



## Original Research Article

## Significance of age at first pregnancy and its effect on maternal and perinatal outcome

Rathnamma P<sup>1</sup>, Deepika N<sup>2,\*</sup><sup>1</sup>Dept. of Obstetrics and Gynaecology, Sri Devaraj Urs Medical College, Kolar, Karnataka, India<sup>2</sup>Dept. of Obstetrics and Gynaecology, MVJ Medical College and Research Hospital, Bangalore, Karnataka, India

## ARTICLE INFO

## Article history:

Received 15-05-2020

Accepted 25-05-2020

Available online 12-09-2020

## Keywords:

Maternal age

Primigravida

Pregnancy outcomes

Adolescent

## ABSTRACT

**Objective:** To determine the existence of associations between significance of age at first pregnancy and its effect on maternal and perinatal outcome.**Materials and Methods:** A prospective study conducted in the department of OBG on all 2100 primi gravida women admitted in labour ward and they were divided into three groups: adolescent (<19 years), elderly group (>30years) and control group (20-29 years). The adolescent and elderly group were compared with the control group for the maternal and perinatal outcomes.**Results:** Rate of abortions, gestational diabetes, gestational hypertension, hypothyroidism and still birth were more common in elderly group, preterm deliveries, IUGR, foetal malpresentations, IUD and neonatal death were common in adolescent group as compared to control group. There was statistical significant difference regarding APGAR scores and admission to neonatal intensive care unit.**Conclusion:** Maternal age has significant role in the pregnancy outcome. Adolescent and elderly maternal age is a risk factor for adverse pregnancy outcomes. Early booking, close supervision in the antenatal and intrapartum period, appropriately timed obstetric intervention may contribute to good maternal and perinatal outcome.© This is an open access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## 1. Introduction

Throughout the centuries maternal age has been an important factor in survival of mankind. Only recently with effective birth control women have option of planning their age of child bearing. Women should be aware of the risks so that they can make informed decision about their pregnancies including when to become pregnant.<sup>1</sup>

Adolescence is transition from childhood to adulthood as defined by World Health Organization as a period between 10-19 years. This is the period when structural, functional and psychological development occurs to prepare the woman for assuming motherhood.<sup>2</sup> The adolescent women require additional counselling and perinatal period should be utilized to provide perinatal and new born care education.

\* Corresponding author.

E-mail address: [deepikang@gmail.com](mailto:deepikang@gmail.com) (Deepika N).

The number of adolescent pregnancies has increased because of increase in premarital sex, higher fertility rate for this age group and decreased age of menarche.<sup>3</sup> In addition; there are some extrinsic factors such as inadequate prenatal care, illiteracy, poor socioeconomic conditions which affect the outcome of pregnancy in teenage girls.<sup>4</sup>

Early marriages and early pregnancy are the accepted cultural norms of our society. Although adolescent marriage is a cognizable offence in India, it is still a common practice in many parts of the country.<sup>2</sup>

Teenage pregnancy is often referred to as 'at risk pregnancy' and is of grave concern.<sup>2</sup> Several complications like preterm birth, poor maternal weight gain, toxemia, anaemia and sexually transmitted diseases are strongly associated with teenage pregnancy.<sup>2</sup>

The women having their first pregnancy at or above 30 years (FIGO-35 years) are called elderly primigravidae.

Large body of literature exists, describing the impact of advanced maternal age on maternal and foetal outcomes.<sup>5</sup> In Sweden the mean maternal age at the birth of first child increased between 1974 and 2001 from 24.4 to 28.5 years. The corresponding mean maternal age increased from 21.4 to 24.9 years in the United States and from 25.6 to 28 years in Japan between 1970 and 2000.<sup>6</sup> The mean maternal age in India is between 20-29 years.

Some factors for postponing the child bearing are women's career priorities, advance education, infertility, late marriage and financial concern.<sup>1</sup> Effective birth control, advances in assisted reproductive technology and increasing rates of divorce followed by re-marriage all contribute to the trend of delayed child bearing.<sup>5</sup> A normal women's fertility is at its maximum at about age of 23 years after which there is gradual decline so that by age of 40 years chances of spontaneous conception are greatly reduced. It is well established that fecundity decreases with increasing age. However, the enormous advances in reproductive medicine have compensated to some extent, for this natural decrease in fecundity and nowadays even postmenopausal women have become pregnant through oocyte donation.<sup>6</sup>

Risk of chromosomal abnormalities and miscarriages increases with age. According to American society for reproductive medicine (ASRM) Mirmingham (2003), a women's risk of having a baby with down syndrome is

At age 25	1 in 1,250
At age 30	1 in 1,000
At age 35	1 in 400
At age 40	1 in 60

Preeclampsia, diabetes mellitus and preterm deliveries are common complications encountered in the elderly primigravidae.<sup>1</sup>

Women aged 40 years or over have an increased incidence of labour induction, instrumental deliveries and caesarean sections. The possible hypotheses are decreased pelvic floor compliance, reduced maternal efforts, decrease in estrogen receptors and anxiety by mother and obstetrician.<sup>7</sup>

Rate of birth asphyxia, growth restriction, malpresentation and gestational diabetes are significantly higher among elderly primigravidae.<sup>8</sup>

Thus, to assess the true effects of maternal age, researchers need an inclusive set of narrowly defined age groups involving all reproductive ages across a number of outcomes.

The purpose of the study is to determine whether the maternal age has any influence on maternal and perinatal outcome.

## 2. Materials and Methods

The prospective study was conducted in the Department of Obstetrics and Gynaecology, Sri Devaraj Urs Medical College, Kolar with effect from June 2013 to May 2015 on primigravida.

### 2.1. Inclusion criteria

All primigravida admitted in labour ward.

### 2.2. Exclusion criteria

Multigravida

## 3. Methods

Detailed history was taken as per the proforma.

A thorough general physical examination, systemic and obstetric examination was conducted.

Method of termination of pregnancy and gestational age at the time of termination was to be noted. Mode of delivery, birth weight and APGAR score was also be noted.

Perinatal and maternal outcome was noted till the time of discharge.

All the data was collected, compiled and statistically analyzed.

## 4. Results

In the period of 2013 to 2015, there were 5820 deliveries, out of which 2100(36.08%) women were primigravidae admitted in the labour ward.

Among the 2100 women, 104 (4.95%) were in the age group  $\leq 19$  years, 1746 (83.15%) were in the age group 20-29 years and 250 (11.90%) were in the age group 30 years and above.

Mean age was  $24.27 \pm 3.57$  years. Minimum age was 18 years and maximum age was 41 years. Most of the subjects 1746 (83.15%) were in the age group of 20-29 years which formed the comparison group. Adolescent and elderly subjects were compared with the age group 20-29 years. The demographic characteristics of the study population are summarised in Table 1.

It was observed that out of 2100 subjects, 1888 women had medical disorders and incidence was 89.90%. 100 women had three medical disorders, 254 had two and 1534 had only one disorder.

resents the prevalence of specific medical complications according to age group. Most common medical disorder was anemia in 1068 (50.85%) women more commonly seen in adolescent age group followed by hypothyroidism in 431 (20.52%), preeclampsia in 214 (10.19%), cholestasis in 46(2.19%), cardiac disease in 42 (2.00%), gestational hypertension in 28(1.33%), diabetes mellitus in 20 (0.95%) and eclampsia in 16(0.76%) women. Hepatitis, epilepsy and deep vein thrombosis was observed in 5(0.23%) women

**Table 1:** Demographic characteristics

Characteristics	N	%
<b>Maternal age</b>		
≤19 years	104	4.95%
20-29 years	1746	83.15%
≥30 years	250	11.90%
<b>Booking status</b>		
Booked	1602	76.28%
Unbooked	498	23.71%
<b>Residence</b>		
Rural	1893	90.14%
Urban	207	9.85%
<b>Occupation</b>		
Housewife	1240	59.05%
Farmer	440	20.95%
Labourer	315	15%
Employed	105	
<b>Education</b>		
Literate	1928	91.80%
Illiterate	149	7.09%

each. Renal disease and hyperthyroidism was observed in 4(0.19%) women each.

Hypothyroidism was present in 30.2%, 17.18% and 40.00% women in three age groups. It was more in elderly (p value =0.000) which was statistically significant.

It was observed that out of 2100 women, 10 had gynaecological complications and the incidence was 0.47%. Fibroid uterus was present in 0.11% and 1.6% women in age group 20-29 years and elderly group. Incidence was higher in elderly, (p value=0.248) and ovarian cyst was present in 0.96%, 0.11% and 0.4% women in three age groups. Incidence was higher in adolescents, (p value=0.40).

The frequencies of ectopic pregnancies, abortions and full term deliveries were similar in all the groups whereas preterm deliveries were higher in adolescents group (p=0.032) as shown in Table 4.

It was observed that there were 69.23%, 79.61% and 75.20% full term deliveries in three age groups. It was more in age group 20-29 years. Rate of abortions was highest in elderly primigravida (13.20%, p value=0.590) which was not statistically significant. Maximum number of preterm deliveries were observed in adolescent age group (21.15%, p value=0.032) and it was statistically significant. Rate of induction of labour was similar in adolescent (26.59%) and elderly primigravida (20%). Incidence of caesarean section was similar in all the three groups. The most common indication was acute foetal distress (6.75%). Highest rate was observed in 20-29 years age group (8.03%). In adolescent age group the most common indication of caesarean section was cephalo-pelvic disproportion (10.09%, p value=0.017) which was statistically significant. In elderly primigravida the most common indication of caesarean section was in coordinate uterine action (5.5%, p value=0.516) which was not statistically significant.

There were 95 babies in adolescent group, 1593 babies including 35 twins and 1 triplet pregnancy in age group 20-29 years and 229 babies including 9 twins and 2 triplet pregnancies in elderly group. All the three groups were comparable with respect to birth weight.

Rate of still births was highest in elderly primigravida (3.61%, p value=0.10), admission to neonatal intensive care unit was highest in adolescent age group (13.76%, p value=0.006) and incidence of neonatal deaths was highest in adolescent age group (2.70%, p value=0.244) which was not statistically significant.

Among the maternal complications, the incidence of retained placenta and postpartum haemorrhage was similar in all the three groups and there was no maternal death reported.

It was observed that normal babies were born to 79.81%, 93.55% and 86.25% subjects in three age groups. It was more in age group 20-29 years.

Admission to Neonatal intensive care unit was present in 13.76%, 5.03% and 8.33% babies born to the mothers in three age groups. It was more in adolescents (p value =0.006) which was statistically significant.

## 5. Discussion

The main objective of this study was to investigate the influence of maternal age on maternal and foetal outcome. The study population included only primigravida women admitted in labour ward. The main findings of the study indicated that there is increased incidence of anaemia, eclampsia, jaundice, intrauterine growth restriction, preterm labour and neonatal death in adolescent mothers. Elderly primigravida bears significantly higher risk of pregnancy complications like gestational hypertension, diabetes mellitus, hypothyroidism, congenital anomalies, abortions and stillbirths. The maximum numbers of the women (83.15%) were in age group of 20-29 years which formed the comparison group. Adolescent and elderly women were compared with the age group of 20-29 years.

The main findings of the study indicated that adolescent patients bear significantly higher risk anaemia and eclampsia, elderly primigravida are at risk of developing hypothyroidism, diabetes mellitus and deep vein thrombosis whereas incidence of pre eclampsia and jaundice was similar in all the three groups. The above findings were comparable with Kumar A et al,<sup>9</sup> Saxena P et al.<sup>10</sup>

We also found an increased incidence of IUGR, preterm delivery and induction of labour in adolescent group and incidence of spontaneous abortion and caesarean delivery in elderly group. This is in line with the findings of other researchers. For example, Bell et al<sup>11</sup> who reported caesarean rates in the range of 25-35% for women aged ≥ 35 years and approximately 40% for women aged > 40 years compared with the estimates of 14-20% for women aged < 35 years. This was because elderly pregnancies

**Table 2:** Medical complications

Medical complications	≤19 years n=104	20-29Years n=1746	≥30 years n=250
Anemia	70(67.3%) (p=0.015)	873(50.00%)	125(50%)
Hypothyroidism	31(30.2%)	300(17.18%)	100(40.00%) (p=0.000)
Preeclampsia	11(10.5%)	176(10.08%)	27(10.800) (p=0.907)
Cholestasis	4(3.84%)	32(1.83%)	10(4.00%) (p=0.407)
Cardiac disease	2(1.87%)	37(2.11%)	3(1.2%) (p=0.652)
Gestational hypertension	2(1.87%)	20(1.1%)	6(2.4%) (p=0.444)
Diabetes mellitus	1(0.96%)	13(0.71%)	6(2.4%) (p=0.456)
Eclampsia	4(3.84%) (p=0.083)	8(0.4%)	4(1.6%)
Hepatitis	1(0.96%) (p=0.810)	3(0.17%)	1(0.4%)
Epilepsy	1(0.96%) (p=0.810)	3(0.17%)	1(0.4%)
Deep vein thrombosis	1(0.96%)	1(0.06%)	3(1.2%) (p=0.886)
Renal Disease	1(0.96%) (p=0.710)	2(0.11%)	1(0.4%)
Hyperthyroidism	1(0.96%) (p=0.289)	2(0.11%)	1(0.4%)

**Table 3:** Obstetrical complications

Obstetrical complications	≤19 years n=104	20-29 years n=1746	≥30 years n=250
Intrauterine growth restriction	35 (34.00%) (p=0.026)	353(20.22%)	49(19.82%)
Breech	6(5.76%) (p=0.516)	60(3.45%)	9(3.6%)
Twins	1(0.96%)	35(2.0%)	9(3.6%) p=0.407
Congenital malformation	1(0.96%)	20(1.14%)	3(1.2%) (p=0.620)
Intrauterine death	2(1.87%) (p=0.382)	7(0.40%)	1(0.4%)
Transverse lie(I)	1(0.96%)(p=0.20)	5(0.28%)	2(0.8%)
Transverse lie with hand prolapse (II)		1(0.05%)	
Face	1(0.96%) (p=0.630)	2(0.11%)	1(0.4%)
Triplet		1(0.57%)	2(0.8%) (p=0.779)
Brow		1(0.57%)	
<b>Placental</b>			
Placenta previa	3(2.88%)	10(0.57%)	7(2.8%) (p value=0.167)
Abruptio placentae	1(0.96%) (p=0.20)	5(0.28%)	2(0.8%)
<b>Cord</b>			
Cord prolapsed	1(0.96%) (p=0.10)	3(0.17%)	1(0.4%)
Cord presentation		1(0.05%)	

**Table 4:** Pregnancy outcome

Pregnancy outcome	≤19 years n = 104	20-29years n=1746	≥30 years n= 250
Ectopic pregnancy	1(0.96%) (p=0.390)	2(0.11%)	1(0.4%)
Abortion	9 (8.5%)	188 (10.76%)	33 (13.20%) (p=0.590)
Preterm deliveries	22(21.15%) (p=0.032)	166(9.50%)	28 (11.22%)
Full term deliveries	72(69.23%) (p=0.102)	1390 (79.61%)	188 (75.20%)

**Table 5:** Birth weight

Birth weight	≤19years n=95	20-29 years n= 1593	≥30 years n=229
≤1500	4(4.12%) (p=0.516)	98 (6.15%)	
1500-2000	8(8.24%) (p=0.579)	100 (6.27%)	20(8.73%)
2001-2499	23(23.71%)(p=0.008)	155 (9.75%)	29(12.66%)
2500-2999	50 (53.31%) (p=0.020)	1103(69.26%)	162(70.74%)
3000-3499	9(9.27%)(p=0.447)	103(6.45%)	11(4.80%)
≥3500	1(1.03%) (p =0.561)	34(2.15%)	7(3.07%)

**Table 6:** Perinatal outcome

Perinatal outcome	≤19 years n = 95	20-29 years n = 1593	≥30 years n=229
Normal	74(79.81%) (p =0.007)	1490(93.55%)	196(86.25%)
Admission to Neonatal intensive care unit	14(13.76 (p=0.006)	80(5.03%)	20(8.33%)
Neonatal death	3(2.70% (p=0.244)	10(0.61%)	5(2.08%)
Stillbirth (n=25)	1(0.91%)	8(0.49%)	4(1.66 (p=0.466)
Fresh stillbirth			
Macerated stillbirth	3(2.70% (p=0.163)	5(0.30%)	4(1.66%)

were premium pregnancies. These women had attained their first pregnancy at the age of decreasing fertility and often after the years of infertility. This in turn influenced the decision of caesarean section in an attempt to reduce the adverse maternal and perinatal outcome. Various reasons have been given to explain increased risk of caesarean delivery among advanced maternal age, including increasing obstetric complications with aging, non reassuring foetal status in older age, increasing obesity, risk of abnormalities in course of labour, malpresentations, multiple gestation, placenta previa, macrosomia, arrest of descent, prior uterine surgeries, arrest of dilatation, induction of labour, repeat caesarean delivery and caesarean delivery on maternal request.<sup>12–15</sup> Insufficient myometrial efficiency with aging may also be a possible reason for increased caesarean delivery among advanced age.<sup>16</sup>

Younger and older maternal age has been consistently highlighted as a risk factor for adverse pregnancy outcome. Another pertinent finding of the study was the rate of still birth which was higher in adolescent and elderly group which was not statistically significant when compared with the age group 20-29 years. Adolescent and elderly primigravida are “high risk group”. There was higher incidence of anaemia, eclampsia, jaundice, intrauterine growth restrictions and preterm labour in the adolescent age group which contributed to the increase number of stillbirths in the adolescent age group.

In the elderly primigravida, the incidence of congenital anomalies, gestational hypertension, diabetes mellitus and multiple pregnancies were higher which led to higher rate of stillbirths.

The incidence of admissions in Neonatal intensive care unit was higher in the adolescents (p value=0.006) which was statistically significant and comparable to the study by Ziadeh SM<sup>16</sup> (3.4%) and Edge VL and Laros RK<sup>17</sup> (5.6%). In the adolescent age group the incidence was more because of higher proportion of preterm and intrauterine growth restricted babies. In the elderly age group the incidence was more because of higher rate of multiple pregnancies, hypothyroidism, diabetes mellitus and foetal distress. The increased rate of admissions in Neonatal intensive care unit was to avoid adverse perinatal outcome of “premium

pregnancy” in older primigravida.

In the age group 30 years and above, 2.08% subjects had neonatal deaths which was comparable to the study by Cnattingius S et al (1.63%).

The rate of neonatal deaths was higher in the adolescents (p value=0.244) and elderly primigravida (p value=0.20) which was not statistically significant when compared with age group 20-29 years. As adolescent and elderly primigravida are “high risk group”, there was higher incidence of eclampsia, intrauterine growth restrictions and preterm births in the adolescent age group which contributed to the increase number of neonatal deaths in the adolescent age group. In the elderly primigravida, the incidence of congenital anomalies, diabetes mellitus, multiple pregnancy and foetal distress was higher which led to higher incidence of neonatal deaths.

## 6. Conclusion

Maternal age has significant role in the pregnancy outcome. Adolescent age constitute “high risk group” in the reproductive terms because of double burden of reproduction and growth. There is increased incidence of anaemia, eclampsia, jaundice, intrauterine growth restriction, preterm labour and neonatal death in adolescent mothers. The adverse outcomes are attributed to poor nutrition, illiteracy, lack of utilization of health care services and biological immaturity.

Elderly pregnancies are regarded as “premium pregnancies” as these women conceive at the time of age related decreasing fertility, often after the years of infertility.

It is concluded that there is an increase in pregnancy complications with increasing age e.g. gestational hypertension, diabetes mellitus, hypothyroidism, congenital anomalies, abortions and stillbirths. The increased incidence of underlying medical disorders, decreased cardiovascular reserve and diminished ability to adapt to physical stress that may accompany ageing could be the cause of increased maternal and perinatal morbidity. Early booking, close supervision in the antenatal and intrapartum period, appropriately timed obstetric intervention and advocacy of active management of labour may contribute to good

maternal and perinatal outcome.

## 7. Source of Funding

None.

## 8. Conflict of Interest

None.

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## Author biography

**Rathnamma P**, Assistant Professor

**Deepika N**, Assistant Professor

**Cite this article:** Rathnamma P, Deepika N. Significance of age at first pregnancy and its effect on maternal and perinatal outcome. *Indian J Obstet Gynecol Res* 2020;7(3):415–420.