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Childbirth in Primiparous Adolescents: Prevalence, Pregnancy Profile, Maternal and Perinatal Prognosis

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Abstract

Introduction: Adolescent childbirth is a public health and social problem worldwide. It is associated with both maternal and perinatal morbidity and mortality. The general objective of our study is to determine the prevalence and profile of pregnant women, and to assess the maternal and perinatal prognosis of adolescent childbirth in Kisangani. **Methods:** This was a prospective, multicenter, case-control observational study conducted over a seven-month period, from February 1 to August 31, 2024, in primiparous adolescent gestational carriers (cases) and primiparous gestational carriers aged 20 to 34 years (controls) who delivered in five health facilities in the city of Kisangani, Democratic Republic of Congo. **Results:** The prevalence of teenage childbirth was 13.8%. Adolescents were more likely than controls to be in secondary education and to be unemployed. Compared with controls, pregnant adolescents were more likely to have poor ANC attendance. There was a statistical difference between the two groups in relation to pelvic anomaly, rupture of membranes on admission, hypertensive disorders, vicious presentation, caesarean section, episiotomy, postpartum anaemia and puerperal psychosis. In fact, these morbidities were more common in adolescent girls than in controls. Compared with controls, neonatal depression, prematurity, low birth weight and perinatal death were more prevalent in the newborns of teenage mothers. **Conclusion:** The prevalence of teenage childbirth is high in Kisangani; there is an association between unmarried status, lack of employment, low socio-economic status, poor ANC follow-up and teenage childbirth in Kisangani.

The latter is also associated with high maternal and perinatal morbidity and mortality.

Keywords

Childbirth, Adolescent, Prevalence, Prognosis

1. Introduction

Adolescent pregnancy and childbirth remain a global public health and social problem in both developed and developing countries [1]-[3].

The World Health Organization (WHO) defines an adolescent as any person between the ages of 10 and 19 [3] [4].

According to the World Atlas [5], African countries lead the world in teenage pregnancy. Mali, Angola, Mozambique, Guinea, Chad, Malawi and Côte d'Ivoire had 175, 167, 143, 142, 137, 137 and 135 per 100,000 births per year respectively [5]. In the sub-Saharan African region, the prevalence of teenage pregnancy is 19.3%, with East and Central Africa having the highest prevalence (21.5%) [6].

In 2010, the teenage birth rate was 6/1000 in Sweden, 24/1000 in England, 34/1000 in the USA and 9/1000 in France [7]. Around 16 million girls aged 15 - 19 and 2 million girls under 15 give birth every year worldwide, and half of all adolescent births occur in just seven countries: Bangladesh, Brazil, the USA, Ethiopia, India, Nigeria (7.5% - 49.5% in 2023) and the DRC, where a 2017 study in Lubumbashi found an adolescent birth rate of 7.7% [8].

Teenage pregnancy and childbirth present health risks for the mother, such as anaemia, hypertension, eclampsia, depressive disorders, dystocic labour, puerperal endometritis, post-partum haemorrhage and caesarean delivery. But also for the child, who is at increased risk of low birth weight, prematurity, depression, and perinatal death, consequently, has greater morbidity and mortality in childhood [9]-[16].

In the DRC, in the city of Lubumbashi, soft-tissue tears were recorded in 10.0% of adolescent cases, and the proportion of episiotomies was 29.1%. Teenage mothers were more likely to have a pathological delivery (4.1%). Eclampsia at delivery or postpartum was more common in adolescents than in adults, with proportions of 3.6% and 0.6% respectively [8].

Thus, the overall aim of our study is to determine the prevalence and profile of pregnant women, and to assess the maternal and perinatal prognosis of adolescent childbirth in Kisangani.

2. Methodology

2.1. Study Design, Period and Framework

This was a case-control, multicenter, prospective observational study conducted over a seven-month period, from February 1 to August 31, 2024, in primiparous

adolescent pregnant women (cases) and in primiparous pregnant women aged 20 to 34 (controls) who had come to give birth in the following five health facilities in the city of Kisangani: Kabondo general referral hospital, PRINCE ALWALEED medical center, Matete Hospital Centre, BOLILA Medical Center and SAINT JOSEPH Hospital center.

The city of Kisangani, in the eastern part of the Democratic Republic of Congo, has several maternity hospitals. A pre-survey was carried out to select maternity units that admitted a significant number of adolescent parturients.

2.2. Study Population

The study population consisted of all pregnant women who had given birth during the study period in the five health facilities that served as study sites.

2.3. Sample and Selection Criteria

Sample

In this study, sampling was of the non-probability convenience type. The sample size was calculated using Epi Info© 7.2.4.0 in its StatCalc function. This calculation considered the prevalence of teenage childbirth at 7.7% according to the study conducted in Lubumbashi, another city in the DRC in 2014 [8]. Assuming a confidence level of 95% and a power of 80%, the minimum number of subjects required for this study to be carried out was 109 pregnant girls aged under 20 (cases). Each case was matched with two controls (pregnant women aged between 20 and 34).

Selection criteria

The study included consenting primiparous pregnant women who had come to give birth, aged less than 20 years for the cases and 20-34 years for the controls during the study period; with records allowing follow-up of the delivery and postpartum period for both the mother and the newborn. All parturients aged 35 or over, all parturients transferred to another health facility and all non-consenting parturients were not included in this study. Pregnant women with multiple pregnancies, who were not primiparous, who had a scarred uterus and who were aged between 20 and 34, but who came after the admission of 2 controls selected for each study case, were excluded from this study.

At the end of this inclusion process, a sample of 378 pregnant women who had given birth was selected for this study. This sample was made up of 126 pregnant women aged under 20 (cases) and 252 pregnant women aged between 20 and 34 (controls).

2.4. Data Collection

Data collection was prospective, based on interviews and documentary analysis. The research team consisted of 13 people: 5 general practitioners, 5 midwives or maternity unit managers (one doctor and one midwife per site), 2 laboratory technicians and a supervisor who was our principal investigator.

2.5. Study Variables

The variables studied were as follows:

- ***Maternal sociodemographic characteristics***: maternal age, marital status (married, single), occupation (unemployed, employed), parity, level of education (not in school, primary, secondary and higher education or university) and pregnancy follow-up. Pregnant women living with a partner were considered married, and single in the opposite case. Pregnancies were considered unattended if no prenatal consultation (ANC) had taken place, poorly attended if the number of ANCs was between 1 and 3, and well attended if the number of ANCs was greater than or equal to 4.)

To determine the socio-economic level of our patients, we had used the index of possession of material goods as proposed in the 2014 Democratic Republic of Congo Demographic and Health Survey. This rating takes into account the presence in a household of a few goods considered as an index of wealth, and each of these goods is rated out of 1. These are running water in the household, internal toilets, electricity, each of the 4 consumer goods (Radio or cell phone, television, refrigerator, vehicle,). Thus, the different scores enable us to classify the population studied as: 7/7 = high socio-economic level 2 to 6/7 = medium-high socio-economic level 0 - 1/7 = low socio-economic level [17].

- ***Parameters related to maternal morbidity and mortality***: route of delivery (cesarean or vaginal), fetal presentation (cephalic vertex, vicious or noncephalic vertex), episiotomy, postpartum anemia, hypertensive disorders, pathological delivery, soft tissue lesions, puerperal psychosis, maternal death. Delivery was considered pathological when placental retention and/or delivery hemorrhage were noted. Soft tissue lesions included cervical, vaginal and perineal tears. Post-partum anemia was defined as a hemoglobin level below 10 g/l. Hypertensive disorders were defined as a rise in blood pressure greater than or equal to 140 mm Hg systolic and/or 90 mm Hg diastolic.

- ***Parameters related to perinatal morbidity and mortality:*** low birth weight (<2500 grams), neonatal depression (Apgar score at the fifth minute < 7), prematurity, perinatal death. Prematurity was defined on the basis of the date of the first day of the last menstrual period (LMP), validated using the Finnstrôm morphological score for newborns and/or early ultrasound dating (before 14 SA). It was used when gestational age was less than 37 SA.

2.6. Data Processing and Analysis

Data were entered using Microsoft Office Excel LTSC 2021 and analyzed using R version 4.4.0.

Bivariate analyses were performed, enabling us to compare percentages using the Chi-2 test of independence and Fisher's exact test according to their validity conditions. Means were compared using Student's t-test.

To measure the strength of association between variables, we also calculated crude odds ratios and their confidence intervals for significant outcomes, using

the simple binary logistic regression method.

To eliminate confounding factors, we calculated adjusted odds ratios and their confidence intervals using the GLM (Genealize Linear Model) multiple (multivariate) logistic regression method.

2.7. Ethical Considerations

Permission was sought from the Ethics Committee of the University of Kisangani and obtained. Written informed consent to participate in the study was obtained from each adolescent. Data were kept anonymous.

3. Results

3.1. Prevalence

Out of a total of 1002 births recorded during the study period, we identified 138 births under the age of 20 (adolescents), representing a prevalence of 13.8%.

3.2. Socio-Demographic Data

The mean age was 17 years, with a standard deviation of 1.5 for adolescent gestational carriers, and 26.4 years, with a standard deviation of 3.7, for mothers aged 20 to 34. There was a statistical difference between cases and controls in terms of marital status, level of education, occupation and socio-economic status. Adolescent girls were more likely than controls to have a secondary education, and to be unemployed. Single status and low socioeconomic status were more common among cases. Pregnant adolescents were 3 times more likely to be single (adjusted OR = 3.26; [95% CI = 1.89 - 5.69]; $p < 0.001$) and 10 times more likely to be unemployed (adjusted OR = 9.87; [95% CI = 4.39 - 26.5]; $p < 0.001$) than controls. (Table 1).

3.3. Gynaeco-Obstetrical History of Pregnant Adolescents Versus Controls

There was a statistical difference between the two groups in relation to the number of ANC, knowledge of date of last menstrual period and desire for pregnancy. Compared with the controls, the majority of pregnant teenagers had poor ANC attendance (65.9% vs. 33.3%), were unaware of the date of the last menstrual period in 28.6% vs. 13.1%, and the pregnancy was unwanted in teenagers (85.7% vs. 19.0%). Pregnant teenagers had a high risk of ignoring the date of the last menstrual period (adjusted OR = 0.35; [95% CI = 0.16 - 0.76]; p-value = 0.009) and 43 times the risk of having the unwanted pregnancy (adjusted OR = 43.2; [95% CI = 19.5 - 105]; p-value < 0.001) than controls (Table 2).

3.4. Maternal Prognosis

There was a statistical difference between the two groups with regard to pelvic anomaly, rupture of membranes on admission, hypertensive disorders, vicious presentation, caesarean section, episiotomy, postpartum anaemia and puerperal

Table 1. Socio-demographic characteristics of adolescent gestational carriers and controls.

Variables	MATERNAL AGE		cOR (95% CI)	P	aOR (95% CI)	P
	<20 ans N = 126[1] (%)	20 - 34 ans N = 252[1] (%)				
Average age (years)	17.0 (1.5)	26.4 (3.7)				
Marital status						
Single	63 (50.0)	48 (19.0)	—		—	
Married	63 (50.0)	204 (81.0)	4.25 (2.67 - 6.84)	**<0.001**	3.26 (1.89 - 5.69)	**<0.001**
Level of education						
No schooling	16 (12.7)	36 (14.3)				
Primary	18 (14.3)	0 (0.0)				
Secondary	84 (66.7)	120 (47.6)				
Higher/University	8 (6.3)	96 (38.1)				
Occupation						
Employed	6 (4.8)	96 (38.1)	—		—	
unemployed	120 (95.2)	156 (61.9)	12.3 (5.65 - 32.4)	**<0.001**	9.87 (4.39 - 26.5)	**<0.001**
Socio-economic level						
Low	45 (35.7)	36 (14.3)	—		—	
Middle	81 (64.3)	216 (85.7)	3.33 (2.01 - 5.56)	**<0.001**	1.16 (0.63 - 2.10)	0.6

[1]Averages (standard deviation), n (%).

Table 2. Gynaeco-obstetrical history of pregnant teenagers versus controls.

Variables	MATERNAL AGE		cOR (95% CI)	P	aOR (95% CI)	P
	<20 ans N = 126[1] (%)	20 - 34 ans N = 252[1] (%)				
Number of ANC						
Well attended	19 (15.1)	144 (57.1)	—		—	
Poorly attended	83 (65.9)	84 (33.3)	7.49 (4.33 - 13.5)	**<0.001**	1.39 (0.59 - 3.10)	0.4
No followed	24 (19.0)	24 (9.5)	7.58 (3.65 - 16.1)	**<0.001**	0.72 (0.24 - 2.12)	0.6
Knowledge of the date of last menstrual period						
No	36 (28.6)	33 (13.1)	—		—	
Yes	90 (71.4)	219 (86.9)	2.65 (1.56 - 4.54)	**<0.001**	0.35 (0.16 - 0.76)	**0.009**
Desired pregnancy						
No	108 (85.7)	48 (19.0)	—		—	
Yes	18 (14.3)	204 (81.0)	25.5 (14.5 - 47.2)	**<0.001**	43.2 (19.5 - 105)	**<0.001**

[1]n (%).

psychosis. In fact, these morbidity factors were more prevalent in adolescent girls than in controls. Adolescents were twice as likely as controls to have ruptured membranes on admission, pelvic anomaly, caesarean delivery, episiotomy and puerperal psychosis (Table 3).

Table 3. Maternal prognosis of adolescent gestational carriers versus controls.

Variables	MATERNAL AGE		cOR (95% CI)	P	aOR (95% CI)	P
	<20 ans N = 126[1] (%)	20 - 34 ans N = 252[1] (%)				
Dynamic dystocies						
No	98 (77.8%)	192 (76.2%)				
Yes	28 (22.2%)	60 (23.8%)				
Pelvic anomaly						
No	111 (88.1%)	251 (99.6%)	—		—	
Yes	15 (11.9%)	1 (0.4%)	33.9 (6.75 - 617)	**<0.001**	20.5 (3.60 - 390)	**0.005**
Ruptured membranes						
No	83 (65.9%)	203 (80.6%)	—		—	
Yes	43 (34.1%)	49 (19.4%)	2.15 (1.32 - 3.48)	**0.002**	1.97 (1.14 - 3.39)	**0.015**
Hypertensive disorders						
No	96 (76.2%)	229 (90.9%)	—		—	
Yes	30 (23.8%)	23 (9.1%)	3.11 (1.73 - 5.68)	**<0.001**	1.40 (0.67 - 2.90)	0.4
Mode of delivery						
Caesarean section	30 (23.8%)	24 (9.5%)	—		—	
vaginal delivery	96 (76.2%)	228 (90.5%)	2.97 (1.65 - 5.38)	**<0.001**	2.71 (1.14 - 6.31)	**0.022**
Presentation anomalies						
No	114 (90.5%)	252 (100.0%)				
Yes	12 (9.5%)	0 (0.0%)				
Soft tissue lesions						
No	110 (87.3%)	228 (90.5%)				
Yes	16 (12.7%)	24 (9.5%)				
Episiotomy						
No	64 (50.8%)	192 (76.2%)	—		—	
Yes	62 (49.2%)	60 (23.8%)	3.10 (1.97 - 4.90)	**<0.001**	3.71 (2.08 - 6.68)	**<0.001**
Delivery disorders						
No	98 (77.8%)	204 (81.0%)				
Yes	28 (22.2%)	48 (19.0%)				
Post-partum anemia						
No	36 (28.6%)	120 (47.6%)	—		—	

Continued

Yes	90 (71.4%)	132 (52.4%)	2.27 (1.45 - 3.63)	**<0.001**	1.14 (0.66 - 1.97)	0.6
Psychiatric disorders						
No	104 (82.5%)	240 (95.2%)	—		—	
Yes	22 (17.5%)	12 (4.8%)	4.23 (2.05 - 9.13)	**<0.001**	3.00 (1.35 - 6.88)	**0.008**
Maternal death						
No	125 (99.2%)	252 (100.0%)				
Yes	1 (0.8%)	0 (0.0%)				

3.5. Perinatal Prognosis

There was a statistical difference between cases and controls with regard to perinatal prognosis. Compared with controls, neonatal depression, prematurity, low birth weight and perinatal death were more common in newborns of teenage mothers. Newborns of teenage mothers had 5 times the risk of neonatal depression (adjusted OR = 4.67; [95% CI = 2.06- 11.1]; p-value < 0.001) (Table 4).

Table 4. Perinatal prognosis of newborns of teenage mothers and controls.

Variables	MATERNAL AGE		cOR (95% CI)	P	aOR (95% CI)	P
	<20 ans N = 126[1]	20 – 34 ans N = 252[1]				
APGAR 5th minute						
≥7	95 (75.4)	240 (95.2)	—		—	
<7	31 (24.6)	12 (4.8)	6.53 (3.30 - 13.7)	**<0.001**	2.67 (2.06 - 11.1)	**<0.001**
Prematurity (<37 SA)						
No	86 (68. 3)	216 (85.7)	—		—	
Yes	40 (31.7)	36 (14.3)	2.79 (1.67 - 4.69)	**<0.001**	0.91 (0.34 - 2.35)	0.9
Low birth weight						
No	83 (65.9)	216 (85.7)	—		—	
Yes	43 (34.1)	36 (14.3)	3.11 (1.87 - 5.20)	**<0.001**	1.79 (0.70 - 4.59)	0.2
Perinatal death						
No	117 (92.9)	252 (100.0)				
Yes	9 (7.1)	0 (0.0)				

4. Discussion

4.1. Prevalence

Our study reports a prevalence of 13.8%. Our prevalence is higher than those found by other studies carried out in urban areas in Africa, such as Kakudji *et al.* [8], Fouelifack *et al.* [18], Hamidou *et al.* [19] and Traoré *et al.* [20], who found frequencies of 7.7%, 6.9%, 3.06% and 5.72% respectively. However, very low

frequencies (below 2%) have been noted in Enugu (Nigeria) and Kuala Lumpur (Malaysia) [21].

Our high prevalence is justified by the low socio-economic level of families, with illiteracy leading teenage girls into a very early sexual life. Some authors also point to the absence of certain non-governmental organizations that encourage unmarried pregnant or raped teenagers and give them the alternative of abortion in the event of an unwanted pregnancy [12].

Our prevalence is similar to those of Liga *et al.* [22] in Ethiopia, who reported a national frequency of 10.3%, Koita *et al.* [23] in Senegal, Diallo *et al.* [24] in Guinea and Salifou *et al.* [25] in Niger in 2024, who reported rates of 12.3%, 14.86% and 14.43% respectively.

4.2. Profile of Pregnant Women

In our series, 50.0% of teenage mothers were single, 66.7% had a secondary education, 95.2% were unemployed and 35.7% had a low socio-economic status. They had not followed ANC correctly (65.9%), were unaware of the date of last menstrual period (28.6%) and did not want their pregnancies (85.7%). These proportions are statistically different from those of adult women giving birth, and are more to the disadvantage of adolescents. After multivariate logistic regression, adolescents were 3 times more likely to be single and 10 times more likely to be unemployed than controls.

Concerning marital status, some authors such as Salifou *et al.* [25], Samaké *et al.* [26], Diallo *et al.* [24] and Kakudji *et al.* [8] reported a predominance of married adolescents. Others, such as Koita *et al.* [23], found a high proportion of single girls. This difference can be explained by the different operational definitions of the term "married". As in our study, the first two authors defined it as anyone living only as a couple, while others such as Koita *et al.* [23] insisted on the possession of a civil status certificate.

In our study, 65.9% of teenage pregnancies were not well monitored. This rate is higher than those found by Kakudji *et al.* [8] and Salifou *et al.* [25], who reported rates of 48.6% and 33.2% respectively. It is far higher than that of Samaké *et al.* [26]. According to the WHO, in developing countries, young pregnant women often present late to ANC (in the second or third trimester of pregnancy) or do not even come for antenatal care.

Reasons cited for this lack of interest in antenatal care services include ignorance of the importance of antenatal care, lack of family or social support, unavailability of antenatal care services and poverty. Also of note are unkind remarks by health workers towards unmarried pregnant adolescents, who attempt to evade public respect as some clinics lack privacy [8].

Well-conducted ANC is essential for a good obstetrical prognosis. Prenatal follow-up is the privileged period when high-risk pregnancies are detected with a view to proper management. Our results show a significant difference when comparing the rates of poorly monitored pregnancies (65.9% versus 33.3%; $P < 0.001$)

in adolescent and adult births, which may have contributed to pregnancy complications in adolescents.

In our study, compared with adults, 28.6% of teenage mothers were unaware of the date of the last menstrual period (versus 13.1%; P < 0.001). This result could be explained by the low educational level of teenagers and the fact that 85.7% of them did not want their pregnancies (adolescence multiplied the risk of having an unwanted pregnancy 43 times; adjusted OR: 43.2).

4.3. Maternal Prognosis

Unlike pregnant adults, adolescents were statistically at high risk of pelvic anomaly, vicious presentation, rupture of membranes on admission, caesarean delivery, episiotomy, hypertensive disorders and puerperal psychosis (P < 0.05).

In our study, pelvic anomaly was significantly more frequent in the under-20s than in the 20 - 34 s (adjusted OR = 20.5). This result is identical to that of Traoré *et al.* [20] at Sikasso Hospital, who found 9.2% pelvic anomalies in adolescent girls versus 3% in adults, with a statistically significant difference. Although the mature forms of the pelvis are acquired around the age of 16, the pelvis does not definitively complete its configuration until the age of 25. In adolescents, the pelvis grows more slowly and progressively into old age. Moreover, the acquisition of adult height does not imply equivalent growth of the pelvis. This immaturity of the pelvis is responsible for abnormalities of the pelvis, such as borderline pelvis and the generally shrunken pelvis in adolescents [8] [20].

Adolescent parturients were 3 times more likely to give birth by caesarean section than adults. This result corroborates those of Traoré *et al.* [20] and Kakudji *et al.* [8], where caesarean section was the preferred mode of delivery for 32.8% versus 20.7% (P < 0.005; RR = 1.5) and 11.4% versus 7.4% (adjusted OR = 1.9) respectively. In practice, the high caesarean section rate was attributed to several factors, such as the high proportion of pelvic anomalies, the high frequency of hypertensive disorders in very young women, primigravida, lack of prenatal follow-up and vicious presentations.

Hypertensive disorders were more frequent in adolescents than in adults (23.8% vs. 9.1% P < 0.001). This frequency is higher than those of Salifou *et al.* [25], Traoré *et al.* [20] and Kakudji *et al.* [8], who found 19.85%, 10.76% vs. 3% and 3.6% vs. 0.6% respectively. Our high frequency would be due to the globalization of all hypertensive disorders in our study, whereas the other authors retained only cases of eclampsia, which is only one of the complications of hypertension during pregnancy. Low socio-economic status may also influence this trend. Several factors determine the onset of vasculo-renal syndromes in adolescent girls: vascular immaturity, biological and endocrine immaturity, and primigravida [22] [25].

This study found that episiotomy was performed 4 times more frequently in adolescents than in adults (adjusted OR= 3.7). This finding is echoed in other studies [8] [23] [25]. The authors of the latter studies believe that the disorders are

due to other causes, such as the technical skills of the personnel conducting the delivery, mastery of active management of the third stage of labor, and physiological processes, rather than the age of the parturient. In our series, in addition to the above-mentioned reasons, the rate of episiotomy in adolescents is also due to the immaturity of the perineum, making it difficult to stretch during release.

Concerning post-partum anemia, the study showed that 71.4% of teenage mothers were anemic versus 52.4% ($P < 0.001$). Kakudji *et al.* [8] found a postpartum anemia rate of 2.3% versus 1.0%. This difference may be linked to the operational definition of postpartum anemia, which in our study was considered to be any hemoglobin drop below 10 g/dl. Whereas the aforementioned author also included clinical signs in the definition (decompensated anemia).

4.4. Perinatal Prognosis

The study shows that 31.7% of newborns born to adolescent mothers were premature, compared with 14.3% of those born to adult mothers. Our result is far superior to those of Kakudji *et al.* [8], Traoré *et al.* [20] and Salifou *et al.* [25], who found 12.7% versus 6.9%, 5.65% versus 3% and 12.97% respectively. Our high frequency of prematurity would be attributed primarily to the operational definition criterion. The high proportion was found by means of morphological score evaluation in newborns of teenage mothers who were subject to ignorance of the date of the last menstrual period due to their low level of education and the absence of early ultrasound dating [27]. It is then linked to the lack of prenatal follow-up and unfavourable socio-economic conditions.

In the adolescent, the physical immaturity of the uterus (less developed) is often blamed for the birth of a premature or even a low-weight newborn [28] [29]. Studies on teenage pregnancies confirm the competition between the teenage mother's body and the body of the fetus for food, nutrients, vitamins and minerals. This explains why adolescent girls are twice as likely as adult women to have low-birth-weight babies, and more likely than adult women to give birth to premature babies [29] [30].

With regard to neonatal depression (APGAR at 5 minutes < 7), our study found a frequency of 24.6% in newborns of teenage mothers versus 4.8% ($P < 0.001$); newborns of teenage mothers had 5 times the risk of neonatal depression than those of adult mothers (adjusted OR = 4.67). Our results concur with those of Ndiaye. O [17] in Senegal and Salifou *et al.* [25], who found respectively 28% of cases versus 16% for controls ($p = 0.04$) and 27.19%, but far superior to that of Kakudji *et al.* [11], who found that the proportion of newborns depressed at 5 minutes of life (Apgar score < 7) was 8.2% in the adolescent group versus 5.6% in the adult group, the difference not being statistically significant ($p = 0.1566$).

Concerning perinatal mortality, a high risk of perinatal death is found in newborns of teenage mothers, a finding similar to that of Kakudji in Lubumbashi by Kakudji [8]. The accumulated risk of perinatal mortality in newborns of teenage mothers is consistent with previous surveys [3]. Perinatal mortality is explained

by intra-uterine growth retardation, constituting a picture of chronic fetal suffering fetal distress, which accumulates during labor and leads to acute fetal distress; this would also account for the high frequency of neonatal depression [31].

5. Conclusion

The prevalence of teenage childbirth is high in Kisangani; there is an association between unmarried status, secondary education, lack of employment, low socio-economic status, poor ANC follow-up and teenage childbirth in Kisangani. The latter is also associated with high maternal and perinatal morbidity and mortality.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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