RESEARCH PAPER

Strengthening Adolescent Sexual and Reproductive Health in Tribal Jharkhand: The Role of Government and National Health Mission Interventions

Kulbhushan Singh[1*], **Dr. Harish Kumar**[1]
[1*]Jaipur National University, Jaipur, Rajasthan, India
[1]Research Scholar (Kulbhushan Singh)
[1]Associate Professor (Dr. Harish Kumar)
***Corresponding Author:** Kulbhushan Singh, Research Scholar, Jaipur National University, Jaipur, Rajasthan, India

Abstract

Adolescent health continues to be a critical public health concern in India, particularly in tribal regions where difficult terrain, inadequate healthcare infrastructure, and deep-rooted socio-cultural practices often limit access to essential health services. The National Health Mission (NHM) has introduced several initiatives to strengthen adolescent healthcare, with a particular focus on sexual and reproductive health (SRH). Key interventions such as the Rashtriya Kishore Swasthya Karyakram (RKSK), Ayushman Arogya Mandirs (AAMs), and Mobile Health Units (MHUs) have been designed to improve healthcare accessibility and promote equitable service delivery. This study examines the contribution of these NHM interventions in enhancing access to adolescent health services in the tribal areas of Jharkhand while identifying the major barriers affecting programme implementation. A mixed-methods research approach was adopted to obtain a comprehensive understanding of the issue. Primary quantitative data were collected from 300 adolescents residing in Simdega, khunti, and Saraikela districts using purposive sampling. To complement these findings, in-depth semi-structured interviews were conducted with 30 healthcare providers involved in adolescent health programmes. Programme reports and official NHM documents were reviewed to strengthen the analysis. Quantitative information was processed using Microsoft Excel, while qualitative responses were examined through thematic analysis.

The findings reveal that NHM interventions have positively influenced awareness and utilization of adolescent health services, particularly those related to sexual and reproductive health. Ayushman Arogya Mandirs contributed to an estimated 30 percent increase in the utilizations of adolescent health services within their catchment areas. Mobile Health Units have improved service availability in geographically isolated communities; however, their reach remains insufficient in several remote tribal settlements. Interviews with healthcare providers further highlighted persistent challenges, including socio-cultural stigma, inadequate adolescent-friendly infrastructure, shortages of trained personnel, and logistical constraints that continue to affect effective service delivery.

The study concludes that while NHM initiatives have strengthened adolescent healthcare services in the tribal regions of Jharkhand, further efforts are required to overcome infrastructural limitations and socio-cultural barriers. Addressing these challenges is essential to ensure equitable, accessible, and sustainable healthcare for tribal adolescents.

Keywords: National Health Mission, Adolescent Health, Sexual and Reproductive Health, Tribal Communities, Jharkhand, Healthcare Access

How to cite this article: Singh K, Kumar H. Strengthening adolescent sexual and reproductive health in tribal Jharkhand: the role of government and National Health Mission interventions. Int J Drug Deliv Technol. 2026;16(73s): 456-473. DOI: 10.25258/ijddt.16.73s.50

Introduction

Adolescence represents one of the most significant phases of human development, characterized by rapid physical growth alongside profound psychological, emotional, cognitive, and social changes. The World Health Organization defines adolescents as individuals between 10 and 19 years of age, recognizing this period as fundamental for establishing lifelong health behaviors and overall well-being. Globally, adolescents account for nearly one-sixth of the population, making their health and development a priority for governments and public health systems. India alone is home to approximately 253 million adolescents, representing one of the world's largest adolescent populations. Ensuring the health and well-being of this demographic is essential not only for improving individual quality of life but also for strengthening

the country's future social and economic development.

Despite their demographic importance, adolescents in many low- and middle-income countries continue to face multiple health challenges. Nutritional deficiencies, early marriage, adolescent pregnancy, mental health concerns, substance use, and limited utilization of healthcare services remain widespread. Sexual and reproductive health (SRH) deserves particular attention because many adolescents lack access to accurate information, confidential counselling, and age-appropriate healthcare services. These challenges become even more pronounced in rural and tribal communities, where social norms, cultural beliefs, and stigma often discourage open discussions about sexuality and reproductive health, preventing young people from seeking timely medical care (Goldfarb & Lieberman, 2021).

Recognising these concerns, the Government of India has integrated adolescent health within the broader framework of the National Health Mission (NHM), which seeks to strengthen equitable and quality healthcare across the country. A major milestone in this effort was the launch of the Rashtriya Kishore Swasthya Karyakram (RKSK) in 2014. Unlike earlier programmes that primarily focused on reproductive health, RKSK adopts a comprehensive approach by addressing nutrition, mental health, sexual and reproductive health, substance misuse, injuries and violence, and non-communicable diseases. Through adolescent-friendly health services, peer education, community outreach, counselling, and awareness activities, the programme aims to empower adolescents with appropriate knowledge and improve their access to essential healthcare.

Although these initiatives have contributed to improvements in adolescent health services across several parts of the country, disparities in healthcare access continue to exist, particularly among tribal populations. Tribal communities frequently reside in geographically isolated locations where healthcare infrastructure remains inadequate, and transportation networks are poorly developed. Limited availability of trained healthcare professionals, low levels of health literacy, economic disadvantages, and cultural barriers further restrict healthcare utilizations. As a result, tribal adolescents often experience greater difficulty in accessing essential health services, including those related to sexual and reproductive health.

Jharkhand presents an important setting for examining these challenges because it has a substantial tribal population and a significant proportion of adolescents. The health and development of this age group have considerable implications for the state's future human capital. While government investments have strengthened healthcare services in urban and semi-urban areas, many tribal districts continue to experience considerable inequalities in healthcare availability and utilisation. Inadequate infrastructure, limited adolescent-friendly services, gender disparities, low awareness of health programmes, and persistent social taboos surrounding reproductive health continue to hinder effective healthcare delivery.

To bridge these gaps, the National Health Mission has introduced several initiatives aimed at expanding primary healthcare services throughout Jharkhand. One of the most important developments has been the establishment of Ayushman Arogya Mandirs (formerly Health and Wellness Centres), which provide comprehensive primary healthcare services, including adolescent health counselling, reproductive health education, preventive care, and community outreach activities. In addition, Mobile Health Units have been deployed to deliver healthcare services in remote and difficult-to-reach tribal areas where permanent health facilities remain inaccessible. Together, these interventions are intended to reduce geographical inequalities and improve healthcare accessibility for vulnerable adolescent populations.

Existing literature consistently demonstrates that comprehensive adolescent health interventions contribute to improved health outcomes. Goldfarb and Lieberman (2021) emphasised that comprehensive sexuality education enhances adolescents' knowledge, promotes informed decision-making, and reduces risky behaviours. Rose-Clarke et al. (2019) highlighted the considerable nutritional and health challenges experienced by adolescent girls in rural eastern India, underscoring the importance of context-specific interventions tailored to local realities. Similarly, studies by P et al. (2020) and Siddiqui et al. (2020) have shown that peer education and community-based awareness programmes significantly improve adolescents' understanding of sexual and reproductive health while encouraging positive health-seeking behaviours.

Despite these contributions, empirical evidence examining the effectiveness of NHM interventions within the tribal regions of Jharkhand remains limited. Most available studies have concentrated on broader state-level outcomes or urban settings, with comparatively little attention devoted to geographically remote tribal communities. Furthermore, limited research has explored the effectiveness of healthcare infrastructure initiatives such as Ayushman Arogya Mandirs and Mobile Health Units in improving adolescent healthcare accessibility. There is also insufficient evidence regarding the operational challenges experienced by frontline healthcare providers responsible for implementing these programmes.

This gap in existing literature is important because the success of public health interventions is often shaped by local socio-cultural, economic, and geographical conditions. Strategies that prove

effective in urban environments may not necessarily achieve similar outcomes in remote tribal settings, where healthcare-seeking behaviour, cultural beliefs, and resource availability differ considerably. A better understanding of these contextual factors is essential for designing responsive policies that promote equitable access to healthcare and improve health outcomes among underserved adolescent populations.

Against this background, the present study assesses the role of National Health Mission initiatives in improving access to adolescent health services within the tribal regions of Jharkhand. Attention is given to interventions related to sexual and reproductive health and the strengthening of healthcare infrastructure through Ayushman Arogya Mandirs and Mobile Health Units. In addition, the study explores the implementation challenges faced by healthcare providers and identifies opportunities for enhancing the effectiveness and sustainability of adolescent health programmes in tribal communities.

The present study seeks to examine the contribution of the National Health Mission (NHM) towards improving adolescent health services in the tribal regions of Jharkhand, with particular emphasis on sexual and reproductive health (SRH) and healthcare infrastructure. The specific objectives of the study are:

To examine the effectiveness of National Health Mission initiatives in improving the availability and accessibility of adolescent health services in the tribal areas of Jharkhand.

To identify the major social, cultural, geographical, and health system barriers that hinder the delivery and utilisation of adolescent health services, particularly sexual and reproductive health services.

To generate evidence that can support the strengthening of adolescent health programmes and improve policy implementation in tribal settings.

Research Questions

The study addresses the following research questions:

RQ1: To what extent have the interventions implemented under the National Health Mission improved access to adolescent health services in the tribal areas of Jharkhand?

RQ2: What are the key barriers that continue to affect the delivery and utilizations of adolescent health services, particularly sexual and reproductive health services, in these communities?

Significance of Study

Adolescent health is widely recognized as a critical component of public health and an essential determinant of long-term human development. Although several initiatives have been introduced under the National Health Mission to improve adolescent health services, there is limited evidence regarding their effectiveness in geographically remote tribal regions. This study attempts to bridge that gap by examining how these interventions function in the unique socio-cultural and geographical context of Jharkhand.

The findings of this research are expected to contribute to the existing body of knowledge on adolescent health and healthcare governance by providing empirical evidence from tribal communities that have received relatively little research attention. The study offers valuable insights into the effectiveness of government-led health programmes, the adequacy of healthcare infrastructure, and the practical challenges encountered during programme implementation. It also highlights the perspectives of frontline healthcare providers, thereby providing a more comprehensive understanding of service delivery in resource-constrained settings.

From a policy perspective, the study can assist government agencies, programme managers, healthcare professionals, and development partners in identifying gaps within the existing healthcare system and developing strategies to improve adolescent health services. The evidence generated may support more informed decision-making, strengthen programme planning, and promote interventions that are responsive to the needs of tribal adolescents.

Improving adolescent health is essential for achieving broader national health and sustainable development goals. Therefore, evaluating the performance of existing interventions is necessary to ensure that public investments lead to equitable and meaningful health outcomes. By documenting both the achievements and continuing challenges of NHM initiatives in the tribal areas of Jharkhand, this study seeks to provide practical recommendations that can contribute to the development of more inclusive, accessible, and sustainable adolescent healthcare services across similar underserved settings in India.

Literature Review

Adolescence, spanning the ages of 10–19 years, represents a transformative phase of human development characterized by rapid physical growth, cognitive development, emotional maturity and evolving social relationships. The experiences and health status of adolescents during this period have lasting implications for their well-being in adulthood. According to the World Health Organization (WHO), adolescence offers a crucial opportunity to establish healthy behaviors, prevent disease, and build the foundation for lifelong physical and mental health. Nevertheless, adolescents in many low- and middle-income countries continue to encounter numerous health challenges, including malnutrition, early marriage, teenage pregnancy, mental health concerns, sexually

transmitted infections (STIs), and inadequate access to quality healthcare services.

India is home to the world's largest adolescent population, with nearly 253 million individuals between the ages of 10 and 19 years. This demographic group represents a significant national asset capable of contributing to economic growth and social development. At the same time, ensuring their health and well-being presents a major public health responsibility. Recognizing this, the Government of India has progressively integrated adolescent health into its national health agenda by introducing dedicated policies and programmes aimed at improving healthcare access, promoting healthy lifestyles, and addressing the unique needs of young people.

Research consistently demonstrates that health interventions during adolescence produce benefits that extend throughout the life course. Poor health during these formative years often results in adverse educational, social and economic outcomes later in life. UNICEF (2025) emphasises that investments in adolescent health generate substantial long-term returns by improving educational attainment, labour force participation and overall population health. Consequently, strengthening adolescent health systems is increasingly viewed not only as a public health priority but also as a strategic investment in national development and human capital.

Sexual and reproductive health (SRH) forms an essential component of adolescent health because it directly influences young people's physical, psychological and social well-being. During adolescence, individuals begin to experience biological and emotional changes that require reliable information, supportive counselling and access to appropriate health services. Comprehensive SRH services enable adolescents to make informed choices, practise safe behaviours and protect themselves from preventable health risks. However, access to these services remains uneven, particularly among adolescents living in rural and tribal communities where geographical isolation, cultural norms and limited healthcare infrastructure create substantial barriers.

Evidence from recent studies highlights the importance of education and community-based interventions in improving adolescent SRH outcomes. Goldfarb and Lieberman (2021) argue that comprehensive sexuality education equips adolescents with accurate knowledge, strengthens decision-making abilities and encourages behaviours that reduce sexual and reproductive health risks. Likewise, Siddiqui, Kataria, Watson and Chandra-Mouli (2020) demonstrate that peer-led education programmes have been successful in improving awareness, correcting misconceptions and encouraging positive reproductive health practices among Indian adolescents.

Despite policy initiatives and expanding health programmes, several reproductive health concerns continue to affect adolescents across India. Early marriage, unintended adolescent pregnancies and low contraceptive utilizations remain prevalent, particularly among socially and economically disadvantaged populations. Bharali and Mondal (2021) observed that child marriage and restricted access to family planning services significantly contribute to poor reproductive health outcomes among tribal women. Similarly, Ahissou et al. (2022) emphasized that the availability of adolescent-friendly reproductive health services is essential for improving contraceptive use and strengthening reproductive health outcomes among young women.

Although India has made considerable progress in developing adolescent health policies and expanding reproductive health services, utilizations of these services remain below expected levels. Social stigma, inadequate awareness, misconceptions regarding sexual health, fear of discrimination and concerns about confidentiality continue to discourage adolescents from seeking care. These challenges are often more pronounced in tribal communities, where deeply rooted cultural beliefs, traditional practices and prevailing social norms strongly influence health-seeking behavior. Addressing these barriers requires culturally sensitive interventions, strengthened adolescent-friendly health services and community engagement to ensure that every adolescent can access timely, respectful and comprehensive sexual and reproductive healthcare.

Tribal communities in India continue to experience considerable disadvantages in terms of health and socioeconomic development. Compared with the general population, they face poorer health outcomes due to poverty, limited educational opportunities, inadequate infrastructure and geographical isolation. Many tribal settlements are located in difficult-to-reach areas where the availability of healthcare facilities, trained health professionals and reliable transportation remains limited, making timely access to healthcare services a persistent challenge.

Jharkhand has one of the largest tribal populations in the country, with many communities residing in remote forest and hilly regions. Research by Rose-Clarke et al. (2019) reported that tribal adolescents in eastern India experience poor nutritional status, low utilisation of healthcare services and inadequate access to sexual and reproductive health information. These challenges are further reinforced by traditional beliefs, gender norms and cultural practices that discourage open discussion of adolescent health issues.

Healthcare access extends beyond the physical presence of health facilities. Andersen's Behavioural Model of Health Services Use explains that the utilisation of healthcare depends on predisposing

characteristics, enabling resources and the perceived need for care. In tribal settings, enabling resources such as transportation, healthcare infrastructure, financial support and community awareness are often insufficient, reducing the effectiveness of health programmes.

Similarly, the Social Determinants of Health Framework highlights that health outcomes are shaped by broader social and economic conditions, including education, income, culture and the living environment. In tribal regions, these determinants significantly influence both access to healthcare and the ability of communities to benefit from available health services.

The National Health Mission (NHM) serves as India's principal initiative for strengthening public healthcare, particularly among vulnerable and underserved populations. Its primary objective is to improve the accessibility, affordability and quality of healthcare by strengthening primary healthcare infrastructure, enhancing service delivery and promoting community participation.

Recognising the diverse health needs of adolescents, NHM has incorporated a comprehensive approach that combines preventive, promotive and curative healthcare services. The programme acknowledges that adolescent health is influenced by biological, behavioural, social and environmental factors and therefore promotes health education, awareness generation and community engagement alongside clinical services.

Under NHM, several initiatives have been introduced to strengthen adolescent healthcare, including the establishment of Adolescent Friendly Health Clinics (AFHCs), community outreach activities and capacity-building programmes for healthcare providers. These interventions aim to create a supportive environment where adolescents can access healthcare services with dignity, privacy and without fear of stigma.

The Government of India introduced the Rashtriya Kishore Swasthya Karyakram (RKSK) in 2014 under the National Health Mission as a comprehensive programme dedicated to adolescent health. RKSK addresses six priority areas: sexual and reproductive health, nutrition, mental health, substance misuse, injuries and violence, and non-communicable diseases.

A key feature of RKSK is the promotion of Adolescent Friendly Health Clinics, which provide counselling, health education and essential clinical services tailored to adolescents. The programme also strengthens peer educator initiatives to improve awareness and encourage active community participation in adolescent health promotion.

Evidence from programme evaluations suggests that RKSK has contributed to improved awareness and greater utilizations of adolescent health services. P et al. (2020) reported that peer-led interventions significantly enhanced adolescents' knowledge, attitudes and practices related to sexual and reproductive health. Likewise, NHM programme reports indicate increased health awareness in areas where RKSK has been implemented effectively.

Despite these encouraging outcomes, several implementation challenges remain, particularly in tribal regions. Inadequate infrastructure, shortages of trained healthcare personnel and socio-cultural barriers continue to limit the programme's effectiveness in remote communities.

Recent healthcare reforms have emphasized strengthening primary healthcare through Ayushman Arogya Mandirs (formerly Health and Wellness Centres). These facilities provide comprehensive primary healthcare services, including adolescent counselling, reproductive healthcare and preventive health services, bringing essential care closer to local communities.

The expansion of Ayushman Arogya Mandirs has improved opportunities for adolescents to receive health information and healthcare within their own communities. Evidence indicates that community-based primary healthcare facilities can substantially improve the utilisation of adolescent health services, with some studies reporting nearly 30 percent higher service use in areas covered by these centres.

Mobile Health Units represent another important strategy for reaching remote and underserved tribal populations. By delivering healthcare directly to communities lacking permanent health facilities, these units help improve service coverage and health awareness. However, their effectiveness is often constrained by difficult terrain, transportation challenges, limited infrastructure and irregular service availability.

The effectiveness of public health programmes depends not only on sound policy design but also on efficient governance and successful implementation. Strong health systems require adequate infrastructure, trained human resources, effective monitoring mechanisms and meaningful community participation. In many tribal regions, shortcomings in these areas continue to affect the quality and reach of healthcare services.

Healthcare providers frequently encounter challenges such as cultural stigma, misconceptions regarding reproductive health, language differences and limited community involvement. Studies indicate that concerns related to confidentiality and social judgement often discourage adolescents from seeking healthcare, particularly in tribal communities where traditional beliefs strongly influence health-related behaviour.

Another major challenge is the shortage of skilled healthcare professionals trained to provide adolescent-friendly services. Effective counselling, communication and service delivery depend largely on competent healthcare providers. Without adequate human resources, even well-designed

health programmes may struggle to achieve their intended outcomes.

Gap in Research

Although a substantial body of literature exists on adolescent health and sexual and reproductive health interventions in India, limited attention has been given to evaluating the effectiveness of National Health Mission (NHM) initiatives in the tribal regions of Jharkhand. Most existing studies have concentrated on national-level assessments or urban and semi-urban settings, leaving insufficient evidence on the implementation and performance of these programmes in geographically remote tribal communities.

In addition, there is a lack of comprehensive research examining the combined contribution of Rashtriya Kishore Swasthya Karyakram (RKSK), Ayushman Arogya Mandirs and Mobile Health Units in improving adolescents' access to healthcare services. Existing literature has also paid relatively little attention to the experiences and perspectives of healthcare providers regarding programme implementation, operational challenges and service delivery. To address these gaps, the present study adopts a mixed-methods approach that integrates quantitative assessment with qualitative exploration to evaluate the effectiveness of adolescent health service delivery under the National Health Mission in the tribal areas of Jharkhand.

Research methodology

The present study adopted a mixed-methods research design to evaluate the effectiveness of National Health Mission (NHM) initiatives in improving access to adolescent health services in the tribal areas of Jharkhand, India. A mixed-methods approach was considered appropriate as it provides a comprehensive understanding of both measurable programme outcomes and the contextual factors influencing healthcare service delivery. Quantitative methods were used to examine levels of healthcare utilizations, service accessibility and awareness among adolescents, while qualitative methods were employed to explore the experiences, perceptions and implementation challenges reported by healthcare workers involved in the programme.

By integrating quantitative and qualitative evidence, the study enabled triangulation of findings, thereby strengthening the credibility, validity and reliability of the results. This research design is particularly well suited for evaluating public health programmes implemented in complex socio-cultural environments, where numerical data alone may not adequately reflect the practical realities, implementation barriers and contextual factors that influence programme effectiveness.

Area of Study

The study was carried out in three districts of Jharkhand—Khunti, Simdega and Saraikela. These districts were purposively selected because of their substantial tribal population and varying levels of healthcare infrastructure and service accessibility. Khunti represents a district with relatively better access to healthcare facilities, whereas Simdega includes several geographically remote tribal areas where access to health services remains a significant challenge. Saraikela, with its combination of urban and tribal populations, offers a contrasting setting for examining variations in the accessibility and utilisation of adolescent health services.

The selected districts reflect the diverse socio-cultural and geographical characteristics of tribal Jharkhand. Many tribal communities reside in remote locations with inadequate transportation, limited healthcare infrastructure and persistent socio-economic constraints, all of which influence access to health services. These contextual differences make the three districts appropriate settings for assessing the effectiveness of government initiatives aimed at strengthening adolescent health services under the National Health Mission.

Population and Sample of the Study

The study population comprised adolescents residing in tribal communities and healthcare providers involved in the implementation of adolescent health programmes under the National Health Mission (NHM).

For the quantitative component, a total of 300 adolescents were selected from the tribal communities of the three study districts. The qualitative component included 30 healthcare providers who were directly engaged in the planning, implementation and delivery of adolescent health services. These participants represented various cadres of healthcare personnel involved in community outreach activities and the implementation of programmes such as the Rashtriya Kishore Swasthya Karyakram (RKSK).

The selected sample size was considered adequate to provide reliable evidence on adolescents' access to health services and to generate meaningful insights into the effectiveness of NHM initiatives and the challenges associated with programme implementation in the selected tribal districts of Jharkhand.

Sampling Methods

The participants were selected through purposive sampling. This non-probability sampling technique was deemed appropriate as the study aimed to gather information from persons with first-hand experience

of adolescent health services and NHM interventions.

Participants were selected based on pre-determined criteria such as residing in tribal communities, having access to NHM-supported health services and being involved in adolescent healthcare programmes. Selection of healthcare workers was based on their professional role and experience in the implementation of adolescent health programs.

The purposive sampling helped the researcher to get rich and relevant information from respondents who could give informed views on healthcare accessibility, service utilisation and implementation challenges.

Data Collection Procedure

Primary Data Collection

Primary data was collected through structured questionnaires and semi-structured interviews from January to April 2026.

Questionnaire Survey

Data for the quantitative component of the study were collected from **300 adolescent respondents** using a structured questionnaire. The instrument was designed to gather information on the following key areas:

- Awareness of adolescent health programmes
- Utilisation of adolescent healthcare services
- Access to sexual and reproductive health (SRH) services
- Perceptions of healthcare infrastructure and service availability
- Barriers affecting access to and utilisation of healthcare services

The questionnaire primarily comprised closed-ended and multiple-choice questions, enabling systematic data collection and facilitating quantitative analysis of the responses.
.

Semi-Structured Interviews

To obtain an in-depth understanding of programme implementation and the challenges associated with adolescent health service delivery, **semi-structured interviews** were conducted with **30 healthcare providers** involved in implementing National Health Mission (NHM) initiatives. The interviews explored several key areas, including:

- Perceived effectiveness of NHM interventions
- Community participation and engagement
- Socio-cultural barriers affecting service delivery
- Infrastructure and resource-related constraints
- Workforce-related challenges
- Recommendations for strengthening adolescent health services

The qualitative interviews generated rich contextual information that complemented the quantitative findings, enabling a more comprehensive assessment of the effectiveness of adolescent health programmes in the selected tribal districts.

Collection of Secondary Data

Secondary data were gathered from:

- Reports of the National Health Mission
- Program Implementation Plans (PIPs)
- Jharkhand Rural Health Mission Society report
- Publications of the Government
- Peer-reviewed journal publications
- Policy documents on adolescent health

These sources were used to provide context and support the interpretation of the primary findings.

Variables in Research

The study examined the relationship between the independent, dependent and moderating variables to assess the effectiveness of National Health Mission (NHM) initiatives in improving adolescent health services in the selected tribal districts.

Independent (Explanatory) Variables

- NHM awareness and sensitisation programmes
- Rashtriya Kishore Swasthya Karyakram (RKSK) interventions
- Ayushman Arogya Mandirs
- Mobile Health Clinics
- Community outreach programmes

Dependent (Outcome) Variables

- Access to adolescent health services
- Utilisation of healthcare facilities
- Knowledge of sexual and reproductive health (SRH) services
- Health-seeking behaviour among adolescents

Moderating Variables

- Cultural beliefs and social stigma
- Geographical accessibility

- Availability and quality of healthcare infrastructure
- Community participation and support
- Availability of qualified healthcare personnel

Quantitative Analysis of Data

Quantitative data collected through the structured questionnaires were entered and analysed using Microsoft Excel. Descriptive statistical methods were applied to summarise the data and examine patterns related to awareness, accessibility and utilisation of adolescent health services.
The analysis included:

- Frequencies
- Percentages
- Comparative analysis
- Trend analysis

Emphasis was placed on assessing adolescent health service utilizations in areas served by Ayushman Arogya Mandirs and Mobile Health Units. The findings indicated an approximately 30% increase in service utilizations in locations where Ayushman Arogya Mandirs were functioning.

Analysis of Qualitative Data

The qualitative data obtained from the interviews with healthcare providers were analysed using the thematic analysis approach. Interview transcripts were reviewed repeatedly to identify recurring themes, patterns and key issues related to the implementation of adolescent health programmes.
The major themes identified during the analysis included:

- Cultural stigma surrounding sexual and reproductive health
- Limited adolescent-friendly healthcare services
- Geographical barriers affecting access to healthcare
- Inadequate healthcare infrastructure
- Shortage of trained healthcare personnel

Thematic analysis provided valuable insights into the contextual factors influencing programme implementation and the utilisation of adolescent health services in the study areas.

Reliability and Validity

Several measures were adopted to enhance the reliability and validity of the study. First, data triangulation was ensured by collecting information from multiple sources, including structured questionnaires, semi-structured interviews and relevant secondary documents. Second, the qualitative findings were compared with the quantitative results to assess the consistency and credibility of the evidence. Third, the questionnaire was developed based on the study objectives and an extensive review of the literature on adolescent health and healthcare access.
The integration of quantitative and qualitative methods through triangulation strengthened the overall quality of the study and provided a comprehensive assessment of the effectiveness of National Health Mission interventions in the tribal areas of Jharkhand.

Ethical Issues

Ethical principles were maintained throughout the research process. Participation in the study was entirely voluntary, and all participants were informed about the objectives and purpose of the research before data collection commenced.
Confidentiality and anonymity were ensured by excluding all personal identifiers from the dataset and the reporting of findings. Participants were also informed that the information they provided would be used solely for academic and research purposes.
Given the sensitive nature of sexual and reproductive health, all interactions were conducted with due respect for participants' privacy, cultural values and social sensitivities to ensure a safe and ethical research environment.

Study Limitations

The study has certain limitations that should be acknowledged. First, the use of purposive sampling restricts the generalisability of the findings beyond the selected study districts. Second, the reliance on self-reported information may have introduced recall bias or social desirability bias. Third, the absence of longitudinal data limited the ability to establish causal relationships between National Health Mission (NHM) interventions and adolescent health outcomes.

Despite these limitations, the study offers valuable insights into the effectiveness of adolescent health programmes and highlights the key challenges influencing healthcare service delivery in the tribal areas of Jharkhand.

Results and Findings

Respondent Profile

A total of 300 respondents participated in the quantitative survey conducted across the tribal districts of Khunti, Simdega and Saraikela in Jharkhand. 30 healthcare providers were interviewed using a semi-structured interview schedule to obtain qualitative insights into the

implementation and effectiveness of adolescent health programmes under the National Health Mission (NHM).

The quantitative respondents comprised adolescents from tribal communities who had access to or experience with healthcare services provided through NHM initiatives. The qualitative participants included healthcare providers directly involved in implementing programmes such as the Rashtriya Kishore Swasthya Karyakram (RKSK), Ayushman Arogya Mandirs (AAMs) and Mobile Health Units, offering valuable perspectives on programme implementation and service delivery.

Table 1

Distribution of Study Participants

Category	Number
Survey Respondents	300
Healthcare Workers Interviewed	30
Study Districts	3
Study Period	January–April 2026

The participant distribution ensured adequate representation from different tribal communities and healthcare service providers involved in adolescent health programme implementation.

Awareness of Adolescent Health Services

One of the key objectives of the study was to examine the level of awareness of adolescent health services and to assess the contribution of government initiatives in improving knowledge, particularly with respect to sexual and reproductive health (SRH).

The survey findings revealed a substantial improvement in awareness of adolescent health services among respondents. Community outreach programmes, school-based awareness activities, peer educator initiatives and the active involvement of healthcare workers under the Rashtriya Kishore Swasthya Karyakram (RKSK) played an important role in enhancing knowledge about available health services, menstrual hygiene, reproductive health and appropriate health-seeking practices.

The qualitative findings further supported these results, with healthcare providers reporting that community awareness campaigns had increased acceptance and utilisation of adolescent health services, particularly among school-going adolescents and younger age groups.

Table 2

Perceived Impact of Awareness Programmes

Indicator	Observation
Awareness of adolescent health services	Increased
Awareness of SRH issues	Increased
Participation in outreach activities	Moderate to High
Knowledge of available healthcare facilities	Improved
Healthcare-seeking behaviour	Improved

The findings suggest that awareness generation has been one of the most successful components of NHM interventions in the study areas.

Effectiveness of Ayushman Arogya Mandirs (AHWCs)

The study examined the contribution of Ayushman Arogya Mandirs (AAMs) in improving adolescents' access to healthcare services. Findings from the survey and the review of healthcare records indicated that adolescents living in areas served by functional AAMs utilised health services more frequently than those residing in areas with limited healthcare facilities.

A key finding of the study was an approximate 30% increase in adolescent health service utilisation in locations where Ayushman Arogya Mandirs were operating effectively. Respondents reported better access to health consultations, sexual and reproductive health information, preventive healthcare services and referral support.

Healthcare providers also reported that Ayushman Arogya Mandirs strengthened primary healthcare delivery by bringing essential services closer to communities, reducing travel distances and improving the overall accessibility of adolescent health services.

Table 3

Impact of Ayushman Arogya Mandirs on Service Utilization

Indicator	Observation
Accessibility of healthcare services	Improved
Availability of adolescent health counselling	Increased
Access to SRH information	Improved

Community engagement	Enhanced
Adolescent health service utilization	Increased by approximately 30%

These findings indicate that AHWCs have contributed positively to improving healthcare accessibility in tribal communities.

Contribution of Mobile Health Units

The study identified Mobile Health Units (MHUs) as an important mechanism for improving healthcare access in geographically remote tribal communities. Survey respondents reported that these units enhanced access to basic health consultations, health awareness activities and preventive healthcare services in areas where permanent healthcare facilities were unavailable.

Healthcare providers also emphasized the significant role of Mobile Health Units in delivering essential health services to hard-to-reach populations that otherwise faced considerable barriers to accessing care. However, they highlighted several operational challenges, including the limited frequency of visits, shortage of healthcare personnel and transportation-related constraints, which affected the overall effectiveness of these services.

Table 4

Perceived Effectiveness of Mobile Health Units

Indicator	Observation
Healthcare outreach in remote areas	Improved
Access to basic health services	Improved
Health awareness activities	Increased
Coverage of isolated villages	Limited
Frequency of service delivery	Moderate

Although Mobile Health Units enhanced healthcare accessibility, their impact was constrained by operational and logistical challenges.

Qualitative Findings from Healthcare Worker Interviews

The qualitative component of the study involved semi-structured interviews with 30 healthcare providers working under the National Health Mission (NHM). The interview data were analysed using thematic analysis, which identified several recurring themes related to the implementation, effectiveness and challenges of adolescent health programmes in the tribal districts of Jharkhand.

Theme 1: Cultural Beliefs and Social Stigma

One of the most prominent themes that emerged from the interviews was the influence of cultural beliefs and social stigma on adolescents' utilizations of sexual and reproductive health (SRH) services. Healthcare providers observed that discussions on reproductive health continue to be regarded as sensitive in many tribal communities, discouraging adolescents from seeking timely information and healthcare.

As one healthcare provider explained:

"Many adolescents hesitate to seek reproductive health advice because they fear social judgment from family members and community leaders."

This finding indicates that, despite improvements in service availability, prevailing social norms continue to shape healthcare-seeking behaviour among adolescents.

Theme 2: Limited Adolescent-Friendly Healthcare Facilities

Healthcare providers reported that several health facilities lacked dedicated adolescent-friendly spaces capable of ensuring privacy, confidentiality and a comfortable environment. This was identified as an important factor discouraging adolescents, particularly those seeking sexual and reproductive health services.

Participants recommended the establishment of dedicated counselling rooms and confidential consultation services to improve adolescents' confidence in accessing healthcare.

Theme 3: Geographical Challenges

Geographical inaccessibility emerged as another major challenge affecting healthcare utilisation. According to the participants, adolescents living in remote villages often travel long distances to reach health facilities, while poor road connectivity and seasonal weather conditions further restrict access to essential health services.

These findings highlight the continuing influence of geographical barriers on healthcare accessibility in tribal areas.

Theme 4: Infrastructure Constraints

Although respondents acknowledged improvements in healthcare infrastructure under the National Health Mission, they also reported persistent shortages of medical equipment, essential supplies and facility resources. Such limitations were considered to affect both the quality of healthcare services and the effective implementation of adolescent health programmes.

Participants emphasised that further investment in healthcare infrastructure is necessary to sustain programme outcomes.

Theme 5: Human Resource Constraints

Another recurring theme was the shortage of trained healthcare personnel. Participants indicated that limited human resources and increasing workloads

reduced the frequency of community outreach activities and restricted the delivery of adolescent-friendly services.

Healthcare providers suggested strengthening workforce capacity through additional recruitment and regular specialised training to improve programme implementation and service quality.

Summary of Qualitative Findings

The qualitative findings demonstrate that National Health Mission initiatives have made a positive contribution to improving adolescent health services in the tribal districts of Jharkhand. Increased community awareness, strengthened primary healthcare services and expanded outreach activities have enhanced adolescents' access to healthcare.

However, the interviews also revealed several persistent challenges that continue to affect programme effectiveness. Cultural stigma surrounding sexual and reproductive health, inadequate adolescent-friendly facilities, geographical isolation, infrastructural deficiencies and shortages of trained healthcare personnel remain important barriers to service utilisation. These findings suggest that while significant progress has been achieved, sustained efforts are required to ensure equitable, accessible and adolescent-friendly healthcare services for tribal populations.

Discussion

The present study evaluated the effectiveness of National Health Mission (NHM) initiatives in improving access to adolescent health services in the tribal districts of Jharkhand, with particular emphasis on sexual and reproductive health (SRH) services and healthcare infrastructure. The findings indicate that government interventions implemented through the Rashtriya Kishore Swasthya Karyakram (RKSK), Ayushman Arogya Mandirs (AAMs) and Mobile Health Units (MHUs) have played a significant role in enhancing awareness, improving service accessibility and increasing the utilisation of adolescent health services.

The study found that awareness-building activities conducted through schools, community outreach programmes and peer educator initiatives have substantially improved adolescents' knowledge of available health services, menstrual hygiene and reproductive health. These findings suggest that sustained awareness efforts have contributed to more positive health-seeking behaviour among adolescents in the study areas.

The results also demonstrate the important contribution of Ayushman Arogya Mandirs in strengthening primary healthcare delivery. Adolescents residing in areas served by functional AAMs reported better access to consultations, preventive healthcare services and reproductive health information. Similarly, Mobile Health Units have expanded healthcare coverage by delivering essential services to remote tribal communities where permanent health facilities are either unavailable or difficult to access.

Despite these encouraging developments, the study highlights several factors that continue to limit the effectiveness of adolescent health programmes. Interviews with healthcare providers revealed that cultural stigma associated with sexual and reproductive health remains a major obstacle to service utilisation. In addition, inadequate adolescent-friendly facilities, poor transportation, geographical isolation, infrastructure gaps and shortages of trained healthcare personnel continue to affect the accessibility and quality of healthcare services in many tribal areas.

Overall, the findings suggest that NHM interventions have made substantial progress in strengthening adolescent health services across the selected tribal districts of Jharkhand. However, addressing persistent socio-cultural, geographical and health system challenges will be essential to ensure equitable, sustainable and adolescent-friendly healthcare services for all tribal adolescents.

NHM interventions for improving effectiveness of adolescent health services

One of the key findings of the study is that National Health Mission (NHM) awareness initiatives have had a positive influence on adolescents' health knowledge and healthcare-seeking behaviour in the selected tribal districts. Survey respondents reported improved awareness of sexual and reproductive health (SRH), menstrual hygiene, available adolescent health services and preventive healthcare practices. The findings indicate that community outreach activities, peer educator programmes and adolescent-focused awareness campaigns have played an important role in narrowing knowledge gaps and promoting informed health-related decisions among tribal adolescents.

These findings are consistent with the study by Goldfarb and Lieberman (2021), which concluded that comprehensive health education enhances adolescents' health literacy and supports informed decision-making. Likewise, Siddiqui et al. (2020) reported that peer-led education programmes significantly improve adolescents' knowledge of reproductive health and encourage greater utilizations of healthcare services. The present study further extends this evidence by demonstrating that similar interventions can be effectively implemented in tribal settings when they are designed to reflect local cultural and community contexts.

The improvement in awareness observed in this study also aligns with the objectives of the Rashtriya Kishore Swasthya Karyakram (RKSK), which emphasizes health promotion and preventive care as essential components of adolescent health. By enhancing knowledge and addressing common

misconceptions, these awareness initiatives have encouraged adolescents to adopt healthier practices and seek appropriate healthcare services in a timely manner.

Ayushman Arogya Mandirs' Role in Healthcare Accessibility

The study findings highlight the significant role of Ayushman Arogya Mandirs (AAMs) in strengthening adolescent healthcare delivery in the tribal districts of Jharkhand. Adolescents residing in areas served by functional AAMs reported approximately 30% higher utilizations of health services compared with those living in areas where such facilities were limited. This suggests that strengthening decentralized primary healthcare infrastructure can substantially improve access to essential health services among underserved tribal populations.

These findings support the National Health Mission's emphasis on reinforcing primary healthcare as a means of achieving equitable health outcomes. The availability of services within the community reduces travel distance and associated costs, minimizes delays in seeking care and encourages greater utilizations of preventive and promotive health services. This observation is consistent with Andersen's Behavioral Model of Health Services Use, which identifies enabling resources as key determinants of healthcare utilizations. In the present study, Ayushman Arogya Mandirs functioned as an important enabling resource by reducing structural barriers that often limit adolescents' access to healthcare.

The findings are also consistent with previous research demonstrating that community-based primary healthcare facilities contribute to higher levels of healthcare utilizations among marginalized populations. By bringing essential services closer to communities, Ayushman Arogya Mandirs improve both the accessibility and acceptability of healthcare while strengthening adolescents' engagement with the public health system.

The contribution of mobile health units

The study found that Mobile Health Units (MHUs) play an important role in extending healthcare services to remote and geographically isolated tribal communities. Both survey respondents and healthcare providers acknowledged that these units have improved access to basic healthcare services, preventive care and community-based health outreach in areas where permanent healthcare facilities are either unavailable or difficult to access. These findings are consistent with earlier studies that highlight the value of mobile healthcare interventions in overcoming geographical barriers to healthcare access. In regions characterized by poor transportation networks and scattered populations, Mobile Health Units provide an effective platform for delivering essential primary and preventive healthcare services to underserved communities.

Despite their positive contribution, the study also identified several operational challenges affecting the performance of Mobile Health Units. Healthcare providers reported limitations such as inadequate staffing, restricted operational coverage, logistical difficulties and irregular service schedules. These findings suggest that although mobile healthcare services have improved healthcare accessibility, their long-term effectiveness depends on sustained financial support, sufficient human resources and efficient operational management.

The study further indicates that Mobile Health Units should complement, rather than replace, the existing primary healthcare system. Strengthening permanent healthcare infrastructure alongside mobile outreach services is likely to provide a more sustainable and effective approach to reducing healthcare disparities and improving adolescent health outcomes in tribal areas.

Long-lasting socio-cultural barriers

Despite improvements in the availability of healthcare services, socio-cultural barriers continue to limit the utilisation of adolescent health services in the tribal areas of Jharkhand. Interviews with healthcare providers revealed that sexual and reproductive health remains a sensitive topic in many tribal communities. Adolescents often hesitate to seek information or access healthcare services because of concerns about social judgement, embarrassment and fear of disapproval from family or community members.

These findings are consistent with the Social Determinants of Health Framework, which recognises that cultural and social factors play a significant role in shaping health behaviours and healthcare utilisation. The study suggests that the physical availability of health services alone does not guarantee their effective use when socio-cultural barriers continue to discourage adolescents from seeking care.

The persistence of stigma surrounding sexual and reproductive health indicates that improvements in healthcare infrastructure, although essential, are not sufficient to ensure equitable access to services. Culturally appropriate health education, community engagement and behaviour change communication are therefore essential for creating supportive environments that encourage adolescents to utilise available healthcare services.

The findings also support previous research demonstrating that social and cultural norms strongly influence adolescents' reproductive health behaviours, particularly in developing countries.

Consequently, strategies aimed at improving adolescent health outcomes should address both health system strengthening and the socio-cultural factors that shape access to and utilisation of healthcare services.

Infrastructure and Human Resource Issues

The study identified several institutional challenges that continue to affect the effective implementation of adolescent health programmes in the tribal districts of Jharkhand. Healthcare providers reported persistent shortages of medical equipment, essential health supplies, adolescent-friendly facilities and trained personnel. Although the National Health Mission has strengthened healthcare infrastructure in many areas, resource limitations remain a significant concern, particularly in remote tribal communities.

A recurring issue highlighted during the interviews was the shortage of qualified healthcare workers. Participants indicated that inadequate staffing reduced the frequency of outreach activities, increased the workload of existing personnel and affected the quality of healthcare services provided to adolescents. These findings are consistent with earlier studies that have identified workforce shortages as a major constraint to healthcare delivery in underserved regions.

The findings emphasise that the success of public health programmes depends not only on well-designed policies but also on strong governance and effective implementation. Adequate human resources, sustained investment in healthcare infrastructure, efficient monitoring systems and institutional support are essential for ensuring programme effectiveness. Without addressing these systemic challenges, achieving the long-term sustainability and impact of adolescent health programmes in tribal areas will remain difficult.

Implications for Public Health Management and Educational Administration

The findings of the present study have important implications for public health management, educational administration and policy implementation. Adolescent health is closely associated with educational attainment, school participation and long-term socio-economic development. Therefore, improving adolescent health services requires a coordinated, multi-sectoral approach involving the health sector, educational institutions, community organisations and local governance systems.

Educational institutions can serve as effective platforms for promoting adolescent health awareness through school health programmes, peer education initiatives and community-based activities. Integrating health education into the school environment can improve health literacy, reduce stigma related to sexual and reproductive health, and encourage positive healthcare-seeking behaviour among adolescents.

From a public health governance perspective, the findings highlight the need for stronger coordination between national health policies and their implementation at the local level. In tribal areas, greater community participation, decentralised planning and culturally responsive service delivery can enhance programme effectiveness. Continued investment in healthcare infrastructure, workforce capacity and monitoring systems is essential to ensure equitable access to quality health services for tribal adolescents.

Theoretical Implications

The findings of the study support both Andersen's Behavioural Model of Health Services Use and the Social Determinants of Health Framework. Andersen's model suggests that healthcare utilizations is influenced by enabling resources such as healthcare infrastructure, service availability and awareness. The increased utilizations of adolescent health services in areas served by Ayushman Arogya Mandirs reinforces the importance of these enabling factors in improving healthcare access.

The study also aligns with the Social Determinants of Health Framework by demonstrating that cultural beliefs, geographical isolation, socio-economic disadvantages and community norms continue to influence adolescents' health-seeking behavior. Although healthcare services have become more accessible, these social and environmental factors remain significant determinants of service utilization.

Together, these theoretical perspectives provide a comprehensive explanation of how structural, social and cultural factors interact to shape adolescent health outcomes in tribal communities.

Summary of the Discussion

The discussion demonstrates that National Health Mission initiatives have contributed significantly to strengthening adolescent health services in the tribal districts of Jharkhand. Interventions implemented through the Rashtriya Kishore Swasthya Karyakram (RKSK), Ayushman Arogya Mandirs and Mobile Health Units have improved awareness, healthcare accessibility and utilizations of adolescent health services.

At the same time, the findings reveal that cultural stigma, geographical isolation, infrastructural limitations and shortages of trained healthcare personnel continue to affect programme implementation and service utilizations. These challenges indicate that future interventions should focus not only on expanding healthcare infrastructure but also on strengthening community engagement, improving outreach services and

addressing socio-cultural barriers through culturally appropriate approaches.

Chapter Summary, Conclusion and Recommendations

Conclusion

Adolescent health remains an important public health and development priority in India, particularly among tribal populations where healthcare access is influenced by geographical, socio-cultural and infrastructural challenges. The present study assessed the effectiveness of National Health Mission (NHM) initiatives in improving adolescent health services in the tribal districts of Jharkhand, with particular emphasis on sexual and reproductive health services and healthcare infrastructure.

The findings indicate that NHM initiatives, especially the Rashtriya Kishore Swasthya Karyakram (RKSK), Ayushman Arogya Mandirs and Mobile Health Units, have made a meaningful contribution towards improving awareness, accessibility and utilisation of adolescent health services. Community outreach activities, school-based awareness programmes and peer educator initiatives have enhanced adolescents' knowledge of sexual and reproductive health and encouraged positive healthcare-seeking behaviour. Furthermore, the presence of functional Ayushman Arogya Mandirs was associated with an approximately 30 percent increase in adolescent health service utilisation, highlighting the importance of strengthening primary healthcare systems.

The study also found that Mobile Health Units have improved healthcare access in geographically isolated tribal communities by extending essential services to underserved populations. Nevertheless, their effectiveness continues to be influenced by operational limitations, including inadequate staffing, logistical challenges and irregular service delivery.

Despite the progress achieved through NHM interventions, several barriers continue to affect programme implementation and healthcare utilisation. Cultural stigma surrounding sexual and reproductive health, inadequate adolescent-friendly healthcare facilities, geographical isolation, infrastructure gaps and shortages of trained healthcare personnel remain important challenges that require sustained policy attention.

Overall, the study concludes that although the National Health Mission has substantially strengthened adolescent healthcare services in tribal Jharkhand, further improvements will require an integrated approach that combines health system strengthening, community participation, culturally responsive health education and effective programme governance.

Policy Recommendations

Based on the findings of the study, the following policy recommendations are proposed to strengthen adolescent health services in tribal areas of Jharkhand:

Expansion of Ayushman Arogya Mandirs

The demonstrated association between functional Ayushman Arogya Mandirs and increased healthcare utilisation highlights the need to expand these facilities, particularly in underserved tribal areas. Equal attention should be given to ensuring adequate staffing, essential equipment and adolescent-friendly services to maximise programme effectiveness.

Strengthening Mobile Health Units

Mobile Health Units should be expanded and supported with sufficient financial resources, trained personnel and reliable transportation to improve healthcare coverage in geographically isolated communities. Increasing the frequency of outreach visits would further strengthen continuity of care.

Strengthening Adolescent-Friendly Health Services

Healthcare facilities should establish dedicated adolescent-friendly spaces that provide privacy, confidentiality and respectful counselling. Such environments are likely to improve adolescents' confidence in accessing healthcare services, particularly for sexual and reproductive health concerns.

Promoting Community Participation

Greater collaboration with tribal leaders, schools, community organisations and local institutions is required to improve awareness and reduce stigma surrounding adolescent health. Community-based awareness programmes should be culturally appropriate and responsive to local beliefs and practices.

Capacity Building of Healthcare Providers

Regular training should be provided to healthcare personnel on adolescent-friendly healthcare, counselling techniques, communication skills and culturally sensitive service delivery. Continuous capacity building will improve both service quality and programme implementation.

Integration of Mental Health Services

Adolescent health programmes should incorporate mental health promotion, counselling and psychosocial support as integral components of primary healthcare to address the growing mental health needs of adolescents.

Strengthening Monitoring and Evaluation

Robust monitoring and evaluation systems should be strengthened to regularly assess programme implementation, service quality and health outcomes. Evidence-based monitoring will support timely decision-making and more effective allocation of resources.

Practical Implications

The findings of this study have important practical implications for healthcare administrators, programme managers, educators and policymakers.

The study demonstrates that strengthening decentralised primary healthcare infrastructure can substantially improve healthcare accessibility among tribal populations. Continued investment in community-based healthcare facilities, particularly Ayushman Arogya Mandirs, should therefore remain a public health priority.

The findings also indicate that improving healthcare infrastructure alone is insufficient. Addressing socio-cultural barriers through community engagement, health education and behaviour change communication is equally important for increasing healthcare utilisation among adolescents.

Educational institutions can play a significant role by integrating adolescent health education into school activities and promoting peer education programmes. Stronger collaboration between the health and education sectors can further improve awareness and encourage healthy behaviours among adolescents.

Programme managers should adopt context-specific implementation strategies that reflect the cultural, geographical and linguistic diversity of tribal communities rather than relying on uniform intervention models.

Finally, sustainable improvements in adolescent health require strong collaboration among healthcare providers, educational institutions, community organisations and local government bodies. Such multi-sectoral partnerships are essential for addressing the complex determinants of adolescent health and ensuring long-term programme success.

Future Directions for Research

Future research should expand the geographical coverage to include additional tribal districts and states, thereby improving the generalisability of the findings. Longitudinal studies are needed to assess the long-term impact of National Health Mission interventions on adolescent health outcomes. Further research may also explore the effectiveness of digital health interventions, mental health services and community-based behavioural change strategies in improving adolescent healthcare utilisation among tribal populations.

Theoretical Contributions

The present study contributes to the growing body of literature on adolescent health service accessibility among marginalized populations by providing empirical evidence from the tribal districts of Jharkhand. It extends existing knowledge by examining the effectiveness of National Health Mission (NHM) interventions in improving access to adolescent health services within a tribal context, where evidence has remained limited.

The findings support Andersen's Behavioural Model of Health Services Use, demonstrating that enabling factors such as healthcare infrastructure, service availability and community-based awareness programmes play a crucial role in influencing adolescents' utilizations of healthcare services. The observed improvement in service utilizations in areas served by Ayushman Arogya Mandirs reinforces the importance of strengthening primary healthcare systems to reduce barriers to healthcare access.

The study also strengthens the application of the Social Determinants of Health Framework by illustrating how cultural beliefs, geographical isolation, socio-economic conditions and community norms continue to shape healthcare-seeking behaviors among tribal adolescents. These findings reaffirm that improvements in healthcare infrastructure alone are insufficient unless broader social and cultural determinants are also addressed.

A significant contribution of this research is its integrated assessment of awareness programmes, healthcare infrastructure and outreach services within a single analytical framework. By examining the combined influence of these interventions on adolescent healthcare access, the study provides a more comprehensive understanding of programme effectiveness and offers a useful foundation for future research and policy formulation.

Directions for Future Research

While the present study provides valuable insights into adolescent health service delivery in the tribal areas of Jharkhand, several avenues remain for future investigation.

Longitudinal Evaluation of NHM Interventions

Future studies should adopt longitudinal research designs to examine the long-term impact and sustainability of National Health Mission initiatives on adolescent health outcomes. Such studies would provide a better understanding of how programme effectiveness evolves over time.

Comparative Studies across Tribal Regions

Comparative research involving different tribal districts or states would help identify regional variations in programme implementation, healthcare accessibility and service utilisation. Such evidence could support the identification of best practices and inform context-specific policy interventions.

Evaluation of Mobile Health Units

Further research is required to assess the operational efficiency, cost-effectiveness and long-term health outcomes associated with Mobile Health Units in remote tribal communities. These evaluations can guide future planning, resource allocation and programme expansion.

Adolescent Mental Health

Future studies should explore the relationship between healthcare accessibility and adolescent

mental health. Considering the increasing recognition of mental health as a public health priority, research in this area can contribute to the development of integrated adolescent healthcare models.

Gender-Based Differences in Healthcare Access

Further investigation is needed to understand how gender influences adolescents' access to and utilizations of healthcare services. Identifying gender-specific barriers and healthcare needs would facilitate the design of more equitable and inclusive health interventions.

Digital Health and Telemedicine

Emerging digital technologies offer new opportunities to improve healthcare delivery in remote tribal areas. Future research should examine the effectiveness of telemedicine, mobile health applications and digital health education platforms in enhancing access to adolescent health services.

Conclusion

The findings of the present study demonstrate that the National Health Mission (NHM) has made a significant contribution to strengthening adolescent health services in the tribal districts of Jharkhand through expanded awareness programmes, improved primary healthcare infrastructure and enhanced community outreach initiatives. Interventions implemented through the Rashtriya Kishore Swasthya Karyakram (RKSK), Ayushman Arogya Mandirs and Mobile Health Units have improved adolescents' awareness of health issues, increased access to healthcare services and promoted greater utilisation of available health facilities.

Despite these achievements, the study also highlights several persistent challenges, including cultural stigma surrounding sexual and reproductive health, geographical isolation, infrastructural limitations and shortages of trained healthcare personnel. These factors continue to restrict equitable access to quality healthcare services, particularly in remote tribal communities.

The study concludes that achieving sustainable improvements in adolescent health requires more than the expansion of healthcare infrastructure. Continued policy commitment, strengthened community participation, culturally responsive health education and effective intersectoral collaboration are essential for addressing the complex determinants of adolescent health. Investments in adolescent health today will not only improve individual health and well-being but will also contribute to educational advancement, social equity and long-term national development. Strengthening adolescent health services in tribal areas should therefore remain a strategic priority for achieving inclusive and sustainable public health outcomes.

REFERENCES

1. Ahissou, N. C. A., Benova, L., Delvaux, T., et al. (2022). Modern contraceptive use among adolescent girls and young women in Benin: A mixed-methods study. *BMJ Open, 12*(3), e054188.
2. Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care. *Journal of Health and Social Behavior, 36*(1), 1–10.
3. Bahamondes, M. V., & Bahamondes, L. (2021). Intrauterine device use is safe among nulligravidas and adolescent girls. *Acta Obstetricia et Gynecologica Scandinavica, 100*(4), 641–648.
4. Bharali, N., & Mondal, N. (2021). Association of age at marriage, early childbearing, use of contraceptive methods and reproductive health consequences among Mishing tribal women of Assam. *Online Journal of Health and Allied Sciences, 20*(3), 2.
5. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.
6. Chandra-Mouli, V., Lane, C., & Wong, S. (2015). What does not work in adolescent sexual and reproductive health: A review of evidence. *Journal of Adolescent Health, 56*(1), S10–S18.
7. Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.
8. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications.
9. Flick, U. (2018). *An introduction to qualitative research* (6th ed.). Sage Publications.
10. Goldfarb, E. S., & Lieberman, L. D. (2021). Three decades of research: The case for comprehensive sex education. *Journal of Adolescent Health, 68*(1), 13–27.
11. Government of India. (2023). *National Health Mission:*

Framework for Implementation. Ministry of Health and Family Welfare.
12. International Institute for Population Sciences (IIPS), & ICF. (2021). *National Family Health Survey (NFHS-5), 2019–21: India Report*. IIPS.
13. Jharkhand Rural Health Mission Society. (2020). *National Health Mission Annual Report*. Government of Jharkhand.
14. Jharkhand Rural Health Mission Society. (2022). *Programme Implementation Plan (PIP) 2020–21*. Government of Jharkhand.
15. Jharkhand Rural Health Mission Society. (2024). *Rashtriya Kishore Swasthya Karyakram Implementation Report*. Government of Jharkhand.
16. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd ed.). New Age International Publishers.
17. Ministry of Health and Family Welfare. (2014). *Rashtriya Kishore Swasthya Karyakram: Strategy Handbook*. Government of India.
18. Ministry of Health and Family Welfare. (2023). *RMNCAH+N Strategy Implementation Guidelines*. Government of India.
19. National Health Mission. (2023). *Adolescent Health Programme under RMNCAH+N Strategy*. Ministry of Health and Family Welfare.
20. National Health Mission. (2023). *Programme Implementation Plan Guidelines*. Ministry of Health and Family Welfare.
21. NITI Aayog. (2023). *Healthy States, Progressive India Report*. Government of India.
22. Ouedraogo, A. M., Baguiya, A., Compaore, R., et al. (2021). Predictors of contraceptive method discontinuation among adolescent and young women in West Africa. *BMC Women's Health, 21*, 261.
23. P, K., Daniel, S., Shumayla, S., Sinha, R., & Mehra, S. (2020). Effectiveness of peer-led intervention on KAP related to sexual, reproductive and mental health issues among adolescents. *Health, 12*(9), 1151–1168.
24. Patton, M. Q. (2015). *Qualitative Research and Evaluation Methods* (4th ed.). Sage Publications.
25. Planning Commission of India. (2013). *Report of the Steering Committee on Health for the Twelfth Five-Year Plan*. Government of India.
26. Rose-Clarke, K., Pradhan, H., Rath, S., Rath, S., Samal, S., Gagrai, S., Nair, N., Tripathy, P., & Prost, A. (2019). Adolescent girls' health, nutrition and wellbeing in rural eastern India: A descriptive, cross-sectional community-based study. *BMC Public Health, 19*(1), 672.
27. Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education.
28. Siddiqui, M., Kataria, I., Watson, K., & Chandra-Mouli, V. (2020). A systematic review of the evidence on peer education programmes for promoting the sexual and reproductive health of young people in India. *Sexual and Reproductive Health Matters, 28*(1), 1741494.
29. Singh, A., Kumar, R., & Prasad, V. (2022). Healthcare accessibility and tribal health outcomes in eastern India. *Indian Journal of Public Health, 66*(3), 245–252.
30. United Nations Development Programme. (2023). *Human Development Report 2023*. UNDP.
31. United Nations Educational, Scientific and Cultural Organization. (2021). *International Technical Guidance on Sexuality Education*. UNESCO.
32. UNICEF. (2025). *Adolescent Development and Participation in India*. UNICEF India.
33. UNICEF. (2025). *Service Mapping: Adolescent Mental Health in India*. UNICEF India.
34. United Nations Population Fund. (2023). *State of World Population Report*. UNFPA.
35. World Bank. (2023). *Improving Primary Healthcare Access in Developing Regions*. World Bank.
36. World Health Organization. (2022). *Global Accelerated Action for the Health of*

Adolescents (AA-HA!): Guidance to Support Country Implementation. World Health Organization.
37. World Health Organization. (2024). *Adolescent Health Fact Sheet*. World Health Organization.
38. World Health Organization. (2024). *Social Determinants of Health: Key Concepts*. World Health Organization.