
“ ADOLESCENT PREGNANCY AND ITS
OUTCOME - A COMMUNITY BASED
PROSPECTIVE STUDY”

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ABSTRACT

Background and Objectives

Adolescent pregnancy is dangerous for the mother, child and the community. Teenage girls are twice as likely to die of pregnancy and childbirth related complications as opposed to older women. Present study was undertaken to know the complications and outcomes of adolescent pregnancy and to study the various socio-demographic factors associated.

Methods

This one year community based prospective study was done in a rural PHC area comprising of 5 subcentres namely Kakati A, Kakati B, Honaga, Bhutramanahatti and Vantamuri. A total of 144 adolescent pregnant women, aged between 15-19 years were selected for the study. Information on socio-demographic variables, adolescent pregnancy complications and outcome was recorded in 3 visits.

Results

In the current study majority, 34.1% participants were of 19 years age, 90.3% adolescents were housewives and 48.6% had studied up to high school. The mean age of marriage was 16 years and 79.2% of them were primigravidae. Traditional practices (68.8%) were the commonest reason for early marriage and family pressure (46.5%) was the often cited reason for early pregnancy.

Pedal edema was seen in 22.7% of the study subjects and PIH in 7.1% of them. Anemia was noted in 77.1% of the individuals and 21.9% delivered through cesarean section with malpresentation (35.5%) being the most repeated indication. Preterm deliveries were present in 31.9% of the teenagers and a majority (63.9%) of pregnancies ended in full term delivery and still birth was present in 4.8% of the teens. Abortions occurred in 2.1% of the girls and the LBW was present in 38.3% of the babies born.

Conclusion

In this study, the mean age of participants was 17.8 years and this occurrence of pregnancy in teenage leads to various complications like anemia, pregnancy induced hypertension, prolonged labor, operative delivery, low birth weight and adverse outcomes.

Keywords

Adolescent pregnancy, Complications, Outcome.

LIST OF ABBREVIATIONS

ANC	-	Ante Natal Care
ASHA	-	Accredited Social Health Activist
AWW	-	Anganwadi Worker
BMI	-	Body Mass Index
BP	-	Blood Pressure
cms	-	Centimeters
DF	-	Degrees of Freedom
EDD	-	Expected Date of Delivery
FTD	-	Full Term Delivery
g	-	Gram
Hb	-	Hemoglobin
HCL	-	Hydrochloric Acid
Hg	-	Mercury
HIV	-	Human Immunodeficiency Virus
IEC	-	Information Education and Communication
IUCD	-	Intra Uterine Contraceptive Device
Kg	-	Kilogram
LBW	-	Low Birth Weight
LMP	-	Last Menstrual Period
LSCS	-	Lower Segment Caesarean Section
MF	-	Multiplication Factor
mm	-	Millimètre
NFHS	-	National Family Health Survey

NGO	-	Non Governmental Organization
NRHM	-	National Rural Health Mission
OCP	-	Oral Contraceptive Pill
PHC	-	Primary Health Centre
PIH	-	Pregnancy Induced Hypertension
PPH	-	Post Partum Hemorrhage
PTD	-	Pre Term Delivery
PUC	-	Pre University College
RCH	-	Reproductive and Child Health
Rh	-	Rhesus
SD	-	Standard Deviation
SPSS	-	Statistical Product and Service Solutions
STD	-	Sexually Transmitted Diseases
TB	-	Tuberculosis
TT	-	Tetanus Toxoid
UK	-	United Kingdom
USA	-	United States of America
WHO	-	World Health Organization
χ^2	-	Chi Square

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INTRODUCTION

‘Adolescence’ or ‘Teenage’ is the transition from childhood to adulthood. The word ‘adolescence’ is derived from a Latin word ‘adolescere’, which means ‘to grow up’. It is defined by the World Health Organisation (WHO) as period between 10-19 years of age. Adolescence represents a key stage in development and a critical opportunity for ensuring successful transition to adulthood. A child in this time grows in structural, functional and psychological aspects.¹

In recent decades adolescent pregnancy has become an important health issue in a great number of countries, both developed and developing. However, pregnancy in adolescence is by no means a new phenomenon. Most teenage marriages lead to the teenage motherhood. Once the matrimony is over during teenage, it hardly ever leaves any liberty for a planned maternity, mainly in a patriarchal kind of society. In this state, the fertility choice of the married woman or the expression of her background quality barely gets chance to be manifested after fleeting through a series of ‘Hierarchical Social Structures’ viz., society, community, family, husband; and the immediate motherhood is hardly designed by herself.

The latest international estimates indicate that worldwide more than 60 million women aged 20–24 years were married before the age of 18 years and about 16 million women 15–19 years old give birth each year, representing 11.0% of all births worldwide. Ironically, half of all adolescent births occur in just seven countries: Bangladesh, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Nigeria and the United States.²

Adolescent pregnancy is on the rise, emerging as a serious problem all over the world and more so in developing countries like India where early marriages and early pregnancies are long established and well accepted customs.³ This is more pronounced in states of Bihar, Uttar Pradesh and West Bengal. In India, 16.0% of adolescent girls had started the process of childbearing and that in Karnataka were 18.0%, suggesting that adolescent fertility is quite high in India.⁴

Motherhood primarily requires a suitable and healthy physiological environment, all other external factors being supplementary. At the teen age of a woman, this environment is not assured, leading to the highest probability of hazardous circumstances both medical and social, to the foetus as well as mother. Adolescent pregnancy besides being a major determinant of large family size and rapid growth of population, fertility among adolescents may have significant social, economic and health consequences.⁵ Pregnancy in young women is a high risk event as she herself has not attained her full growth potential and is immature for reproduction. Extrinsic factors like illiteracy, poor socio economic status and inadequate antenatal care also affect the outcome of pregnancy.⁶

Adolescent pregnancy is dangerous for the mother, child and the community. Although adolescents aged 10-19 years account for 11.0% of all births worldwide, they account for 23.0% of the overall burden of disease (disability- adjusted life years) due to pregnancy and childbirth. Fourteen percent of all unsafe abortions in low and middle-income countries are among women aged 15–19 years.² Medical complications such as pre term labour, pregnancy induced hypertension, anaemia and low birth weight babies are strongly associated with adolescent pregnancy. Teenage girls are twice as likely to die of

pregnancy and childbirth related complications as opposed to older women. It is also found that children born to adolescent mothers are at higher risk of infant and child mortality. Stillbirths and death in the first week of life are 50.0% higher among babies born to mothers younger than 20 years than among babies born to mothers 20–29 years old. Deaths during the first month of life are 50.0% – 100.0% more frequent if the mother is an adolescent versus older, and the younger the mother, the higher the risk. The rates of preterm birth and asphyxia are higher among the children of adolescents, all of which increase the chance of death and of future health problems for the baby.⁷

The social consequences of pregnancy in adolescence, particularly for unmarried girls, can be severe. School dropout and subsequent lower educational attainment not only hold back personal development but also reduce women's lifetime earnings and hence their contribution to economic growth. Within the framework of teenage marriage and motherhood, women's exposure to several rigid social customs and beliefs can influence the fate of their pregnancy outcomes and health of their children. These factors added with women's lower level of education and awareness and limited access to the household resources and health services can have heightened negative impact on their pregnancy outcomes and health of their children. The biological inconsistency of the teenage motherhood may lead to pregnancy wastages. Various studies have shown that delaying adolescent births could significantly lower population growth rates, potentially generating broad economic and social benefits, in addition to improving the health of adolescents.²

Hence, adolescent pregnancy is not just a health issue; it is a development issue as well. It is rooted in poverty, gender inequality, child marriage and lack of education. It often means an abrupt end to childhood, curtailed education and lost opportunities to an economic and socially productive life.

While there is growing recognition of the need for action to promote adolescent reproductive health, work done in this regard is often piecemeal. In view of the negative socio-economic, demographic and health consequences of early pregnancy, it is important to have a clear understanding of this vulnerable group of adolescent girls.

In this background, as no study about early pregnancy was done in this area, a study to know the complications, outcomes and socio demographic factors associated with adolescent pregnancy was taken up. The inferences obtained from this study can be further used to curb the occurrences of adolescent pregnancies and thereby protect the health of the women and in turn that of the country.

OBJECTIVES

The objectives of the present study were;

1. To know the complications and outcomes of adolescent pregnancy.
2. To study the socio-demographic factors associated with adolescent pregnancy.

REVIEW OF LITERATURE

ADOLESCENCE: A CRITICAL PHASE

Adolescence is crossroads in development for life. Caught in the web of transition from childhood to adulthood, the adolescents are most acutely affected by various unprecedented and unmanageable changes. It is a difficult period for the young. It is the time of major physical changes like growth spurt, wherein the size and shape of the body change markedly and of puberty, when reproductive capacity is established. It is the time of mental and psychological changes, putting great pressure on themselves and those around.⁸

Adolescents are distinct from children or adults. Although all of them pass through a transition phase, their experiences are diverse as they constitute a heterogeneous group. The familial environments in which teenagers grow also have a tremendous impact on them and their diverse needs. It is a phase of life that is woven within social and cultural dimensions and hence is perceived differently by diverse cultures. While often the world expands for boys thereby giving them greater autonomy, mobility, opportunity and power, for many girls it contracts as they are systematically deprived of these advantages.⁹

Today, one fifth of the world population is of adolescents with four fifth of them in developing countries. When young people strive to fulfill their physical, intellectual, emotional, spiritual, social and artistic potential, they contribute a great deal to the societal progress.¹⁰ The state of their health is important for their lives now and in the future; for this generation and the generations coming next.

CHILD MARRIAGE: A VIOLATION OF HUMAN RIGHTS

Reaching puberty should mark the beginning of a gradual changeover to a healthy and productive adulthood. Instead, for many girls, puberty marks an accelerating trajectory into inequality. Child marriage is a primary source of this, curtailing a critical period for growth, learning, identity formation and experimentation; each of which is essential if maturation into fully rounded human beings is to be unhindered. Even with the appropriate laws against child marriage in place, the practice persists for a variety of complex, interrelated reasons and poverty often underlies wedding. Some parents genuinely believe that the matrimony will secure their daughters' future, while others see their daughters as a burden or even a commodity. Marriage is often seen as a safeguard against premarital sex, and the duty to protect the girl from sexual harassment and violence is transferred from father to husband.¹¹

Early marriage marks a turning point in the life of a large proportion of adolescent girls in India having far reaching educational, health, social and economic consequences. Early marriage often results in holding back adolescent girls' opportunities for education and skill formation. It also impedes proper physical and mental development before taking on the load of reproduction, resulting in greater reproductive health risks.¹²

The third National Family Health Survey (2005-06) of India reveals that while age at marriage for girls is increasing in India, early marriage continues to be widely prevalent. According to the survey, more than 47.0% of girls were already married by 18 years. Trends indicated that the percentage of women who get married before the legal minimum age at marriage of 18 years has been

decreasing over time and that from 1992 to 2006 the percentage of women married by 18 years of age has only reduced from 54.0% to 47.0%. More than half of the women aged 18-29 years get married by the age of 18 years in the states of Bihar (64.0%), Jharkhand (60.0%), Rajasthan (58.0%), Andhra Pradesh (56.0%), West Bengal (53.0%), Madhya Pradesh (53.0%), Uttar Pradesh (52.0%) and Chhattisgarh (51.0%).¹³

Married girls are often under pressure to become pregnant soon after marriage, although they are still kids themselves and know little about sex or reproduction. It directly threatens health and wellbeing. Complications of pregnancy and childbirth together are the main cause of death among adolescent girls aged 15-19 years in developing countries like India.

ADOLESCENT PREGNANCY: CHILDREN HAVING CHILDREN

About 16 million adolescent girls between 15-19 years of age give birth each year. Babies born to adolescent mothers account for roughly 11.0% of all births worldwide, with 95.0% occurring in developing countries. In some societies girls marry and start their families before their own childhoods have ended and in other countries the majority of births to young mothers occur outside marriage where there is a high rate of sexual activity amongst adolescents, some of it coerced, or linked to poverty and social exclusion. However, most childbearing amongst adolescents is in the context of marriage or other forms of union and the highest birth rates to under 19-year-olds are in countries with a high rate of child marriage, a scenario often encountered in developing countries.¹⁴

In developed countries, girls become pregnant due to early sexual debut as a part of risk taking and experimental nature of adolescents. Exposure to alcohol and drugs might lead them into sexual activity resulting in an unintended pregnancy. Declining age at menarche and increased schooling and thereby delaying the age of marriage have prolonged the period of adolescence. Together with a growing independence from parents and families, this has led in recent decades to more premarital sexual relations and increasing numbers of adolescent pregnancies. Lack of knowledge about sex and family planning and the lack of skills to put that knowledge into practice pose teenagers at risk for pregnancy. Rates of use of contraception by adolescents are also often low.¹⁵

In India, although the legal age at marriage is 18 for females and 21 for males, early marriage continues to be the norm. Most reproduction occurs within marriage and so the low age at marriage automatically links to early onset of sexual activity, and thereby fertility. Overall 12.0% of women aged 15-19 years have become mothers and 4.0% in the same age group are pregnant with their first child. This indicates that one in six women in this age group have begun childbearing. Among married adolescents a much higher percentage of adolescents are mothers (44.0%) or have already begun childbearing (58.0%). Although the knowledge of one or the other type of contraceptive method was about 99.0% among adolescents, only 23.0% of the married and 18.0% of the unmarried teenagers had ever used contraception.¹³

Hence, globally, either in developing or developed countries, the key determinants of adolescent pregnancy include early marriage, sexual coercion and lack of access to and use of contraception.

Causes of Teen Pregnancies:

Teen pregnancies may result from different reasons in industrialised countries as compared to developing countries. Factors that contribute to teenage pregnancies include: customs and traditions that lead to early marriage as in developing countries, alcohol and drug influenced adolescent sexual behaviour, peer pressure to engage in sexual activity, lack of education and information about reproductive sexual health and limited access to tools that prevent pregnancies, sexual abuse, violence and family strife at home and low educational ambitions and goals among others.¹⁶

CONSEQUENCES OF ADOLESCENT PREGNANCY: THE DARK FUTURE

Health risks for mother and baby are strongly associated with childbirth at an early age. Although births among adolescents account for 11.0% of all births worldwide, they account for 23.0% of the overall burden of disease (in terms of disability adjusted life years) due to pregnancy and childbirth among women of all ages. In low and middle income countries, complications of pregnancy and childbirth are the leading cause of death in women aged 15–19 years. The social consequences of pregnancy in adolescence, particularly for unmarried girls, can be severe. School dropout and subsequent lower educational attainment not only hold back personal development but reduce women's lifetime earnings and hence their contribution to economic growth. Pregnancies in unmarried girls sometimes provoke violence. Although reliable data on the scale of the problem are not available, pregnancy is increasingly recognized as a reason for suicide among

pregnant girls. Similarly, pregnancy among unmarried girls in some cultures is reported as a ground for homicide, on the basis of maintaining family honour.¹⁷

Complications in pregnancy and delivery: ^{2.14.15}

Some complications of pregnancy may occur more frequently and more severely in adolescents than in older women viz. anaemia, hypertension, malaria, HIV, operative interventions, prolonged and obstructed labour.

Outcomes of adolescent pregnancy: ^{2.14.15}

Adolescents are more likely to give birth to preterm and low birth weight babies, who are at higher risk of neonatal and perinatal mortality. Amongst teenagers, abortion and death during childbirth in many countries is twice as high as for older women. This is due to a range of factors, including primiparity, pregnancy related complications, poverty, low social status and lack of access to health services.

A descriptive cross sectional study was done in Kathmandu, Nepal to know the outcomes of adolescent pregnancy. The study compared the outcomes of 168 mothers of age 15-19 with that of 401 of 20-24 years and showed that the relative risk of low birth weight babies among adolescents was 1.1 times higher than the young mothers and also that neonatal (17.2% vs. 16.7%) and maternal complications like post partum haemorrhage (0.6% vs. 0.2%) was higher among adolescents.¹⁸

A large population based retrospective cohort study conducted in Canada showed that the adverse outcomes of pregnancy like low birth weight, pre term delivery and neonatal death were present in 8.3%, 12.4% and 0.5% participants respectively and it consistently increased with decreasing maternal age and were always highest among infants born to younger mothers¹⁹

Yet another retrospective cohort study done at Scotland showed that among first births, emergency caesarean section was more likely among teenage mothers which were seen in 8.6% of them. Second births in women aged 15- 19 had complications like prematurity in 4.7%, stillbirth in 0.7% and emergency caesarean section in 4.2% mothers.²⁰

A study conducted in USA concluded that, the post neonatal mortality rate for infants born to younger mothers was substantially higher (3.2 per 1000) than that of infants born to mothers 23–29 years old (0.8 per 1000). Infants born to adolescent mothers between 16-17 years had near three-fold higher risk of post neonatal death compared to older mothers.²¹

A study was conducted at Tanzania and it showed that 66.7% of study participants were pregnant between 16-18 years and 90.2% had unplanned pregnancy and of which 2.9% had undergone abortion. It also showed that a total of 81.8% of the study participants had knowledge about the complications of adolescent pregnancy.²²

Another study was conducted in USA to determine whether young age confers an intrinsic risk of adverse outcomes of pregnancy and it concluded that teenage mothers between 13 to 17 years of age had a 1.4 times significantly

higher risk of delivering an infant who had low birth weight or who was delivered prematurely than mothers of 20 to 24 years age²³

A study conducted in New York concluded that young mothers between 13 to 17 years had a nearly 75.0% increased risk of preterm labour. The increased risk was principally attributed to biologic immaturity and moreover young age with low gynaecological age was associated with two fold risk of preterm labour.²⁴

A study was conducted in New Jersey to find the associations between weight gain, pre pregnancy weight-for-height and infant birth weight in a sample of 1419 term deliveries to adolescents. It showed that, the overall incidence of low birth weight in adolescents was 5.0%. and that there was also a significant effect for maternal weight in the direction of lesser overall birth weight among low weight adolescents.²⁵

Another study done in USA showed that low birth weight was noted in 10.8% of young adolescents and neonatal mortality in 4.9 per 1000 live births and these complications had a strong association with young maternal age and the risk decreased as age advanced.²⁶

A study was done in England to quantify the age-related risks of adverse outcomes during pregnancy in women less than 18 years and it showed that the proportion of preterm labour was 6.6% and that of maternal anaemia was 13.9%. Operative vaginal delivery, elective caesarean or emergency caesarean were all less likely in women aged less than 18 years and they were no more likely to have stillbirths or small-for-gestational-age infants than women aged 18–34 years.²⁷

A retrospective review was performed on the obstetric outcomes of teenage pregnancies delivered in 1 year in a tertiary centre in Hong Kong. The results were compared with the rest of the obstetric population in the same hospital in the same year. The teenage mothers had increased incidence of preterm labour (13.0%) when compared with the non-teenage mothers. There was no difference in the types of labour, but the incidence of caesarean section was lower (4.1% vs. 12.6 %,) in the teenage mothers. Although the incidence of low birth weight was higher in the teenage mothers (13.5% vs. 6.5%), there was no significant difference in the mean birth weight, gestation at delivery, incidence of total preterm delivery, or perinatal mortality or morbidity.²⁸

A study was done to evaluate a comprehensive adolescent pregnancy program in USA and it showed that 92.0% of study participants were primigravida, 8.0% were multigravida and 84.0% were aged between 15-18 years at the time of delivery. It also stated that hypertensive disorders of pregnancy occurred in 21.5% and anaemia in 43.0% of participants.²⁹

A cross sectional study conducted in Brazil to compare perinatal characteristics among early and late pregnant adolescents showed that low birth weight and preterm birth was present in 14.1% and 10.4% of early and late adolescents respectively and it was found to be statistically significant.³⁰

A retrospective cohort study was conducted in USA to investigate the relationships between infant mortality and maternal age and it showed that the risk of infant, neonatal and post-neonatal mortality were significantly higher for younger adolescent than older mothers which was present in 1.2%, 0.7% and

0.5% of teen mothers respectively. There were no differences in neonatal or post-neonatal mortality risks for older adolescent between 18–19 years mothers.³¹

A study was done in Uruguay to find out whether adolescent pregnancy is associated with increased risks of adverse pregnancy outcomes and it concluded that adverse perinatal outcomes like operative vaginal delivery was present in 3.5 %, post partum haemorrhage in 5.4%, low birth weight in 10.2% and preterm delivery in 10.8% of adolescents and it was significantly higher when compared with adult women.³²

Maternal and foetal outcomes in adolescent pregnancies were studied in Turkey and it was found that first prenatal visit during pregnancy was significantly later in adolescence group (20 weeks) than that of adult group (15 weeks) and that the mean birth weight of newborns was 3197 ± 569 g and foetal macrosomia was significantly lower in adolescence group compared with adult group. Cephalopelvic disproportion as indication for caesarean section was present in 32.0% of participants and preterm labour in 18.5% and this was found to be significantly higher in adolescent group than that of the adult group.³³

Yet another study was conducted in Turkey to compare the perinatal outcomes of women aged 19 or less with adult pregnancies between 20-38 years-old women and it showed that the ratio of LBW (26.4% vs. 22.9%), malpresentation (23.1% vs. 11.0%), preterm labour (11.1% vs. 4.2%) and eclampsia (5.0% vs. 1.5%) in the adolescent group was significantly higher than that of the control group but caesarean delivery (37.0% vs. 52.7%) was lower in the adolescent group than that of the control group. The ratio of all complicated

pregnancies in the adolescent group was significantly higher than that of the control group (49.4% vs. 37.9%).³⁴

A similar study was done in Jordan to know the adverse outcomes of adolescent pregnancies and it showed that there was a significant increase of preterm labour (14.6% vs. 8.0%), forceps delivery (4.5% vs. 1.4%), neonatal intensive care unit admission (22.7% vs.13.5%) and a lower incidence of caesarean section (7.1% vs.16.8%) in the teenage group than the control group of adult women. However, medical and obstetric complications including pregnancy-induced hypertension, diabetes mellitus, anaemia, placenta praevia, abruptio placenta and multiple pregnancies were not different in both groups.³⁵

A retrospective cohort study done in Germany to compare the risks for adverse reproductive outcomes of adolescent nulliparae to teenagers who either have had an induced abortion or a previous birth, showed that amongst adolescents with a previous birth, 1.5% had perinatal mortality and 0.9% had neonatal mortality and amongst adolescents with a previous abortion, 1.5% had stillbirths, 7.7% had preterm births and 2.8% had very low birth weight infants.³⁶

Another study was conducted in Canada to characterize the obstetric outcome and prevalence of anaemia in primiparous adolescents and compare them with those in older primiparas and it revealed that adolescents were more likely to have a preterm delivery (12.6% vs.7.5%), low birth weight infants (10.1% vs.4.3%) and were 2.5 times more likely than adults to be anaemic at 26 to 35 weeks' gestation and pre-delivery. It also showed that proportion of adolescents delivered by caesarean section was significantly lower than the adults (12.1% vs. 27.7%).³⁷

A clinical report on adolescent pregnancies stated that approximately 51.0% of adolescent pregnancies end in live births, 35.0% end in induced abortion and 14.0% result in miscarriage or stillbirth. The incidence of having a low birth weight infant among adolescents is more than double the rate for adults, and the neonatal death rate is almost 3 times higher. The mortality rate for the mother is twice that for adult pregnant women. It was also associated with other medical problems including poor maternal weight gain, prematurity, pregnancy-induced hypertension, anaemia and STDs.³⁸

Obstetric outcomes in nulliparous young adolescents was calculated in Thailand by a retrospective case control study and it showed that the total weight gain during pregnancy, number of antenatal visits and neonatal birth weight were significantly lower in teenagers than control group. It also revealed that 16.5% of young adolescents had anaemia, 19.8% had preterm delivery and 8.3% had preeclampsia and that they were significantly more than the control subjects.³⁹

Another study conducted in Greece to determine the adolescent pregnancy outcomes showed that among the teenage pregnancies, 34.0% resulted in birth, 57.0% in abortions and 9.0% in miscarriage. Toxemia, anemia, premature separation of the placenta and placenta previa were seen in 1.2%, 0.23%, 1.08% and 1.29% of cases respectively.⁴⁰

A study conducted in UK showed that, of the 1,660 pregnancies in the young adolescents, 59.6% were terminations. Anemia was 2.53 times as common in teenagers while hypertension was 1.7 times as frequent. Caesarean section rate in the adolescent group was 0.56 times and forceps deliveries were 2.37 times greater than the control group.⁴¹

A study was conducted in Jabalpur Madhya Pradesh, to know the perinatal outcomes of adolescent pregnancy and it showed that the proportion of short (height <145 cm.): 28.8% vs. 9.4%, underweight (weight <45 Kg.): 38.0% vs. 12.5% and anaemic (Hb <9 g%): 52.5% vs. 37.3% women was significantly higher in the adolescent group.⁴²

Another study conducted in Nagpur Maharashtra, to know the adolescent pregnancy outcomes and complications showed that adolescents had a higher ratio of still births (5.4% vs. 2.4%), low birth weight babies (18.5% vs. 3.8%), toxemia of pregnancy (20.5% vs. 12.6%), preterm labour (16.2% vs. 2.8%) and cephalopelvic disproportion (9.1% vs. 1.8%).⁴³

A cohort study in Kolkata West Bengal, revealed that anaemia (63.0% vs. 43.6%), preterm deliveries (51.7% vs. 25.9%) and low birth weight babies (65.5% vs. 26.4%) were significantly more prevalent in teenage pregnancies.⁴⁴

Another community based study was conducted in Delhi and it showed that 3.0% adolescent and 8.0% adult pregnancies ended pre term. Pregnancy wastage was about six times more common in adolescent pregnancies and presentation other than vertex was reported in 5.0% and 2.5% of adolescent and adult pregnancies respectively. Only one third of adolescents had institutional delivery where as more than half of adults opted for institutional delivery.⁴⁵

Yet another study conducted in New Delhi found that incidence of anaemia (53.8%) and pregnancy induced hypertension (33.7%) was high in adolescent pregnant women. It also showed that appropriate ante natal care reduced the complications of pregnancy and especially low birth weight.

Maternal age was however not found to be associated with occurrence of intra uterine growth retardation and preterm deliveries.⁴⁶

A cross-sectional observational study undertaken in Kolkata West Bengal, revealed that the teenage mothers had a higher proportion of preterm deliveries (27.7% vs. 13.1%), low-birth weight babies (38.9% vs. 30.4%) and stillbirth rate (5.1% vs. 0.9%) in comparison with the adult pregnant women. The teenage mothers also developed more adverse perinatal complications such as preterm births (27.7% vs. 13.1%) and neonatal deaths (5.1% vs. 1.7%) when compared with those of the adult primigravida mothers.⁴⁷

Yet another study conducted in Nagpur Maharashtra, to determine the consequences of teenage pregnancy showed that adolescents had significantly more ratio of low birth weight babies than adults (39.5% vs. 34.6%). Operative interference and assisted delivery was observed to be significantly less in teenagers than adults and for other complications of pregnancies viz. preterm labor, premature rupture of membrane, placenta praevia, antepartum hemorrhage and outcome viz. congenital anomaly, twins, there were no significant differences between the two groups.⁴⁸

A study was conducted in Delhi to find the determinants and child outcomes of adolescent pregnancy and it stated that besides lower maternal age, lack of education, low socio-economic status, maternal under nutrition and limited access to maternal health services were important determinants of poor pregnancy outcomes. The risk of maternal death was about three times higher in late adolescent girls; and those less than 15 years old were 5 times as likely to die as women in their twenties. Teen mothers also had a higher propensity to

experience adverse outcomes such as higher fetal wastage (miscarriage/still births) and the risk of toxemia of pregnancy was three times higher.⁴⁹

A comparative study of teenage primigravidae in Kolkata, West Bengal revealed that incidence of complications of pregnancy like anemia, pregnancy induced hypertension and preterm labor were significantly higher among teenage mothers. The fetal outcome was significantly worse in adolescents with high incidence of perinatal mortality in 8.0% and low birth weight babies in 35.0% of participants.⁵⁰

A study was conducted in Varanasi to know the outcomes of pregnancy and it showed that complications like pregnancy induced hypertension: 11.4% vs. 2.2%, pre-eclamptic toxemia: 4.3% vs. 0.6%, eclampsia: 4.9% vs. 0.6% and premature onset of labor: 26.1% vs. 14.6% occurred more commonly in teenagers compared to adult controls. Teenage mothers also had increased incidence of low birth weight: 50.4% vs. 32.3%, premature delivery: 51.8% vs. 17.5% and neonatal morbidities like perinatal asphyxia: 11.7% vs. 1.9%. Teenage pregnancy was also associated with higher fetal: 1.9% vs. 0.3%, and neonatal mortality: 3.8% vs. 0.5%.⁵¹

Another comparative study conducted in Miraj Maharashtra, to determine the outcomes of teenage pregnancy showed that the adolescent mothers were nearly three times more at risk of developing anemia, delivering pre-term, twice as likely to develop hypertensive problems in pregnancy and were more likely to deliver vaginally with no significant increase in the risk of assisted vaginal delivery or caesarean section. Teen mothers were nearly twice at risk of

delivering low birth weight babies and 50.0% less likely to have normal birth weight babies.⁵²

A study done on the basis of RCH data in Karnataka stated that proportion of teenage pregnancies was found to be more in rural (66.6%), illiterate (71.4%) and those belonging to lower castes (70.0%). This study did not mention about the complications associated with adolescent pregnancy.⁵

A retrospective study in Bangalore showed that mean age of marriage in adolescent pregnant women was 16.5 years and mean age of first pregnancy was 18.1 years. Among the study population 13.2% were illiterate and 56.0% had studied up to high school emphasising the literacy association with early pregnancy.⁶

Another similar study conducted at Bangalore, showed that the mean age at marriage increased significantly with an increase of the educational status of teenage pregnant mothers. The most common reasons for early marriage and early pregnancy were traditional practices and family pressure which were present in 64.0% and 57.7% participants respectively and a total of 63.0% of teenage pregnant girls were not aware of any family planning methods.⁵³

METHODOLOGY

Study area:

Study area was the field practice area of Primary Health Centre (PHC), Vantamuri, which included its five subcentres- Kakati A, Kakati B, Honaga, Bhutramanahatti and Vantamuri.

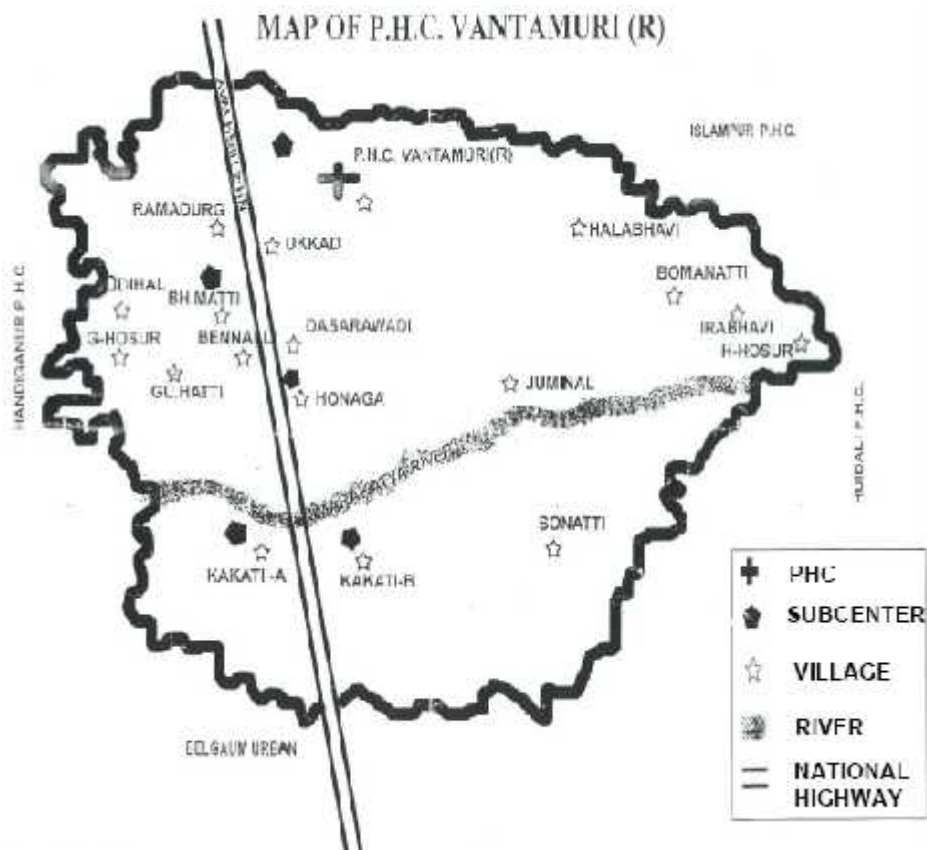


Figure 1. Map of Vantamuri Primary Health Centre showing study area

Study design:

A community based longitudinal study.

Study period: One year – January 2012 to December 2012.

Source of data

The study was conducted on pregnant women between the age group of 15-19 yrs, residing in Primary Health Centre Vantamuri area.

Sample size:

Population of Vantmuri PHC – 34,625

Birth rate of Vantamuri PHC - 19/1000 population

Approximate pregnant women: $35000 \times 19 / 1000 = 655$

Loss to follow up: 10% = 65.5;

$$655 + 65.5 = 720.5$$

Adolescent pregnant women in rural area of Karnataka- 20.9% (NFHS-3)

$$\text{so, } n = 0.20 \times 720$$

$$n = \mathbf{144}$$

Ethical Clearance

The present study was approved by J. N. M. C. Institutional Ethics Committee on Human subjects' Research. (Ref: MDC/PG/7012 dated 21/10/2011)

Method of collection of data:

Pregnant women between the age group of 15-19 years belonging to Vantamuri Primary Health Centre area were eligible for the study. Adolescents as per WHO, are between 11-19 years and reproductive age group is between 15-45 years and hence pregnant adolescents were taken between 15-19 years. Pregnant women within 20 weeks of gestation were enrolled for the study as most of the complications of pregnancy occur after 20 weeks. Their residential addresses were obtained from the ASHA workers as they were beneficiaries of NRHM project.

The study included three visits, first being the enrolment, second between 28-36 weeks of gestation and third in their post partum period between 0-14 days to record their outcome. Women were interviewed with a predesigned, pretested questionnaire to know about their socio demographic and pregnancy details.

At the first visit, women were physically examined and their blood samples investigated for haemoglobin level and HIV status. Second visit included physical examination and blood investigation for haemoglobin level. Third visit was to note the details of their delivery. If the women were out of the study area for their delivery, they were contacted through phone and with the help of ASHA workers, their information was obtained.

The instruments used in this study included questionnaire, weighing machine, measuring tape, sphygmomanometer, stethoscope. All the instruments and techniques were initially standardized during pilot study.

Hemoglobin estimation by Sahli's method⁵⁴

Hemoglobin estimation by Sahli's method was done for every participant in the study.

Hemoglobin meter tube was filled with N/10 HCL up to its lower mark with a dropper. The finger of the participant was pricked with all aseptic precautions, and the first drop of blood was discarded. The hemoglobinometer pipette was used to suck blood up to 20 cu mm mark. Blood was immediately transferred into tube containing HCL. The solution was left in the tube for about 10 minutes (for maximum conversion of hemoglobin to acid hematin). Then the acid hematin formed was diluted by adding distilled water drop by drop. The color of the solution was matched with the standard comparators and the reading of lower meniscus was noted as result.

HIV test by Rapid Test:⁵⁵

3 drops of buffer solution (given along with the kit) was added to the centre of the device. Then, 1 drop of patient's sample was added. Later, 5 drops of buffer solution, 2 drops of liquid conjugate (given along with the kit) and then 5 drops of buffer solution were again added and results noted (antigen-antibody reaction appeared as pink dot).

Interpretation of results:

Non reactive: If only one dot appeared (control dot)

Reactive: If two dots, one control and the other either HIV-1 or HIV-2 appeared or if all the three dots (control, HIV-1 & HIV-2) appeared.

Invalid test: If no dot appeared even after the test was complete.

A qualified laboratory technician performed the above investigations according to the standard guidelines.

Inclusion Criteria:

All pregnant women between 15-19 years belonging to the study area.

Exclusion Criteria:

Pregnant women who were more than 20 weeks of gestation at the first contact and those who had chronic diseases like TB, Congenital Heart Diseases and Diabetes Mellitus were excluded from the study.

Analysis:

- Codes were prepared for each options of the questionnaire. Data was entered in Excel sheet to prepare a master chart. SPSS version 18.0 software was used for analysis of the data. Tables and graphs were prepared by using Microsoft Windows 2007 software.
- Numerical socio-demographic variables were analyzed by means and standard deviations. Categorical data regarding socio-demographic factors and adolescent pregnancy outcome and complications were summarized using percentages.
- Chi square test was used to find the association between various socio demographic variables and adolescent pregnancy and its outcome. Fischer's Exact Test was used for r x c tables.

Definition of study variables

Age: Age was recorded to the nearest completed years.

Educational status:

- Illiterate - A person who cannot read and write.
- Primary school – Person who has studied from 1st to 7th standard.
- High school – Person who has studied 8th to 10th standard.
- Pre-university / Diploma – Person who has studied up to PUC 2nd year or a diploma course.
- Graduate– Person who has obtained any degree.

Occupation:

- Housewife – A woman who takes care of the household day to day duties.
- Agriculturist – A person who works in farm field.
- Daily wage worker – A person who makes living on daily wage basis
- Factory worker – A person who works in a small or large scale industry
- Any other Profession – A person who is employed in any profession other than these like teacher, tailor, clerk, receptionist etc.

Socio-economic status:

Information regarding per capita income (in Rupees / month) was collected and socio-economic status was classified using Modified B G Prasad's

classification for the study period (2012) and it was calculated by Multiplication factor with 1961 Prasad's classification values.⁵⁶

Average consumer price index for year 2012 = 969⁵⁷

Modification was done with the aid of multiplication factor (M.F), which was obtained as below:

$$\begin{aligned} \text{M.F.} &= \frac{\text{Average consumer price index for the study period (2012)}}{100} \times 4.93 \\ &= 969 / 100 \times 4.93 = 47.77 \end{aligned}$$

Socio-economic status	Prasad's classification 1961 (per capita income in Rs/month)⁵⁶	Modified Prasad's classification In study period 2012 (per capita income in Rs/month)
I	≥100	≥4800
II	50—99	2400 – 4779
III	30-49	1440 – 2399
IV	15-29	720 – 1439
V	≤15	≤719

Type of family:¹

Nuclear family- Household, where married couple along with their dependent children live in the same house.

Joint family- Household, where many married couples and their children live in the same house. Males are blood relatives and females of the family are related by either marriage or blood relation.

Three generation family- Household, where representatives of three generations related to each other by direct descent live together.

Consanguineous Marriage: According to WHO, a consanguineous is defined as a marriage between people who are second cousins or more related.

Height: The subject stood straight without footwear, with heels, buttocks and back touching the wall and arms hanging by side. The height was measured from head to heel. The coinciding reading was measured to the nearest cm using a measuring tape.⁵⁸

Weight: Body weight was measured without any foot wear and with minimal clothing to the nearest 0.1 kilogram using a standard portable weighing machine, which was standardized periodically during the study. The scale was adjusted to zero before each session and weight was recorded in kilogram.⁵⁸

Body Mass Index (BMI): The BMI was calculated using the formula given below.⁵⁸

$$\text{BMI} = \text{Weight (Kg)} / \text{Height (Meter}^2\text{)}.$$

BMI is classified for Asians as:⁵⁹

BMI	Status
< 18.5	Under weight
18.5 -22.9	Normal
≥23	Over weight

Blood pressure measurement: During the study, at first and second visit, blood pressure of each study participant was recorded using mercury sphygmomanometer, first by palpatory method followed by auscultatory method as per standard guidelines. Both blood pressure measurements were obtained after the subject had rested for at least five minutes in a seated position. All blood pressure measurements were made on left arm of each subject, using a cuff of appropriate size at the level of the heart. The average of two systolic blood pressure and diastolic blood pressure readings were considered to describe the blood pressure of the participant. In cases where the two readings differed by over 10 mm Hg, a third reading was obtained and three measurements were averaged.¹

Categorization of subjects by blood pressure levels: The subjects were divided into “Normotensives” or “Hypertensives” on the basis of their blood pressure levels.

Normotensives: Systolic blood pressure less than 140 mm Hg and Diastolic blood pressure less than 90 mm Hg.

Hypertensives: Systolic blood pressure 140 mm Hg or above; Diastolic blood pressure 90 mm Hg.⁶⁰

Anemia: Anemia is present when the hemoglobin level (Hb) in the blood is below the lower extreme of the normal range for the age and sex of the individuals.⁶⁰

Grading of anemia in pregnancy according to WHO criteria:⁶¹

Hemoglobin (g %)	Anemia
≥11.0	No Anemia
10.0-10.9	Mild Anemia
7.0-9.9	Moderate Anemia
<7.0	Severe Anemia

Lie: Relationship of the long axis of the fetus to the long axis of the centralized uterus or maternal spine. They are of three types - longitudinal, transverse and oblique.⁶⁰

Presentation: The part of the fetus which occupies the lower pole of the uterus. The common presentations are cephalic, breech and shoulder.⁶⁰

Vaginal Delivery: Expulsion or extraction of a viable fetus out of the womb through the vagina.⁶⁰

Caesarean Section: Operative procedure whereby the fetus is delivered through an incision on the abdominal and uterine walls.⁶⁰

Prolonged Labor: The combined duration of the first and second stage of labor will be more than 18 hours.⁶⁰

Post Partum Hemorrhage: Any amount of blood from or into the genital tract following birth of the baby up to the end of the puerperium which adversely affects the general condition of the mother evidenced by rise in pulse rate and falling blood pressure.⁶⁰

Full Term Delivery: Delivery between 37 and 42 weeks of gestation.⁶⁰

Preterm Delivery: Delivery of the fetus before 37 completed weeks of gestation.⁶⁰

Still Birth: A birth of a newborn after 28th completed weeks (Weighing 1000 grams or more) when the baby does not breathe or show signs of life after delivery.⁶⁰

Abortion: Expulsion or extraction from its mother of an embryo or fetus weighing 500 grams or less when it is not capable of independent survival.⁶⁰

Neonatal Death: Death of the baby within 28 days of birth.⁶²

Birth weight: Information regarding weight recorded at birth in kilograms taken from the mothers.⁶²

Low Birth Weight: Any neonate weighing < 2500g at birth irrespective of the gestational age.⁶²

RESULTS

The present study was conducted in the rural field practice area of Primary Health Centre, Vantamuri of Department of Community Medicine, Jawaharlal Nehru Medical College, Belgaum on 144 adolescent women during the period of January 2012 to December 2012.

The data obtained was tabulated and analyzed under following headings:

- I. Socio-demographic variables**

- II. Complications and outcomes of adolescent pregnancy**

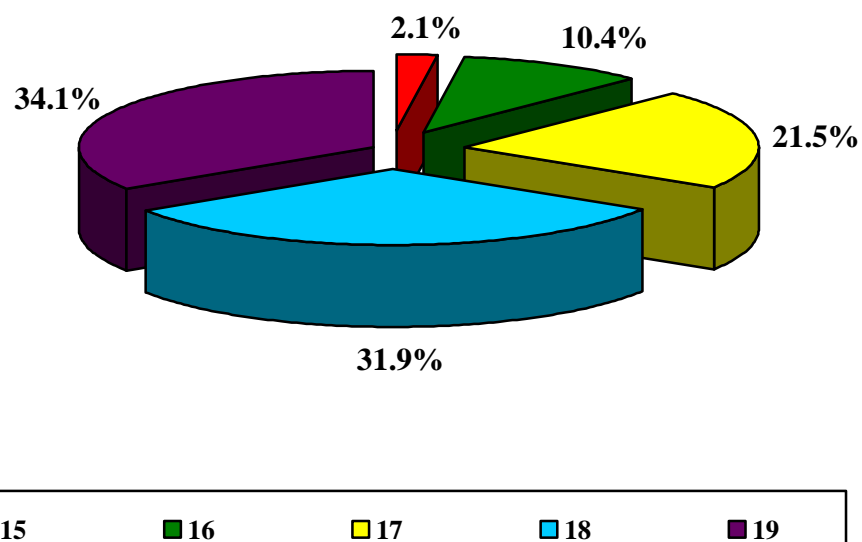
- III. Association between various socio-demographic factors and adolescent pregnancy**

I) Socio-demographic variables

Age:

Table 1. Distribution of the study participants according to their age.

Age (Years)	Study participants (n=144)	
	Number	Percentage
15	3	2.1
16	15	10.4
17	31	21.5
18	46	31.9
19	49	34.1
Total	144	100.0

Graph 1: Distribution of the study participants according to their age.

In the present study, out of 144 study participants, 49 (34.1%) were 19 years of age, 46 (31.9%) were of 18 years, 31 (21.5%) were of 17 years, 15 (10.4%) of 16 years and 3 (2.1%) were of 15 years of age. The mean age was 17.8 (SD±1.1) years and the median age was 18 years.

Religion:**Table 2. Distribution of the study participants according to their religion.**

Religion	Study participants (n=144)	
	Number	Percentage
Hindu	127	88.2
Muslim	17	11.8
Christian	0	0.0
Total	144	100.0

A major number of participants, 127 (88.2%) were Hindus by religion and the rest were Muslims. There were no Christian participants in the study.

Occupation:**Table 3. Distribution of the study participants according to their occupation.**

Occupation	Study participants (n=144)	
	Number	Percentage
Housewife	130	90.3
Agriculturist	12	8.3
Daily wage worker	2	1.4
Total	144	100.0

As many as 130 (90.3%) participants of the study were housewives and 12 (8.3%) were agricultural workers.

Husbands' Occupation:**Table 4. Distribution of the study participants according to their husbands' occupation.**

Husbands' Occupation	Study participants (n=144)	
	Number	Percentage
Agriculturist	42	29.2
Laborer	39	27.1
Factory Worker	48	33.3
Others	15	10.4
Total	144	100.0

A large number of participants' husbands, 48(33.3%) were factory workers followed by 42 (29.2%) were agriculturists and 39 (27.1%) were laborers.

Education:**Table 5. Distribution of the study participants according to their education.**

Education	Study participants (n=144)	
	Number	Percentage
Illiterate	29	20.1
Primary School	38	26.4
High School	70	48.6
PUC/Diploma	7	4.9
Total	144	100.0

A large majority of adolescent girls, 70 (48.6%) were educated up to high school and only few, 7 (4.9%) studied beyond high school.

Husbands' Education:**Table 6. Distribution of the study participants according to their husbands' education.**

Husbands' Education	Study participants (n=144)	
	Number	Percentage
Illiterate	34	23.6
Primary School	37	25.7
High School	60	41.7
PUC/Diploma	9	6.2
Graduate	4	2.8
Total	144	100.0

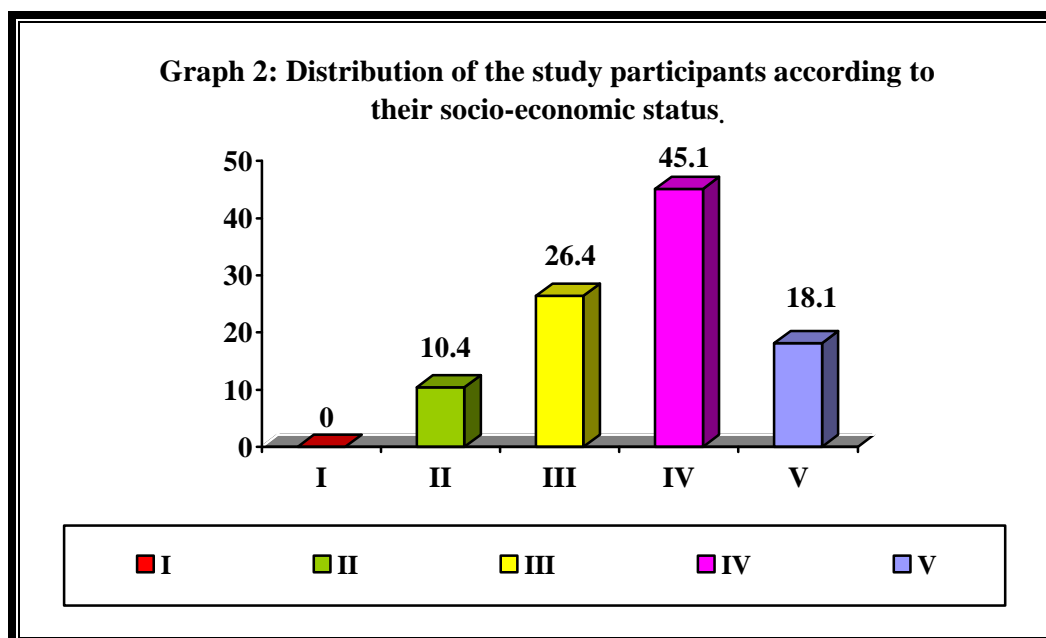
Of the husbands of the study participants, a large number, 60 (41.7%) had studied up to high school followed by 37 (25.7%) up to primary school and 34 (23.6%) of them were illiterate

Type of Family:

A great number of adolescents, 110 (76.4%) were living in a joint family and the rest, 34 (23.6%) in nuclear family.

Socio-Economic Status:**Table 7. Distribution of the study participants according to their socio-economic status.**

Socio-Economic Status	Study participants (n=144)	
	Number	Percentage
Class I	0	0.0
Class II	15	10.4
Class III	38	26.4
Class IV	65	45.1
Class V	26	18.1
Total	144	100.0



In the present study, majority of them, 65 (45.1%) belonged to class IV according to modified B G Prasad classification, followed by 38 (26.4%) to class III and 26 (18.1%) to class V. None of the participants belonged to class I.

Age at Marriage:**Table 8. Distribution of the study participants according to their age at marriage.**

Age at marriage (Years)	Study participants (n=144)	
	Number	Percentage
<10	6	4.2
10 – 14	7	4.9
15 – 19	131	90.9
Total	144	100.0

Most of the adolescents, 131 (90.9%) had married in 15 – 19 years. The mean age of marriage was 16 years ($SD \pm 2.0$) and the median age of marriage was 16 years.

Previous Pregnancies:

Amongst the total adolescents in the study, 114 (79.2%) were primigravidae, 28 (19.4%) had previous one pregnancy and 2 (1.4%) had previous 2 pregnancies.

Outcomes of Previous Pregnancies:

Of the total 30 girls who had previous pregnancies, 8 (26.6%) had abortion, 6 (20.0%) had still birth and 4 (13.4%) of them had infant death while 12 (40.0%) of the participants' children were alive and healthy.

Consanguineous Marriage:

Out of the total 144 adolescents, 49 (34.0%) had consanguineous marriage.

Awareness about Contraception:

Knowledge about contraception was almost equally divided amongst participants with 74 (51.4%) being aware and 70 (48.6%) unaware about any kind of contraceptive methods.

Source of Contraceptive Awareness:

Table 9. Distribution of the study participants according to source of contraceptive awareness.

Source	Study participants (n=74)	
	Number	Percentage
Neighbors	7	9.5
Televisions	34	45.9
Health care Providers	3	4.1
Multiple Responses	30	40.5
Total	74	100.0

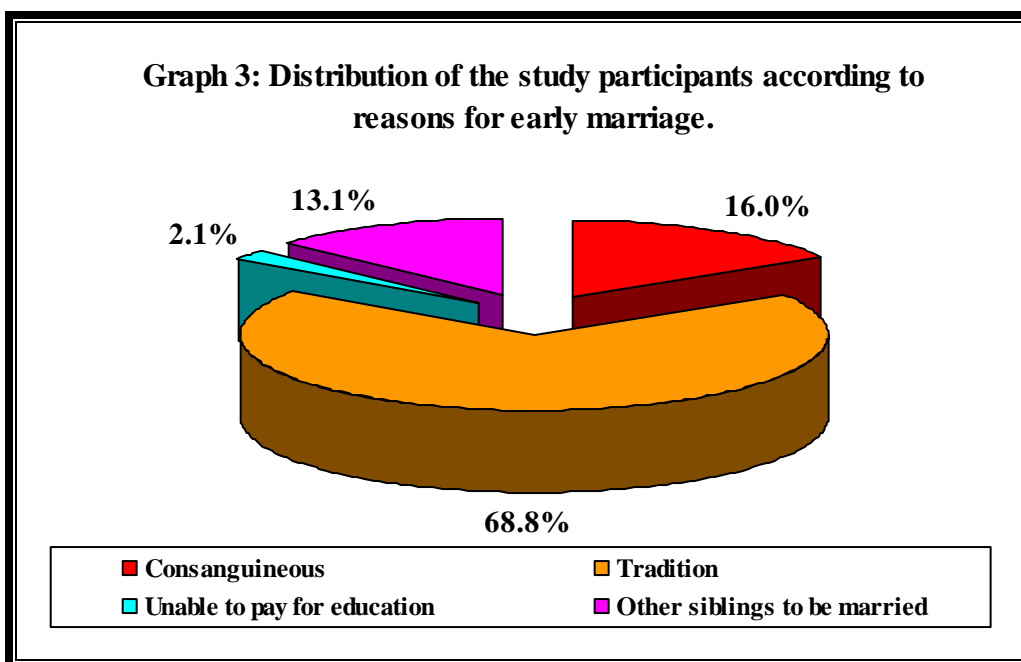
A majority, 34 (45.9%) participants had knowledge about contraception from television followed by 30 (40.5%) from multiple sources like television and health care providers together.

Contraceptive practice:

Although half of the adolescents had knowledge about one or the other method of contraception, none of them practiced any kind of contraceptive methods either after marriage or after child birth.

Reasons for Early Marriage:**Table 10. Distribution of the study participants according to reasons for early marriage.**

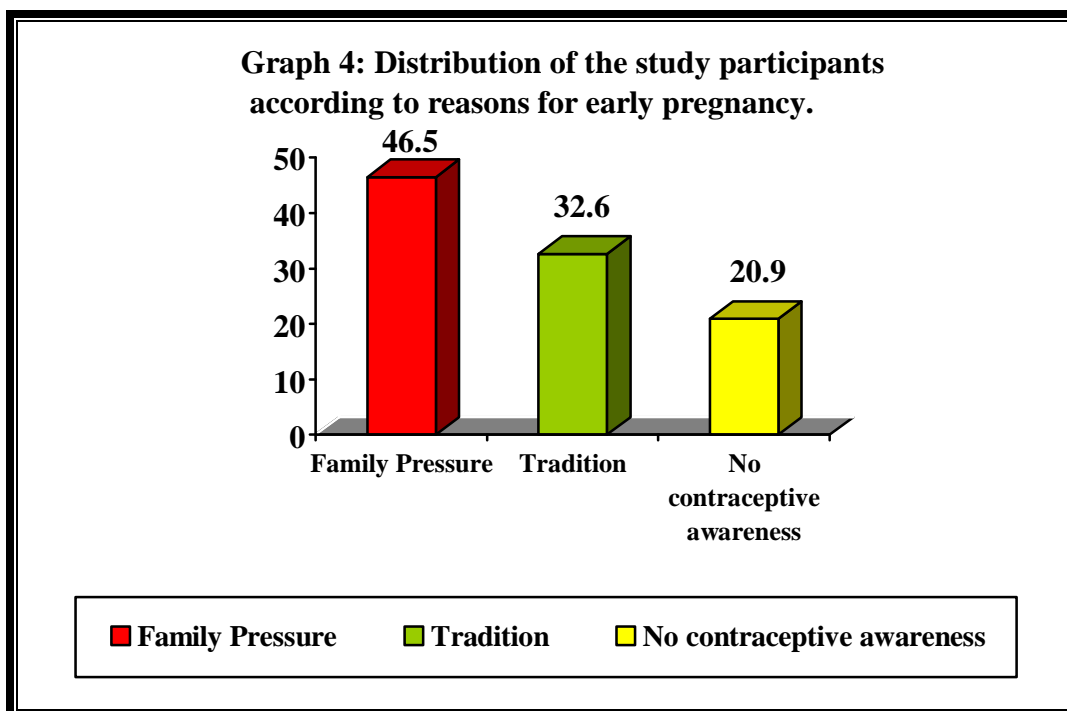
Reasons for Early Marriage	Study participants (n=144)	
	Number	Percentage
Consanguineous	23	16.0
Traditional Practices	99	68.8
Unable to pay for education	3	2.1
Other siblings to be married	19	13.1
Total	144	100.0



The most common reason cited for early marriage was its traditional practice which was seen in 99 (68.8%) of participants, followed by consanguinity in 23 (16.0%) of adolescents.

Reasons for Early Pregnancy:**Table 11. Distribution of the study participants according to reasons for early pregnancy.**

Reasons for Early Pregnancy	Study participants (n=144)	
	Number	Percentage
Family Pressure	67	46.5
Tradition	47	32.6
Lack of awareness about contraception	30	20.9
Total	144	100.0



Out of 144, majority, 67 (46.5%) of the adolescents conceived early due to family pressure and 47 (32.6%) of them got pregnant as a part of tradition. A total of 30 (20.9%) participants gave the reason as their lack of awareness about contraception methods for their early pregnancy.

Height:

The heights of the participants ranged from 132cms to 170cms with a mean height of 150.2cms and SD of 6.17cms. The median height was 150cms.

Weight:

The weights of the participants ranged from 30kg to 60kg with a mean 44.1kg and SD of 5.74. The median weight was 44kgs.

Body Mass Index:

Table 12. Distribution of the study participants according to BMI.

BMI	Study participants (n=144)	
	Number	Percentage
< 18.5	59	41.0
18.5 – 22.9	72	50.0
>23	13	9.0
Total	144	100.0

Half of the study participants, 72 (50.0%) were of normal BMI, 59 (41.0%) were underweight with a BMI of < 18.5 and 13 (9.0%) of them were overweight.

Pregnancy Registration:

A majority of adolescents, 118 (81.9%) had registered their pregnancy with a health care provider within 12 weeks of gestation.

TT injection and IFA tablets:

All the participants (144) had taken two doses of TT injections or one booster dose as required and a minimum of 100 iron and folic acid tablets.

ANC Visits:

A majority of the girls, 114 (79.2%) had taken more than 4 ANC visits at a health care facility followed by 22 (15.3%) had taken 4 visits and 5 (3.5%) had taken 3 visits. Participants who had abortion, 3 (2.0%) had taken only 1 visit.

II) Complications and outcomes of adolescent pregnancy

Pedal Edema:

Table 13. Distribution of the study participants according to pedal edema.

Pedal Edema	Study participants (n=141)	
	Number	Percentage
Present	32	22.7
Absent	109	77.3
Total	141	100.0

Of the total 144 participants, 3 had abortion and were not included for the 2nd and 3rd visit. Among 141 continued in study, 32 (22.7%) had pedal edema.

Hypertension:

Table 14. Distribution of the study participants according to PIH status.

PIH (BP >140/90 mm of Hg)	Study participants (n=141)	
	Number	Percentage
Present	10	7.1
Absent	131	92.9
Total	141	100.0

Out of 141 participants, only 10 (7.1%) adolescents had hypertension with BP >140/90 mm of Hg in their 2nd trimester.

Fetal Lie:**Table 15. Distribution of the study participants according to fetal lie.**

Fetal Lie	Study participants (n=141)	
	Number	Percentage
Longitudinal	136	96.5
Transverse	5	3.5
Total	141	100.0

Almost all of the adolescents, 136 (96.5%) had a longitudinal fetal lie and only 5 (3.5%) had transverse fetal lie position.

Fetal Presentation:**Table 16. Distribution of the study participants according to fetal presentation.**

Fetal Presentation	Study participants (n=141)	
	Number	Percentage
Cephalic	128	90.8
Breech	8	5.7
Others	5	3.5
Total	141	100.0

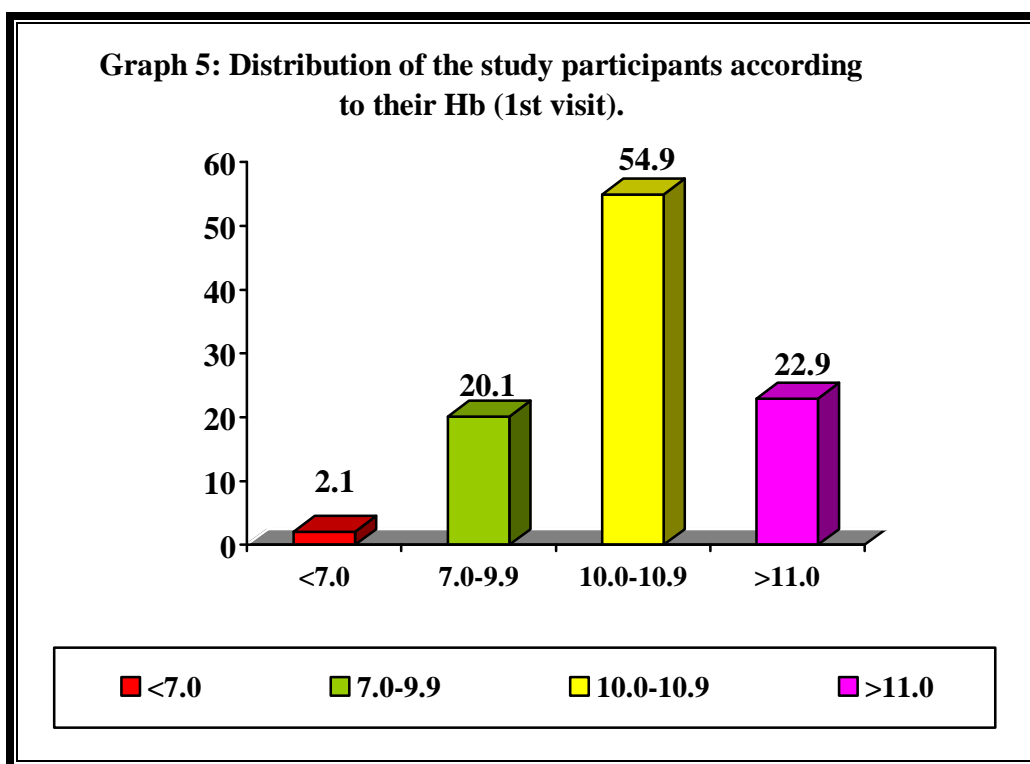
A majority of the participants, 128 (90.8%) had cephalic presentation and 8 (5.7%) had breech presentation.

HIV Status:

All the participants were tested for HIV status and they were all negative.

Hemoglobin (1st visit):Table 17. Distribution of the study participants according to hemoglobin in 1st visit.

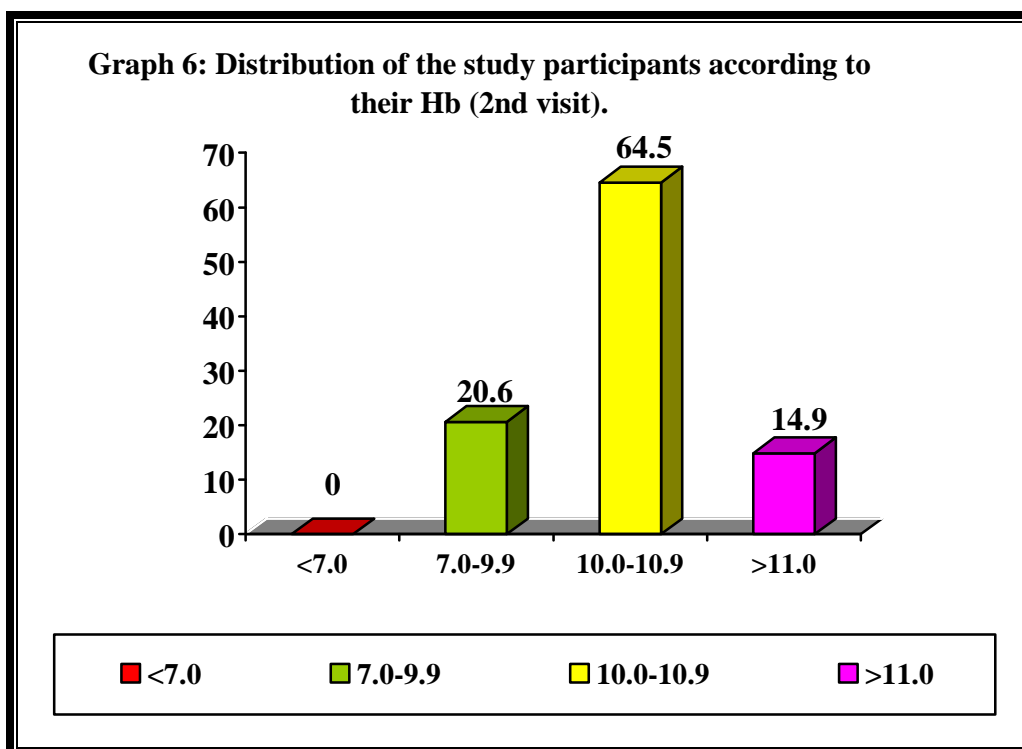
Hb (g %)	Study participants (n=144)	
	Number	Percentage
< 7.0 (Severe Anemia)	3	2.1
7.0 – 9.9 (Moderate Anemia)	29	20.1
10.0 – 10.9 (Mild Anemia)	79	54.9
≥ 11.0 (No Anemia)	33	22.9
Total	144	100.0



Of the total 144 participants, 79 (54.9%) had Hb between 10.0 – 10.9 g%, 29 (20.1%) had Hb between 7.0 - 9.9 g% and 3 (2.1%) had severe anemia with Hb <7 g%. Only 33 (22.9%) adolescents had a normal Hb of ≥11.0g%.

Hemoglobin (2nd visit):Table 18. Distribution of the study participants according to hemoglobin in 2nd visit.

Hb (g %)	Study participants (n=141)	
	Number	Percentage
< 7.0 (Severe Anemia)	0	0.0
7.0 – 9.9 (Moderate Anemia)	29	20.6
10.0 – 10.9 (Mild Anemia)	91	64.5
≥ 11.0 (No Anemia)	21	14.9
Total	141	100.0



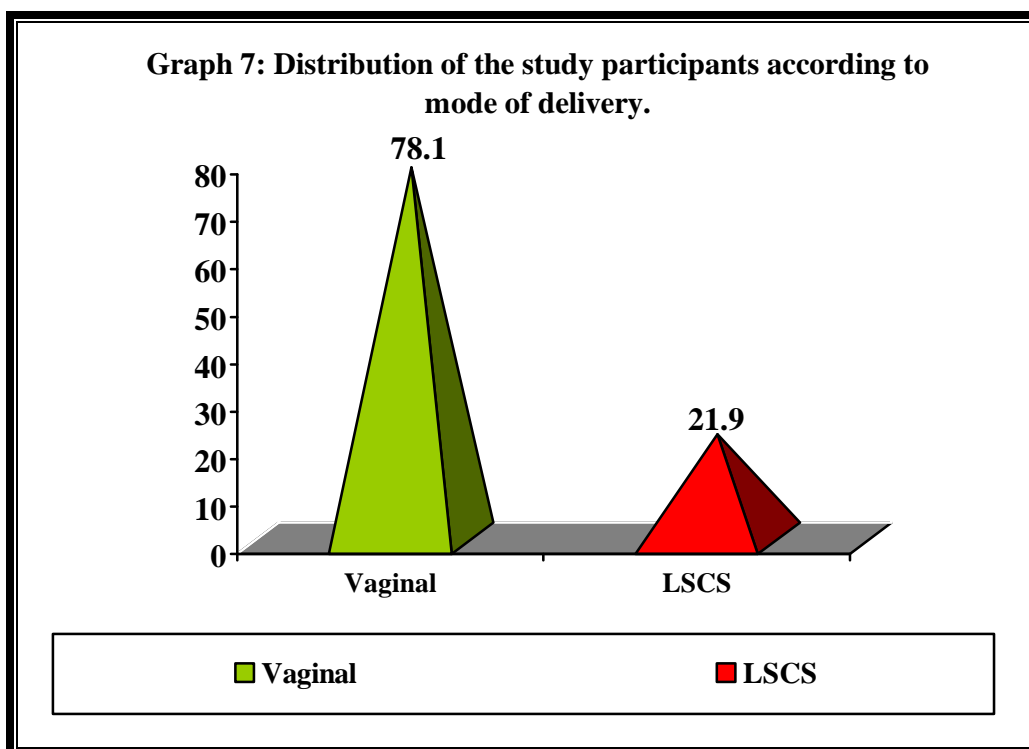
As 3 girls had aborted, among remaining 141 participants, 91 (64.5%) had Hb between 10.0 – 10.9 g% and 29 (20.6%) had Hb between 7.0 - 9.9 g%. Only 21 (14.9%) adolescents had a normal Hb of ≥ 11.0 g% and none had severe anemia.

Place of Delivery:

All the 141 (100.0%) study participants delivered at hospital.

Mode of delivery:**Table 19. Distribution of the study participants according to mode of delivery.**

Mode of delivery	Study participants (n=141)	
	Number	Percentage
Vaginal	110	78.1
LSCS	31	21.9
Total	141	100.0

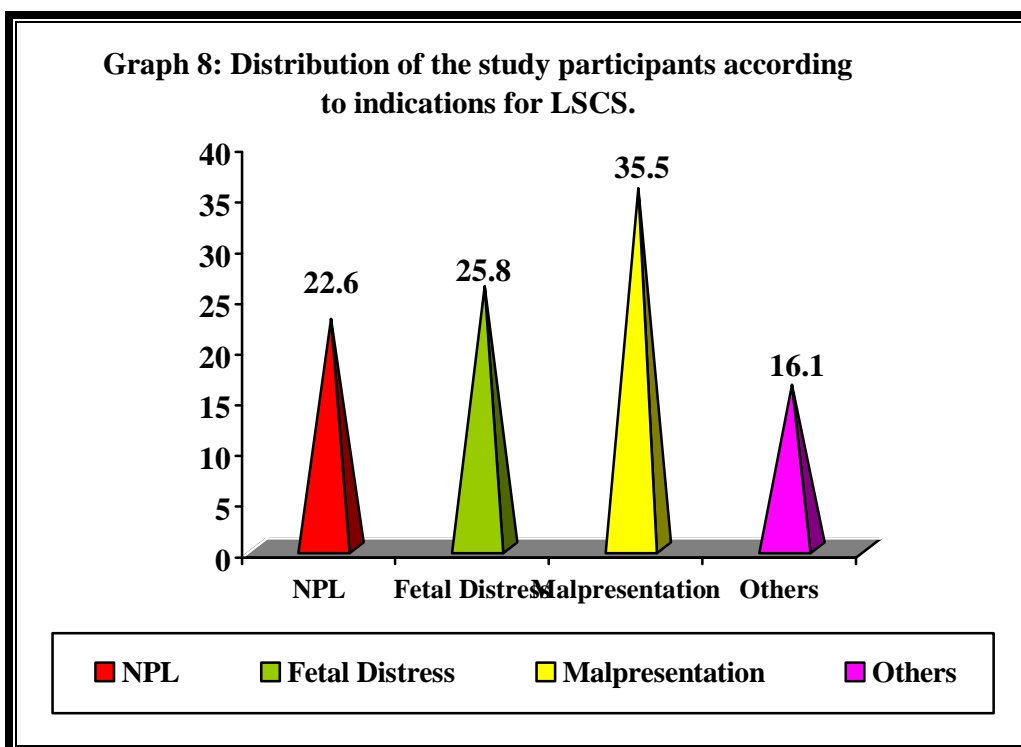


A majority of participants, 110 (78.1%) underwent vaginal delivery and 31 (21.9%) delivered by LSCS.

Indications for LSCS:

Table 20. Distribution of the study participants according to indications for LSCS.

Indications for LSCS	Study participants (n=31)	
	Number	Percentage
Non Progress of Labor	7	22.6
Fetal Distress	8	25.8
Malpresentation	11	35.5
Others	5	16.1
Total	31	100.0



Malpresentation was the most common cause for caesarean section with 11 (35.5%) participants in that category followed by fetal distress in 8 (25.8%) adolescents.

Period of Gestation:**Table 21. Distribution of the study participants according to period of gestation.**

Period of Gestation	Study participants (n=141)	
	Number	Percentage
Full Term	96	68.1
Preterm	45	31.9
Total	141	100.0

Of the 141 adolescents, 96 (68.1%) had a full term delivery and 45 (31.9%) underwent preterm delivery.

Prolonged Labor:**Table 22. Distribution of the study participants according to prolonged labor status.**

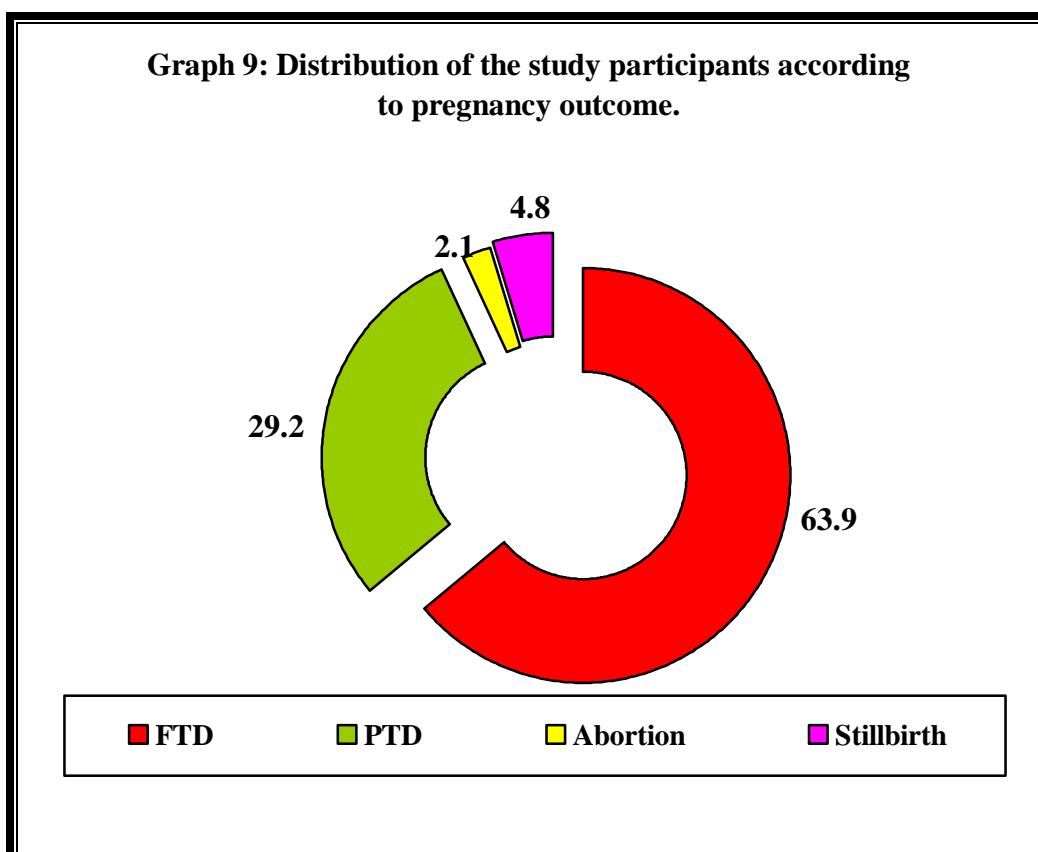
Prolonged Labor	Study participants (n=141)	
	Number	Percentage
Present	33	23.4
Absent	108	76.6
Total	141	100.0

Among the total study participants, 108 (76.6%) had a normal labor process and 33 (23.4%) experienced prolonged labor.

Pregnancy Outcome:

Table 23. Distribution of the study participants according to pregnancy outcome.

Pregnancy Outcome	Study participants (n=144)	
	Number	Percentage
Full term Delivery	92	63.9
Pre term Delivery	42	29.2
Abortion	3	2.1
Still birth	7	4.8
Total	144	100.0



A majority of adolescents, 92 (63.9%) had full term delivery followed by 42 (29.2%) had preterm delivery, 7 (4.8%) had stillbirth and 3 (2.1%) had abortion.

Post partum hemorrhage:

Among the total 141 participants, 4 (2.8%) had post partum hemorrhage.

Gender of Child:**Table 24. Distribution of the study participants according to gender of child.**

Gender of Child	Study participants (n=141)	
	Number	Percentage
Male	75	53.2
Female	66	46.8
Total	141	100.0

About half, 75 (53.2%) of the children born to adolescent mothers were males.

Birth Weight:**Table 25. Distribution of the study participants according to child's birth weight.**

Birth Weight (Kg)	Study participants (n=141)	
	Number	Percentage
<2.5	54	38.3
>2.5	87	61.7
Total	141	100.0

Birth weight >2.5kg was observed in 87 (61.7%) of the new born children and 54 (38.3%) babies had weight <2.5kg at birth.

Cry After Birth:**Table 26. Distribution of the study participants according to child's cry after birth.**

Cry After Birth	Study participants (n=134)	
	Number	Percentage
Immediate	102	76.1
Delayed	32	23.9
Total	134	100.0

Of the total 141 participants, 7 had still birth and among the remaining 134 children born alive, 102 (76.1%) cried immediately after birth and 32 (23.9%) had a delayed cry.

Pre-lacteal Feeds:**Table 27. Distribution of the study participants according to pre-lacteal feeds to the child.**

Pre-lacteal Feeds	Study participants (n=134)	
	Number	Percentage
Given	81	60.4
Not given	53	39.6
Total	134	100.0

Of the total 134 children live born, a major number of them, 81 (60.4%) were given some kind of pre-lacteal feeds and 53 (39.6%) were not given any pre-lacteal feeds.

Type of Pre-lacteal Feeds:**Table 28. Distribution of the study participants according to type of pre-lacteal feeds given to the child.**

Type of Pre-lacteal Feeds	Study participants (n=81)	
	Number	Percentage
Sugar Water	33	40.7
Honey	28	34.6
Cow's Milk	12	14.8
Others	8	9.9
Total	81	100.0

Sugar water was the commonest pre lacteal-feed given which was seen in 33 (40.7%) of new born children of adolescent mothers followed by honey in 28 (34.6%), cow's milk in 12 (14.8%) and others like water and dates in 8 (9.9%) of children.

Breast Feeding Initiation:**Table 29. Distribution of the study participants according to breast feeding initiation.**

Breast Feeding Initiation	Study participants (n=134)	
	Number	Percentage
<1 hour	84	62.7
1-4 hours	27	20.1
>4 hours	23	17.2
Total	134	100.0

A majority of the mothers, 84 (62.7%) initiated breast feeding within 1 hour of birth followed by 27 (20.1%) mothers who initiated between 1 - 4 hours of child birth. A total of 23 (17.2%) mothers still initiated breast feeding after 4 hours.

Reasons for Delayed Breast Feeding Initiation:

Table 30. Distribution of the study participants according to reasons for delayed breast feeding initiation.

Reasons for Delayed Breast Feeding Initiation	Study participants (n=23)	
	Number	Percentage
Baby Unwell	4	17.4
LSCS	12	52.2
Mother Unwell	7	30.4
Total	23	100.0

Most common reason cited for the delayed initiation of breast feeding was delivery by LSCS which was noted in case of 12 (52.2%) women, followed by mother being unwell as in 7 (30.4%) mothers and baby not well in 4 (17.4%) participants.

Neonatal Death:

Of the 134 live children born, 4 neonates had died. Among them, 2 died in early neonatal period (< 7 days) due to respiratory distress and remaining 2 died in late neonatal period - one due to congenital cardiac anomalies and the other due to septicemia.

III) Association between various socio-demographic factors and adolescent pregnancy

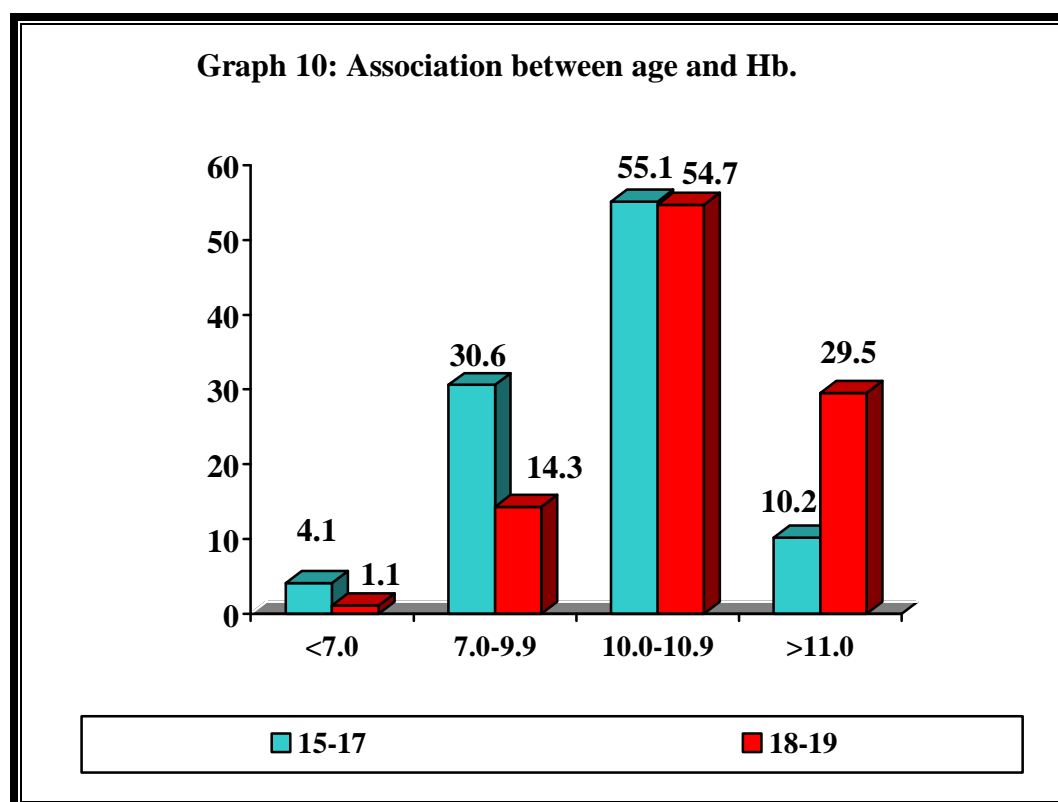
Table 31. Association between age and pregnancy outcome.

Age (Years)	Pregnancy Outcome				Total
	Live Birth		Abortion	Still birth	
	Full term delivery	Pre term delivery			
No. (%)	No. (%)	No. (%)	No. (%)		
15-17	34 (69.4)	11 (22.4)	2 (4.1)	2 (4.1)	49
18-19	58 (61.1)	31 (32.6)	1 (1.0)	5 (5.3)	95
Total	92	42	3	7	144
$\chi^2 = 3.017$ $DF = 3,$ $p = 0.389$					

Amongst the total 15-17 years age group adolescents, 34 (69.4%) had full term delivery, 11 (22.4%) had pre term delivery, 2 (4.1%) had abortion and 2 (4.1%) had still birth. In the 18-19 years age group girls, 58 (61.1%) had full term delivery, 31 (32.6%) had pre term delivery, 1 (1.0%) had abortion and 5 (5.3%) had still birth. However, this association between age and outcome was not statistically significant ($p=0.389$).

Table 32. Association between age and Hb.

Age (Years)	Hemoglobin (g %)				Total
	Severe Anemia (<7.0)	Moderate Anemia (7.0 –9.9)	Mild Anemia (10.0 –10.9)	No Anemia (≥11.0)	
	No. (%)	No. (%)	No. (%)	No. (%)	
15-17	2 (4.1)	15 (30.6)	27 (55.1)	5 (10.2)	49
16-18	1 (1.1)	14 (14.3)	52 (54.7)	28 (29.5)	95
Total	3	29	79	33	144
2 = 10.708, DF = 3, p = 0.013					



As many as, 2 (4.1%), 15 (30.6%) and 27 (55.1%) of the participants had severe, moderate and mild anemia in 15-17 years age group and this association was found to be statistically significant ($p < 0.013$).

Table 33. Association between age and PIH.

Age (Years)	PIH		Total
	Present No. (%)	Absent No. (%)	
15-17	2 (4.3)	45 (95.7)	47
18-19	8 (8.5)	86 (91.5)	94
Total	10	131	141
$\chi^2 = 0.336$, DF = 1, p = 0.562			

Only a small number of mothers, 2 (4.3%) and 8 (8.5%) belonging to 15-17 years and 18-19 years group respectively had PIH and this was not found to be statistically significant ($p=0.562$).

Table 34. Association between age and prolonged labor.

Age (Years)	Prolonged Labor		Total
	Present No. (%)	Absent No. (%)	
15-17	10 (21.3)	37 (78.7)	47
18-19	23 (24.5)	71 (75.5)	94
Total	33	108	141
$\chi^2 = 0.178$, DF = 1, p = 0.673			

In the age group of 15-17 years, 10 (21.3%) and 23 (24.5%) adolescents between 18-19 years age group, had experienced prolonged labor. However, there was no statistical significance for this difference ($p=0.673$).

Table 35. Association between age and mode of delivery.

Age (Years)	Mode of Delivery		Total
	Vaginal No. (%)	LSCS No. (%)	
15-17	37 (78.7)	10 (21.3)	47
18-19	73 (77.7)	21 (22.3)	94
Total	110	31	141
$\chi^2 = 0.021, \quad DF = 1, \quad p = 0.886$			

Amongst the 15-17 years aged adolescents, 10 (21.3%) and among the 18-19 years age group, 21 (22.3%) participants had delivered by LSCS. However, this association was not found to be statistically significant ($p=0.886$).

Table 36. Association between age and birth weight of the child.

Age (Years)	Birth Weight of the Child (Kg)		Total
	>2.5 No. (%)	<2.5 No. (%)	
15-17	27 (57.4)	20 (42.6)	47
18-19	60 (63.8)	34 (36.2)	94
Total	87	54	141
$\chi^2 = 0.663, \quad DF = 1, \quad p = 0.415$			

Even though the association between age of the mother and birth weight of the child was not statistically significant ($p=0.415$), of the mothers of 15-17 years age group, 20 (42.6%) and 34 (36.2%) in 18-19 years age group had children weighing less than 2.5kgs.

Table 37. Association between age and cry after birth of the child.

Age (Years)	Cry After Birth		Total
	Immediate No. (%)	Delayed No. (%)	
15-17	37 (82.2)	8 (17.8)	45
18-19	65 (73.0)	24 (27.0)	89
Total	102	32	134
$\chi^2 = 1.164, \quad DF = 1, \quad p = 0.281$			

A total of 8 (17.8%) and 24 (27.0%) children born to mothers between 15-17 years group and 18-19 years group respectively had a delayed cry after birth. Nevertheless, this difference was not found to be statistically significant ($p=0.281$).

Table 38. Association between education and pregnancy outcome.

Education	Pregnancy Outcome				Total
	Live Birth		Abortion	Still birth	
	Full term delivery	Pre term delivery			
	No. (%)	No. (%)	No. (%)	No. (%)	
Illiterate	18 (62.1)	7 (24.1)	2 (6.9)	2 (6.9)	29
Primary	24 (63.2)	12 (31.5)	0 (0.0)	2 (5.3)	38
High school and above	50 (64.9)	23 (29.9)	1 (1.3)	3 (3.9)	77
Total	92	42	3	7	144
Fischer's Exact p =0.636					

Majority of the mothers who had studied up to high school and beyond had full term delivery: 50 (64.9%), 23 (29.9%) had preterm delivery, 1 (1.3%) had abortion and 3 (3.9%) had still birth. Similarly, most of the women who studied up to primary school also had full term delivery: 24 (63.2%), 12 (31.5%) had preterm delivery and 2 (5.3%) had still birth. None had abortion. Amongst the illiterate individuals, 18 (62.1%) had full term delivery, 7 (24.1%) had preterm delivery and there were 2 (6.9%) participants each in still birth and abortion category. Nevertheless, this association between education of mother and the pregnancy outcome was not statistically significant ($p=0.636$).

Table 39. Association between education and Hb.

Education	Hemoglobin (g %)				Total
	Severe Anemia (<7.0)	Moderate Anemia (7.0 –9.9)	Mild Anemia (10.0 –10.9)	No Anemia (≥11.0)	
	No. (%)	No. (%)	No. (%)	No. (%)	
Illiterate	2 (6.9)	6 (20.7)	15 (51.7)	6 (20.7)	29
Primary	0 (0.0)	9 (23.7)	20 (52.6)	9 (23.7)	38
High school and above	1 (1.3)	14 (18.2)	44 (57.1)	18 (23.4)	77
Total	3	29	79	33	144
Fischer's p=0.693					

Among the illiterates, 2 (6.9%) had severe anemia, 6 (20.7%) were moderately anemic and 15 (51.7%) were suffering from mild anemia. Of the adolescents who had studied up to primary school, 9 (23.7%) had moderate anemia and 20 (52.6%) had mild anemia but there were no severe anemia cases. In the girls, who had studied up to high school and beyond, 1 (1.3%) had severe anemia, 14 (18.2%) suffered from moderate anemia and 44 (57.1%) were mild anemic. This association between education and anemia was not statistically significant ($p=0.693$).

Table 40. Association between education and PIH.

Education	PIH		Total
	Present No. (%)	Absent No. (%)	
Illiterate	1 (3.7)	26 (96.3)	27
Primary	2 (5.3)	36 (94.7)	38
High school and above	7 (9.2)	69 (90.8)	76
Total	10	131	141
$\chi^2 = 1.181, \quad DF = 2, \quad p = 0.554$			

Association between education of mother and PIH status was not statistically significant ($p=0.554$) as, only some of the mothers: 1 (3.7%), 2 (5.3%) and 7 (9.2%) who were illiterate, studied up to primary school or up to high school and beyond respectively had PIH.

Table 41. Association between education and prolonged labor.

Education	Prolonged Labor		Total
	Present No. (%)	Absent No. (%)	
Illiterate	9 (33.3)	18 (66.7)	27
Primary	6 (15.8)	32 (84.2)	38
High school and above	18 (23.7)	58 (76.3)	76
Total	33	108	141
$\chi^2 = 2.714, \quad DF = 2, \quad p = 0.257$			

A small number of the adolescents, 9 (33.3%) among illiterates, 6 (15.8%) among those who studied up to primary school and 18 (23.7%) with education up to high school or beyond had prolonged labor as a complication in their delivery process and this association was not found to be statistically significant ($p=0.257$).

Table 42. Association between education and mode of delivery.

Education	Mode of Delivery		Total
	Vaginal No. (%)	LSCS No. (%)	
Illiterate	21 (77.8)	6 (22.2)	27
Primary	29 (76.3)	9 (23.7)	38
High school and above	60 (78.9)	16 (21.1)	76
Total	110	31	141
$\chi^2 = 0.103, \quad DF = 2, \quad p = 0.950$			

Among the adolescents who were illiterate, only 6 (22.2%) had LSCS. Likewise, among the primary and high school educated girls, 9 (23.7%) and 16 (21.1%) underwent LSCS respectively. Nevertheless, this association between mode of delivery and education was not statistically significant ($p=0.950$).

Table 43. Association between education and birth weight of the child.

Education	Birth Weight of the Child (Kg)		Total
	>2.5 No. (%)	<2.5 No. (%)	
Illiterate	15 (55.6)	12 (44.4)	27
Primary	24 (63.2)	14 (36.8)	38
High school and above	48 (63.1)	28 (36.9)	76
Total	87	54	141
$\chi^2 = 0.625$, DF = 2, p = 0.732			

Of the total illiterate study participants, 12 (44.4%) had given birth to children with birth weight <2.5kgs. Amongst the primary and high school educated girls, 14 (36.8%) and 28 (36.9%) gave birth to low birth weight babies weighing <2.5kgs. However, this association did not find any statistical significance (p=0.732).

Table 44. Association between education and cry after birth of the child.

Education	Cry after Birth		Total
	Immediate No. (%)	Delayed No. (%)	
Illiterate	19 (76.0)	6 (24.0)	25
Primary	29 (80.6)	7 (19.4)	36
High school and above	54 (74.0)	19 (26.0)	73
Total	102	32	134
$\chi^2 = 0.423, \quad DF = 2, \quad p = 0.810$			

The association between education and cry after birth of the child was not statistically significant ($p=0.810$) since, only 6 (24.0%) among illiterates, 7 (19.4%) amongst primary educated girls and 19 (26.0%) of those studied up to high school and ahead had children with delayed cry at birth.

Table 45. Association between occupation and pregnancy outcome.

Occupation	Pregnancy Outcome				Total
	Live Birth		Abortion	Still birth No. (%)	
	Full term delivery No. (%)	Pre term delivery No. (%)			
House Wife	85 (65.4)	38 (29.2)	3 (2.3)	4 (3.1)	130
Others	7 (50.0)	4 (28.6)	0 (0.0)	3 (21.4)	14
Total	92	42	3	7	144
Fischer's Exact p=0.064					

Amongst the total 130 housewives, 85 (65.4%) had a full term delivery, 38 (29.2%) delivered pre term, 3 (2.3%) had abortion and 4 (3.1%) had still birth. Of the adolescents of other occupations, 7 (50.0%) had full term delivery, 4 (28.6%) had pre term delivery and 3 (21.4%) had still birth but none had abortions. Nonetheless, this association between occupation and pregnancy outcome was not found to be statistically significant ($p=0.064$).

Table 46. Association between occupation and Hb.

Occupation	Hemoglobin (g %)				Total
	Severe Anemia (<7.0)	Moderate Anemia (7.0 –9.9)	Mild Anemia (10.0 –10.9)	No Anemia (≥11.0)	
	No. (%)	No. (%)	No. (%)	No. (%)	
House wife	3 (2.3)	26 (20.0)	69 (53.1)	32 (24.6)	130
Others	0 (0.0)	3 (21.4)	10 (71.4)	1 (7.2)	14
Total	3	29	79	33	144
Fischer's Exact p=0.486					

Severe anemia was present in only 3 (2.3%) housewives and in none of the adolescents of other occupations. A total of 26 (20.0%) and 69 (53.1%) of housewives had moderate and mild anemia respectively. Among the girls of other occupations, moderate anemia was seen in 3 (21.4%) and mild anemia in 10 (71.4%) of the participants. However, this association did not find any statistical significance (p=0.486).

Table 47. Association between occupation and PIH.

Occupation	PIH		Total
	Present No. (%)	Absent No. (%)	
House wife	8 (6.3)	119 (93.7)	127
Others	2 (14.3)	12 (85.7)	14
Total	10	131	141
$2_{yc} = 0.309$, $DF = 1$, $p = 0.578$			

The association between occupation and PIH was not found to be statistically significant ($p=0.578$) as, only 8 (6.3%) housewives and 2 (14.3%) girls with other occupations had PIH.

Table 48. Association between occupation and prolonged labor.

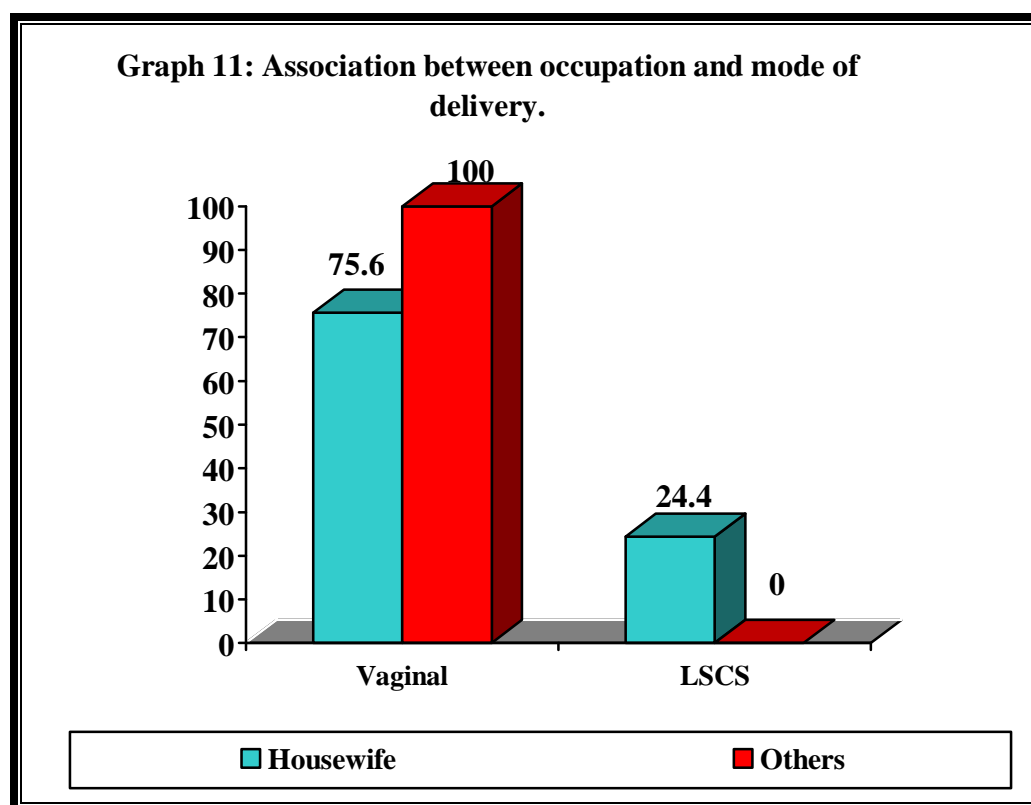
Occupation	Prolonged Labor		Total
	Present No. (%)	Absent No. (%)	
House wife	29 (22.8)	98 (77.2)	127
Others	4 (28.6)	10 (71.4)	14
Total	33	108	141
$2_{yc} = 0.022$ $DF = 1$, $p = 0.882$			

Prolonged labor was present in only 29 (22.8%) of the housewives and in 4 (28.6%) of the girls of other occupations. Nevertheless, there was no statistically significant association between occupation and prolonged labor ($p=0.882$).

Table 49. Association between occupation and mode of delivery.

Occupation	Mode of Delivery		Total
	Vaginal No. (%)	LSCS No. (%)	
House wife	96 (75.6)	31 (24.4)	127
Others	14 (100.0)	0 (0.0)	14
Total	110	31	141

Fischer exact p=0.040



Amongst the total housewives, 31 (24.4%) underwent LSCS whereas among the adolescents of other occupations none of them had delivered by LSCS and so this association between occupation and mode of delivery was found to be statistically significant ($p=0.04$).

Table 50. Association between occupation and birth weight of the child.

Occupation	Birth Weight of the Child (Kg)		Total
	>2.5 No. (%)	<2.5 No. (%)	
House wife	81 (63.8)	46 (36.2)	127
Others	6 (42.9)	8 (57.1)	14
Total	87	54	141
$\chi^2 = 2.459, \quad DF = 1, \quad p = 0.117$			

A total of 46 (36.2%) housewives had given birth to low birth weight babies with birth weight <2.5kgs and among adolescents of other occupations, 8 (57.1%) delivered LBW babies. However, this association between occupation of the mother and birth weight of the child was not statistically significant ($p=0.117$).

Table 51. Association between occupation and cry after birth of the child.

Occupation	Cry after Birth		Total
	Immediate No. (%)	Delayed No. (%)	
House wife	93 (75.6)	30 (24.4)	123
Others	9 (81.8)	2 (18.2)	11
Total	102	32	134
$2_{yc} = 0.002,$ DF = 1, p = 0.962			

Association between occupation of the mother and cry after birth of the child was not statistically significant ($p=0.962$) since, a small number, 30 (24.4%) of newborns of housewives and 2 (18.2%) babies belonging to mothers of other occupations had children with delayed cry at birth.

Table 52. Association between socio-economic status and pregnancy outcome.

Socio-Economic Status	Pregnancy Outcome				Total
	Live Birth		Abortion	Still birth No. (%)	
	Full term delivery No. (%)	Pre term delivery No. (%)			
Class II	13 (86.7)	2 (13.3)	0 (0.0)	0 (0.0)	15
Class III	22 (57.9)	15 (39.5)	0 (0.0)	1 (2.6)	38
Class IV	41 (63.1)	16 (24.6)	2 (3.1)	6 (9.2)	65
Class V	16 (61.6)	9 (34.6)	1 (3.8)	0 (0.0)	26
Total	92	42	3	7	144
Fischer's Exact p=0.297					

Note: None of the study participants belonged to class I socio-economic status

Among the participants of class II, 13 (86.7%) had full term delivery and 2 (13.3%) had pre term delivery. There was no abortion or still birth in this group. Of the class III adolescents, 22 (57.9%) delivered full term, 15 (39.5%) had pre term delivery and there was 1 (2.6%) still birth. Amongst the class IV and V, full term delivery was in 41 (63.1%) and 16 (61.6%), pre term delivery in 16 (24.6%) and 9 (34.6%), abortion in 2 (3.1%) and 1 (3.8%) and still birth in 6 (9.2%) and 0 participants respectively. There was no statistical significant association between socio-economic status and pregnancy outcome (p=0.297).

Table 53. Association between socio-economic status and Hb.

Socio-Economic Status	Hemoglobin (g%)				Total
	Severe Anemia (<7.0)	Moderate Anemia (7.0 –9.9)	Mild Anemia (10.0 –10.9)	No Anemia (≥11.0)	
	No. (%)	No. (%)	No. (%)	No. (%)	
Class II	0 (0.0)	2 (13.3)	10 (66.7)	3 (20.0)	15
Class III	0 (0.0)	8 (21.1)	19 (50.0)	11 (28.9)	38
Class IV	2 (3.1)	13 (20.0)	36 (55.4)	14 (21.5)	65
Class V	1 (3.8)	6 (23.2)	14 (53.8)	5 (19.2)	26
Total	3	29	79	33	144
Fischer's Exact p=0.959					

Note: None of the study participants belonged to class I socio-economic status

Severe anemia was present in 2 (3.1%) of class IV and 1 (3.8%) of class V participants. Similarly, moderate anemia was noted in 2 (13.3%), 8 (21.1%), 13 (20.0%) and 6 (23.2%) adolescents belonging to class II, III, IV and V respectively. A total of 10 (66.7%) girls belonging to class II, 19 (50.0%) to class III, 36 (55.4%) to class IV and 14 (53.8%) to class V had mild anemia. This association was, however, not found to be statistically significant (p=0.959).

Table 54. Association between socio-economic status and PIH.

Socio-Economic Status	PIH		Total
	Present No. (%)	Absent No. (%)	
Class II	1 (6.7)	14 (93.3)	15
Class III	4 (10.5)	34 (89.5)	38
Class IV	4 (6.3)	59 (93.7)	63
Class V	1 (4.0)	24 (96.0)	25
Total	10	131	141
Fischer's exact p = 0.834			

Note: None of the study participants belonged to class I socio-economic status

PIH was present in 1 (6.7%) participant of class II, 4 (10.5%) of class III, 4 (6.3%) of class IV and 1 (4.0%) of class V. However, this association between socio-economic status and PIH was not statistically significant ($p=0.834$).

Table 55. Association between socio-economic status and prolonged labor.

Socio-Economic Status	Prolonged Labor		Total
	Present No. (%)	Absent No. (%)	
Class II	1 (6.7)	14 (93.3)	15
Class III	10 (26.3)	28 (73.7)	38
Class IV	15 (23.8)	48 (76.2)	63
Class V	7 (28.0)	18 (72.0)	25
Total	33	108	141
$\chi^2 = 2.824$, DF = 3, p = 0.420			

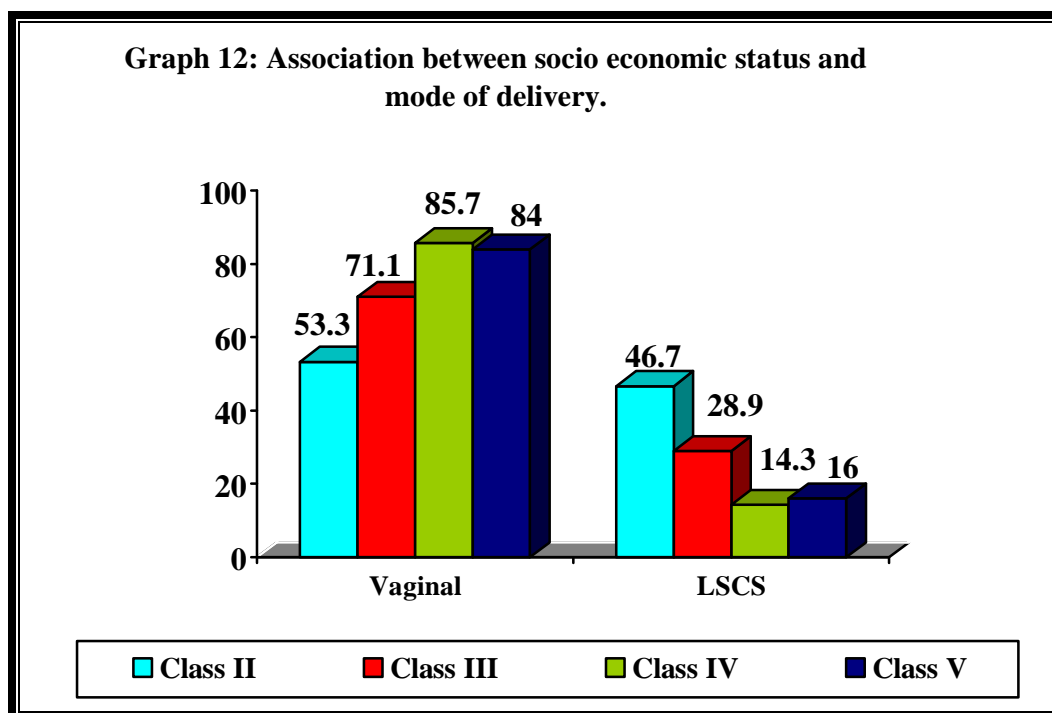
Note: None of the study participants belonged to class I socio-economic status

Of the class II participants, 1 (6.7%) had prolonged labor as a complication of pregnancy. Similarly, only 10 (26.3%) of class III, 15 (23.8%) of class IV and 7 (28.0%) of class V had prolonged labor. Nevertheless, this association between socio-economic status and prolonged labor was not found to be statistically significant ($p=0.420$).

Table 56. Association between socio-economic status and mode of delivery.

Socio-Economic Status	Mode of Delivery		Total
	Vaginal No. (%)	LSCS No. (%)	
Class II	8 (53.3)	7 (46.7)	15
Class III	27 (71.1)	11 (28.9)	38
Class IV	54 (85.7)	9 (14.3)	63
Class V	21 (84.0)	4 (16.0)	25
Total	110	31	141
$\chi^2 = 9.101, \quad DF = 3, \quad p = 0.028$			

Note: None of the study participants belonged to class I socio-economic status



Among the class II participants, 7 (46.7%) had undergone LSCS. Likewise, among class III, 11 (28.9%), class IV, 9 (14.3%) and class V, 4 (16.0%) adolescents had delivered by LSCS. This association between socio-economic status and mode of delivery was estimated to be statistically significant ($p=0.028$).

Table 57. Association between socio-economic status and birth weight of the child.

Socio-Economic Status	Birth Weight of the Child (Kg)		Total
	>2.5 No. (%)	<2.5 No. (%)	
Class II	10 (66.7)	5 (33.3)	15
Class III	22 (57.9)	16 (42.1)	38
Class IV	39 (61.9)	24 (38.1)	63
Class V	16 (64.0)	9 (36.0)	25
Total	87	54	141
$\chi^2 = 0.474$, $DF = 3$, $p = 0.925$			

Note: None of the study participants belonged to class I socio-economic status

Low birth weight was seen in children born to 5 (33.3%) women in class II, 16 (42.1%) in class III, 24 (38.1%) in class IV and 9 (36.0%) participants in class V. However, there was no statistically significant association between socio-economic status and birth weight of the baby ($p=0.925$).

Table 58. Association between socio-economic status and cry after birth of the child.

Socio-Economic Status	Cry after Birth		Total
	Immediate No. (%)	Delayed No. (%)	
Class II	12 (80.0)	3 (20.0)	15
Class III	26 (70.3)	11 (29.7)	37
Class IV	46 (80.7)	11 (19.3)	57
Class V	18 (72.0)	7 (28.0)	25
Total	102	32	134
$\chi^2 = 2.184, \quad DF = 3, \quad p = 0.535$			

Note: None of the study participants belonged to class I socio-economic status

Infants with delayed cry after birth were born to 3 (20.0%) adolescents in class II, 11(29.7%) girls in class III, 11 (19.3%) in class IV and 7 (28.0%) in class V socio-economic status. However, this association between socio-economic status and cry after birth of the child was not statistically significant ($p=0.535$).

Table 59. Association between number of previous pregnancies and outcome of present pregnancy.

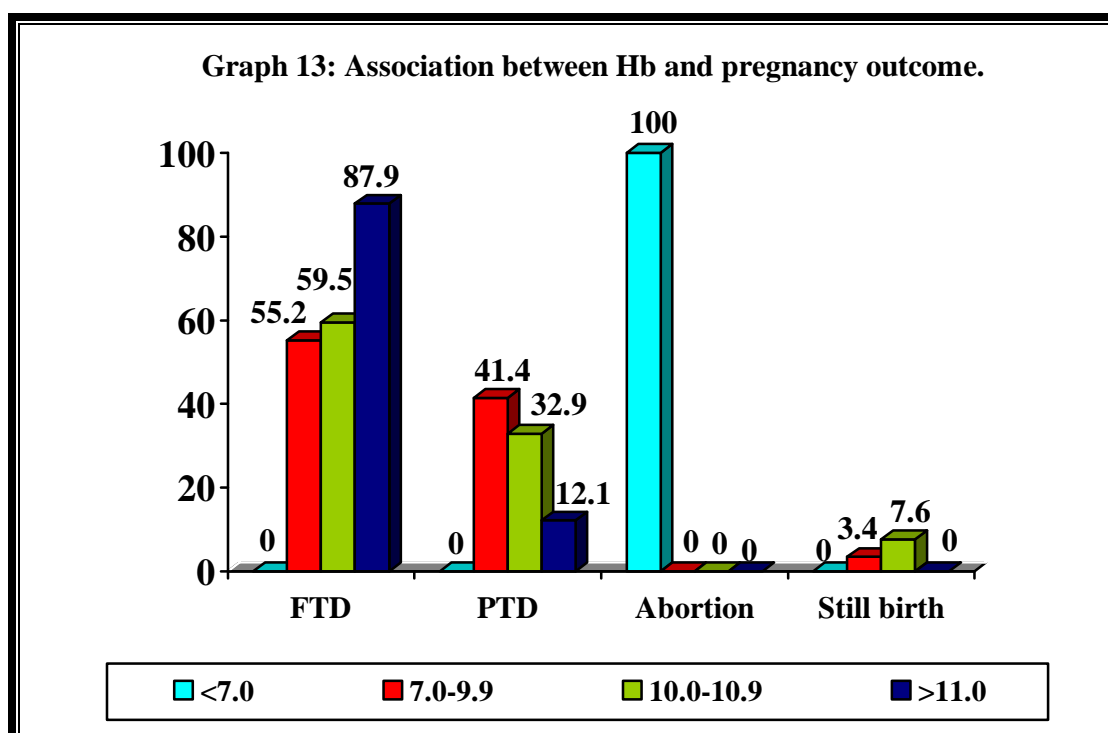
Previous Pregnancies (No)	Pregnancy Outcome				Total
	Live Birth		Abortion	Still birth	
	Full term delivery	Pre term delivery			
No. (%)	No. (%)	No. (%)	No. (%)		
0	75 (65.8)	32 (28.1)	3 (2.6)	4 (3.5)	114
1	17 (60.7)	9 (32.2)	0 (0.0)	2 (7.1)	28
2	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	2
Total	92	42	3	7	144
Fischer's Exact p=0.142					

Amongst the total primigravidae, 75 (65.8%) had full term delivery, 32 (28.1%) had preterm delivery, 3 (2.6%) had abortion and 4 (3.5%) had still birth. Of those participants who had previous 1 pregnancy, 17 (60.7%) had full term delivery, 9 (32.2%) had pre term delivery and 2 (7.1%) had still birth but none had abortion. Among women who had conceived twice before, 1 (50.0%) had pre term delivery and 1 (50.0%) had still birth. However, no statistically significant association was found between number of previous pregnancies and the outcome of present pregnancy (p=0.142).

Table 60. Association between Hb and pregnancy outcome.

Hb (g %)	Pregnancy Outcome				Total
	Live Birth		Abortion	Still birth	
	Full term delivery	Pre term delivery			
No. (%)	No. (%)	No. (%)	No. (%)		
< 7.0 (Severe Anemia)	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)	3
7.0 – 9.9 (Moderate Anemia)	16 (55.2)	12 (41.4)	0 (0.0)	1 (3.4)	29
10.0 – 10.9 (Mild Anemia)	47 (59.5)	26 (32.9)	0 (0.0)	6 (7.6)	79
≥11.0 (No anemia)	29 (87.9)	4 (12.1)	0 (0.0)	0 (0.0)	33
Total	92	42	3	7	144

Fischer's exact p <0.001

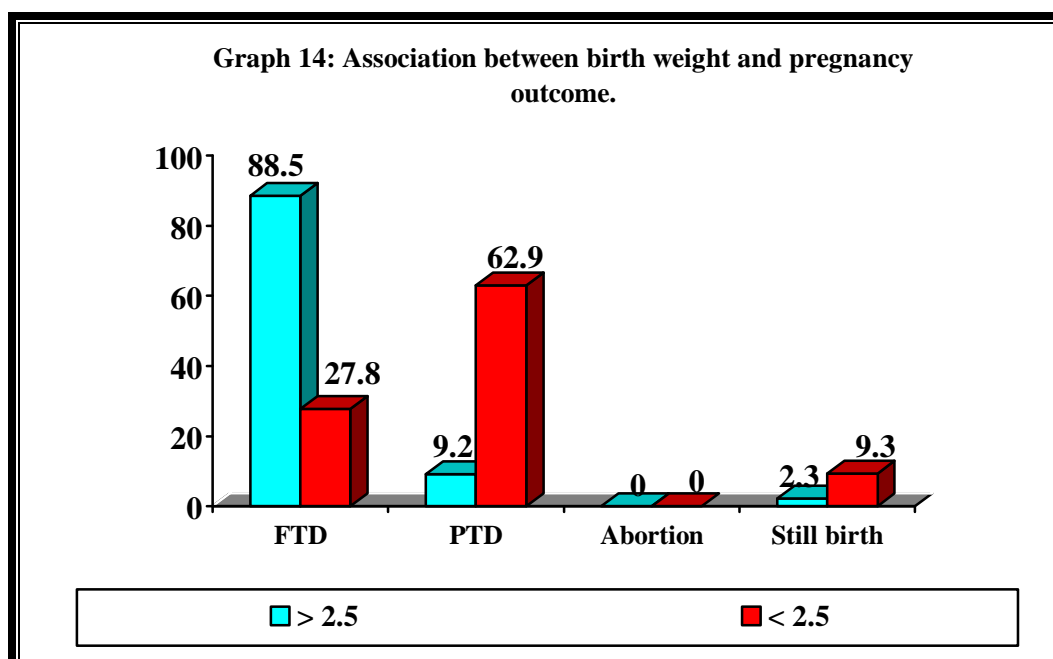


Abortion had occurred among all of the 3 (100.0%) adolescents with Hb of <7g%. Amongst the girls with Hb between 7.0-9.9 g%, 16 (55.2%) had full term delivery, 12 (41.4%) had pre term delivery, 1 (3.4%) had still birth and none had abortion. Of the 10.0-10.9g% group, 47 (59.5%) had full term delivery, 26 (32.9%) had pre term delivery and 6 (7.6%) had still birth. A total of 29 (87.9%) girls with Hb \geq 11g% had full term delivery and 4 (12.1%) had pre term delivery. There were no abortions or still birth. Thus, the association between Hb and pregnancy outcome was statistically significant ($p<0.001$).

Table 61. Association between birth weight and pregnancy outcome.

Birth Weight (Kg)	Pregnancy Outcome				Total
	Live Birth		Abortion	Still birth	
	Full term delivery	Pre term delivery			
No. (%)	No. (%)	No. (%)	No. (%)		
>2.5	77 (88.5)	8 (9.2)	0 (0.0)	2 (2.3)	87
<2.5	15 (27.8)	34 (62.9)	0 (0.0)	5 (9.3)	54
Total	92	42	0	7	141

Fischer's exact p <0.001



A majority, 77 (88.5%) of adolescents who had given birth to normal weight babies had full term delivery followed by 8 (9.2%) who had preterm delivery and 2 (2.3%) had still birth. Of the children with <2.5kgs at birth, 15 (27.8%) were full term, 34 (62.9%) were pre term and 5 (9.3%) were still born. Consequently, there was a statistically significant association between birth weight and pregnancy outcome ($p < 0.001$).

DISCUSSION

Table 1: Age distribution of study participants

In the present study, 144 adolescents were interviewed. Among them, majority were of 18-19 years group (66.0%). The mean age among the study population was 17.8 ± 1.1 years and the median age was 18 years.

Similarly, a study conducted at Bangalore by Thekkekkara et al⁶, consisted of 76.0% adolescents in 18-19 years age group. Another study in Nagpur by Chahande et al⁴³ had pregnant adolescents with a mean age of 18.5 years.

Table 2: Distribution of study participants according to religion

In this study, 88.2% were Hindus by religion and the rest 11.8% were Muslims. There were no Christian participants in the study.

Participants of a study conducted by Parasuramalu et al⁵³ in Bangalore comprised 73.0% Hindus and 27.0% Muslims.

Table 3: Distribution of study participants according to occupation

In the present study, 90.3% participants were housewives and 9.7% belonged to other occupations like agriculturist and daily wage workers.

A study conducted in Bangalore,⁵³ showed that 97.4% mothers were housewives.

Table 4: Distribution of study participants according to husbands' occupation

In the current study, a majority (33.3%) of husbands' of the participants were factory workers followed by 29.2% agriculturists.

In the Nagpur study⁴³, 61.3% husbands were laborers and in Bangalore study⁵³, their percentage was 70.5%. The present study area is an industrial area and hence most of the participants were factory workers.

Table 5: Distribution of study participants according to educational level

Majority (48.6%) of the participants in the present study had studied up to high school and 20.1% adolescents were illiterate.

Similarly, a study conducted at Jabalpur⁴² showed that 24.0% of the adolescents were illiterate. Yet another study of Bangalore⁵³ stated that 32.1% participants had studied up to high school and 26.9% were illiterate.

Table 6: Distribution of study participants according to husbands' educational level

This study showed that majority, 41.7% of participants' husbands had studied up to high school and 23.6% were illiterate.

The study conducted by Parasuramalu et al⁵³ stated that 43.5% husbands of the participants had studied up to high school and 24.5% were illiterate. A study in a Delhi⁴⁵ resettlement colony showed that 47.3% of husbands had studied up to high school and 10.8% were illiterate. Conversely, Nagpur⁴³ study showed that only 3.9% of the husbands were illiterate.

Table 7: Distribution of study participants according to socio-economic status

In the present study, a majority (45.1%) of the participants belonged to Class IV socio-economic status.

A study done in rural areas of Bangalore⁵³ showed that 46.1% mothers belonged to class II socio-economic status, 21.8% to class III and 6.40% to class IV.

Table 8: Distribution of study participants according to age at marriage

In this study, 90.9% girls got married between 18-19 years and the mean age of marriage was 16 ± 2 years and median age was 16 years.

A study done in rural Bangalore⁵³ showed that the mean age of marriage was 17 ± 1.5 years. Another study at a hospital in Bangalore showed that the mean age of marriage was 16.5 ± 1.5 years⁶. According to the NFHS-3 data¹³, the median age of marriage for adolescents was 17.7 years.

Previous Pregnancies:

In the present study, 79.2% adolescents were primigravidae and 19.4% had previous 1 pregnancy.

A study in Greece⁴⁰ had 78.0% primigravida participants. Another study in Varanasi⁵¹ showed that 83.2% were primigravidae. Yet another study in rural Bangalore⁵³ showed that 87.2% participants were primigravida and 12.8% were gravida II.

Table 9: Distribution of study participants according to contraception awareness

A total of 51.4% of participants were aware about contraception and the most common source was television (45.9%).

In a study conducted at Tanzania²², 71.4% of adolescents had knowledge about contraception and the most common source was television and news papers together in 41.9% girls. A Bangalore study⁵³ showed that 37.0% of the adolescents had knowledge about contraception and television acted as the most common source of information as in 48.2% adolescents.

NFHS 3¹³ data states that 96.0% adolescent women had awareness about contraception. In our study, perhaps, the educational level of participants was not high and hence they did not have awareness about contraception.

Table 10 & 11: Distribution of study participants according to reasons for early marriage and early pregnancy.

The most common reason for early marriage in this study was its traditional practice which was seen in 68.8% participants and the commonest reason for early pregnancy was family pressure (46.5%) followed by tradition (32.6%).

A study conducted in Bangalore⁵³ showed that 64.0% and 57.7% of girls cited traditional practice the most common reason for early marriage and early pregnancy respectively.

Table 12: Distribution of study participants according to BMI

Half of the study participants (50.0%) in this study had a normal BMI (18.5-22.9) and 41.0% were underweight (<18.5)

A study in Jabalpur⁴² consisted of 38.0% of adolescents who were underweight. Another study done at New Jersey²⁴ showed that 27.1% of adolescent mothers were underweight.

ANC Visits:

In the current study, 79.2% had adequate ANC with a minimum of 4 visits. This finding corresponds to a study conducted in Kolkata⁴⁷, wherein, 68.3% of adolescent pregnant women had adequate ante natal visits.

Table 13: Distribution of study participants according to pedal edema

In the present study, 22.7% participants had pedal edema. Similarly, in a study conducted at Delhi,⁴⁵ 25.0% of adolescents experienced pedal edema.

Table 14: Distribution of study participants according to PIH

The present study showed that PIH was present in 7.1% of the study participants.

A similar study conducted at Nagpur⁴³ stated that 2.9% of adolescents had PIH. Another study at Nepal by Pun et al¹⁸ had a PIH prevalence of 1.2% among adolescents. Yet another study conducted at Jordan³⁵ had 4.9% adolescents with PIH. Conversely, a study by Saxena et al at South Delhi⁴⁶ comprised of 30.5% adolescent pregnant women with PIH.

Table 15 & 16: Distribution of study participants according to fetal lie and presentation

Among the total adolescents, 96.5% girls had a longitudinal lie and 90.8% had cephalic presentation.

Mukhopadhyay et al⁴⁷ conducted a study at Kolkata, which had 98.3% adolescents with cephalic presentation. Another study by Sharma et al⁴⁵ in Delhi showed that cephalic presentation was present in 78.1% adolescent pregnant women.

Table 17 & 18: Distribution of study participants according to Hb at 1st and 2nd visit

In this study, majority (77.1%) had anemia, of which 54.9% of the participants had mild anemia, 20.1% had moderate anemia and 2.1% had severe anemia in 1st visit. In the 2nd visit, a greater part, 85.1% had anemia and among the anemic, 64.5% had mild anemia and 20.6% suffered from moderate anemia.

Banerje et al⁴³ conducted a study in Kolkata and it showed that 63.0% of adolescent mothers were anemic. Another study conducted at Delhi⁴⁵ had 52.4% mothers suffering from anemia. A study at Uruguay, by Agudelo et al,³² consisted of 6.8% of adolescents with severe anemia.

Table 19: Distribution of study participants according to mode of delivery

The commonest mode of delivery among adolescents in this study was vaginal delivery, which was experienced by 78.1% participants and 21.9% underwent lower segment caesarean section.

A similar study conducted by Varma et al⁵⁰ showed that 82.5% of adolescents had vaginal delivery and 17.5% had undergone LSCS. Another study at Canada³⁷ had 69.9% teenagers who delivered vaginally and 12.1% delivered by LSCS. Yet another

study conducted in Uruguay³² had a C-section rate of 14.1% and a study in Turkey³³ had 62.1% girls with normal delivery and 37.9% with cesarean section.

Table 20: Distribution of study participants according to indications for LSCS

In the present study, malpresentation was the most common indication for LSCS (35.5%) followed by fetal distress (25.8%) and non progress of labor (22.6%).

In a study conducted at Canada,³⁷ breech presentation was the commonest (32.0%) indication for performing LSCS followed by non progress of labor in 24.0% of adolescents. Another study conducted by Imir et al³⁴ at Turkey, stated fetal distress as an indication for LSCS in 31.3% adolescents and malpresentation in 23.3% participants.

Table 21: Distribution of study participants according to period of gestation

A majority (68.1%) of participants in this study had delivered at full term and 31.9% had a pre term delivery.

Similarly, a study conducted at New Jersey by Hediger et al,²⁴ showed that 33.3% adolescents had pre term delivery. In another study done by Chen et al¹⁹ at Canada, the prevalence of pre term delivery among adolescents aged between 15-19 years was 28.4%.

Table 22: Distribution of study participants according to prolonged labor

In the current study, 23.4% teenagers had prolonged labor. Similarly, in a study conducted at Delhi,⁴⁵ 17.2% of participants had prolonged labor and another study at USA²⁹ showed that 17.0% of the teenagers experienced prolonged labor.

Table 23: Distribution of study participants according to outcome

In the present study, 93.1% of the participants had live births at the end of their pregnancy (63.9% were full term and 29.2% were pre term birth), 4.8% delivered still born babies and 2.1% had abortions.

In the Kolkata study,⁴⁷ still births were present in 5.1% of the participants and 94.9% had live births. In another study conducted at Delhi,⁴⁶ 4.3% participants had still births. However, conversely, another study conducted at Delhi⁴⁵ had live births in 78.1%, still births in 15.6% and abortions in 4.6% teenagers. Possibly, good ante natal care in the area was the reason for low still births and abortion rates.

Post partum hemorrhage

In the current study, only 2.8% of the teens had post partum hemorrhage as a complication of pregnancy. Similarly, in a study by Phupong et al³⁹ in Thailand, the incidence of PPH was 3.3% and in Uruguay study³² it was 5.4%.

Table 24: Distribution of study participants according to gender of the child.

In this study, majority of the children born to adolescent mothers were males (53.2%), and it was in accordance with the studies conducted at Brazil³⁰ and Turkey³⁴ where the proportion of males was 51.5% and 54.2% respectively.

Table 25: Distribution of study participants according to child's birth weight

In this existing study, 38.3% of children born were of birth weight <2.5 kg which was similar to the studies conducted at Kolkata⁴⁷ and Delhi⁴⁶ wherein the incidence of low birth weight among adolescents was 38.9% and 33.9% in that order.

Table 26: Distribution of study participants according to child's cry after birth

A majority (76.1%) of the children born in this study had cried immediately after birth and 23.9% had a delayed cry. The most probable reason for delayed cry could be prolonged labor and fetal distress among the neonates.

Table 27 & 28: Distribution of study participants according to pre-lacteal feeds given to the child and type of pre-lacteal feeds

In this study, 60.4% of the participants gave pre-lacteal feeds to their children and the most common pre-lacteal feed given was sugar water which was seen in 40.7% of the adolescents. Perhaps, as the educational level of the participants was low, majority of them practiced pre-lacteal feeding.

Table 29 & 30: Distribution of study participants according to breast feeding initiation.

In the present study, majority of them (62.7%) had initiated breast feeding within an hour of childbirth and amongst those who delayed it beyond 4 hours, common reasons cited were - undergoing LSCS (52.2%) followed by mother being unwell (30.4%). Delayed initiation was probably because, women in the rural areas have a fear about infection if the mother starts feeding immediately after LSCS.

Neonatal Death

In this study, among the total study participants, 2.8% of the teenagers' children died within 28 days of birth. Similarly, in a study by Kumar et al,⁵¹ neonatal mortality was 3.8% and in a study by Sharma et al,⁴⁵ it was 1.7%.

Table 31-37: Association between age and pregnancy outcome and complications

The pregnancy outcome and complications were compared between mid adolescents (15-17 years) and late adolescents (18-19 years).

Full term deliveries (69.4% vs. 61.1%) and abortions (4.1% vs.1.0%) were more in mid adolescents but pre term deliveries (22.4% vs. 32.6%) and still births (4.1% vs. 5.3%) were higher among late adolescents. PIH (4.3% vs. 8.5%), prolonged labor (21.3% vs. 24.5%), LSCS (21.3% vs. 22.3%) and delayed cry at birth of the child (17.8% vs. 27.0%) were present in majority in late adolescents. Due to this inconsistency, there was no statistical significance found between these variables.

This discrepancy was probably because there is no much physical and physiological difference between mid and late adolescents and that there are other socio economic and family factors in rural area which would influence the pregnancy and age alone may not be the factor responsible for the adverse implications.

Although low birth weight was more (42.6% vs. 36.2%) in mid adolescents, there was no statistical significant association between them. As the age increased, anemia decreased, with severe anemia (4.1% vs. 1.1%), moderate anemia (30.6% vs. 14.3%) and mild anemia (55.1% vs. 54.7%) being more present in girls between 15-17 years age group and this was statistically significant (p=0.013).

In a study conducted by Agudelo et al³², converse to this study, PIH (4.9% vs. 4.3%) and LSCS (14.0% vs. 13.9%) were more seen in mid adolescents than old teens. Consistent with the present study, anemia (7.2% vs. 6.2%) and low birth weight (10.3% vs. 9.6%) was common in 15-17 years adolescents. In similar studies by Fraser et al²³ at USA and Chen et al¹⁹, LBW was more noted in adolescents less than 17 years than between 18-18 years (7.0% vs.5.0% and 8.69 vs.7.6% respectively).

Table 38-44: Association between education and pregnancy outcome and complications

As the educational level increased, full term deliveries increased from 62.1% in illiterate individuals to 64.9% in high school level educated girls. Abortions and still births decreased from 6.9% in each category among illiterates to 1.3% and 3.9% among high school educated adolescents respectively. Prolonged labor (33.3%) and LBW (44.4%) were seen in majority in illiterates but PIH (9.2%) and delayed cry of newborns (26.0%) were more present in high school studied teens. However, LSCS was common (23.7%) among girls educated up to primary level.

There were more severely anemic girls among illiterates (6.9%), moderate anemia was highest (23.7%) in girls studied up to primary school and majority (57.1%) of adolescent girls who had studied up to high school suffered from mild anemia. Still, there was no statistically significant relationship between any of these complications and educational status. As educational status alone would not affect the pregnancy and there is a bearing of various socio cultural factors, this irregularity was found.

In a USA study,²³ LBW was seen among those who were not educated compared to appropriately educated girls (7.0% vs.5.0%).

Table 45-51: Association between occupation and pregnancy outcome and complications

Housewives had higher proportion of full term deliveries (65.4% vs.50.0%), preterm deliveries (29.2% vs.28.6%) and abortions (2.3% vs.0.0%) as compared to working women but still births were more seen in employed women (3.1% vs.21.4%). Similarly, delayed child cry at birth (24.4% vs.18.2%) and severe anemia (2.3% vs. 0.0%) were higher among housewives. On the contrary, PIH (6.3% vs.14.3%), prolonged labor (22.8% vs.28.6%), LBW (36.2% vs. 57.1%), moderate (20.0% vs.21.4%) and mild anemia (53.1% vs. 71.4%) were more noted among teenagers involved in various jobs. However, no statistical significant association was established between any of these variables and occupation of the adolescents. Women engaged in employment were probably under additional stress and did not have good ante natal care and hence, had increased complications than those who were housewives.

Somehow, only housewives had undergone LSCS and there were no working teens who had delivered through cesarean section and this was statistically significant (p=0.040).

Table 52-58: Association between socio-economic status and pregnancy outcome and complications

As the socio-economic status decreased, women having preterm deliveries and abortions increased from 13.3% to 34.6% and none to 3.8% respectively, but full term deliveries decreased from 86.7% to 61.6%. Still births were highest (9.2%) in class IV teenagers. Anemia and prolonged labor also increased as the socio-economic status decreased from 66.7% to 53.8% and 6.7% to 28.0% correspondingly. LBW (42.1%),

PIH (10.5%) and delayed cry after birth (29.7%) were highest in class III women. There was no statistical significance for this difference. However, women undergoing LSCS decreased from 46.7% to 16.0% as the socio-economic status increased. That is, women with better economic conditions had delivered by LSCS in higher proportion and this distinction was statistically significant ($p=0.028$). Perhaps, people with better economic conditions were affordable for caesarean section and did not take risks in case of any complications in pregnancy and labor process.

Pregnancy outcome and complications were not significantly associated with various socio-demographic variables as these factors are closely interwoven and they do not affect the pregnancy individually but have effect all together due to their interaction along with other variants like type of family, elders advice, cultural fads and taboos during pregnancy and child bearing process.

Table 59: Association between number of previous pregnancies and pregnancy outcome

With increasing number of previous pregnancies, from primigravida to gravida III, preterm deliveries and still births increased from 28.1% to 50.0% and 3.5% to 50.0% respectively although, this was not statistically significant. This could have been probably due to decreased care of women who were not pregnant for the first time in contrast to primigravidae who were treated with utmost care and affection. However, no abortions occurred in multigravida adolescents.

Similarly, a study conducted by Reime et al³⁶ in Germany, showed that nulliparous teens had a higher risk of preterm delivery than girls with previous pregnancy (4.0% vs. 3.5%) but conversely, it stated that still birth was higher amongst nulliparous in comparison with multiparous girls (1.4% vs. 1.0%).

Table 60: Association between Hb and pregnancy outcome

In the present study, there was a better pregnancy outcome with improvement of anemia. As anemia status improved, full term deliveries increased from 0.0% in severe anemic girls to 87.9% in girls with no anemia. Preterm deliveries and abortions decreased with betterment of hemoglobin and hence this association between anemia and pregnancy outcome was statistically significant ($p < 0.001$). This is in consistence with earlier reports that anemia increases pregnancy complications and is liable for adverse pregnancy outcomes.

Table 61: Association between birth weight and pregnancy outcome

Preterm births (9.2%) and still births (2.3%) were more observed in children with low birth weight and this was statistically significant ($p < 0.001$). This is due to the fact that neonates born prematurely would not have developed well and would be low weight.

CONCLUSION

The current study revealed that adolescent pregnant women were more between 18-19 years of age, were housewives, married early due to traditional practices and got pregnant early due to family pressure and had inadequate awareness about contraceptive methods. Pregnancy complications like anemia, PIH, preterm delivery, low birth weight and operative delivery were present in them. Various factors like age, education, occupation, socio-economic status, previous pregnancies influenced the complications and outcome of adolescent pregnancy.

LIMITATIONS

The limitations of the study are:

- Neonatal complications like jaundice, congenital anomalies and puerperal problems like anemia, fever could not be observed due to time constraints.
- Most of the pregnancies in rural areas are revealed only after 12-16 weeks of gestation and any pregnancy loss earlier to that in an adolescent could not have been reported purposely.

RECOMMENDATIONS

On the basis of this study, the following recommendations have been made for the improvement of health of adolescents in the community.

- The mean age of marriage in this study was 16 years. Although, the child marriage act is already in effect in our country and the legal minimum age of marriage is fixed at 18 years, girls are still married off at a younger age and this practice is rampant in rural areas. Thus, the act needs to be sternly enforced so that age of marriage is increased.
- Traditional practices were the most common reason for early marriage and family pressure for early pregnancy. Hence, IEC activities should be held at each village level to make people, especially elders aware about the hazards of adolescent pregnancy and try to curtail such practices. AWW, ASHA, health workers, medical officers, NGOs and other local leaders must take an active part in such campaigns.
- It was also observed in this study that although contraceptive awareness was high in adolescents, none of them were practicing and few of those who had conceived early cited lack of contraceptive awareness as a reason for it. Therefore, effective IEC campaigns need to be held to impart knowledge regarding contraceptive usage.

SUMMARY

The present study – “Adolescent Pregnancy and its Outcome – A Community Based Prospective Study”, was undertaken to know the complications and outcomes of adolescent pregnancy and also to distinguish the various socio demographic factors influencing adolescent pregnancy.

This community based prospective study was carried out in a rural PHC area comprising of 5 subcentres namely Kakati A, Kakati B, Honaga, Bhutramanahatti and Vantamuri, which is the field practice area of J. N. M.C, Belgaum. A total of 144 adolescent pregnant women, aged between 15-19 years were selected for the study and the duration of the study was for one year from 1st January 2012 to 31st December 2012. The study included three visits with first being enrolment, second between 28-36 weeks of gestation and third in their post partum period between 0-14 days to record their outcome.

In the current study majority, 34.1% participants were of 19 years age and 88.2% were Hindus by religion. As many as 90.3% adolescents were housewives and 33.3% of their husbands were factory workers. A large number of teenagers and their husbands had studied up to high school (48.6% and 41.7% respectively). Most, 45.1% of the teens belonged to class IV socio-economic status as per modified B G Prasad classification and 76.4% were living in a joint family.

A great number of study participants, 90.9% had married in the age group of 15-19 years and the mean age of marriage was 16 years. A total of 34.0% had consanguineous marriage and 79.2% of them were primigravidae. As many as

51.4% of the girls were aware about contraception methods and television (45.9%) was the most common source of information, but none used them. Traditional practices (68.8%) were the commonest reason for early marriage and family pressure (46.5%) was the often cited reason for early pregnancy.

About 81.9% of the participants had registered their pregnancy within 12 weeks of gestation and 79.2% of them had taken adequate ANC visits. All of the adolescents in the study had taken iron and folic acid and TT injections as necessary. Half of the study participants, 50.0% had normal BMI and 41.0% were underweight.

Pedal edema was seen in 22.7% of the study subjects and PIH in 7.1% of them. As many as, 96.5% of the adolescents had longitudinal fetal lie and 90.8% had cephalic presentation. All the 144 adolescents of the study were tested for HIV and were all negative.

At the first visit, when their hemoglobin was estimated, majority (54.9%) had mild anemia and 2.1% had severe anemia. Similarly, in 2nd visit, 64.5% suffered from mild anemia but none had severe anemia. All the study participants delivered in hospital and a total of 21.9% through cesarean section with malpresentation (35.5%) being the most frequent indication. Preterm deliveries were present in 31.9% of the teenagers and 23.4% had prolonged labor. A majority (63.9%) of pregnancies ended in full term delivery and still birth was present in 4.8% of the teens. Abortions occurred in 2.1% of the adolescent girls.

Of the children born, majority, 53.2% were boys and 23.9% babies had delayed cry at birth. The incidence of low birth weight was 38.3%. A total of 60.4% of the adolescents gave pre-lacteal feeds to their children and sugar water

(40.7%) was most often given. Of the total participants, 2.8% of the teenagers' children died within 28 days of birth.

Various socio-demographic variables had influence over adolescent pregnancy. Significant associations were found between age and anemia status ($p=0.013$), occupation and socio-economic status with mode of delivery ($p=0.040$ and 0.028 respectively). Anemia and birth weight were also noted to be significantly associated with pregnancy outcome ($p<0.001$).

Nevertheless, there were no statistical significant associations observed between age, educational level, occupation and socio-economic status with pregnancy outcome, anemia, PIH, prolonged labor, birth weight of the child and cry of the child at birth. Number of previous pregnancies too did not establish significant association with outcome of present pregnancy.

Hence, the present study recommends that in order to improve the health of the adolescents, periodic IEC activities have to be held at villages and people, principally elders, need to be told about complications and ill effects of adolescent pregnancy and awareness about contraception should be raised. Child marriage act must be stringently imposed to restrain child marriages.

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ANNEXURE I

ETHICAL CLEARANCE LETTER



K.L.E.SOCIETY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
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Ref: MDC/PG/1402

Date: 21/10/2011

To,

Postgraduate Student,
Department of Community Medicine,
J.N.Medical College,
BELGAUM.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, I wish to inform you that the research project "ADOLESCENT PREGNANCY AND ITS OUTCOME-A COMMUNITY BASED PROSPECTIVE STUDY", is Ethical and justifiable and has been cleared by the departmental Ethical Committee and College Dissertation and Research Committee.

(Dr. P.V. Patil),
Chairman
College Ethical Dissertation
And Research Committee,
J.N.Medical College, Belgaum.

ANNEXURE II

INFORMED CONSENT

**“ADOLESCENT PREGNANCY AND ITS OUTCOME-A
COMMUNITY BASED PROSPECTIVE STUDY”**

INVESTIGATORS: _____

Introduction:

I am a post graduate student of Dept of Community Medicine, JNMC, KLE University, Belgaum. I am conducting a study in Vantamuri, Kakati, Honaga and Bhutharamanahatti areas.

Methodology:

I will be interviewing eligible pregnant women to know about their pregnancy and examine them. Laboratory investigations with blood samples will be done. No treatment will be provided if any illness is found during the study.

Possible benefits:

You will not be eligible for any kind of monetary benefits or free services by virtue of your participation in the study. You will be benefitted by the health education given during the study regarding the problems associated with adolescent pregnancy and education on contraception.

Possible risks:

Methods applied to do the study are safe. No risk is involved in the study.

Cost of participation:

The cost of the study will be borne by the researcher. You will not have any costs attached to your participation.

Legal rights:

By signing this consent form you are not waiving any of your legal rights.

Privacy and Confidentiality:

The results of the study may be published for scientific purposes. However your identity will not be revealed. All information collected will be coded so that no one other than the investigator will know your identity.

Withdrawal from the study:

You can withdraw from the study at any time if you wish to do so.

Authorization to publish the results:

The researcher may use the information gathered from this study for presentation in scientific journals. However your identity will not be revealed.

Questions:

If you have any queries regarding the study, you can contact Dr. _____ on mobile no _____. If you have any questions about rights as a research participant you can contact Dr. P. V. Patil, Chairman, J. N. M. C Institutional Ethics Committee on human subjects' research on 0831-2471350.

Consent summary:

“I have been explained all the contents of this consent form in my local language and having understood and clarified all my queries about the study to the best of my knowledge, I hereby give my voluntary consent for participation in the study. I do sign the informed consent form in front of an eyewitness whom I recognize.”

Name and Signature/ left thumb impression of the participant:

Name and Signature of the interviewer:

Name and Signature/ left thumb impression of the eyewitness:

Signature of the guide:

Date:

ANNEXURE III

PROFORMA

**“ADOLESCENT PREGNANCY AND ITS OUTCOME- A
COMMUNITY BASED PROSPECTIVE STUDY”**

Investigator: Dr. _____

VISIT-I

S.No:

A) Name:

B) Age: _____ years

C) Address & Phone No:

D) Religion:

1. Hindu 2. Muslim 3. Christian 4. Others

E) Occupation:

1. Housewife 2. Agriculture 3. Daily wage worker 4. Others

F) Husbands occupation:

1. Agriculture 2. Daily wage worker 3. Factory Worker
4. Others

G) Education:

1. Illiterate 2. Primary School 3. Secondary School
4. PUC/ Diploma

H) Husbands Education:

1. Illiterate 2. Primary School 3. Secondary School
4. PUC/ Diploma 5. Graduate

D) Type of Family:

1. Nuclear 2. Joint 3. Three Generation

J) Monthly Income of Family:

K) Total Number of Family Members:

L) Per Capita Income:

M) Socio Economic status (Modified B G Prasad classification):

1. Class I 2. Class II 3. Class III 4. Class IV
5. Class V

N) Obstetric Information:

1. Age of Menarche: _____years
2. Age of marriage: _____years
3. Duration of Married Life: _____years
4. Previous Pregnancies: a) number
b) (i) male (ii) female
c) (i) alive (ii) dead
5. Consanguineous Marriage: a) Yes
b) No
6. Present Pregnancy: a) LMP:
b) EDD:
c) Gestational Age:
d) Pregnancy Score:
G____ P____ L____ A____

O) Contraception Information:

1. Knowledge/ Awareness about Contraception: a) Yes

b) No

2. If Yes, From Where: a) Neighbours

b) Television

c) News papers

d) Health Care Workers

3. Contraception Used:

After Marriage: a) None

b) Calendar Method

c) Condom

d) OC Pills

After Child Birth: a) None

b) Calendar Method

c) Condom

d) OC Pills

e) IUCDs

P) Reason for Early Marriage:

1. Consanguineous

2. Traditional Practices

3. Not Able to Pay for Education

4. Other Siblings to be married

5. Others

Q) Reason for Early Pregnancy:

1. Family Pressure
2. Tradition
3. Lack of Awareness about Contraception

R) History of Chronic Diseases:

1. No
2. Hypertension
3. Diabetes Mellitus
4. Tuberculosis
5. Congenital Heart Diseases
6. Jaundice
7. Others

S) Personal Information:

1. Diet: a) Vegetarian b) Mixed
2. Appetite: a) Normal b) Increased c) Decreased
3. Sleep: a) Normal b) Disturbed
4. Bladder: a) Normal b) Increased Frequency c) Decreased Frequency
5. Bowel: a) Regular b) Diarrhoea c) Constipated
6. Habits:
 - i) None
 - ii) Chewing Tobacco
 - iii) Smoking
 - iv) Alcoholism
 - v) Others (please specify)

T) General Physical Examination:

1. Height: _____ cms
2. Weight: _____ kgs
3. BMI:
4. Built: a) Good b) Moderate c) Poor
5. Pallor: a) Present b) Absent
6. Icterus: a) Present b) Absent
7. Cyanosis: a) Present b) Absent
8. Clubbing: a) Present b) Absent
9. Koilonychia: a) Present b) Absent
10. Lymphadenopathy: a) Present b) Absent
11. Oedema: a) Present b) Absent
12. Thyroid Swelling: a) Present b) Absent
13. Breast Examination: a) Normal b) Abnormal

U) Vitals:

1. Pulse Rate: _____ / min
2. Blood Pressure: _____ mm Hg
3. Respiratory Rate: _____ / min
4. Temperature: a) Febrile b) Afebrile

V) Systemic Examination:

1. Per Abdomen:
2. Cardio Vascular System:
3. Respiratory System:
4. Central Nervous System:

W) Investigations:

1. Haemoglobin:
2. HIV Status:
 - a. Reactive
 - b. Non Reactive
3. Any Other Investigations:

**“ADOLESCENT PREGNANCY AND ITS OUTCOME-A COMMUNITY
BASED PROSPECTIVE STUDY”**

VISIT-II

S.No:

A) Gestational Age:

B) TT Injection:

1) Taken

2) Not Taken

C) Iron and Folic Acid Tablets:

1) Taken

2) Not Taken

D) Antenatal Visits:

1) Taken

2) Not Taken

If not, Why:

1) Tradition

2) No Access to Health Care Facility

3) Financial Burden

E) Any Other Complaints:

Diagnosis	Treatment Taken	By Whom

F) General Physical Examination:

1. Weight: _____ kgs

2. Pallor:

a) Present

b) Absent

3. Icterus:

a) Present

b) Absent

4. Cyanosis:

a) Present

b) Absent

- | | | |
|---------------------|------------|-----------|
| 5. Clubbing: | a) Present | b) Absent |
| 6. Koilonychia: | a) Present | b) Absent |
| 7. Lymphadenopathy: | a) Present | b) Absent |
| 8. Oedema: | a) Present | b) Absent |

G) Vitals:

1. Pulse Rate: _____/ min
2. Blood Pressure: _____ mm Hg
3. Respiratory Rate: _____/ min
4. Temperature: a) Febrile b) Afebrile

H) Systemic Examination:

1. Per Abdomen: a) Fundal Height:
 b) Lie: (i) Longitudinal (ii) Transverse
 c) Presentation: (i) Cephalic (ii) Breech (iii) Others
 d) FHS: _____/ min
2. Cardio Vascular System:
3. Respiratory System:
4. Central Nervous System:

I) Investigations:

1. Haemoglobin:
2. Any Other Investigations:

**ADOLESCENT PREGNANCY AND ITS OUTCOME-A COMMUNITY
BASED PROSPECTIVE STUDY**

VISIT-III

S.No:

A) Delivery Details:

- | | | |
|---|----------------------|-------------|
| 1. Place of Delivery: | a) Home | b) Hospital |
| 2. Mode of Delivery: | a) Vaginal | |
| | b) Caesarean Section | Indication- |
| 3. Period of Gestation: | a) Term | b) PreTerm |
| 4. Prolonged Labour | a) Present | b) Absent |
| 5. Post Partum Haemorrhage: | a) Present | b) Absent |
| 6. Placenta: | a) Present | b) Absent |
| 7. Any Other Complications (Please Specify) | | |

B) Baby Details:

- | | | |
|-----------------------|--------------|--------------|
| 1. Sex: | a) Male | b) Female |
| 2. Birth Weight: | a) >2500 kg | b) <2500 kg |
| 3. Cry After Birth: | a) Immediate | b) Delayed |
| 4. Pre Lacteal Feeds: | a) Given | b) Not Given |

If yes, please Specify

- | | | | |
|-------------------------------|----------------|------------|------------|
| 5. Breast feeding initiation: | a) within 1 hr | b) 1-4 hrs | c) > 4 hrs |
|-------------------------------|----------------|------------|------------|

If >4hrs, why?

- | | | |
|--------------------|--------------|-------------------|
| 6. Breast Feeding: | a) Exclusive | b) With top feeds |
|--------------------|--------------|-------------------|

ANNEXURE IV

KEY TO MASTER CHART

**“Adolescent Pregnancy and its Outcome- A Community Based
Longitudinal Study”**

Investigator: Dr. _____

A) Serial No

B) Age

C) Religion:

1. Hindu
2. Muslim
3. Christian

D) Occupation:

1. Housewife
2. Agriculturist
3. Daily Wage Worker
4. Others

E) Husband's occupation:

1. Agriculturist
2. Labourer
3. Factory worker
4. Others

F) Education:

1. Illiterate
2. Primary School
3. High School
4. PUC/Diploma

- G) Husband's education:
1. Illiterate
 2. Primary School
 3. High School
 4. PUC/Diploma
 5. Graduate
- H) Type of family:
1. Nuclear
 2. Joint
 3. Three generation
- I) Socio Economic Status (Modified B G Prasad Classification):
1. Class I
 2. Class II
 3. Class III
 4. Class IV
 5. Class V
- J) Age at marriage in years
- K) Previous pregnancies (no)
- L) Present status:
0. Not applicable
 1. Alive
 2. Dead
 3. Still birth
 4. Abortion
- M) Consanguineous marriage:
1. Yes
 2. No

N) Knowledge / Awareness about contraception:

1. Yes

2. No

O) If yes, from where?

0. Not applicable

1. Neighbor

2. Television

3. Health care worker

4. Multiple responses

P) Contraception used after marriage:

1. None

2. Condom

3. OC Pills

Q) Contraception used after first child:

1. Not applicable

2. None

3. Condom

4. OC Pills

5. IUD

R) Reasons for early marriage: 1. Consanguineous

2. Traditional

3. Not able to pay for education

4. Other siblings to be married

5. Others

- S) Reasons for early pregnancy: 1. Family pressure
2. Tradition
3. Lack of awareness about contraception
- T) H/O of chronic diseases 1. No
2. Hypertension
3. Diabetes Mellitus
5. Others
- U) Habits: 1. None
2. Chewing tobacco
3. Others
- V) Height in cms
- W) Weight in kgs
- X) BMI
- Y) Pallor: 1. Present
2. Absent
- Z) Hemoglobin in g%
- AA) TT injection: 1. Taken
2. Not taken
- AB) 100 IFA tablets: 1. Taken
2. Not taken
- AC) Pregnancy registration: 1. <12 weeks
2. > 12 weeks

AD) ANC visits:	1. 1
	2. 2
	3. 3
	4. 4
	5. >4
	6. Not taken
AE) If not, why?	0. Not applicable
	1. No access to health facility
	2. Financial burden
	3. Others
AF) Weight in kgs:	
AG) Pallor:	1. Present
	2. Absent
AH) Pedal Edema:	1. Present
	2. Absent
AI) Hypertension: (>140/90):	1. Yes
	2. No
AJ) Lie:	1. Longitudinal
	2. Transverse
AK) Presentation:	1. Cephalic
	2. Breech
	3. Others
AL) Hemoglobin in g%	

AM) Place of delivery:	1. Home
	2. Hospital
AN) Mode of delivery:	1. Vaginal
	2. LSCS
AO) If LSCS, indication:	0. Not applicable
	1. Non progress of labour
	2. Fetal distress
	3. Malpresentation
	4. Others
AP) Period of gestation:	1. Full term
	2. Preterm
AQ) Prolonged labour:	1. Present
	2. Absent
AR) Post partum hemorrhage:	1. Present
	2. Absent
AS) Sex of the child:	1. Male
	2. Female
AT) Outcome:	1. Full term delivery
	2. Preterm delivery
	3. Abortion
	4. Still birth
	5. Neonatal death
AU) Birth weight:	1. > 2.5 kg
	2. < 2.5 kg

- AV) Cry after birth:
1. Immediate
 2. Delayed
- AW) Pre lacteal feeds:
1. Given
 2. Not given
- AX) If fed, what was given?
0. Not Applicable
 1. Sugar water
 2. Honey
 3. Cow's milk
 4. Others
- AY) Initiation of breast feeding:
1. Within 1 hour
 2. 1-4 hours
 3. > 4 hours
- AZ) If started after 4 hours, why?
0. Not applicable
 1. Baby unwell
 2. LSCS
 3. Mother unwell
 4. Colostrum is not good for baby
 5. Tradition
- BA) Type of breast feeding practiced?
1. Exclusive
 2. With top feeds