International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Félix E et al. Int J Reprod Contracept Obstet Gynecol. 2026 Jan;15(1):1-7
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20254252

Original Research Article

Determinants of complications in adolescent pregnancies: a cross-sectional analytical study in three hospitals in Yaoundé

Essiben Félix[1]*, Ngo D. M. Ange[2], Umuhire Evelyne[1], Mol H. Léonard[1], Foumane Pascal[1]

[1]Department of Gynecology and Obstetrics, Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Cameroon
[2]Department of Gynecology and Obstetrics, Faculty of Medicine and Pharmaceutical Sciences, University of Dschang, Cameroon

Received: 25 November 2025
Accepted: 18 December 2025

***Correspondence:**
Dr. Essiben Félix,
E-mail: fessiben@gmail.com

ABSTRACT

Background: Adolescent pregnancy remains a pressing public health issue in Cameroon, contributing significantly to maternal and neonatal complications. Understanding the determinants of these complications is crucial to improving care and outcomes for pregnant adolescents in Yaoundé. The objective of the study was to describe the key sociodemographic, clinical, and healthcare-related factors associated with complications among pregnant adolescents in Yaoundé.
Methods: We conducted a prospective, hospital-based cross-sectional analytical study over eight months (October 2024–June 2025) in three hospitals in Yaoundé. The study involved adolescent girls aged 15–19 years attending antenatal care or birthing at these sites. Data were collected using pretested questionnaires and analysed using Stata SE17 and R 4.4.3, with statistical significance set at $p<0.05$.
Results: Out of 215 adolescent mothers enrolled, 22% experienced complications, with perineal lacerations (30.7%) and low birth weight (21.9%) being the most common maternal and foetal complications respectively. Significant independent risk factors for complications included having fewer than 4 antenatal care visits (aOR=3.75, p=0.011) and unemployed partner or working in the informal sector (aOR=7.60, p=0.008). Additionally, receiving good preventive care during ANC was found to be a protective factor (OR=0.21, p=0.015). Other factors such as age, education level, history of abortion, and partner support were not significantly associated with complications.
Conclusion: Adolescent pregnancy is subject to overlapping socioeconomic and healthcare limitations, leading to high maternal and neonatal complications despite hospital-based deliveries. Addressing these outcomes requires adolescent-centered, multidisciplinary management including by families, clinicians, researchers, and government policies.

Keywords: Adolescent, Pregnancy, Complications, Determinants, Yaoundé

INTRODUCTION

In recent years, adolescent pregnancy has become an important health issue in many countries, especially developing countries like Cameroon even though by no means is it a new phenomenon. According to the World Health Organization (WHO), an adolescent pregnancy refers to pregnancy occurring in females aged 10 to 19 years with peculiar physical, social, psychologically and reproductive health requirements.[1] The transition from childhood to adulthood occurs in adolescence, characterized by numerous physiological, anatomical, structural, and psychological changes. Teenagers are more likely to experience pregnancy and childbirth complications with ensuing serious health consequences because they are not prepared.[2] Complications from pregnancy are the second leading cause of death for adolescent girls aged 15-19 years worldwide, with low-

and middle-income (LCMI) countries accounting for 99% of global maternal deaths of women aged 15-49 years.[3]

Globally every year, an estimated 21 million girls aged 15-19 years in developing regions who become pregnant and approximately 12 million of them give birth.[4] In 2022, approximatively 13% adolescent girls gave birth before the age of 18. It is also worth noting that there is an inequality in the distribution of adolescent pregnancies between, and event within countries due to a plethora of factors.[1]

In Africa, rates of adolescent pregnancies are increasing with higher occurrences of adverse maternal and perinatal outcomes. Several factors can contribute to the onset of these complications. In the literature, it is described that demographic factors like residence, marital status, the level of education of both the adolescents and parents as well as the level of communication between parents and adolescent regarding reproductive and sexual health are determining factors.[5] In the Democratic Republic of Congo, a study indicated that the risk of complications in adolescent pregnancy stems from limited capacity for maternal and neonatal care.[6]

Adolescent pregnancy constitutes a public health problem in Cameroon and concern 8.2 to 12 % of all deliveries.[7,8] Delay in ANC attendance contributes to negative long-term health outcomes for the pregnant adolescent and their newborns.[8] Give the importance of this subject, especially in our context, we sought to find out why certain pregnant adolescents have complications while others do not in Yaoundé.

METHODS

Study design

A prospective hospital-based cross-sectional and analytical study was carried out.

Study site

This study was carried out in three hospitals namely: the Yaoundé Central Hospital (YCH), the Yaoundé Gynaecology, Obstetrics and Pediatrics Hospital (YGOPH) and the Social Animation and Health Centre (CASS) of Nkoldongo.

Study duration

This study was carried out over a period of eight (8) months from October 2024 to June 2025 with data collection from January 2025 to May 2025.

Study population

Our study population consisted of pregnant adolescents aged 10-19 years consulting at the outpatient departments and maternities of Yaounde Central Hospital, Yaounde Gyneco-Obstetrical and Pediatric Hospital and Nkoldongo Social and Health Animation Center (CASS). We included all pregnant adolescents aged 10-19 years who presented for ANC visits. We obtained their approbation and authorization of their guardians. All adolescents aged 10-19 years who come to deliver within the period of our study were included. We excluded pregnant adolescents with known chronic diseases before pregnancy and those who withdrew their approbation during the course of the study

Sampling

Our sampling was probabilistic and consecutive. We calculated sample size using the Cochran's formula with the prevalence of adolescent pregnancies of 14.4% in Cameroon.[8] Our minimal size was 190 participants.

Procedure

After administrative authorizations, patients fulfilling our eligibility criteria were approached. We obtain their written/oral consent after a comprehensive explanation of the study. Relevant information was obtained with the use of a validated pre-tested questionnaires adapted for the study.

Variables

The variables collected included sociodemographic characteristics (age, residence, marital status, level of education, profession, primary carer, context of pregnancy, age of partner, profession of partner, level of partner's support); gynecological history (menarche, gynecological age, method of contraception); obstetrical history (gravidity, parity, abortion); personal medical history (HTN, diabetes, sickle cell anaemia); toxicologic history (alcohol, smoking); family history (HTN, preeclampsia, adolescent pregnancy); delivery (GA at delivery, route of delivery); pregnancy follow-up (Number of ANCs, site of ANCs, health care professional in charge of ANCs, GA during first ANCs); fetal complications (preterm birth, low birth weight, neonatal asphyxia, intrauterine demise, neonatal infections, neonatal death) and maternal complications (preeclampsia, obstructed labour, perineal tears, postpartum bleeding, premature prolonged rupture of membranes (PPRM), postpartum depression).

Based on themes regarding social support in maternal literature (financial assistance, emotional encouragement, practical involvement e.g. attending ANCs, and taking part in decision making), we developed a 5-point scoring system to evaluate the level of partner's support: level 1: no form of support, may deny or reject the pregnancy; level 2: minimal or inconsistent support (rare financial aid, rare visits, no emotional encouragement, no decision making); level 3: occasional support (financial, emotional, practical involvement) under external pressure from family; level 4: consistent support (but no taking part in decision making);

level 5: fully supportive (with decision making and active planning for the child's future). Score was on 5, with 1 and 5 being the lowest highest scores, respectively, poor=1-2; moderate=3 and good=4-5.

Prevention was evaluated by a score on 7

Obstetrical ultrasound (1=ultrasound done in first and or second trimester or 0=ultrasound done only in third trimester or not done); iron and/or folic acid supplementation (1=yes, 0=no), malaria prevent (1=at least IPT or mosquito net, 0=no); tetanus vaccine (1=yes, 0=no); syphilis serology (1=yes, 0=no), HIV serology (1=yes, 0=no). Addition to these, points=7 resulting in a maximum of 7 and a minimum of 0. Those who scored 6 or 7=good prevention; 4–5=moderate prevention; 0-3=bad prevention.

Preparation for delivery

Received advise on financial and material preparation (1=yes, 0=no); Counselling on labour and danger signs (1=yes, 0=no); available birth companion (1=yes, 0=no); site for delivery determined (1=yes, 0=no); means of transport (1=yes, 0=no). Those who had a score of: 0–2=bad preparation; 3=moderate preparation; 4-5=poor preparation.

Postpartum depression

It was evaluated using the Edinburg postnatal depression scale (EPDS), which is a widely used screening tool designed to identify mothers experiencing postnatal depression. It consists of 10 self-report questions, each scored on a scale of 0-3, based on how the mother has felt over 7 previous days. Scoring was as follows: 0-9 likely no depression; 10-12=possible depression (to re-administer the test subsequently); 13 or more: suspicion of depression, further exploration necessary. For our study, any adolescent with EPDS score ≥13 was considered as having depression.

Data collection and analysis

Data was entered into KoboToolbox electronic questionnaire and the dataset was subsequently exported to Stata SE version 17 and R version 4.4.3 for cleaning, processing and analysis. Quantitative variables were expressed as mean and standard deviation or median and interquartile range which were compared using Student's t test following the distribution. Pearson's chi-square test was used for comparison between categorical data and Student's test for numerical data. Variables were compared by calculating the odds ratio. All p values less than 0.05 were considered statistically significant.

Administrative formalities

We obtained research authorisations and ethical clearance from the respective hospitals as well as the Institutional Review Board of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I.

Ethical considerations

This study was carried out according to the principles stated in the 1964 Declaration of Helsinki.

Potential participants in our study and their guardians (for adolescents less than 18 years) were duly informed of the importance, procedure and risks of the study before obtaining their consent. No adolescent was forced to participate in the study and they could withdraw anytime they decided. Confidentiality was ensured by assigning randomly generated codes to every participant for all documentation purposes. All data collected was used research only.

RESULTS

In our study, 236 participants were assessed for eligibility, we excluded 21 participants; 12 refused to participate or withdrew their consent during the study, 4 participants had known underlying chronic diseases (2 with sickle cell anaemia, 1 rheumatic valvular heart disease, and 1 with chronic kidney disease), and 5 whose pregnancy outcomes could not be determined since they were lost to follow-up. We finally enrolled 215 participants and analyzed their data.

Prevalence of complications in adolescent pregnancies

In our study, 22% of adolescents experienced either maternal complications, foetal complications or both.

Prevalence of maternal complications in adolescent pregnancies

Common maternal complications noted were: perineal tears (30.7%), postpartum depression (21.9%), obstructed labor (15.4%), preeclampsia (14%) and anaemia (8.8%). In our study, neonatal complications included: low birth weight (21.9%), preterm birth (18.6%), neonatal asphyxia (15.8%) and perinatal death (9.3%) (Figure 1).

Socio-demographic characteristics

Table 1 compares sociodemographic characteristics of adolescents who encountered complications and those who did not. Adolescents whose partners were in the informal sector or unemployed were 3 times more at risk of having complications (OR=2.99, p=0.001).

Pregnancy follow-up characteristics

Table 2 compares pregnancy follow-up characteristics of the two groups. Having attended <4 ANCs significantly increased the risk of complications (OR 3.87, p<0.001). Adolescents who received good preventive measures (vaccines, malaria prophylaxis, pregnancy work up)

during pregnancy were less likely to have complications compared to those who had poor preventive measures and this association was statistically significant (OR 0.21, p=0.015).

Obstetrical and gynaecological characteristics

Table 3 compares the gynaecological and obstetrical history in the two groups. No gynaecological or obstetrical historical was associated with the occurrence or non-occurrence of complications in pregnant adolescents. Although a strong association existed between gestational age at delivery and occurrence of complications, this relationship was not statistically significant (OR=2.3; CI= [0.5-10.53]; p=2.291).

Determinants of complications in adolescent pregnancy (multivariate analysis)

An unemployed partner or informal sector worker, having attended less than 4 ANCs were strongly associated with complications.

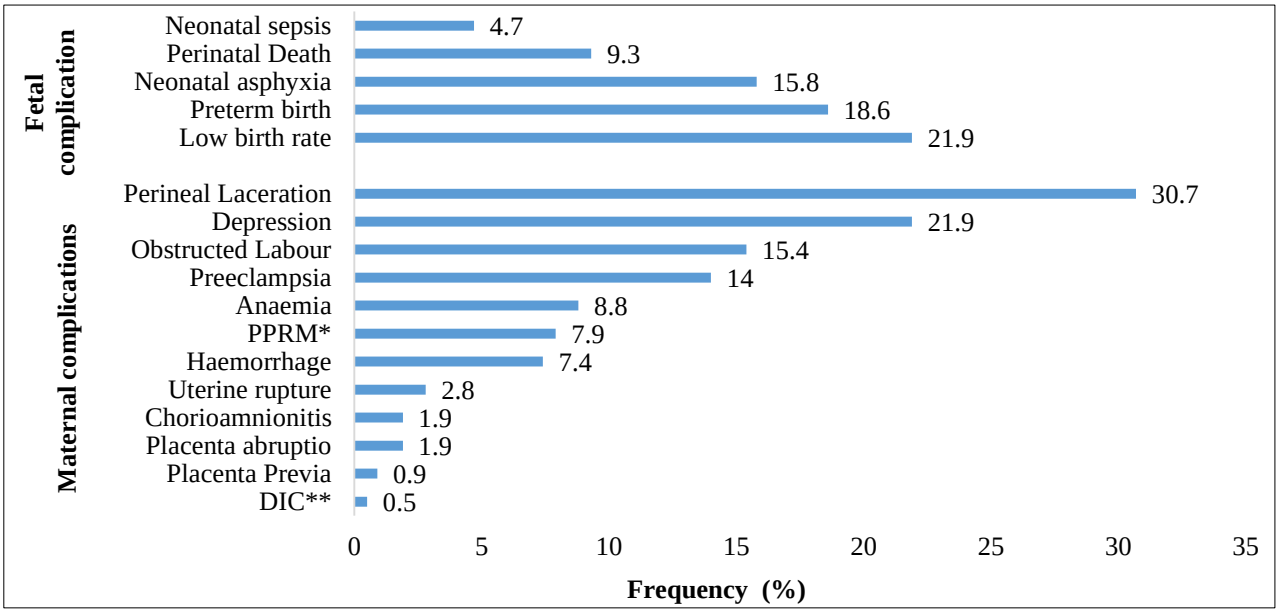

Figure 1: Adolescents maternal and fetal complications.

*PPRM: prolonged premature rupture of membranes, **DIC: disseminated intravascular coagulation

Table 1: Sociodemographic characteristics associated with complications in our study population.

Variables	Complications	No complications	OR [95%CI]	P value
Age (years)				
<18	60	16	1.1 [0.54-2.13]	0.961
18-19	108	31		
Marital status				
Single	120	37	0.5 [0.13-1.64]	0.465
Married	21	3		
Cohabiting	27	7		
Religion				
Non-Christian	14	4	1.0 [0.31-3.12]	0.969
Christian	154	43		
Level of education				
Secondary	115	30	1.8 [0.80-4.18]	0.237
Primary or none	30	6		
Higher	23	11		
Residence				
Rural	27	4	2.1 [0.68-6.21]	0.192
Urban	141	43		
Partner's profession				
Informal sector	91	24	3.0 [1.32-6.74]	0.001
Formal sector	19	15		

Continued.

Variables	Complications	No complications	OR [95%CI]	P value
Student/unemployed	58	8		
Partner's support				
Poor	67	12	2.0 [0.95-4.14]	0.181
Good	90	32		
Average	11	3		

Table 2: Pregnancy follow-up characteristics associated with complications.

Variable	Complications	No complications	OR (95% CI)	P value
Number of ANC visits				
<4	77	36	3.9 [1.84-8.11]	<0.001
≥4	91	11		
ANC site				
1st, 2nd, 3rd category	10	3	1.5 [0.37-6.24]	0.296
4th to 5th category	87	30		
6th category or none	71	14		
ANC professional				
Obstetrician	28	12	1.6 [0.62-4.14]	0.491
Primary care physician	8	5		
Midwife	64	18		
Nurse/nursing aid	39	11		
Other/none	11	1		
Gestational age at 1st ANCs (weeks)				
<13	19	11	0.3 [0.13-0.93]	0.098
13-28	81	25		
>28	50	11		
Prevention				
Good	37	19	0.2 [0.07-0.68]	0.015
Average	94	24		
Bad	37	4		
Preparation for delivery				
Good	71	28	2.9 [1.33-6.18]	0.01
Moderate	17	8		
Bad	11	80		

Table 3: Obstetrical and gynaecological characteristics associated with complications.

Variables	Complications	No complications	OR (95% CI)	P value
Gynaecological age (years)				
<3	25	3	1.9 [0.48-7.32]	0.154
3-5	94	33		
>5	49	11		
Menarche				
<12	16	4	1.0 [0.33-3.30]	0.640
12-14	126	33		
>14	26	10		
History of abortion				
Yes	18	10	0.4 [0.19-1.04]	0.057
No	150	37		
Gravidity				
1	139	35	1.7 [0.76-3.54]	0.202
>1	29	12		
Gestational age at delivery (weeks)				
<32	14	2	2.3 [0.5-10.53]	0.291
32–37	24	4		

Continued.

Variables	Complications	No complications	OR (95% CI)	P value
≥37	125	41		
Route of delivery				
Vaginal	124	36	1.2 [0.54-2.48]	0.699
Caesarean	44	11		
Family history of adolescent pregnancy				
Yes	128	35	1.1 [0.52-2.31]	0.807
No	40	12		
Lifestyle				
Sedentary	3	3	0.3 [0.05-1.37]	0.09
Active	168	47		

DISCUSSION

In our study, 22.9% of adolescents had complications which is similar to the results obtained in 2017 by Essiben et al.[9] Complications were obstetrical and non-obstetrical. These findings support most previous research in Cameroon showing higher maternal morbidity in adolescents.[9,10] This can be explained by biological immaturity of adolescents as well as social stigma that usually hinders adolescents from seeking medical attention on time. Factors commonly associated with obstetric complications are diverse.

The mean age we found, 18 years, was also reported by other studies.[9,11] The difference in percentage could be explained by the use of a wider age range compared to that used in our study. The high proportion of older adolescents may reflect increased sexual activity, lower contraceptive use, or greater autonomy in this age group.[12]

Most adolescents of our study (72.7%) were single as found in a study before in Yaoundé.[13] Singlehood is expected to be prominent at these ages particularly in urban areas. Contrary to the findings of Kabemba et al in 2016 in rural DRC, most adolescents were married (69.2%).[6] Early marriage and consequently pregnancy are usually culturally more acceptable and sometimes encouraged.

Adolescents whose partners were unemployed or in the informal sector had more complications than those whose partners had a stable job. Most adolescents conceived in the context of consensual sex (97.7%), unless they were single (72.7%) and majorly supported by their parents (60.9%). The fact that the partner's occupation influences the occurrence of complications indicates the importance of partner involvement in the support provided to pregnant adolescents. Nsahlai et al in 2022 in Yaoundé found that partners were the main financiers of ANC in adolescents (59.4%).[13]

Their level of education was predominantly secondary (67.3%). That means they can comprehend the health implications associated with their gravid state. In fact, although almost all participants attended at least 1 ANC visit, just 17.7% had more than 5 visits.

Therefore, partner's informal employment may reflect lower socioeconomic status of adolescent environment, affecting affordability of ANCs, nutrition, and delivery services.

Having fewer than 4 ANC visits was significantly associated with having complications. This goes hand in glove with late onset of ANC found among the participants which could explain why they do not attain adequate number of visits before delivery. Adolescents have a tendency to forget or to start ANC late what is founded in the study, due to ignorance, misinformation, fear of the reaction of the parents, stigma from family or society, financial constraints and other.[9,11,14,15]

Therefore, 42.3% of adolescents in our study reported being poorly prepared for delivery. It was described frequent loss to follow-up during ANC due to factors like financial constraints, long waits on queues before consultation, long distance from hospital to their home.[11] Compounding this with late onset of ANCs and tendency to delay seeking medical attention, it appears that adolescents do not visit the hospital frequently enough to be adequately prepared for labour and delivery. Adolescents are therefore also exposed to non-obstetrical complications like anaemia (8.8%) or hypertensive disorders (13%) due to lack of prevention during ANC.

Above all, most participants were primigravida (81.4%). Childbirth in adolescents is often a first-time event. It carries risks of obstructed labor due to a pelvis that is frequently insufficiently developed for childbirth. Obstructed labor represents 15.4% of complications found in the study. However, rural adolescents had twice the odds of complications, although this was not statistically significant. This may be due to the fact that rural areas often face limited ANC services from qualified healthcare providers, contributing to poor outcomes.[10,15] Other factors such as gynaecological age, alcohol use, and family history showed trends toward significance but were not conclusive.

Limitations

The reluctance of adolescents and/or their guardians to respond, due to the sensitive nature of the subject addressing issues related to sexuality, often perceived as

taboo, especially within family environments were challenging. Some bias could be taken in consideration particularly regarding inaccurate information regarding their pregnancy history since the topic discussed concerned sexual and reproductive life, on the other hand, to their ability to remember information regarding certain aspects of menstrual history and level of involvement of partner.

CONCLUSION

Complications during adolescent pregnancy are related to poor monitoring of the pregnancy and preparation of the delivery due to limited socio-economic status of relatives.

ACKNOWLEDGEMENTS

Authors would like to thank the authorities of the Yaounde Central Hospital (YCH), Yaoundé Gyneco-Obstetric and Pediatric Hospital (YGOPH) and the Social Animation and Health Centre (CASS) of Nkoldongo their support during study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Félix E, Ange NDM, Evelyne U, Léonard MH, Pascal F. Determinants of complications in adolescent pregnancies: a cross-sectional analytical study in three hospitals in Yaoundé. Int J Reprod Contracept Obstet Gynecol 2026;15:1-7.