

Bridging the Gap: Access to Maternal Healthcare Services and Infant Mortality Reduction in Tribal Communities Under Sustainable Development Goal Framework

**Deepak Kumar Naik¹, Dr. Snigdha Rani Panda², Dr. Snehalata Das³,
Bishnu Naik⁴**

¹Research Scholar, School of Tribal Resource Management (STRM), Kalinga Institute of Social Sciences (KISS) Deemed to be University, Bhubaneswar, Odisha, 751024, India

²Associate Professor, School of Tribal Resource Management (STRM), Kalinga Institute of Social Sciences (KISS) Deemed to be University, Bhubaneswar, Odisha, 751024, India

³Assistant Professor, School of Tribal Resource Management (STRM), Kalinga Institute of Social Sciences (KISS) Deemed to be University, Bhubaneswar, Odisha, 751024, India

⁴Research Scholar, School of Tribal Resource Management (STRM), Kalinga Institute of Social Sciences (KISS) Deemed to be University, Bhubaneswar, Odisha, 751024, India

Corresponding Author: Dr. Snigdha Rani Panda

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ABSTRACT

Infant mortality is an important public health issue and plays a key role in fulfilling SDG3: Ensure healthy lives and promote well-being for all. Quality maternal health services at all levels, such as antenatal care (ANC), skilled birth attendance, institutional delivery, and postnatal services, are necessary for maternal and newborn survival, especially for vulnerable tribal communities. This study attempts to examine the relationship between access to maternal health care and infant mortality reduction among tribal population of Kendujhar District of Odisha, India. This study used descriptive cross sectional research design with primary data obtained through a structured questionnaire and the respondents were 400 people. Descriptive statistics were used for the analysis of the data including frequencies and percentages. The results reveal that 39.25% of respondents did not receive antenatal care services in their last pregnancies and

60.75% received antenatal care services in their last pregnancies. Indeed, among ANC users, only 20.2% attended 4 or more ANC visits, while 30.0% attended the second and the third ANC visits. The achievement of the study's objectives also revealed that several barriers, including lack of access to health care, geographical isolation, limited transport facilities, and socioeconomic issues, still hinder the use of maternal health services in tribal areas. The results indicate that greater use of maternal health care services is associated with improved pregnancy outcomes, which could have an impact on infant mortality. The study identifies the need to strengthen primary healthcare infrastructure, expand community awareness, enhance transportation infrastructure, and promote the full utilization of maternal health care services to achieve equitable maternal and child health outcomes. These measures will help achieve SDG 3 by preventing maternal and infant mortality and promoting the health and well-being of tribal people.

Keywords: Maternal healthcare, Infant mortality, Antenatal care, Tribal communities, Maternal health services, Sustainable Development Goals (SDGs), Odisha.

1. INTRODUCTION

Infant mortality refers to the death of a baby before his first birthday and serves as an indicator of population health and a measure of the effectiveness of a healthcare system. While significant strides have been achieved worldwide in the reduction of infant mortality, significant contributions to infant mortality are still coming from preventable causes, especially among vulnerable and marginalized populations. Inadequate maternal health, nutrition, timely access to health facilities, and the lack of skilled health providers continue to be significant problems impacting infant survival (Hasan et al., 2023). Access to maternal healthcare services, such as antenatal care (ANC), skilled birth attendance, institutional delivery, and postnatal care (PNC) is of fundamental importance for maternal and infant health outcomes. Access to timely and quality maternal health care contributes to preventing complications of pregnancy, the safe delivery of babies, and improved survival rates of infants. While inequities between different groups of people are no longer present when it comes to healthcare, disadvantaged populations, particularly tribal communities in remote areas (Austin et al., 2014), continue to suffer. Geographical isolation, insufficient healthcare infrastructure, inadequate transportation, lack of awareness, and socio-economic factors are some of the significant issues faced by tribal communities in India when it comes to accessing maternal health care services. The Kendujhar District of Odisha, with a significant tribal population, is beset with some of these issues, and maternal/child health improvement is a critical public health problem of the district. In these contexts, low utilization of maternal health services could lead to poor pregnancy outcomes and infant mortality. Neonatal and

under-five mortality rates are a particular focus of Sustainable Development Goal 3 (Good Health and Well-being), and quality maternal health services are a prerequisite for achieving universal health coverage. The SDG framework highlights the importance of lowering preventable maternal and child mortality and ensuring equal and fair access to health care, especially for vulnerable populations (Dowou et al., 2023). Although a number of Government programmes have been put in place, these objectives have not been achieved because access to maternal health services is limited, services are too costly and of too poor quality. Therefore, identifying the association between maternal health care services and newborn health outcomes is important for developing effective interventions. The current investigation is an attempt to draw attention to the use of maternal health care services and its impact on infant mortality among the tribal community of Kendujhar District, Odisha. It seeks to uncover those barriers, the significance of antenatal, skilled birth attendant, and postnatal care, and suggest policy interventions to improve maternal and child health services and to move towards the Sustainable Development Goals (SDGs) (Naik et al., 2025).

2. LITERATURE REVIEW

The literature highlights that a health care system can play an important role in achieving better health outcomes and sustainable development. According to Mitra and Chatterjee (2026), the World Health Organization (WHO) health care framework comprises six pillars: service delivery, health workforce, health information systems, access to essential medicines and technologies, health financing, and leadership and governance. They noted that despite progress in the healthcare sector, India still faces several challenges, including low investment in public healthcare, inadequate infrastructure, a shortage of human resources, and high out-of-pocket healthcare expenditure. They, however, noted that the Accredited Social

Health Activist (ASHAs) programme has yielded positive results in the field of maternal, child, and health by leveraging community-based interventions. Siciliani and Cylus (2025) argued that health is not only a goal of sustainable development but also fundamental to achieving it, including reducing poverty, improving education, advancing gender equality, promoting economic growth, reducing inequalities, and strengthening institutions. A number of studies have been undertaken to identify ways to improve health care and reduce health care inequalities. Alessia et al. (2026) identified that personalized mobile health (mHealth) interventions can effectively alleviate depression, anxiety, and stress among pregnant and postnatal women by delivering customized mental health resources and enhancing access to maternal healthcare services. Similarly, Hogendoorn et al. (2024) found that increased family healthcare use predicted a slight rise in FSS among young children, underscoring the need for early detection and prevention strategies. Trott et al. (2024) also found that childhood maltreatment is linked to poorer mental health in adulthood and greater health care providers' use of mental health services, and that trauma-informed care and early intervention are needed. There are persisting inequalities in health care among populations. Ghosh (2025) highlighted delays in accessing maternal care services, geographic access challenges, and barriers to healthcare services as significant drivers of maternal health disparities in developing nations, emphasizing the need for region-specific policies and enhancements in healthcare infrastructure. Likewise, Radney and Lee (2024) identified that Black children in foster care had greater access to preventive health care and greater utilization of chronic health services. The study also revealed that the higher placement instability among black children led to the interruption of care and poorer health outcomes. Hansdah et al. (2023) studied the health problems faced by the indigenous Santal tribe in Odisha and found that the

absence of education, traditional beliefs, superstition, and intoxication negatively affected people's health-seeking behavior; however, good government health programs positively affected their financial well-being. Naik and Panda (2023) pointed out that innovation and entrepreneurship can help improve sustainable livelihoods, economic empowerment, and education for tribal communities while also preserving their cultural heritage. All of these studies argue that, to improve health outcomes, especially for vulnerable and marginalized populations, there is a need to strengthen health systems, address inequalities, improve access to health care, and implement community-based interventions.

3. RESEARCH GAP

1. Limited studies on the socioeconomic factors influencing infant mortality among tribal communities.
2. Insufficient research on the role of prenatal and postnatal healthcare access in reducing infant mortality in tribal areas.

4. RESEARCH OBJECTIVES

1. To analyze the socioeconomic determinants affecting infant mortality rates in tribal communities, including income level, maternal education, and employment status.
2. To assess the role of access to healthcare services, particularly prenatal and postnatal care, in influencing infant mortality patterns in tribal areas.

5. RESEARCH QUESTIONS

1. What is the relationship between socioeconomic factors such as household income, maternal education, and employment status and infant mortality rates in tribal communities?
2. What effect does access to health services; especially prenatal/postnatal care services have on the infant mortality rate in tribal areas?

6. SCOPE OF THE STUDY

The present study is concerned with access to maternal health services and how this can be used to reduce infant mortality rate among the tribal communities of Kendujhar District in Odisha. It looks at the use of prenatal, childbirth and postnatal services under the umbrella of Sustainable Development Goal 3 (SDG 3).

7. RESEARCH METHODOLOGY

The way a study is undertaken, including research design, data collection, sampling, and analysis of data. The present study is descriptive and analytical and investigates the relationship between availability of maternal care services and declining infant mortality rates in tribal communities. In the study, primary data sources and secondary data sources are used. Structured questionnaires and interviews are used to gather the primary data while the secondary data are gathered from government reports, The NFHS, WHO publications, SDG reports and the literature. The respondents are selected using purposive sampling technique. Collected data is analyzed using descriptive and statistical methods to interpret the collected data and to understand how access to maternal health care and socioeconomic status impact infant mortality outcomes. Ethical issues such as informed consent, confidentiality, and voluntary participation are observed during the research process.

Hypothesis

- H1: There is a significant relationship between socioeconomic status and infant mortality rates in tribal communities.
- H2: Greater access to prenatal and postnatal healthcare services is associated with lower infant mortality rates in tribal populations.

8. RESULTS AND DISCUSSION

8.1 Gender wise distribution

The data on gender-wise distribution have been taken from a questionnaire survey of 400 respondents, as presented in Table 1. The findings reveal that, of the total respondents, females accounted for 70% and males for 30%. Since the study was mainly on maternal health and health outcomes, the increased involvement of women is not surprising.

Table 1: Gender-wise distribution

Gender	No. of respondents	Percentage
Male	120	30
Female	280	70
Total	400	100

(Source: Study Result)

8.2 Age-wise distribution

The age-wise distribution of respondents was determined based on participants' ages (18-60 years) using questionnaire-based surveys. Different age groups were included in the study to assess their awareness and involvement in maternal and child care practices. Respondents aged 18-30 years were aware of pregnancy care and the baby's health after birth. The group aged 31-40 years had the highest participation and was more actively involved in discussions about child healthcare. The 41-50 age group had a mixture of healthcare preference types. Participants in the 51-60 age group shared their knowledge and experience in the community about childcare practices.

Table 2: Age-wise distribution

Age	Male	Female	Male %	Female %
18-30	9	80	2.25	20
31-40	47	128	11.75	32
41-50	54	64	13.5	16
51-60	10	8	2.5	2
Total	120	280	30	70

(Source: Study Result)

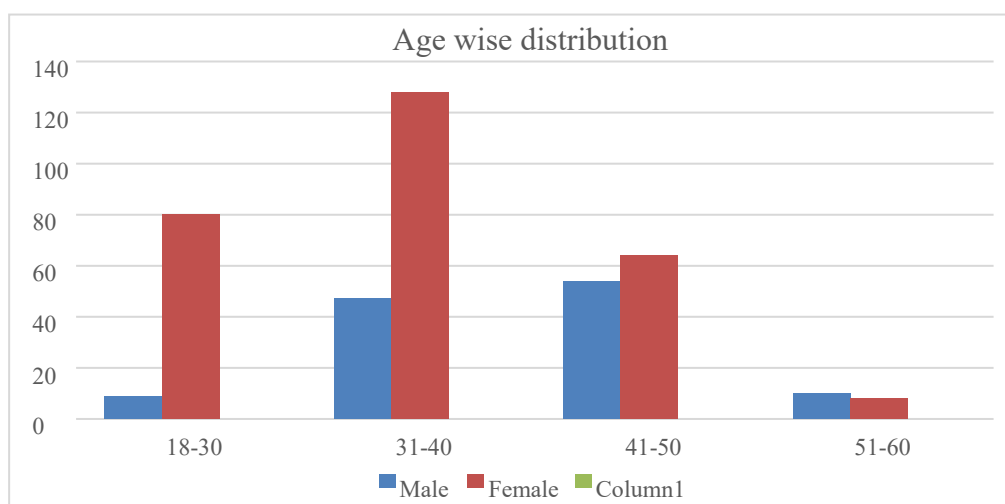


Figure 1: Age-wise distribution
(Source: Study Result)

8.3 Education Level

The educational level of the respondents is shown in Table 3. The results indicated that 31.0% of the respondents were highly educated, closely followed by 30.75% who were low educated. Medium-level education was reported by 18.25% of respondents, and

higher education by 18.0%. Respondents with very high education (3rd highest category) accounted for 2.0% of the total. The data show that the majority of respondents had either low or high education, while only a small number had a very high education level.

Table 3 Education Level

Educational Level	Respondent	Percentage
Low	123	30.75
Medium	73	18.25
High	124	31
Higher	72	18
Very high	8	2

(Source: Study Result)

8.4 Access to Drinking Water

Table 4 reveals that the majority of the respondents (352, 88%) depend upon handpumps for their drinking water. Of those who reported having access to piped water, 31 (7.75%) had piped water; 13

(3.25%) used water from rivers or streams; and 4 (1%) used other sources. The results show that handpumps are the primary source of drinking water, while access to piped drinking water remains low.

Table 4 Access to Drinking Water

Access to drinking water	Frequency	Percentage
Piped	31	7.75
Handpump	352	88
River/ Stream	13	3.25
Other	4	1

Source: Study Result

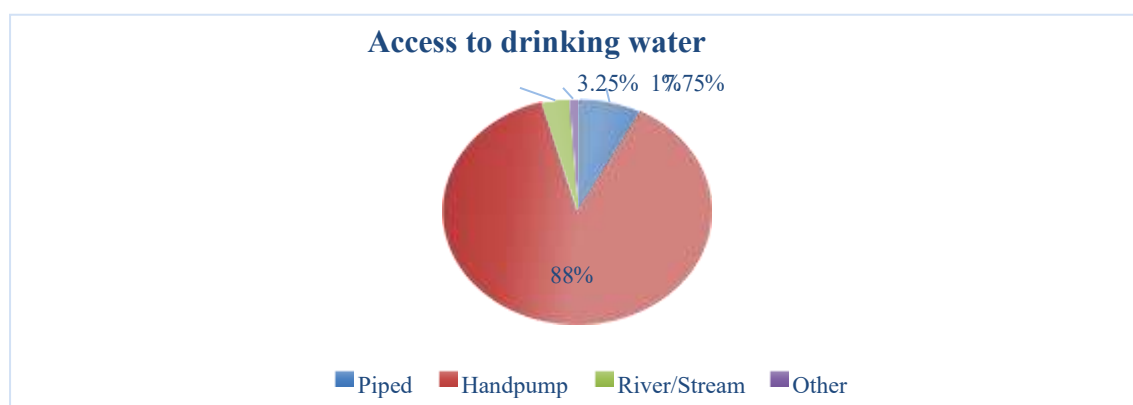


Figure 2: Access to Drinking Water
(Source: Study Result)

8.5 Received Antenatal Care (ANC) during last Pregnancy

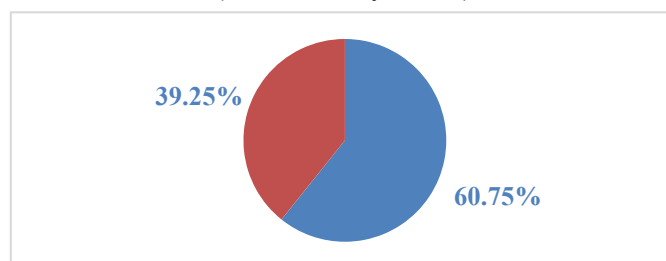
The results indicate that 60.75% of the respondents received an antenatal care (ANC) check-up during pregnancy, while 39.25% did not. Those who attended ANC services mentioned that support from

family, transport facilities, and counseling by ASHA/ANM workers helped them prioritize regular check-ups. On field visits, however, it was found that 157 respondents did not undergo any ANC check-ups during pregnancy, signifying a gap in access or utilization of maternal healthcare.

Table 5: Received Antenatal Care (ANC) during last Pregnancy

Response	Frequency (n)	Percentage (%)
Yes	243	60.75
No	157	39.25
Total	400	100.00

(Source: Study Result)



(Source: Study Result)

Figure 3: Received Antenatal Care (ANC) during last pregnancy

8.6 How many ANC visits did you attend

Table 6 presents the distribution of respondents according to the number of antenatal care (ANC) visits they attended during pregnancy. Of the total respondents, 73 (30.0%) attended the second ANC visit, and another 73 (30.0%) attended the third ANC visit, making these the most

commonly reported categories. Additionally, 49 (20.2%) respondents attended four or more ANC visits, indicating that approximately one-fifth of the participants completed the recommended number of ANC visits. The smallest proportion of respondents (48, 19.8%) attended only their first ANC visit.

Table 6: How many ANC visits did you attend

ANC visits	Frequency	Percentage
1st visit	48	19.8
2nd time visits	73	30.0
3rd time visits	73	30.0
4th or more visits	49	20.2

Source: Study Result

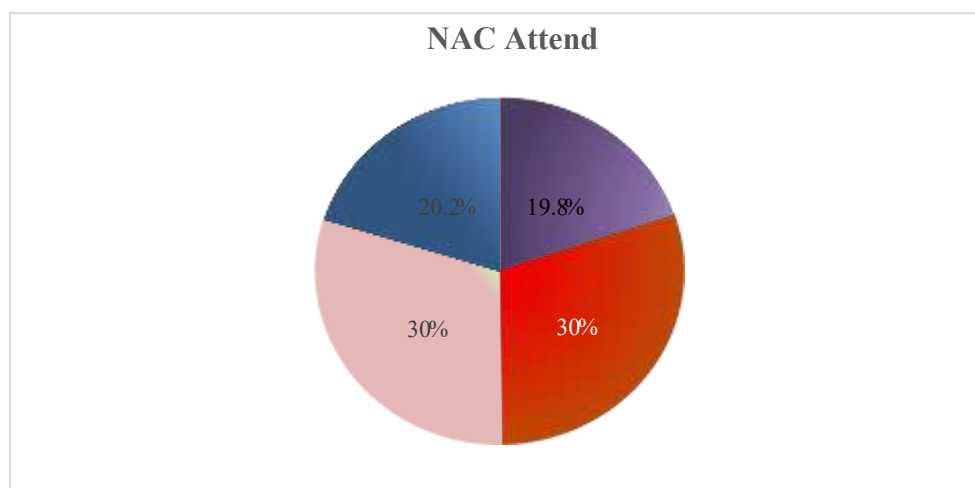


Figure 4: How many ANC visits did you attend
(Source: Study Result)

FINDINGS

The study outcomes reveal that maternal health care services have improved for tribal people in Kendujhar district, although a few areas still need improvement to ensure good maternal and infant health outcomes. Women's participation was the majority (70%), with the highest share in the 31-40 age group, the most active reproductive age. There was still some degree of difference in educational attainment, with 31.0% having a high level and only 2.0% having a very high level. Limited access to basic infrastructure, as most households (88%) used handpumps for drinking water. Regarding maternal healthcare utilization, 60.75% of respondents received antenatal care (ANC) during their last pregnancy, while 39.25% did not receive any ANC, indicating that a significant proportion of women still experience challenges accessing maternal healthcare services. Of those who used ANC, the second and third ANC visits were the most frequently attended (30.0% each), though 20.2% attended four or more visits, indicating that although many women take up ANC, they do not attend all their ANC visits. The findings indicate that while maternal health services are becoming more widely used, increasing ANC continuity, improving healthcare infrastructure, increasing community awareness, and addressing socioeconomic and geographical

barriers are important in order to meet the targets of SDG 3: Good health and well-being and reduce infant mortality.

CONCLUSION

The study has found that maternal health care services help enhance maternal and infant health outcomes among tribal people in Kendujhar District, Odisha. The results showed that women who used antenatal care services were more likely to receive basic maternal health care, leading to improved health outcomes and lower infant mortality rates. Though the Government has introduced maternal health programs, a significant proportion of women either did not receive antenatal care or did not attend the required number of ANC visits due to geographical separation, poor healthcare infrastructure, poor transportation, lack of awareness, and socioeconomic factors. These continue to impede access to quality maternal health services in tribal communities in an equitable manner. So, strengthening Primary Healthcare systems, improving accessibility to maternal healthcare systems, improving awareness among communities through ASHA and ANM workers, and ensuring that antenatal and Postnatal care are continuous are essential for reducing preventable infant deaths. Ensuring access to quality maternal health services for all will not only enhance

maternal and child health but also play a crucial role in achieving Sustainable Development Goal 3 (SDG 3) – Good Health and Well-being by ensuring healthy lives and promoting well-being for all, especially vulnerable tribal populations.

Declaration by Authors

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