

Interviewer's Signature:

Interviewer Name:

Date:/...../.....

Assigned cause of death*

IV. Treatment

1. Any h/o illness/injury: Yes (1) No (2) DNK (3)

2. If yes, nature of the illness

3	Symptoms of illness	Circle the correct response
A	Inability to feed	Yes No
B	Fever	Yes No
C	Loose stool	Yes No
D	Vomiting	Yes No
E	Fast breathing	Yes No
F	Convulsions	Yes No
G	The appearance of Skin Rashes	Yes No
H	Injury (like fractures, wounds)	Yes No
I	Any other symptoms	

4.1 Treatment of illness was taken? Yes (1) No (2) DNK (3)

4.2 If yes, where was the child treated:

1. Public Health Facility: PHC CHC DH SDH/Taluq Hospital
2. Private Hospital/Nursing Home
3. Qualified allopathic private practitioner
4. AYUSH practitioner
5. Unqualified provider (quack, informal provider)
6. Traditional healer

4.3 What is the distance from your house to the health facility?

4.4 After how much time was the treatment provided?

5. Was the child referred to another health facility? Yes (1) No (2)

5.1 If yes, where?

6. Did you take the child to the referral facility? Yes (1) No (2)

6.1 If no, why?

7. Place of death:

- | | | |
|---------------------|------------------------|--------------------|
| 1. Home | 2. On way | 3. Sub Centre |
| 4. PHC/CHC/RH | 5. DH | 6. Medical College |
| 7. Private Hospital | 8. Other, Specify..... | 9. DNK |

Section B. Probable cause of death:

- | | | |
|--------------------------|-----------------------------------|---------------|
| 1. Diarrhea | 2. Pneumonia | 3. Malaria |
| 4. Measles | 5. Septicaemia (Infection) | 6. Meningitis |
| 7. Injury | 8. Any other cause (specify)..... | |
| 9. No identifiable cause | | |

Section C. According to the respondent (parent, close family member), what was the cause of death?

Section D. At which level do you think the delay occurred?

1. Delay at home (eg; the seriousness of illness not recognized, treatment not sought, treatment sought at a late stage, family members did not allow treatment seeking)
2. Delay in transportation (eg; transport facility not available, could not afford local transport, difficult/hilly terrain, long distance to the health facility)
3. Delay at facility level (eg; doctor/staff not available, drugs & equipment not available, delay in initiation of treatment)

Section E. Based on your analysis of the situation in which the death took place, what according to you could have been done to avert this death?

1.

2.

3.

Signature.....

ANNEXURE III

CASE STUDIES

CASE 1

A resident of Parkhet Village of Bharuch, Nitaben was blessed with a baby girl Hetal (weighing 3.2 kg) on the 4th day of September 2017 in the District Hospital of Bharuch. Hetal was the third girl child born to Nitaben who came from a BPL family and was diagnosed with sickle cell anemia during her ANC visits. On interviewing the family, it was found that the baby post discharge showed seizure-like symptoms. So the family took her to a private hospital (Khushboo hospital) where she was treated for 5 days. Post the treatment, the child was growing normally with respect to her age. Reportedly she again got sick and had a cough on the 8th day of March 2018. Nitaben took her to a private allopathic doctor who advised her cetirizine syrup and a decongestant. On the 10th day of March 2018, Nitaben took her to the Derol PHC for polio vaccination. The child had fever post vaccination and the mother told that the cough aggravated after that. The family decided to take the child to the hospital on the 13th day of March but she passed away in the night of 12th day of March 2018.

According to the Sarpanch and family, the child got infected after the vaccination process due to which she lost her life which could have been a possibility as “adverse event following immunization (AEFI)” but seems unlikely because no other such case was reported in the PHC.

CASE 2

Shakuntala, 25, gave birth to twin babies in the ambulance on December 26, 2017, while she was rushed to the nearest public health facility of Derol. Soon after delivery she was admitted and was under the care of doctors with her neonates. The twins (a girl and a boy) were full term babies but had low birth weight 1200gms and 1500gms respectively. The children were in the incubator for 48 hours and were discharged on December 28, 2017. They were given mother's feed after 28th December. The girl had shown no symptoms of illness but the boy had difficulty in feeding from the 7th day of birth. On the night of January 5th the girl died at home and the parents called 108 to take the boy to the hospital, but he too lost his life in transit.

On checking the medical file of the infants to further understand the reason of death, it was found that it was discharge against medical advice. The children were very weak and also had septicemia. The hospital strongly recommended them to be kept in the hospital but parents partly due to finances and partly due to their hesitation refused for the same. On asking further, the mother told that this was her second pregnancy, and her older son expired a year back at the age of one due to some disease. Also the mother, in spite of the counseling, was planning her third pregnancy.