

Epidemio-Clinical Approach and Prognosis of Teenage Delivery in the Commune VI Du District of Bamako in Mali

Soumana Oumar Traoré^{1,2*}, Cheickna Sylla³, Alou Samaké⁴, Saleck Doumbia², Saudatou Tall², Ibrahima Tegueté^{4,5}, Youssouf Traoré^{1,5}, Niani Mounkoro^{4,5}, Mamadou Traoré^{1,2}, Amadou I. Dolo^{1,3}

¹Faculty of Medicine and Odontostomatology, University of Sciences, Techniques and Technologies of Bamako, Bamako, Mali

²Gynecology-Obstetrics Department, Reference Health Centre of Commune V, Bamako, Mali

³Department of Gynecology-Obstetrics, Koutiala Reference Center, Sikasso, Mali

⁴Department of Gynecology-Obstetrics, Reference Health Centre of Commune VI, Bamako, Mali

⁵Department of Gynecology and Obstetrics, Gabriel Touré University Hospital, Bamako, Mali

Email: *traoreoumar69@yahoo.fr

How to cite this paper: Traoré, S.O., Sylla, C., Samaké, A., Doumbia, S., Tall, S., Tegueté, I., Traoré, Y., Mounkoro, N., Traoré, M. and Dolo, A.I. (2020) Epidemio-Clinical Approach and Prognosis of Teenage Delivery in the Commune VI Du District of Bamako in Mali. *Open Journal of Obstetrics and Gynecology*, 10, 1492-1512. <https://doi.org/10.4236/ojog.2020.10100136>

Received: September 12, 2020

Accepted: October 27, 2020

Published: October 30, 2020

Copyright © 2020 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0). <http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Objective: To describe the epidemiological aspects, clinical characteristics, aspects of childbirth and to determine the maternal and perinatal prognosis during the delivery of adolescent girls at the reference health centre of commune VI of the district of Bamako in Mali. **Materials and Methods:** This was a descriptive, cross-sectional, analytical case-control study from January 1 to December 31, 2018, or 12 months with prospective data collection. **Results:** During the study period from January 01 to December 31, 2018, we recorded 1768 teenage deliveries out of a total of 9012 deliveries, a frequency of 19.61%. The average age of the cases was 17.4 ± 1 years. Single adolescent girls accounted for 14.67% (OR = 3.05, P = 0.001) unintended pregnancies (11.67% vs. 2.3%; P = 0.000007; OR = 5.52), the non-completion of the antenatal consultation (14.67% vs. 5.33%; P = 0.0001; preterm births (14.33% vs. 7.67%); P = 0.01; OR = 2.5), anaemia (7.33% vs. 3%; P = 0.009; OR = 2.01), instrumental extractions (P = 0.00008, OR = 2.87), perineal tears (P = 0.0016; OR = 3.05), mechanical dystocies (P = 0.0039); low birth weights (P = 0.039; OR = 2.2) were found to be significantly higher in adolescent girls than adults. **Conclusion:** Teenage versus adult births are associated with many more maternal-fetal complications.

Keywords

Childbirth, Teenage Girls, Maternal-Fetal Prognosis

1. Introduction

The word adolescence comes from the Latin verb “*adolescere*” which means to grow up *towards* (ad: verse, olescere: grow) [1]. According to the World Health Organization (WHO), the term refers to people aged 10 to 19. It is a period of physical, psychic and social maturation that extends between childhood and adults [2]. There are one billion adolescents in the world, 85% of whom live in developing countries [3]. Adolescent girls make up 22% of the female population in Africa [4]. This population is estimated at 23.1% in Mali [5]. Adolescence is marked in the daughter by the development and functioning of the reproductive organs. While the occurrence of pregnancy is possible, the adolescent is in a state of psychological imbalance and immaturity of the organs; this poses various problems obstetrical (prematurity, unsafe abortion, dystocia at the time of child-birth...), psychological, and social [2].

However, the definition of teen pregnancy remains unclear, especially with regard to chronological limits. Some authors detain 18 years, others 17 years or 16 years [6] [7] [8] [9] [10].

It is now estimated that one in two girls aged 13 and a half is able in her body to conceive a child.

The age of first sexual intercourse has become more and more early. In France, the average age of first sexual intercourse seems to have stabilized in recent years around 17 and a half years [11]. In Mali, for women aged 25 - 49, the median age at first sexual intercourse is estimated at 17 years [12]. This incredible advance in biological maturation associated with early sexual activity makes it possible to be a parent at an extremely young age.

This age group contributes 14% to the total fertility of women in Mali [12].

More than 14 million teenage girls give birth each year. Although these births occur in all societies, 12.8 million, or more than 90%, occur in developing countries [13]. 40% - 50% of girls have a baby before the age of 18 in Côte d'Ivoire, Liberia, Mali, Cameroon, Bangladesh [13].

For some young mothers, it is a happy event; they are well supported and give birth to a healthy daughter or son. But for millions of others, the pregnancy was not planned; the birth takes place too early and the experience is marked by fear and suffering. Adolescent girls face health risks during pregnancy and birth accounting for 15% of the global burden of maternal disease, and 13% of all maternal deaths [13].

The adverse outcomes of these complicated pregnancies and deliveries are essential: preterm birth, neonatal suffering, the birth of a low-weight child and the death of the newborn, without forgetting obstetric fistulas and its consequences on the girl's life [14].

A World Health Organization study on teen pregnancies alone states that age alone may not be the cause, education, social status and use of health facilities are factors involved.

In developing countries, only 53% of births are cared for by a qualified person.

Pregnancy among young people not only jeopardizes the health and survival of the child or woman, but also the schooling and professional future of the girl [15]. In Kenya, up to 10,000 girls a year leave school because of their pregnancies [16]. When pregnancy is not desired, it can lead to an abortion, a very limited opportunity in some countries because of its illegality, with its disastrous complications. Of the 19 million illegal abortions that take place each year, 2.2 to 4 million are among teenage girls [17].

In Mali, several studies have been done on teen childbirth. But given the magnitude of the phenomenon and its maternal-fetal complications, this study finds its place.

2. The Objective

Was to describe the epidemiological aspects, clinical characteristics, aspects of childbirth and to determine the maternal and perinatal prognosis during the delivery of adolescent girls at the reference health centre of commune VI of the district of Bamako in Mali.

3. Materials and Methods

This was a descriptive, cross-sectional, analytical study of type witness cases from January 1 to T December 31, 2018, is 12 months with prospective data collection. The study population: was all parturients admitted to the maternity ward of the reference health center of the as VI during the study period. The scaling was exhaustive. Inclusion criteria: We included in the study all participants meeting the definition of primipara regardless of gestity with a single-fetal pregnancy of at least 28 weeks of gestational age amenorrhea. Cases: These are teenagers between the ages of 10 and 19. Witnesses: These are participants aged 20 and over. We collected a case for a witness. The non-inclusion criteria: for, 1 cases, adolescents who were not primiparous or have multiple pregnancies or a pregnancy of more than 28SAwere not included in the study. For Witnesses: Multiparous or multiple-pregnancy or less than 2 - 8-week amenorrhea patients are not included in the study. The women admitted after childbirth. The variables studied were socio-demographic aspects, clinical characteristics, labour delivery, mode of delivery, caesarean section indications and maternal-fetal prognosis. The participants were subjected to a questionnaire for this purpose. The birthing register; emergency obstetric and neonatal care; Prenatal consultation book (NPC); the partogram and the post partum registry were consulted regularly during our investigation. Data analysis and processing: the counting of questionnaires has been manual. The collected data was captured and analyzed using the Epi Info software, version 3.5.3, the CDC in Atlanta and WHO. The final document was written using Word 2007 and Excel software for tables and graphs. Karl PEARSON's Khi 2 test was the statistical test used for the comparison, significant if $P = 0.05$. The combination test used is Odds Ratio (OR) calculated with 95% confidence interval.

4. Results

4.1. Frequency and Socio-Demographic Aspects

During the study period from January 01 to December 31, 2018, we recorded 1768 teenage deliveries of adolescents out of a total of 9012 deliveries, a frequency of 19.61%. The most represented age group among adolescent girls was 18 - 19 years or 55.67%; an average age of adolescent girls of 17.4 - 1.2 years with extreme ages 14 and 19 years. The average age of controls was 23.19 years - 3.1 years with extreme ages 20 and 40 years. The average age of the spouses was 28.34 - 4.39 years for the cases compared to 34.27 - 5.8 years for the controls. The majority of birth attendants resided in the commune, with a frequency of 82.33% for adolescent girls and 85% for controls. The number of girls in school was 39.67% of adolescent girls who were out of school compared to 30.67%. Of these, 45% had a primary education level compared to 27% among controls. In contrast, only 14% of adolescent girls had a secondary school level compared to 31.67% of witnesses. Domestic helpers accounted for 13.67% of adolescent girls compared to 2% of witnesses. 14.67% of adolescent girls were single compared to 5.33% for witnesses. The spouse's profession: Students accounted for 8.33% of teenage spouses compared to 1.33% of controls. These epidemiological aspects of parturients are summarized in **Table 1**.

4.2. Clinical Features

Of these, 0.67% had a history of abortion compared to 8% of the controls. In our study 13.67% of adolescent girls used a modern contraceptive method compared to 25.3%. Non-antenatal consultation was more common among adolescents than in controls with the respective frequencies 14.67% versus 5.33%. The average number of antenatal consultations was 2.7 for adolescent girls compared to 3.7 for controls. Only 36.67% of adolescent girls had completed at least 4 antenatal consultations compared to 55% of the witnesses. We also found that failure to perform antenatal counseling was strongly associated with unintended pregnancies, at 72.73% among adolescents compared to 43.75% for controls. Adolescent girls are twice as likely to fail to perform antenatal check-ups as controls, at 32.42% versus 15.85%. Adolescent girls tend to start antenatal consultations later than adults with the average age of pregnancy at the first antenatal consultation at 19.42-5SA compared to 16.4-5.1SA in controls, respectively. Medical and obstetric complications of pregnancy: in our study, the prematurity rate is 7.33% in adolescents versus 3% in controls. Anaemia was twice as common among adolescent girls: 14.33% vs. 7.67%. As for high blood pressure was noted in 14% among adolescents versus 11% in controls. Clinical characteristics are summarized in **Table 2**.

4.3. Aspects of Childbirth

4.3.1. The Process of Childbirth Work

The reference/evacuation was 38.55% for cases versus 26% for witnesses. Direct

Table 1. The epidemiological aspects of the patients.

Age	Adolescents		Witnesses		P	OR	IC
	Staff	%	Staff	%			
14 - 17	133	44.33%	-	0%	-	-	-
18 - 19	167	167	-	0%	-	-	-
20 - 26	-	-	254	84.67%	-	-	-
27 - 34	-	-	41	13.67%	-	-	-
35 and over	-	-	5	1.66%	-	-	-
Residence							
Commune VI	247	82.33%	255	85%			
Out of Common VI	53	17.67%	45	15%			
Profession	41	13.67%	6	2%	0.0000011	7.75	[3.2 - 2.65]
Housekeeper	16	5.33 %	19	6.33%	0.6	0.8	[0.3 - 1.7]
Hairdresser	8	2.67%	16	5.33%	0.09	0.48	[0.17 - 1.2]
Seamstress			73	24.33%	0.01	1.8	[1.24 - 2.6]
Student	110	36.67%	124	41.33%	0.15	0.78	[0.5 - 1.13]
Housewife	107	35.67%	26	8.67%	0.21	0.67	[0.3 - 1.3]
Saleswoman	18	6%	32	12%	0.000000	0.0000	[0 - 0.09]
Employee	0	0%	6	2%	0.0000011	7.75	[3.2 - 2.65]
Marital status							
Bride	256	85.33%	284	94.67%	0.001	0.32	[0.16 - 0.6]
Single	44	14.67%	16	5.33%	0.001	3.05	[1.6 - 5.9]
Spouse's occupation							
Driver	30	10%	37	12.33%	0.36	0.78	[0.5 - 1.35]
Trader	81	27%	87	29%	0.58	0.9	[0.62 - 1.31]
Student	25	8.33%	4	1.33%	0.00006	6.72	[2.28 - 26.8]
Mechanic	34	11.33%	14	4.67%	0.004	3.61	[1.3 - 5.38]
Worker	50	28.07%	49	28.07%	0.91	1.02	[0.65 - 1.6]
Tailor	40	13.33%	40	13.33%	1	1	[0.6 - 1.64]
Employee	40	13.3%	69	23%	0.003	0.51	[0.32 - 0.8]
Educational level							
out of school	119	39.67%	92	30.67%	0.02	1.48	[1.05 - 2.1]
Primary	135	45%	81	27%	0.000004	2.2	[1.5 - 3.2]
Secondary	42	14%	95	31.67%	2.510	0.35	[1.8 - 4.4]
Higher	4	1.33%	32	10.67%	0.0000011	0.11	[3.1 - 34.7]

Table 2. Clinical characteristics.

History	Adolescents		Witnesses		P	OR	IC
	Staff	%	Staff	%			
HTA	5	1.67%	6	2%	1	0.83	[0.19 - 3.3]
Asthma	10	3.33%	13	4.33%	0.52	0.76	[0.29 - 1.9]
Sickle cell anemia	2	0.67%	3	1%	1	0.66	[0.05 - 5.8]
VIH	3	1%	1	0.33%	0.3	3	[0.24 - 159]
Diabetes	1	0.33%	2	0.67%	0.56	1.2	[0.66 - 2.4]
Not	279	93%	274	91.3%	0.4	1.2	[0.6 - 118.7]
Contraception							
Yes	41	13.67%	76	25.3%	0.0003	0.46	[0.2 - 0.7]
Not	259	86.33%	224	74.67%	0.0003	2.14	[1.3 - 3.3]
Gestivity (G)							
G = 1	298	99.3%	276	92%	0.00002	12.9	[3.1 - 113]
G ≥ 2	2	0.67%	24	8%	0.00002	0.07	[0.008 - 0.3]
Abortion							
Not	298	99.3%	276	92%	0.00002	12.9	[3.1 - 113]
Yes	2	0.67%	24	8%	0.00002	0.07	[0.008 - 0.3]
CPN							
Yes	256	85.33%	284	94.67%	0.0001	0.32	[0.16 - 0.61]
Not	44	14.67%	16	5.33%	0.0001	3.05	[1.6 - 5.9]
Number of NCCs (N)							
Number = 0	44	14.67%	16	5.33%	0.0001	3.05	[1.6 - 59]
Number [1 - 3]	146	48.67%	119	39.67%	0.026	1.44	[1.02 - 2.01]
Number 4	110	36.67%	165	55%	0.000006	0.47	[0.33 - 0.6]
Reasons for CPNs.							
Economic	7	15.91%	5	31.25%	0.19	0.42	[0.09 - 2.04]
Afraid	5	11.36%	4	25%	0.19	0.38	[0.07 - 2.3]
Unwanted pregnancy	32	72.73%	7	43.75%	0.037	3.42	[0.9 - 13.4]
lieu de CPN							
Cabinet/Clinic	20	6.7%	31	0.3%	0.14	0.62	[0.33 - 1.2]
Community Health Centre	177	69.1%	135	47.53%	0.000s	2.5	[1.7 - 3.5]
CSREF	59	3.04%	118	41.55%	0.000004	0.42	[0.28 - 0.62]
Auteur CPN							
obstetrician nurse	30	11.72%	25	8.8%	0.26	1.25	[0.1 - 2.5]
Doctor	26	10.16%	74	26.06%	0.000002	0.32	[0.18 - 0.53]
Midwife	200	78.13%	185	65.14%	0.0008	1.9	[1.2 - 2.8]
Prenatal check-up							
Yes	173	67.58%	239	84.15%	0.000006	0.39	[0.25 - 0.6]
Not	83	32.42%	45	15.85%	0.000006	2.54	[1.65 - 3.9]

admissions were 60.33 per cent for cases and 71.61 per cent for controls. Painful uterine contractions strongly dominate the reason for admission: 91.33% in cases compared to 91% in controls. Conjunctiva pallor was more common in adolescent girls, at 8% than in controls 5.33%. High blood pressure was found at admission in 14% of cases compared to 11% of controls. The membranes were ruptured in 34.67% in adolescents versus 29.33% in controls. The pelvis was normal in the majority of cases, 89.33% among adolescents compared to 93.33% among controls. Fetal heart noises less than 120 beat/mn were detected more in teenage girls 6.33% than controls 1%. The presentation of the summit was the most represented with frequencies of 92.67% for cases compared to 91.33% for witnesses. The admission procedures, the parameters of the mother and the fetus are summarized in **Table 3**.

4.3.2. The Mode of Delivery and Caesarean Section Indications

Natural births accounted for 82.33% for adolescent girls compared to 84.33% for controls. We recorded 17.67% of cases of caesarean delivery in adolescents compared to 15.67% in controls. Adolescent girls are three times more likely to have a caesarean section for mechanical dystocia, 49.05% compared to 21.28% for controls. Vaginal delivery, instrumental extractions and caesarean section indications are summarized in **Table 4**.

4.3.3. Maternal and Fetal Prognosis

The majority of the parturients had given birth without complications, 89.5% among adolescents compared to 95.26% among controls. A significant number of perineal tears were observed in adolescent girls, at 6.8% compared to 2.37% for controls. We recorded 2 cases of maternal death among adolescent girls or 0.67% compared to 1 case among controls or 0.34%. Low birth weight (p<lt; 2500 g) was twice as common among adolescents 13.33% as among controls 6.33%. Apgar's score at the first minute was poor in 10% of newborns of teenage mothers compared to 9.33% among controls. Apgar's score was good in 85.33% of cases compared to 84.67% for controls. The recorded perinatal deaths were 58.82% stillborn fresh; 17.65% stillborn macerated; 23.53% early neonatal deaths in cases versus 42.11% of fresh stillbirths; 47.37% stillborn macerated; 10.52% of early neonatal deaths in controls. Early maternal, fetal and neonatal complications are summarized in **Table 5**.

The reasons for the outcome of newborns in neonatology are presented in **Figure 1**: 22.33% of newborns from teenage mothers were referred to neonatology compared to 12.67% of newborns from controls. The reasons for evacuation were essential: neonatal suffering was the most common reference ground, with 38.81% for cases compared to 31.58% for controls; hypotrophy with 20.89% among adolescents versus 26.31% for controls; prematurity with 32.84% among adolescent girls versus 23.68% among controls; fetal macrosomia with 4.48% in adolescents versus 15.78% in controls and fetal malformations with 2.98% in adolescents versus 2.63% in controls.

Table 3. Admission procedures and parameters of mother and fetus.

How to admit	Adolescents		Witnesses		P	OR	IC
	Effectifs	%	Eff	%			
Direct admission	181	60.33%	215	71.61%	0.003	0.6	[0.4 - 0.85]
Reference/Evacuation	116	38.55%	78	26%	0.0009	1.7	[1.2 - 2.58]
Hospitalized	3	1%	7	2.33%	0.2	0.4	[0.07 - 1.9]
Reason for admission							
Uterine contractions	274	91.33%	273	91%	0.89	1.04	[0.57 - 1.9]
Water losses	12	4%	15	5%	0.55	0.79	[0.33 - 1.84]
Bleeding	4	1.33%	8	2.67%	0.24	0.49	[0.1 - 1.86]
Conjunctiva							
Colorful	276	92%	276	92%	0.19	0.65	[0.3 - 1.3]
Pales	24	8%	16	5.33%	0.19	1.54	[0.77 - 3.2]
This							
<14/9	258	86%	267	89%	0.26	0.75	[0.45 - 1.2]
≥14/9	42	14%	33	11%	0.26	1.31	[0.78 - 2.2]
State of membranes							
Intact	196	65.33%	212	70.67%	0.16	0.78	[0.5 - 1.12]
Broken	104	34.67%	88	29.33%	0.16	1.28	[0.9 - 1.83]
Basin							
Limit	26	8.67%	19	6.33%	0.28	1.4	[0.73 - 2.8]
BGR	6	2%	1	0.33%	0.06	6.1	[0.7 - 281.6]
Normal	268	89.33%	280	93.33%	0.08	0.56	[0.3 - 1.1]
HU							
<36	280	93.33%	286	94.33%	0.29	0.69	[0.31 - 1.45]
≥36	20	6.67%	14	4.67%	0.29	1.45	[0.69 - 3.2]
BDCF							
[120 - 160]	271	90.33%	279	93%	0.24	0.7	[0.4 - 1.3]
<120	19	6.33%	3	1%	0.0005	6.7	[1.9 - 35.61]
>160	5	1.67%	5	1.67%	1	1	[0.23 - 4.4]
Not perceived	5	1.67%	13	4.33%	0.05	0.4	[0.1 - 1.14]
LA Color							
Clear	266	88.67%	271	90.33%	0.51	0.84	[0.48 - 1.5]
Misconial	34	11.33%	29	9.67%	0.51	1.2	[0.68 - 2.1]
Presentation							
Summit	272	92.67%	274	91.33%	0.65	1.2	[1.1 - 5.1]
Siege	15	5%	21	7%	0.3	0.7	[0.3 - 1.5]
Other	7	2.33%	5	1.67%	0.56	1.4	[0.4 - 5.7]

Table 4. Distribution of parturients by vaginal delivery, instrumental extractions and caesarean section indications.

Childbirth lane	Adolescents		Witnesses		P	OR	IC
	Eff	%	Eff	%			
Low track	247	82.33%	253	84.33%	0.5	0.87	[0.6 - 1.4]
Caesarean section	53	17.67%	47	15.67%	0.5	1.15	[0.7 - 1.8]
Low track							
Sucker	51	20.65%	21	8.3%	0.00008	2.87	[1.6 - 5.2]
Normal	196	79.35%	232	91.7%	0.00008	0.35	[0.19 - 0.6]
Indication							
Mechanical dystocia	26	49.05%	10	21.28%	0.0039		
Basin generally shrunk	6	11.32%	1	2.13%			
Failed work probation	5	9.43%	4	8.5%			
Disproportion foeto-pelvic	3	5.66%	1	2.13%			
Vicious presentation	5	9.43%	2	4.26%			
Pre-uterine rupture syndrome	2	3.77%	-	-			
Lack of commitment	5	9.43%	2	4.26%			
Dynamic dystocia	9	16.98%	13	27.66%	0.19		
Stationary dilation	5	9.43%	7	14.89%			
Trigger failure	4	7.55%	6	12.77%			
Seat/Primipare	4	7.55%	6	12.77%	0.39		
Acute fetal suffering	9	16.98%	11	23.4%	0.42		
Funicular anomaly	7	13.20%	8	17.02%			
Hretro-placental ematoma	2	3.77%	3	6.38%			
Placenta prævia	2	3.77%	3	6.38%	0.55		
Severe pre-eclampsia	3	5.66%	4	8.5%	0.39		

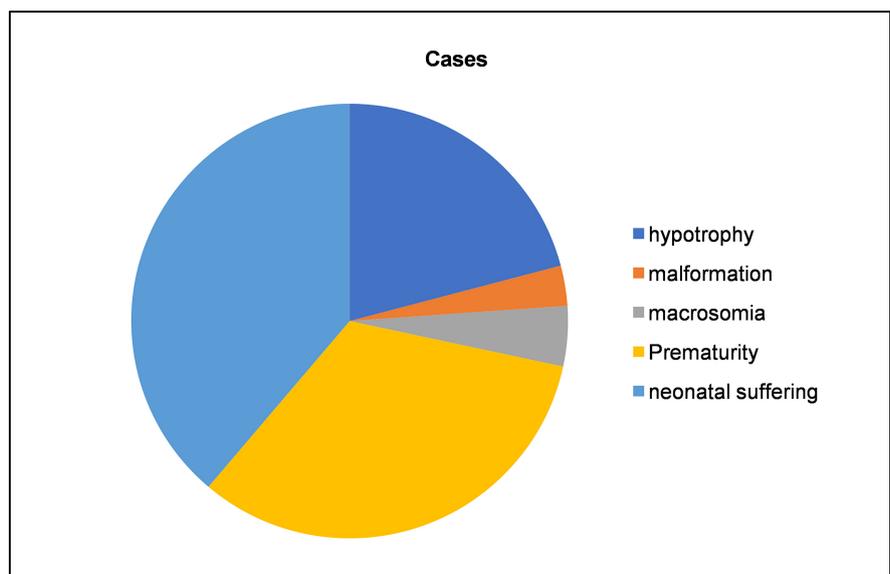


Figure 1. Distribution of newborns based on the reasons for their paediatric references.

Table 5. Early maternal, fetal and neonatal complications.

Complications	Adolescents		Witnesses		P	OR	IC
	Eff	%	Eff	%			
Yes	15	5%	10	4.17%	0.31	1.5	[0.63 - 3.9]
Not	285	95%	290	95.83%	0.31	0.66	[0.26 - 1.6]
Complications							
Perineal tear	17	6.8%	6	2.37%	0.016	3.05	[1.2 - 9.6]
Cervical tear	5	2.02%	5	1.98%	0.96	1.02	[0.2 - 4.5]
Vulvar hematoma	4	1.62%	1	0.4%	0.16	4.1	[0.4 - 205.1]
No	221	89.5%	241	95.26%	0.015	0.4	[0.19 - 0.8]
Maternal death							
Yes	2	0.67%	1	0.34 %	0.58	1.95	[0.1 - 115.7]
Not	298	99.33%	299	99.66%	0.58	0.49	[0.008 - 9.6]
Apgar 1ere Minute							
[0 - 3]	14	4.67%	18	6%	0.47	0.77	[0.35 - 1.67]
[4 - 7]	30	10%	28	9.33%	0.78	1.08	[0.6 - 1.9]
[8 - 10]	256	85.33%	254	84.67%	0.82	1.05	[0.66 - 1.7]
Apgar							
0	13	4.33%	17	5.67%	0.45	0.75	[0.3 - 1.68]
[0 - 3]	4	1.33%	2	0.67%	0.41	2.01	[0.2 - 22.3]
[4 - 7]	5	1.67%	2	0.67%	0.25	2.5	[0.41 - 26.7]
[8 - 10]	278	92.67%	278	93%	0.87	0.95	[0.49 - 1.86]
Weight (g)							
<2500	40	13.33%	19	6.33%	0.0039	2.2	[1.25 - 4.3]
[2500 - 3999]	257	85.67%	275	91.67%	0.021	0.54	[0.31 - 0.94]
≥4000	3	1%	6	2%	0.31	0.5	[0.08 - 2.35]
Referred to paediatrics							
Yes	67	22.33%	38	12.67%	0.002	1.98	[1.3 - 3.15]
Not	233	77.67%	262	87.33%	0.002	0.50	[0.32 - 0.79]
Type of death							
Early neonatal death	4	23.53%	2	10.52%	0.29	2.6	[0.31 - 32.3]
Fresh stillborn	10	58.82%	8	42.11%	0.32	1.96	[0.4 - 9.08]
Stillborn macerated	3	17.65%	9	47.37%	0.05	0.23	[0.03 - 1.3]

4.3.4. Pathologies of Diaper Suites

In our study postpartum anaemia, postpartum eclampsia, endometritis were found to be more common in adolescent girls than in controls: 3.3% vs. 2%, 1.33% vs. 1%, 2.67% vs. 0.67% respectively. These pathologies of diaper sequences are summarized in **Figure 2**.

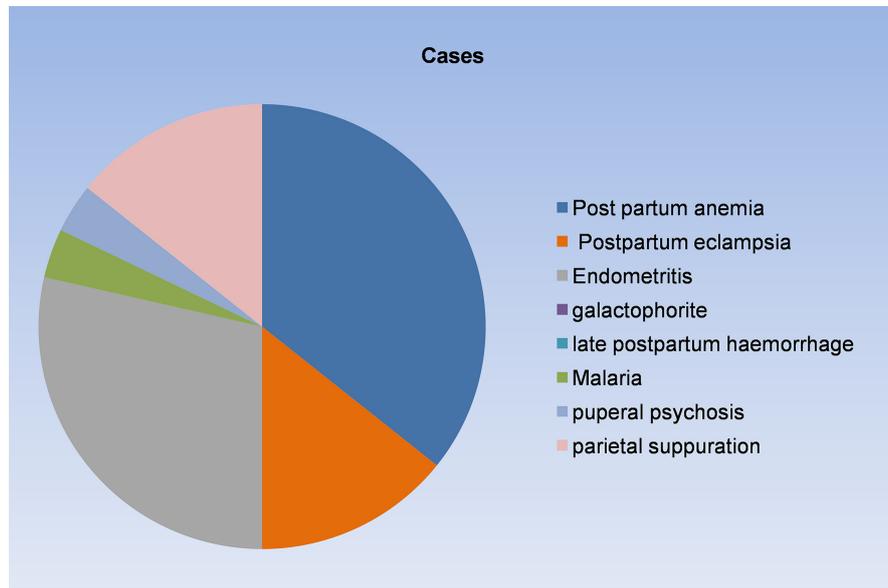


Figure 2. Distribution of parturients according to complications of diaper suites.

5. Discussion

5.1. The Frequency of Teen Delivery

In the literature, studies on adolescence pose problems, comparisons are difficult because the chronological limits of this segment of the population are not precisely defined. Some authors take an upper age of 18, others 17 years, and 16 years for some [6] [7] [8] [9]. We took the 10 - 19 age group recommended by WHO. In our series, this frequency was 19.61% superimposed on previous studies in Mali. Dembélé F. [18] in 2015, Dembélé S. [19] in 2012, Sanogo M. [20] in 2009, Yattasaye A. [4] in 1998 had found a teenage delivery frequency of 19.2%; 21.72%; 12.11%; 18.14% respectively. According to LEKE J.F.R. [21] in 1995, the incidence of teen pregnancy in black Africa ranged from 5 to 20%. The teen birth rate is much lower in developed countries such as France with 0.6%, the USA with 5.6%, Great Britain with 2.6% [22] in 2010. The high frequency of early marriages in our countries; the low level of education; the low use of contraception among adolescent girls; cultural and religious factors are factors that may explain this difference between the frequencies observed in Africa and elsewhere in the world.

5.2. Socio-Demographic Aspects

In our study, the age group most represented among adolescent girls was 18 - 19 years old with 55.67% with an average age of 17 years - 1.2 years. In Mali, Dembélé F. [18] found that 55.73% of adolescent girls were between 18 - 19 years of age. On the other hand Sanogo M. [20] reported that the most represented age group was 16 - 17 years with 50.3%. Dembélé S. [19] in its study found that 80% of adolescent girls were under the age of 18 with an average age of 17. We have not reported births among adolescent girls under the age of 14. We believe that

very young adolescent girls under the age of 15 were most often spared the scarcity of sexual activity and/or generally anovulatory cycles in this age group. Geographical accessibility, the quality of services, trust in the sick-provider relationship is important in the use of a structure and medical care. Thus, the majority of the birth attendants were residents of the study commune, a frequency of 82.33% for adolescent girls and 85% for controls. **Educational attainment:** Studies of adolescent fertility affirmed the importance of education as a limiting factor in early fertility [23] [24]. In our study, we found that 39.67% of adolescent girls were out of school compared to 30.67% of controls ($P=0.02$; $OR=1.48$). Dembélé S. [19] reported that 69.8% of adolescent girls compared to 90.3% of controls were out of school. Coulibaly B. [25] and Yattasaye A. [4] reported 91.21% and 29.3% of out-of-school adolescent girls respectively. Our low rate of non-schooling compared to Dembélé S. [19] is due to the fact that our study is conducted in urban areas unlike that of Dembélé S. [19] carried out in rural areas. There is a clear difference between the rates of adolescent girls not enrolling in developed and developing countries. In Italy, the rate of non-enrolment in this age group is 1%, in Israel the rate is 4%. **Schooling:** Adolescent girls who were in school were twice as likely to be in the control group. Female participants with a primary education level were the most numerous among adolescent girls 45% versus 27% among controls ($P = 0.000004$; $OR = 2.2$). On the other hand, only 14% of adolescent girls had a secondary school level compared to 31.67% of the controls ($p = 2.5 \times 10^{-7}$; $OR = 2.85$). Teenage girls, once pregnant, are removed from school or drop out because of pregnancy or marriage. Dembélé S. [19] in 2012 found that 18.9% and 11.3% of the participants who had attended primary and secondary school respectively were adolescent girls. And Drabo A. [26] in 2015 reported 34.5% of adolescent girls with a primary education level compared to 5% of controls. **Occupation:** Domestic helpers accounted for 13.67% of adolescent girls compared to 2% of controls ($P = 0.0000011$, $OR = 7.75$). Drabo A. [26] reported that 13.1% of adolescent girls compared to 1.5% of witnesses were housekeepers. Sanogo M. [20] had found 35% of domestic helpers among teenage girls. Similarly, in our study, students accounted for 36.67% of adolescent girls compared to 24.33% of controls ($p=0.01$ and $OR=1.8$). Dembélé F. [18] found that students accounted for 26.57% of adolescent girls compared to 8.04% of witnesses. This high frequency of students among adolescent girls is explained by the lack of sex education in the school curriculum and the media masses (television, internet, etc.). **Marital styling:** Child marriage is defined as any marriage in which a person is under the age of eighteen and is a widespread practice in all regions of the world. This harmful traditional practice not only violates the human rights of girls and young women, but also threatens their health and well-being [27] [28]. The place of marital status in pregnancies and childbirth has been the subject of much study [29] [30]. In our series 85.33% of teenage girls were married compared to 94.67% of the witnesses ($P=0.001$). Dembélé F. [18] in 2015, Dembélé S. [19] in 2012, Drabo A. [26] in 2015, and

Traoré F. [31] in 2002 found 86.98%, 79.2%, 73.6%, 62% of teenage girls married in their studies, respectively. In our series 14.67% of adolescent girls were single compared to 5.33% for the witnesses ($P = 0.001$, $OR = 3.05$). Dembélé S. [19] and Dembélé F. [18] reported 20.8% and 13.02% of single adolescent girls respectively. P.H. Boisselier in France [32] in 1985 in the French journal of obstetrics and biological gynecology and reproductive biology, found 75% of French teenagers single compared to 15% of African adolescents single. This high rate of married teenage girls could be explained by early marriage in our country. **The profession of the spouse:** Women during their pregnancies are mainly supported by their spouses especially with regard to the financial means and this depends not only on their wishes but on their activities. Teenage girls are more likely to become pregnant with inactive spouses [26]. In our study, students accounted for 8.33% of teenage spouses compared to 1.33% of controls ($P = 0.00006$, $OR = 6.72$). Drabo A. [26] found 31.8% of students as teenage spouses compared to 26.4% among controls.

5.3. The Clinical Aspects

99.3% of adolescent girls were at first pregnancy compared to 92% of controls ($P = 0.00002$). Those with a history of abortion were 0.67% compared to 8% for controls. Dembélé F. [18] and Nekam F. [32] in 1995 had found a history of abortions, in 4.69% and 1.2%, respectively. Numerous studies have shown low contraceptive use among adolescent girls and are considered a determining factor in the onset of pregnancy. In Hamada's series [33] in Rabat, Morocco in the Journal of Obstetric Gynecology and Reproductive Biology in 2004, 22.4% of adolescent girls used at least one contraceptive method compared to 20% in sub-Saharan Africa, 5% in India and Pakistan, 40% in Indonesia and Thailand, 30% to 53% in Latin American and Caribbean countries [34], 58% in France and 82% in Denmark [35]. In our study 13.67% of adolescent girls used a modern contraceptive method compared to 25.3% in controls ($P = 0.0003$; $OR = 2.14$). As for Drabo A. [26], contraceptive use was 9.1% among adolescents versus 25% among controls.

Prenatal counseling: The purpose of prenatal consultation is to safeguard a woman's health during pregnancy, to allow her to give birth to a healthy child and to teach her the care of the newborn [21]. The failure to perform this antenatal consultation was more common in adolescent girls than in controls with the respective frequencies 14.67% versus 5.33%. The difference was statistically significant with a 3.05-fold increase in the risk of a pregnant adolescent not performing this antenatal consultation ($P = 0.0001$, $OR = 3.05$). The average number of antenatal consultations was 2.7 for adolescent girls compared to 3.7 for controls. Only 36.67% of adolescent girls had completed at least 4 antenatal consultations compared to 55% of the witnesses. Drabo A. [26], reported 6.8% of unsecured teenage pregnancies compared to 2.8% among adult controls. Diallo A. [36] and Dembélé S. [19] had found higher rates of unsecured pregnancies with

30.02% and 58% respectively among adolescent girls compared to 15.02% and 16% among controls. Traoré B. [37] reported 23.7% of adolescent girls who did not have antenatal care. We also found that failure to perform antenatal counseling was strongly associated with unintended pregnancies, at 72.73% among adolescent girls compared to 43.75% in controls with a statistically significant difference ($P = 0.037$; $OR = 3.42$). Drabo A. [26] found in her study that women with unintended pregnancies had performed less antenatal care ($P = 0.081$, $OR = 2.87$). An unwanted pregnancy is a disgrace to the girl and her family in our society. The family is not concerned with pregnancy monitoring and often the procreator who needs to care for it is not known. In addition to limited financial resources. For example, these adolescent girls are twice as likely to fail to perform antenatal check-ups as controls, at 32.42% versus 15.85% with a statistically significant difference ($P = 0.000006$; $OR = 2.54$). Adolescent girls tend to start antenatal consultations later than adults with the average age of pregnancy at the first antenatal consultation at 19.42-5SA compared to 16.4-5.1SA in controls, respectively. According to WHO, in developing countries, young pregnant women often come late for antenatal consultations (in the second or third trimester of pregnancy) or do not even show up for antenatal care. The reasons given for this apathy towards antenatal care services include: ignorance of the importance of antenatal care (especially among non-registered), lack of family or social support, poverty, unpleasant remarks from health workers to unmarried adolescents who are pregnant [38]. Fear of HIV testing [39].

In the literature, numerous studies have shown the high frequency of anaemia in adolescent girls especially in developing countries where half of adolescent girls are anemic. The latter is favoured by intestinal parasitic infections, malaria, nutritional deficiency of iron and folic acid. Teenage mothers with iron deficiency anemia are more likely to give birth before term [2] [13] [19]. In our study, the prematurity rate was 7.33% among adolescents compared to 3% among controls with a 2.5-fold increased risk of preterm birth ($P = 0.01$; $OR = 2.5$). According to Boisselier [32], the rate of preterm birth among adolescent girls is 11.5% while it reaches 30% according to Suraiya [40]. Anaemia was twice as common among adolescent girls: 14.33% vs. 7.67% with a 2.01-fold increase in risk for adolescent girls ($P = 0.009$; $OR = 2.01$). This rate is comparable to the literature on which the rate of adolescent anaemia ranges from 12.5 to 25% [41] [42] [43]. We found no statistically significant difference in high blood pressure, 14% in adolescent girls versus 11% in controls with ($P = 0.26$); the rate of high blood pressure in adolescent girls varies between 10% and 17.5% [41]-[46]. The rate of malaria among adolescent girls in our study was 11.67% comparable to that of the literature which is estimated at 15% [47].

5.4. Aspects of Childbirth

5.4.1. How the Labour Work Unfolded

Referral/evacuated participants were 38.55% for cases versus 26% for controls.

Adolescent girls were 1.74 times more likely to be referred/evacuated than controls ($P = 0.0009$; $OR = 1.74$). Dembélé F. [18] found that 22.92% of adolescent girls versus 8.29% of witnesses were admitted according to the reference/evacuation mode. Painful uterine contractions were the reason for admission in 91.33% in cases versus 91% in controls. The absence of iron and folic acid supplementation due to the failure to perform antenatal consultation explains the frequency of conjunctival pallor higher in adolescents at 8% than in controls 5.33% ($P = 0.19$). Our rate is higher than Drabo A. [26] which had regained pallor in 6.3% of adolescent girls compared to 1.8% among controls. High blood pressure was found at admission in 14% of cases compared to 11% ($P = 0.26$, $OR = 1.31$). Drabo A. [26] had found high blood pressure at admission in 2.5% of adolescent girls versus 2.4% in controls. Diallo A. [36] in his study reports that 24.22% of adolescent girls had high blood pressure at admission. Prolonged work with ruptures of membranes is common in our context. Adolescent girls were 1.28 times more likely to have ruptured membranes at admission. Most often, this rupture of membranes is made at the level of community health centers. They were broken in 34.67% among adolescent girls compared to 29.33% among controls with ($P = 0.16$; $OR = 1.28$). Drabo A. [26] reported that membranes were ruptured at admission in 19.1% of adolescent girls compared to 13.2% in controls and when at Diane H. [48], this rate had reached 77% among adolescent girls compared to 47% among controls. The pelvis was normal in the majority of cases, 89.33% among adolescents compared to 93.33% among controls. The difference was not statistically significant ($p=0.08$; $OR=0.56$). In the literature, the rate of normal pelvis varies between 92.18% and 95.7% among adolescent girls and between 94.06% and 96.3% among controls [18] [20] [26]. The generally narrowed pelvis was found in 2% of adolescent girls compared to 0.33% of controls with a statistically significant difference ($P = 0.05$; $GOLD = 6$). Gandonou M. [49] had found similar results in adolescent girls in Benin, with 2% of the pelvis generally narrowed; Drabo A. [26] reported a generally reduced pelvis rate of 4.3% in adolescent girls (including 4 cases of immature pelvis) and 3.7% in controls. This may be due to the fact that teenage girls have not finished their physical growth. Fetal heart noises below 120 beats/mn were detected more in adolescents 6.33% than 1% controls with a statistically significant difference ($P = 0.0005$; $OR = 6.7$). Drabo A. [26] had reported 3.6% of adolescent girls with fetal heart noises below 120 beat/mn. The presentation of the summit was the most represented with frequencies of 92.67% for cases compared to 91.33% for controls ($P = 0.65$; $OR = 1.2$). In the literature, the rate of cephalic presentation ranges from 92.18% to 98.5% among adolescent girls and from 94.06% to 98.3% among controls [18] [20] [22] [26] [44]. The high rate of presentation of the summit could be explained by compliance with the law of accommodation among the majority of our pregnant women.

5.4.2. The Mode of Delivery and Caesarean Section Indications

Natural births accounted for 82.33% for adolescent girls compared to 84.33% for

controls ($P = 0.5$; $OR = 0.87$). In the literature, the rate of vaginal delivery among adolescent girls ranges from 75.9% to 94.8% [18] [31] [43]. Instrumental extraction in adolescent girls ranges from 8.4% to 26.9%, the main indication of which is poor maternal co-operation during the expulsive phase, linked to defective psychological preparation of adolescent girls for safe delivery [19] [50]. In our series, instrumental suction cup extraction was 20.65% of cases compared to 8.3% for controls ($P = 0.00008$, $OR = 2.87$). Mr. Laghzaoui Boukaidi *et al.* [51] had found in Morocco that instrumental delivery was 20.25% among adolescent girls. However, we can say that in the vast majority of cases, teenage delivery is done naturally, as evidenced by these different results. These deliveries required rigorous monitoring of the labour of delivery using the partogram. We recorded 17.67% of caesarean delivery cases among adolescents compared to 15.67% of controls ($P = 0.5$, $OR = 1.1$). Dembélé F. [18] had found 16.15% of cases of high-birth among adolescent girls. Sanogo M. [20] had reported a rate of 13.75% of caesarean adolescent girls for different indications, this rate was 15.78% according to Yattassaye A. [4] and 5.2% according to Traoré F. [31], Niane M. [52] and Ongoiba A. [14] reported 24.1% and 20.04% of caesarean sections in adolescents, respectively.

5.5. Cesarean Section Indications

Adolescent girls are 3 and 1/2 times more likely to have caesarean section for mechanical dystocia, or 49.05% compared to 21.28% for controls; with a statistically significant difference ($p=0.0039$; $OR=3.5$). Bone growth in women does not end until the age of 18 and the deportation canal does not mature until the age of 20 to 21, although the bone age varies significantly from woman to woman and from population to population depending on nutritional level [2]. In this area, most authors agree that there is an increased risk related to age, and that physical immaturity increases the risk of dystocia, the latter potentially leading to maternal death, as well as serious obstetric complications [2] [7] [9] [53] [54]. Hamada *et al.* [28] in Rabat, Morocco, reported 57% of mechanical dystocies as causes of caesarean section in adolescents compared to 20% in controls.

5.6. Maternal and Fetal Prognosis

According to some authors, the association between adolescence birth and adverse maternal and perinatal prognosis could be explained in part by the deleterious social environment [39]. In our series, the majority of participants gave birth without complications, 89.5% among adolescent girls compared to 95.26% among controls; the difference was statistically significant ($P = 0.015$; $OR = 0.4$). Dembélé S. [19] reported 85.8% of adolescent girls compared to 97.3% of controls with uncomplicated delivery. A significant number of perineal tears were observed in adolescent girls, at 6.8% compared to 2.37% for controls with a statistically significant difference ($P = 0.016$; $OR = 3.05$). Dembélé F. [18] and Dembélé S. [19] reported 2.08% and 7.5% of perineal tears in adolescent girls,

respectively. This high rate of perineal tears in adolescents compared to adults is due in part to the immaturity of perineal musculature in adolescent girls. **Maternal deaths:** We recorded 2 cases of maternal death among adolescent girls or 0.67% compared to 1 case in controls or 0.34%. The difference was statistically significant ($p=0.58$; OR-1.95).

Newborn weight: In our series, low birth weight ($p<0.05$; <2500 g) was twice as common in adolescents 13.33% as in controls 6.33% ($p=0.0039$; OR-2.2). Traoré F. [31] and Diallo D. [55] reported 13.5% and 11.8% of low birth weight respectively among newborns from adolescent mothers. As for Dembélé F. [18], the low birth weight rate was 10.26% among adolescent girls versus 5.41% for controls.

Low birth weight may be either preterm infants who are at gestational age or hypotrophy whose weight is less than gestational age. This low birth weight is detrimental to these newborns whose survival depends on rigorous follow-up by the family and health workers. In addition, the results of the multi-variety study conducted by Forum *et al.* [56] do not show a significant association between maternal age and delivery of a small-weight newborn.

Status of newborns at birth: The recorded perinatal deaths were 58.82% stillborn fresh; 17.65% stillborn macerated; 23.53% early neonatal deaths in cases versus 42.11% of fresh stillbirths; 47.37% stillborn macerated; 10.52% of early neonatal deaths among controls. Dembélé F. [18] reported 3.08% of perinatal deaths among adolescent girls and 2.28% of perinatal deaths among controls and when at Dembélé S. [19], the perinatal mortality rate was 5.2% among adolescent girls and 8.8% among controls. Perinatal mortality varies in the literature between 1.36% for Konje [57] and 5.4% for Ryan [54].

5.7. The Reference Patterns of Newborns in Neonatology

In our series, 22.33% of newborns from teenage mothers were referred to neonatology compared to 12.67% of infants from controls with a statistically significant difference ($P = 0.002$; OR = 1.98). The reasons for evacuation were mainly: Neonatal suffering with 38.81% among adolescent girls versus 31.58% among controls; hypotrophy with 20.89% in adolescent girls versus 26.31% in controls; prematurity with 32.84% among adolescent girls versus 23.68% among controls; fetal macrosomia with 4.48% in adolescents versus 15.78% in controls and fetal malformations with 2.98% in adolescents versus 2.63% in controls. Dembélé F. [18] found that newborns were referred to paediatrics in 18.97% of adolescent cases and 11.18% in controls and Maiga R. [58] reported that the baseline rate for newborns was 15.9% for adolescent girls and 9.0% for controls.

5.8. Pathologies of Diaper Suites

In the literature, no particular complications of diapers are reported in young mothers [33] [59]. In our study, postpartum anemias, postpartum eclampsia, endometritis were found to be more common in adolescent girls than in con-

trols: 3.3% vs. 2%, 1.33% vs. 1%, 2.67% vs. 0.67% without a statistical link. The P values were P = 0.3, respectively; P = 0.7; 0.06.

6. Conclusion

Teenage versus adult births are associated with many more maternal-fetal complications.

Authors' Contributions

All the authors participated in the writing of the manuscript. They all approve the final version of the manuscript.

Ethics Authorisation

The ethics committee's authorization was found prior to the start of the study.

Conflicts of Interest

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

References

- [1] Dadoorian, D. (2003) Teenage Pregnancy. Eres Editions, Ramonville-Saint-Agne, 136 p.
- [2] World Health Organization (1998) World Health Day: Safe Motherhood: Delaying Births. Geneva, 1-3.
- [3] Barabara, S. (1996) Family Planning Saves Lives: Teenage Girls and Reproductive Health. 15-18.
- [4] Yattasaye, A. (1998) Teenage Giving Birth at the Maternity Ward of CHU. Thesis, Gabriel Touré Medical, Bamako, No. 74, 83 p.
- [5] Samaké, S., Traoré, S.M., Ba, S., Dembélé, E., Diop, M., Mariko, S., *et al.* (2007) Mali Demographic and Health Survey. 410 p.
- [6] Eure, C.R., Lindsay, M.K. and Graves, W.L. (2002) Risk of Adverse Pregnancy Outcomes in Young Adolescent Parturients in an Inner-City Hospital. *American Journal of Obstetrics and Gynecology*, **186**, 918-920.
<https://doi.org/10.1067/mob.2002.123986>
- [7] Gallais, A., Robbillard, P.Y., Nuissier, E., Cuitassier, T. and Janky, E. (1996) Adolescence and Maternity in Guadeloupe: About 184 Observations. *Journal of Obstetrics and Gynecology and Reproductive Biology*, **25**, 523-527.
- [8] Creatsas, G., Michalas, S., Terzakis, E. and Kaskarelis, D. (1980) Teenage Pregnancy. *Gynecology*, **31**, 343-345.
- [9] Carles, G., Jacquelin, X., Raynal, P., Bertsch, M. and Zoccarato, A.M. (1998) Pregnancy and Childbirth in Adolescent Girls under 16 Years of Age. Study of 150 Cases in French Guiana. *Journal of Obstetrics and Reproductive Biology*, **27**, 508-513.
- [10] Robin, G. and Letombe, B. (2006) Contraception in the Adolescent Age. 30th National Days of the French National College of Gynaecologists and Obstetricians. Paris, 5-40.
- [11] ANRS, INSERM, INED (2007) First Results of the Survey: Background of Sexuality

- in France. Press Kit. March 13, 9-10.
- [12] National Institute of Statistics (INSTAT/MPATP); INFO-STAT; ICF International. Demographic and Health Survey in Mali 2012-2013. 577 p.
- [13] McIntyre, P. and World Health Organization (2007) Pregnant Teenagers: Bringing Global Promises of Hope. 30 p.
- [14] Ongoiba, A. (1999) Teenage Pregnancy and Childbirth at the Hospital of Point G. Thesis of Medicine, Bamako, No. 60.
- [15] World Health Organization (2004) Adolescent Pregnancy (Issues in Adolescent Health and Development). WHO, Geneva.
- [16] The Van, C. (1998) Teen Pregnancy: Social Norms, Lived Realities. Harmattan, Paris, 206 p.
- [17] N'diaye, P., Diallo, I. and Fall, C. (2001) A New Decision-Making Tool in the Fight against Maternal Mortality. The Dystocial Risk Score. *Health*, **11**, 133-138.
- [18] Dembélé, F. (2015) Teenage Delivery at the Reference Health Centre in Commune IV in Bamako District. Thesis Medicine, No. 80.
- [19] Dembélé, S. (2012) Adolescent Childbirth at the Dioila Reference Health Centre. Thesis Med. Bamako, No. 211.
- [20] Sanogo, M. (2009) Teenage Delivery at the Reference Health Centre in Commune VI of Bamako District. Thesis Medicine, No. 287.
- [21] Fatton, B. (2005) Dynamic Anatomy of the Perineum. In *Pelvi-Perineology*, 21-30.
- [22] Merger, R., Jean, L., Jean, M. and Nelly, B. (2008) *Obstetrics*. 6th Edition, Masson, Paris, 597 p.
- [23] Daguette, A. (2010) Teenage Pregnancies in France and Great Britain: A Disturbing Phenomenon for the Public Authorities. *Social Information*, **157**, 96-102.
- [24] Chamaki, A. (1992) Physiology of Puberty. 3rd National Course of School and University Medicine in Tunis. 11: 124.
- [25] Coulibaly, B. (1992) Study of Teenage Gravity at the Maternity Ward of the National Hospital of Point "G". Thesis Medicine, Bamako, No. 56.
- [26] Drabo, A. (2015) Teenage Pregnancy and Childbirth at the Health Centre Municipality II of Bamako District. Thesis Medicine, Bamako, No. 85.
- [27] Population Reference Office (2013) The World Youth Data Sheet. 4 p.
- [28] Zuber, M.C. and Blondel, B. (1987) Marital Status, Cohabitation and Pregnancy. Evolution of the Social and Medical Aspects of Out-of-Marriage Births in France. *Population*, **42**, 741-746. <https://doi.org/10.2307/1533006>
- [29] Boisselier, P.H. (1985) Teenage Pregnancy. *French Journal of Obstetrics and Biological Reproductive Gynecology*, **14**, 607-611.
- [30] Daguette, A. (2010) Teenage Pregnancies in France and Great Britain: A Disturbing Phenomenon for the Public.
- [31] Traoré, F. (2002) Consequence of Early Pregnancy in the Peri-Urban Area of Bamako. Thesis Medicine, No. 103.
- [32] Nekam, F. (1995) Risk Factors for Pregnancy in Single Adolescents in Commune IV. Medical Thesis, Bamako, No. 39.
- [33] Hamada, H., Zaki, A., Nejjar, H., Filali, A., Chraïbi, C., Bezad, R., et al. (2004) Teenage Pregnancy and Childbirth in Rabat, Morocco: Characteristics and Profile. *Journal of Obstetrics and Reproductive Biology*, **33**, 60714. [https://doi.org/10.1016/S0368-2315\(04\)96601-X](https://doi.org/10.1016/S0368-2315(04)96601-X)

- [34] The Alan Guttmacher Institute (1998) Into a New World: Young Women's Sexual and Reproductive Lives.
- [35] Janky, L.S., Gallais, A. and Landre, M. (1996) Generalities on Pregnancy and Childbirth in Adolescent Girls. Medical and Surgical Encyclopedia (Elsevier, Paris) Gynecology-Obstetrics, 5016-D10, 6 p.
- [36] Diallo, A. (2013) Adolescent Birth at the Reference Health Centre of Commune VI. Thesis Med. Bamako, No. 146.
- [37] Traore, B. (2010) Teenage Giving-Up at the Maternity Ward of the Ségou Regional Hospital Centre. *Médecine d'Afrique Noire*, **57**, 449-454.
<https://doi.org/10.1353/dss.0.0142>
- [38] Chaibva, C.N., Ehlers, V.J. and Roos, J.H. (2009) Midwives' Perceptions about Adolescents' Utilisation of Public Prenatal Services in Bulawayo, Zimbabwe. *Midwifery*, **26**, e16-e20.
- [39] Markovitz, B.P., Cook, R., Flick, L.H. and Leet, T.L. (2005) Socioeconomic Factors and Adolescent Pregnancy Outcomes: Distinctions between Neonatal and Post-Neonatal Deaths. *BMC Public Health*, **25**, 79. <https://doi.org/10.1186/1471-2458-5-79>
- [40] Suraiya, S.K., Al Sibai, M.H. and AL-Suleiman, S.A. (1986) Obstetric Implications of Pregnancy in Adolescence. *Acta Obstetrica et Gynecologica Scandinavica*, **65**, 57-61. <https://doi.org/10.3109/00016348609158231>
- [41] Reynold, H., Wrigth, K., Olukoya, A. and Neelofur-kan, D. (2004) Adolescent Maternal Care Optic Young. *Reproductive Health and HIV/AIDS Serial Publication*, **11**, 1-4.
- [42] Impact Boarding School (1997) Obstetric Gynecology (2) Med. Forensic-Toxicology, Paris, Publisher SA, March No. 18, Chapter 158, 6.
- [43] Soula, O., Carles, G., Largeaud, M., El Guindi, W. and Montoya, Y. (2006) Teenage Pregnancy under 15 Years Study of 181 Cases in French Guiana. *Journal de Gynécologie Obstétrique et Biologie de la Reproduction*, **35**, 53-61.
[https://doi.org/10.1016/S0368-2315\(06\)76372-4](https://doi.org/10.1016/S0368-2315(06)76372-4)
- [44] Benene, A., Elberoussi, L., Elfarouqi, A., Chraibi, C. and Alaoui, M.T. (2009) Adolescent Childbirth, Oranger Maternity Experience (Rabat, Morocco). About 129 Cases. *Maghreb Medicine, Electronic Edition*, Number 165, 50-54.
- [45] Djanhan, Y., Kodjo, R., Gondo, D., Abauleth, Y.R. and Bohoussou, K.M. (1995) Adolescent Birth at the Chu in Coccody-Abidjan. *Black African Medecine*, **42**, 217-219.
- [46] Iloki, L.H., Koubaka, R., Itoua, C. and Mbemba Moutounou, G.M. (2004) Pregnancy and Teen Birth in Congo: About 276 Cases at the Brazzaville University Hospital. *Journal of Obstetrics and Reproductive Biology*, **33**, 37-42.
[https://doi.org/10.1016/S0368-2315\(04\)96310-7](https://doi.org/10.1016/S0368-2315(04)96310-7)
- [47] Faucher, Ph., Dappe, S. and Madelenat, P. (2002) Maternity in Adolescence: Obstetrical Analysis and Review of the Influence of Cultural, Socioeconomic and Psychological Factors in a Retrospective Study of 62 Cases. *Gynecologie, Obstétrique & Fertilité*, **30**, 944-952. [https://doi.org/10.1016/S1297-9589\(02\)00497-6](https://doi.org/10.1016/S1297-9589(02)00497-6)
- [48] Diane, H. (2011) Teenage Delivery at the Reference Health Centre in the V Commune of Bamako, Mali. Thesis Medicine, No. 265.
- [49] Gandounou, M. (2012) Prognosis of Teen Delivery in the University Clinic of Gynecology and Obstetrics at CNHU-HKM (Benin). Thesis Medicine, Bamako.
- [50] Sittner, B., Hudson, D.B., Grossman, C. and Gaston-Johansson, F. (1998) Adolescents Perceptions of Pain during Labor. *Clinical Nursing Research*, **7**, 82-93.

<https://doi.org/10.1177/105477389800700107>

- [51] Laghzaoui, B., Bouhya, S., Bennani, O., Hermas, S., Soummani, A. and Aderdour, M. (2002) Teenage Pregnancy and Childbirth. *Morocco Medical*, **24**, 181-185.
- [52] Niane, M. (2000) Adolescent Pregnancy Epidemic Approach at Fousseini DAOU Regional Hospital in Kayes. Thesis Medicine, Bamako, No. 99, 47 p.
- [53] Tambwe, M.N.K., Kalenga, M.K. and Kakoma, S.Z. (1999) Teenage Partnering at University Clinics in Lubumbashi, Congo. *French Journal of Gynecology and Obstetrics*, **94**, 379-383.
- [54] Osbourne, G.K., Howat, R.L. and Jordan, M.M. (1981) The Obstetric Outcome of Teenage Pregnancy. *BJOG: An International Journal of Obstetrics & Gynaecology*, **88**, 215-221. <https://doi.org/10.1111/j.1471-0528.1981.tb00971.x>
- [55] Diallo, D. (1995) Teenage Delivery in Suburban Settings. Thesis Med. Bamako, No. 48.
- [56] Fourn, L., Slobodan, D. and Louise, S. (1999) Factors Associated with the Birth of Low-Weight Children: A Multi-Varied Analysis. *French-Language Study and Research Papers/Health*, **9**, 7-11.
- [57] Konje, J.C., Alan, P., Alan, W., Douglas, M.H., Alastair, I., et al. (1992) Early Teenage Pregnancies in Hull. *BJOG: An International Journal of Obstetrics & Gynaecology*, **99**, 969-973. <https://doi.org/10.1111/j.1471-0528.1992.tb13699.x>
- [58] Maiga, R. (2010) Adolescent Delivery at Sominè Dolo Hospital in Mopti, Case-Control Study. Thesis Medicine, No. 253.
- [59] Vinatier, D., Patey Savatier, P. and Monnier, J.C. (1987) Generalities on Pregnancy and Childbirth in Adolescent Girls. Medical and Surgical Encyclopedia (Paris) Gynecology-Obstetrics, 5016-D10, 165-169.