AMP ACTA MÉDICA PORTUGUESA
A Revista Científica da Ordem dos Médicos

Determinants of Adolescent Pregnancy in the Municipality of Malanje, Angola: A Case-Control Study

Determinantes da Gravidez na Adolescência no Município de Malanje, em Angola: Um Estudo Caso-Controlo

Kalonesse ARAGÃO✉[1,2], Euclides SACOMBOIO[3,4], Cristina TEIXEIRA[5,6], Joaquim VAN-DÚNEM[7], Paulo CAMPOS[8]
Acta Med Port 2025 Feb;38(2):88-98 ▪ https://doi.org/10.20344/amp.22407

ABSTRACT

Introduction: Adolescent pregnancy is a global public health problem, with some of the highest rates observed in Sub-Saharan Africa. This phenomenon contributes to maternal and neonatal mortality and may result in diverse economic and psychological consequences. Knowledge of its determinants can help decision-makers to design local policies of sexual and reproductive health. Therefore, the aim of this study was to analyze the determinant factors of adolescent pregnancy in the municipality of Malanje, Angola.

Methods: A case-control study was conducted from August to October, 2022. A sample of 411 adolescent women (137 pregnant and 274 non-pregnant) was compared in terms of socio-demographic, behavioral, family, and extra-family factors. Descriptive statistics, binary univariate and multivariate logistic analysis were applied, with *p*-values ≤ 0.05 indicating statistical significance. Adjusted odds ratio (AOR) and the respective 95% confidence interval (95% CI) were obtained.

Results: The multivariable analysis showed that a higher risk of adolescent pregnancy was associated with living in a *de facto* union or being married (AOR = 10.37; 95% CI = 1.05 - 102.83), having 0 - 4 (AOR = 7.40; 95% CI = 1.25 - 43.77) or 5 - 8 years of schooling (AOR = 5.21; 95% CI = 1.25 - 21.77), and a lower risk was related with having a family history of adolescent pregnancy (AOR = 0.30; 95% CI = 0.11 - 0.80) for women aged 15 - 17. For those aged 18 - 19, a higher risk of pregnancy was associated with early sex initiation (AOR = 3.75; 95% CI = 1.05 - 13.43), having multiple sexual partners (AOR = 3.02; 95% CI = 1.23 - 7.44), while a lower risk was related with peer pressure (AOR = 0.35; 95% CI = 0.15 - 0.82). In both groups, the likelihood of pregnancy was significantly increased for irregular or non-use of contraceptive methods.

Conclusion: In Malanje, adolescent pregnancy is a multifactorial phenomenon, and preventive strategies must consider the adolescents' age. Among adolescents aged 15 - 17, early marriages, should be reduced, through the promotion of education and the creation of specific laws. For older adolescents, preventive strategies should be focused on avoiding risky behaviors such as early initiation of sexual activity and multiple sexual partners. Comprehensive sexual education, including knowledge about contraceptive methods should be promoted.

Keywords: Angola; Pregnancy in Adolescence; Sexual Behavior; Sociodemographic Factors

RESUMO

Introdução: A gravidez na adolescência é um problema global de saúde pública, com taxas mais elevadas na África Subsariana. Este fenómeno contribui para mortalidade materna e neonatal e pode ter diversas consequências económicas e psicológicas. O conhecimento dos seus determinantes pode ajudar os decisores políticos no desenho de políticas locais de saúde sexual e reprodutiva. O presente estudo teve como objetivo analisar os fatores determinantes da gravidez na adolescência no município de Malanje, em Angola.

Métodos: Um estudo de caso-controlo realizado entre agosto e outubro de 2022. Uma amostra de 411 mulheres adolescentes (137 gestantes e 274 não gestantes) foi comparada quanto a fatores sociodemográficos, comportamentais, familiares e extrafamiliares. Foram aplicadas estatística descritiva e análises por regressão logística binária univariada e multivariada, com significância estatística quando $p \leq 0,05$.

Resultados: A análise multivariada demostrou que para as mulheres de 15 - 17 anos de idade, um risco mais elevado de gravidez na adolescência estava associada a estados civis de união de facto ou casada (ORA = 10,37; 95% IC = 1,05 - 102,83), ter 0 - 4 (ORA = 7,40; 95% IC = 1,25 - 43,77) ou 5 - 8 anos de escolaridade (ORA = 5,21; 95% IC = 1,25 - 21,77), enquanto um risco mais baixo estava relacionado com história familiar de gravidez na adolescência (ORA = 0,30; 95% IC = 0,11 - 0,80). Para as mulheres entre 18 - 19 anos de idade, um risco mais elevado de gravidez estava associado a início precoce da atividade sexual (ORA = 3,75; 95% IC = 1,05 - 13,43), múltiplos parceiros sexuais (ORA = 3,02; 95% IC = 1,23 - 7,44), enquanto um risco mais baixo estava associado a pressão dos pares (ORA = 0,35; 95% IC = 0,15 - 0,82). Em ambos os grupos, a probabilidade de engravidar foi significativamente aumentada para uso irregular ou não uso de contracetivos.

Conclusão: Em Malanje, a gravidez na adolescência é um fenómeno multifatorial e as estratégias preventivas devem ter em conta idade das adolescentes. Nas adolescentes com idades entre os 15 e 17 anos é importante reduzir o casamento precoce, através da promoção da educação e da criação de leis específicas. Nas adolescentes mais velhas, as estratégias preventivas devem estar focadas nos comportamentos de risco, como o início precoce da atividade sexual e múltiplos parceiros. Deve ser promovida a educação sexual incluindo conhecimentos sobre métodos contracetivos.

Palavras-chave: Angola; Comportamento Sexual; Fatores Sociodemográficos; Gravidez na Adolescência

1. Department of Public Health. Faculty of Medicine. Universidade Agostinho Neto. Luanda. Angola.
2. Department of Health Science. Polytechnic Institute. Universidade Rainha Njinga a Mbande. Malanje. Angola.
3. Department of Basic Sciences. Health Science Institute. Universidade Agostinho Neto. Luanda. Angola.
4. Health Training Center. Clínica Multiperfil. Luanda. Angola.
5. EPI Unit. Institute of Public Health. Universidade do Porto. Porto. Portugal.
6. Instituto Politécnico de Bragança. Bragança. Portugal.
7. Department of Pediatrics. Faculty of Medicine. Universidade Agostinho Neto. Luanda. Angola.
8. Department of Gynecology and Obstetrics. Faculty of Medicine. Universidade Agostinho Neto. Luanda. Angola.

✉ **Autor correspondente:** Kalonesse Aragão. kalonessebioquimica@gmail.com

Recebido/*Received*: 07/10/2024 - **Aceite/*Accepted*:** 02/01/2025 - **Publicado/*Published*:** 03/02/2025

KEY MESSAGES

- This analysis may provide better support for defining accurate health policies in our setting concerning prevention of adolescent pregnancy according to age groups.
- Among adolescents aged 15 - 17, early marriage should be avoided, through the promotion of education and the creation of specific laws.
- Despite the difference in the determinants of getting pregnant between adolescents aged 15-17 and 18-19, regular contraceptive use and avoiding risky behaviors such as early initiation of sexual activity and multiple sexual partners play an important role in preventing teenage pregnancy. Therefore, reproductive and sexual education is a fundamental element in multidisciplinary interventions to prevent teenage pregnancy.

INTRODUCTION

Adolescent pregnancy is defined as pregnancy in women aged 10 - 19 years.[1] In 2023, the adolescent fertility rate per 1000 women aged 15 - 19 varied from 10 or less in Australia, New Zealand, East Asia, and Europe to 98 in sub-Saharan Africa.[2] In a meta-analysis of studies from 2016 to 2021, the pooled prevalence of adolescent pregnancy was 30% in Africa, and the highest value (33%) was in Western Africa.[3] In this region, Angola is among the countries with the highest adolescent fertility rate (163 per 1000 women),[4] where approximately 35% of adolescent women (15 - 19 years old) experience at least one pregnancy.[4,5] Reducing the adolescent fertility rate is an internationally desired target, and is included in the Millennium Development Goals and Sustainable Development Goals.[6,7] Despite a notable reduction in adolescent fertility worldwide, Sub-Saharan Africa continues to exhibit the highest rate.[1]

Besides its magnitude, adolescent pregnancy contributes to maternal complications such as pre-eclampsia, eclampsia,[8] anemia,[9,10] puerperal endometritis and systemic infections,[11] as well as adverse neonatal outcomes such as low birth weight, prematurity,[8] and neonatal mortality.[12,13] Socio-economically, adolescent mothers may face numerous difficulties in entering the labor market due to low education levels resulting of abandoning school.[14] In addition to the biological and economic consequences of adolescent pregnancy, some authors have also reported psychological outcomes. Some pregnant adolescent face mental health conditions such as depression, traumatic stress, and suicidal and homicidal ideation.[15] In short, adolescent pregnancy may lead to biological, psychological, and socioeconomic consequences.

Considering the sub-Saharan context, determinants of adolescent pregnancy operate at different levels including individual and family-related factors, health service-related factors and sociocultural, environmental, and economic determinants.[16] Individual determinants include age,[17,18] early marriage,[18-20] low education level,[17-21] and behavioral factors such as alcohol consumption and substance abuse,[16] multiple sexual partners,[17] poor knowledge of sexual and reproductive health,[20,22] and non-use or irregular use of contraception.[16,19] Adolescent pregnancy tends to be more common in large families, which are characterized by the poorest wealth quintiles, early pregnancy history, lack of communication, woman head of household, divorced or widowed head of household, maternal or paternal low educational level, and domestic violence.[16-23] The role of friendships and social and healthcare infrastructures affects adolescent sexual behavior at the community level. Lack of access to family planning, an unmet need for contraception, opportunities for leisure and recreation, as well as peer pressure, contribute to adolescent pregnancy due to increased high-risk behaviors such as early sex initiation, multiple sexual partners, and non-use of contraception.[17,19,23]

As previously mentioned, Angola is among the Sub-Saharan African countries with the highest adolescent fertility rate. However, there is a lack of knowledge of the factors associated with this phenomenon. Published research is essentially based on descriptive or cross-sectional studies carried out in the south of the country in the provinces of Huambo and Huila. In these studies, most pregnant adolescents were single, with completed primary education, and lived with both biological parents. Compared to non-pregnant adolescents, the pregnant ones had less school attendance and they reported alcohol consumption and having multiple sexual partners more frequently.[24,25] According to the Malanje Municipal Health Directorate, this municipality situated in the North of Angola registered around 2170 new cases of teenage pregnancy in the first half of 2022 (unpublished data), a worrying scenario without available studies. The aim of the present study was to analyze the determinant factors of adolescent pregnancy in the municipality of Malanje, Angola. The results of this study can help decision-makers to design local health policies with targeted interventions to promote knowledge about sexual and reproductive health for adolescents.

METHODS

Study design and location

We conducted an unmatched case-control study (two controls for one case) in the municipality of Malanje, Angola, from August 2nd to October 5th, 2022. The municipality of Malanje is located in northern Angola, in the province of Malanje, and comprises five urban areas, 22 peri-urban areas, and 212 rural areas. In 2014, the municipality had approximately 506 847 residents. Agriculture and commerce are the main economic activities in Malanje, and the government is the largest employer.

In 2022, the municipality of Malanje had 37 functional health units (36 being primary health care units), of which only 12 had antenatal care services. Family planning services are available to all women from menarche to 45 years old, and sexual and reproductive health education begins in the seventh grade, but with several limitations. According to the Malanje Municipal Health Directorate, there are several contraceptive methods available freely for the population in public health units such as condoms, injectables, pills, intrauterine devices, and implants. Among them, injectables are the most commonly used method, after condoms (unpublished data).

Population and sampling technique

The study population comprised adolescent women living in the municipality of Malanje. The sample consisted of 420 participants divided into two groups: cases (n_1 = 140) and controls (n_2 = 280). An appropriate sample size was calculated according to a proportion of cases living with both parents (P_1) of 0.356; a proportion of controls living with both parents (P_2) of 0.507; an average of proportions (P) of 0.4315; a control-to-case ratio (C) of 2:1; a critical value ($Z_{1-\alpha/2}$) of 1.96; a test power ($Z_{1-\beta}$) of 84%; and a non-response rate of 10%. The data were obtained from studies carried out in sub-Saharan Africa.[22,26]

A single-stage cluster sample was selected. According to existing resources and a list of healthcare units provided by the Health Directorate of the municipality, five healthcare centers (Cahala, Canambua, Catepa I, Maxinde II, and Ritondo) were selected at random. Due to the lack of a sample list to select the elements within the cluster, all eligible adolescents were included in the study. Therefore, healthcare centers with more patients (cases and controls) during the study period contributed with more participants. After data collection, nine survey forms were excluded from the analysis due to incomplete information. Therefore, the final sample comprised 137 cases and 274 controls.

The study included all women aged 15 - 19 years residing in the municipality of Malanje, who received antenatal care or emergency medical services. All cases were pregnant adolescents who received their first antenatal care visit. Non-pregnant adolescents were used as hospital controls recruited from those who received emergency medical services in the same healthcare units as the cases. To avoid sample heterogeneity concerning obstetric characteristics and the number of previous prenatal care visits, we excluded all adolescents in a return antenatal visit and who had been pregnant previously.

According to the United Nations Children's Fund,[27] around 94.1% of annual cases of teenage pregnancy occur in the 15 - 19 age group. Likewise, the Malanje Municipal Health Directorate reported that adolescents aged between 15 - 19 years old represent 98.2% of adolescent women who attended antenatal care in the first half of 2022. For this reason, the present study only covered women in this age group.

Measurements of variables and instruments

Adolescent pregnancy was chosen as the dependent variable, which was dichotomous (i.e., yes or no). Exposure factors were grouped as socio-demographic, behavioral, family, and non-family contextual variables (Table 1).

The survey form comprised five sections: (1) identification; (2) sociodemographic; (3) behavioral; (4) family; (5) nonfamily contextual data. The Parent-Child Conflict Tactics Scale (CTSPC) is an internationally known instrument comprising 18 items divided into two subscales of psychological abuse and physical violence.[28] In a pilot study with the same population as that of the present study, the translated scale had a Cronbach's alpha of 0.76. In the present study, the CTSPC was used to assess physical and psychological violence as dichotomous (yes or no) without considering the score. Therefore, the participant who reported any act of these forms of violence was classified as 'yes'. Physical violence was moderate and severe. Severe cases involved harsher acts such as being beaten for a long time, being strangled, and being burned with a hot liquid.

Data collection and processing

A team of 10 inquirers (first-year nursing and clinical psychology students) was recruited and trained in completing the survey forms and ethics for scientific research, then allocated into non-fixed paired groups to collect primary and retrospective data from each healthcare center. The pilot study allowed the rewriting of some questions to facilitate the participants' understanding in the data collection phase. The inquirers completed data collection via a face-to-face conversation with each participant without their parent present. Each survey form was filled out twice: once with a pencil and again with a pen to confirm each entry. The maximum time to fulfill the data collection instruments was 11 minutes (seven for the survey form and four for the scale). Finally, the data were entered into a database and cleaned

Table 1 – Measurements of variables

Variables	Definition and measurements
Age	Completed age at the time of the study: 15 - 17 or 18 - 19 years
Residence type	The geographic space where adolescents live: urban, peri-urban, or rural
Education level	The highest year of schooling completed: 0 - 4, 5 - 8, 9 - 12, and ≥ 13
Literacy	Can read and write: yes or no
Alcohol consumption	Having consumed alcoholic beverages in the last 12 months: yes or no
Smoking habits	Having smoked one or more cigarettes in the last 30 days: yes or no
Multiple sexual partners	Having more than one partner in the past 12 months: yes or no
Early sex initiation	Had first sexual intercourse <15 years of age: yes or no
Contraceptive use	Frequency of condom use or other available method: never, sometimes, or always
Family structure	Who adolescents lived with in the last year: both parents, single parent, or no parent
Family size	Number of people at home in the last year: small (2 - 4), medium (5 - 9), or large (≥ 10)
Legal responsible occupation	Professional/technical, commerce, agriculture, other, or none
Peer pressure	Influence from friends to have sex: yes or no
Places of leisure	Sports clubs, parks, cinemas, swimming pools, and cultural centers: yes or no

for analysis.

Statistical analysis

Data analysis was performed with IBM SPSS version 27.0. Descriptive analysis was conducted by calculating absolute and relative frequencies, means, and standard deviations. The Kolmogorov-Smirnov test was used to assess sample normality. Means were compared using the independent *t*-test. Pearson's chi-squared and Fisher's exact tests were used to evaluate associations between the dependent variable and each exposure factor in a cross table. For all tests and models, statistical significance was given by a 95% confidence interval (95% CI) and a *p*-value of ≤ 0.05.

Adolescents aged 10 - 14, 15 - 17, and 18 - 19 years are biologically, psychologically, and legally different.[29] Moreover, pregnant adolescents do not share the same demographic and risk behavioral and adverse obstetric outcomes; therefore, the collection and disaggregated analysis of data by age may generate more representative results, understanding of the problem, and targeting of health interventions.[30-33] All variables with *p*-values of ≤ 0.10 in the bivariate analysis were candidates for logistic regression analysis disaggregated by age groups. Crude odds ratios were obtained by univariate binary logistic regression, followed by adjusted odds ratios (AORs) determined by multivariable logistic regression. Multicollinearity assessment determined all variance inflation factors below the cutoff value of 2.5.

Ethical aspects

This study was approved by the Independent Bioethics Committee of Agostinho Neto University's Faculty of Medicine (Deliberation No. 23/2022). The participants and some guardians received informed consent or assent forms. The participants were made aware of the study's objectives, risks, benefits, and beneficiaries. Participation in the study was not mandatory, and the participants' identities remained anonymous. There was no discrimination against the participants regardless of their outcome, sociodemographic condition, or behavior. In addition, the study did not have physical or biological risks.

RESULTS

Table 2 provides a comparison of the sociodemographic data between the case and control groups. Of the 411 participants, most were aged 15 - 17 years (n = 246; 59.9%), single (n = 386; 93.9%), and living in a peri-urban area (n = 381; 92.7%). Approximately 61.6 had 5 to 8 years of schooling, and 90.8% could read and write. The mean age of the study participants was 17.1 ± 1.3 years (case group = 17.4 ± 1.2 years; control group = 16.9 ± 1.3 years; $p < 0.001$), and the average number of school years successfully completed was 7.3 ± 2.3 (case group = 6.9 ± 2.4 years; control group = 7.6 ± 2.2 years; $p = 0.004$). The bivariate analysis showed that adolescent pregnancy was significantly ($p < 0.05$) associated with age, marital status, and education.

As seen in Table 3, more than 70% of the participants lived in an area without opportunities for leisure and recreation, or sexual and reproductive health programs, with no significant differences between groups. However, the case group was exposed to less peer pressure than the control group, and this difference was statistically significant (21.9% *vs* 38.0%, respectively; $p = 0.001$).

As seen in Table 4, on average, each participant lived in a family of 7.1 ± 2.8 people (case group = 7.1 ± 2.9; control group = 7.2 ± 2.8; *p* = 0.748). Most participants (n = 209; 50.9%) lived with both parents and a medium-sized family (n = 272; 66.2%) and did not experience moderate (n = 263; 64.0%) or severe (n = 370; 90.0%) physical violence in the last 12 months. Among these variables, only the family history of early pregnancy had a statistical association with adolescent pregnancy, which was higher in the control group than in the case group (80.7% *vs* 69.3%, respectively; *p* = 0.013).

As seen in Table 5, most participants reported safe behaviors such as no alcohol consumption (n = 326; 79.3%), single sexual partner (n = 239; 75.4%), and non-early sex initiation (n = 253; 79.8%). Comparing the case group with the control group, the former exhibited significantly higher rates of planning to become pregnant (40.1% *vs* 26.1%, respectively; *p* = 0.008), multiple sexual partners (32.8% *vs*

Table 2 – Comparative analysis of sociodemographic characteristics between pregnant and non-pregnant adolescents in Malanje, Angola

	Total		Cases (n = 137)		Controls (n = 274)			
Variables	N	%	n	%	n	%	χ^2	*p*-value
Age (years)								
15 - 17	246	59.9	70	51.1	176	64.2	6.56	0.010*
18 - 19	165	40.1	67	48.9	98	35.8		
Marital status								
Single	386	93.9	120	87.6	266	97.1	14.40	< 0.001*
De facto union or married	25	6.1	17	12.4	8	2.9		
Residence type								
Urban	9	2.2	4	2.9	5	1.8	2.62	0.270
Peri-urban	381	92.7	123	89.8	258	94.2		
Rural	21	5.1	10	7.3	11	4.0		
Literacy								
Yes	373	90.8	120	87.6	253	92.3	2.45	0.118
No	38	9.2	17	12.4	21	7.7		
Adolescent's education (years)								
0 - 4	36	8.8	20	14.6	16	5.8	11.50	0.003*
5 - 8	253	61.6	86	62.8	167	60.9		
9 - 12	122	29.7	31	22.6	91	33.2		

N: sample size; n: number of respondents; %: percentage; χ^2: chi-squared test; *: statistical significance

Table 3 – Comparative analysis of non-family contextual characteristics between pregnant and non-pregnant adolescents in Malanje, Angola

	Total		Cases (n = 137)		Controls (n = 274)			
Variables	N	%	n	%	n	%	χ^2	*p*-value
Peer pressure								
No	277	67.4	107	78.1	170	62.0	10.72	0.001*
Yes	134	32.6	30	21.9	104	38.0		
Places of leisure and recreation								
Yes	107	26.0	39	28.5	68	24.8	0.63	0.427
No	304	74.0	98	71.5	206	75.2		
SHR programs								
Yes	105	25.5	39	28.5	66	24.1	0.92	0.337
No	306	74.5	98	71.5	208	75.9		

AP: adolescent pregnancy; N: sample size; n: number of respondents; %: percentage; χ^2: chi-squared test; SRH: Sexual and Reproductive Health; *: statistical significance

Table 4 – Comparative analysis of family characteristics between pregnant and non-pregnant adolescents in Malanje, Angola

	Total		Cases (n = 137)		Controls (n = 274)			
Variables	N	%	n	%	n	%	χ^2	*p*-value
Family structure								
Both parents	209	50.9	69	50.4	140	51.1	0.81	0.666
Single parent	110	26.8	40	29.2	70	25.5		
No parent	92	22.4	28	20.4	64	23.4		
Family size								
Small	72	17.5	25	18.2	47	17.2	0.08	0.962
Medium	272	66.2	90	65.7	181	66.4		
Large	67	16.3	22	16.1	45	16.4		
Head of household's education (years)								
0 - 4	31	7.5	12	8.8	19	6.9	5.54	0.236
5 - 8	45	10.9	20	14.6	25	9.1		
9 - 12	111	27.0	29	21.2	82	29.9		
≥ 13	26	6.3	9	6.6	17	6.2		
Unknown	198	48.2	67	48.9	131	47.8		
Head of household's occupation								
Professional/technical	141	34.3	43	31.4	98	35.8	4.85	0.303
Commerce	65	15.8	21	15.3	44	16.1		
Agriculture	103	25.1	43	31.4	60	21.9		
Other	85	20.7	26	19.0	59	21.5		
None	17	4.1	4	2.9	13	4.7		
Family history of AP								
No	78	19.0	37	27.0	41	15.0	8.82	0.013*
Yes	316	76.9	95	69.3	221	80.7		
Unknown	17	4.1	5	3.6	12	4.4		
Physical violence								
No	263	64.0	88	64.2	175	63.9	0.01	0.942
Yes	148	36.0	49	35.8	99	36.1		
Severe physical violence								
No	370	90.0	122	89.1	248	90.5	0.22	0.642
Yes	41	10.0	15	10.9	26	9.5		

AP: adolescent pregnancy; N: sample size; n: number of respondents; %: percentage; χ^2: chi-squared test; *: statistical significance

18.3%, respectively; $p = 0.003$), and non-use of contraception (50.4% *vs* 26.7%, respectively; $p < 0.001$) than the latter.

From the multivariable analysis, the risk of adolescent pregnancy was significantly higher in women aged 15 - 17 who lived in *de facto* union or were married (AOR = 10.37; 95% CI = 1.05 - 102.83), had 0 - 4 (AOR = 7.40; 95% CI = 1.25 - 43.77) or 5 - 8 years of schooling (AOR = 5.21; 95% CI = 1.25 - 21.77), and used contraception irregularly (AOR = 6.02; 95% CI = 1.80 - 20.12) or did not use any contraceptive methods (AOR = 9.20; 95% CI = 2.79 - 30.35). For women aged 18 - 19, the likelihood of adolescent pregnancy was increased in case of early sex initiation (AOR = 3.75; 95% CI = 1.05 - 13.43), multiple sexual partners (AOR = 3.02; 95% CI = 1.23 - 7.44), and irregular (AOR = 4.04; 95% CI = 1.25 - 13.11) or non-use (AOR = 5.40; 95% CI = 1.50 - 19.40) of contraception, as seen in Table 6.

DISCUSSION

The aim of this study was to identify determinants of adolescent pregnancy in Malanje, Angola. According to our results, cohabitation with a sexual partner and having less

Table 5 – Comparative analysis of behavioral characteristics between pregnant and non-pregnant adolescents in Malanje, Angola

	Total		Cases (n = 137)		Controls (n = 274)			
Variables	N	%	n	%	n	%	χ^2	*p*-value
Alcohol consumption								
No	326	79.3	106	77.4	220	80.3	0.48	0.491
Yes	85	20.7	31	22.6	54	19.7		
Smoking habits								
No	401	97.6	132	96.4	269	98.2	1.28	0.312
Yes	10	2.4	5	3.6	5	1.8		
Early sex initiation								
No	253	79.8	103	75.2	150	83.3	3.21	0.073
Yes	64	20.2.	34	24.8	30	16.7		
Multiple sexual partners								
No	239	75.4	92	67.2	147	81.7	8.83	0.003*
Yes	78	24.6	45	32.8	33	18.3		
Contraception use								
Always	65	20.5	10	7.3	55	30.6	32.36	< 0.001*
Sometimes	135	42.6	58	42.3	77	42.8		
Never	117	36.9	69	50.4	48	26.7		
Planned to get pregnant								
No	215	67.8	82	59.9	133	73.9	7.02	0.008*
Yes	102	32.2	55	40.1	47	26.1		

N: sample size; n: number of respondents; %: percentage; χ^2: chi-squared test; *: statistical significance.

than nine years of schooling were significant predictors of adolescent pregnancy among girls aged between 15 and 17 years. Furthermore, older adolescents were associated with a higher risk of pregnancy if they had multiple sexual partners and early sex initiation, while a lower risk of getting pregnant was observed among those reporting peer pressure. Regardless of the age group of adolescents, not using or irregularly using contraception was associated with an increased risk of getting pregnant.

Although the present study differs from others due to the type of analysis we used (disaggregated by age), the results on early marriage are consistent with those found in other Sub-Saharan countries.[5,18,19,22] In Sub-Saharan Africa, the desire or planning for pregnancy can increase with the adolescent's age, and motherhood is a cultural element of a woman's identity. Hence, most women marry without a (traditional) religious or civil ceremony, and they do not use contraceptive methods.[34] According to the World Health Organization, early marriage (cultural or civil) occurs often in low- and middle-income countries and it may be prevented by keeping girls in school and by establishing laws that protect adolescents from early marriage.[35] Despite the United Nations Population Fund initiatives and the Angolan government's efforts to prevent school dropouts as a result of adolescent pregnancy, some pregnant teenagers drop out of school due to economic demands and feelings of shame by social judgment.[4,36] Once pregnant, the teenager cannot interrupt the pregnancy. In Angola, abortion is a crime, except in cases where the fetus is unviable, there is risk of death or irreversible damage to the woman's physical and mental integrity, there is an incurable disease or malformation of the fetus, and in cases of coercion, sexual violence, and rape.[37] In this context, there is still a gender disparity in terms of education and employability, so men assume the economic and protective role in the home, while women bear the domestic burden and prevent early pregnancy.[36] According to Saewvic,[38] due to the lack of access policies to contraceptive methods and cultural configurations regarding female sexuality, there has not been a focus on pregnancy prevention in boys.

Our findings are relatively consistent with studies conducted in other sub-Saharan countries, reporting a higher risk of getting pregnant among adolescents with early sexual initiation,[16,23,39-41] and those with multiple sexual partners,[19,23] although in our setting such associations were only observed among adolescents aged 18 or 19 years. The prevalence of early sexual initiation (before 15 years old) among girls in Sub-Saharan Africa is high (46%), although

Table 6 – Multivariable analysis of sociodemographic, behavioral, family, and non-family contextual factors associated with adolescent pregnancy in the municipality of Malanje, Angola, disaggregated by age

	15 - 17 years		18 - 19 years	
Variables	COR (95.0% CI)	AOR (95.0% CI)	COR (95.0% CI)	AOR (95.0% CI)
Marital status				
Single	1	1	1	1
De facto union/married	32.63 (4.12 - 258.12)***	10.37 (1.05 - 102.83)*	1.28 (0.41 - 3.99)	0.47 (0.13 - 1.71)
Adolescent's education (years)				
9 - 12	1	1	1	1
5 - 8	4.58 (1.35 - 15.57)*	5.21 (1.25 - 21.77)*	1.84 (0.95 - 3.55)	0.97 (0.44 - 2.15)
0 - 4	12.00 (2.85 - 50.52)***	7.40 (1.25 - 43.77)*	3.31 (0.99 - 11.06)	0.90 (0.20 - 4.00)
Peer pressure				
No	1	1	1	1
Yes	0.65 (0.35 - 21)	0.82 (0.35 - 1.88)	0.28 (0.13 - 0.59)***	0.35 (0.15 - 0.82)*
Early sex initiation				
No	1	1	1	1
Yes	1.39 (0.71 - 2.73)	1.08 (0.47 - 2.50)	3.10 (1.02 - 9.43)*	3.75 (1.05 - 13.43)*
Multiple sexual partners				
No	1	1	1	1
Yes	1.98 (0.98 - 4.03)	1.57 (0.64 - 3.87)	2.44 (1.14 - 5.27)*	3.02 (1.23 - 7.44)*
Contraception use				
Always	1	1	1	1
Sometimes	4.36 (1.50 - 12.64)**	6.02 (1.80 - 20.12)**	3.65 (1.24 - 10.75)*	4.04 (1.25 - 13.11)*
Never	11.83 (4.06 - 34.47)***	9.20 (2.79 - 30.35)***	4.87 (1.60 - 14.82)**	5.40 (1.50 - 19.40)**
Planned to get pregnancy				
No	1	1	1	1
Yes	2.13 (1.03 - 4.41)*	1.96 (0.81 - 4.78)	1.75 (0.91 - 3.36)	2.05 (0.96 - 4.38)
Family history of AP				
No	1	1		1
Yes	0.41 (0.22 - 0.79)**	0.30 (0.11 - 0.80)*	0.50 (0.22 - 1.14)	0.56 (0.20 - 1.58)
Unknown	0.66 (0.20 - 2.21)	0.50 (0.08 - 3.03)		

AOR: adjusted odds ratio; COR: crude odds ratio; CI: confidence interval; ***: $p < 0.001$, **: $p < 0.01$, *: $p < 0.05$

this prevalence presents large differences between countries.[42] In our study, one out of five girls reported early sexual activity. This behavior has been considered an important public health issue demanding prevention,[42] because it has been associated with multiple sexual partners and unprotected sexual activity, increasing the risk of adolescent pregnancy.[40] Despite the lack of association with the phenomenon under study, the present study demonstrates that moderate physical violence occurs in both groups (pregnant and non-pregnant women) with a relatively high frequency. Physical abuse and other forms of maltreatment are factors that contribute to early sex initiation and multiple sexual partners.[43]

Measures such as promoting women's education and preventing school dropout play an important role in avoiding early sexual initiation because educated adolescents can improve their knowledge, skills, and awareness about health issues, including reproductive health. This will lead to individuals who are more empowered and better informed about optimal timings for marriage and pregnancy.[39-42] Encouraging sexual abstinence can help delay sexual initiation with an impact on decreasing early pregnancy prevalence. However, promoting sexual abstinence without providing comprehensive sexuality education may not be effective.[40]

According to our results, irregular or no use of contraceptives was a strong predictor of pregnancy in both age groups of girls, corroborating the results from previous studies conducted in similar settings.[16,19,23] Negative perceptions

and misconceptions about contraceptive use,[16,44] particularly concerns of contraceptive-induced fertility impairment may contribute to low contraceptive uptake among adolescents.[45] The use of contraceptive methods is lower in adolescent women belonging to cultures or religions in which contraception is prohibited, and in those whose partners are unaware of contraception methods highlighting the impact of cultural aspects on the prevalence of adolescent pregnancy.[46] Also, low awareness and poor knowledge about contraceptive methods,[47] as well as the lack of adequate reproductive health services and skilled staff to attend to adolescents who require contraceptive methods are factors hindering their use.[16] According to the World Health Organization, increasing the use of contraception is an essential issue when preventing early and unwanted pregnancies is under discussion. To address these issues, we should be promoting the access to reproductive health services and adequate contraceptive information.[35] Besides contraception use, sexual health education should be more robust, encouraging greater autonomy and safety breaking down stereotypes, myths, and distorted beliefs associated with sexuality.[48] Educational policies established for new generations should take into account the need of comprehensive sexuality education for young people providing them with knowledge and skills in preventing sexual risk behaviors. Since abortions are illegal in Angola (with a few exceptions), early pregnancy puts girls at higher risk of unsafe abortion. Therefore, in this context, sexual health education plays an important role. A comprehensive sexuality education is particularly important in our setting, since boys are not educated about contraception, and this responsibility is delegated to women instead.

This study is a snapshot taken over a short period; therefore, more extensive and longitudinal studies are suggested to see possible variations in the results. More studies regarding cultural factors, family, and qualitative approaches are required to obtain a better understanding of this problem and determine effective solutions.

Our results did not corroborate findings from previous research reporting higher risk of pregnancy among adolescents with family history of early pregnancy.[22,23] Young women often learn values and attitudes from their mothers and older sisters and early pregnancy in the eldest daughter can trigger preventive conversation between family members about sexual activity and contraception.[27]

Opposite to previous research[16,19,23] our findings revealed a lower risk of pregnancy among girls reporting peer pressure to have sex, although such an association was only observed among older adolescents. Peer pressure to engage in unsafe sexual activity is one of the causes of adolescent pregnancy.[23] We can speculate that the participants of this study may have felt pressure to have sex, though not necessarily unsafe sex, or that these girls could have been pressured to become sexually active but have sought or received advice on preventing unwanted pregnancies.

Study limitations

Although the healthcare units were selected randomly, participants within each healthcare unit were not selected randomly due to the lack of a preliminary list of eligible women, which may affect the representativeness of our results.

As stated in the Methods section, this study relied on hospital controls who underwent medical interventions. This approach may have reduced or hidden the strength of association between variables.

Our research was based on a case-control study, retrospective in nature. This study design is prone to recall bias as girls have had to recall some events about their lives. Furthermore, we cannot exclude the observer bias, as we could not blind research staff to who was a case and who was a control.

CONCLUSION

For adolescents who attended the Malanje Healthcare Units between August and October of 2022, pregnancy appears to be a multifactorial phenomenon. These factors are not the same for different age groups and preventive strategies should consider these differences. Preventive strategies for adolescents aged 15 - 17 should aim to reduce early marriages, both civil and cultural, through the promotion of education and the creation of specific laws. For older adolescents, pregnancy was associated with risky behaviors such as early initiation of sexual activity and multiple sexual partners. These practices can be changed with the creation of educational programs combining primary sexual abstinence promotion and comprehensive sexual education. Sexual health education should provide in-depth knowledge about contraception and the use of contraceptives; that is a core issue for all age groups. These programs must be able to overcome cultural barriers, to promote gender equity, and develop girls' autonomy regarding sexuality.

ACKNOWLEDGMENTS

The authors thank the Department of Public Health of the Agostinho Neto University's Faculty of Medicine for the opportunity to learn at doctoral level; the Municipal Health Management in Malanje for characterizing the municipality in terms of sexual and reproductive health issues, and providing a list of health units; the polytechnic Institute of the University Rainha Njinga a Mbande for providing a training place for inquirers.

AUTHOR CONTRIBUTIONS

KA: Study design, data collection and analysis, database conception, writing and critical review of the manuscript.

ES: Data analysis, database conception, writing and critical review of the manuscript.

CT, PC: Study design, writing and critical review of the manuscript.

JVD: Study design, data collection, critical review of the manuscript.

All authors approved the final version to be published.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in October 2024.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

COMPETING INTERESTS

The authors have declared that no competing interests exist.

FUNDING SOURCES

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

1. World Health Organization. Adolescent pregnancy. 2023. [cited 2023 Jun 12]. Available from: https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy.
2. World Health Organization. The global health observatory: adolescent birth rate (per 1000 women). 2024. [cited 2024 Sep 18]. Available from: https://www.who.int/data/gho/data/indicators/indicator-details/GHO/adolescent-birth-rate-(per-1000-women-aged-15-19-years).
3. Eyeberu A, Getachew T, Sertsu A, Sisay M, Baye Y, Debella A, et al. Teenage pregnancy and its predictors in Africa: a systematic review and meta-analysis. Int J Health Sci. 2022;16:47-60.
4. United Nations Population Fund Angola. Annual report: summary of main activities and results. 2020. [cited 2023 May 08]. Available from: https://angola.unfpa.org/en/publications/unfpa-angola-2020-annual-report-activities-and-results.
5. Asmamaw DB, Tafere TZ, Negash WD. Prevalence of teenage pregnancy and its associated factors in high fertility sub-Saharan Africa countries: a multilevel analysis. BMC Womens Health. 2023;23:23.
6. Vogel JP, Fawole B, Adeniran AS, Adegbola O, Oladapo OT. Millennium development goal 5 and adolescents: looking back, moving forward. Arch Dis Child. 2015;100:S43-7.
7. World Health Organization. Health in 2015: from millenium development goals to sustainable development goals. 2015. [cited 2023 May 08]. Available from: https://www.who.int/publications/i/item/9789241565110.
8. Grønvik T, Fossgard Sandøy I. Complications associated with adolescent childbearing in Sub-Saharan Africa: a systematic literature review and meta-analysis. PLoS One. 2018;13:e0204327.
9. Indarti J, Al Fattah AN, Dewi Z, Hasani RD, Mahdi FA, Surya R. Teenage pregnancy: obstetric and perinatal outcome in a tertiary centre in Indonesia. Obstet Gynecol Int. 2020;2020:1-5.
10. Pietras J, Jarząbek-Bielecka G, Mizgier M, Markowska A. Adolescent pregnancy – medical, legal and social issues. J Matern Fetal Neonatal Med. 2024;37:1-5.
11. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J, et al. Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study. BJOG: Int J Obstet Gynaecol. 2014:121;S40-8.
12. Wu H, Zhao M, Liang Y, Liu F, Xi B. Maternal age at birth and neonatal mortality: associations from 67 low-income and middle-income countries. Paediatr Perinat Epidemiol. 2021;35:318-27.
13. Ochieng Arunda M, Agardh A, Larsson M, Asamoah BO. Survival patterns of neonates born to adolescent mothers and the effect of pregnancy intentions and marital status on newborn survival in Kenya, Uganda, and Tanzania, 2014–2016. Glob Health Action. 2022;15:2101731.
14. Leftwich HK. Alves MV. Adolescent pregnancy. Pediatr Clin North Am. 2017;64:381-8.
15. Mutahi J, Larsen A, Cuijpers P, Peterson SS, Unutzer J, McKay M, et al. Mental health problems and service gaps experienced by pregnant adolescents and young women in Sub-Saharan Africa: a systematic review. EClinicalMedicine. 2022;44:101289.
16. Yakubu I, Salisu WJ. Determinants of adolescent pregnancy in sub-Saharan Africa: a systematic review. Reprod Health. 2018;15:15.
17. Mekonen EG. Pooled prevalence and associated factors of teenage pregnancy among women aged 15 to 19 years in sub-Saharan Africa: evidence from 2019 to 2022 demographic and health survey data. Contracept Reprod Med. 2024;9:26.
18. Kefale B, Yalew M, Damtie Y, Adane B. A multilevel analysis of factors associated with teenage pregnancy in Ethiopia. Int J Womens Health. 2020;12:785-93.
19. Ochen AM, Chi PC, Lawoko S. Predictors of teenage pregnancy among girls aged 13–19 years in Uganda: a community based case-control study. BMC Pregnancy Childbirth, 2019;19:211.
20. Moshi FV, Tilisho O. The magnitude of teenage pregnancy and its associated factors among teenagers in Dodoma Tanzania: a community-based analytical cross-sectional study. Reprod Health. 2023;20:28.
21. Mbulu CO, Yang L, Wallen GR. Adolescent pregnancy persists in Nigeria: does household heads' age matter? PLOS Glob Public Health. 2024;4:e0003212.
22. Ayele BG, Gebregzabher TG, Hailu TT, Assefa BA. Determinants of teenage pregnancy in Degua Tembien District, Tigray, Northern Ethiopia: a community-based case-control study. PLoS One. 2018;13:e0200898.
23. Chung HW, Kim EM, Lee JE. Comprehensive understanding of risk and protective factors related to adolescent pregnancy in low- and middle-income countries: a systematic review. J Adolesc. 2018;69:180-8.
24. Chitumba HO, Nungulo VN, Kahuli CN. Perfil das adolescentes grávidas atendidas no centro de saúde materno-infantil da mineira (Huambo, Angola). Rev Port Inv Comport Soc. 2022;8:1-15.
25. Gembi FT. Gravidez na adolescência em contexto angolano: estudo acerca dos fatores de risco e de proteção, em enfoque no funcionamento familiar. Coimbra: Universidade de Coimbra:; 2012. [cited 2024 Sep 18]. Available from: https://estudogeral.uc.pt/handle/10316/26167?locale=pt.
26. Vundule C, Maforah F, Jewkes R, Jordaan E. Risk factors for teenage pregnancy among sexually active black adolescents in Cape Town. A case control study. S Afr Med J. 2001;91:73-80.
27. United Nations Children's Fund. Report on the regional forum on adolescent pregnancy, child marriage and early union in south-east Asia and Mongolia. 2018. [cited 2022 Jan 10]. Available from: https://www.unicef.org/eap/media/3696/file/Adolescent%20pregnancy.pdf.
28. Bhona FM, Gebara CF, Noto AR, Vieira MD, Lourenço LM. Inter-relações da violência no sistema familiar: estudo domiciliar em um bairro de baixa renda. Psicol Reflex Crit. 2014;27:591-8.

29. Dixon-Mueller R. How young is "too young"? Comparative perspectives on adolescent sexual, marital, and reproductive transitions. Stud Fam Plann. 2008;39:247-62.
30. Cox S, Pazol K, Warner L, Romero L, Spitz A, Gavin L, et al. Vital signs: births to teens aged 15–17 years- United States, 1991–2012. Morb Mortal Wkly Rep. 2014;63:312-8.
31. Beguy D, Ndugwa R, Kabiru CW. Entry into motherhood among adolescent girls in two informal settlements in Nairobi, Kenya. J Biosoc Sci. 2013;45:721-42.
32. Neal S, Chandra-Mouli V, Chou D. Adolescent first births in East Africa: disaggregating characteristics, trends and determinants. Reprod Health. 2015;12:1-13.
33. United Nations Children's Fund. Collecting and reporting of sex- and age-disaggregated data on adolescents at the sub-national level. 2016. [cited 2024 Sep 26]. Available from: https://data.unicef.org/resources/collecting-reporting-sex-age-disaggregated-data-adolescents-sub-national-level/.
34. Ngum Chi Watts MC, Liamputtong P, McMichael C. Early motherhood: a qualitative study exploring the experiences of African Australian teenage mothers in greater Melbourne, Australia. BMC Public Health. 2015;15:873.
35. Chandra-Mouli V, Camacho AV, Michaud PA. WHO guidelines on preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. J Adolesc Health. 2013;52:517-22.
36. World Bank. Navigating education, motherhood, and informal labor: the experiences of young women in Luanda: executive summary. 2023. [cited 2024 Nov 09]. Available from: https://openknowledge.worldbank.org/server/api/core/bitstreams/72288bd5-413b-420b-85f3-141952feed19/content.
37. Imprensa Nacional de Angola. Código Penal Angolano. Luanda: Lexdata- Sistema e Edições Jurídicas; 2020.
38. Saewvic E. What about the boys? The importance of including boys and young men in sexual and reproductive health research. J Adolesc Health. 2012;51:1-2.
39. Ahinkorah BO, Kang M, Perry L, Brooks F, Hayen A. Prevalence of first adolescent pregnancy and its associated factors in sub-Saharan Africa: a multi-country analysis. PLoS One. 2021;16:e0246308.
40. Alukagberie ME, Elmusharaf K, Ibrahim N, Poix S. Factors associated with adolescent pregnancy and public health interventions to address in Nigeria: a scoping review. Reprod Health. 2023;20:1-11.
41. Maharaj NR. Adolescent pregnancy in sub-Saharan Africa – a cause for concern. Front Reprod Health. 2022;4:984303.
42. Ferede TA, Muluneh AG, Wagnew A, Walle AD. Prevalence and associated factors of early sexual initiation among youth female in sub-Saharan Africa: a multilevel analysis of recent demographic and health surveys. BMC Womens Health. 2023;23:1-11.
43. Thompson R, Lewis T, Neilson E, English D, Litrownik A, Margolis B, et al. Child maltreatment and risky sexual behavior. Child Maltreat. 2017;22:69-78.
44. Gbagbo FY. Contraceptive use among basic school pupils in Ghana: a case study of a municipality. Int J Pediatr. 2020;2020:1-8.
45. Zimmerman LA, Karp C, Shiferaw S, Seme A, Bell SO. Assessing the effect of concerns about contraceptive-induced fertility impairment on hormonal contraceptive use by parity and residence: evidence from PMA Ethiopia 2020 cross-sectional survey. BMJ Open. 2024;14:e077192.
46. Abdulai M, Kenu E, Ameme DK, Bandoh DA, Tabong PT, Lartey AA, et al. Demographic and socio-cultural factors influencing contraceptive uptake among women of reproductive age in Tamale Metropolis, Northern Region, Ghana. Ghana Med J. 2020;54:64-72.
47. Ba MF, Diallo AI, Diongue FB, Ndiaye I, Ndiaye NS, Mbaye SM, et al. Factors associated with contraceptive use among adolescents in three regions of Senegal. Afr J Reprod Health. 2024;28:155-62.
48. Marí-Ytarte R, Moreno-López R, Barranco-Barroso R. Sex and relationship education for the autonomy and emotional well-being of young people. Front Psychol. 2020;11:1280.