Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 3784 - 3796
Received 16 February 2021; Accepted 08 March 2021.

Study of Impact of Extremes of Maternal Age on Pregnancy Outcomes

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ABSTRACT

To evaluate the maternal and fetal outcomes of pregnancies in extremes of maternal age and assess the obstetric and neonatal complications in pregnant women of adolescent and advanced age group. To analyze the factors contributing toeenageand elderly pregnancies. Desire for male child and pursuit of career were the two primary reasons for being pregnant at advanced age which was assessed by percentage of occurrence. Similarly, for teens lack of awareness of contraception and love marriage were the leading reasons for early marriage.It would be appropriate to conclude that with meticulous evaluation of the pregnant woman with proper prenatal care,antenatal surveillance and delivery in a tertiary care institution with proper NICU facilities, a good perinatal outcome can be expected in both the extremes of ages as our ultimate goal is to have a "HEALTHY MOTHER WITH A HEALTHY BABY"

Keywords:Latin, awareness, pregnancy and oocytes.

1. INTRODUCTION

In the changing times, vast variations in the field of obstetrics have been seen. These variations have occurred in respect to outlook of the society towards pregnancy and child bearing. One such change is regarding the age of child bearing and motherhood. On one hand where women are delaying pregnancies and are working relentlessly to achieve the pinnacle in their professional career, there is also a subset of the society where females are married even before their adolescence is complete. Both form the two extreme ends namely, the teenage pregnancy and pregnancy at advanced maternal age. On one hand where the fertility is seen to be on the declining trend with poorer quality of the oocytes in advanced age; on the other hand we have the teenage where the reproductive system is still not mature enough to bear the stress of the pregnancy. Thus, both these groups are high risk categories.[1,2]

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The word adolescence is Latin in origin, derived from the verb adolescere, which means "to grow into adulthood." 1 Adolescence is a time of moving from the immaturity ofchildhood into the maturity of adulthood. There is no single event or boundary line that denotes the end of childhood or the beginning of adolescence. Experts in fact think the passage from childhood into and through adolescence as composed of a set of transitions that unfold gradually and that touch upon many aspects of the individual's behaviour, development, and relationships. These transitions are biological, cognitive, social, and emotional (Steinberg&Sherk,2008).[3]

Adolescent pregnancy has become important health issue in a great number of countries, both developed and developing.3 WHO defines teenage pregnancy as pregnancy in a girl who is 10 to 19 years of age, age being defined as her age at the time of delivery.[4] Adolescent pregnancy rate is on rise, emerging as serious problem all over the world and more so in developing countries like India. Incidence of teenage pregnancy in India is 2 women out of every 1000 pregnancies. 5 and it is estimated that about 70,000 adolescent girls die each year because of teenage pregnancy. [5,6] The youngest mother in world's history is Lina Marcela Medina de Jurado who gave birth at age five years, seven months, and 21 days, in 1938. [7]

It has been seen that the two opposite ends of maternal age have negative implications both on the health of the mother as well as the baby. The risk for medical disorders, derangement in biochemical parameters, delivery related and post-partum complications all increase in these two opposite age brackets. Apart from the maternal consequences, adverse fetal and neonatal outcomes have also been found to have a higher incidence.[8]

2.MATERIALS AND METHODS

Study Design: Prospective Observational study

Period of Study: August 2017 to February 2019

Place of Study: Department of Obstetrics and Gynaecology, SreeBalaji Medical College and Hospital, Chromepet, Chennai-44.

Sample Size: A total of 200 patients were selected for the purpose of the study. A convenient sample of 100 adolescent mothers of age 13- 19 years or less were selected as one study group and 100 mothers of age 35 years or more were selected as another study group.

Study population: Both the study groups were selected from Obstetric Outpatients and

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Inpatients, Department of OBG, Sree Balaji medical college and hospital, Chromepet, Chennai.

Inclusion criteria:

- Pregnant girls aged13 -19yrs
- Pregnant women 35 years andabove
- Singletonpregnancies
- Viablefetus
- Period of gestation>28weeks

Exclusion criteria:

- Pregnant women >19yrs and<35yrs
- Multiplepregnancies
- Women with pre-existing conditions like congenital heart diseases, epilepsy, tuberculosis, type 1 DM, bronchial asthma.
- Period of gestation<28weeks

Statistical analysis

The collected data were analysedwith IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In all the above statistical tools the probability value .05 is considered as significant level.

4.RESULTS

Figure 1: Pie chart showing the study groups and the number of cases

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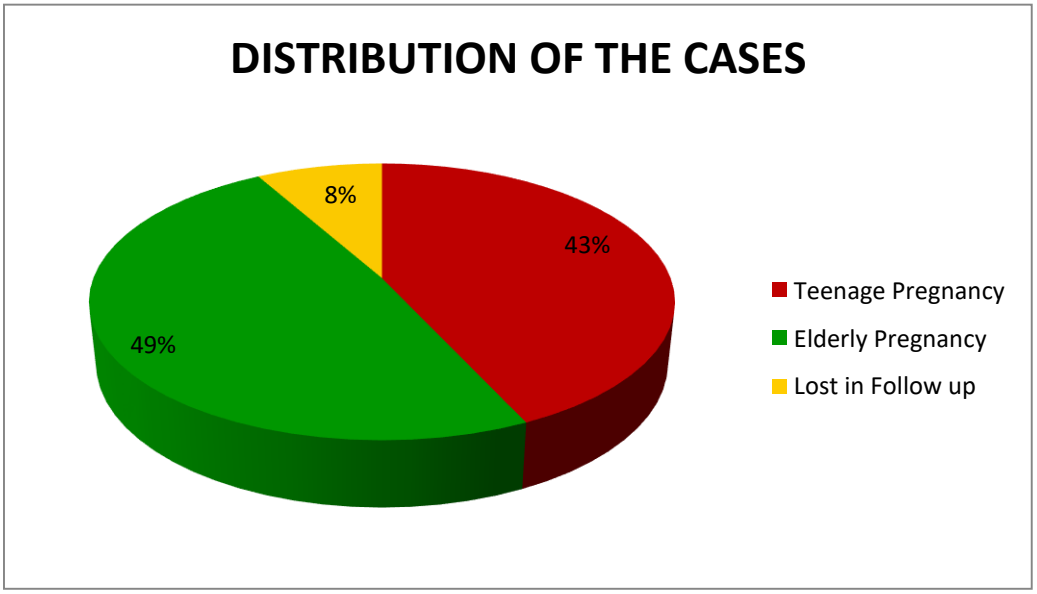
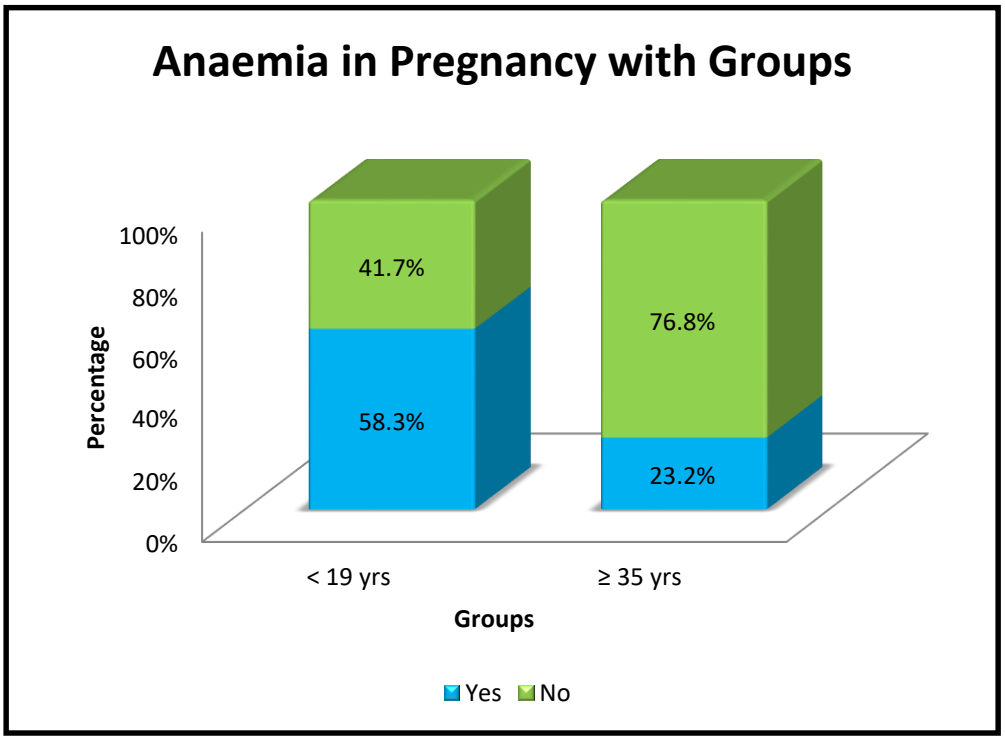


The above table and figure depict the number of pregnancies studied in teenage group (<19yrs) and elderly age group (≥35yrs) being 84 and 95, respectively. (16 and 5 were the lost for follow up respectively)

Figure 2: Bar graph showing the prevalence of anemia in teenage and elderly pregnant women



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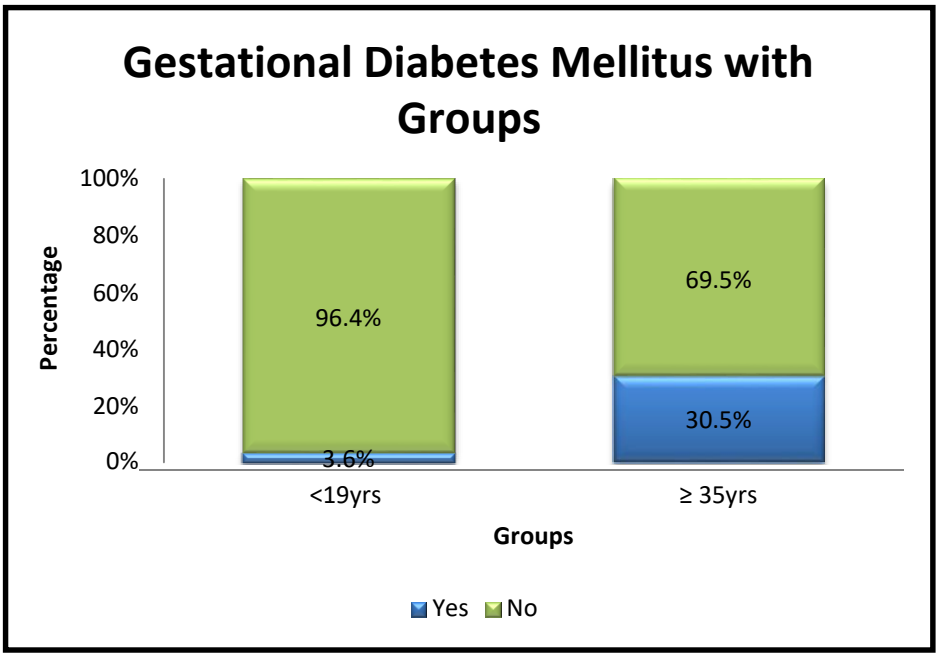
It is well evident from the table and bar graph that 58.3% of pregnant teens are anemic. On the other hand, anemia in elderly is seen to be lower (23.2%). (p value- 0.0005**)

Figure 3: Bar graph showing the relation of Gestational diabetes mellitus with extremes ofage



Clearly evident from the above shown diagram and table that 30.5% of the advanced age group women developed gestational diabetes. The younger adolescent group had 3.6% of them developing the complication. A significant p value of 0.0005** is obtained.

TABLE 1: DISTRIBUTION OF PROM WITH EXTREMES OF AGE

PROM with Groups							
			Groups		Total	X^2 value	P-value
			< 19 yrs	≥35 yrs			
PROM	Yes	Count	18	11	29	3.186	0.074 #
		%	21.4%	11.6%	16.2%		
	No	Count	66	84	150		
		%	78.6%	88.4%	83.8%		
Total		Count	84	95	179		
		%	100.0%	100.0%	100.0%		
# No Significant at P > 0.05 level							

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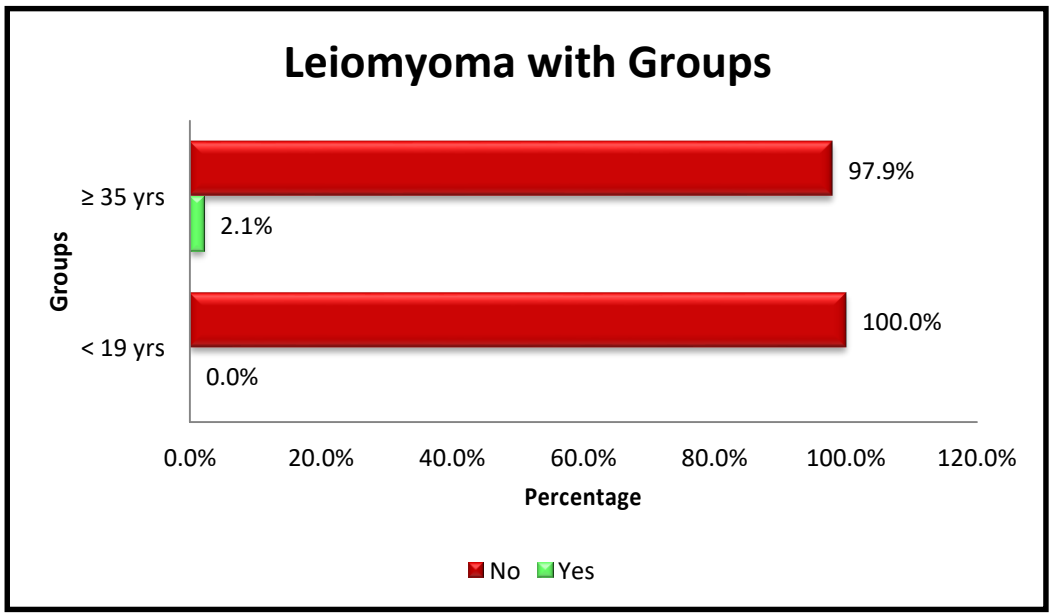
TABLE 2: DISTRIBUTION OFCONGENITAL ANOMALY WITH EXTREMES OFAGE

Congenital anomaly withGroups							
			Groups		Total	X^2 value	P-value
			< 19 yrs	≥ 35 yrs			
Congenital anomaly	1	Count	0	1	1	0.889	1.000 #
		%	0.0%	1.1%	.6%		
	2	Count	84	94	178		
		%	100.0%	98.9%	99.4%		
Total		Count	84	95	179		
		%	100.0%	100.0%	100.0%		
# No Significant at P > 0.05 level							

It is well depicted in the above table and diagram that the congenital anomaly is seen in fetus of woman of age group ≥35yrs. The anomaly seen was ventricular septal defect. Teenage group did not have any congenital anomaly in this study. (p value- 1.000#).

Figure 4: Bar charts showing the prevalence of leiomyoma in teenage and elderly pregnantwomen



It is observed that the prevalence of leiomyoma in pregnancy, if present, is seen in the advanced age group (≥35yrs), with a prevalence of 2.1%. No leiomyomas were seen in teenage pregnancy.

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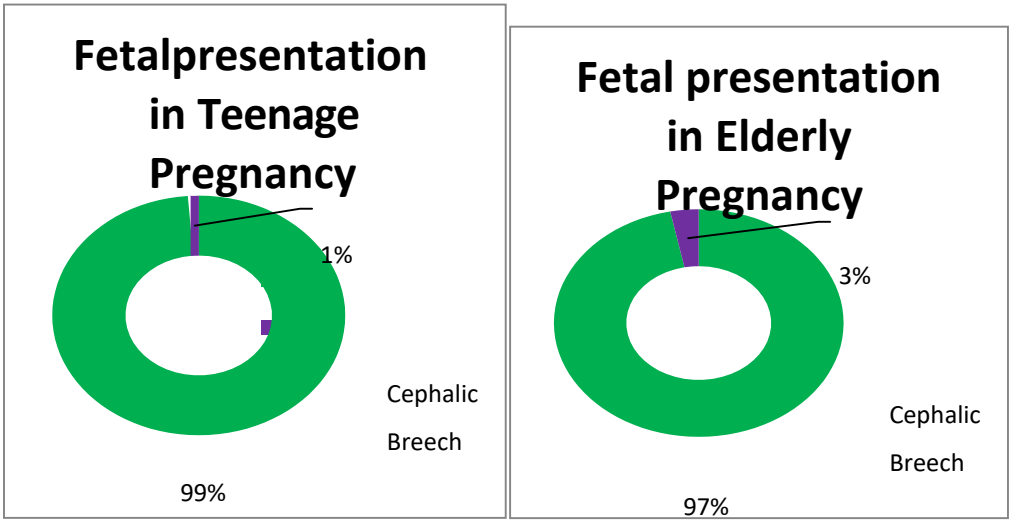
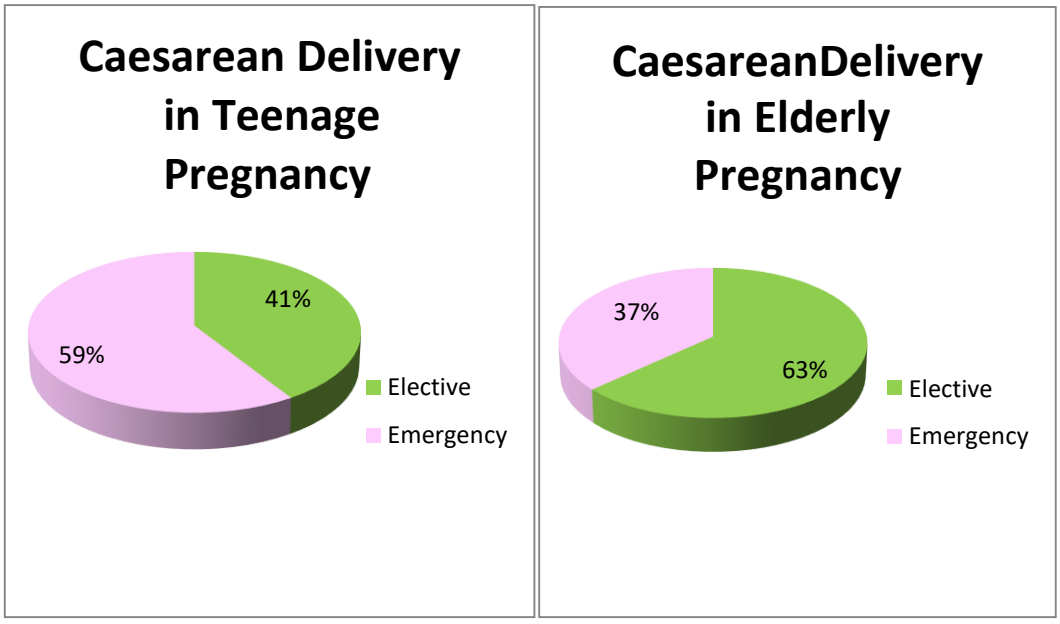
Figure 5: Bar graph showing fetal presentation in teenage and elderly age group pregnancies



It is clearly depicted that pregnant women ≥35years show higher incidence of Breech (3.2%) than adolescent pregnant girls (1.2%). Also, in both the age groups cephalic presentation forms the major fetal presentation. (<19yrs - 98.8% and >35yrs- 96.8%)

Figure 6: Pie charts showing the types of cesarean delivery in adolescent and advanced age pregnantwomen



A clearly evident fact from the above depicted data is that the majority of the cesarean deliveries in adolescent age group are emergency (59%) which may be attributed to the attitude of families to bring teens to hospital after onset of labour or give a trial by untrained dais at home or sheer negligence etc. The elderly age group on the other hand have more elective cases of

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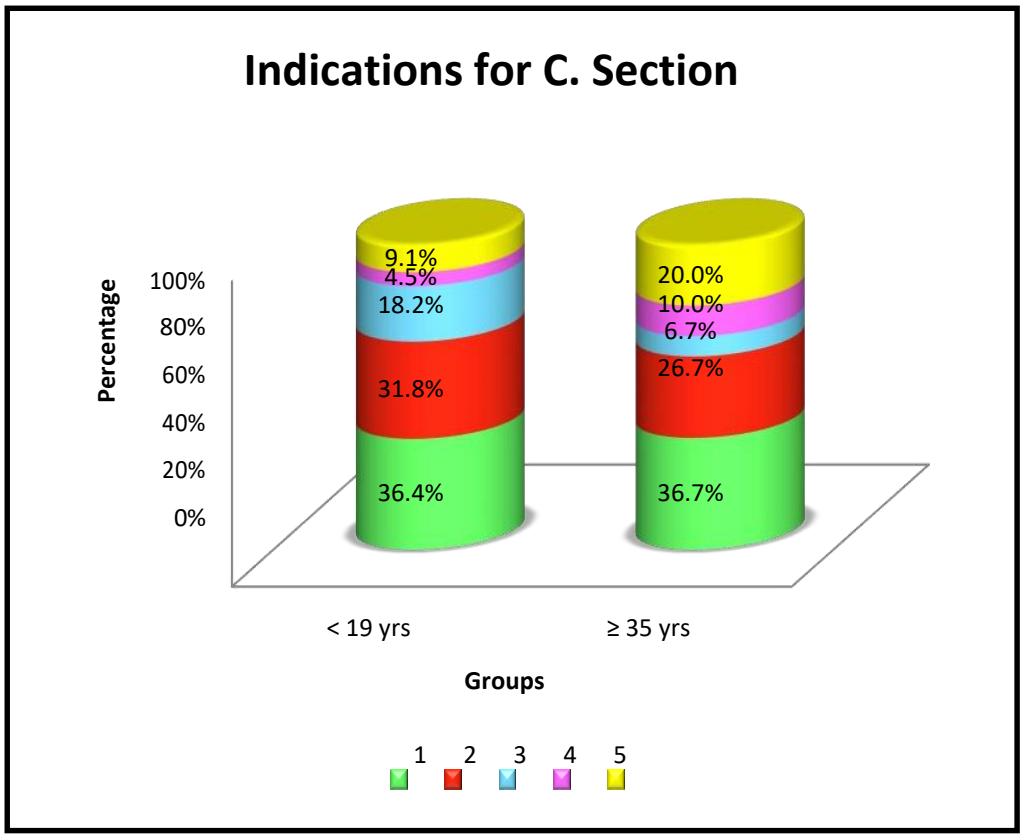
cesarean sections (63%). This is due to the age-associated pre-existing medical disorders such as the GDM or hypertensive disorders of pregnancy which warrant more cases to be posted electively. Another reason on the rise is that of 'precious baby' conceived after ART.

Figure 7: Donut chart showing the different indications of C. section in teen and elderly pregnant women



1-CPD, 2- fetal distress, 3- pre-eclampsia, 4- malpresentation. 5-GDM

The data depicted above presents the various indications of cesarean section in adolescent pregnancy and advanced age group. The most common indication in both the groups is the cephalo-pelvic disproportion (36.4 % in teens and 36.7% in advanced age group). Fetal distress also forms a major portion among the indications. GDM as an indication is more likely to be seen in elderly women as compared to teenage pregnant girls (20% vs 9.1%,respectively). Pre-eclampsia and malpresentation are other indications.

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TABLE 3: DISTRIBUTION OF REASONS OF PREGNANCY AT EXTREMES OFAGE

Reason ofmarriage	**Teenage pregnancy**		**Elderly pregnancy**	
	Frequency	Percentage	Frequency	Percentage
Concept of early/ late marriage infamily	21	25	1	1.1
Lack of knowledge of contraception	32	**38.1**	6	6.3
Failure ofcontraception	-	-	2	2.1
Love marriage	24	28.6	-	-
Desire for male child	-	-	22	**23.2**
Pursuit ofcareer	-	-	19	20
Husband outsidecountry	-	-	6	6.3
History of infertility	-	-	16	16.8

The mentioned table and the figure represent the reasons leading to pregnancies at extremes of age. The main reason for teenage pregnancy was seen to be lack of knowledge about contraception. The other reasons were love marriage and concept of early marriage in families/ family issues. The elderly women had late child bearing primarily due to the desire for a male child or in pursuit of career. History of infertility was seen in 16.8%. Failure of contraception formed a minimal 2.1%.

4.DISCUSSION

Maternal age affects pregnancy from conception to delivery. Various studies done in the past have established the fact that the extremes of maternal age have negative impact over the pregnancy in antepartum, intrapartum and postpartum period, hence increasing the incidence of complications. Present study is an observational study done at our hospital on both teenage and elderly mothers to evaluate the complications associated after applying the various exclusion criteria.[9,10]It was seen that the drop out/ lost for follow up were more in case of adolescent pregnancies. This may be due to lack of awareness about the importance of regular antenatal care or due to unapproachability of the nearest health care centre, as major portion of the

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population studied had educational qualification of <12 th standard and were having rural background belonging to lower class (52%) or upper lower class (31%). On the other hand, the elderly pregnant women had more number of regular antenatal visits. Majority of the teen pregnancies were primigravidae (98%) with spontaneous conception whereas elderly females were mostlymultigravida(87%) with 16% having conceived after ovulationinduction or by assisted reproductive technology. Similar findings were demonstrated by AwololaOO et al and Nair A et al in teenage pregnancy where 98% and 90% were primi, respectively.22,46Peeping into the antenatal period, various complications were studied in both the age groups.[11] The prevalence of anemiain our study was seen to be 58.3% in teen pregnancies (which was statistically significant) as shown in Table 40 and 23.2% in elderly age group.Many studies in various different parts of the world show that the prevalence of pre-eclampsia is higher for advanced maternal age.[12-14] An interesting aspect of FASTER TRIAL was that it did not find advancing maternal age to be associated with a statistically significant increased risk for hypertensive complications of pregnancy such as gestational hypertension (adjOR 0.8 and 1.0, for women aged 35 –39 and > 40 years, respectively) or preeclampsia (adjOR 0.9 and 1.1, for ages 35 – 39 and > 40 years, respectively)(p value- .034.)77. This was interpreted to be a consequence of controlling for covariates such as parity and assisted reproductive care. [15,16] Similar to this,present study also shows no statistical significance. This may be attributed to the small sample size of the present study.

This present study revealed a non-significant trend towards the congenital anomalies associated with extremes ofage which is in contrast to prior studies which show significance with the extremes of age as shown in Table 43 (Cleary-Goldman et al, Prysak M et al). [17,18] Small sample size may be a factor in this finding.In our study, the neonatal mortality is seen to be 1.1%with a non significant p value of 1.000. The reason of neonatal demise was respiratory distress in a GDM mother. FASTER TRIAL and study done in Nova Scotia, Canada by Joseph KS et al showed significant perinatal death. In FASTER TRIAL , 40years and older was associated with a statistically significant increased risk of perinatal loss (adjOR 2.2). There were 119 stillbirths and 37 neonatal demises in total. The failure of uterine vasculature to adapt to the increased hemodynamic demands of pregnancy as women age is a proposed explanation.[18] According to Joseph KS et al , older maternal age was associated with significantly higher rates ofperinatal mortality/ morbidity even among women without pregnancy complications (adjusted rate ratio 1.48, 95% CI 1.05 to 2.10, P=0.03 for women 35 –39 years and 2.16, 95% CI 1.11 to 4.19, P=0.02 for women ≥40 years, compared with women 20–

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24years).[19]Apart from the complications, various reasons enquiredregarding being pregnant at such an extreme age brought to light that majority of the teenagers were not aware about availability of contraception(38.1%). Love marriage(28.6%) also formed an important segment as far as teenage pregnancies were concerned followed by concept of early marriage/ child marriage being followed in various parts of India. The main reason for elderly pregnancy was seen to be desire for a male child(23.2%) followed by pursuit of career(20%). Infertility was associated with 16.8% of the deliveries.As observed by the reasons stated, it can be clearly demarcated that the main reasons for pregnancies at both extremes are either due to lack of awareness or are social in character.[20]

5.CONCLUSION

Warring differences in the outlook of the society has been observed as far as the domain of marriage and child bearing is concerned. On one hand where some are of the view that, earlier the marriage the better it is; there's also a cadre who postpone marriage and prefer late child bearing. This may be so as to fulfil their responsibility as early as possible on one extreme and postponement, on the other extreme is seen more in career-oriented women. This results in women getting pregnant either at a young age or at an advanced age making the teenage pregnancy and elderly pregnancy respectively two important aspects since both are high risk categories. Various reasons amount to these pregnancies. Adolescents are still in growing age and are not mature enough both physically and psychologically to bear the stress of pregnancy which leads to obstetric and neonatal complications making teenage child bearing an at-risk pregnancy. Similarly, pregnancy at an advanced age is also considered under high r isk category because the incidence of complications in this age group are also found to be substantially high. This may be owed to the fact that ovarian reserve and oocyte quality decline with agemaking conception difficult with an increased rate of antenatal, postnatal and neonatal complications such as GDM, pre-eclampsia, preterm births, caesarean sections, postpartum haemorrhage, low birth weight babies etc.

It is the need of the hour to spread awareness regarding the deleterious effects of extremes of age on pregnancy which can be achieved via social media through audio and visual means. Starting from the schools sex education may be one way to educate teens regarding contraception and to abolish all misbeliefs. Proper counselling should be given to t he couples regarding the harms of delaying pregnancy. Couples should be allowed to make an informed choice. Oocyte preservation may also be offered to couples who are planning to delay child

bearing further. Since both the extreme age brackets are high risk frequent antenatal visits may be advised and be kept under the close supervision by a senior obstetrician. Complications must be anticipated and measures be taken to either prevent or keep them under control.It would be appropriate to conclude that with meticulous evaluation of the pregnant woman with proper prenatal care,antenatal surveillance and delivery in a tertiary care institution with proper NICU facilities, a good perinatal outcome can be expected in both the extremes of ages as our ultimate goal is to have a "HEALTHY MOTHER WITH A HEALTHY BABY"!

Funding: No funding sources

Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGMENTS

The encouragement and support from Bharath University, Chennai, is gratefully acknowledged. For provided the laboratory facilities to carry out the research work.

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