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ABSTRACT

Objective: To determine the pregnancy outcome among adolescents and non-adolescents.

Design: A retrospective cross sectional study.

Setting: Kiambu County Hospital, Kenya.

Subjects: Three hundred and thirty six patients who delivered at Kiambu County Hospital.

Main outcome measures: Maternal and foetal morbidity and mortality.

Results: More adolescent were single and of lower level of education than the non-adolescents with a statistical significance of 0.025 and 0.031 respectively. Anaemia occurred in 16.0% of adolescents compared to 2.4% among the non-adolescents with a statistical significance of $p(<0.001)$. Cephalopelvic Disproportion (CPD) occurred in 8% of the adolescents vs. 1.6% among the non-adolescents vs. 1.6% among the non-adolescents with a statistical significance ($P<0.018$). Preterm deliveries occurred in 5.6% of the adolescents compared to 0.8% with a statistical significance of 0.031. Post-partum haemorrhage occurred in 7.2% of the adolescents compared to 0.8% of the non-adolescents with a statistical significance of $P<0.01$. Puerperal sepsis occurred in 7.2% of the adolescent vs 1.6% among the non-adolescents ($P<0.031$). The mean birthweight of the adolescents was 2.9 kgs compared to 3.1 kgs with the difference being statistically significant with a P-value of 0.015.

Conclusion: Socio-economic status was worse among the adolescents. Intra-partum complications like malpresentation, cephalopelvic disproportion and preterm deliveries were more common among the adolescents than the non-adolescents. Mean birth weight was lower for the adolescents. Post-partum complications like haemorrhage and sepsis were also more common in the group. Adolescent pregnancy is high risk and should be prevented but if it occurs, comprehensive antenatal follow-up is mandatory

INTRODUCTION

Adolescence is defined as a period during which, the individual progresses from the point of initial appearance of secondary sexual characteristics to that of sexual maturity, the individual's psychological process and patterns of identification develop from those of a child to those of an adult, and a transition is made from the state of total socio-economic dependence to one of relative independence. The age range is 10-20 years (1). Adolescent pregnancy represents a development threat. As the adolescent is struggling to grow physically and emotionally and develop during the pubertal years, the pregnant

adolescent must also adjust to the physical and emotional changes that accompany pregnancy, build a relationship with the foetus, and develop identity as a mother. Pregnancy may actually inhibit the growth of individual identity and personality and interfere with the completion of the development task of adolescence (1).

Teenage pregnancy is a growing worldwide problem in developing and developed countries alike. It is a major health, social and moral problem in many societies. The prevalence of adolescent pregnancy is also rising. Teenage fertility in Kenya has edged slightly upward, with the proportion that have begun childbearing rising from 21% in 1998 to

23% in 2003 (2). For most adolescent girls, pregnancy means termination of education and other future opportunities and hence less economic potential. A low education level affects many aspects of human life, including demographic and health behaviours. It has consistently been shown that education attainment has a strong effect on reproductive behaviour, contraceptive use, fertility, infant and child feeding, infant and child mortality rates, morbidity rates and issues relating to family health, nutrition and hygiene. Notwithstanding, the unresolved debate on the role of biological immaturity as opposed to social disadvantage in explaining poor birth outcomes among adolescents, studies in various settings of the world have established a positive association between teenage pregnancy poor pregnancy outcomes such as low birth weight, premature births and pregnancy wastage (3).

Social support for the pregnant and parenting adolescent comes primarily from her mother and from the father of the baby. This is in contrast to the normative development of strong peer social support relationships. Adolescent mothers often experience negative social support, affecting their pregnancy and their health and the well being of her child.

The unique developmental needs of the pregnant adolescents require prenatal care services focused on assessment, health promotion, preventive clinical services, social support, continuity of care and education. There are two other issues concerning health services for adolescents; accessibility and affordability. Locating these services in programs specifically designed to serve pregnant and parenting

teenagers may increase adolescents' use of health care services. The study aims to evaluate the outcome of adolescent pregnancy as compared to adult pregnancy.

MATERIALS AND METHODS

The study was carried out at Kiambu District Hospital (KDH), which is situated in Kiambu County in central Kenya. The hospital receives high risk, selected and many unbooked antenatal patients. Booked patients are admitted directly to labour ward from home, while unbooked patients and referrals are admitted through casualty. The study population was all adolescent and non-adolescent antenatal mothers who delivered at Kiambu District Hospital irrespective of their booking status. The sample size was 316, and comprised of all adolescent (118) and non-adolescent pregnant (118) patients. Multistage stratified systematic method of patient selection was used to identify all the subjects to be included in the study. The data were analysed and compared between the adolescent and non-adolescent mothers. For comparisons between the two groups, Chi-square and Fisher's exact probability where applicable were used for categorical data and students' T test for normally distributed data was used for continuous data.

RESULTS

Determination of the outcome of pregnancy between the adolescents and non-adolescents delivering at KDH.

Table 1
Frequency distribution of the social demographic characteristics

Characteristic	Adolescent (N=118)	Non-adolescent (N=118)	O.R(C.L)	P-Value
Age in years				
Mean	18.33years (S.D +1.77)	25.14 years(S.D +3.017)		
Median	19.00 years	25.00 years		
Minimum	13 years	21 years		
Maximum	20 years	35 years		
Marital status				
Single	29 (24.8%)	16 (13.6%)	2.095(1.091-4.025)	0.025
Married	89 (75.2%)	102 (86.2%)		
Level of education				
None of primary	92 (77.6%)	71 (60%)	2.310 (1.330-4.012)	0.003
Secondary and college	26 (22.4%)	47 (40%)		
Occupation				
Non-salaried	100 (84.8%)	92 (77.6%)	1.000 (0.340-2.940)	1.000
Salaried	18 (15.2%)	26(22.4)		

24.8% of adolescents compared to 13.6% of the non-adolescents were single. This was statistically significantly different with a p-value of 0.025. There were 77.6% of adolescents who attained primary education compared to 60% of the non-adolescents.

Twenty one point six percent of adolescents compared to 37% of non-adolescents had attained secondary education. The differences were statistically significant with a p-value of 0.003.

Table 2
Frequency distribution of antenatal clinic (ANC) attendance

ANC attendance	Adolescent N=118	Non-adolescents N=118	P-Value	Odds ratio(C.I)
Gestational age in trimester)				
1 st ANC attendance				
None	12(10.4%)	3 (2.4%)		
First	None (0%)	None (0%)		
Second	88(74.4%)	113 (96.0%)		
Third	18(15.2%)	2 (1.6%)		
No of ANC Visits	117(99.2%)	118(100.0%)		
<4	1 (0.8%)	0 (0%)		
>4			0.021	(1.9684)

Table 3
Frequency distribution of the antepartum complications

Complication	Adolescents N=118	Non-adolescents N=118	O.R(C.L)	P-Value
Pregnancy induced hypertension				
Yes	3 (2.4%)	1.00(0.198-5.052)	1.00(0.198-5.052)	
No	115 (97.6%)			1.00
Premature rupture of membranes				
Yes	2 (1.6%)	4 (3.2%)	0.492 (0.088-2.735)	0.409
No	116 (98.4%)	114 (96.8%)		
Anaemia	Adolescents N=106	Adolescents N=115		
Yes	17 (16.0%)	3 (2.4%)	7.7460(2.239-26.800)	0.001
No	101 (84.0%)	112 (97.6%)		

Anaemia was present in 16.0% of adolescents compared to 2.4% of the non-adolescents. This was significant statistically with a P-value <0.001.

Table 4
Frequency Distribution of Interpartum complications

Complication	Adolescents N=118	Non-adolescents N=118	P-Value	Odds Ratio(C.L)
Malpresentation				
Yes	4 (93.2 %)	2(1.6%)		
No	114(96.8%)	116(98.4%)	0.409	2.0331(0.366-1.306)
Cephalopelvic disproportion				
Yes	9 (8.0%)	2 (1.6%)		
No	109(92.0%)	116(98.4%)	0.018	5.3478(1.147-24.929)
Non-reassuring foetal status				
Yes	9 (7.2%)	8(6.4%)		
No	109(92.8%)	110(93.2%)	0.802	1.135(0.423-3.043)
Failed induction				
Yes	0(0%)	1(0.8%)		
No	118(100%)	117(99.25)	0.316	2.0162(0.180-22.525)
Preterm deliveries				
Yes	7 (5.6%)	1 (0.8%)		
No	111(94.4%)	117(99.2%)	0.031	7.3559(0.891-60.698)
Post term				
Yes	4(3.2%)	5(4%)		
No	114(96.8%)	113(96.0%)	0.734	0.7933(0.208-3.026)

The adolescents who had a caesarian section due to CPD were 8.0% compared to 1.6% of the non-adolescents with a statistical significance difference of $P < 0.018$. Preterm deliveries occurred in 5.6% of the adolescents vs. 0.8% of the non-adolescents. This was statistically significant with a P -value < 0.031 .

Table 5
The frequency distribution of the mode of delivery

Mode of delivery	Adolescents (N=118)	Non-adolescents(N=118)
Spontaneous vertex delivery	101(85.6%)	96(81.6%)
Caesarian section	13(11.2%)	21(17.6%)
Assisted Vacuum delivery	4(3.2%)	1 (0.8%)

The main mode of delivery was by spontaneous vertex delivery.

Table 6
Frequency distribution for the post-partum complications

Complication	Adolescents n=118)	Non-adolescents (n=118)	P-Value	Odds ratio(C.L)
Post-partum haemorrhage				
Yes	9(7.2%)	1(0.8%)		
No	109(92.8%)	117(99.2%)	0.010	9.620(1.200-77.119)
Retained placenta				
Yes	1(0.8%)	0(0%)		
No	117(99.2%)	118(100.0%)	0.569	
Puerperal sepsis				
Yes	9(7.2%)	2(1.6%)		
No	109(92.8%)	116(98.4%)	0.031	4.771(1.010-22.5490)
Maternal Death				
Yes	2(1.6%)	0(0%)		
No	116(98.4%)	118(100.0%)	0.156	2.016(1.779-2.286)

Post-partum haemorrhage occurred in 7.2% of the adolescents compared to 0.8% of the non-adolescents. This was statistically significant with a P-value <0.01 at 95% C.I. Puerperal sepsis occurred in 7.2% of the adolescents as compared to 1.6% among the non-adolescents. This was statistically significant with a P-value <0.031.

Table 7
Frequency distribution of the neonatal outcome

Outcome	Adolescents (N=118)	Non-adolescents (N=118)	P-Value	O.R(C.L)
Birth weight(Gms)				
<2500	13(11.2%)	9(8.0%)	0.390	1.450(0.618-3.402)
>2500	105(88%)	109(92.0%)		
Birth weight				
Mean(Kgs)	2.9+SD 0.6	3.1+SD 0.5	0.015	
Still Birth				
Yes	2(1.6%)	4(3.2%)		0.492(0.88-2.735)
No	116 (98.4 %)	114(96.8%)	0.409	
Apgar score(5 minutes)				
0-6	5(4.1%)	2(1.7%)		2.4721(5.5833-8.3675)
7-10	113(95.9%)	116(98.3%)	0.331	
Neonatal death				
Yes	2(1.66%)	2(1.6%)		1.000(0.139-7.213)
No	116(98.4%)	116(98.4%)	1.00	

Table 7 shows that the mean birth weight was different with the non-adolescents having a higher mean weight. These differences were statistically significant with a P-value of 0.015. Neonatal deaths occurred in 1.6% of the adolescent and non – adolescent mothers. The results support the alternate hypothesis that adolescents have a poorer pregnancy outcome than the non-adolescents.

DISCUSSION

The mean age for the adolescents was 18 years and for the non-adolescents was 25 years. The minimum age of 13 years was on the extreme bearing in mind that bone formation is still actively taking place at this age. The maximum age for the non-adolescents was 35 years.

In this study, 4% of the adolescents had not attained any level of education compared to 2.4% of the non-adolescents while only 22.4% had attained a level equal or higher than secondary school compared to 31.2% of the non-adolescents. Majority of the adolescents had achieved primary education. Level of education more or less defines social economic status of an individual in the society. Women of poorer socio-economic status tend to have a poorer pregnancy outcome. This is compound by the biological disadvantage of adolescents due to immaturity. These factors among others contribute to adverse pregnancy outcomes especially among the adolescents.

In this study, 21.6% of the adolescent mothers were non-employed compared to 8.8% of the non-adolescent mothers. This was statistically significant with a P-value of 0.042. More adolescents were single mothers (24.8%) compared to 13.6% among the non-adolescent group. This was statistically significant with a P-value of 0.025. In Kenya, 83.3% of women aged 15-19 years are not married (KDHS-2003) (2). This implies that most adolescents conceived out of wedlock and hence depends on their parents for financial support during the antenatal and delivery. Marriage is known to provide social stability, which enhances obstetric performance.

The adolescent mothers who never attended antenatal clinic was 10.4% compared to only 2.4% among the non-adolescents with a statistical significance of P-value of 0.001. Adolescents who attended the ANC tended to delay before making their first antenatal visit at 27 weeks of gestation compared to non-adolescents who made their first antenatal visit earlier, that is, 15.2% compared to 1.6%. This was statistically significant with a P-value of 0.001. This compares with other studies where adolescent pregnancies are often characterised by delayed initiation of prenatal care, poor prenatal health behaviours, and hence poorer obstetric outcomes (4, 5). There was no statistical significant difference in the number of ANC attendance between the adolescents and the non-adolescents in this study. The nature of healthcare that the pregnant woman receives significantly affects the pregnancy outcome, early ANC attendance may help in early diagnosis of high-risk cases and this favorably alters prenatal mortality (6). According to the WHO recommendation, a woman should have four to six focused visits. The findings of this study is better than

that found in 2003 KDHS, where 40% of the Kenyan women had not made any single antenatal visit at their sixth month of gestation. The non-adolescents tended to delay their first antenatal visit majority making their first visit in the second trimester. The WHO recommends the first visit at the earliest time when pregnancy is suspected 15.2% of adolescents compared to 1.6% of the non-adolescents made their first visit in the third trimester. This was statistically significant with a P-value of 0.001. Another study showed that the largest contributor to poor pregnancy outcome was a woman missing prenatal care; prenatal care reduces the obstetrical risks particularly to the medically, socially and economically disadvantaged groups like the adolescents. Prenatal care provides an opportunity to conduct risk assessment, risk reduction and maternal education (21). Adequacy of prenatal care is a measure based upon the month of prenatal care entry and the number of visits (21).

In this study, 2.4% of both the adolescents and the non-adolescents had pregnancy-induced hypertension. Other studies have demonstrated a clear trend towards increasing rates of preeclampsia, eclampsia, anaemia, operative vaginal delivery, post-partum haemorrhage and peripheral endometritis as maternal age decreased. Rates of gestational diabetes, third trimester bleeding and premature rupture of membranes, increased progressively with increasing maternal age (7). Although in this study didn't get any of either group having gestational diabetes, studies have shown that gestational diabetes is less common in adolescents than in adult women (15).

The non-adolescents had a higher PROM rate of 3.2% compared to adolescents (1.6%), but this was not statistical significance. This concurs with the study done in the Latin American (7). It is established factors that there is more predisposition to PROM among the non-adolescents. Anaemia was more common among the adolescents with 16% of the adolescents compared to 2.4% of the non-adolescents having anaemia. The difference was significant statistically with a P-value of 0.001. A study, done in Tanzania, found out that in 85.5% of all pregnant adolescents were anaemic (20). The high anaemia rate among the adolescents could have partly contributed to the preterm deliveries and the lower mean birth weight.

The adolescents had a high rate of malpresentation during labour 3.2% vs 1.6% among the non-adolescents. There was a statistical significance, in the cephalopelvic disproportion among the adolescents 8% VRS 1.6% among the non-adolescents. Again 1.6% among the adolescents had Caesarean section due to the prolonged labour compared to non-adolescents 0.8%.

Adolescent mothers are at increased risks of operative vaginal delivery and puerperal endometritis in agreement with several published studies (8, 9). It has been suggested that in young adolescents the

pelvic bones and the birth canal may still be in the process of growth, increasing the risk of prolonged and obstructed labour, use of ventouse, and puerperal endometritis (9). If this theory of biological immaturity accounted for the greatest proportion of delivery complications, we would expect the rates of Caesarean delivery to be higher in this population. However, in this study, found that adolescent mothers are at decreased risk of cesarean delivery collaborating the findings from previous reports (10-12,14). The reasons for this association are unclear.

May be apart from cephalopelvic disproportion that occurs more frequently among the adolescents most of the other indications of emergency caesarian section occur more frequently among the non-adolescents with 4.0% of them vs 3.2% of the adolescents having post term. This finding concurs with the literature which outlines that post term increases with advancing maternal age (23).

Puerperal sepsis occurred in 7.2% of the adolescents vs. 1.6% of the non-adolescents could be partly due to increase in operative delivery, increased chances of prolonged labour among the adolescents. The latter two findings were present in this study. Contrary to my finding of increased risk of post-partum haemorrhage among adolescents of 7.2% of adolescents vs. 0.8% of the non-adolescents ($P < 0.010$), which corroborates with other studies (7), Jolly *et al* (11) found the risk of post-partum haemorrhage was lower in adolescents younger than 18 years.

Adolescent's mothers had a higher rate of mortality than the non-adolescent, with 1.6% of the adolescent's mothers dying due to pregnancy related complications. Although this was not statistically significant this is quite an issue worth finding out how future mortalities could be avoided. The issue of mortality could be multifactorial with the adolescents being disadvantaged biologically, socio-economically, which compounds their poorer health seeking behaviour.

With regard to adverse perinatal outcomes, we found a higher risk of LBW and preterm delivery, among infants of adolescent mothers, with the youngest age groups running the highest risks. Preterm delivery occurred in 5.6% of the adolescents vs. 0.8% of the non-adolescents mothers. This was statistically significant with a P -value < 0.031 . Although there are several reports indicating that adolescent pregnancy is not associated with increased risks of adverse perinatal outcomes (13, 16), most studies from both developed and developing countries have consistently reported that pregnant adolescents are at increased risk for preterm delivery and Low Birth Weight (LBW) (9,19,11,12,17,18). This is an important consideration because LBW is the leading cause of neonatal and infant morbidity and mortality. The relation between adolescent pregnancy and SGA is

less clear in the literature. An increased incidence of SGA infants in adolescent mothers has been reported by some authors (18) but not by others (11, 16). Some workers have concluded that inadequate prenatal care is a risk factor for low birth weight among other adverse pregnancy outcomes (21). Some authors have indicated that preterm delivery is a major complication of teenage pregnancies especially if the interval between menarche and conception is short. In particular, younger adolescents aged less than 18 years have been observed to have the highest proportions of low birthweight, preterm birth and infant mortality rate due to possible biological immaturity (22). Lower Apgar score at five minutes was commoner among the adolescent's babies (2.5%) than the non-adolescent's (1.7%). The differences in the Apgar score were not statistically significant.

In this study there was the same number of perinatal/neonatal deaths between the two groups. Previous investigations of perinatal mortality in adolescent pregnancy have yielded conflicting results. Some studies have found increased risk of neonatal mortality among infants born to adolescent mothers (9, 16), whereas others found no increase (12, 14, 21). In accordance with several studies it has been confirmed that adolescents were at no greater risk of foetal death than adult women (11, 12, 16, 19). This in keeping with the findings of this study where there was no difference in neonatal death.

In conclusion, malpresentation, post-term and anaemia were higher in the adolescent mothers than in the non-adolescent mothers. Intra-partum complications like preterm delivery, foetal distress, failed induction and prolonged labour occurred more commonly among the adolescent mothers than the non-adolescent mothers. Post-partum complications like haemorrhage, sepsis and maternal deaths occurred more in the adolescent mothers than in the non-adolescent group. Neonatal and foetal complications like low birth weight, stillbirths, low Apgar scores were higher in the adolescent group than in the non-adolescent mothers. By reducing the number of adolescent pregnancies and by providing better prenatal and obstetric care to those adolescents who become pregnant, maternal and prenatal morbidity in the developing countries can be reduced.

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