

Teenage Pregnancy and Associated Risk Factors and Outcome in Nepal From 2000-2020: A Systematic Review and Meta-Analysis

Shrestha DB,¹ Budhathoki P,² Shrestha O,³ Karki S,³ Thapa N,³ Dangal G,⁴ Baral G,⁵ Itani S,⁶ Poudel A⁷

¹Department of Internal Medicine, Mount Sinai Hospital, Chicago, IL, USA.

²Department of Internal Medicine, Bronxcare Health System, Bronx, NY, USA.

³Nepalese Army Institute of Health Sciences, Kathmandu, Nepal.

⁴Department of Obstetrics and Gynecology, National Academy of Medical Sciences (NAMS), Kathmandu, Nepal.

⁵Department of Obstetrics and Gynecology, Nobel Medical College, Biratnagar, Kathmandu University, Nepal.

⁶Department of Pediatrics, SUNY Downstate Health Sciences University, Brooklyn, NY, USA.

⁷Department of Medicine, Sukraraj Tropical and Infectious Disease Hospital, Kathmandu, Nepal.

Corresponding Author

Dhan Bahadur Shrestha
Department of Internal Medicine,
Mount Sinai Hospital, Chicago, IL, USA.
E-mail: medhan75@gmail.com

Citation

Shrestha DB, Budhathoki P, Shrestha O, Karki S, Thapa N, Dangal G, et al. Teenage Pregnancy and Associated Risk Factors and Outcome in Nepal From 2000-2020: A Systematic Review and Meta-Analysis. *Kathmandu Univ Med J.* 2022;78(3):225-33.

ABSTRACT

Background

Teenage pregnancy is considered a high-risk pregnancy in terms of reproductive outcome and the subsequent financial constraint.

Objective

To assess the prevalence of teenage pregnancy, associated risk factors, and outcomes in the context of Nepal.

Method

We searched electronic databases to search relevant articles published from January 2000 till October 2020 using the keywords with appropriate Boolean operators. All the data were extracted into a standardized form designed in Excel. We conducted a statistical analysis using Comprehensive Meta-Analysis Software (CMA) version 3. Data pooled for proportion with 95% confidence interval (CI). A Forest plot was used to visualize the degree of variation between studies.

Result

Fourteen studies were included in the analysis after the rigorous screening of 4425 studies. Prevalence of teenage pregnancy was 13.2% (Proportion, 0.132; CI, 0.077-0.215). Among teenage pregnancies, 11.8% were already multigravida (Proportion, 0.118; CI, 0.029-0.374). Among teen pregnancies, 18.6% were illiterate; among the literate, only 25.9% were of education above grade 10, 31.9% were unaware of contraceptive methods, and only 3.2% reported using any contraception methods. 75.4% of teenage pregnancies had a vaginal delivery with or without episiotomy, 6.5% by instrumental deliveries, and 21.5% by cesarean section. Preterm delivery was 12.0%, and post-term delivery was 8.2%. Abortion was reported in 11.1% of teenage pregnancies. Major tears were reported in 52.9%, obstructed labor was in 4%, and pre-labor rupture of the membrane was in 7.0% of teenage pregnancies. The low birth weight of newborns was 19.4%. Stillbirth and neonatal deaths were 1.7% and 1.4%, respectively.

Conclusion

The prevalence of teenage pregnancy in Nepal was 13.2%. The majority of them did not use any form of contraceptives; and had low education. Several maternal and neonatal complications were reported among teenage pregnancies.

KEY WORDS

Cesarean section, Contraception, Delivery, Infant, Low birth weight, Obstetric, Pregnancy in adolescence

INTRODUCTION

Pregnancy is a physically and mentally challenging process for every woman. To cope with this healthily without having a major negative impact on the mother's health, women must be physically and mentally mature. Teenage pregnancy, pregnancy below the age of 20 years, is considered a high-risk pregnancy and is a significant public health problem stretching worldwide. According to World Health Organization (WHO), teenage pregnancy means pregnancy between 10 and 19 years of age.¹ Adolescent pregnancy is a significant contributor to maternal and childhood morbidity and mortality and the vicious cycle of ill-health and poverty.¹

Globally, about 16 million girls aged 15 to 19 years and two million girls under 15 give birth every year. In addition, an estimated three million girls aged 15-19 undergo unsafe abortions every year.¹ Babies born to adolescent mothers account for roughly 11% of all births worldwide, with 95% occurring in developing countries.² In Nepal, adolescents comprise 24.18% of 26.5 million of the Nepalese population.³ The median age at first marriage for a woman in Nepal is 17.9 years. Nepalese women initiate sexual intercourse at a median age of 17.9 years, just after marriage which suggests that the majority of newly married couples are teenagers.⁴ Seventeen percent of women aged 15-19 have begun childbearing; 13% have had a live birth, and 4% are pregnant with their first child.⁴ Considering these statistics, women get pregnant within the first few years of their marriage, so the prevalence of teenage pregnancy (< 20 years) is common in Nepal.

Several factors contribute to teenage pregnancy. In many societies, girls may be under pressure to marry and bear children early or have limited educational and employment prospects.¹ Other factors for teenage pregnancy include unprotected sexual activities, low socioeconomic status, poor awareness about contraceptive needs and choices. On the other hand, education is a major protective factor for early pregnancy: the more years of schooling, the fewer early pregnancies. In addition, teenage pregnancy is often associated with maternal complications like preeclampsia, obstructed labor, pregnancy-induced hypertension (PIH), major tears, preterm labor, prelabor rupture of membrane (PROM), antepartum hemorrhage (APH), postpartum hemorrhage (PPH), and others.⁵ Neonatal complications include birth asphyxia, stillbirth, neonatal deaths, intrauterine death, respiratory distress, low birth weight, neonatal sepsis, IUGR, jaundice, congenital anomalies, meconium aspiration, and low birth weight APGAR score, and so on.⁵

The purpose of this study was to assess the prevalence of teenage pregnancy, associated risk factors, its outcomes, and various social factors that lead a teenage girl towards such high-risk pregnancy.

METHODS

We used the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guidelines for our review.⁶ Our review was registered in PROSPERO (CRD42020215842).⁷

We searched electronic databases like PubMed, PubMed Central, Embase, Scopus, and Google Scholar to search relevant articles from January 2000 till October 2020 using the keywords like "teenage pregnancy" and "Nepal" with appropriate Boolean operators. The detailed search strategy is documented as Supplementary Appendix 1.

Published cross-sectional, retrospective, or prospective studies reporting prevalence, risk factors, or outcomes of teenage pregnancy in Nepal were included. While editorials, commentaries, reviews, and viewpoint articles with no proper teenage pregnancy data were excluded.

We screened the studies using Covidence.⁸ Two reviewers (OS and SK) independently screened the title and abstract based on the inclusion criteria. Any conflicts were resolved by the consensus obtained from the third reviewer (NT).

All the data were extracted independently into a standardized form designed in Excel. The extracted data were peer-reviewed by reviewers to avoid any possible errors. The characteristics extracted for each selected study include author/s, study year, study design, sample size, study setting, mode of delivery, period of gestation, prevalence, parity, religion, caste, place of residence, education, economic status, marital status, type of marriage, occupational status, planning of pregnancy, the decision about the pregnancy, awareness about dangers of teenage pregnancy, awareness about contraceptives, use of contraception, the attitude of family members, care during pregnancy, nutritional requirement during pregnancy met or unmet, household works during pregnancy, neonatal complications, and maternal complications.

We conducted a statistical analysis using Comprehensive Meta-Analysis Software (CMA) version 3.⁹ Proportion was used as a measure of effect to pool the data. The I-squared (I^2) test was used for the assessment of heterogeneity.¹⁰ Fixed/random-effects model was used as per the heterogeneities of the study. A Forest plot was used to visualize the degree of variation between studies.

Risk of bias assessment based on the critical appraisal checklist

The qualitative evaluation of the individual study was performed using the Joanna Briggs Institute (JBI) critical appraisal tool.¹¹ The bias assessment of the included studies is depicted in table 1-3.

Table 2. Bias assessment of cross-sectional studies

JBI Questionnaire	Shrestha et al. ¹²	Kafle et al. ¹³	Suwal et al. ¹⁴	Pun et al. ⁵	Subedi et al. ¹⁵	Nepal et al. ¹⁶	Maharjan et al. ¹⁷	Paudel et al. ¹⁸
Was the sample frame appropriate to address the target population?	YES	YES	YES	YES	YES	YES	YES	YES
Were study participants sampled in an appropriate way?	YES	NO	NO	YES	YES	NO	YES	YES
Was the sample size adequate?	UNCLEAR	NO	NO	NO	YES	NO	UNCLEAR	YES
Were the study subjects and the setting described in detail?	YES	YES	YES	YES	YES	YES	YES	YES
Was the data analysis conducted with sufficient coverage of the identified sample?	YES	YES	YES	YES	YES	YES	YES	YES
Were valid methods used for the identification of the condition?	YES	YES	YES	YES	YES	YES	YES	YES
Was the condition measured in a standard, reliable way for all participants?	YES	YES	YES	YES	YES	YES	YES	YES
Was there appropriate statistical analysis?	YES	YES	YES	YES	YES	YES	YES	YES
Was the response rate adequate, and if not, was the low response rate managed appropriately?	YES	YES	YES	YES	YES	YES	YES	YES
Overall appraisal	INCLUDE	INCLUDE	INCLUDE	INCLUDE	INCLUDE	INCLUDE	INCLUDE	INCLUDE

Table 3. JBI bias assessment of cohort studies

JBI Questionnaire	Yadav et al. ¹⁹	Lama et al. ²⁰	Tripathi et al. ²¹	Shrestha et al. ²²	Gurung et al. ²³
1. Were the two groups similar and recruited from the same population?	YES	YES	YES	YES	YES
2. Were the exposures measured similarly to assign people to both exposed and unexposed groups?	YES	YES	YES	YES	YES
3. Was the exposure measured in a valid and reliable way?	YES	YES	YES	YES	YES
4. Were confounding factors identified?	YES	NO	NO	NO	NO
5. Were strategies to deal with confounding factors stated?	YES	NO	NO	NO	NO
6. Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?	YES	YES	YES	NA	YES
7. Were the outcomes measured in a valid and reliable way?	YES	YES	YES	YES	YES
8. Was the follow up time reported and sufficient to be long enough for outcomes to occur?	YES	YES	YES	YES	YES
9. Was follow up complete, and if not, were the reasons to loss to follow up described and explored?	YES	YES	YES	YES	YES
10. Were strategies to address incomplete follow up utilized?	NA	NA	NO	YES	NO
11. Was appropriate statistical analysis used?	YES	YES	YES	YES	YES
Overall appraisal: Include <input type="checkbox"/> Exclude <input type="checkbox"/> Seek further info <input type="checkbox"/>	INCLUDE	INCLUDE	INCLUDE	INCLUDE	INCLUDE

Subgroup analysis

Subgroup analysis was done based on residence, caste, religion, literacy rate, marriage type, awareness and use of contraception, use of contraception, and socioeconomic class.

Sensitivity analysis

Sensitivity analysis was performed by re-running analysis by excluding individual studies to check the impact of the study on the overall result.

RESULTS

Our database search identified a total of 4425 studies, and

395 duplicates were removed. We screened the title and abstract of 4030 studies and excluded 3970 studies. We assessed the full-text eligibility of 60 studies and excluded 46 studies (Fig. 1). A total of 14 studies were included in the narrative summary (Table 4) and quantitative analysis.

Quantitative analysis

Prevalence of Teenage pregnancy

Pooling data using random-effect model from seven studies reporting the prevalence of teenage pregnancies, the prevalence of teenage pregnancy was found to be 13.2% (Proportion, 0.132; CI, 0.077-0.215, I²: 99.82) (Fig. 2).

Table 3. JBI bias assessment of case control studies

JBI Questionnaire	Sharma et al. ²⁴
1. Were the groups comparable other than the presence of disease in cases or the absence of disease in controls?	YES
2. Were cases and controls matched appropriately?	NO
3. Were the same criteria used for identification of cases and controls?	YES
4. Was exposure measured in a standard, valid and reliable way?	YES
5. Was exposure measured in the same way for cases and controls?	YES
6. Were confounding factors identified?	NO
7. Were strategies to deal with confounding factors stated?	NO
8. Were outcomes assessed in a standard, valid and reliable way for cases and controls?	YES
9. Was the exposure period of interest long enough to be meaningful?	YES
10. Was appropriate statistical analysis used?	YES
Overall appraisal: Include <input type="checkbox"/> Exclude <input type="checkbox"/> Seek further info <input type="checkbox"/>	INCLUDE

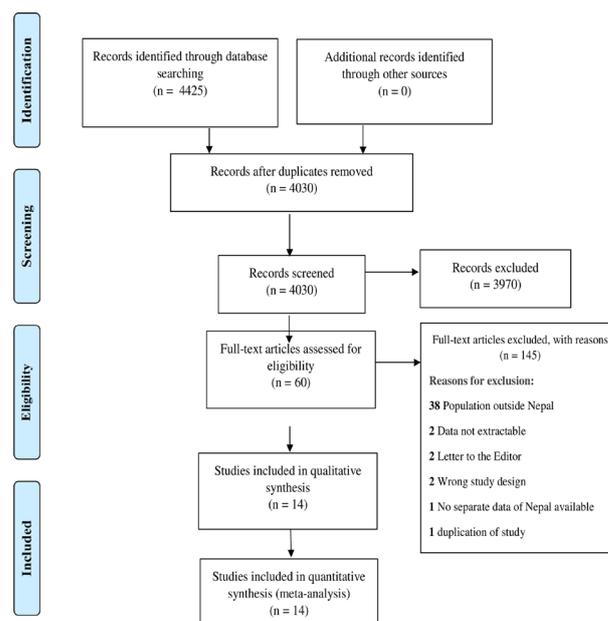


Figure 1. PRISMA flow diagram

Table 4. Narrative summary of the included studies

Study	Year	Study Design	(N)	Study Setting	Outcomes
Yadav et al. ¹⁹	2008	Retrospective cohort	4101	Mahendra Adarsh Chikitsalaya, Chitwan	Mode of delivery, period of gestation, prevalence, parity, demographic variables like caste of teenage pregnancy and neonatal complications.
Shrestha et al. ¹²	2020	Cross-sectional	527	Dhulikhel Hospital.	Mode of delivery, period of gestation, demographics like caste, place of residence education, socio-economic status of teenage pregnancy, neonatal and maternal complications
Sharma et al. ²⁴	2002	Case-control	70	BP Koirala Institute of Health Sciences	Demographics like education and socio-economic status of teenage pregnancy, type of marriage, planning and decision about pregnancy, awareness about contraception and pregnancy, care during pregnancy, and attitude of family members towards pregnancy
Kafle et al. ¹³	2010	Cross-sectional	180	Kapan, Imadol and Jhoukhel of Kathmandu Valley.	Period of gestation, gravida, demographics like caste and maternal complications
Lama et al. ²⁰	2012	Case control	350	Nepal Medical College Teaching Hospital	Period of gestation, gravida, demographics like caste of teenage pregnancy and maternal
Suwal ¹⁴	2012	Prospective cross-sectional	100	College of Medical Sciences Teaching Hospital (CMSTH), Bharatpur	Mode of delivery, period of gestation, decision about pregnancy, awareness about contraception, used contraception and neonatal complications
Pun et al. ⁵	2011	Descriptive cross-sectional	168	Kathmandu Univeristy Hospital, Dhulikhel Hospital, Kavre.	Neonatal and maternal complications
Tripathi et al. ²¹	2014	Case control	50	Gandaki Medical College and Teaching Hospital	Mode of delivery, period of gestation, neonatal and maternal complications
Subedi et al. ¹⁵	2019	Cross-sectional	2688	Nobel Medical College and Teaching Hospital	Mode of delivery, period of gestation, prevalence, neonatal and maternal complications
Maharjan et al. ¹⁷	2019	Cross-sectional	7054	Okhaldhunga Community Hospital	Mode of delivery, period of gestation, prevalence, primigravida, demographics like caste of teenage pregnancy, neonatal and maternal complications
Shrestha ²²	2001	Retrospective	575	VDCs of Mustang, Dhading and Sunsari	Demographics like religion, education, socioeconomic status, occupation, awareness about contraception, used contraception, neonatal and maternal complications
Nepal et al. ¹⁶	2018	Cross-sectional	545	Tertiary hospital in western Nepal	Mode of delivery, period of gestation, prevalence, primigravida, demographics like education and socio-economic status of teenage pregnancy and neonatal complications
Gurung et al. ²³	2020	Cross-sectional	60742	12 public hospitals	Period of gestation, neonatal and maternal complications
Paudel et al. ¹⁸	2018	Cross-sectional	7788	NDHS 2006, 2011 and 2016	Prevalence, demographics like religion, place of residence, socio-economic status and occupation of teenage pregnancy

Sensitivity analysis of the prevalence of teenage pregnancy was carried by excluding individual studies, which showed no significant differences in the result.

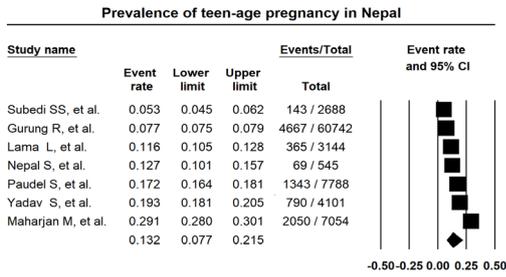


Figure 2. Forest plot depicting pooled prevalence of teenage pregnancies among studies reporting teenage pregnancies

Gravity among teenage pregnant ladies

Among studies reporting gravidity status of teenage pregnant ladies, pooling of the data using random-effect model showed, 11.8% of them were multigravida (Proportion, 0.118; CI, 0.029-0.374; I²: 98.737), and 83.7% were primigravida (Proportion, 0.837; CI, 0.648-0.934; I²: 97.61) (Fig. 3).

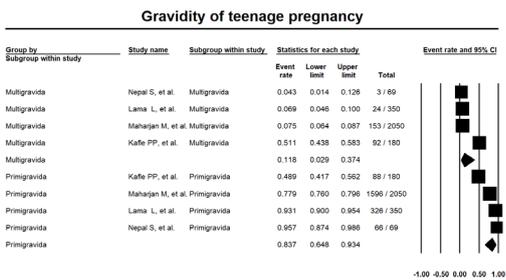


Figure 3. Forest plot depicting sub-group analysis based on gravidity among teenage pregnancies from studies reporting teenage pregnancies

Socio-demographic factors

a. Religion

Only three studies reporting teenage pregnancies reported religious status. Pooling of the data showed 84.9% were Hindu by religion (Proportion, 0.849; CI, 0.804-0.885; I²: 83.59), followed by Buddhist in 8.7% (Proportion, 0.087; CI, 0.040-0.177; I²: 96.11), and rest 5.1% were others (Proportion, 0.051; CI, 0.026-0.099; I²: 90.589).

b. Literacy rate

Pooling of the data using random-effect model showed 18.6% of the teenage pregnant ladies were illiterate (Proportion, 0.186; CI, 0.108-0.301; I²: 96.562) while 42.9% were literate (Proportion, 0.429; CI, 0.197-0.697; I²: 99.08) (Fig. 4). Among the literate, only 25.9% were educated above grade 10 (Proportion, 0.259; CI, 0.225-0.295; I²: 0.00).

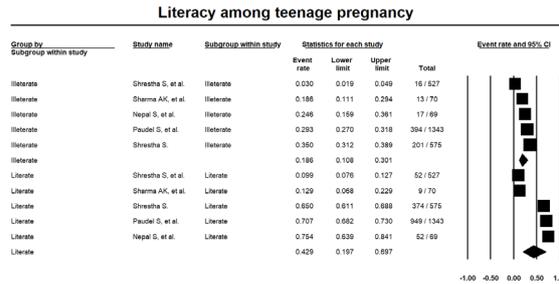


Figure 4. Forest plot depicting sub-group analysis on literacy rate among teenage pregnancies

c. Residential settings

Among teenage pregnant ladies, 40.1% were from rural residential setting (Proportion, 0.40; CI, 0.137-0.739; I²: 99.35), and 59.9% were from urban residential setting (Proportion, 0.599; CI, 0.261-0.863; I²: 99.35).

d. Caste

Among studies reporting caste among teenage pregnancies, pooling of the data using random effect model showed 29.5% were Brahmin/Chhetri (Proportion, 0.295; CI, 0.233-0.365; I²: 95.92), 33.8% were Mongolians (Proportion, 0.338; CI, 0.211-0.495; I²: 97.40), 16.1% were Newar (Proportion, 0.161; CI, 0.074-0.316; I²: 99.26), and 24.8% were others (Proportion, 0.248; CI, 0.143-0.395; I²: 99.01) (Fig. 5).

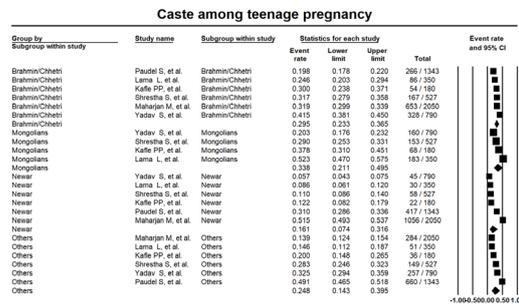


Figure 5. Forest plot showing caste distribution among teenage pregnancies (Note: Maharjan M, et al. and Paudel S, et al. reported indigenous population overall, kept as Newar while analyzing)

e. Socioeconomic class

Analysis pooling socio-economic status of teenage pregnant ladies showed 57.1% were low socio-economic class (Proportion, 0.571; CI, 0.454-0.680; I²: 96.17), 32.8% were medium socio-economic class (Proportion, 0.328; CI, 0.219-0.459; I²: 96.90), and only 6.3% were high socio-economic class (Proportion, 0.063; CI, 0.026-0.146; I²: 97.02).

f. Marriage type

Among studies reporting type of marriage, pooling of the data showed 47.5% were arrange type marriage (Proportion, 0.475; CI, 0.357-0.596; I²: 73.99), and 52.5% were love type marriage (Proportion, 0.525; CI, 0.404-0.643; I²: 73.99).

g. Awareness of contraceptive methods

Regarding contraception methods awareness and practice in pregnant teenage ladies, only a few studies explored it. Pooling of the data showed 68.1% were aware (Proportion, 0.681; CI, 0.260-0.928; I^2 , 98.40), and 31.9% were unaware of contraceptive methods (Proportion, 0.319; CI, 0.072-0.740; I^2 , 98.40) (Fig. 6).

Awareness of contraceptive methods among teenage pregnancy

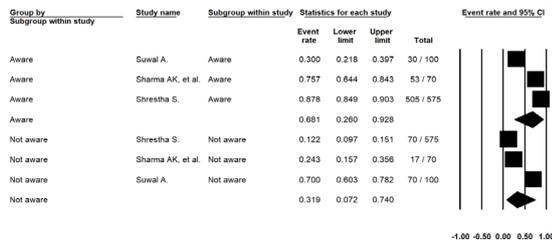


Figure 6. Forest plot showing caste distribution among teenage pregnancies

h. Use of contraception

Among teenage pregnant ladies, only 3.2% reported to use any methods of contraception (Proportion, 0.032; CI, 0.007-0.134; I^2 , 88.11) while 96.8% reported not used any methods of contraception (Proportion, 0.968; CI, 0.866-0.993; I^2 , 88.11).

Vaginal deliveries with or without episiotomy

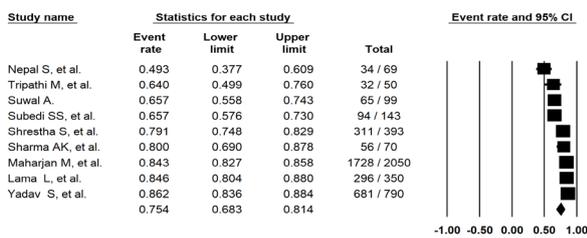


Figure 7. Forest plot showing vaginal delivery with or without episiotomy among teenage pregnancies

Type of delivery

Vaginal delivery with or without episiotomy was the commonest mode of pregnancy termination. Pooling of the data using random-effect model from nine studies reporting delivery type showed 75.4% of teenage pregnancies were terminated by vaginal delivery with or without episiotomy (Proportion, 0.754; CI, 0.683-0.814; I^2 , 92.89) (Fig. 7). Sensitivity analysis of vaginal delivery with or without episiotomy was carried out by excluding individual studies that showed no significant differences in the result.

Instrumental vaginal delivery was reported in 6.5% of teenage pregnant ladies (Proportion, 0.065; CI, 0.038-0.108; I^2 , 91.44) (Supplementary file 2, Fig. 9). Sensitivity analysis of instrumental vaginal delivery was carried out by excluding individual studies that showed no significant differences in the result.

Cesarean section was reported in 21.5% of teenage pregnancies (Proportion, 0.215; CI, 0.139-0.318; I^2 , 93.77). Sensitivity analysis of cesarean delivery was carried out

Pre-term delivery among teenage pregnancy

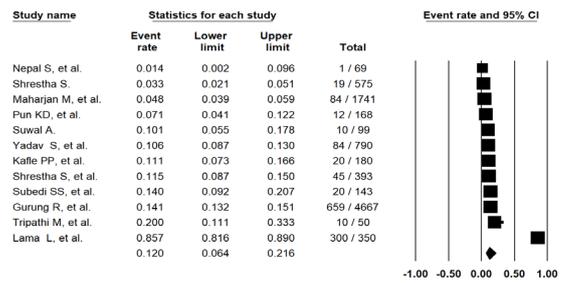


Figure 8. Forest plot showing preterm delivery among teenage pregnancies

APH and PIH among teenage pregnancy

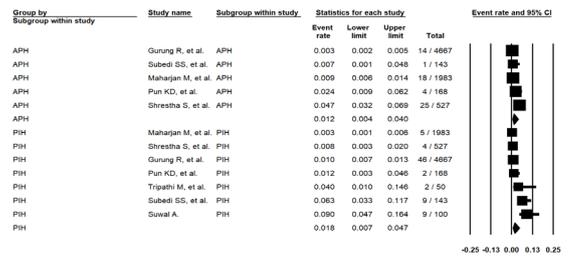


Figure 9. Forest plot showing APH and PIH among teenage pregnant ladies (Note: Maharjan M, et al. reported both APH and PPH in combination)

Adverse events during delivery among teenage pregnancy

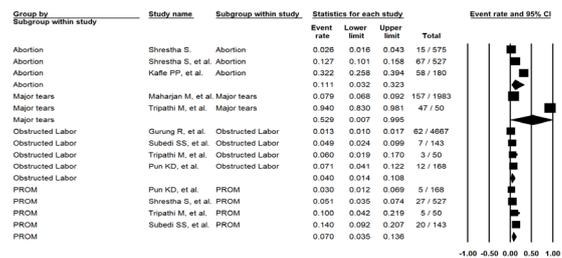


Figure 10. Forest plot showing adverse events during delivery among teenage pregnancies

by excluding individual studies that showed no significant differences in the result.

Low birth weight neonate among teenage pregnancy

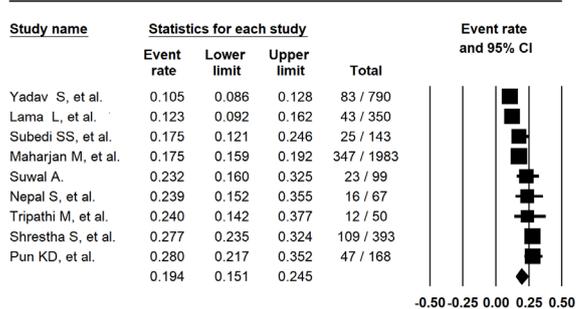


Figure 11. Forest plot showing low birth weight of neonates among teenage pregnancies

Time of termination of teenage pregnancies

Preterm termination of teenage pregnancies was reported in seven studies. The pooling of the data showed that preterm termination was 12.0% (Proportion, 0.120; CI, 0.064-0.216; I^2 , 98.51) (Fig. 8). Sensitivity analysis of preterm

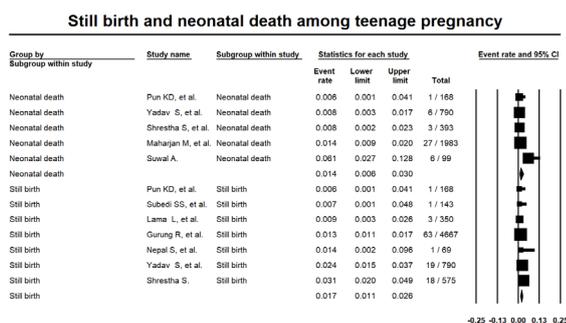


Figure 12. Forest plot showing still birth and neonatal death among teenage pregnancies

termination of pregnancy was carried out by excluding individual studies showed no significant differences in the result.

Term delivery was reported in 75.8% of teenage pregnancies (Proportion, 0.758; CI, 0.552-0.889; I², 98.84). Sensitivity analysis of term delivery among teenage pregnancies was carried out by excluding individual studies that showed no significant differences in the result.

Post-term delivery was reported in 8.2% of teenage pregnancies (Proportion, 0.082; CI, 0.040-0.161; I², 93.21). Sensitivity analysis of post-term delivery among teenage pregnancies by excluding individual studies that showed no significant differences in the result.

Maternal events

a. Antepartum hemorrhage (APH) and pregnancy-induced hypertension (PIH)

APH was reported in 1.2% of teenage pregnancies (Proportion, 0.012; CI, 0.004-0.040; I², 94.74), and PIH was reported in 1.8% of teenage pregnancies (Proportion, 0.018; CI, 0.007-0.047; I², 92.05) (Fig. 9).

b. Delivery events

Abortion was reported in 11.1% of teenage pregnancies (Proportion, 0.111; CI, 0.032-0.323; I², 97.84), major tears were reported in 52.9% of teenage pregnancies (Proportion, 0.529; CI, 0.007-0.995; I², 98.66), obstructed labor was reported in 4% of teenage pregnancies (Proportion, 0.040; CI, 0.014-0.108; I², 92.41), PROM were reported in 7.0% of teenage pregnancies (Proportion, 0.070; CI, 0.035-0.136; I², 82.89) (Fig. 10).

Fig 10. Forest plot showing adverse events during delivery among teenage pregnancies

Infant/ Neonatal events

a. Low birth weight (LBW)

LBW was reported in nine studies. Pooling of the data showed 19.4% of babies born were LBW (Proportion, 0.194; CI, 0.151-0.245; I², 89.64) (Fig. 11). Sensitivity analysis of post-term delivery among teenage pregnancies by excluding individual studies that showed no significant differences in the result).

b. Stillbirth and neonatal death

Still, birth was reported in seven studies. Pooling of the data showed 1.7% stillbirth among teenage pregnancies (Proportion, 0.017; CI, 0.011-0.026; I², 62.26). Neonatal death was reported in five studies The pooling of the data showed that 1.4% of teenage pregnancies lead to neonatal death (Proportion, 0.014; CI, 0.006-0.030; I², 76.50) (Fig. 12).

DISCUSSION

Our study is the first meta-analysis to evaluate the prevalence of teenage pregnancy, its associated factors, and maternal and neonatal complications of teenage pregnancy in Nepal at a national level, pooling the various studies done in the country. We found that the prevalence of teenage pregnancy in Nepal was 13.2% and far higher than that of southeast Asia (4.7%), Eastern Asia (0.7%), and Latin America (6.4%).²⁵ However, the prevalence of teenage pregnancy in Nepal was lower than in Africa (18.8%).²⁵ Most of the pregnant ladies were primigravida as per our study. We found out that more than half of teenage pregnancies occurred in people with low socioeconomic status. Prior meta-analyses have found that low socioeconomic status increases the risk of teenage pregnancies and poor outcomes among teenage pregnancies.^{25,26} We found that about 40.1% of adolescent pregnancies occurred in a rural settings.

As per Kassa et al. living in rural areas increased the risk of teenage pregnancies.²⁵ People living in rural areas have decreased educational opportunities, poverty, and limited access to sexual and reproductive health facilities. Thus, living in rural areas can contribute to increased teenage pregnancies. However, most of the teenage pregnancies occurred in urban settings compared to a rural settings in our study, which was in contrast to Kassa et al.²⁵ This may be explained by the inclusion of studies, most of which were conducted in medical colleges that were situated in the urban area. We found that 96.8% of women with teenage pregnancies had not used any form of contraception despite an awareness level of 68.1% about contraceptive methods. This finding was significant because teenage pregnancy is associated with lack of contraceptive use and decreased knowledge about contraceptive methods. Contraceptive use is associated with decreased risk of recurrent teenage pregnancy as per the study one by Maravilla et al.²⁷ The discrepancy in the use of contraceptive methods despite knowledge about the contraceptive methods may be explained by the unfavorable attitude of community towards the use of contraception, reservations in buying contraception from pharmacy stores or health centers and inaccessibility of contraceptives in rural areas of the country. We found that only 25.9% of teenage girls who were pregnant had education above grade 10, 18.6% were illiterate and about 42.9% were literate. Kassa et al.

reported that adolescent girls who don't attend schools are likely to get married at an earlier age and get pregnant than those who attend schools.²⁵ A low level of education prevents the empowerment of women with the required skills to prevent pregnancy and restricts access to sexual education. Thus, age-appropriate health education is essential for a teenage adolescents to prevent teenage pregnancy.

Adolescent mothers aged 10-19 years are exposed to higher risks of eclampsia, puerperal endometritis, and systemic infections than women aged 20-24 years.¹ Additionally, some 3.9 million unsafe abortions among girls aged 15-19 years occur each year, contributing to maternal mortality, morbidity, and lasting health problems.¹ We found maternal complications like major tears (52.9%), abortion (11.1%), PROM (7.0%), obstructed labor (4%), antepartum hemorrhage (1.2%), and pregnancy-induced hypertension (1.8%) in teenage pregnancies. Furthermore, we found that vaginal delivery was the most common mode of delivery among teenage girls, and preterm termination was found in 12% of teenage pregnancies. As per our study, about one in five babies born to teenage pregnant women in Nepal were likely to have low birth weight. This finding was similar to Ganchimeg et al. who found that low birth weight was one of the most frequent outcomes of teenage pregnancy through secondary analysis of WHO's Multicountry Survey

on Maternal and Child Health including twenty-nine countries.²⁸

Our study has several limitations. First, most of the included studies were done at tertiary centers and may not generalize to the entire nation. However, our analysis also included a national National Demographic and Health Survey (NDHS) report-based study, which improves the generalizability of our study. The heterogeneities in our study were due to the variable definition of teenage pregnancies among the included studies, different demographics of the population like residential setting, caste, religion, etc. included in the studies. In addition, increasing rates of self-abortion make it hard to determine the true prevalence of teenage pregnancies.

CONCLUSION

The prevalence of teenage pregnancy in Nepal was 13.2%. The majority of those with teenage pregnant ladies reported not using any contraceptives, and teenage pregnancies were frequently seen among women with low education and low socioeconomic status. Common maternal and neonatal complications due to teenage pregnancy were major tears, obstructed labor, premature membrane rupture, and low birth weight.

REFERENCES

1. Adolescent pregnancy. [Internet]. [cited 2021 Feb 22]. Available from: <https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy>
2. World Health Organization. Preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries: What the evidence says. World Health Organization [Internet]; 2012 [cited 2021 Feb 22]. Available from: https://apps.who.int/iris/bitstream/handle/10665/70813/WHO_FWC_MCA_12_02_eng.pdf
3. Central Bureau of Statistics. Population Monograph of Nepal. Government of Nepal; [Internet]. 2014 [cited 2021 Feb 22]. Available from: [https://nepal.unfpa.org/sites/default/files/pub-pdf/Population Monograph 2014 Volume1.pdf](https://nepal.unfpa.org/sites/default/files/pub-pdf/Population%20Monograph%202014%20Volume1.pdf). Accessed February 22, 2021.
4. Ministry of Health, Nepal. 2016 Nepal Demographic and Health Survey Key Findings. Ministry of Health Nepal [Internet]. 2017 [cited 2021 Feb 22]. Available from: <https://dhsprogram.com/pubs/pdf/SR243/SR243.pdf>
5. Pun KD, Chauhan M. Outcomes of adolescent pregnancy at Kathmandu University Hospital, Dhulikhel, Kavre. *Kathmandu Univ Med J*. 2011;9(33):50-3. doi:10.3126/kumj.v9i1.6263
6. Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D, et al. Meta-analysis of Observational Studies in Epidemiology. A Proposal for Reporting. *JAMA*. 2000;283(15):2008-12. doi: 10.1001/jama.283.15.2008.
7. Shrestha D, Budhathoki P, Dangal G, Shrestha O, Karki S, Thapa N. Teenage pregnancy and associated risk factors and outcome in Nepal from 2000-2020: A Systematic Review and Meta-Analysis. PROSPERO 2020 CRD42020215842 Available from: https://www.crd.york.ac.uk/prospere/display_record.php?ID=CRD42020215842
8. Covidence systematic review software, Veritas Health Innovation, Melbourne, Australia. Available at www.covidence.org
9. Borenstein M, Hedges L, Higgins J, Rothstein H. *Comprehensive Meta-Analysis Version 3*. Biostat. Englewood, NJ 2013
10. Identifying and measuring heterogeneity. Available from: https://handbook-5-1.cochrane.org/chapter_9/9_5_2_identifying_and_measuring_heterogeneity.htm. Accessed December 18, 2020.
11. critical-appraisal-tools - Critical Appraisal Tools | Joanna Briggs Institute. <https://joannabriggs.org/critical-appraisal-tools>. Accessed December 18, 2020.
12. Shrestha S, KC D, Dongol A. Co-morbidities, Maternal and Fetal Outcome of Teenage Pregnancy at Tertiary Care Hospital, Nepal. *Kathmandu Univ Med J (KUMJ)*. 2020;18(69):59-63.
13. Kafle PP, Pakuryal KN, Regmi RR, Luintel S. Health problems and social consequences in teenage pregnancy in rural Kathmandu Valley. *Nepal Med Coll J*. 2010;12(1):42-44.
14. Suwal A. Obstetric and perinatal outcome of teenage pregnancy. *J Nepal Health Res Counc*. 2012;10(1):52-56.
15. Subedi SS, Sharma S, Yadav M. Prevalence of adolescent pregnancy in a tertiary care hospital. *J Nepal Med Assoc* [Internet]. 2019 Aug 31 [cited 2021 Feb 22];57(218):248-51. doi:10.31729/jnma.4573
16. Nepal S, Atreya A, Kanchhan T. Teenage pregnancies in Nepal - The problem status and socio-legal concerns. *J Nepal Med Assoc* [Internet]. 2018 Jan 1 [cited 2021 Feb 22];56(211):678-82. doi:10.31729/jnma.3571
17. Maharjan M, Thapa N, Maharjan N, Rai P, Pun P, Petrini MA, et al. Prevalence of Teenage Pregnancy in A Community Hospital of Rural Nepal: A Cross-sectional Study. *J Nepal Med Assoc* [Internet]. 2019 May 1 [cited 2021 Feb 22];57(217):176-80. doi:10.31729/jnma.4083
18. Poudel S, Upadhaya N, Khatri RB, Ghimire PR. Trends and factors associated with pregnancies among adolescent women in Nepal: Pooled analysis of Nepal Demographic and Health Surveys (2006, 2011 and 2016). *PLoS One*. 2018;13(8). doi:10.1371/journal.pone.0202107

19. Yadav S, Choudhary D, K.C. N, Kumar R, Mandal RK, Sharma A, et al. Adverse reproductive outcomes associated with teenage pregnancy. *McGill J Med* [Internet]. 2008 [cited 2021 Feb 22];11(2):141–4. doi:10.26443/mjm.v11i2.600
20. Lama L, Shrestha S, Sharma A, Upadhyay S, Pathak MR. Immediate neonatal outcome of adolescent pregnant mother at Nepal Medical College Teaching Hospital. *Nepal Med Coll J*. 2013;15(2):117-21.
21. Tripathi M, Sherchand A. Outcome of Teenage Pregnancy. *J Univers Coll Med Sci*. 2014;2(2 SE-Original Articles). doi:10.3126/jucms.v2i2.11168
22. Shrestha S. Socio-cultural factors influencing adolescent pregnancy in rural Nepal. *Int J Adolesc Med Health*. 2002;14(2):101-9. doi:10.1515/IJAMH.2002.14.2.101
23. Gurung R, Målqvist M, Hong Z, Poudel PG, Sunny AK, Sharma S, et al. The burden of adolescent motherhood and health consequences in Nepal. *BMC Pregnancy Childbirth*. 2020 May 24;20(1). doi:10.1186/s12884-020-03013-8
24. Sharma AK, Verma K, Khatri S, Kannan AT. Determinants of pregnancy in adolescents in Nepal. *Indian J Pediatr*. 2002;69(1):19-22. doi:10.1007/BF02723769
25. Kassa GM, Arowojolu AO, Odukogbe AA, Yalew AW. Prevalence and determinants of adolescent pregnancy in Africa: a systematic review and Meta-analysis. *Reprod Health*. 2018;15(1):195. doi:10.1186/s12978-018-0640-2
26. Amjad S, MacDonald I, Chambers T, Osornio-Vargas A, Chandra S, Voaklander D, et al. Social determinants of health and adverse maternal and birth outcomes in adolescent pregnancies: A systematic review and meta-analysis. *Paediatr Perinat Epidemiol* [Internet]. 2019 Jan 5 [cited 2021 Feb 22];33(1):88–99. doi:10.1111/ppe.12529
27. Maravilla JC, Betts KS, Couto e Cruz C, Alati R. Factors influencing repeated teenage pregnancy: a review and meta-analysis. *Am J Obstet Gynecol*. 2017;217(5):527-545.e31. doi:10.1016/j.ajog.2017.04.021
28. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J, et al. Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study. *BJOG An Int J Obstet Gynaecol*. 2014;121:40-48. doi:10.1111/1471-0528.1263