

Original Article

Feto-maternal Outcomes in Adolescent and Young Adult Primigravid Mothers in a Tertiary Care Hospital in Bangladesh

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Abstract

Introduction: Adolescent pregnancy is a worldwide common health problem bearing serious social and medical implications relating to maternal and child health. In Bangladesh, pregnancy among adolescent girls is high. Approximately 66% of women under 18 years old reporting a first birth.

Objectives: We aimed to examine the obstetrical and neonatal outcomes of adolescent mother associated with first birth.

Materials & Methods: A cross-sectional descriptive study was undertaken to compare the different socio-demographic characteristics and pregnancy outcomes of adolescent primigravida mothers with those of adult primigravida mothers in a tertiary-care hospital in Bangladesh. A sample of 61 adolescent mothers in cases and 61 adult mothers of comparison group comprised the study subjects. Data were collected through interviews and by observations using a predesigned schedule.

Results: Results revealed that the adolescent mothers had a higher incidence (24.6%) of caesarian deliveries compared to 4.9% in the adult mother (OR: 6.304, 95% CI: 1.712-23.1, p=0.002). Term delivery was also higher 85.2% among adolescent group (OR: 2.82, 95% CI: 1.161-6.842, P=0.019). However, adult mother had greater incidence of postdated delivery (OR: 0.236, 95% CI: 0.073-0.764, P=0.011) and spontaneous onset of labor (OR: 0.442, 95% CI: 0.212-0.921, P=0.028). There was no significant difference found regarding neonatal outcomes like preterm, low birth weight, low APGAR score and NICU admission. Most of the adolescent mother are jobless in comparison to adult mother (p=0.015).

Conclusion: Adolescent pregnancy is still a rampant and important public-health problem in Bangladesh with unfavorable pregnancy outcomes which can be overcome by creating awareness with quality antenatal, intranasal and postnatal care.

Key words: Primigravida, Adolescent pregnancy, Adult mother, Obstetric outcomes, Neonatal outcomes.

Introduction

Adolescent pregnancy is defined as a pregnancy in girls 10-19 years of age. It is estimated that more than sixteen million females aged 15 to 19 years give birth each year, which represents approximately 11 percent of all births globally¹. Although adolescent fertility rates

are decreasing worldwide, around 18 million girls under the age of 20 give birth each year². Two million of these births are from girls under 15 years of age². More than 90% of these births occur in low and middle-income countries¹. Most adolescent pregnancies and childbirths take place in west and central Africa, east and southern Africa, South Asia, Latin America, and the Caribbeans². Different pieces of literature show that the prevalence of adolescent pregnancy varies across regions of the world. In the Asia Pacific regions, it ranges up to 43% in Bangladesh and from 11.1% to 47.3% in Nepal³.

In Bangladesh, the legal minimum age for marriage is 18 years for girls, but enforcement of this law is weak⁴. The present-day median age at first marriage is 15.8 years, and 66% of Bangladeshi women report having children before the age of 18⁵. Patriarchal norms and social structures make it difficult for girls to refuse sex or

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use contraceptives particularly in the context of marriage⁶.

Young spouses struggle to negotiate family planning decisions, reducing their capacity to schedule and spacing pregnancies for improved health and well-being. Misconceptions regarding contraception discourage to delay first pregnancy⁶. Because of this combination of variables, the prevalence of adolescent pregnancy has only slightly decreased over the last two decades; in 1993, adolescents accounted for 33% of all births or pregnancies, compared to 30.8% in the year 2014⁷.

According to the literature, several sociodemographic, cultural, and individual variables are related with adolescent pregnancy. Approximately 90% of adolescent pregnancies in the developing world are of married females, owing to their more frequent exposure to sex and pressure to conceive shortly after marriage^{8, 9}. As a result, majorities of adolescent pregnancies (about 75%) are planned^{1,10}.

Enforced social norms regarding gender roles, deeply embedded in community and familial contexts, equate a girl's value with her ability to reproduce^{6, 11}. Married adolescent females are less likely to engage in family planning, due to a lack of awareness about contraception and male-dominated couple dynamics, which restrict their individual ability to regulate the timing and frequency of pregnancy^{4, 12}. In addition, adolescents face an abnormal number of barriers to receiving reproductive treatments inside the official health systems due to lack of physical and financial access to health care facilities¹³.

Studies have shown that adolescent pregnancy has poor maternal and neonatal health outcomes^{1, 2, 8}. Issues during pregnancy and delivery are the second leading cause of mortality among 15-19 years old females worldwide¹.

Babies born to adolescents mothers had a significantly higher risk for mortality than those born to women aged 20 to 24 years^{1, 15}. School dropout^{14, 15}, poverty^{2, 15}, high rate of marriage⁸, pregnancy-induced hypertension and induced abortion^{1, 14} are some of the consequences of adolescent pregnancy on the mother. Adolescent pregnancy can have serious consequences for the fetus, including preterm birth, low birth weight, stillbirth, and high fetal and neonatal death rates¹⁶

Materials and Methods

Study setting and design

The study was conducted at Ad-din Medical College and Hospital in Dhaka during January 2022 to June 2022. This is one of the tertiary-care hospitals in Dhaka, with over 10,000 deliveries annually. The study undertaken was of a cross-sectional, descriptive type with two group cases and comparison respectively.

Adolescent pregnancy was defined as pregnancy occurring during the maternal ages of 10-19 completed years at delivery. Primigravida adolescent mothers aged 13-19 years were regarded as the cases (Group A) while primigravid adult mothers aged 20-30 years formed the comparison group (Group B). Primigravida women were chosen to minimize the impact of parity. Age between 20 and 30 years was considered since this age-group is generally regarded as safe for childbirth. Ages above 30 years constituting elderly primigravida, multiple gestation, women with major medical illnesses before & during pregnant state, intrauterine fetal death, congenital anomaly baby and any neonatal complication occurring after 24 hours of delivery were excluded from the study.

Variables relating to the socio demographic characteristics of the women in two groups, such as, mother's education and occupation, marriage age, socio-economic status, antenatal care, Contraceptive use, gestational age at delivery, mode and method of delivery, onset of labor and neonatal outcomes were observed.

Regarding the antenatal care (ANC); the women who had ANC were subdivided into 2 groups regular (≥ 4 antenatal visit) and irregular according to the visits to private doctors or hospital and ANC clinics units. Delivery before 37 completed weeks was defined as preterm and after 40 weeks defined as postdated pregnancy. Intrapartum Partograph was performed for each woman.

The maternal status, labor progress, delivery characteristics and neonatal outcomes were reviewed and recorded. Cesarean section was done for obstetric indications of a patient with active labor pain which include failure of progress of labor (arrest of dilatation or descent despite efficient uterine contractions), persistent or non-assuring FHR pattern or fetal distress, CPD etc.

All the neonates were assessed for weight, APGAR score at one and five minutes after birth, and those who were

admitted to neonatal care unit (NICU) were followed for 24 hours. Birth weight less than 2.5 kg was taken as low-birth weight baby.

Collection and analysis of data

The principal investigator and her team members visited the labor ward and operation theatre regularly two days in a week. However, cases admitted for delivery were not evenly distributed. Adolescent and young adult mothers were enrolled.

Data were gathered by observing and conducting interviews, following a predetermined schedule. The first interaction with research participants for data collection occurred shortly after the baby's birth. The research participants were questioned according to the schedule as soon as their condition allowed, and in situations where they had not recovered, their closest relative was interviewed. Data were validated, and missing information was obtained from antenatal records, if accessible.

Statistical analysis

The study's findings were statistically examined using the methodologies, descriptive statistics include tables, graphs, frequencies, percentages, means, and standard deviations & inferential statistics: The Chi square test and one-way ANOVA test (F test) were employed to determine the relationship between the relevant variables. Data were input and analyzed using the SPSS program. P-value < 0.05 was deemed statistically significant.

Ethics

Informed verbal consent was obtained from all the study subjects before they went into active labor.

Results

Sociodemographic characteristics

All adolescent pregnant mothers belonged to the age-group of 13-19 years. Whereas, there was no adolescent mother got pregnant aged less than 16 years. Their mean (\pm SD) age of pregnancy was 18.4(\pm 0.5) years. The maximum number of adult mother became pregnant between the age of 20-24 years approximately 73.8%, and only about 26.2% belonged to the age-group of 25-30 years. Their mean (\pm SD) age was 23.0(\pm 2.5) years. The different socio-demographic characteristics are summarized in Table 1.

Table-I : Sociodemographic Characteristics

Variables	Group A% (n=61)	Group B% (n=61)	P-value
Maternal Age (mean \pm SD)	18.43 \pm 0.531	23.03 \pm 2.569	0.000
17-19 years (n=61)	100(61)	0.0(0)	0.000
20-24 years (n=45)	0.0(0)	73.8(45)	
25-30 years (n=16)	0.0(0)	26.2(16)	
Educational Status			
Primary(n=16)	21.3(13)	4.3(3)	0.000
Secondary(n=39)	42.6(26)	21.3(13)	
Higher Secondary(n=32)	34.4 (21)	18.0(11)	
Graduate(n=28)	0.0(0)	45.9(28)	
Illiterate(n=7)	1.6(1)	9.8 (6)	
Occupation			
Home Maker(n=110)	96.7(59)	83.6(51)	0.015
Office Job(n=12)	3.3(2)	16.4(10)	
Socio Economic Status			
low class(n=4)	4.9 (3)	1.6 (1)	0.135
middle class(n=115)	95.1 (58)	93.4 (57)	
high class(n=3)	0.0 (0)	4.9 (3)	

Table-2: Age of Marriage

Variables	Group A% (n=61)	Group B% (n=61)	P-value
Age at marriage (mean \pm SD)	16.8 \pm 1.113	21.18 \pm 2.988	0.000
14-16yrs(n=25)	39.3(24)	1.6(1)	0.000
17-19yrs(n=54)	60.7(37)	27.9(17)	
20-24yrs(n=34)	0.0 (0)	55.7(34)	
25-29yrs(n=9)	0.0 (0)	14.8(9)	
Time interval between marriage and 1st conception (years)	1.5633 \pm 1.03	1.7708 \pm 1.27	0.307

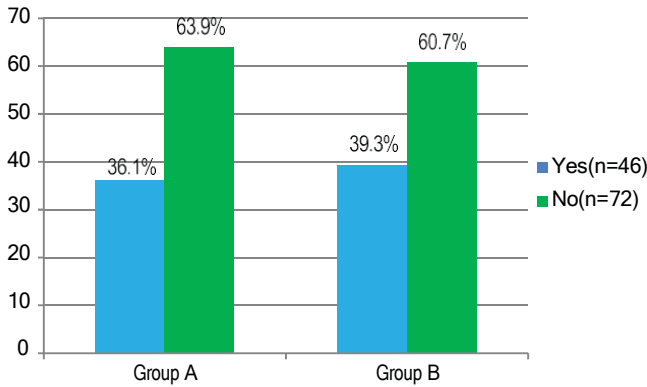


Figure-1: Use of Contraceptives

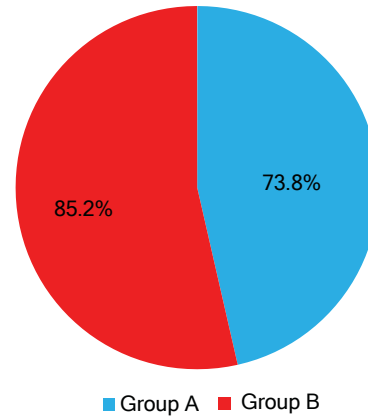


Figure-2: Antenatal Care Received

Table-3: Pregnancy Outcomes

Variables	Group A %(n=61)	Group B %(n=61)	Odds Ratio (95%CI)	P-Value
Gestational age at delivery (mean ± SD) (in weeks)	38.7±1.46	39.1±1.76		0.251
Mode of delivery				
Vaginal Delivery(n=102)	73.8(45)	93.4(57)	0.197 (0.062,.632)	0.003
Vaginal Instrumental Delivery(n=2)	1.6(1)	1.6(1)	1.000(0.061,16.36)	1.000
Cesarean Section(n=18)	24.6(15)	4.9(3)	6.304(1.712,23.1)	0.002
Time of delivery				
Term(n=93)	85.2(52)	67.2(41)	2.82(1.161,6.842)	0.019
Preterm(n=11)	8.2(5)	9.8(6)	0.818(0.236,2.839)	0.752
postdated(n=18)	6.6 (4)	23.0(14)	0.236(0.073,.764)	0.011

Table-4: Neonatal Outcomes

Variables	Group A %(n=61)	Group B %(n=61)	Odds Ratio (95%CI)	P-Value
Birth weight(mean ± SD)	2.758±.395	2.756±.499		0.075
Low birth weight (n=26)	18.0(11)	24.6(15)	0.675 (0.281,1.618)	0.377
APGAR Score in 5 th min(<8)(n=9)	9.8(6)	4.9 (3)	50.564(0.647,47.812)	0.299
NICU Admission(n=21)	14.8 (9)	19.7 (12)	0.707(0.273,1.82)	0.472

Abbreviations: NICU: Neonatal Intensive Care Unit

In our study, a high number of (9.8%) non-educated women were found in adult group. Most of the adolescent mother was less educated about 42.6% completed secondary and approximately 34.4% in high school compared to higher education level in adult primigravid mother approximately 18.0% in high school and 45.9% in university. Most of the mothers were unemployed about 96.7% in group A and 83.6% in group B. Among adolescent group only 3.3% women were

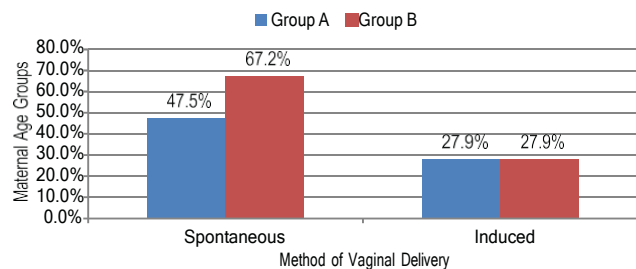


Figure-3: Method of Vaginal Delivery (Onset of Labour)

working in comparison to 16.4% of adult women were employed in different sector, which was statistically significant ($p=0.015$), table-1.

During the study period, all the mothers were married in both the groups. The mean age of marriage was $16.8(\pm 1.1)$ years in adolescent group and $21.2(\pm 2.9)$ years in adult group. The mean duration between the marriage and the conception was $1.5(\pm 1.0)$ years in adolescent group and $1.8(\pm 1.2)$ years in adult group ($p=0.307$), table-2.

The percentage of ever use of contraceptive methods in adolescent mothers was 36.1% as opposed to in older mothers 39.3%. Maximum percentages >60% of mothers in both groups did not use contraception ever, figure-1.

A higher proportion approximately 85.2% of the adult mothers received a minimum of four antenatal checkup compared to the adolescent mothers about 73.8%. There was no significant difference of antenatal care between adolescent and older mothers ($p=0.116$), figure-2.

Outcomes of pregnancy

In our study, the mean gestational age at birth was $38.7(\pm 1.4)$ weeks in adolescent group and $39.1(\pm 1.7)$ weeks in adult group, which was not significant ($p=0.251$). The adult mothers had a higher proportion 93.4% of normal vaginal delivery compared to the adolescent mothers 73.8% ($p=0.003$), statistically significant. About 24.6% of the adolescent mothers had caesarian delivery compared to 4.9% of the adult mothers. However, the association regarding the mode of delivery was significant ($p=0.002$, OR: 6.304, 95% CI: 1.712-23.1). The incidence of term deliveries were higher in adolescent group 85.2% compared to adult group 67.2%, which was statistically significant ($p=0.019$, OR:2.82, 95% CI: 1.161-6.842), table 3.

The adult mothers had a higher proportion 23.0% of post-dated pregnancies compared to the adolescent mothers 6.6%, which was statistically significant ($p=0.011$, OR:0.236, 95% CI:0.073-0.764). The adolescent mothers had a lesser proportion 8.2% of preterm deliveries compared to the adult mothers 9.8%, table 3.

Among all the vaginal delivery, the adult mother had a higher proportion 67.2% of spontaneous labor compared to adolescent mother 47.5%. This association was statistically significant ($p=0.028$, OR: 0.442, 95% CI: 0.212-0.921), figure 3.

Regarding neonatal outcomes, the mean birth weight was $2.75(\pm 0.395)$ kg in the adolescent group and

$2.75(\pm 0.499)$ kg in adult group and the difference was not statistically significant ($p=0.075$). The incidence of low birth weight was higher in adult group ($p=0.377$, OR: 0.675, 95%CI: 0.281-1.1618). The 5th min APGAR score were lower among adult group ($P=0.299$, OR: 5.564, 95% CI: 0.647-47.812). Higher rate of neonatal admission in NICU was detected in adult group 19.7% as compared to adolescent group 14.8% ($P=0.472$, OR: 0.707, 95% CI: 0.273-1.82), but not statistically significant, table 4.

Discussion

Adolescent pregnancy rates in developed countries have decreased over the previous 70 years. But in developing countries like Bangladesh adolescent pregnancy is still rampant with enormous impact on maternal and child health. Thus, adolescent pregnancy becomes a public health problem in Bangladesh and needs to be tackled on a priority basis.

Adolescent pregnancies put mothers at high risk to many health-related complications and their newborns to poor birth outcomes. Adverse outcomes of adolescent pregnancy arise not only from physical and medical causes but are also associated with individual, familial and socio-cultural factors besides lack of access to healthcare, contraception, and other resources which is the prevailing situation in most developing countries. This study aimed at finding the distribution of different socio-demographic characteristics, such as education, occupation, socioeconomic status etc., and pregnancy outcomes between adolescent mothers and their older counterparts.

Although the legal age at marriage is 18 years for females and 21 years for males in Bangladesh, early marriage is common. In our study, by the age of 14-16 years 39.3% of female were married and by the age of 17-19 years this figure rises to 60.7% in adolescent group. However, among adult group, 29.5% women were married within 19 years and 55.7% women were married within 20- 24 years. All women were married during their first pregnancy; so, the low age at marriage automatically links to early onset of sexual activity and thereby fertility. The mean age of adolescent primigravida mother was $18.43(\pm 0.531)$ years compared to $23.03(\pm 2.56)$ years in adult mother. The time period of interval between the marriage and first conception was found to be less among adolescent mother $1.56(\pm 1.0)$ years in comparison to the adult group $1.77(\pm 1.2)$ years. Similar figure has been reported in a study of India, where 26% of female are married by the age of 15, and by the age of

18 years this increases to 54%^{17,18}. It has been reported that there is increase fertility among the adolescent group. Study shows lesser time interval of conception in adolescent mother in comparison to adult mother¹⁸.

Women's education and adolescent motherhood were shown to have an inverse connection. Possible explanations for the inverse relationship between educational attainment and adolescent motherhood include lower educated women having insufficient knowledge about the high risk period of becoming pregnant, being unaware of family planning methods, and the negative effects of early childbearing on their health and children. These factors are further aggravated by the fact that lower educated women have lower levels of empowerment within family and society which eventually translate into higher level of adolescent motherhood^{19,20}. Whereas, in this study, we found the illiteracy rate was higher among the adult mothers 9.8% compared to the adolescent mothers 1.6%.

In our study, maximum portion of mother ($\geq 93\%$) belongs to middle class family and most of them ($\geq 83\%$) were engaged in household works, only few adult mother (about 16.4%) were employed in different sectors. Several study showed, poor socioeconomic status were found to be significantly associated with adolescent mother in contrast to the adult group. In a lower literacy society, individuals are more inclined to follow the age-old cultural tradition of marrying off a female child at a young age. Poverty and sex biasness act as a catalyst for early marriage of girl child^{18,20,23}.

The percentage of ever use of contraceptive methods in adolescent mothers was 36.1% as opposed to in older mothers 39.3%. Maximum percentages $>60\%$ of mothers in both groups did not use contraception ever. Similar result showed in one study, the contraceptive knowledge and use were lower in adolescent mothers in comparison to older mothers of 20-25 years of age¹⁸.

In this study, Adolescents are less likely to seek regular antenatal care (≥ 4 visits); 73.8% in adolescent groups had regular ANC as compared to 85.2% in non-adolescent pregnant group ($P=0.116$). A study at Egypt and Sudan, shows that 63.3% of adolescents had ANC as compared to 82.3% of older women²¹. Other studies also showed that adolescents had poor antenatal care²². This indicates that the adolescent mothers were less careful about their pregnancy probably because of the lack of awareness and maturity.

In our study, adolescent mothers had a higher proportion of caesarian delivery compared to the adult mother. About 24.6% of the adolescent mothers in this study had caesarian delivery compared to 4.9% of adult mothers. However, the association between the age of mothers and the mode of delivery was significant ($p=0.002$). The most common overall indication for caesarean section was cephalopelvic disproportion (26.7%) followed by fetal distress (20.0%). Indication for caesarean section in cephalopelvic disproportion and fetal distress was more commonly found among the adolescent mothers than among the adult mothers. Views on the process of delivery in pregnant adolescents vary greatly. Various literatures cited that there is biological immaturity of the adolescent pelvis which causes cephalopelvic disproportion leading to an increase in cesarean section rate²³⁻²⁶. Some authors have reported a higher rate of instrumental deliveries in the case of adolescent pregnancies¹⁴⁻¹⁶. Other authors have reported lower rates, and some contradicted this view²⁷⁻²⁹.

The adult mothers had a higher proportion (23.0%) of post-term pregnancies compared to the adolescent mothers (6.6%), which was statistically significant ($p=0.011$). A study at India, showed the similar result of 7.7% adult mother had post-term pregnancies compared to adolescent mothers 2%³⁰. Among vaginal deliveries higher percentage of adult mother 67.2% goes to spontaneous labor than adolescent mother 47.5%, however, this result is statistically significant ($p=0.028$).

In regard to neonatal outcomes, lower incidence of low birth weight baby were seen in the adolescent group 18% as compared to 24.6% in adult group ($P=0.377$). This observation contradicts the findings of several other authors³¹⁻³³. Low APGAR scores in 5th minute were found among infants of adult mothers, which is not consistent with other studies³⁴. NICU admission was higher in adult group 19.7% as compared to adolescent group 14.8% and the most common reasons of admission were intrapartum fetal distress, prematurity and low birth weight etc.

The study's drawback is that it was done at a tertiary hospital with high-quality maternal and newborn care facilities, thus the findings may not be representative of the entire community. Moreover, sample size is small due to limited study period. We also did not evaluate complications of pregnancy among adolescent mothers. However, regarding neonatal outcomes some bias

might have been introduced, as the complications delayed beyond 24 hours could not be observed since there was no scope of any follow-up.

Conclusions

Adolescent pregnancy may not be associated with serious obstetrical complications as perceived, if high-quality antenatal, intranasal, and postnatal care are provided. Higher level of education is an important deterrent to early marriage and early childbearing. Delaying marriage and childbearing among adolescents and married females is vital to bring down the population growth in nations with middle and low incomes. Quality healthcare facilities and a committed educational program may effectively decrease the prevalence of adolescent pregnancy in developing countries.

References

1. WHO. Adolescent pregnancy fact sheet. Adolescent Pregnancy Fact Sheet. 2014 Sep;1-4.
2. UNFPA, "Motherhood in Childhood, Facing the challenge of adolescent pregnancy, state of world population," 2013.
3. WHO, Guidelines on Preventing Early Pregnancy and Poor Reproductive Outcome Among Adolescents in Developing Countries, WHO, Geneva, 2011.
4. Human Rights Watch. Marry before your house is swept away: Child marriage in Bangladesh .2015 [cited 2024 Apr 20]. Available from: <https://www.hrw.org/report/2015/06/09/marryyour-house-swept-away/child-marriage-bangladesh>.
5. Rasheda Khan RK, MacQuarrie KL, Quamrun Nahar QN, Marzia Sultana MS. The men are away: pregnancy risk and family planning needs among women with a migrant husband in Barisal, Bangladesh.2016;6(1):46-87.
6. Gipson JD, Hindin MJ. „Marriage means having children and forming your family, so what is the need of discussion?“Communication and negotiation of childbearing preferences among Bangladeshi couples. Culture, Health & Sexuality. 2007;9(2):185-98.
7. Islam MM, Islam MK, Hasan MS, Hossain MB. Adolescent motherhood in Bangladesh: trends and determinants. PLoS One. 2017 Nov;12(11):e0188294.
8. Ayuba II, Gani O. Outcome of teenage pregnancy in the Niger Delta of Nigeria. Ethiop J Health Sci. 2012;22(1):45-50.
9. Erulkar A. Adolescence lost: The realities of child marriage. J Adolesc Health. 2013;52(5):513-4.
10. Presler-Marshall E, Jones N. Empowering girls to prevent early pregnancy. Overseas Dev Inst. 2012;14(2):97-99.
11. Karim N, Greene ME, Picard M. The cultural context of child marriage in Nepal and Bangladesh: Findings from CARE's Tipping Point Project. Community Participatory Analysis. Res Rep. 2016;42:25-36.
12. Raj A. When the mother is a child: the impact of child marriage on the health and human rights of girls. Arch Dis Child. 2010;95:931-5.
13. Henry EG, Lehnertz NB, Alam A, Ali NA, Williams EK, Rahman SM, Ahmed S, El Arifeen S, Baqui AH, Winch PJ. Sociocultural factors perpetuating the practices of early marriage and childbirth in Sylhet District, Bangladesh. Int Health. 2014;7(3):212-7.
14. Vincent G, Alemu FM. Factors contributing to, and effects of, teenage pregnancy in Juba. South Sudan Med J. 2016;7;9(2):28-31.
15. Presler-Marshall E, Jones N. Charting the future: Empowering girls to prevent early pregnancy. 2012;7(2):25-49.
16. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J, Yamdamsuren B, Temmerman M, Say L, Tunçalp Ö, Vogel JP. Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study. BJOG. 2014;121:40-8.
17. World Health Organization. Adolescent pregnancy: issues in adolescent health and development. Geneva: WHO. 2004;21-29.
18. Medi R, Das B, Das A, Ahmed M, Bawri S, Rai S. Adverse Obstetrical and Perinatal Outcome in Adolescent mothers associated with first birth: a hospital-based case-control study in a tertiary care hospital in North-East India. Adolescent Health, Medicine and Therapeutics. Dove Press Journal. 2016; 7:37-42.
19. Marchetta F, Sahn DE. The role of education and family background in marriage, childbearing, and labor market participation in Senegal. Economic Development and Cultural Change. 2016;64(2):369-403.
20. Islam MM, Islam MK, Hasan MS, Hossain MB. Adolescent motherhood in Bangladesh: Trends and determinants. PloS one. 2017;12(11):e0188294.

21. Galal S. A comparison between adolescents (15-19 years) and 20-24-year-old mothers in Egypt and Sudan. In Arab Conference on Maternal and Child Health. 1999;695:54-96.
22. Mayor S. Pregnancy and childbirth are leading causes of death in teenage girls in developing countries. *BMJ* 2004; 328:1152.
23. Tufail A, Hasmi HA. Maternal and perinatal outcomes in teenage pregnancy in a community based hospital. *Pak J Surg.* 2008;24(2): 130-134.
24. Al-Ramahi M, Saleh S. Outcome of adolescent pregnancy at a university hospital in Jordan. *Arch GynecolObstet*2006;273:207-10.
25. Scholl TO, Hediger ML, Belsky DH. Prenatal care and maternal health during adolescent pregnancy: a review and meta-analysis. *J Adolesc Health* 1994; 15:444-56.
26. Geist RR, Beyth Y, Shashar D, Beller U, Samueloff A. Perinatal outcome of teenage pregnancies in a selected group of patients. *Journal of pediatric and adolescent gynecology.* 2006;19(3):189-93.
27. Ziadeh S. Obstetric outcome of teenage pregnancies in North Jordan. *Archives of gynecology and obstetrics.* 2001;265:26-9.
28. Lao TT, Ho LF. The obstetric implications of teenage pregnancy. *Human reproduction (Oxford, England).* 1997;12(10):2303-5.
29. Eure CR, Lindsay MK, Graves WL. Risk of adverse pregnancy outcomes in young adolescent parturients in an inner-city hospital. *American journal of obstetrics and gynecology.* 2002;186(5): 918-20.
30. Mukhopadhyay P, Chaudhuri RN, Paul B. Hospital-based perinatal outcomes and complications in teenage pregnancy in India. *Journal of health, population, and nutrition.* 2010; 28(5):494.
31. Chen XK, Wen SW, Fleming N, Demissie K, Rhoads GG, Walker M. Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. *International journal of epidemiology.* 2007;36(2):368-73.
32. Sharma V, Katz J, Mullany LC, Khatri SK, LeClerq SC, Shrestha SR, Darmstadt GL, Tielsch JM. Young maternal age and the risk of neonatal mortality in rural Nepal. *Archives of pediatrics & adolescent medicine.* 2008;162(9):828-35.
33. Watcharaseranee N, Pinchantra P, Piyaman S. The incidence and complications of teenage pregnancy at Chonburi Hospital. *J Med Assoc Thai.* 2006;89(Suppl 4):S118-23.
34. Berenson AB, Wiemann CM, Rowe TF, Rickert VI. Inadequate weight gain among pregnant adolescents: risk factors and relationship to infant birth weight. *American journal of obstetrics and gynecology.* 1997;176(6):1220-7.