



Fetal Outcome of Deliveries among Teenagers in Centre Region of Cameroon

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Authors' contributions

This work was carried out in collaboration between all authors. Author FYF designed the study, wrote the protocol, and wrote the first draft of the manuscript. Authors JHF, JTF, LDF and FDN collected data and did the literature search and statistical analysis. ERM supervised all the team work. All authors read and approved the final manuscript.

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ABSTRACT

Aims: In order to inform public health action, we sought to compare the fetal outcome of adolescent pregnancies with the non-adolescent ones.

Study Design: Retrospective cross sectional study.

Place and Duration of Study: Yaoundé Central Hospital, the largest facility of Centre Region (Cameroon) between May 2008 and March 2010.

Methodology: A total of 6041 deliveries were compared using rates, proportions, means and OR, the fetal outcome of adolescent (10-19 years old) deliveries registered at the Yaoundé Central Hospital, to those in their non-adolescent counterparts.

Results: Referred deliveries were significantly higher in adolescent participants compared to their non-adolescent counterparts (6.4% versus 4.3%, OR 1.53 95% CI 1.07-2.20). Non-adolescent pregnancies lasted significantly longer than adolescent pregnancies (38.46±2.72 versus 38.13±3.19 weeks respectively, p=.007). The former group had significantly higher rates of premature and post-term: deliveries (29.3% versus 24.5%, p=.041 OR 1.28 95% CI 1.01-1.62 and 4.9 versus 2.4%, p=.014 OR 2.11 95% CI 1.46-3.87 respectively).

The rates of cesarean and assisted vaginal deliveries did not differ significantly between the 2 groups (16.6% versus 14.6%, p=.207 and 1.5% versus 1.1%, p=.411 respectively). Babies born of adolescent mothers weighed significantly less (irrespective of birth order) than those born of non-adolescent mothers (mean weights 2984.80±647.81 versus 3190.72±645.45 grams, p<.001).

The odds of both apparent and perinatal deaths was significantly higher in the adolescent group (AOR 1.75, 95% CI 1.25-2.47 and AOR 1.69 95% CI 1.17-2.45 respectively).

Conclusion: Adolescent pregnancies are associated with poor fetal outcome. There is need for counseling and provision of family planning services to reduce their incidence.

Keywords: Adolescent; delivery; fetal outcomes; Centre Region; Cameroon.

1. INTRODUCTION

Adolescence means a transitional stage of physical and mental human development, involving biological, social and psychological changes which occurs between 10-19 years [1]. Adolescent pregnancy has longly been a problem with adverse obstetric and neonatal outcomes being influenced by biological immaturity, unintended pregnancy, inadequate perinatal care, poor maternal nutrition, and stress. Socioeconomic, cultural, geographic and racial factors are also associated with teenage pregnancy and poor pregnancy outcome [2,3]: cephalopelvic disproportion, premature labor dystocia, operative delivery, intra uterine growth retardation, neonatal mortality and still birth [4-6].

Like other sub Saharan African countries, Cameroon has a high rate of adolescent pregnancies. According to the 2011 Demographic Health Survey (DHS), 23.3% of women are adolescents [7]. Cameroon is a country located in Central Africa and has a population of 23,130,708 inhabitants. Sixty two per cent of the total population is less than 25 year old and the median age is 18.3 years. Mother's mean age at first birth is 19.7 years.

Life expectancy at birth is 57.37 years. The contraceptive prevalence rate is 23.4% and the total fertility rate is 4.82 children born / women. Yaoundé is the political capital of the country with a population of 2,403,000 inhabitants [8]. This town also serves as the capital of the Centre Region (one of the ten administrative regions in the country), which has 4,098,592 inhabitants. The Yaounde Central Hospital has the oldest and the largest maternity of the region with an average of approximately 3,000 births a year [9]. The aim of this study was to assess whether adolescent deliveries have more fetal complications, than non-adolescent deliveries in the Centre region of Cameroon.

Our general objective was to evaluate the neonatal outcome in adolescent delivery, specifically by identifying the socio demographic characteristic of adolescents delivering at the Yaoundé Central Hospital, determining the prevalence of adolescent delivery in the study population, evaluating the immediate fetal outcomes (mode of delivery, 5th Apgar score, birth weight, gestational age at birth) and comparing these outcomes with those of women aged 20 and above delivering in the same maternity.

2. MATERIALS AND METHODS

A cross-sectional study carried out at the Obstetrics and Gynecology Unit of Yaoundé Central Hospital which reviewed deliveries from May 1, 2008 to March 30, 2010. Using Lorenz's formula for calculating sample size $N = \frac{p(1-p)}{d^2}$ where N = sample size and assuming a P = national prevalence of adolescent pregnancy in Cameroon of 26.54% [9], an α of 0.05 and a Z_α of 1.96, a minimum sample size of 300 women was required but in order to increase the power of the study, all deliveries recorded in the registers (6041) during the study period were included. The following data were retrieved from the delivery registers and noted on a structured pre-tested anonymous data collection sheet: participant's age (in years), route and mode of delivery (categorized nominally into normal vaginal delivery, assisted vaginal delivery and cesarean delivery), vital status of fetus at birth (alive or still birth), Apgar scores at the 5th minute of life as a continuous variable and birth weight (in grams). The study covariates were parity (categorized ordinally as 1 (primipara), 2-5 and multipara (>5)), gestational age (in weeks) marital status (single or married), profession (unemployed, civil servant, privately employed, self-employed), level of education (categorized ordinally as never schooled, primary, secondary and tertiary). The following variables were used to assess foetal outcomes: birth weight, 5th minute Apgar score, referral status of the mother gestational age. Foetal outcome was considered poor in the presence of one of the following: birth weight less than 2,500 grams or above 4,000 grams, 5th minute Apgar's score less than 7.

Statistical analyses were done using SPSS (Statistical Package for Social Sciences) 20.0 for Windows statistical software package. Prior to analyses, all continuous data were tested for normality using histogram plots to justify use of parametric statistical tests. Univariate analyses of continuous variables are presented as frequencies, means and standard deviations. Strength of associations between categorical variables is presented as odds ratios and the chi-squared test (χ^2) was used to assess differences between proportions. Differences between means were assessed using multiple analyses of variance (ANOVA). All statistical tests were two-sided and considered statistically significant at $p < .05$.

3. RESULTS

We got data from 6041 participants who put to birth at the Yaoundé Central Maternity during our study period. Valid and missing data for each variable are shown in Table 1.

The frequencies of variables in Tables 2, 3, 4, 5 and 6 are sum up to 100% following the total number of valid data and not the total number of participants.

The results obtained after statistical analysis of our study population (only valid data) are shown below.

3.1 General Characteristics of Study Participants

General characteristics of study participants are shown in Table 2.

The mean age of adolescents was 17.78 ± 1.31 and that of non-adolescent women 28.32 ± 5.44 years. The prevalence of adolescent delivery in our population was 9.3% (560 out of 5997) as shown in Table 1. We equally noticed that 79.4% (434 out of 560) of the adolescents were not married against 50.1% (2654 out of 5437) for non-adolescents. Fifty two point six per cent (290 out of 551) of adolescents were students.

The proportion of referred participants was significantly ($p = .020$) higher in the adolescent group (6.4% versus 4.3%, OR 1.53 (1.07-2.20)).

There were significantly ($p = .020$) more referred participants in the adolescent group (6.4% versus 4.3%, OR 1.53 (1.07-2.20)).

3.2 Obstetrical Characteristics of Study Participants

Singleton pregnancies made up the bulk of the study sample (5365 cases, 94.8%) followed by twin pregnancies (295 cases, 5.0%) and triplet pregnancies (16 cases, .2%).

3.3 Gestational Ages of Participants

Gestational ages of participants are shown in Table 3.

Gestational ages of pregnancies ranged between 28 and 46 weeks in the entire study sample, 28-44 weeks in the adolescent group and 28-46 in

Table 1. Number of valid and missing data for each variable

Variable	Age	Marital status	Employment status	Referral status	Gestational age	Mode of delivery
valid	5997	5845	5904	5997	4032	5921
missing	44	196	137	44	2009	120
total	6041	6041	6041	6041	6041	6041

the non-adolescent group. When assessed as means, pregnancies in the non-adolescent group lasted significantly longer than pregnancies in the adolescent group (38.46 ± 2.72 versus 38.13 ± 3.19 weeks respectively, $p = .007$).

This was supported by significantly higher rate of premature deliveries in the adolescent group compared to the non-adolescent group (29.3% and 24.5% respectively, $p = .041$, OR 1.28 95% CI 1.01-1.62).

3.4 Mode of Delivery

The modes of delivery of both groups are shown in Table 4.

Cesarean deliveries accounted for 14.8% (876 out of 5921) of all deliveries with no significant difference between the group specific rates (16.6% versus 14.6% for the adolescent and non-adolescent groups respectively, $p = .207$).

Assisted deliveries accounted for 1.1% (57 out of 5045) of all vaginal deliveries, with no significant difference between the rates in the adolescent and the non-adolescent groups (1.5% and 1.1% respectively, $p = .411$). Fifty four out of 57 assisted vaginal deliveries were done by forceps (94.7%).

3.5 Birth Weights

Foetal outcomes are presented in Table 5. Birth weights ranged from 820 to 5470 grams. Babies born of adolescent mothers weighed significantly less than those born of non-adolescent mothers (mean weights 2984.80 ± 647.81 versus 3190.72 ± 645.45 grams, $p < .001$).

Apgar scores in both groups are compared in Table 6.

Mean 5th minute Apgar's score in the non-adolescent group was significantly higher than in the adolescent group (8.90 ± 2.32 versus 8.44 ± 3.11 ; $P = .001$).

4. DISCUSSION

We got data from 6041 participants who put to birth at the central maternity during our study

period. Each variable had missing data (Table 1). This is a common weakness found in retrospective studies.

4.1 General Characteristics of the Study Participants

Age of participants ranged from 13 to 49 years with a mean age of 27.34 ± 6 years (Table 2). Adolescents participants had a mean age of 17.78 ± 1.31 years while the mean for the non-adolescents group was 28.32 ± 5 years. Candan et al. [10] in 2010 had similar results with mean ages of 19 and 28 years for the adolescents and non-adolescents participants respectively.

The prevalence of adolescent pregnancy in our study population was 9.3%. Ago et al. [11] found 6.3% teenage deliveries in Nigeria (from a total of 2313 deliveries). Tebeu et al. [12] had a very high prevalence of 26.45% working in the North of Cameroon. This high prevalence was probably due to the fact that the North of Cameroon is Muslim dominated and teenage marriages are very common.

The population of referred participants was significantly higher (6.4% against 4.3%) in adolescents than in non-adolescent group ($p = .02$). Some studies have explained this by the fact that adolescents often receive limited or no prenatal care and hence are found in difficult situations needing referrals to bigger health institutions with better facilities for proper management [13]. In our context, many teenagers are poor and prefer to be followed up in small poorly equipped health centres incapable of handling complications of pregnancy and delivery [14].

The mean gestational ages of the non-adolescent group was 38.46 ± 2.72 against 38.13 ± 3.19 weeks for the adolescent group respectively, with a p value of .007. This shows that in the adolescent group, pregnancies lasted significantly shorter than in the non-adolescent group. Many studies have got similar results [10,15].

Table 2. General characteristics of study participants

Variables		Adolescent participants (10-19 years)		Non-adolescent participants		P-value	OR (95 % CI)	Entire study sample	
		n	%	n	%			N	%
Sample size		560	9.3	5437	90.7			5997	100 [¶]
Age (years)	Mean ± SD	17.78±1.31		28.32±5.44		<0.001		27.34±6.03	
	Range	13-19		20-49				13-49	
Marital status	Single	432	79.4	2654	50.1	<0.001	3.85	2759	47.2
	Married	112	20.6	2647	49.9		(3.10-4.77)	3086	52.8
Employment status	Student	290	52.6	1097	20.5	<0.001	NA	1387	23.5
	Unemployed	15	2.7	197	3.7			212	3.6
	Employed	246	44.6	4059	75.8			4305	72.9
Referral status	Referred	36	6.4	233	4.3	0.020	1.53	269	4.5
	Non-referred	524	93.6	5204	95.7		(1.07-2.20)	5728	95.5

[¶]Data unavailable for 44 of the 6041 total cases CI: Confidence Interval, OR: Odds Ratio, NA: Not-applicable

Table 3. Gestational age of participants

Variable		Adolescent participants (10-19 years)		Non-adolescent-participants		P-value	OR(95 % CI)	Entire study sample	
		n	%	n	%			n	%
Gestational age (weeks)	Mean ± SD	38.13 ± 3.19		38.46±2.72		0.026		38.43±2.77	
	Range	28-44		28-46				28-46	
	28-36	110	29.3	897	24.5			1007	25.0
	37-42	252	67.2	2694	73.7	0.007	NA	2946	73.0
	>42	13	3.5	66	1.8			79	2.0

Table 4. Distribution of participants following the mode of delivery

Variable	Adolescent participants (10-19 years)		Non-adolescent participants		p-value	OR (95 % CI)	Entire study sample		
	n	%	n	%			N	%	
Mode of delivery	<i>Vaginal</i>	462	83.4	4583	85.4	0.207	1.16(0.92-1.47)	5045	85.2
	<i>Cesarean</i>	92	16.6	784	14.6			876	14.8
Assisted delivery	<i>Yes</i>	7	1.5	50	1.1	0.411	1.40(0.63-3.09)	57	1.1
	<i>No</i>	455	98.5	4533	98.9			4988	98.9
Type of assisted delivery	<i>Forceps</i>	7	100.0	47	94.0	1.000	NA	54	94.7
	<i>Vacuum extractor</i>	0	0.0	3	6.0			3	5.3

CI: Confidence Interval; OR: Odds Ratio; NA: Non-applicable

Table 5. Outcome of newborns

Variables	Adolescents participants		Non-adolescent participants		P-value	OR (95% CI)	Entire study sample	
	n	%	n	%			n	%
Birth Weight in grams	Mean ± SD	2984.80±647.81		3190.72±645.45		<0.001	3171.40±648.40	
	Range	950-5200		820-5470			820-5470	
	<2500	94	16.8	671	12.4	<0.001	765	12.8
	2500-3999	453	80.9	4238	78.4		4691	78.6
	≥ 4000	13	2.3	500	9.2		513	8.6

Table 6. APGAR scores at 5th minute

Variable	Adolescent participants (10-19 years)		Non-adolescent participants		P-value	OR (95% CI)	Entire study sample		
	N	%	n	%			n	%	
Apgar score at 5th minute	Mean ± SD	8.44±3.11		8.90±2.32		<.001	8.89±2.58		
	Range	0-10		0-10			0-10		
	0-3	57	11.2	305	6.6	<.001	NA	362	7.1
	4-6	5	7.1	65	1.4			70	1.4
	7-10	447	87.8	4234	92.0			4681	91.5
	No	3	100.0	12	100.0			15	100.0

CI: Confidence Interval OR: Odds Ratio NA: Non-applicable

There was equally a significantly higher rate of premature deliveries and post term deliveries in the adolescent group as compared to the adult group with p values of .026 and .007 respectively. Many studies corroborate our findings of more premature and more post-term deliveries in adolescents than in adults [10,15,16].

Cesarean deliveries accounted for 14.8% of all deliveries with no significant differences between the two groups ($p=.207$). This is contradictory to findings from many authors [10,14-16]. However, Safid et al. [17] had similar findings as those of our study. This could be explained by the fact that the Central Maternity of Yaoundé is a referral center and receives all referred cases for cesarean section no matter the age of participants. There was no significant difference between the adolescent and the adult group as far as vaginal assisted delivery was concerned ($P=.411$).

4.2 Fetal Outcomes

It was observed that children born of adolescent mothers had a significantly higher rate of prematurity and post-maturity. Risk factors such as lower follow-up rates, higher incidence of infection and more psychosocial stress may explain the higher rates of prematurity in adolescent mothers while immaturity of the hypothalamo - hypophysial pathway for oxytocin production and uterine immaturity may explain the higher tendency for adolescent pregnancies to go post-term compared to their non-adolescent counterparts.

There were no significant difference in proportion of males compared to females born of adolescents or of non-adolescent mothers ($p=.483$). There was however a significant difference in weights of newborns between the two groups with adolescent mothers newborns having smaller birth weights (mean weight 2984.80g for adolescent group against 3190.72 g for the adult group). Candan et al. and Pun et al. Had similar findings [10,15]. Mean 5th minute Apgar's score was significantly lower in adolescent than in the non-adolescent group with ($P<.001$). This finding was confirmed by Pun et al. who found that newborns from adolescents had more neonatal complications than those from non-adolescents mothers [15]. Candan et al. [10] did not find any statistically significant difference in fetal outcomes between the two groups.

Perinatal deaths were significantly more frequent in the adolescent group. Many studies had similar findings [15,18]. The increased risk was probably attributable to other factors that are related to teenage pregnancy such as cultural practices, poor socioeconomic conditions, low literacy rate, inadequate prenatal and perinatal care besides the biological factors [6,19].

5. CONCLUSION

Adolescent deliveries compared to non-adolescent ones are associated with poor fetal outcome: higher rates of referrals, prematurity, post-term, perinatal deaths, lower birth weights and lower 5th-minute Apgar's scores. We recommend that more emphasis should be put on the prevention of teenage pregnancies, given the poor fetal outcomes they carry at delivery. When teenage pregnancies occur, these adolescents should benefit from subsidized quality prenatal care and orientated to deliver in maternities that can better manage the complications linked to adolescence.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Clearance for the study was obtained from the management board of the study site after ethical clearance by the review board of the Yaoundé University Faculty of Medicine and Biomedical Sciences and from the administration of the Yaoundé Central Hospital. Confidentiality was assured when collecting and analyzing data as prescribed by the Helsinki declaration on human research.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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