

Child Bearing Age and Pregnancy Outcomes in Bangladesh: A Multilevel Analysis of a Nationwide Population-Based Survey

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Abstract

Background: Delayed childbirth has increased significantly over the past several decades in developed countries while teenage pregnancy is still common in developing countries. Assessing the association between adolescent childbearing and the risk of perinatal and health outcomes may help policy makers to reform or formulate new policies to prevent premature death, disability and other adverse perinatal outcomes.

Objectives: To assess the association between adolescent pregnancy and the risk of adverse maternal, obstetrical and neonatal outcomes.

Study design: Data was extracted from 2011 Bangladesh Demographic and Health Survey (BDHS). This is a nationally representative population-based survey with a two-stage stratified cluster sample design. Outcomes for adolescent women ≤ 19 years of age were compared with those of women aged 20 to 34 years (young adult) and ≥ 35 years (adult). Multilevel Poisson regression models were used to determine the associated adverse birth and health outcome with maternal age.

Results: The mean age at childbearing was 26 years. Prevalence of adverse perinatal outcomes including low birth weight, stillbirths, stunting and perinatal mortality were substantially higher among adolescent mothers compared to the young adults. Multilevel regression models indicated that higher risk of low birth weight (adjusted relative risk (aRR), 1.15; 95% CI, 1.00-1.33), childhood stunting (aRR, 1.06; 95% CI, 0.98-1.14) and early neonatal mortality (aRR, 1.60; 95% CI, 0.85-1.27) were observed among the adolescent mothers compared to young adult mothers. Maternal age 35 years or over found to be a greater risk factor for pregnancy termination (aRR, 1.31; 95% CI, 1.09-1.56), caesarean delivery (aRR, 1.35; 95% CI, 1.02-1.79) and menstrual irregularities (aRR, 1.35; 95% CI, 1.02-1.79) than for young adult mothers.

Conclusion: Pregnant women aged ≤ 19 years and ≥ 35 years are at increased risk of different adverse birth and health outcomes. Social awareness needs to be increased about the consequences of early and late childbearing to prevent premature death and disability and adverse perinatal outcomes.

Keywords: Childbearing age; Adolescent; Perinatal outcome; Multilevel poisson regression model; Bangladesh

Introduction

Globally, adult population aged 35 years or over is growing; however, population aged 10-19 years (adolescent) still accounts for a significant proportion of the total population. Around 18% and 20% of the total world population consist of adolescents and adults, respectively of the total adolescent population, around 60% are in the South Asian region [1,2]. One in ten births occur in adolescence worldwide; while in developing countries it ranges from 30% to 50% [3]. This early childbearing can cause problems in achieving Sustainable Development Goal [3].

Several observational studies showed that early and late childbearing is a threat to maternal and infant health [4-6]. For mothers, the major health problems are pregnancy-induced hypertension, premature labor, anaemia and unsafe abortions [7,8]. Infants of adolescent mothers are at increased risks of low birth weight, preterm birth, small for gestational age, stillbirth and early neonatal mortality [9-11]. Most of the studies focused on the adverse child and adult outcomes in connection with maternal age at childbirth in developed countries and very few from developing countries [6,11-13]. Furthermore, findings from these studies were not consistent. For instance, some studies found increased risk of anaemia; whereas other found different results [13-15]. The role of early maternal childbirth in adverse perinatal and health outcomes is not well documented in low-income countries where antenatal and delivery care are lacking sufficiently. Therefore, a comprehensive

research in low-income country using nationally preventative survey data may provide detailed information on the association between teenage pregnancy and related maternal and neonatal outcomes.

Like many developing countries, early childbearing and its related premature death and disability are also significant problems in Bangladesh. Around 35% of women in Bangladesh give birth before reaching age 19. To date, some studies addressed the determinant of early motherhood in Bangladesh using community-based survey [16]. None has assessed the adverse neonatal and health outcomes in connection with maternal childbearing age using nationally representative population-based survey data in Bangladesh. To the best of our knowledge, this is the first attempt to assess the association between adolescent childbearing and the risk of adverse neonatal and health outcomes using population-based survey data.

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Methods and Materials

Data

In this study, we used nationally representative cross-sectional 2011 Demographic and Health Survey of Bangladesh (BDHS) [17,18]. It is based on a two-stage stratified population-based cluster sampling design. Using this sampling procedure, 17,842 women of reproductive age (13-49 years old) were selected for an interview. The response rate was 99%.

Exposure variable

Women of childbearing age was the exposure variable in this study. We calculated women's age at first birth from the women's date of birth. Consistent with previous studies, the calculated childbearing age was classified into three broad categories: adolescent: ≤ 19 years; young adult: 20-34 years; and middle adult: 35 years or over [10,19]. We only included women who gave birth to a child and aged 13 to 49 years old.

Outcome variable

We included a range of adverse birth and health outcome variables. The birth outcomes were low birth weight (LBW) (<2500 g), preterm birth (PTB) (<37 weeks of gestation), perinatal mortality (stillbirth and early neonatal mortality), early neonatal mortality (death within the first seven days of birth), stillbirths (fetal death lasting seven or more months), macrosomia (excessive intrauterine growth beyond a specific threshold regardless of gestational age), stunting and wasting. Stunting and wasting were defined based on height-for-age and weight-for-age which were converted into z-scores (HAZ and WHZ, respectively). The stunting and wasting were defined as having HAZ and WHZ below two standard deviations, respectively. Pregnancy complications (health problems during pregnancy that adversely affected the mother and the fetus), pregnancy termination (termination of the embryo or fetus before its capability to survive), caesarean delivery (surgical procedure to deliver a baby), anaemia (haemoglobin level <110 g/dl), menstrual irregularities (menstrual cycle does not vary between 21-35 days), exclusively breastfeeding (child receive only breast milk during first six month of life), genital sore (bumps and lesions around the vagina) and genital discharges (thick, pasty, thin, cloudy, bloody liquid from the vagina) were also considered as outcome variables.

Covariates

This study considered different individual, household and community- level characteristics as confounding adjustments. Individual level characteristics were maternal age (15-19, 20-24, 25-29, 30-34, 35-39, ≥ 40 years), maternal education (no education, primary, secondary and higher education), husband's education (no education, primary, secondary and higher education), present working status (yes, no) and the number of antenatal visits. Household socio-economic status (poorest, poorer, average, richer, richest) and household food security (never, sometimes, few often) were considered as household level characteristics. Community level characteristics were region (Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, Sylhet) and place of residence (urban, rural).

Statistical analysis

Descriptive statistics were presented as mean and percentage. For each outcome variable, we used the maximum sample size with the available BDHS survey data. For comparison purposes, maternal childbearing age was classified into three categories (adolescent,

young adult and adult). We considered maternal childbearing age as a continuous variable where possible, but mostly used the three categories for tables, figures, odds ratio or risk ratio calculations. Multilevel Poisson regression analysis was performed to determine the relationship between exposure and outcome variables. We used multilevel analysis because individuals are clustered within the same households and households are clustered within communities in BDHS data. When lower levels are nested within higher levels, multilevel analysis produces more valid results. All analyses were account for probability sample design. Stata version 13/SE (Stata Corporation, College Station, Texas, USA) was used for all statistical analysis.

Results

Study characteristics

Table 1 presents the prevalence of different birth and health outcomes by maternal childbearing age categories. The average age of the participants was around 26 years. Around 28% of women gave birth in adolescent time (age 19 years or less), 67% during age 25-34 years old and 5% in age 35 years or over (Figure 1). The major adverse neonatal outcomes were stunting (42%), low birth weight (17%) and wasting (15%) and the maternal health outcomes were menstrual irregularities (68%), pregnancy complication (66%), anaemia (45%), pregnancy termination (18%) and caesarean delivery (14%).

Maternal age and neonatal health outcomes: Multilevel analysis

To assess the association between maternal childbearing age and the risk of adverse perinatal and health outcomes, we performed a series of unadjusted and adjusted multilevel Poisson regression models with random intercept: household and community. The results of the

Characteristics	Crude
Mean (SE)	
Age	25.65 (0.07)
Year of schooling	5.53 (0.04)
Husband year of schooling	4.59 (0.03)
Age at first cohabitation	15.94 (0.03)
Weight	52.2 (0.77)
Height	156.2 (0.76)
BMI	23.30 (0.06)
Children Ever Born	3.93 (0.01)
Prevalence (95% CI)	
Adverse birth outcome	
Low Birth Weight	17.1 (15.9-18.2)
Stunting	41.2 (39.6-42.9)
Wasting	15.5 (14.5-16.6)
Stillbirths	1.3 (1.1-1.5)
Macrosomia	13.8 (12.8-14.9)
Perinatal mortality	2.8 (2.5-3.2)
Early neonatal mortality	2.6 (2.3-3.1)
Adverse health outcome	
Pregnancy complication	66.6 (64.3-68.7)
Pregnancy termination	18.0 (16.9-19.1)
Caesarean delivery	13.9 (12.7-15.2)
Anemia	44.1 (42.2-47.6)
Menstrual irregularities	67.5 (66.0-68.9)
Exclusive breastfeeding	8.88 (8.1-9.7)
Genital sore	6.95 (6.5-7.5)
Genital discharge	10.5 (9.8-11.1)

Table 1: Background characteristics of the study population, SE, Standard error.

unadjusted and adjusted models for specific birth and health outcomes are shown in Tables 2 and 3 respectively. We performed a likelihood ratio test to choose the preferable models. The test compared random effect model against the fixed effect model and found statistically significant results ($P < 0.05$). This implies that random effect models are necessary to assess the association between exposure and outcomes variables.

Adverse neonatal outcomes for all live births are summarized in Table 2. Neonates born to adolescent mothers had higher risks of low birth weight (adjusted relative risk (aRR), 1.15; 95% CI, 1.00-1.33), child

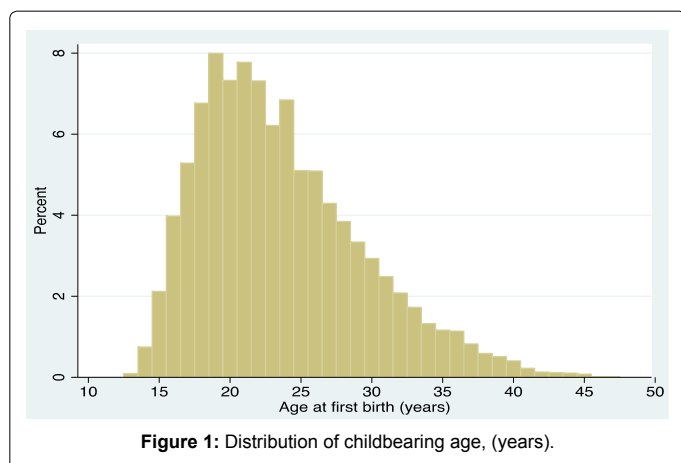


Figure 1: Distribution of childbearing age, (years).

	Adolescent	Young Adult	Adult
Low Birth Weight			
n (%)	381 (18.5)	838 (16.2)	76 (18.7)
RR (95% CI)	1.16 (1.02-1.30)	1.00	1.13 (0.91-1.41)
aRR (95% CI)	1.16 (1.02-1.31)	1.00	1.09 (0.86-1.38)
Still births			
n (%)	30 (1.7)	62 (1.4)	137 (1.2)
RR (95% CI)	1.19 (0.79-1.81)	1.00	0.84 (0.61-1.14)
aRR (95% CI)	1.13 (0.75-1.72)	1.00	0.43 (0.26-0.72)
Stunting			
n (%)	885 (42.9)	2046 (39.6)	178 (43.8)
RR (95% CI)	1.04 (0.98-1.12)	1.00	1.07 (0.93-1.21)
aRR (95% CI)	1.06 (0.98-1.14)	1.00	0.95 (0.83-1.09)
Wasting			
n (%)	312 (15.1)	799 (15.5)	73 (18.0)
RR (95% CI)	0.98 (0.87-1.10)	1.00	1.15 (0.92-1.44)
aRR (95% CI)	0.92 (0.81-1.05)	1.00	1.11 (0.88-1.40)
Macrosomia			
n (%)	298 (14.5)	749 (14.9)	41 (10.1)
RR (95% CI)	1.00 (0.87-1.15)	1.00	0.69 (0.50-0.94)
aRR (95% CI)	1.02 (0.87-1.20)	1.00	0.72 (0.52-1.00)
Perinatal Mortality			
n (%)	76 (4.3)	178 (4.0)	195 (1.7)
RR (95% CI)	1.08 (0.79-1.47)	1.00	0.45 (0.36-0.56)
aRR (95% CI)	0.94 (0.64-1.27)	1.00	0.67 (0.48-0.94)
Early Neonatal Mortality			
n (%)	46 (2.6)	118 (2.6)	60 (2.4)
RR (95% CI)	1.99 (1.45-2.72)	1.00	2.48 (1.64-3.71)
aRR (95% CI)	1.60 (0.85-1.27)	1.00	1.43 (0.76-2.68)

n: Sample Size; CI: Confidence Interval; RR: Relative Risk; aRR: Adjusted Relative Risk

Table 2: Maternal age and adverse birth outcome.

	Adolescent	Young Adult	Adult
Pregnancy Complication			
n (%)	777 (66.8)	2069 (68.3)	122 (65.6)
RR (95% CI)	0.97 (0.92-1.02)	1.00	1.00 (0.87-1.14)
aRR (95% CI)	0.97 (0.92-1.03)	1.00	1.02 (0.90-1.15)
Pregnancy Termination			
n (%)	212 (10.3)	1055 (20.4)	117 (28.8)
RR (95% CI)	0.54 (0.44-0.57)	1.00	1.41 (1.18-1.67)
aRR (95% CI)	0.56 (0.48-0.64)	1.00	1.31 (1.09-1.56)
Caesarean Delivery			
n (%)	241 (11.7)	841 (16.3)	49 (12.2)
RR (95% CI)	0.83 (0.72-0.97)	1.00	0.89 (0.63-1.25)
aRR (95% CI)	0.85 (0.73-0.99)	1.00	1.35 (1.02-1.79)
Anemia			
n (%)	283 (42.2)	725 (43.8)	65 (50.8)
RR (95% CI)	0.91 (0.81-1.03)	1.00	1.07 (0.86-1.32)
aRR (95% CI)	0.90 (0.79-1.04)	1.00	1.01 (0.81-1.26)
Menstruate Irregularities			
n (%)	1394 (67.6)	3517 (68.0)	299 (73.7)
RR (95% CI)	0.99 (0.96-1.03)	1.00	1.08 (1.01-1.15)
aRR (95% CI)	0.98 (0.94-1.02)	1.00	1.14 (1.06-1.23)
Genital Discharge			
n (%)	331 (10.6)	1246 (10.6)	289 (9.8)
RR (95% CI)	0.98 (0.86-1.10)	1.00	0.88 (0.77-1.02)
aRR (95% CI)	0.94 (0.82-1.09)	1.00	0.83 (0.68-1.03)
Genital Sore/Ulcer			
n (%)	225 (7.2)	838 (7.1)	171 (5.8)
RR (95% CI)	1.07 (0.91-1.26)	1.00	0.81 (0.68-0.97)
aRR (95% CI)	1.04 (0.86-1.25)	1.00	0.83 (0.64-1.09)
Exclusive Breastfeeding			
n (%)	159 (7.7)	485 (9.4)	23 (5.7)
RR (95% CI)	0.88 (0.75-1.02)	1.00	0.80 (0.56-1.14)
aRR (95% CI)	0.89 (0.75-1.06)	1.00	1.83 (0.57-1.20)

n: Sample Size; CI: Confidence Interval; RR: Relative Risk; aRR: Adjusted Relative Risk

Table 3: Maternal age and adverse health outcome.

stunting (aRR, 1.06; 95% CI, 0.98-1.14) and early neonatal mortality (aRR, 1.60; 95% CI, 0.85-1.27) than those born to young adult mothers. Relatively higher risk of stillbirth (RR, 1.37; 95% CI, 0.96-1.97) was found in the adolescent mothers compared to young adult mothers. The risk of wasting infant was lower in adolescents (aRR, 0.92; 95% CI, 0.81-1.05). There was no significant difference in risks of macrosomia (aRR 1.02; 95% CI, 0.87-1.20) found between adolescents and young adult mothers.

Adverse maternal pregnancy and obstetrical outcomes for all live births are presented in Table 3. Adolescents had a significantly lower risk of caesarean deliveries than young adult women (aRR, 0.85; 95% CI, 0.73-0.99). When adjusted for all possible confounding factors, adolescents had a lower risk of pregnancy termination (aRR 0.56; 95% CI 0.48-0.64), anaemic (aRR, 0.90; 95% CI, 0.79-1.04), genital discharge (aRR, 0.94; 95% CI, 0.82-1.09) and exclusive breastfeeding (aRR, 0.89; 95% 0.75-1.06) than adults. The risk of facing pregnancy termination, caesarean delivery and menstruate irregularities was significantly higher in adult mothers than their young adult counterparts.

Discussion

With data from population-based cross-sectional studies in Bangladesh, to our knowledge, this study is one of the largest studies to connect maternal childbearing age and range of neonatal and maternal

health outcomes with adjustment for multiple confounders. The study showed that around 35% of all live births resulted from adolescent pregnancy in Bangladesh. The study also demonstrated that adolescent pregnancy had increased risks of low birth weight, stillbirth, stunting and early neonatal mortality; however, adolescent females were protective against pregnancy termination and caesarean delivery.

In both developed and developing countries, birth weight is probably the most important factor that affects neonatal mortality [20]. Our study demonstrated that overall prevalence of low birth weight was 18%. Higher proportion of low birth weight was found among adolescents (19%) than young adult mothers (16%), which was almost consistent with other Asian countries including Maldives (22%), Nepal (21%), Sri Lanka (22%) and Pakistan (19%) [21]. However, prevalence of low birth weight was a bit different in India (low birth weight, 30%) compared to other countries South Asian countries. Consistent with other studies [22,23], our multiple regression model indicated that adolescent pregnancy was associated with an increased risk of delivering low birth weight babies. Childbearing during adolescence may impose double the nutritional demands, as an adolescent struggle to complete her own growth while also providing the nutrients needed for the development of the foetus [21].

Our study found on average, stillbirths were 12 per 1000 live births and early neonatal deaths were 26 per 1000 live births. These rates were relatively higher among adolescent mothers (stillbirths, 14 per 1000 live births and early neonatal mortality, 26 per 1000 live births) than adult mothers (stillbirths, 12 per 1000 live births and early neonatal mortality, 24 per 1000 live births). Multilevel regression analysis indicated that adolescents who were pregnant had higher risks of stillbirths, stunting, perinatal and early neonatal mortality than young adult mothers. Consistent with other studies, after adjusting potential confounding factors, the association became insignificant for early neonatal mortality [24,25]. The exact biological mechanism for increased stillbirth and early neonatal mortality risk with early childbearing age is uncertain. This would probably be related to poor uterine vasculature, medical and obstetric complication among both the young [9,26-28]. Similar to previous studies [9,29,30], our study found adolescent pregnancy was associated with lower risks of caesarean delivery, gestational hypertension and diabetes. Adolescent pregnancy in this study was associated with lower risks of pregnancy termination and caesarean delivery after potential confounding was adjusted in multilevel regression models.

Strength and Limitations

To the best of our knowledge, this is the first nationally representative study in Bangladesh that assessed the association between maternal age and risk of adverse neonatal, obstetric and maternal complications. The study included appropriate statistical models to establish the association, which concluded better findings. Despite this strength, we acknowledge that the study has some limitations. The study failed to establish a causal relationship between the observed associations due to its cross-sectional nature. This study was also based on self-reported data about different adverse birth and health outcome, which are subject to participants' recall bias. However, the self-reported data may not affect much in our analysis because the prevalence of all the adverse neonatal and health outcomes variables was consistent with other Asian countries. To establish a more valid association between adolescent pregnancy and adverse neonatal and health outcomes, large-scale prospective cohort studies are necessary.

Conclusion

The large population-based study suggested that adolescent pregnancy was associated with increased risks of low birth weight, childhood stunting, stillbirths, perinatal and early neonatal mortality in Bangladesh. However, pregnancy termination and caesarean delivery were considerably lower among adolescents compared to young adults. Scaling up of childbearing to young adults is necessary to avoid premature births, deaths and other neonatal disabilities in low-income settings like Bangladesh.

Declarations

Ethics approval and consent to participate: The present research based on the existing survey data were collected by the Monitoring and Evaluation to Assess and Use Results Demographic and Health Surveys (MEASURE DHS) project (www.measuredhs.com). The nationwide survey in this study received ethical approval from the Institutional Review Board of Macro International in Calverton in the United States of America and by the National Ethical Review Committees in Bangladesh. The consent form was obtained from subjects before interviews and all information was recorded confidentially. We received raw data with permission to use it after completing registration procedures and meeting requirements of MEASURE DHS.

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We obtained the data used in this study from MEASURE DHS Archive. The data were originally collected by Macro, Calverton, USA. The authors are grateful to Measure DHS for providing permission to use the 2011 Bangladesh DHS data.

References

1. UN (2013) World Population Prospects: The 2012 revision, highlights and advance tables (Working paper no. ESA/P/WP. 228). United Nations Publications, New York.
2. Akhter N, Sondhya FY (2013) Nutritional status of adolescents in Bangladesh: Comparison of severe thinness status of a low-income family's adolescents between urban and rural Bangladesh. *J Educ Heal Prom*: 2.
3. Lloyd CB (2005) Growing up global: The changing transitions to adulthood in developing countries. National Academies Press.
4. Liu X, Zhang W (2014) Effect of maternal age on pregnancy: A retrospective cohort study. *Chin Med J* 127: 2241-2246.
5. Jolly M, Sebire N, Harris J, Robinson S, Regan L (2000) The risks associated with pregnancy in women aged 35 years or older. *Hum Reprod* 15: 2433-2437.
6. Chen XK, Wen SW, Fleming N, Demissie K, Rhoads GG, et al. (2007) Teenage pregnancy and adverse birth outcomes: A large population based retrospective cohort study. *Intern J Epidemiol* 36: 368-373.
7. Áhman E, Shah IH (2011) New estimates and trends regarding unsafe abortion mortality. *Int J Gynaecol Obstet* 115: 121-126.
8. Mahavarkar SH, Madhu C, Mule V (2008) A comparative study of teenage pregnancy. *J Obstet Gynaecol* 28: 604-607.
9. de Vienne CM, Creveuil C, Dreyfus M (2009) Does young maternal age increase the risk of adverse obstetric, fetal and neonatal outcomes: A cohort study. *Eur J Obstet Gynecol Reprod Biol* 147: 151-156.
10. Fleming N, Osborne C, Biederman S, Yasseen A (2013) Adolescent pregnancy outcomes in the province of Ontario: A cohort study. *J Obstet Gynaecol Can* 35: 234-245.
11. Fall CH, Sachdev HS, Osmond C, Restrepo-Mendez MC, Victora C, et al. (2015) Association between maternal age at childbirth and child and adult outcomes in the offspring: A prospective study in five low-income and middle-income countries (COHORTS collaboration). *The Lancet Global Health* 3: e366-e377.
12. Abu-Hejja A, Ali AM, Al-Dakheil S (2002) Obstetrics and perinatal outcome of adolescent nulliparous pregnant women. *Gynecol Obstet Invest* 53: 90-92.

13. Jolly MC, Sebire N, Harris J, Robinson S, Regan L (2000) Obstetric risks of pregnancy in women less than 18 years old. *Obstet Gynecol* 96: 962-966.
14. Conde-Agudelo A, Belizán JM, Lammers C (2005) Maternal-perinatal morbidity and mortality associated with adolescent pregnancy in Latin America: Cross-sectional study. *Am J Obstet Gynecol* 192: 342-349.
15. Menacker F, Martin JA, MacDorman MF, Ventura SJ (2004) Births to 10-14 year-old mothers, 1990-2002: Trends and health outcomes. *Citeseer*.
16. Sayem AM, Nury A (2011) Factors associated with teenage marital pregnancy among Bangladeshi women. *Reprod Health* 8: 1-12.
17. Bangladesh Demographic and Health Survey (2013) National Institute of Population Research and Training (NIPORT), Mitra and Associates & Macro International, Dhaka, Bangladesh and Calverton, Maryland, USA; 2013. Ministry of Health and Population, Government of Nepal. Kathmandu.
18. Macro O (2002) World bank. Use wealth index to measure socioeconomic status. *DHS dimensions* 4: 1-2.
19. Phipps MG, Sowers M (2002) Defining early adolescent childbearing. *Am J Public Health* 92: 125-128.
20. Karim M, Flora M, Akhter S (2011) Birth weight of the babies delivered by chronic energy deficient mothers in National Nutrition Program (NNP) intervention area. *Bangladesh Med Res Counc Bull* 37: 17-23.
21. Salam A, Haseen F, Yusuf H, Torlesse H (2004) National low birth-weight survey of Bangladesh, 2003-2004. *Prevention* 76: 155.
22. Golestan M, Akhavan KS, Fallah R (2012) Maternal age and low birth weight.
23. Ahmad U, Danborno B, Jibril MM, Ahmed I (2014) Retrospective study of maternal age and birth weight in abubakar tafawa balewa university teaching hospital (atbuth) Bauchi state, Nigeria. *Asian J Med Pharm Res* 4: 179-182.
24. Raymond EG, Cnattingius S, Kiely JL (1994) Effects of maternal age, parity and smoking on the risk of stillbirth. *BJOG: An Intern J Obstet Gynecol* 101: 301-306.
25. Reddy UM, Ko C-W, Willinger M (2006) Maternal age and the risk of stillbirth throughout pregnancy in the United States. *Am J Obstet Gynecol* 195: 764-770.
26. Naeye RL (1983) Maternal age, obstetric complications and the outcome of pregnancy. *Obstet Gynecol* 61: 210-216.
27. Usta IM, Nassar AH (2008) Advanced maternal age. Part I: Obstetric complications. *J Perinat* 25: 521.
28. Shrim A, Ates S, Mallozzi A, Brown R, Ponette V, et al. (2011) Is young maternal age really a risk factor for adverse pregnancy outcome in a Canadian tertiary referral hospital? *J Pediatr Adolesc Gynecol* 24: 218-222.
29. Jahromi BN, Husseini Z (2008) Pregnancy outcome at maternal age 40 and older. *Taiwan J Obstet Gynecol* 47: 318-321.
30. Bayrampour H, Heaman M (2010) Advanced maternal age and the risk of caesarean birth: A systematic review. *Birth* 37: 219-226.