

ORIGINAL ARTICLE

COMPLICATIONS OF PREGNANCY AMONG ADOLESCENTS AND ADULT MOTHERS TREATED IN A PUBLIC HOSPITAL, THE REPUBLIC OF LIBERIA: A RETROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

Complications of pregnancy remain a serious threat in Sub-Saharan Africa despite efforts to minimise maternal mortality due to pregnancy complications, and achieve the Millennium Development Goal 5. This is a retrospective study to determine the most common pregnancy complications among adolescents compared to adults treated in a public hospital from 2015 to 2018. The researcher applied a convenience sampling method in selecting the medical records. The instrument used was adapted from previous studies and data were analysed with descriptive and chi-square test for the inferential statistics. A total of 1,265 patients met the eligibility criteria and 540 (42.7%) were adolescents. Low birth weight (n=478, 88.5%) and preterm delivery (n=496, 91.9%) were common among babies born to adolescent mothers. Pregnancy-related complications among adolescent mothers showing the prevalence of anaemia, hypertension, and malaria were 494 (84.9%), 149 (56.2%) and 193 (62.1%) respectively. Gestational diabetes was found to be high among adult mothers (n=98, 74.8%). Among adolescent mothers, the prevalence of eclampsia was 62 (78.5%) and hemorrhage 61 (53.0%). The prevalence of Intrauterine growth restriction (IUGR) was high among adolescent mothers (n=252, 80.5%). Comprehensive strategies are needed to keep girls in schools and to raise awareness and develop campaigns about using contraception properly to reduce the incidence of adolescent pregnancy as well as to minimise the incidence of pregnancy-related complications.

Keywords: Adolescent, Pregnancy, Complication.

INTRODUCTION

Adolescent pregnancy is a significant public health issue as it often occurs in conditions with poor social care and maternal well-being. It is a health problem associated with complications of childbirth due to growing emotional maturity as well as physical and physiological status¹. According to the United Nations International Children's Emergency Fund², adolescent pregnancy is a situation where girls who have not reached adulthood (between the ages of 13 - 19) become pregnant. Approximately 21 million girls aged 15 to 19 years, including 2 million girls below 15 years, give birth annually in developing countries³.

Adolescent pregnancy is generally associated with horrific outcomes for both the mother and child, and its effect plays a significant role in the lives of adolescents, their families and society in general. Adolescence is known to be a transition period from childhood to adulthood. This lifespan is related to the stages of changes essential to an adolescent girl's development and growth. The adverse effect of teenage pregnancy encompasses abandonment and low educational achievement, resulting in mediocre performance in the job market, leading to weak and inadequate nutrition, medical care for both the mother and the child, and poverty⁴.

The birth rate among adolescents in Sub-Saharan Africa remained the highest compared to developed countries. The birth rate among women ages 15 to 19 years in Sub-Saharan Africa reached over 200 births per 1000 girls⁵. Liberia is among the developing nations that has an alarming rate of adolescent pregnancy in the world, 38%⁶. About 3 out of 10 Liberian girls got pregnant before turning 18 years old⁷.

Complications of pregnancy are health problems that occur during pregnancy and can involve either the mother's health, the baby's health, or both⁸. Complications of pregnancy among adolescent girls and childbirth are the leading causes of death among teenagers aged 15 - 19 in low-and-middle-income countries, resulting in thousands of deaths each year⁹. The most common pregnancy complications are hypertension, preeclampsia, eclampsia, premature labour, obstructed labour, cephalopelvic disproportion, miscarriage, low birth weight babies, gestational diabetes, ectopic pregnancy, and abruptio placenta¹⁰. A study conducted by Rudra, Bal, and Singh (2013) revealed that the complications amongst adolescents aged 16 - 19 years were maternal anaemia, hypertension disorders and preterm delivery. Ganchimeg et al. (2014) showed that preeclampsia, eclampsia, puerperal endometritis

and systemic infections were higher amongst adolescent mothers than adult mothers. Cesarean section in adolescent mothers less than 15 years was 27.9% and 23.5% in the adult mothers.

According to Say et al. (2014), approximately 73% of maternal mortality was caused by direct obstetric complications, whereas medical complications only accounted for 27.5% of all deaths of known causes. Among the immediate obstetric complications, hemorrhage was the leading cause of maternal mortality worldwide at 27.1% and hypertension disorder in pregnancy appeared second worldwide as the direct cause of maternal deaths¹³. According to the Liberian Demography and Health Survey (2013)¹⁴, maternal mortality rate was 1,072 deaths per live births, many of which were associated with pregnancy complications and childbirth.

Liberia has a high maternal mortality rate, and many of the maternal deaths were pregnancy-related complications¹⁵. The research will add to the body of knowledge about pregnancy complications among teenagers compared to non-teenagers in the hospital. It will help doctors and nurses in clinical decision making. The findings will also help nurses to either increase or maintain the current strategies to reduce adolescent pregnancy and identify pregnancy complications, especially those with high risks. Nurses can promote health awareness using the findings from this research to motivate adolescents to attend prenatal and antenatal clinics for early detection of any complications of pregnancy and thus either instigate the proper intervention or refer them to the appropriate institution for further management. The findings of this research can be forwarded to stakeholders to facilitate their decision-making and policy formulation regarding reducing maternal death rate incidence due to pregnancy complications among teens.

However, based on the numerous literature reviewed, it is vivid that there are minimum studies conducted on the complications of pregnancy amongst adolescents in the region of Nimba and Liberia as a whole. It is an indication of a significant knowledge gap. There is a need to conduct this study here in a government-owned regional referral hospital. This study's objective was to determine the most common pregnancy complications among adolescent mothers treated in a public hospital compared to adult mothers.

METHODS

A four-year retrospective, quantitative design study was conducted at the Jackson F. Doe Regional Referral Hospital Obstetrics and

Gynaecology Department from January 1, 2015 to December 31, 2018. Jackson F. Doe Hospital is a 100-bed tertiary care center receiving referrals from several health institutions within the Kparblee District and beyond. The hospital is located in the country's Central North region, South West of Nimba County to be precise, 216 kilometers away from Monrovia, the national capital city.

A convenience sampling technique was used to collect data. The process took two months after fulfilling all ethical requirements. A total number of 1,378 medical records of both adolescent mothers and adult mothers who attended the hospital during the study period were obtained. These medical records were thoroughly perused for eligibility. One thousand two hundred sixty-five (1,265) medical records met all eligibility criteria and were included in the study. The study compared pregnancy complications between teenage mothers and adult mothers.

Inclusion and Exclusion Criteria

The eligibility criteria were all adolescent mothers aged 11 years to 19 years and adult mothers aged 20 years and above. Mothers who had a pre-existing medical diagnosis before pregnancy were excluded. All incomplete medical records were excluded from the study.

Instruments

The research adapted the instruments used in Cameroon by Tamambang et al. (2018) and in Nigeria by Akadiri, Bakare, and Ajenifuja (2015) to conduct this study. The adapted instrument was subject to peer review by research experts who ensured that the tool was consistent while addressing ambiguities and concentrating on items that met the study's intended objective. The panel found that the instrument was appropriate for measuring the study material.

A total of 25 questions were used to review the medical records of both adolescent and adult mothers. The questionnaire covered the eligible participants' demographic data, clinical characteristics, mode of delivery, and pregnancy complications (medical, obstetrics, and fetal complications). The instrument was divided into four parts. Section A is demographics data with six items. Section B is clinical characteristics and fetal outcomes comprising of seven items. Section C is the mode of delivery, and Section D includes medical complications, four items, obstetrics complications, five items, and fetal complications, two items.

Ethical Consideration

Ethical approval was obtained from the Research Ethics Committee of Universiti Teknologi MARA, Malaysia, Shah Alam Campus: Reference:

REC/308/19, University of Liberia Pacific Research and Evaluation Institute (UL-PIRE IRB), reference: IOR0004203 and a letter of permission from Jackson F. Doe Memorial Regional Referral Hospital, reference JFD/ACEO/IAS/050-17.

Data Analysis

The data were analysed using descriptive methods (frequency and percentage, or mean and standard deviation). For inferential analysis, the Chi-square test was applied to analyse the categorical data. A p value of less than 0.05 was considered as statistically significant.

RESULTS

A total of 1,265 patients met the eligibility criteria and were included in the study. Most of the study participants were adults (n=725, 57%), and 540 (43%) were adolescents. The mean age of the adolescent mothers was 17 years (SD=1.53), and adults was 30 years (SD=6.57). The highest educational level among adolescents was primary education (n=356, 65.9%) and most adults completed secondary education (n=381, 52.6%). The proportion of adolescent mothers who delivered preterm and had a low birth weight baby were 496 (91.9%) and 478 (88.5%) respectively.

Prevalence of Complications of Pregnancy among Adolescents Compared to Adults Medical Complications

The result for anaemia showed a statistically significant association between anaemia among adolescents and that of adult mothers with $\chi^2 (1) = 783.298$, $p = 0.001$. The prevalence of anaemia was higher among adolescents (n = 494, 84.9%) compared to adult mothers (n = 88, 15.1%). There was a statistically significant association between hypertension and the maternal age group ($\chi^2 (1) = 25.115$, $p = 0.001$). Adolescent mothers had an increased rate of hypertension during pregnancy (n = 149, 56.2%) compared to adult mothers (n = 116, 43.8%). Malaria in pregnancy was (n = 193, 62.1%) among adolescents and (n = 118, 37.9%) among adult mothers. There was a statistically significant association between malaria in pregnancy among adolescents and adult mothers with $\chi^2 (1) = 63.244$, $p = 0.001$. Meanwhile, the study found gestational diabetes to be higher among adult mothers (n = 98, 74.8%) than adolescents (n = 33, 25.2%). The result also revealed a statistically significant association between gestational diabetes and maternal ages where $\chi^2 (1) = 18.286$, $p = 0.001$. See Table 1.

Obstetrics Complications

Referring to Table 1, the rate of eclampsia was prevalent among adolescents (n = 62, 78.5%)

compared to adult mothers (n = 17, 21.5%), and there was a statistically significant association between eclampsia among adolescents and adult mothers with $\chi^2 (1) = 44.125$, $p = 0.001$. Hemorrhage was common among adolescents (n = 61, 53.0%) compared to adult mothers (n = 54, 47.0%). Hence, there was a statistically significant association between hemorrhage among adolescents and adult mothers as $\chi^2 (1) = 5.545$, $p = 0.019$. Meanwhile, there was no statistically significant association between age groups for preeclampsia, cephalopelvic disproportion and obstructed labour ($p > 0.05$).

Fetal Complications

The prevalence of intrauterine growth restriction (IUGR) was higher among adolescent mothers (n = 252, 80.5%) compared to adult mothers (n = 61, 19.5%), and there was a statistically significant association between IUGR among adolescent mothers and adult mothers with $\chi^2 (1) = 243.203$, $p = 0.001$ (Table 1). On the other hand, intrauterine fetus death (IUFD) was higher among adult mothers (n = 90, 62.1%) compared to adolescents (n = 55, 37.9%), and showed no statistically significant association between them (Table 1).

DISCUSSION

The results showed that anaemia was prevalent among adolescent mothers, 85% compared to adult mothers 15%. Banerjee et al. (2009), in a study conducted in Southeast Asia (India), found that anaemia among adolescent women was 63%, which is lower than the rate of anaemia among adolescents in this current study. Several studies supported the view that teenage mothers have an increased risk of maternal anaemia compared to adult mothers 17 18 19. In many cases, adolescent mothers who became pregnant out of wedlock tend to deny being pregnant and refuse to attend the prenatal clinic. As a result, they have limited experience regarding the process of pregnancy and may not be fully aware of an iron-rich diet that would reduce the risk of anaemia. In addition, malaria, which is an epidemic in the region, generally contributes to anaemia during pregnancy. Malaria, hookworm, other infectious diseases and inadequate nutritional intake had increased anaemic cases among pregnant women in the region, similar to the results of other studies conducted in other developing countries 20 21. If they had attended a prenatal visit, an iron supplement would have been given to all pregnant women at risk of anaemia, as instructed by the Ministry of Health Policy.

According to previous studies, anaemia in pregnancy was associated with a soaring risk of low birth weight among neonate and preterm delivery 22, intrauterine growth restriction, and a low APGAR (a standard assessment for infants after delivery) score at 5 minutes 23. In contrast,

a study conducted in Tanzania by Stephen et al. (2018) found no association between anaemia and low birth weight and preterm delivery.

Malaria is an endemic disease in Sub-Saharan Africa. Okpere, Enabudoso, and Osemwenkha (2010) stated that according to the Ghanaian Ministry of Health, during pregnancy, malaria

accounts for 28% of out-patient attendance, 14% of hospital admissions and 9% maternal death. The prevalence of malaria cases among adolescent mothers was 62% versus 38% among adult mothers. Malaria remains a significant health problem in Liberia for pregnant women due to the country's unsanitary and inappropriate waste management practices.

Table 1: Pregnancy-Related Complications

Variables	Adolescent (n=540)		Adult (n=725)		Total (N=1265)		Test Statistics	p-value
	n=540	42.69%	n =725	57.31%	N=1265	100%		
Medical Complications								
Anaemia							783.298	0.001*
Yes	494	84.9	88	15.1	582	46.0		
No	46	6.7	637	93.3	683	54.0		
Hypertension							25.115	0.001*
Yes	149	56.2	116	43.8	265	21.0		
No	391	39.1	609	60.9	1000	79.0		
Malaria							63.244	0.001*
Yes	193	62.1	118	37.9	311	24.6		
No	347	36.4	607	63.6	954	75.4		
Diabetes							18.286	0.001*
Yes	33	25.2	98	74.8	131	10.3		
No	507	44.7	627	55.3	1134	89.7		
Obstetrics Complications								
Preeclampsia							0.271	0.603
Yes	28	45.9	33	54.1	61	4.8		
No	512	42.5	692	57.5	1204	95.2		
Eclampsia							44.125	0.001*
Yes	62	78.5	17	21.5	79	6.2		
No	478	40.3	708	59.7	1186	93.8		
CPD							1.667	0.197
Yes	113	39.4	174	60.6	287	22.7		
No	427	43.7	551	56.3	978	77.3		
Hemorrhage							5.545	0.019*
Yes	61	53.0	54	47.0	115	9.1		
No	479	41.7	671	58.3	1150	90.9		
Obstructed Labour							3.853	0.050
Yes	38	33.9	74	66.1	112	8.8		
No	502	43.5	651	56.5	1153	91.2		
Fetal Complications								
IUGR							243.203	0.001*
Yes	252	80.5	61	19.5	313	24.7		
No	288	30.3	664	96.7	952	75.3		
IUFD							1.515	0.218
Yes	55	37.9	90	62.1	145	11.5		
No	485	43.3	635	56.7	1120	88.5		

Note: CPD=Cephalopelvic Disproportion, IUGR=Intrauterine Fetus Growth Restriction, IUFD=Intrauterine Fetus Death; The Chi-square test was used to compare the proportion of the two groups for categorical data; *p<0.05 was statistically significant

Malaria in pregnancy causes anaemia, abortion, and bleeding. The intermittent preventive treatment in pregnancy (IPTp) is sulfadoxine-pyrimethamine (Fansidar) administered during the 2nd trimester of pregnancy in all prenatal clinics in the country to protect pregnant women against malaria. IPTp reduces maternal malarial

episodes, maternal and fetal anaemia, placental parasitemia, low birth weight, and neonatal mortality. Mosquito nets treated with insecticides were distributed to all pregnant women attending prenatal hospitals. These initiatives were national measures to avoid malaria and its complications during pregnancy. Teenage mothers may not have

access to these preventive steps possibly due to denial, fear of parental pressure and health facilities' inaccessibility.

Gestational diabetes in this study was higher among adult mothers, 75% versus 25% among adolescent mothers. This study indicated that advanced maternal age was associated with gestational diabetes, which is similar to the findings of a study conducted in Cameroon by Egbe et al. in 2018. Maternal overweight and advanced age are associated with gestational diabetes. Women who are obese already have resistance to insulin before they got pregnant. The combined effects of rising resistance to insulin and reduced pancreatic islet function in aging placed older women at high risk of developing gestational diabetes. Women with a family history of diabetes also experience gestational diabetes.

In this study, hypertension during pregnancy was found to be higher among adolescent mothers than adult mothers. The prevalence of hypertension in pregnancy among adolescents and adult mothers were 56% and 44%, respectively. Goonewardene and Waduge (2010) conducted a similar study among adolescents aged 13 - 16 years, and the results for the proportion of gestational hypertension was lower (12%) compared to our study. In contrast, Berhe et al. (2018) and Paladugu et al., (2018) found gestational hypertension to be more common among adult mothers age 35 and above. Pregnancy hypertension can be caused by smoking, alcohol, hypertension, family history, first-time pregnancy, and for those over 35 years of age. Most teens were nulliparous mothers, and they might engage in alcohol intake due to tension or other social issues.

If gestational hypertension is left untreated, preeclampsia will then ensue. Also, mothers with gestational hypertension are at risk of experiencing seizures during pregnancy. However, it is conspicuous that a majority of women in our study reported that they did not experience preeclampsia symptoms. It is suggested that early and frequent visits to a prenatal clinic can help assess elevated blood pressure during pregnancy and detect any sign and symptom of preeclampsia. Prenatal treatment will decrease the patient's risk of seizures or eclampsia.

The incidence of hemorrhage among adolescent mothers (53%) was relatively higher than adult mothers (47%), and the difference was statistically significant. Similarly, a study conducted in the USA by Kawakita et al. (2016) showed that adolescents had a statistically significant increased risk of hemorrhage during pregnancy. Although there are natural causes of haemorrhage during pregnancy, in this region, local herbs are widely used for treating diseases

and conditions related to pregnancy, such as fever, vomiting, malaria and weakness. These herbs are not without any adverse effects during pregnancy which may lead to hemorrhage.

Intrauterine fetus growth restriction (IUGR) was statistically significant with higher prevalence among adolescents at 80.5% and only 19.5% among adult mothers. In contrast, another study found that maternal age below 16 years and above 35 years were associated with IUGR³¹. Also, it was reported that the rate of anaemia among adolescent mothers was one of the reasons for intrauterine growth restriction²³, other than low nutritional status and lack of antenatal visit.

CONCLUSION

Adolescent pregnancy is both a public health concern and medical problem associated with an increased risk of pregnancy complications. The most prevalent complication of pregnancy among teenagers was anaemia. Other primary maternal complications found were hypertension, malaria, hemorrhage, and eclampsia, whereas neonatal complications comprised of low birth weight and preterm baby and intrauterine fetus restriction. However, gestational diabetes was found to be higher among adult mothers.

Healthcare professionals need to recognise that adolescent pregnancy is considered high risk, therefore pregnant adolescents need to be informed on the early reservation and routine antenatal attendance to help identify and manage any complications. An adolescent should have access to comprehensive reproductive health information and services that are evidence-based, confidential, developmentally appropriate, and culturally sensitive to mitigate these factors.

Limitations

This study was based on secondary data collected from medical records available for review, many of which could not be included in the study due to poor record-keeping processes. The data might be biased as most patients attending this hospital were from rural areas and a majority are Christians. Meanwhile, the rate of patients who were admitted to Jackson F. Doe Hospital might be lower, due to terrible road conditions compared to urban hospitals where patients' intake is never interrupted by road network. The sampling method and retrospective nature of this study also have a risk of selection bias.

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Conflict of interest

The authors declare no potential conflict of interest.

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