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Adolescent Pregnancy Complications in Northern Cameroon: Frequency, Clinical Features, and Maternal Mortality in 604 Cases

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Abstract

Background: Complications of pregnancy among adolescents represent a major public health burden in sub-Saharan Africa, where adolescent mothers face heightened risks of eclampsia, anemia, hemorrhage and maternal death. **Objective:** The aim of this study was to describe the epidemiological and clinical aspects of pregnancy complications among adolescents in Garoua, the northern part of Cameroon. **Methods:** A cross-sectional descriptive study with retrospective data collection was conducted from January to December 2023 in 8 health facilities in Garoua. All parturients aged 10 - 19 years were included; data were analysed using EPI INFO 3.5.3. **Results:** Out of 3031 total deliveries, 993 (32.76%) were adolescent deliveries (*i.e.*, 32.76% of all deliveries involved adolescents aged 10 - 19 years); 604 complete files were analysed. Mean age was 17.73 ± 1.21 years. Only 17.22% had ≥4 antenatal care visits. Clinical complications (defined as any obstetric condition requiring medical intervention beyond routine care) included hypertension (6.29%), neurological signs (3.31%), vaginal bleeding (3.48%), and anaemia (6.46%). Meconium-stained amniotic fluid was present in 25.55%. Maternal mortality was 3.31%, eclampsia being the leading cause (50%). C**onclusion:** Pregnancy complications among adolescents in Garoua are frequent and often severe. Eclampsia is the leading cause of maternal death. Low antenatal care attendance, early marriage, and poverty are the main contextual contributors frequently co-occur-

ring with adolescent pregnancy in this setting; coordinated interventions addressing these factors are needed.

Keywords

Adolescent Pregnancy, Pregnancy Complications, Eclampsia, Maternal Mortality, Cameroon

1. Introduction

Adolescent pregnancy, defined as pregnancy occurring in girls aged 10 - 19 years, remains a concern in reproductive health challenges worldwide, particularly in sub-Saharan Africa [1] [2]. The global adolescent birth rate declined from 64.5 births per 1000 women aged 15 - 19 in 2000 to 41.3 per 1000 in 2023; nevertheless, sub-Saharan Africa remains the highest rate globally, at approximately 101 births per 1000 adolescent women in 2021 [3] [4].

An estimated 21 million girls aged 15 - 19 years in low- and middle-income countries become pregnant annually, of whom approximately 50% carry unintended pregnancies [5]. Adolescent mothers face bigger risks of obstetric complications than those who are adult women and this includes eclampsia, puerperal endometritis, systemic infections, and anemia [1] [6]. Their newborns are also at increased risk of low birth weight, preterm birth, and neonatal death [6] [7].

In Cameroon, 23.3% of deliveries involved adolescents according to the 2019 Demographic and Health Survey [8]. The region of the North of Cameroon, where Garoua is located, is characterized by high rates of early marriage, low female school attendance, and limited access to reproductive health services all established risk factors for adolescent pregnancy [9] [10]. The pooled incidence of pre-eclampsia in sub-Saharan Africa has been estimated at 13%, well above the global average of 5% - 8%, and hypertensive disorders of pregnancy account for approximately 16% of maternal deaths in the region [11] [12].

Despite the recognised magnitude of the problem, no specific study had previously documented the epidemiological and clinical profile of pregnancy complications among adolescents in Garoua. This study was therefore designed to fill this gap, with the objective of describing the frequency, sociodemographic characteristics, clinical features, and maternal outcomes of pregnancy complications among adolescents in Garoua.

2. Methods

2.1. Study Design and Setting

We conducted a cross-sectional descriptive study with retrospective data collection from 1 January to 31 December 2023 in 8 health facilities of the city of Garoua, northern Cameroon: the Regional Hospital of Garoua (HRG), the two Medical Centres (CMA) of Laïndé and Djamboutou, as well as 5 Integrated Health Centres (Kolléré, Ngalbidjé, Poumpoumré, Bocklé, and Takasko). These facilities

serve the two health districts, which significantly cover the urban and peri-urban population. The selected facilities are public health institutions providing intrapartum care at relatively low cost, thereby ensuring greater accessibility for the population. They were also chosen because they serve as the main centers within the two main health districts of Garoua and manage a higher patient load compared to other facilities.

2.2. Participants

All parturients aged 10 - 19 years who delivered at one of the study facilities during the study period were eligible. Patients were excluded if their delivery occurred outside the study period or if their medical records were incomplete. Using consecutive non-probability sampling, 993 adolescent deliveries were identified, of which 604 complete files were retained after exclusion of 389 records. The 389 excluded records were most commonly missing blood pressure values at admission, delivery outcome data, or gestational age; as severely complicated cases may have required emergency transfer with incomplete documentation, the excluded files may be skewed towards more severe presentations, potentially leading to an underestimate of complication rates in the analyzed data.

2.3. Variables

The main variables studied were: sociodemographic data (age, education level, marital status, occupation); obstetric history (parity, gestational age, previous complications); antenatal care attendance (number of ANC visits, ultrasound examinations, blood tests); clinical examination at admission (conjunctival colour, blood pressure, neurological signs, vaginal bleeding); obstetric examination (foetal heart rate, state of membranes, amniotic fluid colour, foetal presentation); and maternal outcomes (complications, maternal death and its cause). Key outcomes were defined as follows using chart-recorded values: hypertension as systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg on admission; anaemia as pallor of conjunctivae on clinical examination (categorised as normal, moderately pale, or pale as recorded in the partogram); neurological signs as any of headache, visual disturbances, or hyperreflexia recorded at admission; pre-eclampsia as hypertension in pregnancy plus at least one additional feature (oedema, proteinuria, or neurological signs) as documented by the attending physician; eclampsia as generalised tonic-clonic convulsions in a woman with pre-eclampsia; and postpartum haemorrhage as excessive bleeding in the immediate postpartum period as recorded by the physician.

2.4. Data Collection and Analysis

Data were collected retrospectively from obstetric records and delivery registers and entered and analysed using EPI INFO version 3.5.3. Results are expressed as frequencies and percentages. The study was conducted in accordance with the principles of the Declaration of Helsinki [13] and was approved by the Regional

Committee for Health Research Ethics of the North Region (Ref. N˚0011/CERSH/NO/2024). Patient confidentiality was maintained throughout.

3. Results

3.1. Frequency and Sociodemographic Profile

Of the 3031 deliveries recorded during 2023, 993 involved adolescents, giving an adolescent delivery rate of 32.76% (*i.e.*, 993 of 3031 total deliveries involved a mother aged 10 - 19 years). After exclusion of 389 incomplete records, 604 files were analysed. The mean age was 17.73 ± 1.21 years (range: 12 - 19 years). The 18 - 19 age group accounted for 58.94% of cases. The vast majority of adolescents (86.42%) were married (n = 522 of 602 with complete marital status data; 2 records missing). Education was limited: 33.77% had never attended school and 42.72% had only primary education. Most (72.19%) were housewives (Table 1).

Table 1. Distribution by age, education, marital status and occupation.

Variable	n	%
AGE (years)-Mean: 17.73 ± 1.21		
10 - 15	39	6.46
15 - 18	209	34.60
18 - 19	356	58.94
Education		
No schooling	204	33.77
Primary	258	42.72
Secondary	111	18.38
Higher	31	5.13
Marital Status	Missing 2	
Married	522	86.42
Single	80	13.25
Occupation		
Housewife	436	72.19
Student	104	17.22
University Student	29	4.80
Other	35	5.79

3.2. Obstetric History and Contraception

The majority of adolescents (74.34%) were primigravida. Only 10.76% had ever used a modern contraceptive method. The mean age at menarche was 11 years in 50.33% of cases. Previous obstetric events of note included uterine scar (1.99%), previous gestational hypertension (0.17%), and previous eclampsia (0.17%).

3.3. Antenatal Care Attendance

ANC attendance was inadequate in the majority of cases. Only 17.22% had achieved the minimum recommended 4 ANC visits; 73.84% attended only 1 - 3 times, and 8.94% received no antenatal care whatsoever. Over 11% had no ultrasound examination during pregnancy. Despite low ANC uptake, 91.56% had received iron supplementation and 90.23% had received intermittent preventive treatment for malaria (Table 2).

Table 2. Antenatal care attendance and treatments received.

Variable	n	%
Number of Anc Visits		
≥4 (recommended)	104	17.22
1 - 3 (insufficient)	446	73.84
None	54	8.94
Gestational Age		
Preterm (<37 weeks)	49	8.11
Term (37 - 42 weeks)	518	85.76
Post-term (>42 weeks)	37	6.13
Number of Ultrasound Scans		
1 scan only	415	68.71
2 scans	93	15.40
≥3 scans	27	4.47
None recorded	69	11.42
Treatment Received		
Iron supplementation	553	91.56
Intermittent preventive treatment (malaria)	545	90.23
Folic acid	23	3.81
Calcium	19	3.15

3.4. Clinical Complications at Admission

Hypertension was present in 6.29% of adolescents at admission. Neurological signs (headache, visual disturbances, hyperreflexia) suggesting imminent eclampsia were found in 3.31%. Active vaginal bleeding was noted in 3.48%, and signs of anaemia in 6.46%. Among patients with ruptured membranes (n = 407), meconium-stained amniotic fluid was observed in 25.55% of cases (Table 3).

Table 3. Clinical signs of complications at admission.

Clinical Variable	n	%
Conjunctivae		
Well Coloured (Normal)	565	93.54

Continued

Moderately Pale	27	4.47
Pale (Anaemia)	12	1.99
Hypertension at Admission		
Yes	38	6.29
No	566	93.71
Neurological Signs		
Yes	20	3.31
No	584	96.69
Vaginal Bleeding		
Yes	21	3.48
No	583	96.52
Amniotic Fluid Colour (if ROM, n = 407)		
Clear	271	66.58
Meconium-Stained (Green)	104	25.55
Blood-Stained (Red)	29	7.13

3.5. Maternal Deaths

Maternal deaths occurred in 20 cases, representing a rate of 3.31%. Eclampsia was the leading cause of death (50%), followed by postpartum hemorrhage (30%), hypertension (10%), severe pre-eclampsia (5%), and uterine rupture (5%) (Table 4).

Table 4. Distribution by cause of maternal death.

Cause of Death	n (N = 20)	%
Eclampsia	10	50.0
Postpartum Haemorrhage	6	30.0
Severe Hypertension	2	10.0
Severe Pre-Eclampsia	1	5.0
Uterine Rupture	1	5.0

4. Discussion

4.1. Frequency

The adolescent delivery rate of 32.76% in our series is markedly higher than that reported by Samaké *et al.* in 2022 in Bamako (19.61%) [14], Adama-Hondegla *et al.* in Lomé (3.66%) [15], and Fouelifack *et al.* at Yaoundé Central Hospital (9.3%) [16]. This high rate likely reflects the specific socio-cultural context of northern Cameroon, where early marriage is prevalent [9] [10], as evidenced by 86.42% of adolescents being married, 76.49% having no schooling or only primary educa-

tion, and only 10.76% using modern contraception—contextual factors frequently co-occurring with adolescent pregnancy in this setting [17].

4.2. Inadequate Antenatal Care

The low attendance of antenatal care was alarming: only 17.22% achieved the WHO-recommended minimum of 4 visits. The WHO emphasises that via antenatal care we are able to detect and manage hypertensive disorders of pregnancy and anaemia [1]. The rarity of ultrasound examinations (11.42% had none) further compromised the quality of foetal monitoring. Financial barriers, geographic distance, and social factors are the primary explanations for low ANC uptake in this context.

4.3. Hypertensive Complications

Hypertensive disorders were present at admission in 6.29% of cases, and neurological signs in 3.31%. Eclampsia accounted for 50% of maternal deaths, reflecting both the high prevalence of hypertensive disorders among young primgravidae and delays in diagnosis and treatment [11] [12]. The WHO recommends systematic screening for pre-eclampsia at every ANC visit, and early magnesium sulfate administration to prevent progression to eclampsia [1] [18].

4.4. Anaemia

A proportion of 6.46% of adolescents had signs of anemia at admission despite 91.56% having received iron supplementation. The persistence of anemia may reflect poor nutritional status, malaria, and hemoglobin disorders common in northern Cameroon. Anemia during pregnancy is a significant independent predictor of perinatal asphyxia and neonatal mortality in sub-Saharan Africa [19] [20].

4.5. Meconium-Stained Amniotic Fluid

Meconium-stained amniotic fluid, a recognized marker of acute fetal distress [19], was present in 25.55% of cases with ruptured membranes. This high rate is consistent with the elevated prevalence of gestational hypertension compromising placental perfusion, and with insufficient fetal surveillance during labor. This finding is further explored in our companion paper on delivery outcomes.

4.6. Maternal Mortality

The maternal death rate of 3.31% in our cohort is high in the context of African adolescent obstetric series. In a systematic review and meta-analysis of adolescent deliveries in Cameroon, Njim *et al.* confirmed that adolescents face a significantly increased burden of adverse maternal and neonatal outcomes compared with adults [21]. Similarly, in a comparative hospital study at the Korle-Bu Teaching Hospital in Accra, Ghana, Onuzo *et al.* found that adolescents had approximately three-fold higher odds of eclampsia than adults [22]. Sub-Saharan Africa accounts

for approximately 70% of global maternal deaths, with 182,000 deaths in 2023 [23]. Among adolescents, risk is amplified by physiological immaturity, late presentation, and delayed management [2] [6]. Eclampsia, responsible for 50% of deaths in this series, is preventable with timely pre-eclampsia screening and magnesium sulphate prophylaxis [18].

4.7. Limitations

The study had many limitations that have to be integrated when analysing the findings. First, the retrospective design and reliance on routine obstetric records mean that data quality depends on the completeness and accuracy of clinical documentation, which may be challenging in resource-limited settings and more difficult in a health centre. Second, the exclusion of 389 (39%) eligible records due to incompleteness introduces a potential selection bias; if more severely ill patients were more likely to have incomplete records (e.g., due to emergency transfers), complication rates in the analysed adolescents may be underestimated. Thirdly, because the study was not carried out in all the facilities, it restricts the generalization of the results obtained. The health-facility deliveries represent a self-selected population, and the findings cannot be extrapolated to home births or the wider adolescent population of northern Cameroon.

5. Conclusion

Pregnancy complications among adolescents in Garoua are frequent, severe, and largely preventable. The frequency of adolescent delivery (32.76%) is among the highest reported in sub-Saharan Africa. Eclampsia is the primary cause of maternal death, fuelled by inadequate antenatal care, undetected pre-eclampsia, and delayed treatment. The main contextual contributors frequently co-occurring with adolescent pregnancy complications in this cohort were low ANC attendance, early marriage, educational deprivation, and poverty. Coordinated interventions including free ANC for girls under 18, systematic pre-eclampsia screening, education about family planning, and policies to end child marriage, are urgently needed to reduce the burden of adolescent pregnancy complications in Garoua and northern Cameroon.

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Conflicts of Interest

The authors declare no conflicts of interest.

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