

# Maternal and Neonatal Prognosis of Childbirth Among 14 to 19 Years Teenage Girls at the Ordre De Malte Hospital of Djougou, Benin

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**Abstract:** *Introduction:* Despite advances in clinical care, teenage childbirth is still feared both medically and socially. Because of their immature bodies, teenage girls are more prone to complications during pregnancy and delivery. *Objective:* This study aimed to investigate maternal and neonatal prognosis of childbirth among 14 to 19 years teenage girls at the Ordre de Malte hospital of Djougou (HZ-OMD) in 2021. *Method:* For descriptive and analytical purposes, we conducted a prospective study in the gynecology and obstetrics section of the Ordre de Malte hospital of Djougou (HZ-OMD), from January 1 to May 31, 2021 (5 months). The study population consisted of all parturients admitted into the gynecology and obstetrics section of the HZ-OMD throughout the study period. Data were collected through a face-to-face interview using a pre-designed and tested questionnaire, as well as through physical checkup. Pearson's chi-square and Fisher's exact tests have been used as appropriate to determine correlation between variables. *Result:* A total of 240 participants were included in this study. The teenage girls childbirths rate in the HZ-OMD was 18.3%. Deliveries were vaginal (63.7%) and vaginal (36.3%). The dystocia noted during vaginal delivery were mechanical (15.2%) and dynamic (11%). High blood pressure was found in 28.6% and was complicated by eclampsia in 16.4% of cases. No maternal deaths were recorded. Preterm births and low birthweight represented 21% and 33.33% of these births respectively. Acute fetal distress was noted in 13.75%. The neonatal mortality rate was 106 per 1000 live births. Irregular fetal heart rate and a generally narrowed pelvis were associated 5.14 and 5.86 times respectively with the risk of delivering through cesarean section ( $p=0.001$ ;  $p=0.033$ ). Fifth minute Apgar  $<7$ , a criteria of fetal morbidity, was significantly associated with low birthweight ( $p=0.01$ ), preterm delivery ( $p=0.021$ ), and acute fetal distress ( $p=0.001$ ). Newborns were 5 times more likely to die when they are of low birthweight ( $p=0.001$ ). *Conclusion:* Teenage girls' childbirth presents huge risks due to the immaturity of their bodies and the poor follow-up of their pregnancies in our settings.

**Keywords:** Teenage, Childbirth, Prognosis, Djougou (Benin)

## 1. Introduction

Teenage girls' childbirth is a real public health problem. It was estimated that approximately 16 million teenage girls give birth a year worldwide [1]. Although these births occur in all

societies around the world, the World Health Organization (WHO) reported nearly 12 million teenage girls childbirths in developing countries [2]. Indeed, sub-Saharan Africa has the highest teenage fertility rates in the world, with no downward trend since 1990 [3]. Of the 14.3 million teenage girls who gave birth in 2008 across the world, one third lived in

sub-Saharan Africa [3].

Despite advances in clinical care, teenage childbirth is still feared both medically and socially. Because of their immature bodies, teenage girls are more prone to complications during pregnancy and delivery [2]. Complications during childbirth are the leading cause of death among teenage girls worldwide [2, 3]. In Benin, the childbirth-related mortality rate among teenage girls aged 15-19 has increased from 0.28‰ in 2006 to 0.44‰ in 2017 [4]. This is associated with the fertility rate of the 15-19 years age group, which has increased significantly since 2012 from 94‰ to 108‰ in 2018 [4]. The total fertility rate (TFR) is 5.7 children per woman in Benin [4]. In addition, Donga prefecture has recorded the highest TFR, which was 6.8 children per woman of childbearing age [4]. In this prefecture, 24.1% of teenage girls have already given birth to an alive child. It has been reported that 655 teenage girls became mothers from January to June 2020 in the Donga prefecture, among which 507 were exclusively recorded in the municipality of Djougou [5]. Nevertheless, there is still a scarcity of studies on the complications and prognosis of childbirth among these adolescents. This raised up the relevance of performing a study on teenage girls' childbirth at the Ordre de Malte hospital of Djougou, a reference care setting in the Djougou-Ouaké-Copargo health area.

This study aimed to investigate maternal and neonatal prognosis of childbirth among 14 to 19 years teenage girls at the Ordre de Malte hospital of Djougou (HZ-OMD) in 2021.

## 2. Method

For descriptive and analytical purposes, we conducted a prospective study in the gynecology and obstetrics section of the Ordre de Malte hospital of Djougou (HZ-OMD), from January 1 to May 31, 2021 (5 months). The study population consisted of all parturients admitted into the gynecology and obstetrics section of the HZ-OMD throughout the study period. Were included in this study, pregnant women aged 14 to 19 with at least 28 weeks' gestation who have delivered at the HZ-OMD. Were also included in this study, pregnant women aged 14 to 19 with at least 28 weeks' gestation who have delivered elsewhere and who have been referred to the HZ-OMD for any reason. Newborns born to these women were included in the study when the birth weight was over 500 g. Participants who did not give their informed consent to this research were excluded, along with their newborns. Non probability sampling design with exhaustive recruitment of all volunteer participants was carried out.

The dependent variable was maternal and neonatal prognosis of the childbirth. Covariables included sociodemographic characteristics of the participants (age group, residence area, school level, occupation, marital status, age at marriage and type of marriage), clinical history of the women (medical and surgical histories, obstetrical history, admission option), follow-up characteristics of the pregnancy (number of prenatal care checkup), pelvic characteristics of the women (effectiveness of the pelvic exam, pelvis type), delivery characteristics (delivery route, delivery trouble,

indication for caesarean section), newborn characteristics (general condition, pregnancy term, weight), and postpartum characteristics (maternal morbidity and mortality, fetal morbidity and mortality).

Data were collected through a face-to-face interview using a pre-designed and tested questionnaire, as well as through physical checkup. A thorough interview was conducted with all parturients admitted to the HZ-OMD throughout the study period. Patients were then followed up from admission through delivery and discharge. Data were entered into Epi Info 7.2 and then exported to Microsoft Excel 2016 for analysis. Data analysis has been implemented with Epi Info 7.2 and R 4.0. In order to identify the risk factors associated with the different parameters of the maternal and fetal prognosis, logistic regression with estimation of the odds ratio (OR) in multivariate analysis was carried out. Pearson's chi-square and Fisher's exact tests have been used as appropriate to determine correlation between variables. A 5% significance threshold has been considered.

## 3. Result

### 3.1. Frequency of Teenage Girls' Childbirths

From January 1 to May 31, 2021, a total of 1,310 childbirths were recorded in the gynecology and obstetrics section of the Ordre de Malte hospital of Djougou (HZ-OMD), among which 240 were in teenage girls. The frequency of teenage girls' childbirths in the HZ-OMD was 18.3%.

### 3.2. Sociodemographic and Cultural Characteristics of the Participants

The mean age of the participants was 17.9 years. The [18-20] years age group was the most represented (73.3%). These participants were mostly illiterates (42.9%) and householdwives (56.2%). In this study, 73.3% of the participants were married and had contracted their unions before the age of 17 in 71.6% of cases (n=126). These marriages were forced in 33.5% of cases (n=59) (Table 1).

**Table 1.** Distribution of participants according to their age group, residence area, school level and occupation (n=240).

	Size	Percentage
Age group (year)		
[14 – 16]	11	4.6
[16 – 18]	53	22.1
[18 – 20]	176	73.3
Residence area		
Rural area	123	51.2
Urban area	117	48.8
School level		
illiterate	103	42.9
Primary school level	89	37.1
Secondary school level	48	20.0
Occupation		
Householdwife	135	56.2
Craftswoman	43	17.9
Shopkeeper	42	17.5
Student	20	8.4

### 3.3. Clinical History of the Women

#### *Medical and surgical histories*

Of all the parturients surveyed, 7.0% had a pathological medical history (n=17) among which high blood pressure (n=15; 6.2%) was the most frequent. Surgical history also appeared at 7.0% (n=17) and was dominated by caesarean section (n=16; 6.6%).

#### 3.3.1. Obstetrical History

These women were mostly primiparous (n=203, 84.6%) and pauciparous (n= 37; 15.4%). They had at least one alive child in 10.8% of cases (n=26; 10.8%).

#### 3.3.2. Admission Option

More than half of these women (n=129; 53.7%) had been referred from other health care facilities to the HZ-OMD. The most frequent reasons for referral were high blood pressure associated with pregnancy (n=31; 24.0%), dystocia (n= 22; 17.1%) and acute fetal distress (n=19; 14.7%).

#### 3.4. Follow-up Characteristics of the Pregnancy

Nearly a quarter (n= 56; 23.3%) of these women have not undergone any prenatal care checkup against 35.9% who had poorly followed up their pregnancy (1 to 3 prenatal care checkups throughout the pregnancy period). Those who have undergone more than four prenatal care checkups were 40.8%.

### 3.5. Pelvic Characteristics of the Women

#### 3.5.1. Effectiveness of the Pelvic Exam

The pelvic exam was carried out on 210 women.

#### 3.5.2. Pelvis Type

Among the 210 women who have undergone the pelvic exam, 88.6% had a clinically normal pelvis. Clinical abnormalities of the pelvis (11.4%) were dominated by transversely narrowed pelvises (n=13; 6.2%), generally narrowed pelvises (n=8; 3.8%) and borderline pelvises (n=3; 1.4%).

### 3.6. Delivery Characteristics

#### 3.6.1. Delivery Route

The deliveries were vaginal (n= 153; 63.7%) and through caesarean section (n= 87; 36.3%). Vaginal delivery was natural in 44.44%, artificial assisted by episiotomy in 32.68%, artificial assisted by suction cup in 11.77%, and directed in 11.11%.

#### 3.6.2. Delivery Trouble

Dystocia was the most frequent trouble recorded during deliveries. That was primarily mechanical (n=13; 15.2%) and dynamic (n=9; 11%).

#### 3.6.3. Indications for Caesarean Sections

Indications for caesarean sections were acute fetal distress (n=29; 33.3%), eclamptic seizures (n= 16; 18.3%), dystocia (n=20; 32.90%) and the third trimester's haemorrhages (n=7;

8.2%).

### 3.7. Newborn Characteristics

#### 3.7.1. General Condition

The majority of the newborns delivered during the study period were born alive (n = 217; 90.4%). Among them, apparently healthy newborns (Apgar  $\geq$  7) represented 69.6% (n= 167) of the sample, Apparent stillbirths (Apgar  $\leq$  3) and intermediate conditions (Apgar 3-7) represented respectively 14.6% (n=35) and 15.8% (n=38).

#### 3.7.2. Pregnancy Term

Preterm births accounted for 19.6% (n=17).

#### 3.7.3. Weight

The newborns' birthweight varied between 590 and 4,435g with a mean weight of 2669g. Low birthweight was 33.7% versus 0.8% macrosomia.

### 3.8. Postpartum Characteristics

#### 3.8.1. Maternal Morbidity and Mortality

Maternal morbidity was 4.16%. It was dominated by incomplete perineal tears (n=8; 3.3%), cervical tears (n=2; 0.8%), postpartum haemorrhages (n=8; 3.3%). In addition, 5% of the participants (n=12) had presented a severe anemia requiring a blood transfusion. None of the parturients presented with puerperal infections or breastfeeding complications. No maternal deaths were recorded.

#### 3.8.2. Fetal Morbidity and Mortality

One out of two newborns had been transferred to the neonatology section (n= 119; 49.6%). Diagnoses made in neonatology were low birthweight (n=80; 33.7%), perinatal asphyxia (n=33; 13.7%), neonatal infection (n=4; 1.6%), and fetal malformations (n= 2; 0.8%).

23 babies' deaths were recorded for 217 alive births, representing a neonatal mortality rate of 106 per 1000 live births.

### 3.9. Factors Associated

#### 3.9.1. Factors Associated with the Occurrence of a Caesarean Section

The age of these young women was not statistically associated with the risk of delivering through cesarean section (p-value=0.098). On the other hand, the occurrence of an irregular fetal heart rate at the moment these women are admitted into the hospital increased 5.14 times the risk of delivering through cesarean section (p-value =0.001; OR=5.14; 95% CI [2- 14.95]). Also a generally narrowed pelvis was statistically associated with the performance of a caesarean section and increased 5.86 times the risk of performing it (p-value =0.033; OR=5.86; 95% CI [1.31-40.77]). Finally, when blood pressure increased by one systolic and/or diastolic unit, the risk of delivering through a caesarean section increased by 2% (p-value =0.045; OR= 1.02; 95% CI [1.00-1.03]) (Table 2).

**Table 2.** Correlation between age group, fetal heart rate, pelvis type, blood pressure and the occurrence of a caesarean section in multivariate analysis.

	Total N	Occurrence of a caesarean section		OR	95% CI	p-value
		n	%			
Age group (year)						
14-16	11	1	9.09	0.17	0.01 – 0.94	0.098
16-18	53	21	39.62	1.14	0.60 – 2.13	0.687
18-20	176	64	36.36	1		
Irregular fetal heart rate						
No	214	70	32.71	1		
Yes	21	15	71.43	5.14	2.00 – 14.95	0.001
Pelvis type						
Normal	186	63	33.87	1		
Transversely narrowed pelvis	13	7	53.85	2.28	0.73 – 7.35	0.154
Generally narrowed pelvis	8	6	75.00	5.86	1.31 – 40.77	0.033
Blood pressure						
< 140/90	169	54	45.58	1		
≥ 140/90	68	31	32.14	1.02	1.00 – 1.03	0.045

**3.9.2. Factors Associated with a First Minute Apgar Score < 7**

Birthweight (p-value=0.042), acute fetal distress (p-value<0.001) and maternal-fetal infection (p-value=0.040) were significantly associated with a first minute Apgar score < 7.

7. Indeed, Newborns with birthweight < 2500g, or acute fetal distress, or maternal-fetal infection were 1.83, 48.94 and 9.9 times respectively more likely to present a first minute Apgar score < 7 (Table 3).

**Table 3.** Correlation between birthweight, acute fetal distress, maternal-fetal infection and a first minute Apgar score < 7 in multivariate analysis.

	Total N	First minute Apgar score < 7		OR	95%CI	p-value
		n	%			
Birthweight						
≥ 2500g	157	38	24.20	1	-	
< 2500g	80	30	37.40	1.83	1.02 – 3.28	0.042
Acute fetal distress						
No	207	24	11.59	1		
Yes	33	29	87.88	48.94	17.47 – 176.22	<0.001
Maternal-fetal infection						
No	233	50	21.45	1		
Yes	4	3	75	9.9	1.24 – 202.57	0.040

**3.9.3. Factors Associated with a Fifth Minute Apgar Score < 7**

Birthweight (p-value= 0.010), preterm delivery (p-value=0.021) and acute fetal distress (p-value<0.001) were significantly associated with a fifth minute Apgar score < 7.

Indeed, Newborns with birthweight < 2500g, preterm births, and newborns with acute fetal distress were 2.38, 2.67 and 20.9 times respectively more likely to present a fifth minute Apgar score < 7 (Table 4).

**Table 4.** Correlation between birthweight, preterm birth, acute fetal distress and a fifth min Apgar score < 7 in multivariate analysis.

	Total N	Fifth minute Apgar score < 7		OR	95% CI	p-value
		n	%			
Birthweight						
≥ 2500g	157	20	12.73	1	-	
< 2500g	80	21	26.25	2.38	1.20 – 4.76	0.010
Preterm birth						
No	193	18	9.32	1	-	
Yes	47	11	23.4	2.67	1.13 – 6.07	0.021
Acute fetal distress						
No	207	9	4.34	1		
Yes	33	17	51.52	20.9	8.25 – 56.71	<0.001

**3.9.4. Factors Associated with Neonatal Death**

Birthweight < 2500g was significantly associated with neonatal death (p-value=0.001). Actually, babies born with low birthweight were 4.95 times more likely to die during neonatal life (95% CI [1.99-13.48]). Likewise, acute fetal distress was significantly associated with neonatal death

(p-value=0.049). Indeed, babies victim of acute fetal distress were 4.62 times more likely to die during neonatal life. Nevertheless, due to the equivocal confidence interval of this association (95% CI [0.88-21.91]), this sense should be considered with uncertainty. As to the delivery route, vaginal delivery encountered more neonatal deaths (11.7%) than vaginal delivery (5.81%). But this difference was not

statistically significant ( $p$ -value=0.140) (Table 5).

**Table 5.** Correlation between birthweight, delivery route, acute fetal distress and neonatal death in multivariate analysis.

	Total N	Neonatal death		OR	95% CI	p-value
		n	%			
Birthweight						
≥ 2500g	160	7	4.37	1		
< 2500g	80	15	18.75	4.95	1.99-13.48	0.001
Delivery route						
Vaginal	153	18	11.70	1	-	
Caesarean section	87	5	5.74	2.16	0.83-6.74	0.140
Acute fetal distress						
No	207	4	1.93	1	-	
Yes	33	3	9.09	4.62	0.88-21.91	0.049

## 4. Discussion

### 4.1. Frequency of Teenage Girls' Childbirths

The frequency of teenage girls' childbirths in this study was 18.3%. This finding is much higher than those reported by Traoré et al [6] and Luhete et al [7], which were 5.72% and 7.7% respectively. The high frequency found in our study could be explained by the fact that the municipality of Djougou is a semi-urban area with a high illiteracy rate and a low schooling rate for girls [4]. Moreover, in this society, motherhood is valued and early marriage is particularly encouraged. This is consistent with our findings. Indeed, 73.3% of the participants in this study were married and 71.6% among them had contracted their unions before the age of 17. This is also consistent with the WHO data. Actually, the WHO has evidenced teenage girls marriage rate of 39% at least before the age of 18 in developing countries [2]. Such a high teenage girls marriage rate found in our study is therefore a reflection of what happens in the general population. Salifou et al [8] in Benin have shown 100% risk of getting married before 18 years among women who practice traditional religions. People in the municipality of Djougou are mostly anchored in traditional practices. Marriages take place within families. Parents factually prefer early marriage for their daughters in order to prevent them from immorality or unintended pregnancies.

More than half of our participants (56.2%) were householdwives without any income-generating activity. The predominance of householdwives is explained by the fact that in the region of Djougou, women are entirely dependent on men for their needs. This highlights the motivation of the little importance attached to women's work and therefore to girls' schooling. Such ideology explains why the majority of our participants were illiterate (42.9%) and only 20% had reached secondary school level.

### 4.2. Maternal Prognosis

At first glance, it is tempting to say that any teenage pregnancy should undergo a prophylactic cesarean section because of the immaturity of their pelvis. However, this is not the case since less than half of our pregnant women (36.3%) delivered by cesarean section. Some authors reported even

lower rates of cesarean section among teenage pregnancies than ours. Koita et al [9] in Senegal reported 28.9%; Kiemtoré et al [10] in Burkina Faso reported 20.7%; and Luhete et al [7] reported 11.4% of cesarean sections among teenage pregnancies. Moreover, pelvic anomalies were the third indication for cesarean section in this study. The shape of the pelvis is influenced by ethnicity, lifestyle, diet, work, and sport [11].

Caesarean section was not associated with young age at pregnancy ( $p=0.98$ ; OR=0.17; CI 95% [0.01-0.94]) in our study. Agbor et al [12] also found in their study a non-significant association between caesarean section and young age at pregnancy ( $p=0.337$ ; OR=0.6; CI 95% [0.1-2.6]). The high frequency of preterm birth and low birthweight of newborns would be factors that should not be neglected in attempts to explain the high frequency of vaginal delivery in teenage pregnancies. For some authors, vaginal delivery in teenage pregnancies is favored by a better myometrial function and greater elasticity of the connective tissue, which allows more spontaneous vaginal deliveries in these women [13].

High blood pressure is the most common complication among teenage pregnancies [9]. However, young age at pregnancy was not significantly associated with the occurrence of high blood pressure during pregnancy ( $p=0.7$ ; OR=1.27; 95% CI [0.33-4.05]). Luhete et al [7] found that the rate of eclampsia was inversely proportional to the age of the woman and that an teenage pregnant had a greater risk of developing eclampsia around the peripartum period (adjusted OR=4.4 (1.3-14.5)). Traoré et al [6] also found in their study that a teenage pregnant had a greater risk of developing eclampsia around the peripartum period (adjusted RR= 3.4 (0.87-0.97)), which reopens the debate on the quality and frequency of prenatal care checkups. Randriambololona et al [14] in Madagascar found that 73.15% of the teenage pregnant in their study had undergone more than four prenatal care checkups. This was not the case in our study. Of the 76.7% who have followed up their pregnancies, only 40.8% had undergone at least four prenatal care checkups, which indicates poor pregnancy follow-up. In addition, the quality of prenatal care checkups among teenage pregnancies is poor, because the follow-up of pregnancy is crucial for the detection and early diagnosis of possible complications such as high blood pressure. Teenage pregnant in the municipality of

Djougou still need to be made aware of the importance of prenatal care checkups.

Authors in the literature are not unanimous regarding the influence of young age at pregnancy on the risk of preterm delivery. In our study, preterm delivery was significantly associated with age ( $p=0.021$ ; OR=2.67; 95% CI [1.13-6.07]). Njim et al [15] concurred, stating that teenage pregnancies had a higher risk of preterm delivery ( $p=0.01$ ; OR =1.7; 95% CI [1.3-2.2]). Teenagers' immature body could explain this risk of preterm delivery. In addition, preterm delivery was also found to be increased in some ethnicities. African and Asian teenagers were more prone to preterm delivery [16]. In contrast, several other authors have evidenced no statistically significant association between preterm delivery and young age at pregnancy [12, 17, 18, 19]. For these authors, only age at pregnancy should not be responsible for preterm delivery. Poor pregnancy follow-up associated with low socioeconomic conditions (homeworks and farmworks) are important factors that could contribute to preterm delivery in these women.

In our study no maternal deaths were recorded. The observation was the same in the study of Diouga et al [20] in Niger. Kiemtore et al [10], on the other hand, counted 13 maternal deaths, corresponding to a maternal mortality ratio of 1786 maternal deaths per 100,000 alive births. The absence of maternal deaths in our study could be justified by the fact that local health care facilities are accustomed to the early reference of teenage pregnancies to a specialized setting. Once at the referral setting, this class of pregnant women is subjected to careful check up and much surveillance because of the high risk of peripartum complications associated with this class.

#### 4.3. Fetal Prognosis

We recorded 33.3% of low birthweight in this study. Luhete et al [7] in Congo and Dolo [21] in Mali found 19.6% and 29% low birthweight respectively among teenage childbirths. It is possible that the theory that the occurrence of low birthweight is due to nutritional competition between the young mother (who is still growing) and her fetus may be valid and thus justify the high low birthweight trends observed in these different studies.

The neonatal mortality rate in our study was 106 per 1000 live births. This rate indicates that huge efforts remain to be made in our country in the field of infant mortality reduction in order to achieve the Sustainable Development Goals (SDGs) [22]. The goal is to reduce neonatal mortality to 12 per 1000 births by the year 2030.

## 5. Conclusion

Teenage girls' childbirth rate is very high in the municipality of Djougou. The teenage pregnant surveyed at the Ordre de Malte hospital of Djougou were mostly illiterate, householdwives, and most of them were already in marital union. Teenage girls' childbirths always present the high-risk character described in the literature and would be due to the

socio-economic vulnerability and low school level of these women. Fetal heart rate and a generally narrowed pelvis were statistically associated with the risk of delivering through a cesarean section. However, cesarean section should not be performed routinely in these women. General condition of the newborn at birth was statistically associated with the birthweight, the occurrence of acute fetal distress, and the term of delivery. The neonatal mortality rate is still high in Djougou. Governmental and non-governmental, regional and local authorities should focus on promoting the education of girls and respecting the age of marriage recommended by the law in force in our country in order to considerably reduce teenage girls' childbirth rate.

## Ethical Considerations

This research's proposal received approval from the administrative authorities of the Ordre de Malte hospital and from the local ethics committee of Parakou University (Reference: 0404/CLERB-UP/P/SP/R/SA).

## Conflicts of Interest

The authors declare no conflict of interest.

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