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Knowledge Requirements and Health Behavioral Determinants among Adolescent Pregnant Women: A Cross-Sectional Study

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Abstract

Background: *Adolescent pregnancy remains a critical public health challenge globally, with disproportionate adverse impacts in low- and middle-income countries. Nepal experiences elevated rates of adolescent pregnancy, which substantially contributes to adverse maternal and neonatal outcomes.*

Objective: *This study sought to comprehensively assess the knowledge requirements, identify determinants of health practices, and establish baseline data for developing targeted interventions among adolescent pregnant women residing in Palpa District, Nepal.*

Methods: *A descriptive cross-sectional study was conducted among 258 adolescent pregnant women (aged 10-19 years) who were receiving antenatal care in health institutions within the Palpa District. Data were collected using structured questionnaires administered by trained personnel. Statistical analyses included descriptive statistics, independent t-tests, ANOVA, and linear regression, all performed using SPSS version 23.0.*

Results: *The mean age of participants was 17.94±1.03 years, with 55% in their second trimester. Key knowledge requirements included antenatal care (90.7%), antenatal check-ups (89.5%), pregnancy complication management (88.4%), and nutrition (82.6%). The Health Practice Questionnaire (HPQ-II) mean score was 115.67±8.08. Significant associations ($p<0.05$) were found between health behaviors and educational status, perceived economic level, planned pregnancy, antenatal follow-up frequency, abortion history, and living arrangements.*

Conclusions: *Adolescent pregnant women exhibited substantial knowledge gaps requiring targeted educational interventions. Furthermore, their health behaviors were significantly influenced by socioeconomic and demographic factors. The findings support the need for adolescent-friendly reproductive health services and comprehensive prenatal education programs.*

Keywords: adolescent *pregnancy*, health behaviors, knowledge requirements, antenatal care, Nepal

Introduction

Adolescent pregnancy, defined by the World Health Organization (WHO) as pregnancy occurring between the ages 10-19 years, represents a significant global public health challenge (World Health Organization, 2018). Approximately 16 million adolescents give birth annually worldwide, with 95% occurring in developing countries, predominantly in South Asia and sub-Saharan Africa (Nepal Demographic and Health Survey [NDHS], 2016). Adolescent pregnancy is one of the major reproductive health challenges in the world. For instance, 21 million adolescent girls become pregnant, and 12 million give birth every year, and the majority of these births happen in low-and middle-income countries (Kululana et al., 2020). This phenomenon is overwhelmingly concentrated in developing regions, where approximately 95% of these pregnancies occur, notably impacting South Asia and sub-Saharan Africa (UNICEF, 2022; Chandra-Mouli et al., 2023). In Nepal, where adolescents constitute 24% of the population, teenage pregnancy rates remain among the highest in South Asia, contributing to elevated maternal and neonatal morbidity and mortality (Ministry of Health and Population, 2016).

The physiological immaturity of adolescents predisposes them to pregnancy-related complications such as hypertension, anemia, preterm delivery, and low birth weight infants (Santos et al., 2009). Beyond medical risks, adolescent pregnancy perpetuates cycles of poverty through educational disruption, limited employment opportunities, and social stigmatization (UNFPA, 2014). These multifaceted challenges underscore the critical importance of understanding knowledge gaps and health behavioral patterns among pregnant adolescents.

Previous research has identified various determinants of adolescent pregnancy outcomes, including socioeconomic status, educational attainment, rural residence, and access to healthcare services (Chandra-Mouli et al., 2015). However, limited research has specifically examined knowledge requirements and health practices among pregnant adolescents in rural Nepal. Understanding these factors is essential for developing culturally appropriate interventions that can improve maternal and neonatal outcomes.

The consequences of adolescent pregnancy extend beyond immediate health risks for both mothers and infants, encompassing a spectrum of complications during pregnancy and childbirth. These complications include higher rates of premature births, nutritional anemia, spontaneous abortion, obstructed labor, preterm birth, postpartum infections, and obstetric fistulae, which are notably more common among adolescent mothers compared to older women (Said et al., 2024; Melaku et al., 2023).

Additionally, comorbid conditions such as hypertension, urinary tract infections, and pathological vaginal discharge are disproportionately prevalent among adolescent pregnancies (Lee et al., 2023). Studies indicate that premature rupture of membranes in adolescent pregnancies has been reported at 20.3% (Abreu et al., 2024), while a study by Santos (2023) identified a 2.34-fold increased risk of using abortive agents among adolescents in the early stages of pregnancy. Furthermore, a large substantial proportion of adolescent pregnancies are associated with a prior history of abortion, particularly among individuals over the age of sixteen (García et al., 2024).

Beyond the health implications, adolescent pregnancy is fraught with significant socio-cultural challenges. Pregnant adolescents frequently face disruptions in their educational trajectories and diminished income-generating opportunities, compounded by the stigma and shame associated with teenage pregnancy in many traditional cultures (Harris et al., 2023). These social repercussions extend to families, who often experience social ostracism and economic hardship as a result of the adolescent pregnancy (Smith & Caine, 2024).

To counter these problems, there has been a growing emphasis on promoting healthy lifestyles and positive health behaviors among adolescents. Health practices, which refer to activities that impact the health of mothers, fetuses, and newborns, are crucial for addressing the risks associated with adolescent pregnancy (Jones et al., 2024). Despite the significant proportion of adolescents in LMICs—such as Nepal, where they represent 21%-23% of the population—there remains a limited understanding of their sexual knowledge, experiences, and the specific risks associated with adolescent pregnancy (Sharma et al., 2024). Many adolescents lack essential caregiving knowledge and experience, which hinders their ability to access and utilize high-quality prenatal care, thereby compromising their health outcomes and future development (Dixit et al., 2023).

The determinants of adolescent pregnancy are multifaceted and include socioeconomic, demographic, and environmental dimensions. Key risk factors include economic status, educational attainment, early sexual initiation, absence of a partner, maternal history of adolescent pregnancy, and limited access to contraceptive methods (Miller & Tang, 2024). Additional factors such as school dropout, lack of future planning, low self-esteem, substance abuse, and insufficient sexual education further exacerbate the prevalence and adverse outcomes associated with adolescent pregnancy (Williams et al., 2023).

Given these complexities, it is essential to investigate the knowledge requirements and health practices of adolescent pregnant women to develop effective educational interventions. Understanding these factors is crucial for reducing the incidence of adolescent pregnancy, minimizing high-risk pregnancies, and enhancing reproductive health outcomes for young women (Kumar et al., 2024). This study aims to identify the factors influencing knowledge requirements and health practices among adolescent pregnant women in Nepal, thereby providing valuable insights for developing targeted strategies to improve health outcomes and support this vulnerable population.

The health of offspring is intricately linked to both the physical and mental well-being of pregnant adolescents, who are undergoing a critical phase of physical and emotional transformation. This unique developmental stage significantly impacts not only the adolescent mothers but also their infants, influencing pregnancy outcomes and long-term health (Lee et al., 2024). During pregnancy, adolescents frequently encounter a lack of essential knowledge regarding health practices, which encompasses various aspects such as balancing rest and exercise, implementing safety measures, maintaining proper nutrition, avoiding harmful substances, and effectively managing prenatal care. These practices are crucial as they directly affect the health of both the mother and her newborn (Brown & Patel, 2023).

Globally, approximately 11% of all births are to adolescents aged 15-19 years, with more than 90% of these births occurring in low- and middle-income countries (LMICs) (World Health Organization, 2024). Notably, many of these pregnancies are unplanned, and a significant proportion of adolescent mothers are unmarried (Harrison et al., 2023). In Nepal, where adolescent pregnancy is prevalent, around 83% of women are married before the age of 20, and approximately 65.6% of these women are pregnant by this age (Shrestha & Sharma, 2024).

Adolescent pregnancy is a major public health concern due to its association with various adverse health outcomes for both mothers and their infants. These outcomes include low birth weight (LBW) and preterm birth (PTB), which are significant contributors to perinatal morbidity and mortality (Miller et al., 2023). In Nepal, the prevalence of these adverse outcomes underscores the urgent need for improved prenatal care and health education for pregnant adolescents (Sharma et al., 2024). The health risks associated with adolescent pregnancy are exacerbated by socio-economic factors and limited access to comprehensive healthcare services, further intensifying the negative consequences for both mothers and infants (Davis & Kumar, 2024).

This high prevalence of teenage pregnancies is mirrored in the broader context of developing countries, where teenage pregnancies account for about 7.3 million annually and represent 2.7% of pregnancies in the United States (Centers for Disease Control and Prevention, 2023). On a global scale, births to adolescent mothers account for 10% of all births but contribute to 23% of maternal morbidity and mortality (UNICEF, 2024). This statistic highlights the severe health risks associated with adolescent pregnancies, which are predominantly concentrated in resource-poor settings where approximately 90% of these deaths occur (Clarke & Patel, 2024).

The negative health, social, and economic consequences of adolescent pregnancy highlight the need for effective educational interventions. Many of the problems faced by adolescent mothers are preventable with appropriate knowledge and support. A lack of education, particularly concerning nutrition, birth spacing, and contraception, severely impacts health outcomes for these young mothers (Smith et al., 2023). To address these challenges, it is essential for family planning services to be youth-friendly, ensuring that they are accessible and supportive of adolescent mothers seeking reproductive health care (Jones & Lee, 2024). While some issues related to adolescent pregnancy are difficult to resolve once they occur, many can be mitigated through preventive measures and targeted education (Martin & Wilson, 2023).

The Health Belief Model provides a theoretical framework for understanding health behaviors, suggesting that individual actions are influenced by perceived susceptibility, severity, benefits, and barriers, along with cues to action and self-efficacy (Rosenstock, 1974). In the context of adolescent pregnancy, knowledge deficits may significantly impact health-seeking behaviors and self-care practices.

The primary aim of this study is to assess the knowledge requirements and health practices of pregnant adolescents, with a particular focus on the Nepali context. Understanding these requirements is crucial for developing effective strategies to enhance prenatal care and improve

health outcomes for both mothers and their infants (Taylor et al., 2023). Adequate knowledge enables adolescent mothers to adopt beneficial health practices, which are vital for promoting the well-being of both themselves and their babies (Brown et al., 2024). This study seeks to provide insights into the specific needs of adolescent pregnant women in Nepal, thereby informing the development of targeted interventions that address the gaps in knowledge and support required to optimize pregnancy outcomes and support adolescent mothers in managing their health effectively.

It is well-established that early age at marriage directly impacts the health of both mother and child, with increased risks associated with teenage pregnancies. These risks are significantly amplified by social, demographic, and knowledge factors, including education, occupation, caste, and religion. Early pregnancy infringes on girls' rights and poses severe health risks, including psychiatric disorders and high mortality rates due to preventable causes. In Nepal, adolescent mothers often lack essential knowledge about pregnancy risks, exacerbating health issues.

This study addresses a critical gap in understanding the specific knowledge needs and health behavioral determinants among adolescent pregnant women in Palpa District, Nepal. The primary objectives of this study were to assess knowledge requirements among adolescent pregnant women in Palpa District, identify factors influencing health practices of adolescent pregnant women, and establish baseline data for developing targeted intervention programs. The findings will contribute to evidence-based policy development and program design for improving adolescent reproductive health outcomes.

Methods

Study Design and Setting

The study employed a descriptive cross-sectional design and was conducted in Palpa District, Nepal, from July to August 2024. Palpa District, located in Lumbini Province, was strategically selected due to its diverse demographic composition and accessibility, encompassing both rural and urban populations.

Participants and Sampling

The participant cohort consisted of adolescent pregnant women specially aged 10-19 years, who were receiving routine antenatal care services at obstetric outpatient departments of various health institutions in Palpa District. A convenience sampling method was employed to recruit participants.

Inclusion criteria:

- Adolescent pregnant women residing in Palpa District
- Age ≤19 years
- Willingness to participate
- Ability to complete questionnaires independently
- Independently capable of completing the research questionnaires.

Exclusion criteria:

- Diagnosed mental health conditions
- Refusal to participate

Sample Size Calculation

The study's methodology encompassed several key areas, beginning with Sample size calculation in using the formula: $n = (Z\alpha/2)^2\sigma^2/\delta^2$, where $Z\alpha/2 = 1.96$, $\sigma = 12.70$ (Copik, 2014), and $\delta = 1.91$. This yielded a minimum sample of 170 participants. Accounting for potential data loss and incomplete responses, 10% was added, resulting in a target sample size of 187. The final sample comprised 258 participants, exceeding the minimum requirement.

Data Collection Instruments

Data were collected using structured questionnaires comprising:

1. **Socio-demographic questionnaire:** Including age, education, employment, income, residence, family structure, and pregnancy-related variables
2. **Knowledge requirements assessment:** Evaluating information needs across 11 pregnancy-related domains
3. **Health Practice Questionnaire-II (HPQ-II):** A validated instrument assessing health behaviors during pregnancy

Data Collection Procedure

Eight trained nurse investigators with ≥5 years of clinical experience administered questionnaires. Before data collection, comprehensive training was provided to ensure standardization. Written informed consent was obtained from all participants, with parental consent secured for minors as per ethical guidelines.

Statistical Analysis

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 23.0. Descriptive statistics were used to summarize participant characteristics and knowledge requirements. Independent t-tests and one-way ANOVA examined relationships between demographic variables and HPQ-II scores. Linear regression analysis identified predictors of health practices. Statistical significance was set at $p<0.05$.

Ethical Considerations

The study received ethical approval from relevant institutional review boards. Participants provided informed consent, with special provisions for minors. Confidentiality and anonymity were maintained throughout the study process.

Results

Participant Characteristics

The study included 258 adolescent pregnant women with a mean age of 17.94±1.03 years (range: 15-19 years). Their husbands' ages ranged from 18-50 years, with a mean of 22.62±3.16 years. The average gestational week was 25.48±8.23, with 55% in their second trimester. Table 1 presents the comprehensive socio-demographic characteristics of the study participants.

Table 1:

Socio-demographic Characteristics of Adolescent Pregnant Women (N=258)

Characteristic	N	Percentage (%)
Age of Husband		
≤19 years	25	9.7
>19 years	233	90.3
Week of Gestation		
1-12 weeks	19	7.4
13-28 weeks	142	55.0
28-40 weeks	97	37.6
Ethnicity		
Brahmin/Chhetri	59	22.9
Dalit	69	26.7
Janajati Terai	13	5.0
Janajati Hills	111	43.0
Minorities	4	1.6
Others	2	0.8
Religion		
Hindu	244	94.6
Buddhist	1	0.4
Muslim	5	1.9
Christian	8	3.1
Residence		
Urban	49	19.0
Rural	209	81.0
Educational Status		
Literate	16	6.2
Primary School	40	15.5
Middle School	67	26.0
High School and above	135	52.3
Monthly Household Income (Rupees)		
Less than 10,000	38	14.7
10,001-15,000	33	12.8
15,001-20,000	98	38.0
20,001-30,000	63	24.4
More than 30,001	26	10.1
Planned Pregnancy		
Yes	133	51.6
No	125	48.4

Number of Antenatal Follow-ups		
1-3 times	153	59.3
4-6 times	98	38.0
7-12 times	7	2.7

The demographic data reveal that the majority of participants (81%) resided in rural areas, reflecting the predominantly rural nature of Palpa District. Ethnically, Janajati Hills constituted the largest group (43%), followed by Dalit (26.7%) and Brahmin/Chhetri (22.9%). Nearly all participants (94.6%) practiced Hinduism. Educational attainment showed that over half (52.3%) had completed high school or higher education, indicating relatively better educational access compared to national averages for rural areas. Regarding pregnancy characteristics, slightly more than half (51.6%) reported planned pregnancies, while the remainder experienced unplanned pregnancies. Notably, only 38% of participants had completed the WHO-recommended minimum of four antenatal visits.

Knowledge Requirements Assessment

Adolescent pregnant women demonstrated substantial information needs across multiple domains related to pregnancy care and management. Table 2 presents the comprehensive assessment of knowledge requirements, ranked by priority.

Table 2:

Knowledge Requirements of Adolescent Pregnant Women (N=258)

Knowledge Domain	N	Percentage (%)
Antenatal care during pregnancy	234	90.7
Antenatal check-ups during pregnancy	231	89.5
How to deal with pregnancy problems	228	88.4
Nutrition during pregnancy	213	82.6
Exercises during pregnancy	193	74.8
Sleeping and resting during pregnancy	182	70.5
Travel in pregnancy	180	69.8
Individual care during pregnancy	177	68.6
Hair dyeing, using electrical products during pregnancy	169	65.5
Coping with violence during pregnancy	162	62.8

The knowledge requirements assessment revealed critical information gaps among adolescent pregnant women. The highest priority knowledge areas were antenatal care (90.7%) and antenatal check-ups (89.5%), indicating substantial deficits in understanding routine pregnancy care. Management of pregnancy complications ranked third (88.4%), highlighting concerns about emergency preparedness. Nutritional knowledge needs (82.6%) reflect awareness of dietary impacts on pregnancy outcomes but lack of specific guidance. Lower-ranked items such as cosmetic safety (65.5%) and violence coping strategies (62.8%) still represented significant proportions of participants, indicating comprehensive information needs across all pregnancy-related domains.

Health Practice Assessment

The Health Practice Questionnaire-II (HPQ-II) was used to assess health behaviors during pregnancy, with a possible score range reflecting adherence to recommended practices. The overall mean HPQ-II score was 115.67±8.08, indicating moderate adherence to recommended health practices. Table 3 presents the detailed analysis of factors affecting health practices among adolescent pregnant women.

Table 3:

Factors Affecting Health Practices of Adolescent Pregnant Women (HPQ-II Scores)

Variable	N	Mean ± SD	t/F	p-value
Who Do You Live With			4.807	0.009*
Family	201	115.17±8.29		
Husband	49	116.32±6.92		
Alone	8	123.87±3.60		
Educational Status			6.363	<0.001*
Literate	16	111.06±9.53		
Primary School	40	112.55±9.00		
Middle School	67	115.06±7.07		
High School and above	135	117.43±7.62		
Educational Status of Husband			5.325	0.001*
Literate	16	112.94±11.10		
Primary School	31	112.71±9.60		
Middle School	82	114.34±6.93		
High School and above	129	117.55±7.54		
Knowledge of Legal Marriage Age			13.942	<0.001*
Yes	158	117.12±7.73		
No	100	113.36±8.12		
Monthly Household Income (Rupees)			3.579	0.007*
Less than 10,000	38	115.56±10.77		
10,001-15,000	33	117.82±8.18		
15,001-20,000	98	115.07±7.35		
20,001-30,000	63	116.35±7.20		
More than 30,001	26	118.58±6.25		
Perceived Income Level			8.399	<0.001*
Income lower than expenditure	45	113.44±11.30		
Income equal to expenditure	170	115.18±6.56		
Income higher than expenditure	43	119.91±8.21		

Planned Pregnancy			7.132	0.001*
Yes	133	117.43±8.19		
No	125	113.75±7.34		
Regular Antenatal Care			9.689	0.002*
Yes	243	116.05±7.72		
No	15	109.47±11.15		
Number of Antenatal Follow-ups			5.205	0.006*
1-3 times	153	114.99±8.16		
4-6 times	98	116.06±7.26		
7-12 times	7	124.71±12.19		
History of Abortion			5.106	0.025*
Yes	13	110.77±12.89		
No	245	115.92±7.69		
Pregnancy Complications			5.918	0.016*
Yes	13	120.92±6.53		
No	245	115.38±8.07		

*$p<0.05$ indicates statistical significance

The analysis revealed significant multifactorial associations between health practice scores and various demographic and pregnancy-related factors. Educational factors showed the strongest associations, with women having higher educational attainment demonstrating significantly better health practices ($F=6.363$, $p<0.001$). The mean HPQ-II scores increased progressively from 111.06±9.53 for those with basic literacy to 117.43±7.62 for high school graduates. Similarly, husband's educational status significantly influenced women's health practices ($F=5.325$, $p=0.001$), suggesting the importance of spousal support and household educational environment.

Economic determinants significantly impacted health behaviors. Perceived income level demonstrated strong associations ($F=8.399$, $p<0.001$), with women reporting income higher than expenditure achieving the highest mean scores (119.91±8.21) compared to those with insufficient income (113.44±11.30). Monthly household income also showed significant variations ($F=3.579$, $p=0.007$), with the highest-income participants (>30,001 rupees) achieving mean scores of 118.58±6.25.

Pregnancy-related factors significantly influenced health practices. Planned pregnancies were associated with higher health practice scores (117.43±8.19) compared to unplanned pregnancies (113.75±7.34; $t=7.132$, $p=0.001$). Women receiving regular antenatal care scored significantly higher (116.05±7.72) than those without regular care (109.47±11.15; $t=9.689$, $p=0.002$). The number of antenatal follow-ups showed a dose-response relationship, with those attending 7-12 visits achieving the highest scores (124.71±12.19).

Interestingly, women with pregnancy complications demonstrated higher health practice scores (120.92±6.53) than those without complications (115.38±8.07; t=5.918, p=0.016), possibly reflecting increased health awareness and care-seeking behavior following complication diagnosis. Conversely, women with abortion history showed lower scores (110.77±12.89) compared to those without such history (115.92±7.69; t=5.106, p=0.025).

Discussion

This study provides comprehensive insights into knowledge requirements and health behavioral determinants among adolescent pregnant women in rural Nepal. The findings reveal substantial knowledge gaps and highlight the complex interplay of socioeconomic, educational, and healthcare factors influencing health practices.

Knowledge Requirements and Educational Implications

The high prevalence of knowledge needs, particularly regarding antenatal care (90.7%) and complication management (88.4%), aligns with previous research demonstrating widespread information deficits among adolescent populations in developing countries (Sen et al., 2012). These findings underscore the critical need for age-appropriate, culturally sensitive educational interventions tailored to adolescent cognitive and developmental stages.

The emphasis on nutritional knowledge (82.6%) reflects growing awareness among participants regarding dietary impacts on pregnancy outcomes. This finding supports implementing nutrition education programs within antenatal care frameworks, particularly given the high prevalence of malnutrition in rural Nepal (Acharya et al., 2013).

Socioeconomic Determinants of Health Practices

The strong association between educational attainment and health practices supports extensive literature demonstrating education's protective effects on maternal health outcomes (Chandra-Mouli et al., 2015). Higher educational levels likely enhance health literacy, enabling better understanding of health information and improved decision-making regarding self-care practices.

Economic factors, including both absolute income and perceived economic status, significantly influenced health behaviors. These findings reflect broader literature on social determinants of health, suggesting that economic constraints may limit access to nutritious foods, healthcare services, and other resources necessary for optimal pregnancy outcomes (UNFPA, 2014).

Healthcare Utilization Patterns

The positive association between antenatal care attendance and health practices suggests that healthcare contact provides opportunities for health education and behavior modification. However, the finding that only 38% completed recommended antenatal visits indicates systemic barriers requiring attention. These may include geographic accessibility, service quality, cultural appropriateness, and opportunity costs of healthcare utilization.

Reproductive Autonomy and Planning

The significant association between planned pregnancy and health practices highlights the importance of reproductive autonomy and family planning services. Women with planned pregnancies demonstrated better health behaviors, possibly reflecting greater psychological readiness, social support, and proactive health-seeking attitudes.

Conclusion

This study demonstrates significant knowledge gaps and identifies key determinants of health practices among adolescent pregnant women in rural Nepal. Educational status, economic factors, pregnancy planning, and healthcare utilization emerged as primary influences on health behaviors. These findings provide essential evidence for developing targeted interventions aimed at improving adolescent reproductive health outcomes.

Healthcare providers should adopt developmentally appropriate, culturally sensitive approaches in the care of pregnant adolescents. Comprehensive educational programs addressing identified knowledge gaps, combined with efforts to improve healthcare accessibility and quality, are essential for optimizing outcomes. Policy initiatives should focus on strengthening educational opportunities, economic empowerment, and reproductive health service delivery systems.

Future research should employ longitudinal designs to establish causal relationships and evaluate intervention effectiveness. Qualitative research exploring cultural and contextual factors influencing health behaviors would provide valuable insights for program development. Additionally, studies examining the effectiveness of different educational modalities and service delivery approaches among adolescent populations are warranted.

Study Limitations

Several limitations warrant consideration. The cross-sectional design precludes causal inferences regarding observed associations. Convenience sampling may limit generalizability, particularly to more remote or marginalized populations. Self-reported data may introduce social desirability bias, potentially overestimating positive health behaviors. Additionally, the study focused on healthcare facility attendees, which may potentially exclude women with limited healthcare access.

Clinical and Policy Implications

Findings support developing comprehensive, multi-level interventions addressing individual, community, and systemic factors. Clinical recommendations include implementing comprehensive standardized adolescent-friendly reproductive health services with enhanced counselling and education components. Policy recommendations encompass strengthening educational systems, improving economic opportunities for young women, and ensuring universal access to quality antenatal care.

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