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Original Research Article

Study of neonatal outcome in primiparous women in different age groups in our population

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Abstract: The objective of this study is to evaluate the associations between maternal age and neonatal outcome in primiparous women with emphasis on teenagers and older women. A prospective observational study is conducted at Guwahati Medical College and Hospital. Primiparous women with singleton births from June 2015 to July 2016 (N=500) were divided into five age groups, 17–19 years and an additional four 5-year classes. The reference group consisted of the women aged 25–29 years. The teenagers showed increased risk of low APGAR score and small for gestational age as compared to the reference (25-29 years) group. Women with advancing age (≥35 years) revealed significantly increased risk of fetal distress and large for gestational age compared with the reference group. Meconium aspiration syndrome (MAS) and stillbirth were found to be highest in the reference group. An analysis of perinatal outcomes in relation to maternal age in the Indian population will provide important knowledge that may be used to further improve social, antenatal, obstetric and neonatal care and reveals risk groups that in particular may need more attention in antenatal care.
Keywords: Pregnancy in primiparous, Neonatal outcome

INTRODUCTION

The question of whether women who deliver in their teens or who delay childbearing are at an increased risk of having an adverse pregnancy outcome is important in a country like India where we can witness both the trends.

Pregnancy and childbirth is a universally celebrated event. Pregnancy is a physiological state of stress on the body and by itself makes women prone to many disorders and diseases. This coupled with the complications of pregnancy can have various severe deleterious effects on the health of the mother and foetus. WHO report 2005 shows that one woman die of pregnancy and childbirth related complications every minute, i.e. more than half a million every year [1].

When girls become mothers before they are physically and emotionally ready, the results are even more tragic. One in every ten births worldwide is to a mother who is still herself a child [2]. Worldwide more than 13 million adolescent girls give birth each year, with more than 9 out of 10 births taking place in the developing world [3]. Babies born to girls in their teens face a 50 per cent higher risk of dying before they reach one year than babies born to women in their twenties. Worldwide, an estimated 70,000 girls [6] and one million infants born to young mother die each year due to pregnancy and childbirth-related complications [4]. Despite the rising age of marriage and laws prohibiting early marriage, half of all Indian women aged 20-24 years got married by the time they were 18 and a quarter by the time they were 15. The median age at marriage for girls in India is 16 years [5].

With increasing cases of infertility, educational and career pursuits among women resulting in delay in child-bearing, more women are starting their obstetric career at the age 35 years and above [6]. Advanced maternal age and parity constitute two major factors in the outcome of pregnancy and labour, both in developed and developing countries [7].

There are a number of studies evaluating neonatal outcome over the full range of reproductive maternal ages, especially with a focus on the youngest and the oldest mothers. Young mothers have been shown to be exposed to an increased risk of a low birth weight, fetal death and preterm birth. Complications during pregnancy and birth at an advanced maternal age

(either defined as 35 years and older or 40 years or older) have also been evaluated in high-income countries. Advanced maternal age at birth has been found to be associated with preterm delivery, low birth weight, intrauterine fetal death and increased perinatal mortality [8].

An analysis of perinatal outcomes in relation to maternal age in the Indian population will provide important knowledge that may be used to further improve social, antenatal, obstetric and neonatal care and reveals risk groups that in particular may need more attention in antenatal care. The present study is done with the following objectives:

1. To assess the impact of maternal age on neonatal outcome among singleton primiparous women in Gauhati Medical College.
2. Special emphasis on adolescents and older mothers.

MATERIALS AND METHODS:

This study analyses the neonatal outcomes of all singleton primiparous women prospectively registered in the Guwahati Medical College and Hospital who gave births from 1st July 2015 to 30th June 2016. Starting with the first antenatal visit, usually in gestational weeks 10–12, the information is collected prospectively in standardised medical record forms completed at antenatal care visits, in the birth units, and at the paediatric examination of the newborn.

The study population was grouped according to maternal age into five subgroups: 17–19; 20–24, 25–29, 30–34; ≥35 years. In the outcome analyses we selected the group of women aged 25–29 years as reference group.

The fetal and neonatal outcomes evaluated were Apgar score at 5 min, fetal distress and aspiration of meconium, shoulder dystocia, stillbirth, large for gestational age and small for gestational age. Small-for-gestational age (SGA) newborns were defined as those with birth weight more than 2 SD below the mean birth weight for gestational age (sex and parity specific) according to an Indian reference curve. Large-for-gestational age (LGA) newborns were those with a birth weight above 2 SD.

RESULTS

In the period July 2015–June 2016, 500 numbers of primiparous women giving birth were studied. The demographic and neonatal data subdivided into maternal age groups are presented in the form of tables and figures.

Table 1: gestational age in weeks in the study population

Gestational age in weeks	Age in years									
	17 – 19	%	20 – 24	%	25 – 29	%	30 – 34	%	≥ 35	%
< 32	2	3%	9	4%	2	1%	1	3%	0	0%
32 – 36	10	14%	36	14%	11	8%	8	20%	3	23%
37 – 41	38	53%	146	59%	89	70%	21	54%	10	77%
≥ 42	21	30%	57	23%	27	21%	9	23%	0	0%
Total number	71		248		129		39		13	

From table 1, it is seen that majority of preterm births occurred in the age group of ≥ 35 years(23.07%) between 32-36 weeks while there is no case of delivery <32 weeks among the elderly. Most of the post term pregnancy occurred in the age group of 17 -19 years(30%).Term pregnancy was highest for the elderly age group >35 years i.e 77%.Most of the teenagers(53%) delivered at 37-41 weeks of gestation. Only 3 % (<32 weeks) and 14 %(32-36 weeks) of preterm deliveries are seen in teenagers in this study. 30 % of teenagers delivered after 42 weeks. Most of the delivery between 25-34 years occurred at 37-41 weeks of gestation (70% for 25-29 years and 54 % for 30-34 years of age). Elderly primiparas > 35 years had no preterm (<32 weeks) or posterm births in our study. Most of the deliveries in the age group of 20-24 years occurred between 37-42 weeks of gestation (59%).

The odds ratio (OR) of preterm births for teenage primiparas are 1.8 and 1.7 for <32 weeks and 32-36 weeks respectively with p values of 0.5 and 0.2 which is statistically not significant. The odds ratio of term gestation for teenagers is 0.03 which is statistically significant. The OR of postdated pregnancy for teenagers is 1.5 with a p value of 0.17 which is not statistically significant(p value of 0.17).The p values of pretem births < 32 weeks for 30-34 years is not significant(p value of 0.64).However the p value of 32-34 week(30-34 years) is 0.04 which is statistically significant. The p values of births at 32-36 weeks and 37-41 weeks for the elderly > 35 years are 0.04 and 0.04 which are statistically significant.

Table 5: odds ratio of gestational age

Gestational age in weeks	Age in years							
	17 – 19		20 – 24		30 – 34		≥ 35	
	Crude OR (95%CI)	P value	Crude OR (95%CI)	P value	Crude OR (95%CI)	P value	Crude OR (95%CI)	P value
< 32	1.8 (0.25 -13.35)	0.540	2.3(0.5-11.2)	0.2	1.67(0.14-18.93)	0.64	0	0
32 – 36	1.7(0.70-4.37)	0.22	1.8(0.8-3.7)	0.01	2.76(1.02-7.47)	0.04	2.76(1.02-7.47)	0.044
37 – 41	0.5(0.28-0.94)	0.03	0.6(0.40-0.1)	0.05	0.52(0.25-1.09)	0.08	3.82(1.01-14.3)	0.04
≥ 42	1.5(0.81-3.07)	0.17	1.12(0.67-1.89)	0.64	5.43(2.52-11.68)	<0.0001	0	0

Table 2: Neonatal complications

Neonatal complications	Age in years									
	17 – 19	%	20 – 24	%	25 – 29	%	30 – 34	%	≥ 35	%
Foetal distress	16	22.5	54	21.7	16	12.4	16	41.02	4	30.7
MAS	0	0	6	2.4	2	1.5	0	0	0	0
Still birth	0	0	2	0.8	1	0.7	1	2.56	0	0
LGA	1	1.4	3	1.2	2	1.5	0	0	1	7.6
SGA	8	11.3	69	27.8	1	0.7	0	0	0	0
Apgar <7	4	5.6	4	1.6	2	1.5	0	0	0	0

From the above table it is evident that most of the neonatal complications occur in the age group of 20-24 years of age (fetal distress 21.7%, MAS 2.4%, stillbirth0.8%, LGA 1.2%, SGA 27.8% and APGAR <7, 1.6%).Fetal distress and stillbirth are highest in the patients aged 30-34 years (41.02% and 2.56% respectively).Other complications are not seen in the age group of 30-34 years. Large for gestational age (LGA) is highest in the patients above 35 years of age (7.6%) whereas small for gestational age is highest among patients aged 20-24 years(27.8%).APGAR scoring <7 is highest in the teenagers(5.6%) and lowest among the patients aged 25-29 years(1.5%);however no case of low APGAR score is seen in patients ≥30 years. Among the teenagers ≤ 19 years, Fetal distress is seen in 22.5 %,SGA in 11.3%,APGAR scoring <7 in 5.6% cases while LGA accounted for only 1.4 %.The lowest incidence of LGA are seen in teenagers (1.4%). However no case of LGA is seen in patients aged 30-34 years. MAS (Meconium aspiration syndrome) are highest in the age group of 20-24 years. No case of MAS is seen in teenage patients and patients aged ≥30 years. Similarly no case of stillbirth is reported in the patients aged ≤19 years and ≥35 years.

Table 3: Indication for NICU admission

Indication for NICU admission	Age in years									
	17 – 19	%	20 – 24	%	25 – 29	%	30 – 34	%	≥ 35	%
NHB	3	4.2	14	5.6	6	4.6	2	5.1	1	7.7
LBW	4	5.6	19	7.6	6	4.6	2	5.1	0	0
Preterm	1	1.4	5	2.01	0	0	0	0	0	0
Congenital anomalies	1	1.4	0	0	0	0	0	0	0	0
EOS	0	0	1	0.4	1	0.7	0	0	0	0
ARDS	1	1.4	7	2.8	2	1.5	0	0	0	0

Most of the babies were admitted for neonatal hyperbilirubinemia (NHB) .NHB was most common in the babies born to the elderly age group ≥35years (7.7%).

The occurrence of NHB is the least among the newborns born to teenage patients(4.2%).Low birth weight babies are mostly in the age group of 18 -24 years(7.6% between 20-24 years and 5.6 % in patients ≤19 years).Only 4.6 % of patients aged 25-29 years and 5.1% of patients aged 30-34 years gave birth to LBW babies. However no case of LBW babies is seen in the elderly patients. Premature babies are seen in patients aged 17-24 years; 2.01% between 20-24 years and 1.4 % in patients aged ≤19 years. Most of the preterm deliveries occurring at < 32 weeks are seen in the patients aged 20-24 years (total 9 cases i.e 3.6 %) whereas teenage patients and patients between 25-29 years had only 2 cases each, of preterm births <32 weeks (2.8% and 1.5% respectively).There is only 1

case of preterm birth <32 weeks in the age group of 30-34 years. However no case of preterm birth <32 weeks is seen in patients ≥35 years. Preterm births between 32 -36 weeks is highest in the age group of 20-24 years (54.8 %%) and the lowest in the reference group (8.5%).There is 14.08% of preterm births of 32-36 weeks in teenagers. Only one case of an anomalous baby is seen in the teenage patients. There are only 2 cases of early onset sepsis (EOS) between 20-29 years. Acute respiratory distress syndrome (ARDS) is most common in the babies born to patients aged 20-24 years (2.8%) and lowest among the teenage patients (1.4%).No case of ARDS is reported in babies of patients above 30 years

DISCUSSION

In the current study, it is seen that most of the neonatal complications occur in the age group of 20-24 years of age (fetal distress 21.7%, MAS 2.4%, stillbirth0.8%, LGA 1.2%, SGA 27.8% and APGAR <7 1.6%).Fetal distress and stillbirth are highest in the patients aged 30-34 years (41.02% and 2.56% respectively).Other complications are not seen in the age group of 30-34 years. Large for gestational age (LGA) is highest in the patients above 35 years of age (7.6%) whereas small for gestational age is highest among 20-24 of age (27.8%). APGAR scoring <7 is highest in the teenagers(5.6%) and lowest among the patients aged 25-29 years(1.5%);however no case of low APGAR score is seen in patients ≥30 years. Among the teenagers ≤ 19 years, Fetal distress is seen in 22.5 %,SGA in 11.3%,APGAR scoring <7 in 5.6% cases while LGA accounted for only 1.4 %.The lowest incidence of LGA are seen in teenagers (1.4%) .However no case of LGA is seen in patients aged 30-34 years. MAS (Meconium aspiration syndrome) are highest in the age group of 20-24 years. No case of MAS is seen in teenage patients and patients aged ≥30 years. Similarly no case of stillbirth is reported in the patients aged ≤19 years and ≥35 years.

Neonatal complications in teenagers

Neonatal complications	Current study	N Gupa *et al.;* [9]	Ashok Kumar *et al.;* [10]	S Ziadeh *et al.;* [11]
Foetal distress	22.5%	0%	6.1%	58.3%
MAS	0%	0%	1.6%	0.5%
Still birth	0%	0.7%	1.9%	0%
LGA	1.4%	5.9%	87.2%	9.2%
SGA	11.3%	9.4%	0%	6.7%
Apgar <7	5.6%	1.8%	0%	5.4%

S H Mahavarkar *et al.;* [12] in their study showed that there was a significant risk of low birth weight babies in teenage pregnancies. Teenagers were 1.8 times likely to have low birth weight babies and 50% less likely to have normal birth weight babies. This again is debated in various studies. Some studies identify low birth weight babies as a result of pregnancy at a younger age (Bhalerao et al. 1990; Rosenberg and McEwan 1991; Konje et al. 1992; Mahfouz et al. 1995; Berenson et al. 1997; Thato et al. 2007). There are studies which do not support this (Aznar and Bennett 1961; Nancy and Deanna 1997; Wang and Chou 1999; Goonewardane et al. 2005). Pre-term labour, malnutrition and young age are the possible explanations for this finding. There was no difference in incidence of very low birth weight babies or perinatal mortality.

Nandini *et al.;* [9] in their study found that women <17 years had a high incidence of low birth weight babies Amini SB *et al.;* in their study found that the average gestational age and birth weight were significantly lower for teenagers 12-15 years old compared with those 16-19 years old and adults. Patients 16-19 years of age had longer gestational age and higher birth weight than the adults. The proportion of primary cesarean deliveries among teenagers 12-15 years old was 11.6%, significantly higher than 9.4% for those 16-19 years old and 10.2% for adults (P < .001).On average, females 16-19 years old had better obstetric outcomes than adults, whereas obstetric outcomes for those 12-15 years old were worse than for adults. Therefore, all teenagers should not be grouped together when their obstetric outcomes are compared with those of adults.

Ashok kumar *et al.;* [10] found in their study that among the neonatal morbidities, incidence of birth asphyxia, respiratory distress syndrome and neonatal hyperbilirubinemia were significantly more in the teenager group. The younger subgroup was maximally affected. Most probable reason would be higher number of premature and LBW babies in this age group.

Neonatal complications in Elderly

Marie Blomberg *et al.;* [13] showed in their study that the neonatal outcomes followed almost the same pattern; fetal distress, meconium aspiration, stillbirth, SGA and low Apgar score were exclusively attributed to women older than 29 years.

Babagana *et al.;* [14] concluded in their study that the fetal outcome among the older primigravid women is generally controversial. Their study revealed

no significant difference in terms of fetal outcome, congenital malformations, stillbirth, neonatal death, and APGAR scores between the two groups.

J D Ojule *et al.;* [15] in their study found that the preterm delivery rate (10.8% vs 5.1%, $P = 0.03$) and fetal macrosomia (16.2% vs 6.6%, $P = 0.002$) were significantly higher in elderly primigravidae compared to the other primigravidae. There were no significant differences in other outcome measures: post-term delivery, low birth weight, birth asphyxia, and stillborn and perinatal mortality rates between the teenagers and elderly age group. This is also in keeping with the results elsewhere.

Indication for NICU admission

In our study it is seen that majority of neonatal admission is for neonatal hyperbilirubinemia (7.7 %) in the elderly age group ≥ 35 years. Other conditions for which the neonates got admitted are for low birth weight (LBW), prematurity, acute respiratory distress syndrome, congenital anomaly and early onset sepsis. In teenagers, most of the babies got admitted for LBW.

M Jolly *et al.;* [16] in their study found that admission to special care baby unit was 5.33 % in >35 years and was 5.20 % for those <35 years of age. Nandini Gupta [9] in their study showed NICU admission of 7.8 % for teenagers.

The strength of this study is that it deals with the outcomes in the population of an entire country where the antenatal care programme is equally available to all pregnant women and is comprehensive. The drawback is obvious given the large size of the study and the numbers of healthcare units involved so the criteria for diagnosis (ICD codes) to define outcomes may not be uniform across the study population, but the variation is most likely not related to maternal age. Our effort was to evaluate neonatal outcomes in different maternal age groups compared with women aged 25–29 overall. Our approach of analysing the data may be a benefit for clinicians interpreting the results when dealing with young and aged mothers.

CONCLUSION:

In conclusion, in a country with a developing social and antenatal maternity healthcare security system, giving cost-free maternity and obstetric care to all pregnant women had a decreased risk for adverse neonatal outcome compared with the reference group. In the same social context childbirth at advanced maternal age was associated with a number of serious complications for the woman as well as the child. For clinicians, counselling young mothers are of great importance to highlight the positive consequences and favourable neonatal outcomes that can come with antenatal care. The results imply that there is a need for individualizing the antenatal surveillance programmes and obstetric care based on age grouping in order to improve the outcomes in the age groups with less favourable neonatal outcomes. Such changes in surveillance programmes and obstetric interventions need to be evaluated in further studies.

Footnotes

Ethics approval the study was approved by the Srimanta Sankardeva University of Health Sciences Guwahati. (Approved September 2015).

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