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Maternal and neonatal outcomes of adolescent pregnancy: a cross-sectional comparative study in a tertiary care hospital

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Abstract
Background: *Adolescent pregnancy is common in lower and middle income countries. These women are highly vulnerable to adverse pregnancy outcomes. The objective of the present study was to identify the maternal and neonatal outcomes of adolescent pregnancy among Bangladeshi girls.*
Methods:*This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynecology of Dhaka Medical College Hospital (DMCH), Dhaka from January to June 2019 among 100 adolescent pregnant women (aged between 15 and 19 years) and similar number of non-adolescent pregnant women. Data were collected by face-to-face interview and relevant clinical examination.*
Results:*The mean (SD) age of the adolescent pregnant women was 18 (0.9) years and majority of them were from low incomefamilies. The nutritional status(BMI and MUAC) of the adolescent mothers was comparatively lower than the non-adolescent women (average BMI 23.2 kg/m^2 vs 25.3 kg/m^2, average MUAC 23.6cm vs 24.2 cm). Maternal pregnancy related complications like hyperemesis gravidae, antepartum hemorrhage, pre-eclampsia, pre-mature rupture of membrane, pre-term labor, obstructed labor, hand or cord prolapseoccurred more commonly among adolescent mothers. Neonatal adverse outcomes like still birth and low birth weight were more prevalent in this group.*
Conclusion: *Pregnancy at adolescent age increases the vulnerability to maternal and neonatal complications. An appropriate action plan should be adopted to prevent the early age pregnancy.*
Keywords: *Adolescent pregnancy, High-risk pregnancy, Pregnancy outcome, Low birth weight, Still birth*

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I. Introduction

Pregnancy at an early age is one of the major challenges to attain the sustainable development goals, where the world is committed to minimize the adverse pregnancy outcomes by the next decade. Pregnancy and motherhood often occur before adolescents are fully developed physically, which exposes them to particularly acute health risks during pregnancy and childbirth, especially in the low and middle income countries. About 16 million women under age of 20 years give birth each year worldwide and more than one-third of this number is contributed from South-East Asian region alone (16% of all births are given by adolescent mothers in this region)(1).

A number of social determinants contribute to adolescent pregnancy including early marriage, sexual coercion and lack of access to and use of contraception(2).The health and social consequences of adolescent pregnancies are well established. Adolescent mothers are at more vulnerable to anemia during pregnancy, high-risk pregnancy, low birth weight, preterm birth as well as maternal and neonatal mortality(2–4).They also have high rates of complications from pregnancy, delivery, and unsafe abortion. Pregnancy during adolescence adds to the higher nutritional needs of adolescent girls as they are still growing and maturing. During the vulnerable period of adolescent growth and development, adequate nutrition plays a vital role in assuring a strong biological foundation for current and future health, well-being and productivity of women which is stuck due to pregnancy at this age(2). Social consequences of early pregnancy include early school dropout, low

empowerment, and risk of remaining poorresulting in less access to health information as well as sexual and reproductive health education(2,5).

Early pregnancy is common in Bangladesh. An estimated 2.5 million births (17% of total births) are attributed to adolescents between the age of 15 and 19 years(1,5). Despite a declining trend, the adolescent fertility rate in Bangladesh is still 118 births per 1000 women younger than 20 with a huge urban-rural disparity (1).Despite the deep penetration of the problem in the society, the health outcome of early pregnancy among the adolescent girls remained quite unexplored. Hence, the present study aimed to identify the maternal and neonatal outcomes of adolescent pregnancy among Bangladeshi girls.

II. Methods

Study design and participants

This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynecology of Dhaka Medical College Hospital (DMCH), Dhaka from January to June 2019. A total of 100 adolescent pregnant women (aged between 15 and 19 years) who got admitted in the Obstetric unit of the hospital full filling the inclusion criteria were included in the study. Similar number of pregnant women between 20 and 25 years who got admitted in the same vicinity were included for comparison of the outcome. Inclusion criteria were women of the selected age groups with at least 28 weeks of pregnancy. Pregnant women with less than 28 weeks of gestation or with abortion were excluded from the study.

Data collection

Socio-demographic information was collected by a face-to-face interview with the mother by using a semi-structured questionnaire developed in English. A pretest was done on 6 adolescent pregnant girls at Ad-din hospital, Mogbazar, Dhaka and finalized after necessary modification based on findings of pre-testing information from mother andneonate.

Data along with maternal and newborn anthropometry were collected from therespondents directly. Weight of the individual respondents was measured with a bathroom scale (model no-3P7044) in nearest kilogram. Before taking weight, machine was checked andcalibrated. Height of the individual respondents was also measured in nearest centimeter withstanding measuring stick (model no-HD, Manufacturer's-MA TSUYOSHI & CO.LTD).Mid upper-arm circumference (MUAC) measurement was taken in nearest millimeter. For the measurement of birth weight, a pediatric scale was used. Pan of the scale wascovered with a blanket or towel and Scale was calibrated to zero. Infant was placed onthe pan of the scale so the weight was well distributed equally over the pan. When theinfant was lying quietly, record was taken in nearest 10 grams. For the measurement of head circumference, a narrow, flexibles and non-stretch tape was used.

Statistical analyses

Relevant descriptive methods were used for presenting the data. Continuous variables were presented as mean with standard deviation (SD) and categorical variables were presented as frequency with percentage. All the statistical analyses were done using the SPSS version 24.0.

III. Results

The mean (SD) age of the adolescent pregnant women was 18 (0.9) years and that was 22 (0.8) years in non-adolescent pregnant women. Majority of the adolescent women were from low income group (52%) while majority of the non-adolescent women were from middle income group (59%). One-fourth of the adolescent women used contraceptive methods (Table 1).

Table 1: Sociodemographic characteristics of the participants

Characteristics	Adolescent, n (%)	Non-adolescent, n (%)
Age (years), mean (SD)	18.08 (0.94)	22.26 (0.81)
Respondent's educational Qualification		
Illiterate	36 (36.0)	31 (31.0)
Primary	43 (43.0)	56 (56.0)
Secondary	21 (21.0)	13 (13.0)
Family income		
Low	52 (52.0)	28 (28.0)
Middle	35 (35.0)	59 (59.0)
High	13 (13.0)	13 (13.0)
Number of family member		
≤4	40 (40.0)	41 (41.0)
>4	60 (60.0)	59 (59.0)
Age of marriage		
≤14yrs	8 (8.0)	3 (3.0)
15-18yrs	92 (92.0)	63 (63.0)

≥19yrs	0 (0.0)	34 (34.0)
Contraceptive usage		
Yes	26 (26.0)	41 (41.0)
No	74 (74.0)	59 (59.0)

The average BMI and MUAC of the adolescent mothers was comparatively lower than the non-adolescent women (23.2 kg/m^2 vs 25.3 kg/m^2). The hemoglobin level was also lower in adolescent mothers. The food habit was somewhat similar in both groups. Majority of the adolescent women were nulliparous (87%). Almost half of them had antenatal care (ANC) visit compared to 70% of their counterparts. Prevalence of anemia was higher among the adolescent mother (Table 2).

Table 2: Pregnancy related characteristics of the participants

Characteristics	Adolescent, n (%)	Non-adolescent, n (%)
Anthropometric measurements		
BMI, mean (SD)	23.23 (2.85)	25.31 (2.37)
Mid-upper arm circumference (MUAC) , mean (SD)	23.56 (1.26)	24.21 (1.11)
Hb, mean (SD)	9.73 (1.30)	10.69 (1.07)
Duration of sleep (hours)		
≤8	24 (24.0)	9 (9.0)
>8	76 (76.0)	91 (91.0)
Food consumption		
Milk	10 (10.0)	6 (6.0)
Egg	8 (8.0)	4 (4.0)
Meat	8 (8.0)	4 (4.0)
Vegetables	86 (86.0)	90 (90.0
Fruit	86 (86.0)	90 (90.0)
Parity		
Nulliparous	87 (87.0)	53 (53.0)
Multiparous	13 (13.0)	48 (48.0)
ANC visit		
Yes	49 (49.0)	70 (70.0)
No	51 (51.0)	30 (30.0)
Frequency of ANC		
<4	28 (57.1)	19 (27.1)
>4	21 (42.9)	81(72.9)
Place of taking ANC		
Govt. Hospital	45 (91.8)	66 (94.8)
Other Place	4 (8.2)	4 (5.2)
Investigation		
Complete	10 (20.41)	12 (17.14)
Incomplete	39(79.79)	58 (82.86)
Immunization		
Yes	84 (84.0)	88 (88.0)
No	16 (16.0	12 (12.0)
Drug History		
Yes	49 (49.0)	70 (70.0)
No	51 (51.0)	30 (30.0)
Comorbidities		
Anemia	51 (51.0)	20 (20.0)
Diabetes Mellitus	3 (3.0)	2 (2.0)
Jaundice	6 (6.0)	5 (5.0)
UTI	16 (16.0)	10 (10.0)
Heart Diseases	2 (2.0)	3 (3.0)
Blood Pressure	25 (25.0)	21 (21.0)
Fever	12 (12.0)	4 (4.0)
Proteinuria	23 (23.0)	17 (17.0)

Hyperemesis gravidae was most common maternal adverse event during pregnancy and it was more prevalent among the adolescent mothers. Antepartum hemorrhage and pre-eclampsia occurred more commonly among adolescent mothers while eclampsia was more prevalent among non-pregnant mothers. Pregnancy related complications like pre-mature rupture of membrane, pre-term labor, obstructed labor, hand or cord prolapse etc. were also more common among adolescent mothers. They required Caesarian section more frequently compared to the non-adolescent mothers and suffered from post-partum hemorrhage and sepsis more frequently (Table 3). In case of neonatal outcome, both still birth and low birth weight were more prevalent among adolescent mothers (Table 3).

Table 3: Maternal and neonatal outcome of pregnancy

Outcomes	Adolescent, n (%)	Non-adolescent, n (%)
Maternal adverse events		
hyperemesis gravidae	48 (48.0)	33 (33.0)
Antepartum hemorrhage (APH)	12 (12.0)	4 (4.0)
Pre-eclampsia	12 (12.0)	5 (5.0)
Eclampsia	5 (5.0)	25 (25.0)
Pre-mature rupture of membrane (PROM)	14 (14.0)	5 (5.0)
Pre term labor of pregnancy	13 (13.0)	5 (5.0)
Obstructed labor	30 (30.0)	10 (10.0)
Meconium stain	5 (5.0)	1 (1.0)
Foul smell discharge	4 (4.0)	1 (1.0)
Hand prolapse	2 (2.0)	0 (0.0)
Cord prolapse	4 (4.0)	0 (0.0)
Hanged product conception	2 (2.0)	0 (0.0)
Vaginal watery discharge	21 (21.0)	10 (10.0)
Post-partum hemorrhage(PPH)	21 (21.0)	11 (11.0)
Sepsis	4 (4.0)	0 (0.0)
Caesarian section	53 (53.0)	37 (37.0)
Neonatal outcome		
Still birth	23 (23.0)	14 (14.0)
Number of live child		
Single	65 (84.4)	57 (66.2)
Tween	12 (15.6)	29 (33.8)
Low birth weight (LBW)	29 (37.6)	20 (23.3)
Head circumference		
<33 cm	26 (33.8)	28 (32.6)
>33 cm	51 (66.2)	58 (67.4)
Congenital anomalies	3 (3.9)	1 (1.2)

IV. Discussion

Adolescent pregnancy is a complex social phenomenon influenced by several personal and socio-economic characteristics. Its consequences affect the health, social and economic well-being of the adolescents, their offspring and society at large.The present study provides a comparative overview of the socio-demographic and pregnancy related characteristics as well as maternal and neonatal outcome of adolescent and non-adolescent pregnant women of Bangladesh. According to our finding, majority of the adolescent pregnancy occurred in low income group of the society. This corroborates with the global trend reported by the WHO, where it was observed that adolescent girls from the poorest quantile of the population are four times more likely to become pregnant than those in the richest fifth(2). However, a study from Bangladesh reported little disparity in socioeconomic status of the adolescent and non-adolescent pregnant women (5), though the majority of the respondents of that study were recruited from the rural area, where the early age pregnancy is already more common compared to the urban area (1). Along with the early age of marriage, the rate of contraceptive use was much lower among the adolescent girls that contributed to their early pregnancy. Moreover, majority of them were deprived of antenatal care. The global authorities reported that the access to reproductive healthcare and contraception is low among the married adolescent girls, which make them vulnerable to the high risk pregnancies during their early life (2).

The nutritional status, in terms of BMI as well as MUAC, of our adolescent mothers was poor compared to their counterparts. Similar results were observed in a previous study from Bangladesh, where almost 30% of the adolescent pregnant girls were underweight (5). Pregnancyduring adolescence over imposes on the nutritional needs and impairs their growth and development (2). Moreover, more than half of the adolescent pregnant women were suffering from anemia which is in line with the national prevalence of anemia among adolescent girls (6). It is also established that pregnancy increases the risk of anemia among the adolescent girls (2).

Antepartum hemorrhage was one of the major maternal complications experienced by our patients. Vaginal bleeding in early pregnancy potentially increases the risk of later adverse outcomes as well as abortion (7,8).The prevalence of pre-eclampsia was higher in the adolescent women in our study compared to the non-adolescent pregnant women, though the prevalence of eclampsia was lower in this group. However, there is ambiguous findings in the previous studies(9–11). The existing evidence suggest that preeclampsia is more common in nulliparous women who are the majority of our adolescent population (12). However it was also hypothesizedthat since the adolescents have less comorbidities like chronic hypertension and gestational diabetes, it might play a protective role from pre-eclampsia as well as eclampsia (9,13), which was found in our study.Peripartum complications such as pre-mature rupture of membrane (PROM), pre term labor of pregnancy, obstructed laboretc. were also more prevalent among the adolescent mothers of our study. These complications were also reported as higher in previous studies conducted in different developing and developed countries like

India (10,14), Turkey (9,13), Mexico (11) etc. Post-partum hemorrhage was also more prevalent among the adolescent women. Early age pregnancy was identified as a risk factor of PPH in previous studies (15,16). Besides these, adolescent mothers of our study had to undergone Caesarian section more frequently compared to their counterparts. This finding was also evidenced in some previous studies (9,10). However, in a previous study from Bangladesh reported similar rate of Caesarian section in both adolescent and non-adolescent group (5).

Neonatal adverse outcomes such as still birth and low birth weight were more prevalent among our adolescent mothers. These outcomes were also more common in the adolescent girls included in previous studies from both Bangladesh (5) and other countries (9–11,13,14,16). Early age pregnancy is identified as a significant predictor of low birth weight of the children in different large scale studies (17–19). Moreover, adolescent pregnant women often suffer from poor nutritional status which also increases the risk of low birth weight (20–22).

Though the study provides an overview of the maternal and neonatal outcome of adolescent pregnancy, it has several limitations. Firstly, the study was conducted on a small number of samples to draw an inference. Moreover, the study was conducted in a tertiary care hospital, so a number of adolescent pregnancies were excluded. Further large scale studies are suggested to snap the overall situation of the adolescent pregnancy in Bangladesh.

V. Conclusions

Pregnancy at an adolescent age increases the risk of pregnancy related complications like pre-eclampsia, pre-term labor, obstructed labor, hand or cord prolapse etc. as well as increases the rate of Cesarean section. Moreover, it elevates the neonatal risk of still birth and low birth weight. It is necessary to implement a national level policy to reduce the adolescent pregnancy and to secure the safe reproductive life.

Declarations:

Ethics approval and consent to participate

Approval of the study protocol was obtained from the ethical committee of Dhaka Medical College.

Informed written consent was obtained from each participants before enrollment.

Availability of data and materials: Patient-level data will be available on request from the corresponding author.

Conflict of interest: The authors declare that they have no competing interests.

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