

**IDENTIFYING AND ADDRESSING STRUCTURAL BARRIERS TO NEONATAL  
MORTALITY RISK AND HOME DELIVERY AMONG TRIBAL POPULATION IN  
SHAHDOL DISTRICT, MADHYA PRADESH**

Dissertation Submitted to



**The IIHMR University, Jaipur**

for the partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

By

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Under the Supervision and Guidance of

Dr. Seema Mehta

2024

Ref.no IHAT/ADMIN/BPL/ 65

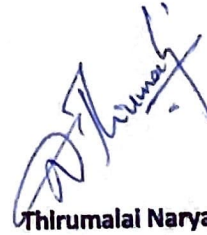
Date:- 01-07-2024

**Certificate of Successful Completion of Internship****To whomsoever it may concern**

**Ms. Suramya Nair** has completed her Internship in Madhya Pradesh Innovation Hub at IHAT, Bhopal, in the period 1<sup>st</sup> April, 2024 to 30<sup>th</sup> June, 2024.

During her internship, she worked with the Shahdol team, and her project was "Identifying and addressing structural barriers to Neonatal Mortality Risk and Home Delivery among Tribal Population in Shahdol District, Madhya Pradesh"

We wish her success in her future endeavors.



**Thirumalai Naryanam**

**State Program lead (MPIH )**

**India Health Action Trust**

## **DECLARATION BY STUDENT**

I hereby declare that this dissertation title “Identifying and addressing structural barriers to Maternal and Child Healthcare: A Study of Neonatal Mortality in Hard-to-Reach Areas of Shahdol District, Madhya Pradesh” is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

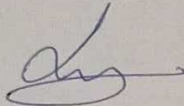
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### CERTIFICATE

This is to certify that dissertation titled “Identifying and addressing structural barriers to Neonatal Mortality Risk and Home Delivery among Tribal Population in Shahdol District, Madhya Pradesh” is a record of the research work undertaken by Suramya Nair in partial fulfilment of the requirements for the award of the degree of MBA Hospital and Health Management from the IIHMR University, Jaipur under my guidance and supervision and ~~his~~ her approach to the research study has been sincere, scientific, and analytical.

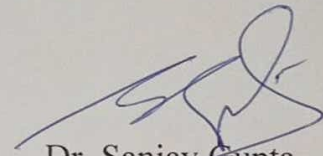
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## Acknowledgements

I extend deep appreciation to all those persons who have, in one way or another, contributed towards the completion of this dissertation. Their continued support, guidance, and various inputs shaped this work into this present form.

I am highly obliged and thankful to the esteemed manager of this organization- Dr Thirumalai Narayanan (State Program Lead, IHAT), Dr Reynold Washington (IHAT), Senthil Kumaran and Mr. Harsh Kumar Singh (State Monitoring and Evaluation Associate whose wisdom, expertise, and unwavering support have been instrumental in shaping the direction of my research. Their profound insights and encouragement have continuously motivated me to push the boundaries of my knowledge and explore new avenues in the field of public health. I am grateful for the time and effort that my mentors have dedicated to reviewing my work, providing constructive feedback, and offering invaluable suggestions for improvement. Their dedication to fostering my intellectual growth and ensuring the quality of my research has been truly inspiring.

I would also like to extend my appreciation to the entire team at IHAT Bhopal for creating an environment that fosters learning and growth. The collaborative spirit, professionalism, and passion for public health that I have witnessed within the organization have been a constant source of inspiration and motivation.

Furthermore, I would like to express my gratitude to the IHAT staff members who have generously shared their expertise, and time to support my research endeavors. Their willingness to engage in insightful discussions, share valuable data, and offer practical guidance have been crucial in enhancing the depth and breadth of my research.

I would like to express my deep sense of gratitude toward Dr Seema Mehta (Professor IIHMR University). Their continuous efforts to sustain the environment of intellectual development and knowledge diffusion proved very helpful to me for pursuing academic development.

Sincerely,

Suramya Nair

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## Abstract

Maternal and Child Health (MCH) is an essential indicator of the overall health and developmental progress of a society. Despite global commitments to improve MCH, significant disparities persist, particularly in rural and tribal areas. In India, such disparities are evident, especially within socio-economically vulnerable and infrastructurally deficient regions like Shahdol District in Madhya Pradesh. Shahdol, with its dense Sal forests and a substantial tribal population (44.7%), faces severe healthcare challenges due to its difficult terrain, seasonal inaccessibility, and weak communication networks. These factors contribute to high neonatal death rates (43 per 1,000 live births), infant mortality rates (72 per 1,000 live births), and under-5 mortality rates (80 per 1,000 live births), all significantly above national averages.

A key factor exacerbating these poor health outcomes is the high prevalence of home deliveries, with approximately 14% of pregnant women opting for home births. This practice is notably linked to neonatal mortality, with the district showing a rate of 46 per 1,000 live births for home deliveries compared to 28 per 1,000 live births for institutional deliveries. The challenges are compounded by the socio-economic vulnerabilities of the tribal population, posing substantial barriers to accessing institutional MCH services. The study conducted in Shahdol District, Madhya Pradesh, has revealed a significant interrelationship between healthcare accessibility and maternal and child health outcomes in Hard-to-Reach Areas (HRAs). The research supports the hypothesis that limited access to health services increases health risks for mothers and newborns. The findings show higher rates of neonatal mortality and home deliveries in HRAs compared to non-HRA areas, with lack of transportation identified as the primary barrier to institutional deliveries. This emphasizes the impact of geographical and infrastructural challenges on health outcomes.

The current definition of HRAs, based solely on vaccination accessibility, is inadequate for addressing the multidimensional challenges affecting maternal and child health. The study highlights the need for a broader definition that includes structural barriers such as geographical obstacles, seasonal variations, and communication issues. Seasonal monsoons further exacerbate these challenges, leading to significant disparities in institutional delivery rates among different Sub-Health Centers (SHCs).

Recommendations from the study include redefining HRAs to encompass diverse structural barriers, improving transport solutions, operationalizing mobile health units, enhancing community participation and sensitization, and developing healthcare infrastructure. Other suggestions include capacity building for healthcare workers, improving data collection and monitoring, fostering inter-sectoral collaboration, and engaging in policy advocacy to ensure targeted healthcare delivery in HRAs.

The research underscores the importance of a multidimensional approach to improving maternal and child health in HRAs, proposing comprehensive strategies to address the complex challenges faced by these areas. Implementing such targeted interventions can significantly improve health outcomes in Shahdol District and serve as a model for other regions facing similar accessibility challenges.

## **Acronyms**

ANM- Auxiliary Nurse Midwife

ASHA – Accredited Social Health Activist

NRLM – National Rural Livelihood Mission

NHM – National Health Mission

SHC – Sub Health Centre

PHC – Primary Health Centres

CHC – Community Health Centres

HW – Health Worker

BC – Block Coordinator

JAS- Jan Aarogya Samiti

VHSNC- Village Health Sanitation Nutrition Committee

VHSND- Village Health Sanitation Nutrition Day

MAS- Mahila Aarogya Samiti

SRLM- State rural livelihood mission

HRA- Hard-to-reach Area

PW- Pregnant Women

ANC- Anti Natal Care

HD- Home Delivery

# Chapter 1: Introduction

## 1.1 Background

MCH suggests the health status and developmental progress of the society. Though there is a commitment, globally, the disparities are enormous, particularly in rural and tribal areas. India, being a large country with diversity, faces many problems related to the equity aspects of health care facilities arrangement, as in the case of rural and tribal sectors where there are paramount disparities between them and the rest of society, basically because of their socio-economic vulnerability and infrastructural deficits.

Shahdol District in northeastern Madhya Pradesh epitomizes this problem. Located in the midst of a region renowned for lush Sal forests, Shahdol covers 6205 sq. km with picturesquely sprawling landscapes and a population of 10.64 lakhs, comprising a sizeable tribal component of 44.7%. The district is further subdivided into five blocks comprising 886 villages and 391-gram panchayats.



*Figure 1 HRA- Pipri*

The demographic and geographical features of Shahdol pose serious challenges to healthcare delivery in the district. Neonatal death rates of 43 per 1,000 live births, infant mortality rates of 72 per 1,000 live births, and under-5 mortality rates of 80 per 1,000 live births have been recorded in the district. This is far above the national averages for the same indicators, a condition requiring immediate investment.

One of the main factors contributing to these poor health outcomes is the high proportion of deliveries conducted at home. According to the National Family Health

Survey 5 estimates, in 2019-2021, about 14% of pregnant women in Shahdol district delivered their babies at home instead of in an institution. This has a great effect on neonatal health, where Shahdol division had a neonatal mortality rate



*Figure 2 HRA- Kothital*

of 46 per 1,000 live births, way above those of birth deliveries conducted within public health facilities of 28 per 1,000 live births. The challenges to healthcare access in Shahdol are enmeshed in difficult terrain, seasonal inaccessibility, weak communication networks, and lack of proper roadways. Coupled with the socioeconomic vulnerabilities of the predominantly tribal population, these pose substantial barriers to accessing institutional maternal and child healthcare services.

In view of these challenges, since 2015, interventions like Project MANCH have been implemented by India Health Action Trust and the National Health Mission, Government of Madhya Pradesh, to improve the quality, accessibility, and uptake of



*Figure 3- HRA Kothital*

essential health services in the tribal territory of Shahdol. Neonatal mortality rates continue to be high and demonstrate how the Toe accepted HRAs definitions and strategies are rather limited when considering maternal and child health outcomes.

The current research study is chemically attempts to identify and address the structural barriers to access to healthcare in terms of maternal and child healthcare in the Shahdol District of Madhya Pradesh, in particular to those X-factors contributing to neonatal mortality and home delivery rates across hard-to-reach areas. It aims at redefining HRAs from the MCH point of view, with analyses of secondary data on neonatal fatalities, SNCU, Home Delivery through ANMOL Data, and exploration of the reasons for home deliveries, attempting to provide some targeted solutions to reduce infant mortality and Home Delivery to improve overall MCH outcomes in the concerned region.

## **1.2 Research question and objective**

### **Research Question**

1. How does accessibility influence the risk of neonatal deaths and the Home Deliveries among tribal populations in Shahdol district, Madhya Pradesh?
2. How can the definition of hard-to-reach areas be refined to better address maternal and child health needs in Shahdol District, Madhya Pradesh?

### **Objectives:**

1. Identify the barriers to accessibility and neonatal mortality, home delivery among the tribal population of Shahdol district.
2. Study the relationship between accessibility and home delivery among tribal in Shahdol.
3. Define hard to reach area more preciously, incorporating variables from accessibility and maternal and child health variables in view of evidence.

The ultimate objective of this study is to achieve a more accurate understanding of the challenges in delivering maternal and child healthcare in HRAs. This redefined understanding may then go on to help in making suitable policy decisions, resource allocation strategies, and designs of interventions for improving health outcomes of mothers and children in Shahdol and other such areas.

## **Hypothesis:**

The neonatal mortality rate and proportion of home deliveries are expected to be very high in all areas defined as hard to reach due to the limited access to maternal and child healthcare services. In essence, it is meant to link clearly the current definition of HRA with the poor maternal and child health outcomes as a way of justifying the reason for a comprehensive broader definition.

### **1.3 Significance of the study:**

One main factor that contributed to health disparity particularly in inaccessible areas of Shahdol District was the poor access to primary healthcare services.

The definition of "hard-to-reach areas" has been conventionally modelled around the vaccination perspective. Literature thus far available defines HRAs as geographical and structural factors that lead to difficulties in delivering vaccination services, including absence of roads, inaccessible terrain, seasonality, and communication problems. However, neonatal mortality rates being considerably higher than usual in such areas suggest that if maternal and infant health outcomes are considered, this definition alone for HRA becomes quite less than adequate.

**In this study, hard-to-reach areas are defined as villages or hamlets where the beneficiaries find difficulties in accessing healthcare services due to various structural barriers.** These barriers encompass geographical obstacles such as lack of roads, dense forests, rivers acting as hurdles, and seasonal variations, which render certain areas unreachable during the rainy season, posing risks during night-time travel. Additionally, issues with network communication further compound the challenges faced by healthcare providers and residents alike.

Given the uncertain healthcare landscape, with its high neonatal mortality rates, home deliveries, and limited accessibility to services, it becomes very crucial to unravel the underlying neonatal deaths in hard-to-reach tribal communities of the Shahdol District. This paper tries to work out the interactive effect of health care accessibility, maternal health care utilization, and neonatal health outcomes in order that actionable insights for targeting interventions should reach all five blocks of Shahdol District, MP.

Hence, this research is an effort toward the redefinition of hard-to-reach areas from the perspective of maternal and new-born child health, drawing on analysis of the interview conducted with beneficiaries residing in the HRA region of all five Blocks, secondary

data analysis on neonatal deaths from SNCU Shahdol District for the last three years, and home delivery data from ANMOL. It will exactly identify which barriers contribute to high neonatal mortality rates in these areas and define more comprehensively HRA as including factors linked to the accessibility of healthcare.

### **Problem being investigated:**

The current study aims at refining the definition of hard-to-reach areas for improved meeting of maternal and child health needs, with special reference to neonatal mortality reduction and decrease in home deliveries in Shahdol District of Madhya Pradesh, India.

The existing definition of HRAs does not seem to capture properly the complexities of health care access in a region like Shahdol with regard to the outcomes in maternal and child health. The research has also focused on identification and addressing the structural barriers to maternal and child healthcare within Shahdol District, especially the role of various social contextual factors that contribute to high neonatal mortality rates and home delivery rates in remote areas.

### **Context and Importance of the Problem:**

Shahdol District in the State of Madhya Pradesh has tough geography and a large, significant tribal population. During the period it had high neonatal mortality (43 per 1,000 live births) with alarmingly high rates and therefore a high prevalence of home deliveries—14% of all births. These numbers are appreciably worse than state and national averages, thus pointing to an acute need for intervention.

## **Chapter 2: Literature Review**

**Table 1: Literature review**

| S. No | Author/ year                            | Title/Objectives                | Study design                              | Results/Conclusion                                                                                                                                  |
|-------|-----------------------------------------|---------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.    | January<br>2007<br>Brackertz,<br>Nicola | "Who is hard to reach and why?" | Literature review and conceptual analysis | Brackertz finds the term 'hard to reach' applied quite loosely, although with an adverse effect of stigmatizing different groups. It concludes that |

|    |                               |                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|-------------------------------|-----------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                               |                                                                                                     |                     | demographic and attitudinal factors in a group make it hard to reach, but very few are impossible to access using appropriate methods. This recommends context-specific approaches instead of broad categorization and advocates for the use of targeted participation tools and outreach strategies for effective engagement of the community.                                                                                                   |
| 2. | Samuel Bawa et al., 2014–2015 | Conduct of vaccination in hard-to-reach areas to address potential polio reservoir areas, 2014–2015 | observational study | Mobile health teams vaccinated 2311 hard-to-reach settlements in four Nigerian states. OPV3 coverage increased from 23% to 61% in children below 1 year, and OPV among 1–5 year-old children increased from 60% to 90%. Penta3 increased from 22% to 55%. Vitamin A was given to 78% of the target population; and 9% of the children aged below 5 years received malaria treatment. The project likely improved population immunity to polio and |



|    |                                            |                                                                                     |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|--------------------------------------------|-------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                            |                                                                                     |                      | strengthened routine vaccination and child health services in underserved communities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3. | Global Polio Eradication Initiative (2018) | Guidelines for Implementing Polio Surveillance in Hard-to-Reach Areas & Populations | Guideline Document   | It provides information on how polio surveillance can be implemented in hard-to-reach areas, either geographically or due to security and cultural barriers. Key strategies involve those on risk assessment and mapping, stakeholder coordination, negotiation in areas of conflict, attitude adjustment in surveillance networks, ad hoc active case search, community-based surveillance, AFP contact sampling, and environmental surveillance. It therefore requires new innovative and adaptive ways to ensure effective surveillance and eventual eradication of poliovirus in such challenging environments. |
| 4. | World Health Organization 2009             | Guidelines for Implementing Polio Surveillance in Hard-to-Reach                     | Descriptive analysis | Such include areas with highly populated slums and settlement informal areas. Mapping facilitated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|    |                                       |                                                                                                                                              |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                       | Areas &<br>Populations<br>Microplanning for<br>immunization<br>service delivery<br>using the<br>Reaching Every<br>District (RED)<br>strategy |                      | the targeted delivery of<br>services, hence improving<br>the immunization coverage<br>immensely.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5. | Sachiko<br>Ozawa<br>2019<br>September | Defining hard-to-<br>reach populations<br>for vaccination                                                                                    | Literature<br>review | Ozawa et al. wanted to<br>outline "hard-to-reach"<br>populations relevant for<br>effective vaccination<br>planning and resource<br>allocation. To this end, the<br>current study did a<br>literature review of reports<br>on "hard-to-reach" and<br>"hard-to-vaccinate"<br>populations in vaccination<br>efforts, finding the lack of<br>clear definitions of these<br>groups by specified<br>criteria. The study<br>suggested defining "hard-<br>to-reach" populations by<br>supply-side barriers, such<br>as geographic isolation<br>and problems relating to<br>physical access to health<br>care, which are separate<br>from the definitions of<br>"hard-to-vaccinate" groups |

|  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                   |
|--|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  |  | <p>influenced by demand-side factors like distrust and lack of aware-ness.</p> <p>Standardizing definitions will be helpful in targeting interventions and resources for the equitation of improvement in vaccination coverage.</p> <p>Further studies on refining definitions and measuring the impact should be done with a view to developing tailored interventions in these populations.</p> |
|--|--|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Chapter 3: Methodology

### 3.1 Research Design

This study uses an analytical research design wherein data will be collected in real-time by conducting structured interviews with mothers and families in the hard-to-reach areas of Shahdol District regarding home deliveries and neonatal deaths and analysis was done.

The secondary data analysis taken from healthcare databases regarding the frequency of death and home delivery occurring in the HRA region will also be part of this study.

### 3.2 Research Setting

The present research study would be conducted in the Shahdol District of the state of Madhya Pradesh, India. A proper focus will be given to four major blocks: Beohari, Burhar, Jaisinghnagar, and Sohagpur. Shahdol District. This study will be conducted in these Blocks in the identified HRA region. Poor road connectivity, flawed communication network, not working in certain seasons are hallmarks that define these HRAs, thereby posing many challenges to maternal and child healthcare services.

### 3.3 Study Population

Two significant study populations proposed to be primarily concentrated upon within the tribal communities of the identified HRAs in Shahdol District are: pregnant women who delivered their babies at home and neonatal death families. These groups have been identified as critical to understanding the barriers to institutional healthcare access and factors that ultimately result in poor maternal and child health outcomes.



*Figure 4*



*Figure 5*

- **Pregnant Women Who Delivered at Home:** This category includes all those women who, due to various reasons, delivered babies at home instead of in healthcare facilities. It will be useful to understand their experiences, reasons for home deliveries, and problems faced in accessing institutional care.
- **Neonatal Death Families:** This includes families that have reported neonatal death. Therefore, the study will establish under which conditions neonates died—like availability of health services and standard of care accorded to them, in order to bring out critical factors related to high neonatal mortality rates in HRAs.
- **Exclusion Criteria:** The study is going to exclude families living outside of the HRA regions in Shahdol District. This criterion is set for focusing attention on places with hard-to-reach areas and hence posing serious issues of accessibility, which can be projected more focused with respect to the structural barriers of professing health care to mothers and young children within HRAs.

### 3.5 Study Duration

The study will be done for a period of three months. In the first month, all preparatory activities like finalizing the protocol, ethical approvals, etc will be completed. Data extraction of secondary data from the SNCU and ANMOL portals. In the second month, data collection will be completed and preliminary analysis initiated. The third month will be dedicated to in-depth data analysis, interpretation of findings, and drafting of the final report.

### 3.4 Study Tools

- SNCU database.
- RCH-ANMOL Data
- GIS mapping tools for locating hard-to-reach areas.
- Structured interviews for the respondent for validation of the findings.

### 3.5 Sampling Size and Technique

The sample size for the present study was determined based on data generated from the RCH-ANMOL and SNCU-DH Shahdol databases. In the RCH-ANMOL data from April 2022 to March 2024, there were 876 identified home deliveries across the five health blocks of Beohari, Burhar, Jaisinghnagar, Gohparu, and Sohagpur. Out of these, 66 women were identified to be residing in hard-to-reach areas. The SNCU-DH Shahdol data from April 1, 2021, to March 31, 2024, has reported 320 neonatal deaths, out of which 10 are from HRA regions.

In order to have a manageable sample size with representation, 27 cases would be randomly selected from the identified populations for in-depth analysis. This approach will consider the duality of the demands for primary qualitative insights and practicalities on data collection and analysis.

### 3.6 Data collection Technique

In case it has to effectively satisfy the research objectives, the research will use both primary and secondary data collection with a mixed-methods approach.

- **Primary data collection:** In this section, structured questionnaires will be used on mothers who opted for home deliveries in the inaccessible areas of Shahdol District. Household surveys with visits are proposed to be conducted in Beohari, Burhar, Jaisinghnagar, and Sohagpur blocks for quantitative data extraction on socio-demographic details, reasons for home deliveries, accessibility issues, and maternal and neonatal health outcomes.  
In addition, there will be semi-structured in-depth interviews among the households where neonates died within the time of investigation. Recorded on the qualitative aspects of neonatal deaths, circumstances leading to them, and perceptions of access to health care and its quality, with what hinders access to health care, information from the safeguarded discussions will be held in private settings within homes or community spaces.
- **Secondary Data Collection:** In this section, data shall be extracted from the existing databases of SNCU and RCH-ANMOL portal. This will include detailed information on neonatal mortality rates, causes of neonatal deaths, and the address. The secondary data will be comprehensively analyzed to provide quantitative insights concerning neonatal deaths and home deliveries in HRAs of Shahdol District.

### 3.8 Data Collection Procedure

To address the objectives of the study effectively, the following detailed data collection procedure will be implemented:

1. **Extract and Review Neonatal Death Records in HRAs from the SNCU Database:** Data pertaining to neonatal deaths will be extracted and reviewed specifically from the Special Newborn Care Unit (SNCU) database, focusing on cases occurring within the identified hard-to-reach areas (HRAs) of Shahdol District. This review will include demographic information of the neonates, causes of death, and which HRA region the death occurred. The data extraction period will cover from April 2022 to September 2023, ensuring a comprehensive analysis of recent cases.

2. **Extract and Review Home Delivery Records in HRAs from the RCH-ANMOL Database:** Home delivery records will be extracted and reviewed from the Reproductive and Child Health - ANM Online (RCH-ANMOL) database for the same period and within the HRAs identified in Shahdol District. This data extraction will focus on capturing demographic details of mothers opting for home deliveries, reasons for choosing home births, and any associated health outcomes.
3. **Map the Geographical Locations of HRAs Using GIS Tools:** Geographic Information System (GIS) tools will be employed to map the precise locations of the identified hard-to-reach areas (HRAs) within Beohari, Burhar, Jaisinghnagar, and Sohagpur blocks of Shahdol District. Mapping these locations will provide spatial context to the data collected, helping to visualize and analyze the distribution of neonatal deaths, home deliveries, and healthcare accessibility challenges across the region.
4. **Conduct Structured Interviews with Respondents to Understand Barriers to Healthcare Access:** Structured interviews will be conducted with respondents, including mothers who opted for home deliveries and families who experienced neonatal deaths within the HRAs. These interviews will delve into qualitative aspects such as the barriers faced in accessing healthcare services, perceptions of healthcare quality, reasons behind home deliveries, and specific challenges encountered during critical healthcare situations. The interviews will be conducted in private settings, ensuring confidentiality and fostering open dialogue to gather comprehensive insights.
5. **Analyze Data to Identify Patterns and Correlations Between Neonatal Deaths, Home Deliveries, and Accessibility Issues:** Data analysis will involve identifying patterns, trends, and correlations between neonatal deaths, home deliveries, and accessibility issues within the HRAs of Shahdol District. Quantitative analysis will focus on statistical methods to understand the relationship between healthcare accessibility indicators (such as distance to facilities, transportation availability) and health outcomes. Qualitative data from interviews will be thematically analyzed to provide contextual understanding and enrich the quantitative findings.

### 3.6 Data analysis plan

- **Software:** STATA for statistical analysis.
- **Descriptive Statistics:** To summarize neonatal mortality data and accessibility barriers.
- **Inferential Statistics:** Chi-square tests to determine associations between neonatal mortality, Home Delivery and accessibility barriers.
- **GIS Mapping** – To identify and locate the HRA region in all Blocks of Shahdol District.

### 3.7 Ethical Considerations:

Informed consent will be obtained with structured interviews for the collection of primary data, ensuring that the participants are aware of the purpose of the study, procedures, and the right to withdraw. Confidence and security of data will be rigorously upheld; it will use the data only for research and anonymize it wherever necessary.

In the case of anonymized record secondary data analysis from SNCU and HMIS, concerns of ethical nature would revolve around issues of data security, confidentiality, and compliance with regulations on research ethics, even while individual consent would not be required since these are anonymous.

## Chapter 4: Analysis and findings

**Table 2 Hard to Reach Area All 4 Block (According to Govt. Official)**

| S.No | Block Name    | PHC Name | SHC Name     | Village Name  |
|------|---------------|----------|--------------|---------------|
| 1    | Burhar        | Keshwahi | Rupaula      | Koti          |
| 2    |               | Jaitpur  | Balbhadrapur | Nawatola      |
| 3    |               |          | Sejhai       | Kothitaal     |
| 4    | Beohari       | Nipaniya | Dalkokothar  | Dalkokothar   |
| 5    |               |          | Papod        | Khusaria      |
| 6    |               |          |              | Banasi        |
| 7    |               |          |              | Jamunhiha     |
| 8    |               |          |              | Duara         |
| 9    |               |          | Tikhwa       | Chatwa        |
| 10   |               |          |              | Mair (Alhara) |
| 11   |               |          |              | Kharhara      |
| 12   |               |          |              | Chuhi         |
| 13   |               |          | Papondh      | Tendua        |
| 14   | Sohagpur      | Khairaha | Sarangpur    | Silpari       |
| 15   |               |          |              | Semra         |
| 16   |               |          | Arjhula      | Arjhula       |
| 17   |               |          | Arjhuli      | Arjhuli       |
| 18   |               |          | Khoh         | Khoh          |
| 19   |               | Bhemouri | Dhanura      | Turri         |
| 20   | Jaisinghnager | Aamdeeh  | Pipri        | Pipri         |
| 21   |               |          |              | Belha         |
| 22   |               |          |              | Palha         |

These are the identified hard-to-reach areas in Shahdol District; these are four blocks: Sohangpur, Beohari, Jaisinghnagar, and Burhar, according to the vaccination perspective wherein the AVD (Alternate vaccine deliver) Vehicle is not reachable for delivering the vaccines to villages.

Gohparu does not have any identified HRA as per vaccination perspective. These HRA regions are further used to identify the accessibility issues in the areas and its impact on maternal and child health outcome – neonatal death and home delivery for further analysis of the study.

## **CHI SQUARE ANALYSIS**

**Table 3: CHI Square analysis**

| <b>Place of Delivery</b>                    | <b>Others</b> | <b>Lack of Transportation</b> | <b>Total</b> |
|---------------------------------------------|---------------|-------------------------------|--------------|
| <b>Home</b>                                 | 2             | 19                            | 21           |
| <b>Healthcare Institute</b>                 | 6             | 0                             | 6            |
| <b>Total</b>                                | 8             | 19                            | 27           |
| <b>Pearson chi2(1) = 18.3214 Pr = 0.000</b> |               |                               |              |

### **Interpretation of the data**

#### **1. Distribution:**

- Out of 21 home deliveries, 19 were due to lack of transportation, whereas 2 were due to other reasons.
- All 6 healthcare institute deliveries were due to other reasons rather than transport issues.

#### **2. Chi-square test:**

- The Pearson chi-square value is 18.3214 with 1 degree of freedom.
- P-value (Pr) is 0.000, which is less than the conventional level of significance of 0.05.

#### **3. Statistical significance:**

- The p-value is less than 0.001, hence statistically significant, thus demonstrating an association between the place of delivery and

#### **4. Interpretation of the association:**

- A strong relationship exists between lack of transportation and home deliveries.
- On the other hand, those who delivered at healthcare institutes did not quote lack of transportation as a reason, indicating thereby they had access to transportation.

#### **5. Implications:**

- This data very strongly supports the hypothesis that transportation is a critical barrier to institutional deliveries in the study area.
- The improvement in access to transportation could lead to a dramatic increase in the institutional delivery rate.

#### **6. Limitations:**

- The sample size is relatively small (27 total deliveries), which should be considered when generalizing these findings.
- OTHER factors influencing the choice of the place of delivery may not be captured in this binary categorization.
- In other words, this analysis yields strong statistical proof that improving access to institutional deliveries in Shahdol District lies at the very core of



this study, intended for the identification and subsequent mitigation of structural barriers to healthcare access in the hard-to-reach areas.

## **HOME DELIVERY DATA- ANMOL**

**HD in Jaisinghnagar-** This graph depicts the spread of home deliveries over many SHCs in Shahdol District:

### **1. Distribution:**

- The data comprises 24 different SHCs, thus it is characterized by comprehensive variation in the number of home deliveries amongst the facilities.
- There is a huge fluctuation in the delivery rates. More precisely, from as low as 1 to as high as 19 cases per SHC.

### **2. Top contributors:**

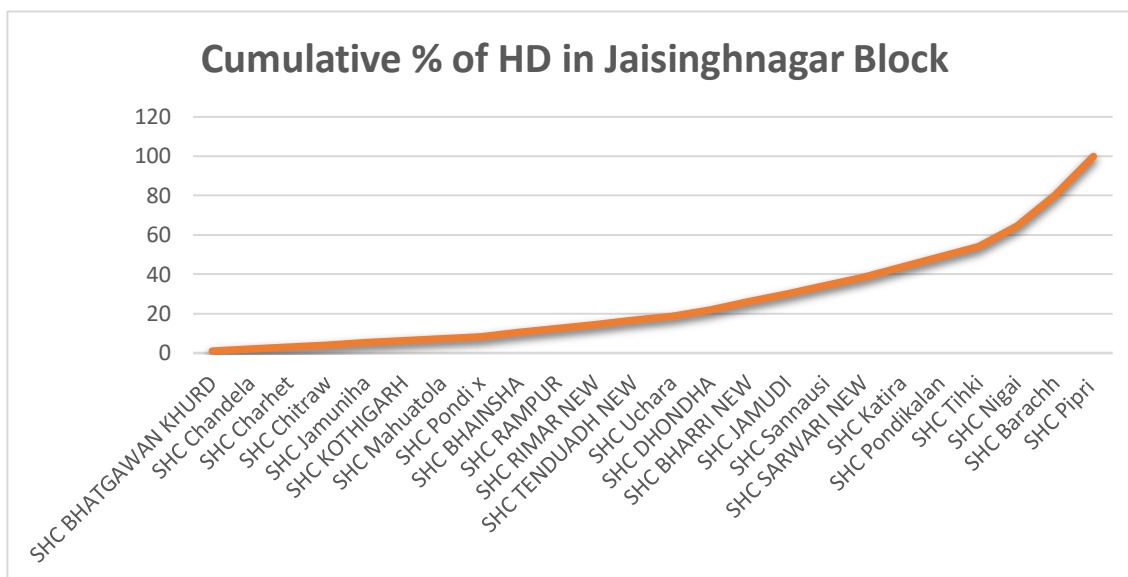
- SHC, Pipri, accounts for the maximum number of home deliveries, 19, with a percentage share of 20% of the total cases.
- The SHC, Barachh, comes next with 15 home deliveries, which is 16% of the total.
- Next comes the SHC, Nigai, with 10 home deliveries, accounting for 10% of the total.

### **3. Cumulative impact:**

- The top three SHCs—Pipri, Barachh, and Nigai—account for 46% of all home deliveries in the dataset.
- 80% of home deliveries are concentrated in just 7 SHCs.

### **4. HRA focus:**

- The SHC Pipri being an HRA region is itself a very vital observation.
- Geographical accessibility may be a major factor for preference of home births in this region, as it has been identified that this HRA solely is accounting for the high number of home deliveries.
- The very high proportion of home deliveries in Pipri, an HRA, clearly establishes geographical accessibility as a critical factor in choosing the place of delivery. This information justifies the objective of the present study for identifying and addressing the structural barriers to healthcare access among populations living in inaccessible areas.



**Figure 6: Cumulative % of HD in Jaisinghnagar Block**

**HD in Burhar Block-** It provides data on home delivery rates across different SHCs of Shahdol District, with the notable information that SHC Sejahai, an HRA, is performing at the top end. This setting brings considerable importance to the interpretation:

The last in this list are the institutional deliveries, led by SHC Sejahai with 22 cases and a contribution of 9% to the total, which culminates the CP to 100%. This is noteworthy when considering its HRA status, which normally poses a challenge to healthcare access.

The remaining ones, in that decreasing order, are: SHC BACHARWAR NEW with 18 deliveries, and SHCs Bartar and Kudeli with 15 each. These top four SHCs account for almost 30% of all the recorded institutional deliveries.

The values for these deliveries range from 1 to 22 for the listed 45 SHCs, thus, showing an uneven distribution of delivery discharge. About 70% of institutional deliveries are concentrated in 13 SHCs alone, and many centers report very low numbers—18 SHCs handling a meager total of 3 or fewer deliveries each.

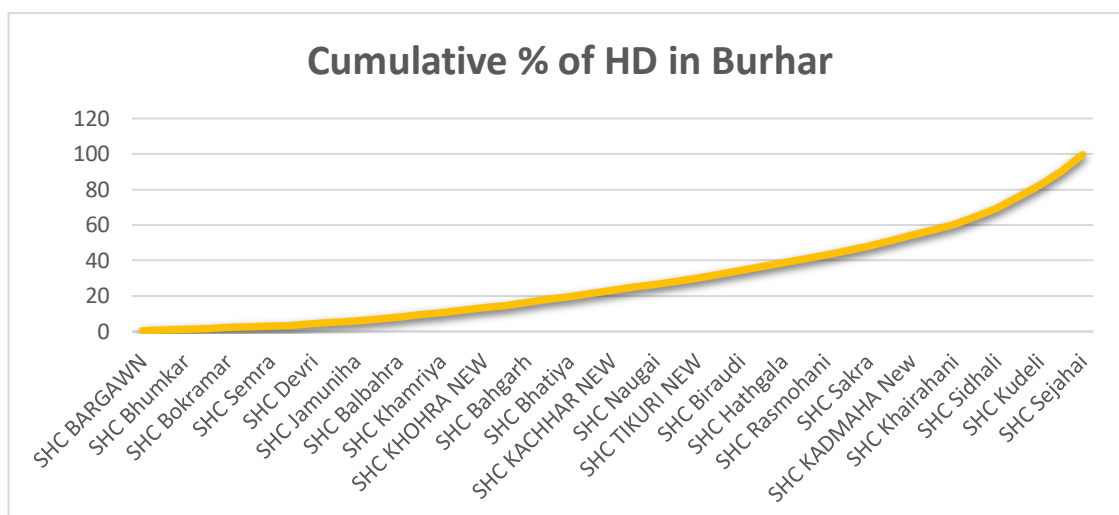


Figure 7

**HD in Beohari Block:** The data on the home deliveries in Beohari Block indicates a high variability across SHCs and even more so within HRAs. Within HRAs, SHC PAPOUNDH is a major contributor with 29 home deliveries contributing 11% to the cumulative percentage of 89%. Similarly, another HRA, SHC PAPODH, has reported 23 home deliveries (9% of the total), adding up to a cumulative percentage of 35%. On the absolute count, SHC DALKOKOTHAR stands lower, with 4 home deliveries (2% of the total), but it contributes to the 12% cumulative percentage.

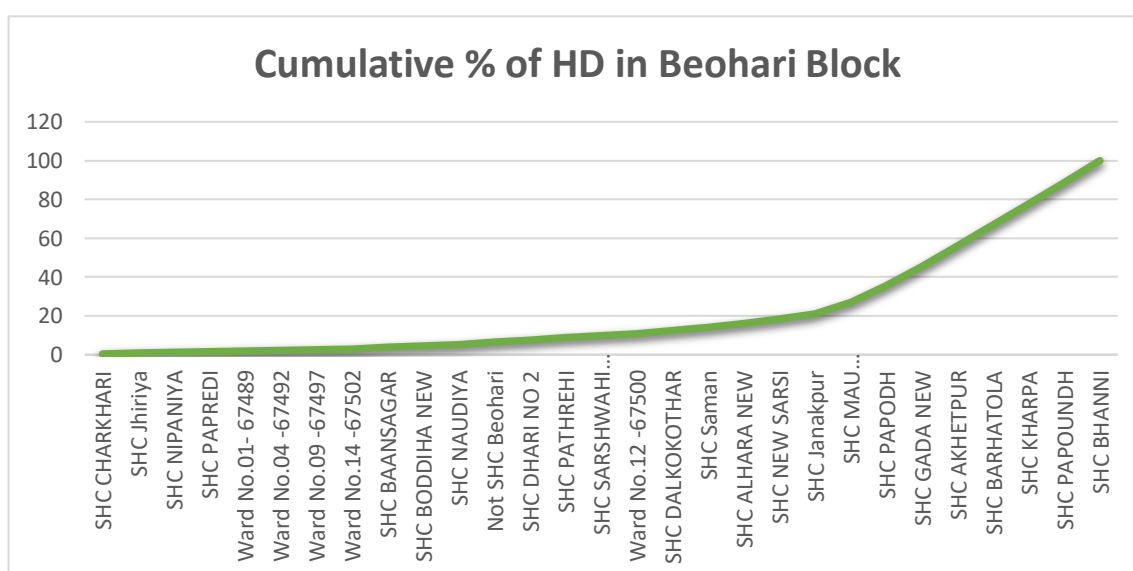


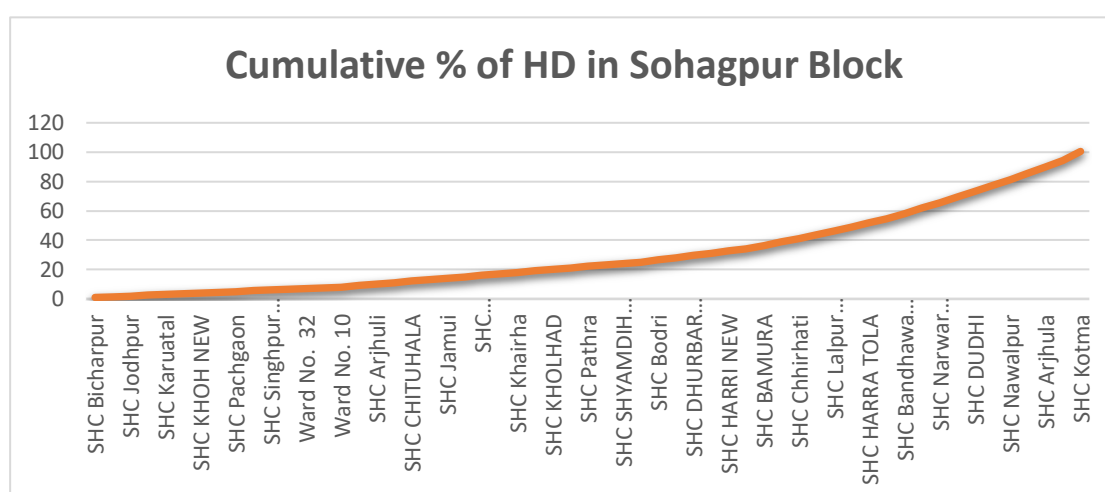
Figure 8

#### Key findings:

- Three HRAs contribution to the total home delivery in the block is 22%.

- Two HRAs SHC PAPOUNDH and SHC PAPODH are among the top contributing SHCs towards home deliveries, which reflect the high influence of geographical barriers on institutional delivery.
- The cumulative percentage indicates that these HRAs add up to few more high contributing SHCs covering a large proportion of home deliveries of the block.
- There is a remarkable contrast in the high-contributing HRAs and many SHCs with a very low number of home delivery cases, which clearly indicates an uneven distribution of challenges across the block.

**HD in Block Sohagpur-** The graph shown below depicts the cumulative percentage depiction of home deliveries going on in Block Sohagpur.

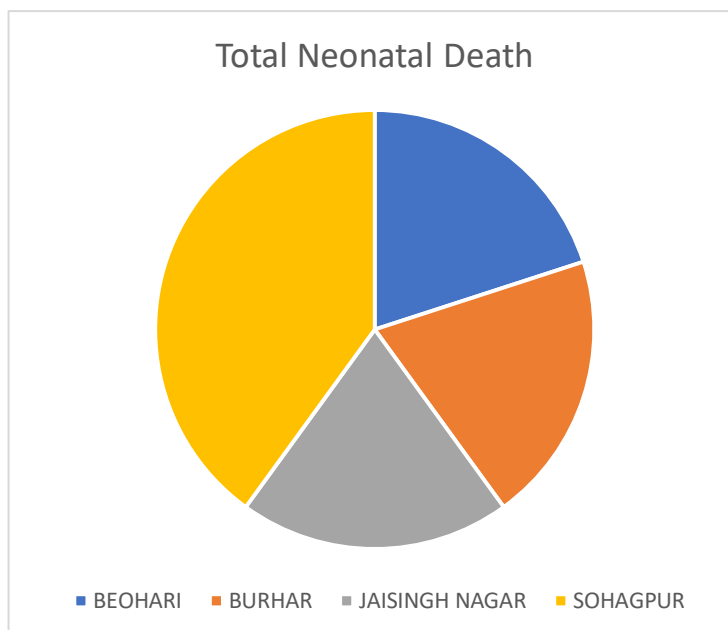


**Figure 9**

This data clearly shows an increasing trend of home deliveries as we move from left to right along the X-axis, which means an increase in the cumulative percentage. The top five areas in terms of percentages pertaining to home deliveries include some prominent locations; one most prominent is that of the SHC Arjhula. SHC Arjhula, being an HRA area, has recorded one of the highest rates of home deliveries. This may indicate that geographical and logistical problems in HRAs like Ajla contribute to a higher rate of home deliveries, quite possibly due to limited access to health care facilities and services.

### **SNCU ANALYSIS-**

The total sample size of the total sample under SNCU data is 320 neonatal death from these 10 neonatal deaths were from HRA identified villages.



**Figure 10: Total Neonatal Death**

This graph shows that among these HRAs, the maximum Neonatal death is in SOHAGPUR—therefore, presumably it may face the most serious health care accessibility problems or other underlying factors which are leading to larger mortality. BEOHARI, BURHAR, and JAISINGH NAGAR have 2 neonatal deaths each, from which one thing becomes certain that these areas are also suffering, though not as seriously compared to SOHAGPUR.

The data brings out wide variations in neonatal mortality rates across villages in the most inaccessible areas of Shahdol District. SEMRA, with a total of 5 neonatal deaths, comes out as the village with the highest mortality, pointing to extremely serious health-access problems or other crucial factors which lead to drastically high numbers of deaths. For MAIRTOLA, the number of deaths is 2, which shows significant problems with maternal and child healthcare. ARJHULA, DALKOKOTHAR, and PIPRI each report 1 neonatal death, thereby proving that these villages, while their counts are low, still have highly significant health care access barriers.

Table 2: Classification of Neonatal Deaths Occurring in hard-to-Reach Areas of Shahdol Dist. M.P. by Mode of Transport to Health Institution: There were a total of 10 neonatal deaths, of which 6 occurred where government transport was used and 4 occurred with self-arranged transport.

Government-provided transport in DALKOKOTHAR 1, MAIRTOLA 2, SEMRA 3, with 2 in one entry and 1 in another. Then there is self-arranged transport in ARJHULA 1, PIPRI 1, SEMRA 2.

This information indicates that there are more neonatal deaths related to government-provided transport in comparison with that arranged by the respondent. These findings could point out problems related to the effectiveness, availability, or timelines in which transportation services are provided by the government in such localities. The existence of death even with self-arranged transport points to additional barriers in accessing reliable, spot transport in emergency cases.

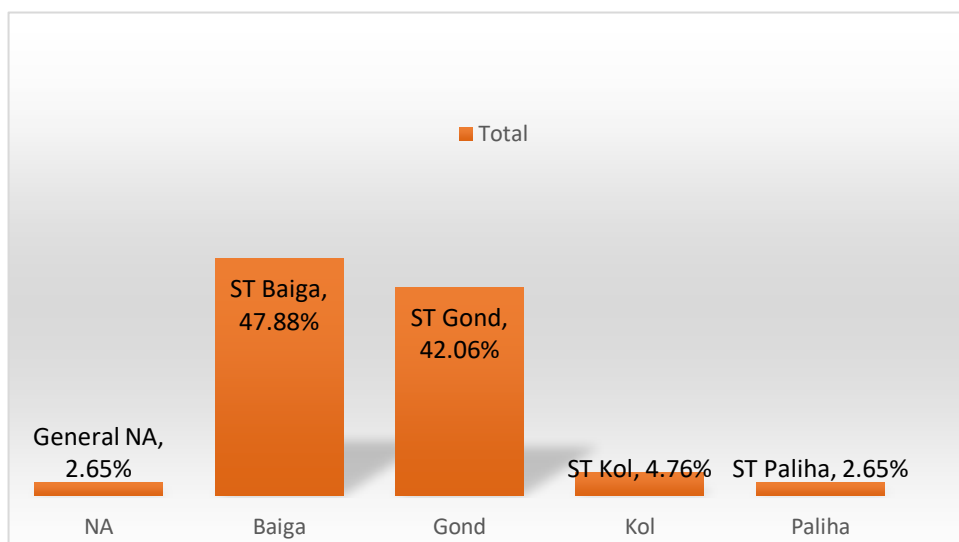
## TOOL ANALYSIS

### DEMOGRAPHIC CHARACTERISTICS

**Block-wise activity distribution** -The above study, carried out in Shahdol District of Madhya Pradesh, reveals that there are enormous differences in the health care accessibility between other blocks; Beohari and Jaisinghnagar both accounted for 30% of the responses from home-delivered women and mothers of neonatal deaths. Sohagpur followed with 26%, and then Burhar with 15%. These figures recommend that Beohari and Jaisinghnagar are greatly influenced by the structural barriers to accessing the basic package of maternal and child healthcare services. These percentages correspond well in said areas to the hypothesis that places considered to be hard-to-reach within geographical and structural barriers have high neonatal mortality rates and a high rate of deliveries conducted at home.

**Village-wise Distribution-** The data shows that it is highest in Turri at 30% and Pipri at 24%, closely followed by Khushriya at 24%. These places account to be a large proportion of the responses from home-delivered women and mothers of neonatal deaths, indicating the acute access to healthcare challenges these communities face. Silpari accounts for 8%, Umarkhoi for 7%, Tendua for 5%, and Kothital for 3%; these villages, though of a lower percentage, also present a significantly high number of such cases.

**Tribal Distribution:** The study in the Shahdol District of Madhya Pradesh has brought out wide



**Figure 11: Tribal Distribution**

differences pertaining to neonatal mortality and home deliveries between the different tribal and general populations. The data

indicates that as many as 97% of the cases are STs, among which the Baiga tribe is 48%, the Gond 42%, the Kol tribe 5%, and the Paliha 3%. In comparison, the general population accounts for only 3%. These results underline the critical challenges of accessing healthcare, which are felt most by the tribal communities within Shahdol District. High percentages among the Baiga

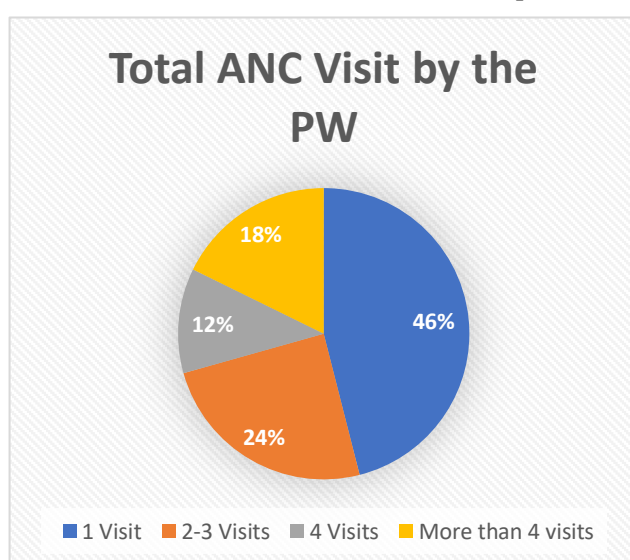
and Gond tribes show that these groups are more predisposed to the structural barriers impeding access to essential maternal and child healthcare services.

**Education Characteristic:** The data show that amongst the Baiga tribe, a significant proportion of members, 23%, has no schooling, whereas 16% have primary education and only 8% reached secondary education, cumulatively accounting for 48% of the total cases. The distribution for the Gond tribe is different: none with secondary education, and 18% were unschooled, whereas 24% had primary education, representing 42% of all total cases. The Kol tribe, though a smaller proportion, includes 2% with primary education and 3% with secondary education, totaling 5%. The Paliha tribe shows 3% with primary education; in addition, 3% of the cases are from the general population with no schooling. In all, 44% of the affected population has no schooling; another 44% have passed primary education, and only 11% have secondary education. These figures underline low educational attainment as strongly correlated, on the one hand, with high neonatal mortality and home deliveries among these communities on the other.

**Previous Gravida:** From the data, it shows that most affected women, 56%, had 1-2 previous pregnancies. It is also evident that one group forms the highest proportion of the cases at 36%. First pregnancies will include 36%, while greater than 4 previous pregnancies form the smallest parcel at 8%. These figures indicate that neonatal mortality and home deliveries can easily occur in women with less previous pregnancies, from 0 to 2, due to perhaps a lack of experience and limited receipt of sufficient maternal health care services.

### **ANTENATAL CARE (ANC) UTILIZATION**

The data reveals that while 100% of the respondents received ANC during their pregnancies,



**Figure 12**

there is significant variation in the number of visits. A substantial 46% of women had only one ANC visit, which may not be adequate for identifying and managing potential health issues during pregnancy. Another 25% had 2-3 visits, 12% had exactly 4 visits, and 18% had more than 4 visits. The high percentage of women with only one ANC visit suggests that many may not receive continuous and comprehensive care throughout their pregnancy. This lack of sufficient follow-up can contribute to the

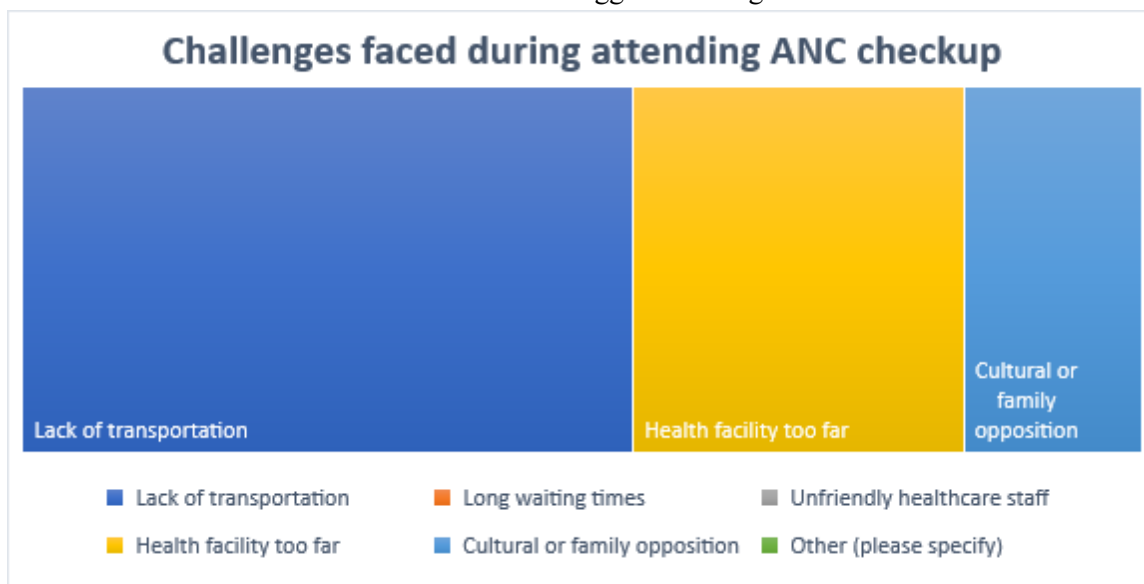
high rates of neonatal mortality and home deliveries observed in the district. The findings highlight the critical need for ensuring not just initial access to ANC, but sustained and frequent visits to provide thorough monitoring and timely interventions.

**Early ANC Utilization-** The data shows that 56% of respondents did not receive first trimester antenatal care (ANC) checkups, while 44% did. This high percentage of missed early ANC visits is concerning, as it may contribute to the elevated neonatal mortality rates and home deliveries in the region.

Among those who did not receive first trimester ANC checkups, several key reasons were identified. The most prevalent barrier was a lack of awareness, cited by 52% of respondents. This suggests a critical need for improved health education and outreach programs in these communities. Distance to healthcare facilities (41%) and lack of transportation (44%) were also major obstacles, underscoring the geographical and infrastructural challenges in accessing care. These findings align with the study's focus on redefining hard-to-reach areas to better reflect maternal and child health needs.

**Another major factor was the cultural beliefs**, accounting for 30%. This fact brings out the need for culturally sensitive interventions and community engagement in the improvement of maternal outcomes. Another interesting revelation is that only 7% mentioned financial constraints, thereby confirming that while economic factors play a role, they may not be the main ones in barriers to accessing care.

**Challenges to attending ANC visits-** Transportation is by far the most critical barrier, with a huge 89% of women citing lack of transportation as a challenge to attending ANC visits. This finding thus agrees very strongly with the study's focus on questions of accessibility in hard-to-reach areas and underlines, more than ever, the critical need for improved transportation solutions or mobile health services. The second biggest challenge was related to the distance to



*Figure 13*

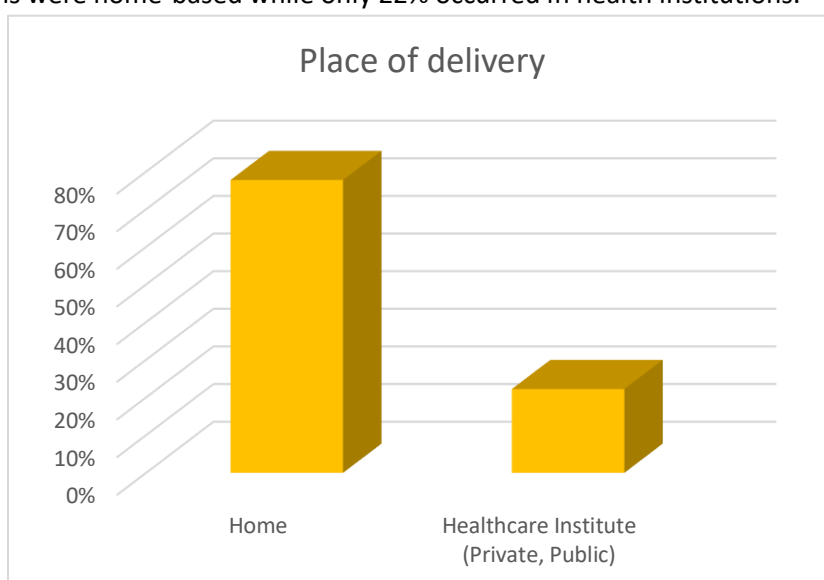
health facilities and was mentioned by 48% of the respondents. This again underscores geographical obstacles for tribal populations in accessing maternal care, thereby strongly supporting the primary purpose of the study: to redefine hard-to-reach areas from the lens of



maternal and child health. Cultural or family opposition in attending ANC visits was mentioned by 26% of the respondents. Noticeably, issues like long wait times and unhelpful health personnel were not mentioned to have caused challenges by any of the respondents, 0%.

## HOME DELIVERY

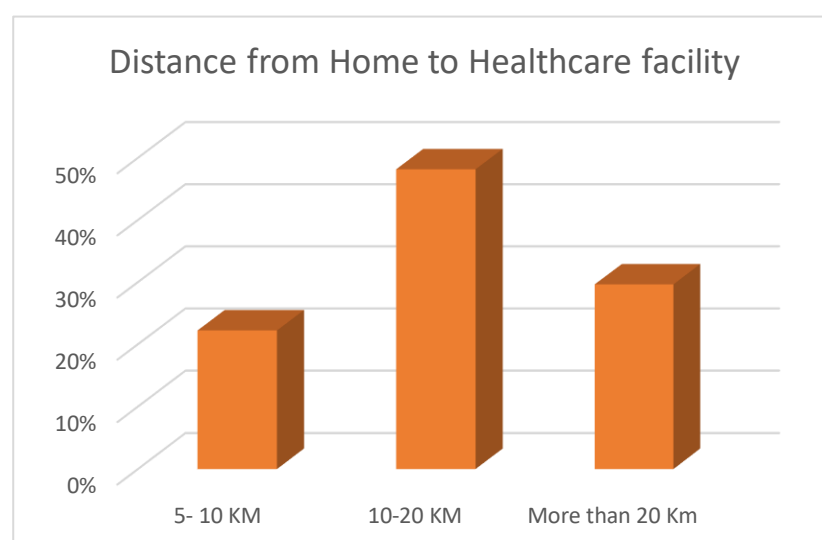
**Place of Delivery-** Out of the total deliveries reported, 27 in number, 21 of these were home deliveries while only 6 were institutional deliveries. This therefore, implies that about 78% of the births were home-based while only 22% occurred in health institutions.



*Figure 14*

This corresponds to the prevalence of deliverance at home attendant upon the problem statement, which initially indicated a rate of 14% home deliveries in Shahdol District, way above the average for the state and the country. This sample therefore came up with even more critical data, portraying institutional deliverance far outnumbered by home ones.

**Distance from Home to nearest delivery point-** Almost half, 48%, of the respondents stay between 10-20 km from the nearest delivery point. This almost represents half of

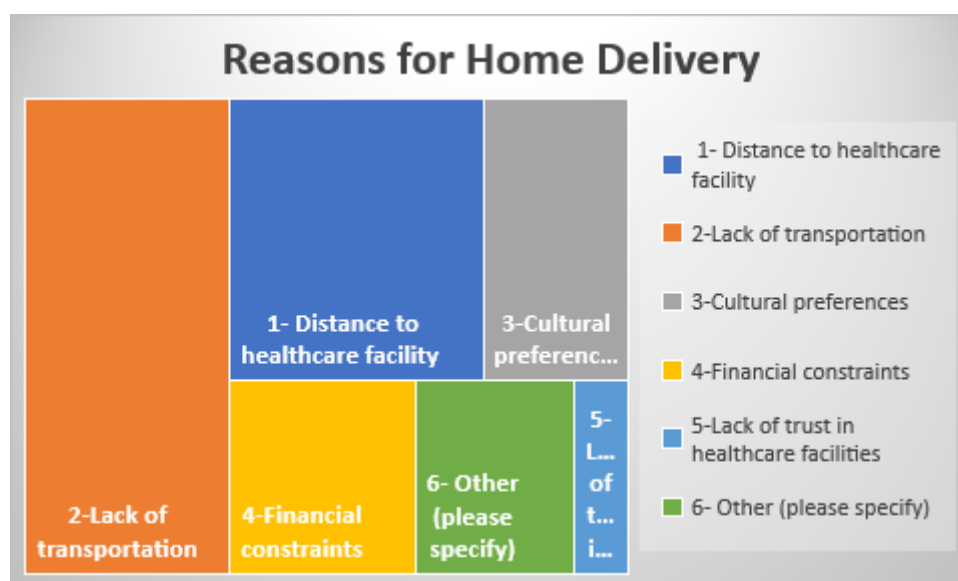


*Figure 15*

the population surveyed to translate into a distance barrier greater than a respectable proportion of pregnant women in need of institutional delivery services. This share in their sample was high, at 30%, with dwelling places being more than 20 km from the nearest delivery point. This group thus faces even greater problems in accessing timely and appropriate maternal health care during delivery. Only 22% of the respondents come from areas that are 5-10 km or relatively closer to where the nearest delivery point is. While it is still a fair distance, especially where there is bad infrastructure, it represents the most accessible group in the survey.

This finding corresponds well with the focus of the study on access issues in hard-to-reach areas and partly explains the high rate of home deliveries observed earlier. In total, 78% of respondents stay more than 10 km away from the nearest delivery point.

**Reasons for Home Delivery**—The data furnished gives critical insights related to reasons for home delivery amongst the surveyed population for Shahdol District of Madhya Pradesh. Lack of transportation comes out as a major factor with 70% respondents stating so as the reason for home delivery. This strongly corroborates with the findings on the issues of accessibility stated earlier, and brings out the important role of transportation in maternal healthcare utilisation.



*Figure 16*

The second most common reason, reported by 52% of the respondents, is the distance to healthcare facilities. Again, this finding verifies the earlier data on the distances many residents face to reach the delivery points and increases the geographical barriers to institutional deliveries.

Cultural preferences, while a major factor with an indication of 30% of the responses for home delivery, devolve into sociocultural aspects to be addressed in the reduction of home deliveries and interventions that sometimes disregard physical accessibility. Financial constraints were

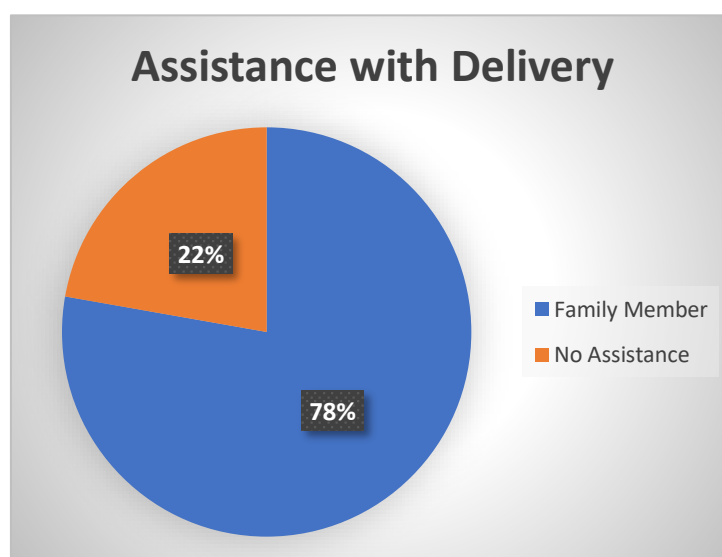
indicated by 26% of the respondents, showing that although it is not a major hindrance, economic factors still play a significant role in the decisions of delivery for some families.

This was interesting: only 7% of the respondents indicated a lack of trust in healthcare facilities as the reason for home delivery. This therefore means that when the access barriers are overcome, most of the respondents are willing to utilize the institutional delivery services.

Other specific reasons for home deliveries were given by an additional 22% of the women, which included not having the necessary documents required, no one to stay at home, and late ambulance services. This points to administrative, social, and emergency response challenges contributing to home deliveries.

**Who assisted the Home Delivery-** The most astonishing fact found is that 52% of deliveries were assisted by family members. This high percentage can indicate serious health complications to both mother and neonate if untrained birth attendants are managing the birth process.

Of greater concern is that 15 percent of the deliveries occurred with no assistance at all. Births that are unassisted represent the highest risk category—a potential for severe complications to mother and child.



*Figure 17*

Traditional Birth

Attendants attended 11

percent of the deliveries. While attendance by Dais is usually observational in nature, therefore typically experienced, they are generally not formally medically trained and hence may not be competent to deal with the process if something goes wrong.

In nearly 22% of the cases the type of assistance was either not available, or not applicable, NA; this may have included institutional deliveries, or cases where this fact was not reported by respondents.

At least 78% of the deliveries, reported in this study, excluding responses of NA, were thus extra-institutional. This very high rate itself of non-institutional deliveries coincides initial concerns of the study of about a high rate of home deliveries in a district.

**Awareness of benefits of the institution Delivery-** The majority of the respondent, more than half, 59% were aware about the benefits of institutional delivery, whereas only 41% of the respondents were unaware about the institutional benefits.

This high percentage of population not being aware implies that, even though some respondents were apparently willing to give birth to their babies in healthcare institutions, some persistent factors obstructed them from performing so. These could be due to lack of transport, lack of money, cultural norms or unavailability of infrastructure to avail health services.

**Demand for Institutional Delivery-** From these data, various factors have been pointed out that would impel the demand for institutional delivery in the future.

The respondents showed an overwhelming response of 89%, for better transportation facilities. This proves that there is a mammoth opportunity waiting in the wings, as far as accessing health services due to facilitation of the transport infrastructure goes as an implication. Another very important factor was cultural acceptance; 30% of the information providers said that increased acceptance of institutional delivery appears to influence birthplace preference. Financial incentives were mentioned by 22% of the respondents, hence establishing that financial support plays a major role in accessing institutional care. Improved trust in the health workers motivated 15% of the respondents, indicating that better relationships and bonding is to be forged between the community and the health workers. Assurance of quality care was noted by 11% of the respondents, pointing to the need for good standards of care in the health institutions. Other factors, which may include personal or unique community considerations, were those mentioned by 7% of the respondents. The findings bring out the need to address the practical, as well as the socio-cultural, barriers to institutional delivery.

**Table 4: Encouraged for Institutional Delivery**

| Encouragement for Institutional Delivery | Total | Percentage |
|------------------------------------------|-------|------------|
| Better transportation facilities         | 24    | 89         |
| Financial incentives                     | 6     | 22         |
| Improved trust in healthcare providers   | 4     | 15         |
| Cultural acceptance                      | 8     | 30         |
| Assurance of quality care                | 3     | 11         |
| Other (please specify)                   | 2     | 7          |

## NEONATAL HEALTH OUTCOME

**Place and immediate post-natal care-**The table shows that 52% of the respondents reported that their newborns did not receive immediate postnatal care. Out of the 48% of the respondents whose newborns received immediate postnatal care, 22% received it in a health facility while 26% received it at home. This, therefore, means that whereas nearly half of the newborns

received some form of immediate postnatal care, nearly an equal proportion were not, with the majority receiving care at home as opposed to in a healthcare facility. Designate points raising a high percentage of newborns that do not receive immediate postnatal care, coupled with the prevalence of home-based care, underscores the need for improved access to and utilization of healthcare facilities for postnatal care.

| Did your Newborn received immediate Postnatal Care | Where               | Total |
|----------------------------------------------------|---------------------|-------|
| No                                                 | NA                  | 52%   |
| Yes                                                | Healthcare Facility | 22%   |
|                                                    | Home                | 26%   |
| Total                                              |                     | 100%  |

**Newborn outcome:** The data depict a worrying trend whereby 44% of newborn babies did not survive, while 56% of the newborn babies are alive. This presents an extremely high neonatal mortality rate, hence posing the challenge of survival at birth in this region. The findings underpin the pressing nature of improving maternal and child healthcare, including immediate postnatal care.

**When the New-born did die-** The data indicates that 56% of the respondent's neonate were alive. In the mortality recorded, neonatal death occurred for 4 percentage cases within an hour of delivery, 7% occur within 24 hours, 11% from 1 to 7 days, and 22 percent after a week. This distribution suggests that a large proportion of neonatal deaths actually occurred after the first week, thus reflecting lingering health challenges beyond the immediate postnatal period.

**Place of death:** According to the data, 44% of neonatal deaths occurred at home. Since a large proportion of neonatal deaths occurred at home, it indicates that there is going to be strong avoidance in using facilities, which would provide care with possible effective interventions to prevent neonatal mortality. This result suggests the importance of improving access to health care—the most immediate postnatal care—in areas difficult to reach within Shahdol District.

**Cause of Neonatal death:** Prematurity, low birth weight seem to be important factors. "Low Birth Weight" and "Malnourished" (recorded twice) are suggested as causes in their own right; these conditions usually arise from poor maternal nutrition and antenatal care, and therefore reflect the need for both greater accessibility and quality of antenatal services.

There is also a notable role of infections, with "Pneumoniae" and "Fever" mentioned twice. Different hygiene practices or care after birth may be more advisable. Earlier recognition of neonatal infections may probably be treated earlier. "Still Birth" was mentioned twice, pointing to problems that may arise during pregnancy or labor. It suggests better monitoring during pregnancy or skilled attendance at delivery.

"A Big phus on neck" most probably signifies a major abscess or infection and points to a possible defect in neonatal care and hygiene and delay in presenting to medical care.

**Symptoms in newborn before death-** Out of 27 total cases reported 12 cases gave specific symptom information while 15 were marked as NA. The common symptoms reported were

- Fever-7 cases
- 6 cases of lethargy
- 5 cases of poor feeding
- 4 cases of difficulty breathing

Most often, these were present in combinations, which means serious health issues in the affected newborn babies

Stillbirth was seen in two cases. That is, under "Other" symptoms, which is yet another neonatal mortality—different from death before or during birth. Other symptoms reported included stopped feeding, diarrhea, and blood from the nose, which indicated a medley of serious neonatal conditions. There was only one case of reporting about jaundice while none explicitly mentioned convulsions. Stopped Feeding is a symptom that could be due to infection or congenital anomalies. This illustrates the need for recognition of early danger signs in neonates. The "unknown" classification in many of the cases indicates either a lack of correct diagnosis or understanding of the real cause of death, which leans toward the requirement for better medical facilities and diagnostic tools during end-of-life care in the region.

**Vaccination within 24 hours-** Among the responded population, 52% of newborns had taken vaccination in the first 24 hours of life, while 48 percent did not. This near-even split shows both progress and persistent challenges in ensuring early immunization coverage in the region.

The fact that more than half of the newborns got timely vaccination is a good indicator, for it shows despite gross inadequacies, some health services do reach a large segment of the population. This may be due to successful institutional deliveries or an effective outreach of health services for births taken place at home.

## **ACCESS TO HEALTH CARE SERVICES**

**Transport to the health facility:** As many as 74% of the respondents walk as their principal mode of transport to health facilities. This surprisingly high figure indicates exactly the immense challenges in accessibility that the community is faced with. Long-distance walking to health services can be particularly problematic for pregnant women,

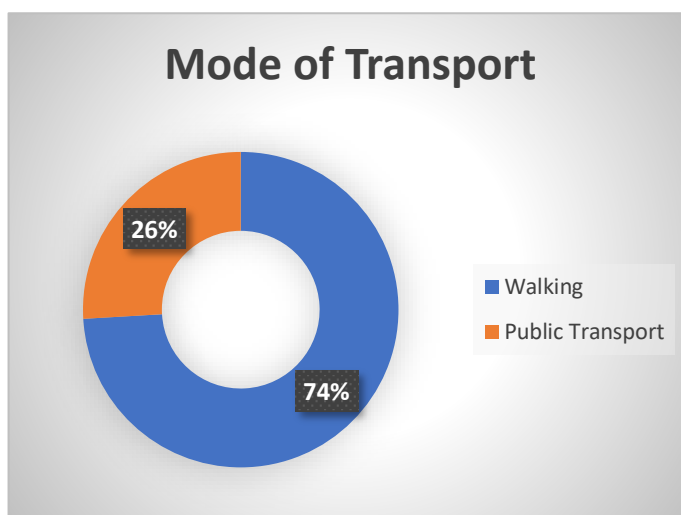


Figure 18

especially during labor, and the sick or those carrying infants for check-ups or vaccinations.

The remaining 26% use public transport to get to health facilities. Although this is a more efficient way of traveling compared with walking, it still potentially indicates difficulties related to the availability, frequency, and cost of public transportation services in the area.

**Ambulance Reach at Home:** About 70% of the respondents reported that ambulances do not reach their homes. This is an alarmingly high percentage, reflecting the grossly inadequate state of emergency medical services in the area. This strongly reinforces the focus of the study on hard-to-reach areas and barriers to healthcare access.

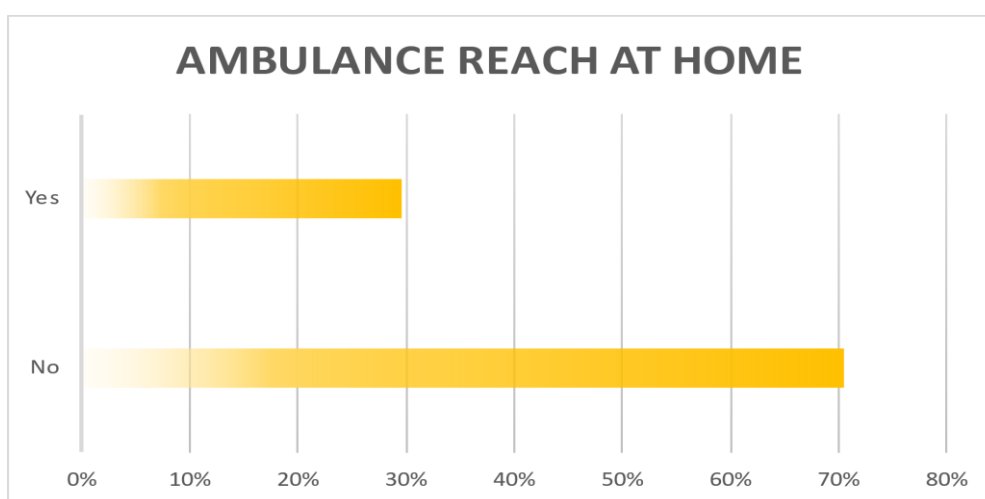


Figure 19

Only 30% of the respondents report that ambulances can reach the homes. While this is good news for households in that percentage, it leaves even a larger percent of the population outside of access to a very vital emergency service.

**Inaccessibility due to Seasonal Variation:** A high majority of 81% of the respondents mentioned that it is hard to get access to health care during a rainy season. This percentage is so high, which justifies that the weather conditions have a huge effect on accessibility to health care in this region. Subsequently, the rainy season has huge effects on health care accessibility since many villages in this region are geographically isolated by either a river or thick jungle. During monsoons, the natural barriers become even stronger.

Rivers swell, cutting off access to villages and therefore health care for entire communities. Without proper infrastructure, crossing the rivers becomes dangerous or

impossible. The heavy rains can turn dirt paths in forested areas into muddy tracks, which are slippery and hard to walk on or just plain unsafe. This makes liaison with main roads quite a challenge for villagers seeking to get to health facilities.

Only 19% of the respondents indicated that seasonal variations have no effect on them regarding seeking health care. Although a minority, nearly one-fifth of the population seems to have access to health care services all year round, having no regard for weather conditions.

**Communication Network:** The results show almost a split on the count of a communication network being reliable: 52% having access to a reliable network, while 48% lack this facility. This near equal division indicates both the gains made and the deep-rooted challenges in communication infrastructure within the region.

Another positive finding is that a little over half the panel reported having access to reliable communication networks. That suggests that some regions have benefited from improved telecommunications infrastructure, possibly allowing better access to information, emergency services, and telemedicine options.

The fact that only 48% of the respondents have access to reliable communication networks, however, is a worrying issue altogether. This is in tandem with earlier findings about barriers to healthcare access and further complicates the challenges faced by residents in hard-to-reach areas.

**Accessibility-improving measures:** The information obtained gives valuable responses of the views of the community on the measures that would make maternal and child healthcare more accessible, where mobile health units scored the highest at 89% of responses; clearly, it has a strong preference for healthcare services going out to even the farthest and inaccessible places, which echoes and confirms previous findings about geographical and transportation barriers.

The second most favored solution, mentioned by 81% of the surveyed, is improved transportation. This major percentage gives evidence of the major impact that transport issues have on accesses to health care, already pointed out when referring to modes of transport and barriers to access in the previous data.

It thus agreed with earlier data on the long distances many residents face to reach healthcare facilities, where 41% of surveyors agree to establish more healthcare facilities due to interest in better access to health services.

A raise in awareness and education, as testified by 37% of the respondents, shows realization of the role knowledge and information play in health-care use.

Other schemes include those related to providing finances, which received mere 11% of the responses, thus indicating that while economic reasons were a cause of concern, they are relatively less critical as compared to logistic and infrastructural issues.

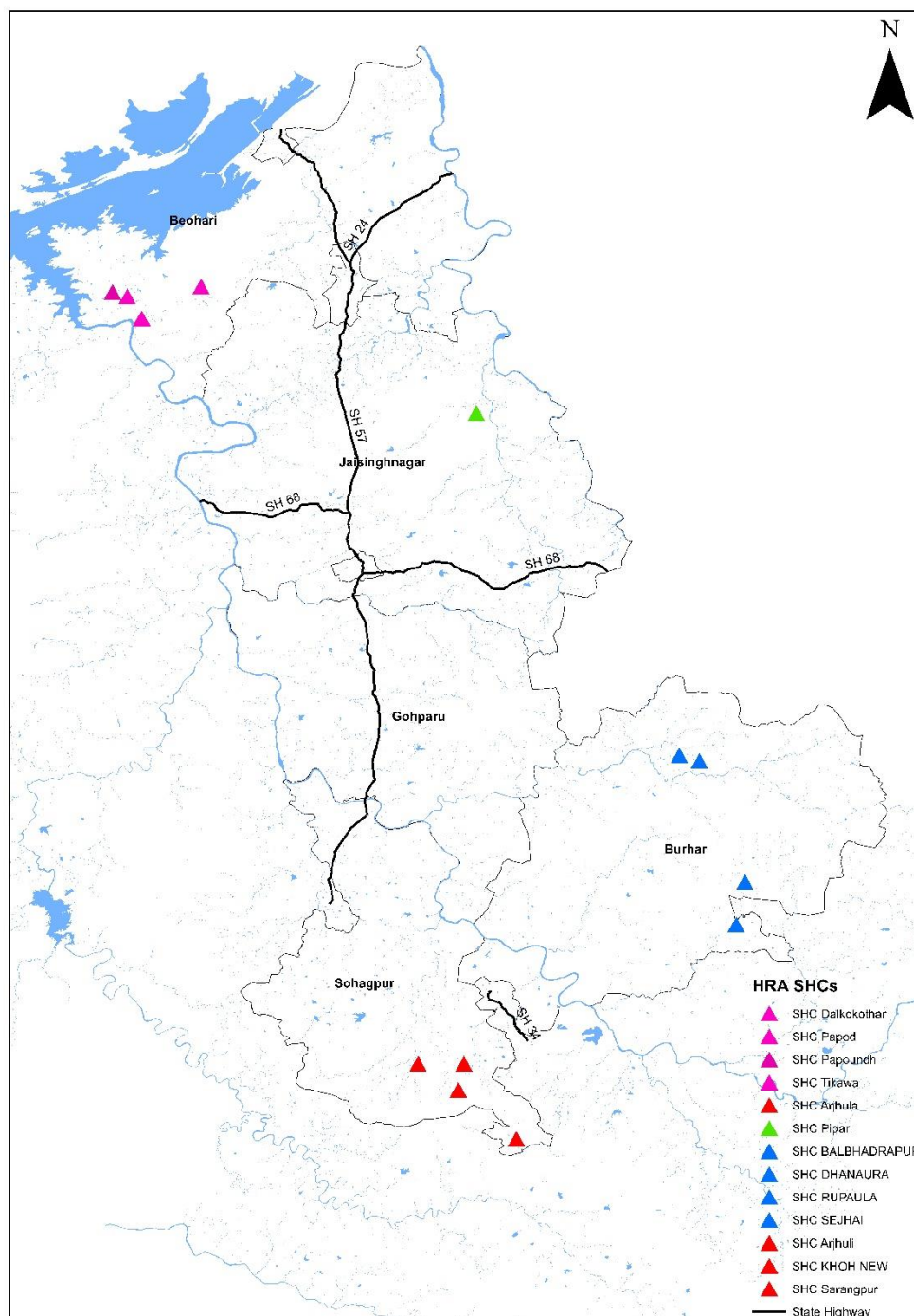


## Chapter 6: Result

A large differential prevails in health care services utilization and health outcomes for the tribal population residing in areas designated as HRAs. The proportion of home deliveries constitutes 78 percent of the total births, caused by 70 percent of patients having no transport facilities, while 52 percent feel that health institutions are at very far distances from their places of residence. It was significant, with the chi-square test confirming a strong association between place of delivery and reasons for choosing that place; thus, transportation emerged as a critical barrier. Analysis of ANMOL data showed that the major chunk of home deliveries are occurring in SHCs situated in HRA of all four Blocks.

Neonatal mortality in the HRAs is more, with 10 deaths occurring at the HRA region. 97% of cases were from Scheduled Tribes, pointing out the severity of challenges to health access for these communities. Aggregate-wise, about 89% of antenatal care visits mentioned no transport, and 81% mentioned increased difficulty in accessing health care during the rainy season because of geographical barriers.

The major accessibility issue that came out from the research to health facilities is inaccessibility, and the major factors were lack of transportation and lack of a road. The villages are covered with jungle and river all around, making it very difficult for pregnant women to go to the healthcare facility. Hence, they choose to deliver at home, which can be a risk for maternal and child health. The rainy season blocks the road because the pathway is muddy and due to a river in between, there is a lack of a bridge pass way; therefore, it can never be accessed by the PW. The network also played a major role as in a few villages the network does not reach, and no communication to health care provider. Hence, the study proves that structural barriers play a major role in child mortality and home delivery in tribal communities of Shahdol, Districts.



**Figure 20- GIS Mapping of HRA**

On detailed GIS mapping, nearly all HRAs are found to be far off from the state highway, which seriously impacts access. More particularly, the HRA of Beohari is located not far from the Bansagar Dam. The dam itself along with the river from which it's generated pretty much sets up large natural hazard towards direct access to the nearby villages. It calls for the adoption of alternative, and usually harder, routes simply because of the existence of a river; this then complicates the implementation of healthcare service delivery. Sewing through the geographical challenges is the pervasiveness of the lack of infrastructure; this, in turn, calls for the need to develop interventions targeted to the specific geography.

## Chapter 7: Conclusion and Recommendation-

The research conducted in Shahdol District of Madhya Pradesh has been able to bring forth strong evidence regarding the interrelationship between health care accessibility with maternal and child health outcome in Hard-to-Reach Areas. Very strongly indeed, the findings supported the initial hypothesis: limited access to health services heightens health risks for mothers and newborns. Compared with the non-HRA areas, the study has reported higher rates of neonatal mortality and home deliveries across HRAs in which lack of transportation was cited as the top barrier to institutional delivery. This underlines how geographical and infrastructural challenges affect health outcomes. The present definition of HRAs, entirely based on vaccination accessibility, is found unsatisfactory in capturing multidimensional challenges that affect maternal and child health, underscoring the requirement for a broader definition that embodies diverse structural barriers. Seasonal variations, especially during monsoons, are aggravating in many areas. These data further underscore large differences in the institutional delivery rates among various SHCs, thus making the scenario of inequity in accessibility to and effectiveness of health care promotion definite. These findings collectively bring out the needed focus toward targeting interventions related to health care access in HRAs.

A redefinition of HRAs from the perspective of maternal and child health has to go hand in glove with the implementation of location-specific solutions and enhanced transport systems, mobile health units, flexing efforts of community engagement, and stronger healthcare infrastructure. It will be through such multifaceted solutions for addressability of complex contextual challenges that Shahdol District will be able to considerably improve maternal and child health outcomes in the most vulnerable areas, potentially setting an example for other regions facing comparable accessibility challenges.

**The following detailed recommendations are proposed based on such findings:**

### **1. Redefining of Hard-to-Reach Areas:**

- Since the HRA is identified from vaccination non-reachables, there is a dire need to formulate a clear definition of HRA from the Maternal and Child Health perspective in geographical barrier areas like Shahdol.
- Hard-to-reach areas are defined as villages or hamlets where the beneficiaries find difficulties in accessing healthcare services due to various structural barriers. These barriers encompass geographical obstacles such as lack of roads, dense forests, rivers acting as hurdles, and seasonal variations, which render certain areas unreachable during the rainy season, posing risks during night-time travel. Additionally, issues with network communication further compound the challenges faced by healthcare providers and residents alike.

### **2. Better transport solutions:**

- **Community-based emergency transport system for pregnant women and new-born.** Liaise with local village committees (JAS, VHSNC, SRLM, MAS, SHG, Panchayat) for creation of a pool of private vehicles which can be availed in those areas which are inaccessible by ambulances.
- Establish a system of vouchers or a service reimbursements scheme to defray the transportation charges incurred by pregnant women while accessing health care services.

**3. Improving Accessibility to Healthcare in HRAs:**

- Operationalize Mobile Health Units to organize regular health camps in identified HRAs with special emphasis on antenatal checkups, postnatal care, and assessment of newborn health.
- Establish temporary residential facilities close to healthcare hub centers for pregnant women from HRAs to stay in the week prior to their expected date of delivery, so more proximity to the health system can be maintained.
- VHSND to cover all HRAs fully by inclusion of remote hamlets and tolas.

**4. Enhance Community Participation and Sensitization:**

- Targeted awareness generation amongst HRAs by ascertaining the need and importance of institutional deliveries and early antenatal care.
- Train and educate local women to act as community health ambassadors to provide peer support and education.
- Use local channels of communication and local congregations to transmit information on health matters and to fight against cultural barriers to healthcare utilization.

**5. Infrastructure Development in Health Organisation:**

- The establishment of adequately equipped PHCs/CHC Preserved at places easily accessible and serving a cluster or clusters of HRAs.
- Maintenance and rebuilding of roads, river crossings to improve access to health facilities throughout the year.
- Establish telemedicine facility in HRAs for remote consultations to reduce physical travel for routine check-ups.

**6. Capacity Building of Healthcare Workers:**

- Depute specialized training on the management of high-risk pregnancies and neonatal emergencies to healthcare workers in HRAs.
- Rotation system to ensure trained/ experienced staff in HRAs.
- Retention/Incentives given to healthcare workers serving in HRA will ensure their motivation for services

**7. Improve Data Collection and Monitoring:**

- Establish a robust health information system that receives data in real-time on pregnancies, deliveries, neonatal health outcome events in the HRAs. The data shall, from time to time, be reviewed and analyzed for trends, gaps, and identification of areas for intervention.

**8. Inter-sectoral Collaboration:**

- Partner the health department with the local administration and other relevant sectors like roads, telecommunication seating at the HRAs to address their multifaceted challenges. Engage with NGOs and community-based organizations in supporting healthcare initiatives across HRAs.

**9. Policy Advocacy:**

- Based on these research findings, engage in policy advocacy at both state and national levels to ensure specially targeted approaches to healthcare delivery take off the ground on identified HRAs.
- The budget for maternal and child health should be increased upon the identification of HRAs.

## Chapter 8: Discussion

This research very convincingly unfolded many questions regarding the interplay between health care accessibility and maternal and child health outcome, particularly in the hard-to-reach areas of Shahdol District, Madhya Pradesh. Main findings: The access to and utilization of health care were sharply contrasted between hard-to-reach areas and more accessible districts and blocks, wherein the former, the occurrence of home deliveries and neonatal mortality was considerably higher. This strongly points to the fact that limited access to health services adds to health risks for mothers and newborns, thus supporting the hypothesis of this study.

One major finding of the research is that the existing definition of HRAs located in vaccination accessibility is inadequate. Indeed, a definition cannot, and will not mirror these intricate challenges that characterize these areas. The research therefore insists on the need for a new definition that accommodates various structural barriers, including geographical accessibility, seasonality, and communication difficulties.

The study identified lack of transportation as the most important factor that contributes to home deliveries in HRAs, therefore underlining the critical role played by physical accessibility in healthcare use. A very important finding indeed, since this opens up an area of intervention. Seasonal variations, especially during the monsoons, disrupted health care access, the results also brought out clearly, which added to the other problems faced by residents living in HRAs.

The research also explains the role that community engagement and education play in improving health outcomes of mothers and children. Cultural factors and lack of awareness were major barriers toward health care utilization, underlining the need for focused awareness campaigns and community-based interventions.

Therefore, these findings hence underscore the need for a multi-dimensional approach toward this objective of improving maternal and child health in HRAs. It may include HRAs definition from the view of maternal and child health, improvement in transport solutions reinforcing healthcare infrastructure, improvement in community engagement, mobile health units, and so on. In conclusion, the study not only indicates the role of accessibility to the critical link of health outcomes but also gives a solution by putting forward a map of such targeted interventions. A comprehensive strategy to address the complex challenges faced in HRAs can help Shahdol District make major gains in maternal and child health outcomes in its most vulnerable areas. Such a study would therefore have a place in similar geographies, presenting difficulties of access, in support of the reduction of maternal and neonatal mortality rates in such remote parts of India.

## Chapter 10: References

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## Chapter 9: Annexures

### **Tool for Verification of study - Identifying and addressing structural barriers to Neonatal Mortality Risk and Home Delivery among Tribal Population in Shahdol District, Madhya Pradesh**

| SNO.                               | QUESTION                        | RESPONSE                                                                                                                                                                                                 |
|------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DEMOGRAPHIC CHARACTERISTICS</b> |                                 |                                                                                                                                                                                                          |
| 1.                                 | Name of Respondent              |                                                                                                                                                                                                          |
| 2.                                 | Name of Block                   |                                                                                                                                                                                                          |
| 3.                                 | Name of the Village             |                                                                                                                                                                                                          |
| 4.                                 | Age of Respondent               |                                                                                                                                                                                                          |
| 5.                                 | Caste of respondent             | <input type="radio"/> SC<br><input type="radio"/> ST<br><input type="radio"/> OBC<br><input type="radio"/> General                                                                                       |
| 6.                                 | If belongs to tribe, tribe name | <input type="radio"/> Gond<br><input type="radio"/> Baiga<br><input type="radio"/> Kol<br><input type="radio"/> Agariya<br><input type="radio"/> Bhariya<br><input type="radio"/> Other (please specify) |
| 7.                                 | Level of Education              | <input type="radio"/> No Schooling<br><input type="radio"/> Primary<br><input type="radio"/> Secondary<br><input type="radio"/> Higher Secondary<br><input type="radio"/> Graduation and above           |
| 8.                                 | Occupation of Respondent        | <input type="radio"/> Employed<br><input type="radio"/> Unemployed                                                                                                                                       |

|                                         |                                                                 |                                                                                                                                                                                                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         |                                                                 | <input type="radio"/> Housewife<br><input type="radio"/> Other                                                                                                                                                                                                                            |
| 9.                                      | Family Income of Respondent                                     | <input type="radio"/> Below 5000<br><input type="radio"/> 5000-10000<br><input type="radio"/> 10000-20000<br><input type="radio"/> 20000 above                                                                                                                                            |
| 10.                                     | Marital Status of Respondent                                    | <input type="radio"/> Married<br><input type="radio"/> Divorced<br><input type="radio"/> Widowed                                                                                                                                                                                          |
| 11.                                     | Number of previous pregnancies                                  | <input type="radio"/> 0 (first pregnancy)<br><input type="radio"/> 1-2<br><input type="radio"/> 3-4<br><input type="radio"/> More than 4                                                                                                                                                  |
| 12.                                     | Date of Delivery                                                |                                                                                                                                                                                                                                                                                           |
| 13.                                     | Is the baby is alive?                                           | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                     |
| <b>ANTENATAL CARE (ANC) UTILIZATION</b> |                                                                 |                                                                                                                                                                                                                                                                                           |
| 14.                                     | Did you receive any antenatal care (ANC) during your pregnancy? | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                     |
| 15.                                     | If yes, how many ANC visits did you have?                       | <input type="radio"/> 1 visit<br><input type="radio"/> 2-3 visits<br><input type="radio"/> 4 visits<br><input type="radio"/> More than 4 visits                                                                                                                                           |
| 16.                                     | Did you receive early ANC (within the first trimester)?         | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                     |
| 17.                                     | If not, why did you not receive early ANC?                      | <input type="radio"/> Lack of awareness<br><input type="radio"/> Distance to healthcare facility<br><input type="radio"/> Lack of transportation<br><input type="radio"/> Cultural beliefs<br><input type="radio"/> Financial constraints<br><input type="radio"/> Other (please specify) |



|                                |                                                                                         |                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                |                                                                                         |                                                                                                                                                                                                                                                                                                                                                                    |
| 18.                            | Were you informed about the importance of ANC visits by healthcare workers?             | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                                                                                              |
| 19.                            | What services did you receive during ANC visits? (Check all that apply)                 | <input type="radio"/> Blood pressure measurement<br><input type="radio"/> Blood tests<br><input type="radio"/> Urine tests<br><input type="radio"/> Ultrasound<br><input type="radio"/> Iron and folic acid tablets<br><input type="radio"/> Tetanus immunization<br><input type="radio"/> Nutritional counselling<br><input type="radio"/> Other (please specify) |
| 20.                            | What were the main challenges you faced in attending ANC visits? (Check all that apply) | <input type="radio"/> Lack of transportation<br><input type="radio"/> Long waiting times<br><input type="radio"/> Unfriendly healthcare staff<br><input type="radio"/> Health facility too far<br><input type="radio"/> Cultural or family opposition<br><input type="radio"/> Other (please specify)                                                              |
| <b>HOME DELIVERY QUESTIONS</b> |                                                                                         |                                                                                                                                                                                                                                                                                                                                                                    |
| 21.                            | Where did you deliver your baby?                                                        | <input type="radio"/> Home<br><input type="radio"/> Institutional (Government hospital, Private hospital)<br><input type="radio"/> During Transport<br><input type="radio"/> Other (Specify)                                                                                                                                                                       |
| 22.                            | Distance from home to the nearest health facility, Delivery point (in km):              | <input type="radio"/> Less than 5 km<br><input type="radio"/> 5-10 km<br><input type="radio"/> 10-20 km<br><input type="radio"/> More than 20 km                                                                                                                                                                                                                   |
| 23.                            | If home delivery, what were the main reasons?                                           | <input type="radio"/> Distance to healthcare facility<br><input type="radio"/> Lack of transportation<br><input type="radio"/> Cultural preferences                                                                                                                                                                                                                |

|                                 |                                                                                                     |                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                                     | <input type="radio"/> Financial constraints<br><input type="radio"/> Lack of trust in healthcare facilities<br><input type="radio"/> Other (please specify)                                                                                                                                                          |
| 24.                             | Who assisted with the delivery?                                                                     | <input type="radio"/> Skilled birth attendant (ANM or Medical staff)<br><input type="radio"/> Traditional birth attendant (Dai)<br><input type="radio"/> Family member<br><input type="radio"/> No assistance                                                                                                        |
| 25.                             | Were you aware of the benefits of institutional deliveries?                                         | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                                                |
| 26.                             | Are you ready for institutional delivery in future?                                                 | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                                                |
| 27.                             | What would encourage you to opt for an institutional delivery in the future? (Check all that apply) | <input type="radio"/> Better transportation facilities<br><input type="radio"/> Financial incentives<br><input type="radio"/> Improved trust in healthcare providers<br><input type="radio"/> Cultural acceptance<br><input type="radio"/> Assurance of quality care<br><input type="radio"/> Other (please specify) |
| <b>NEONATAL HEALTH OUTCOMES</b> |                                                                                                     |                                                                                                                                                                                                                                                                                                                      |
| 28.                             | Did your newborn receive immediate postnatal care?                                                  | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                                                |
| 29.                             | If yes, where was the postnatal care provided?                                                      | <input type="radio"/> Home<br><input type="radio"/> Healthcare facility                                                                                                                                                                                                                                              |
| 30.                             | Is the Newborn Alive?                                                                               | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                                                                |
| 31.                             | When did the newborn died?                                                                          | <input type="radio"/> Within a hour of delivery<br><input type="radio"/> 24 hours of delivery<br><input type="radio"/> 1-7 days of delivery                                                                                                                                                                          |

|                                             |                                                                                          |                                                                                                                                                                                                                                                                          |
|---------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                             |                                                                                          | <input type="radio"/> After a week of delivery                                                                                                                                                                                                                           |
| 32.                                         | Where the newborn died?                                                                  | <input type="radio"/> Home<br><input type="radio"/> Institution<br><input type="radio"/> On the way from home to institution<br><input type="radio"/> On the way from institution to home                                                                                |
| 33.                                         | What were the main cause of neonatal death, if known?                                    | <input type="radio"/>                                                                                                                                                                                                                                                    |
| 34.                                         | What signs or symptoms did your newborn exhibit before death? (Check all that apply)     | <input type="radio"/> Difficulty breathing<br><input type="radio"/> Poor feeding<br><input type="radio"/> Lethargy<br><input type="radio"/> Fever<br><input type="radio"/> Jaundice<br><input type="radio"/> Convulsions<br><input type="radio"/> Other (please specify) |
| 35.                                         | Did your new born received vaccination in 24 hours?                                      | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                    |
| <b>ACCESSIBILITY TO HEALTHCARE SERVICES</b> |                                                                                          |                                                                                                                                                                                                                                                                          |
| 36.                                         | What mode of transportation do you use to reach healthcare facilities?                   | <input type="radio"/> Walking<br><input type="radio"/> Bicycle<br><input type="radio"/> Public transport<br><input type="radio"/> Private vehicle<br><input type="radio"/> Other (please specify)                                                                        |
| 37.                                         | Does Ambulance reach your home?                                                          | <input type="radio"/> Yes<br><input type="radio"/> No                                                                                                                                                                                                                    |
| 38.                                         | What are the primary barriers to accessing healthcare facilities? (Check all that apply) | <input type="radio"/> Lack of roads<br><input type="radio"/> Dense forests<br><input type="radio"/> Rivers/seasonal obstacles<br><input type="radio"/> Poor communication network<br><input type="radio"/> Lack of transportation                                        |

|     |                                                                                                |                                                                                                                                                                                                                                                                      |
|-----|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                                                                                                | <ul style="list-style-type: none"> <li>○ Financial constraints</li> <li>○ Cultural barriers</li> <li>○ Other (please specify)</li> </ul>                                                                                                                             |
| 39. | How do seasonal variations affect your ability to access healthcare?                           | <ul style="list-style-type: none"> <li>○ No effect</li> <li>○ Difficult during rainy season</li> <li>○ Difficult during winter</li> <li>○ Difficult during summer</li> <li>○ Other (please specify)</li> </ul>                                                       |
| 40. | Is there a reliable communication network in your area?                                        | <ul style="list-style-type: none"> <li>○ Yes</li> <li>○ No</li> </ul>                                                                                                                                                                                                |
| 41. | How do you communicate with healthcare providers in case of an emergency?                      | <ul style="list-style-type: none"> <li>○ Mobile phone</li> <li>○ Landline</li> <li>○ Through neighbors/community members</li> <li>○ No reliable means of communication</li> <li>○ Other (please specify)</li> </ul>                                                  |
| 42. | What measures do you think could improve access to maternal and child healthcare in your area? | <ul style="list-style-type: none"> <li>○ Improved transportation</li> <li>○ More healthcare facilities</li> <li>○ Mobile health units</li> <li>○ Increased awareness and education</li> <li>○ Financial support schemes</li> <li>○ Other (please specify)</li> </ul> |