



First Early Pregnancy and Associated Factors Among Adolescent Girls in Benin

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Abstract

The aim of this study is to evaluate associated factors of the first early pregnancy among adolescent girls aged 15 to 19 years old. Data, both quantitative and qualitative for a better appreciation of the event studied, were collected in May 2019 in the 12 departments of Benin. The total sample included 703 participants, aged 15 to 19 years old. Logistic regression method was used to identify the associated factors. The main verbatims of the qualitative component were used to assess the convergences or divergences with the quantitative results of the logistic regression. Among adolescent girls surveyed, 30.2% (n=212) had their first pregnancy before the age of 18 years old. After multivariate analysis, the main associated variables are: age at first menstruation, age at first sexual intercourse, ethnicity, childhood socialization area, father/guardian education level and economic activity, exposure to entertainment activities and information and communication technologies (ICTs). Qualitative interviews showed that naivete, lack of reliable information on sexual and reproductive health before puberty and adolescence period contribute to the early pregnancy. In addition, before being sexually active, certain contextual and social parameters such as peer pressure, bad company, lifestyles, drop of parental control, influence of modernization due to social change, etc. emerged from the qualitative interviews. Questions arise about the effectiveness of the many interventions that have been implemented over decades about their contribution to improving sexual and reproductive health in adolescence and improving the social and economic status of girls.

Keywords Fertility · Pregnancy · Adolescent girls · Associated factors · Benin

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Introduction

Fertility was classically associated with marital conjugal life. The situation has evolved so that pregnancies outside the conjugal framework, with or without cohabitation, are becoming frequent. Thus, the age of fertility life today corresponds to the age of first pregnancy or the first birth (Clark et al. 2017; Delaunay 1994). In recent generations, adolescents and girls under 20 years old are increasingly affected by early pregnancies or childbearing, but disparities exist across countries, administrative divisions and residence areas. In the majority of countries in West and Central Africa (WCA), nearly 25.0% of girls aged 15 to 19 years old either become pregnant or are already mothers, and more than 40.0% marry before the age of 18 years (UNESCO 2017).

Adolescent early pregnancy remains a serious health and social issue worldwide. It is a public health issue because of its impact on maternal and child health and the future of the young mother. Overall, out of the 16 million adolescent girls who gave birth worldwide, 70,000 died because of complications of pregnancy or childbirth. More than half of these deaths occur in sub-Saharan Africa and nearly one-third in South Asia (OMS 2019). The risk of maternal death is 2.41 times higher for women under 20 years old than for those aged 20–24 (Oakley et al. 2016). For children born from adolescent girls worldwide, the infant mortality quotient is 39 per thousand compared to 76 per thousand in sub-Saharan Africa (UN IGME 2018). In addition to the consequences related to maternal and child morbidity and mortality, there are also clandestine abortions, which in most Sub-Saharan African countries can be practiced by non-specialists. This practice increases the risk of maternal death and other physical and psychological consequences for adolescent girls (Leppälähti et al. 2016; November and Sandall 2018; OMS 2012).

In Benin, for every 1000 adolescent girls aged 15–19 years old, 94 have already a child or are carrying a first pregnancy (UNFPA 2017). Concerning infant morbidity, 18.0% of children born from mothers under 20 years old versus 11.0% of those born from mothers aged 20 years old and more are born with low weight (less than 2.5 kg). The infant mortality quotient is higher among children from women under 20 years olds than children from women aged 20 years and more: 119‰ vs 98‰. About maternal mortality, 14.7% of maternal deaths are recorded among adolescent girls under 20 years olds (INSAE 2019).

Conceptually, several approaches have emerged since the 1950s to understand and predict reproductive behavior and its evolution or change in time and space. To this end, micro and macro-level theories of sociological, cultural, economic, biological, institutional and political dimensions have emerged. But only those that address the issue at the micro level will be discussed in this study. Overall, the different approaches attribute the occurrence of early adolescent girl pregnancies or motherhood to biological, demographic, socio-cultural, economic and institutional determinants (Leridon 2015). The main biological factor mentioned is related to the early first menstrual period. Thus, the onset of the first menstrual period and early entry into union are parameters that expose puberty girls to the childbearing.

Socio-cultural approaches through theories of cultural heritage and modernization highlight the importance of socio-cultural mores, norms and values in understanding sexual and reproductive behavior. According to cultural heritage theory, ethnicity and religion are the channels through which a community's traditional and normative values are transmitted. Specifically, as for religion, it is the symbol of values and beliefs that impose on a people a way of thinking, living and acting that is likely to influence their sexuality and perceptions of childbearing. Thus, as if to verify this theory, a study on early motherhood before 20 years in Senegal showed that animist adolescents (24.28%) were more likely to start motherhood early than their Muslim (16.53%) and Christian counterparts: 15.15% (Amouzou 2016).

The theory of modernization highlights the effects of the social changes that traditional African society is undergoing. Indeed, modernization would be the result of internal and external multisectoral development including, in particular: urbanization, women's schooling, the media, modern information and communication technologies (ICT), women's economic and wage work, which in the meantime was intended solely for domestic work, procreation, education, caring for and educating children. In addition to these, there is the introduction and implementation of birth spacing and birth control policies and programs. This modernism to be engendered, among other things, the loss of social control by the elders over the younger generations, the erosion of the traditional African family system, the drop of parental control and the decline of family influence in favor of peers, which would be at the origin of sexual libertine, including early and/or premarital sex (Leridon 2015).

The economic approach adapted to the context of this study is that of rational adaptation developed by Kyriazis (1987), which emphasizes a number of factors such as: education level, economic activity or socio-economic standard of living in understanding reproductive behavior. It relates also the effects of poverty on early sexual behavior among adolescents and youth that would promote an early start of reproductive life specifically childbearing. The economic difficulties of the parents or the household belonging are likely to favor early sexual relations, paid and/or unprotected sex, intergenerational sex, or even multi-partner sex. Following the theoretical approaches mentioned above, several studies related to the adolescent early pregnancy and childbearing have addressed the extent and associated factors of the event. But first, concerning the prevalence of the events occurrence during adolescence, a study conducted in Côte d'Ivoire showed that 36.0% of adolescent girls aged 15–19 years old already had at least 1 child or were pregnant for the first time before their 20th birthday (Kouame 2015). In South Africa, out of 1420 adolescents and girls aged 18–24 surveyed, 19.2% report having had their first pregnancy before the age of 19 years old. Among the latter, 55.5% report having contracted their first pregnancy at first sexual intercourse due to a lack of reliable information on how to prevent pregnancies and the consequences of early and/or unprotected sex. Moreover, for those who were once pregnant, in 74.1% of cases it was an unwanted pregnancy (Mchunu et al. 2013). In Nairobi, Mombasa province, 43.0% of the adolescent girls aged 15–19 years old involved in this study had either already had a child or were pregnant for the first time at the time of the study (Shiateya 2016).

Another study carried out on the factors that explain the pregnancy and childbearing in adolescence in Haiti, a qualitative study among adolescent youth aged 15

to 19 years old revealed, according to the statements of one participant, that in some poor households in the study area, it is “parents who sometimes encourage and force girls to engage in sex work and multi-partner sex at an early age, to help them in return with household expenses” (IHE 2015). In Kenya, it was rather peer influence and peer pressure that led some people to engage in early sexual intercourse with the main consequence of unwanted and/or unplanned early pregnancies. In 89.0% of cases, adolescent girls reported having sexual intercourse at an early age because their peers were already sexually active (Shiateya 2016).

Furthermore, as described in the previous sections, socio-economic theories predict a negative relationship between education level attainment and childbearing. Thus, a high level of education would lead to a late early childbearing and consequently a low final progeny. However, controversial results have been found in the empirical studies explored. While some authors have found a negative association between education level and fertility in adolescence (Argaw 2013; Chicoine 2012; Mchunu et al. 2013; Osili and Long 2008; Pradhan and Canning 2015), others found positive or hardly perceptible relationships that reveal that schooling is an intermediate factor that also depends: on the number of years of study, the content of curricula, the internal organization of the education system and the interventions implemented to facilitate girls retention in school (Antoine 2008; May and Mcqueston 2014; UNFPA and GEEP 2015). Several other factors such as knowledge of sexual and reproductive health (SRH) issues like information and education on the consequences of safer sex practices, use of contraceptive methods, etc. have been discussed in the literature as explanatory factors for early childbearing in adolescence (Yadufashije et al. 2017).

At the methodological level, an in-depth analysis of the processes for estimating the level of childbearing among adolescents in the various studies mentioned above reveals at least two shortcomings. Firstly, it appears that one of both events is said to be early when it occurs at least before the age of 20 years old. This age may vary from one region to another and from one country to another depending on the legislation, especially with regard to age at marriage. In Benin, the legal age for marriage is 18 years and any union contracted before that age is classified as early. In addition, article 180 of the fifth section of Act No. 2015-08 on the Children’s Code of the Republic of Benin protects minors, i.e. girls under 18 years old, against early pregnancy (AN-Bénin 2015). However, early entry into union remains a reality in Benin, in 2018, a study conducted on adolescents and young people aged 10 to 24 years old showed that the prevalence of unions before the age of 18 years is 46.4% (SE/CNLS-TP, ONUSIDA, UNICEF 2018). This becomes a concern because most pregnancies occur within the union or to a small extent prior to the beginning of conjugal life. Moreover, most studies consider a first childbirth or a first pregnancy as the main event marking the beginning of fertility life. In addition, nowadays, reproductive and marital behavior have largely evolved and childbearing no longer necessarily takes place in the nuptial framework. Thus, the occurrence of pregnancies and premarital births are becoming more and more frequent. Therefore, this study considers first pregnancy to be early when it occurs before the age of 18, unlike most previous studies.

The second shortcoming is related to the nature of the data, which are generally only a quantitative. Consequently, the circumstances (e.g. life story) that have favored the early pregnancy are generally not all sufficiently identified through the information collected.

The objective of this study is to evaluate the associated factors of early pregnancy during adolescence in Benin. For this purpose, a specific survey of the issue has been carried out to collect both quantitative and qualitative data; that is not the case in most of the studied mentioned above.

Data and Methods

Data

The quantitative and qualitative data used in this study are complementary data collected in May 2019 as part of our doctoral thesis in demography at the University of Parakou in Benin. This complementary survey had a two objectives: to have updated data and to better identify the qualitative aspects of the event studied through an multivariate analysis. The sample size was 703 adolescent girls aged 15–19 years, spread over all 12 departments of Benin. Participants were selected from colleges and universities, vocational training centers and apprenticeship workshops and in community specifically for those who were out of school or never schooled and not enrolled in training centers. The sample was constituted by a four-stage selection process: a random selection of two municipalities per department, taking into account the size of adolescent girls aged 15–19 years, and within each municipality, two districts including the chief town and a second rural district, according to the size of the target by district. The other two levels are: the selection of data collection sites and the choice of statistical units (US) according to inclusion criteria (being between 15 and 19 years old, being available to participate in the survey, giving consent, having full mental faculties).

The technique for collecting data from the sampled persons is based on semi-directive individual interviews using a questionnaire and an interview guide in a place that is out of sight of the participants. The data collected was relative to: (i) socio-demographics and cultural characteristics and socialization environment; (ii) family life and financial autonomy; (iii) communication and social life; (iv) knowledge about sexual and reproductive life; and (v) characteristics of the spouse or partner. In addition, the qualitative component allowed to collect data on: (i) the circumstances (life story) of the early childbearing; (ii) the behaviors and lifestyles of adolescent girls that would have facilitated the occurrence of the first pregnancy and (iii) the perceptions, opinions and views of some parents and community leaders on the early childbearing in the adolescence nowadays.

The data collection was carried out in conditions that reassured the participants concerning the confidentiality of the information sought and the expected results. Anonymity was ensured because no form included the names and contact information of participants. The study was approved by the Laboratoire de Recherche en

Sciences de la Population et du Développement (LaReSPD) of the University of Parakou (UP) prior to its implementation.

The Variables

The Dependent Variable: Measure of First Early Pregnancy First early pregnancy was measured on the basis of two events: having a live birth or being pregnant for the first time. The second event was considered only for adolescent girls who have no children (zero or nulliparous parity). For those with at least one child, the variable age at first pregnancy was considered. Thus, the interest variable was constructed from the main variable age at first pregnancy for the two categories of adolescents girls.

For adolescent girls having a live birth or being pregnant for the first time the variable age at first pregnancy were used to generate the variable of interest “Age at first pregnancy”, which is initially a continuous numerical variable with values ranging from 11 to 19 years.

According to the Beninese legislation, the legal age recognized for marriage between two persons of the opposite sex and first pregnancy is 18 years old. Being pregnant before that age is said to be early and may be detrimental to the underage girl, particularly about the health of mother and child. Based on this standard, this study considers that the occurrence of the first pregnancy before the age of 18 years old is considered to be early. The variable of interest has been recoded into 02 modalities: 1 “have first pregnancy before the age of 18 years” and 0 “If not”.

Independent Variables They have been classified into three categories: (i) socio-demographic and biological characteristics: educational level, socialization environment, age at first menstrual period and department of residence; (ii) behavioral characteristics: age at first sexual intercourse; use of modern contraceptive method; exposure to Information, Education and Communication (IEC) on sexual and reproductive health; exposure to ICTs and exposure to youth entertainment activities, and (iii) parents/guardians socio-economics characteristics: educational level and economic activity. The choice of these variables is based on the theoretical framework and on the realities of the context of the study and in view of the shortcomings identified in the Benin DHS data. In order to identify specific aspects and measure the effect of modernization, the development of some key composite associated variables is as follows.

Exposure to entertainment activities entertainment activities: (i) nightclub attendance, (ii) parties where young people drink and dance, (iii) school cultural days, (iv) school excursions, (v) night markets, (vi) beach relaxation, and (vii) frequenting cabarets, restaurants or refreshment bars were considered. A principal component analysis (PCA) used the seven variables listed to create a composite variable “degree of exposure to entertainment activities” with three modalities: low exposure (category of adolescents with a score less than 0.1264); medium exposure (category of adolescents with a score between 0.1264 and 0.2814) and high exposure (category of adolescents with a score greater than 0.2814). This categorization was made based on the internal homogeneity of the groups.

ICT exposure this is a composite variable determined from seven variables, six of which relate to social networks subscription (WhatsApp, Facebook, Viber, Messenger, Instagram, Twitter) and one relating to watching television. Thus, from this information, a composite variable with scores ranging from 0 (I never watch television and do not subscribe to any of the social networks) to 6 (I often watch television and subscribe to at least one of the social networks) was generated. This variable has been recoded into 02 modalities: exposed to ICT if score equal 0 and not exposed to ICT if score range between 1 and 6.

Methods

The quantitative data analysis was descriptive, bivariate and multivariate. We use logistic regression method to identify associated factors of early pregnancy. The bivariate analysis was performed using Pearson Chi² and Fischer F association tests. A significance threshold of 5% was used. The logistic regression model which will generate odds ratios is as follows:

$$\text{Ln}\left(\frac{P}{1-P}\right) = \text{logit}(p) = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_i * X_i + \varepsilon.$$

logit(p) is probability of first pregnancy before 18 years old for a given value of x, Xi is set of associated variables (with i ranging from 1 to n), βi is coefficients β associated respectively with each associated variable, ε is error term.

OR > 1: indicate unprotective factor and OR < 1 indicate a protective factor.

As for the qualitative data, a content analysis was carried out after listening and transcribing the interviews. This analysis identified verbatims that could be used to appreciate, explain and better understand the results of the quantitative component.

Results

Prevalence of First Early Pregnancy and Sample Characteristics

The distribution according of the early first pregnancy indicates that 30.2% (n=212) adolescent girls have their first pregnancy before 18 years old. Similarly, the biological factor considered shows that 41.1% (n=289) had their first menstrual period before the age of 14 years old (Table 1).

According to socio-demographics characteristics, the average age is 17.11 (±0.050) years old. The distribution shows that 17.4% participants have 19 years old, compared to 16.5% who have 15 years old. Concerning the socialization area, 55.2% (n=388) of adolescent girls spent the first 12 years of their childhood in the campaigns and medium cities. The distribution by education level shows that 45.0% (n=316) of adolescent girls have reached the first secondary school and 12.8% (n=90) the second secondary cycle. Those with a university level of education account for 6.7% (n=47).

Table 1 Description of variables

Variables	n	%
Socio-demographics characteristics		
Adolescent girls age		
15	116	16.5
16	119	16.9
17	163	23.2
18	183	26.0
19	122	17.4
Age first menstruation		
< 14 years old	289	41.1
14 years old	205	29.2
> 14 years old	209	29.7
Education level		
Never attended school	95	13.5
Primary completed	49	7.0
Primary not completed	106	15.1
First cycle of secondary	316	45.0
2nd cycle level of secondary	90	12.8
University level	47	6.7
Religion		
Catholic	258	36.7
Endogenous	33	4.7
Evangelist	166	23.6
Muslim	182	25.9
Protestant	42	6.0
No religion	22	3.1
Ethnicity		
Fon and related	324	46.1
Adja and related	116	16.5
Yoruba and related	59	8.4
Bariba and related	69	9.8
Ottamari and related	34	4.8
Yoa-lokpa and related	35	5.0
Dendi and related	66	9.4
Socialization area		
Big cities	177	25.2
Medium cities	138	19.6
Campaigns	388	55.2
Behavioural characteristics		
Age at first sexual intercourse		
Under 15 years old	108	23.4
15 years and more	354	76.6
Contraceptive method use		
No	603	85.8

Table 1 (continued)

Variables	n	%
Yes	100	14.2
IEC on SRH		
No	284	40.4
Yes	419	59.6
Exposure to entertainment activities		
Low	320	45.5
Average	180	25.6
High	203	28.9
Exposure to ICT		
Not exposed	199	28.3
Exposed	554	71.7
Characteristics of parents/guardians		
Education level of father/guardian		
Primary	159	22.6
Secondary Cycle 1	176	25.0
Secondary Cycle 2	86	12.2
University	38	5.4
Never attended school	244	34.7
Educational level of mother/guardian		
Primary	121	18.1
Secondary Cycle 1	128	19.1
Secondary Cycle 2 and high	41	6.1
Never schooled	380	56.7
Economic activity father/guardian		
Agriculture/fish/livestock	248	35.3
Trade	73	10.4
Driving	68	9.7
Artisans/artists	147	20.9
Officials	167	23.8
Parent/guardian economic activity		
Agriculture/fish/livestock	73	10.9
Trade	396	59.1
Artisans/artists	108	16.1
Officials	44	6.6
Housewives	49	7.3
Departments of residence		
Alibori	77	11.0
Atacora	37	5.3
Atlantic	109	15.5
Borgou	71	10.1
Collines	37	5.3
Couffo	58	8.3
Donga	60	8.5

Table 1 (continued)

Variables	n	%
Littoral	74	10.5
Mono	41	5.8
Plateau	36	5.1
Ouémé	54	7.7
Zou	49	7.0
Total	703	100

Exposure to IEC on SRH, as well as the use of a modern contraceptive method, provides adolescents with preventive information for a responsible sexual and reproductive life. Such an arrangement provides them with the skills, capacities and abilities necessary to delay not only the first sexual intercourse but also to prevent the occurrence of an unwanted and/or unplanned early pregnancy. Among enrolled adolescents girls, only 14.2% ($n=100$) report used a modern contraceptive method. With variable exposure to IEC on SRH, 59.6% ($n=419$) of respondents report having addressed these issues in the family, school or work environment. According to the environments in which they receive these teachings, the school environment (36.5%) is the most cited, followed by the professional learning environment (12.9%) and the family environment. In contrast to the school framework, 12.6% of adolescent girls reported discussing SRH issues with parents/guardians at home.

Among adolescent girls surveyed, 23.4% ($n=108$) had their first sexual intercourse before the age of 15 years old. Depending on the degree of exposure to entertainment activities, 45.5% ($n=320$) adolescent girls were low exposed compared 28.0% ($n=203$) who were high exposed to these activities. Exposure to ICT indicates that 71.7% ($n=554$) of participants were exposed to at least one of the social networks mentioned and to television.

Bivariate Analysis Coupled with Qualitative Analysis

The results of the bivariate analysis show that the following variables have a significant relationship with early first pregnancy. These are: (i) age at first menstruation; (ii) age at first sexual intercourse; (iii) modern contraceptive method use; (iv) exposure to IEC on SRH; (v) education level; (vi) religion and ethnicity; (vii) socialization area; (viii) parents/guardians education level; and (ix) department of residence (Table 2).

Socio-demographics Characteristics

Adolescent girls who had their first menstruation before 14 years old are more likely to have their first pregnancy earlier than those who had it after 14 years old: 36.0% vs 23.9% ($p=0.012$). Those who had primary school level compared to those with secondary 2nd cycle level: 44.5% vs 17.8% ($p<0.001$); and those who spent the first 12 years of their childhood in campaigns areas compared to those spent it in big

Table 2 Bivariate results: sociodemographics and behaviors factors by first early pregnancy

Variables	n	%	p
Socio-demographics characteristics			
Age at first menstrual period			0.012
< 14 years old	104	36.0	
14 years old	58	28.3	
> 14 years old	50	23.9	
Education level			<0.001
Never schooling	37	38.9	
Primary level	69	44.5	
Secondary 1st cycle	79	25.0	
Secondary 2sd cycle	16	17.8	
University level	11	23.4	
Religion			0.004
Catholic	71	27.5	
Endogenous	11	33.3	
Evangelist	41	24.7	
Muslim	69	37.9	
Protestant	08	19.0	
No religion	12	54.5	
Ethnicity			0.002
Fon and related	87	26.9	
Adja and related	36	31.0	
Yoruba and related	08	13.6	
Bariba and related	29	42.0	
Ottamari and related	16	47.1	
Yoa-lokpa and related	15	42.9	
Dendi and related	21	31.8	
Socialization area			0.051
Big cities	41	23.2	
Medium-sized cities	43	31.2	
Campaigns	128	33.0	
Behavioural characteristics			
Age at first sexual intercourse			0.002
Under 15 years old	64	59.3	
15 to 17 years old	130	43.3	
18 to 19 years old	18	33.3	
Modern contraceptive method use			0.002
No	169	28.0	
Yes	43	43.0	
IEC on SRH			0.024
No	98	34.5	
Yes	114	27.2	
Degree of exposure entertainment activities			0.085
Low	105	32.8	

Table 2 (continued)

Variables	n	%	p
Average	58	32.2	
High	49	24.1	
Exposure to ICT			0.119
Not exposed	67	33.7	
Presentation	145	28.8	
Parents/guardians characteristics			
Father/guardian education level			0.015
Primary	49	30.8	
Secondary Cycle 1	49	27.8	
Secondary Cycle 2 and high	20	23.3	
University	05	13.2	
Never schooling	89	36.5	
Mother/guardian education level			<0.001
Primary	33	27.3	
Secondary Cycle 1	23	18.0	
Secondary Cycle 2 and high	06	14.6	
Never schooling	139	36.6	
Father/guardian economic activity			0.108
Agriculture/fish/livestock	89	35.9	
Trade	18	24.7	
Driving	19	27.9	
Artisans/artists	45	30.6	
Officials	41	24.6	
Mother/guardian economic activity			0.050
Agriculture/fish/livestock	26	35.6	
Trade	128	31.8	
Artisans/artists	33	30.6	
Officials	06	13.6	
Housewives	10	20.4	
Departments of residence			0.017
Alibori	26	33.8	
Atacora	12	32.4	
Atlantic	31	28.4	
Borgou	32	45.1	
Collines	13	35.1	
Couffo	14	24.1	
Donga	21	35.0	
Littoral	13	17.6	
Mono	15	36.6	
Plateau	04	11.1	
Ouémé	15	27.8	
Zou	16	32.7	
Total	212	30.2	

cities: 33.0% vs 23.2% ($p=0.051$) are more likely to report that they have had their first pregnancy earlier. Of the qualitative interviews conducted with the adolescent girls interviewed, two found that lack of information about the physical and physiological changes that occur during adolescence and puberty influence the occurrence of early first pregnancy. The following two interviews testify to this reality; **interview n°1** “I had my first menstruation when i was 12 years old and really didn’t know what it was all about. Something told me to try what my school friends tell me in classroom. We were in second years of secondary 1st cycle and my friends were making fun of me.[...] that’s what shows you’re a real woman [...] they said and they practically kicked me out of the band. I didn’t have any friends left. So one day, I had an experience with a senior high school student from my college who was in my neighbourhood. I’m with two children on my arm at 18 years old with no future and he’s continuing his studies.[...] more seriously, after him, I was forced to marry and i became the third wife of a 40-years old man because my parents wanted to save the family honor”, *Mrs Z. C., secondary school level, Catholic, 18 years old.*

Interview n°2: “[...] we were in 2013, i was 10 years old, i knew i was different from other girls of my age because i was growing up faster than my age and i had my first menstruation in that period. It was also during this period that i had my first sexual intercourse with a friend. It was a unique experience. After, i had others, but i didn’t know that it was necessary to protect myself, for example, or what to do to avoid pregnancy and other sexual diseases. I was already 12 years old. I was taking my exam to start high school where i really discovered the sexual life. Shortly after, my mother told me i was pregnant, i didn’t know it. Unfortunately my child did not survive because the labour of delivery was very difficult for me”, *Mrs T; U, Secondary education level, Protestant, 16 years old.*

Behavioral Characteristics

Based on behavioral characteristics, it appears that a greater proportion of adolescent girls who had their first sexual intercourse before 15 years old: 59.3% vs 50.3% ($p=0.002$); those who had used a modern contraceptive method: 43.0% vs 28.0% ($p=0.002$); and those who were not exposed to IEC on SRH: 34.5% vs 27.2% ($p=0.024$) were more likely to have first pregnancy earlier.

Concerning degree of exposure to entertainment activities, adolescent girls with low exposure and average exposure have a high proportion to experienced early first pregnancy compared to those with high exposure: 32.8% and 32.2% vs 24.1%.

Socio-economics Characteristics of Parents/Guardians

Adolescent girls whose father/guardian or mother/guardian have never been to school compared to those parents/guardians have secondary or high education level: 36.5% vs 13.2% ($p=0.015$) and 36.6% vs 14.6% ($p<0.001$) respectively, are the most likely to have first pregnancy early. At the same time, those whose mothers/guardians are engaged in an economic activity such as farming, fishing or breeding (35.6%) are more likely to experience the event studied earlier than those mothers/

guardians (13.6%) are officials ($p=0.017$). Indeed, the type of economic activity could affect the income level of the household, especially for the head of household. Interview n°3 below shows that the household economic standard of living affects adolescent's needs satisfaction. The participant no. 3 says: "...the pregnancy I'm carrying, I didn't want it. A classmate from the third grade is the author and I didn't have much choice. Additionally, I didn't know anything about unprotected sex consequences and how to avoid pregnancy. At this time, I was in first years of the secondary Cycle 1 and we met during the cultural days of our college which I discovered by curiosity for the first time. My parents are poor but his father is a great civil servant. My parents couldn't afford all the expenses for my schooling.[...] One day, I was even fired and I missed a test because I had not bought the course books imposed by the teacher to process his exercises. He's the one who helped me again. [...] When I got pregnant, my parents kicked me out of the house. At the moment I'm living with a classmate," *Mrs. Z. Mr. student, second years of secondary cycle 2, celestial, 14 years old.*

Moreover, the trend by department of residence showed that Borgou (45.1%), Mono (35.6%), Collines (35.1%), Donga (35.0%), Alibori (33.8%), Atacora (32.4%) and Zou (32.7%) are departments with high proportions than the national average proportion of the first pregnancy (30.2%).

Multivariate Analysis Coupled with Qualitative Analysis

Results of logistic regression show that: age at first menstruation, age at first sexual intercourse, ethnicity, socialization area, economic activity of the father/guardian, and exposure to ICT are the main associated factors of the early first pregnancy in adolescence (Table 3).

Sociodemographics and Economics Factors

Compared to the adolescents who had their first menstruation after 14 years old, those who had it before 14 years old have 1.75 ($p<0.01$) times greater odds of early first pregnancy.

Adolescents who spent the first 12 years of their childhood in campaigns areas have 1.84 ($p<0.05$) times more odds to have first pregnancy earlier than those who spent their childhood in big cities. These trends could be explained by the fact that cities offer certain advantages and opportunities in contrast to rural areas. Moreover, the effect of modern technology, modernization and the decline of traditional social requirements are more pervasive and perceptible in cities than in rural area.

The three below verbatim statements of some parents who were approached, better illustrate the situation: participant n°4: "With soap operas, Facebook and whatsapp, children want to try everything and as soon as possible even if they are not yet have the age or are not mature or responsible. In nowadays life, a pregnancy and a child involve enormous sacrifices and burdens," *Mrs. A. A, Sales woman, 35 years old, no religion, mother of two daughters aged between 9 and 12 years old.*

Table 3 Results from multivariate logistic regression model: early pregnancy associated factors among adolescent girls (odds ratios)

Variables	OR	95% CI
Age first menstruation (Ref = > 14 years old)		
< 14 years old	1.75*	[0.97–3.13]
14 years old	1.11	[0.62–1.99]
Age at first sexual intercourse (Ref = 18 to 19 years old)		
Less than 15 years old	2.47**	[1.08–5.64]
15 to 17 years old	1.30	[1.65–2.61]
Contraceptive use (Ref = yes)		
No	0.99	[0.57–1.73]
IEC on SRH (Ref = yes)		
No	1.01	[0.61–1.64]
Instruction (Ref = university)		
Never schooling	1.10	[0.34–3.49]
Primary level	1.73	[0.59–5.08]
Secondary Cycle 1	1.43	[0.50–4.08]
Secondary Cycle 2	0.55	[0.17–1.75]
Religion (Ref = no religion)		
Catholic	0.80	[0.26–2.47]
Endogenous	0.66	[0.16–2.75]
Evangelist	0.49	[0.15–1.58]
Muslim	0.98	[0.26–3.66]
Protestant	0.47	[0.10–2.06]
Ethnicity (Ref = Yoruba and related)		
Fon and related	4.22***	[1.55–11.45]
Adja and related	4.59***	[1.55–13.61]
Bariba and related	5.12***	[1.51–17.34]
Ottamari and related	5.57**	[1.44–21.34]
Yoa-lokpa and related	3.04*	[0.83–11.11]
Dendi and related	2.58	[0.76–08.76]
Socialization area (Ref = big cities)		
Medium cities	1.50	[0.77–2.93]
Campaigns	1.84**	[1.04–3.24]
Father/guardian education level (Ref = high/university)		
Primary	3.82*	[0.79–18.48]
Secondary Cycle 1	4.41**	[0.95–20.47]
Secondary Cycle 2	1.64	[0.37–7.12]
Never schooling	3.69	[0.75–18.19]
Mother/guardian education level (Ref = never schooling)		
Primary level	0.21	[0.02–2.33]
Secondary 1st cycle	0.25	[0.02–0.59]
Secondary 2nd cycle and more	0.29	[0.02–3.11]
Father/guardian economic activity (Ref = officials)		

Table 3 (continued)

Variables	OR	95% CI
Agriculture/fish/livestock	0.48	[0.20–1.14]
Trade	0.25***	[0.09–0.71]
Driving	0.32**	[0.12–0.83]
Artisans/artists	0.39**	[0.17–0.89]
Mother/guardian economic activity (Ref = officials)		
Agriculture/fish/livestock	2.14	[0.22–20.24]
Trade	2.82	[0.33–24.11]
Artisans/artists	2.65	[0.29–23.89]
Housewives	1.46	[0.15–13.80]
Degree of exposure activities entertainment (Ref = low)		
Average	0.57*	[0.30–1.10]
High	1.08	[0.51–2.29]
Exposure to ICT (Ref = not exposed)		
Exposed	1.38**	[0.81–1.91]
– 2Log likelihood	536.671	
Khi-Chi-deux	72.446***	

Ref reference modality, CI confidence intervals for the OR

***p < 1%, **p < 5%, *p < 10%

Participant n°5: “With the new lifestyles, we can no longer impose anything to children. In the meantime, in order to avoid pregnancies and births out of nuptial framework, the girl is promised and given in marriage as soon as she becomes a woman, i.e. when she has her first menstrual period [...]. It should also be added that the schooling of girls has favored the event because parents, aunts and uncles no longer have direct and permanent control over girls. So they can do whatever they want outside before coming back at home and the parent won’t know anything, especially if they go to university very quickly far from their parents and have to live alone,” **Mr A I, secondary education level, craftsman, 45 years old, father of four children including a 15 years old pregnant girl.** Participant n°6 relate: “White people have succeeded in creating social disorder in our society. There is no more shame when a young girl becomes pregnant or gives birth while under her parents’ roof. Today there are a lot of people who chatting, chatting and chatting about fighting against forced and early marriage, the abandonment of excision, etc. They go so far as to ask for a free choice of spouse. Today nothing has its place in our society. So girls, even very young ones, allow themselves everything. The consequences are what you see for yourself,” **Mr. K.Y., secondary education level; Iman Muslim, 55 years old.**

Father/Guardian Economic Activity and Education Level Only the economic activity and education level of the father/guardian has a significant effect on early fertility. Adolescent girls whose father/guardian is a trader, driver or craftsman have 0.25 (p < 0.001), 0.32% (p < 0.05), and 0.39 (p < 0.05) respectively in the odds lower of

early first pregnancy compared to those whose father/guardian is a civil servant or officials.

The father/guardian education level is a protective factor in early first pregnancy for the adolescent girl. Adolescents whose father/guardian have an elementary (OR=3.82; $p < 0.01$) or secondary Cycle 2 (OR=4.41; $p < 0.05$) have greater odds to have their first pregnancy earlier than those whose father/guardian have a university education level.

The four verbatims below better illustrate the results described above. The first is that of a pregnant girl whose father is a senior public sector official, the second is that of a mother who believes that the problem is deeper and depends on both parents and children, the third is that of a mother who is a self-employed civil servant and the fourth is the point of view of an community leader. Participant n°10 "I confess that i always dressed sexy under the influence of western clothing fashion and through everything i followed on TV and social networks. My girlfriends and wanting to do like some of the star women have also pushed me to my current state. Besides, my mother allowed me a lot of things while my father was fiercely against it. But since my father was hardly ever home during the day, so i could do as i pleased. From the time i was pregnant until i gave birth, my parents were in a fight because i got pregnant during my studies at the age of 15 years old and my father continues to blame my mother for this to every days. Since then, everything has changed in our family; the atmosphere is not like it used to be..." *Mrs. A. B., Female student, girl mother, secondary level, no religion, 17 years old.*

Participant n°11: "I think about the early pregnancy among adolescent's girls, the responsibility is shared between children and parents. Parents who have suffered tell themselves that this will no longer be the case for their children. As a result, they make everything available to the children, especially if they are a little rich. They allow children to do everything, and the latter, immature and spoiled, instead of capitalizing and taking advantage of the means to become responsible men and women in the future, allow themselves the exact opposite. Sometimes, some parents really don't know what's going on because they're out every time because of work. As a result, we are seeing everything, including bad company and the big social problem you talk about," *Mrs. C. M. Ex nanny and domestic worker, Muslim, 49 years old mother.*

During interview n°12, mother and an international consultant in women's entrepreneurship confided: "...I was always between planes at some point in my career. Then i noticed that my children were much more accustomed to their nanny than to me as their mother. I had to take a sabbatical year to get closer to them and create the closeness, trust and family atmosphere i always wanted for my children. From then on, i started by making them lunch in the morning, noon and evening, I would take them to school in the morning and go out to get them...I was there for them and things gradually got back to normal...».

The point of view of a neighborhood chief on the issue during interview n°13 sheds more light on this last result: "... Women's schooling has done us good but the consequences are also there. When they are lucky enough to go far in their studies and find work outside the household, they no longer have time to fully play their role as mothers and wives. Things have really evolved that today you see that it is the

“maids” who practically take their place and it is on the telephone that the housewife gives orders. But can the phone solve everything? I don’t think it can. In addition, the maid does not always have the level of her boss to take care of the children entrusted to her as she would have liked,” *Mrs. Z. T Neighborhood leader, 55 years old, Catholic, Never been to school.*

The realities described by the last participant could be put into perspective because these practices are much more relevant to women civil servants or those who work outside the home. This reality affects the children more when, by constraint, the parent(s) leave the house in the morning and only return home in the evening.

Behavioral Factors

Compared to adolescent girls who had their first sexual intercourse at 18 years old or more, those who had sex before 15 years old have 2.47 times greater odds ($p < 0.05$) to have their first pregnancy earlier.

About entertainment activities, those with average exposure to entertainment activities have 0.57 times less odds ($p < 0.01$) to have their first pregnancy compared to adolescent girls in the low entertainment category. The life story told by an adolescent girl during the interviews, reinforce this result. The entertainment activities contribute to social development and could protect against risky behaviors by reducing the frequency of exposure.

To this end, participant n°14 confided: “ it was from the age of three that i was picked up by my aunt, with whom i lived until the day she threw me out with my pregnancy. While i was at her house, she enrolled me in a tailoring workshop [...] Life was hard with her, waking up early and sleeping late. Standing is a problem sitting is dangerous. In the workshop too, the work was not easy, it’s up from morning to night. At the same time, the boilermaker on my home way was flirting with me. He lived alone and naive as i was, i thought he was living single. I also wanted to do like the other civilized girls: go to the beach, the play centers, be connected to the internet or social networks [...] My life consisted of the workshop and then the housework at my aunt’s house. At one point, i wanted to get away for a while and i accepted the boilermaker’s advances. My workshop manager and my aunt didn’t know anything about this relation relationship with the boilermaker and i’m got used to it because of the trick i used to do with my workshop classmates. There were times when i would miss the workshop or find arguments to see him and spend good time with him. But i regret a little today because after i got pregnant i realized that he already had two wives and the last one was also pregnant at the same time as me,” *Apprentice tailor having suspended training, 16 years old, Evangelist.*

After adjusting for covariates, exposure to ICT, contributes significantly to early pregnancy. Compared to adolescent girls who are not exposed to ICT, those who are exposed have 1.38 ($p < 0.05$) times greater odds to have early first pregnancy. The verbatim n°15 following, converges with this result: “[...] Television and my Android didn’t make my life any easier. I have always wanted to be like the Novella channel actresses and stars. In any case, those two didn’t help me and that is where i am with a child whose father refuses to assume his responsibilities,” *Mrs. S. J,*

1st year of university, Protestant, 18 years old. Moreover, the comments made by participant n°16 during interview corroborate the above: "...I belong to a network of girls who periodically organize partouse parties. I discovered them through my school friends and joined their through whatsApp group. My parents don't know anything because at home i'm the saint and don't touch and i'm watching only religious chains, gospel songs etc. when parents are present. But when they are on office or away, in my free time or on weekends, i have my favorite channels that i'm watch".

Discussion

The early pregnancy or motherhood has implications for public health, demographic, social and economic outcomes for the adolescents and young girls such as: infant and maternal morbidity and mortality levels, reduced chances of professional and economic success, early marriage, school dropout, etc. (Nkwinka and Naidoo 2016; Rutaremwa 2013; Shiateya 2016).

The results of this study show a negative relationship between early sexual intercourse and early pregnancy. This result consistent with those of Salifou and Alladatin (2017) in the municipality of Tchaourou in Benin and Kouame (2015) in Cote d'Ivoire who also found that early first sexual intercourse increases the odds of get early pregnancy before the age of 20 years old. In Côte d'Ivoire, results show that adolescents and young girls who had first sexual intercourse between 10 and 14 years old are 2.83 times more likely to begin their childbearing life before their 20th birthday than those who have their first sexual intercourse after 15 years old.

Education level is generally a differentiating factor pregnancy and motherhood. The results of the present study showed a negative but not significant relationship between education level and early pregnancy. These results are contrary to those found by Ngaba (2012) in Tchad, Amouzou (2016) in Senegal and Osili and Long (2008) in Nigeria. In Tchad, adolescent girls with secondary education level were 0.42 times less likely to experience early motherhood than those with no education or primary level (Ngaba 2012). In Senegal, 6.93% of adolescent girls in secondary school, compared to 29.49% who have never been educated, had a pregnancy before 20 years old. In Nigeria, the results of the study on the relationship between girls schooling and pregnancy also showed that an additional year of schooling reduces the propensity to have pregnancy before 20 years old by 74% ($p < 0.05$).

In the context of Benin, the results could be explained by the decline in the influence of traditional values that governed community life. With schooling, as some participants were told during the interviews, things have changed enough and schooling gives women a certain freedom, power, autonomy, opportunities, occasions and possibilities to make their own choices. Taking into account the reality, adolescent girls in school would spend more time outside than at home and therefore beyond parental control. Without losing sight of the fact that adolescence is a period of transition during which certain impulses like the desire to discover the opposite sex, companies, peer pressure, etc. are born. In addition, living away from parents/guardians after graduation allows adolescents and

young girls to lead a love life with its corollaries if preventive measures are not taken when training or studies are first priority.

The results of this study show that the odd to have pregnancy before the 18th birthday were associated with socialization area in childhood. Living in campaigns or medium cities increases the odds of early pregnancy. This finding consistent with studies of Antoine (2008) in Madagascar and Abebe et al. (2020) in Ethiopia. The first author found that a high proportion of adolescents who spent their childhood in rural areas had first pregnancy before 20 years old than those who spent it in urban areas: 38.2% vs 22.0% ($p < 0.05$). In Ethiopia, adolescent girls who spent childhood in rural areas were 1.97 times more likely than those spent it in urban areas to be mothers before their 20th birthday (Abebe et al. 2020).

The father/guardian education level and economic activity has a significant effect on the early pregnancy according to the type of activity. Compared to adolescent girls whose father/guardian are officials or with high education level, the odd is less than 1 for those whose father/guardian are in other sectors activities. Indeed, economic activity enables the head of household to have the necessary resources to cover his or her needs and those of his/her household members. Similarly, the type of occupation determines the frequency and duration of contact between children and their parents, closeness and parent–child trust. This is what justifies taking into account the socio-economic conditions of the household from which the adolescent girls come, which go beyond the pecuniary/monetary nature of the economic activity. In this order of idea, the result shows the greater odd of early pregnancy among adolescent girls whose parents/guardians are public or private sector employees. This result could be explained rather by professional constraints and not only by the level of income. In Benin, civil servant, whatever the time of year, work an average of 8 h a day outside their households, generally entrusting the care, education and monitoring of children, including adolescent girls, to domestic servants, “nannies” or other skilled persons, particularly in urban cities. Sometimes the distance between the office and the home means that the parents have to leave home very early and return very late at night; sometimes when the children are already asleep. This context obliges the parent/guardian to devote less time to the adolescents, who relies on and follows the example of people she frequently meets in the absence of her parents. There are also the influence and pressure of peers, the clinging to the programs of uninformative television channels, social networks and the internet, etc. Peer pressure can determine the age at first sexual intercourse, as found by Bicchieri (2017) in a longitudinal study on the development of adolescent sexual behaviour in the Netherlands. In addition, the interviews of participants 10 to 13 indicate the important role and responsibility of parents in the sexual and reproductive health education of adolescents and young people. In Ethiopia, Ayele et al. (2018) showed through a case–control study that adolescent girls who do not communicate with their parents/guardians about SRH issues have a 6.25 times higher odds of having a pregnancy before 20 years old.

The effects of modernization have been captured in particular through the ICT exposure variable. The results show a higher odd of early pregnancy among exposed adolescent girls.

Peer-to-peer meetings, networking, discoveries of all kinds, visiting pornographic and/or dating sites, intergenerational “chatting” between young people or “chatting” between generations peers, watching films with little educational content from parents/guardians, etc. are all activities and practices to which adolescents in this category are exposed. When the mass of information and images is not monitored and filtered to extract the best for their maturity and social development, this context can contribute to increasing the deviant and harmful sexual practices for their sexual and reproductive health.

Limitation of the Study

Although the study contributed to a better understanding associated factors of the early pregnancy in adolescence, the results and conclusions may have been biased in a number of aspects. First, the social desirability bias associated with the under-reporting of motherhood and early pregnancy that is socially misperceived. Second, the cross-sectional nature of the data may have affected the results due to the censoring of adolescent girls who will become pregnant after the survey. Third, a survival analysis would have allowed for the inclusion of adolescent girls aged 15 to 17 years who have not yet had their first pregnancy but who are still exposed to the event occurrence. Fourth, the study type correlational cannot determine causation. Thus, results can suggest but not establish causation between variables and early pregnancy. Finally, the low proportion of adolescents concerned by parent–child communication on SRH and the use of a modern contraceptive method could explain why these two variables do not have a significant effect on the first pregnancy after adjusting logistic regression model in contrary to other previous studied.

Conclusion

This study assessed the associated factors of early pregnancy among adolescent girls. The qualitative component through verbatims has led to a better understanding of the manifestation of the event in its context.

The results of the quantitative component reveal that 30.2% adolescents have their first pregnancy before 18 years old. The main associated factors identified are: (i) age at first menstruation, (ii) age at first sexual intercourse, (iii) ethnicity, (iv) childhood socialization area, (v) father/guardian education level and economic activity, and (vi) exposure to ICT. Analysis of the qualitative data shows that the main associated factors of the event occurrence in adolescence are structural and mostly associated to the social transformations under way in lifestyles and ways of thinking, which in return affect reproductive behavior during adolescence. This main conclusion found sources on the social disorganization theory. In addition, results confirm the need for an in-depth study on the content, scope and impact of SRH programs for adolescents an young people, particularly those relating to modern contraceptive commodities and services for adolescents girls. In addition, actions aimed at the active and effective implication of parents, supervisors and educators at different

levels of the social chain in the teaching of SRH issues to adolescents and young people are necessary to ensure effective communication from an early age. This will enable them to have the skills and abilities necessary for sexual and reproductive life as desired.

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Compliance with Ethical Standards

Conflicts of interest The authors declared that there was no conflict of interest regarding this manuscript.

References

- Abebe, A. M., Fitie, G. W., Jember, D. A., Reda, M. M., & Wake, G. E. (2020). Teenage pregnancy and its adverse obstetric and perinatal outcomes at Lemlem Karl Hospital, Tigray, Ethiopia, 2018. *BioMed Research International*, 2020, 1–8. <https://doi.org/10.1155/2020/3124847>.
- Amouzou, M. (2016). *Famille et grossesse précoce au Sénégal : Maternités Adolescentes*. Rapport d'étude (p. 13). Agence Nationale de la Statistique et de Démographie (ANSD).
- AN-Bénin. (2015). *Article 3, Loi n° 2015-08 portant code de l'enfant en République du Bénin* (p. 85).
- Antoine, P. (2008). *Entrée en vie sexuelle, nuptialité et fécondité des adolescents* (p. 29).
- Argaw, B. A. (2013). *The effect of female education on health knowledge and fertility behavior: Evidence from primary schooling reform in Ethiopia* (p 26). Mannheim: Centre for European Economic Research.
- Ayele, B. G., Gebregzabher, T. G., Hailu, T. T., & Assefa, B. A. (2018). Determinants of teenage pregnancy in Degua Tembien District, Tigray, Northern Ethiopia: A community-based case-control study. *PLoS ONE*, 13(7), 1–15. <https://doi.org/10.1371/journal.pone.0200898>.
- Bicchieri, C. (2017). *Norms in the wild: How to diagnose, measure, and change social norms*. Oxford: Oxford University Press.
- Chicoine, L. (2012). *Education and fertility: Evidence from a policy change in Kenya*. Discussion Paper N° 6778 (p. 63).
- Clark, S., Koski, A., & Smith-Greenaway, E. (2017). Recent trends in premarital fertility across sub-Saharan Africa. *Studies in Family Planning*, 48, 1–20.
- Delaunay, V. (1994). *L'entrée en vie féconde: Expression démographique des mutations socio-économiques d'un milieu rural sénégalais* (Etudes du CePeD n°7).
- IHE. (2015). *Déterminants de l'infection au VIH chez les jeunes filles de 15-24 ans en HAÏTI* (p. 29). Institut Haïtien de l'Enfance.
- INSAE. (2019). *Enquête Démographique et de Santé au Bénin (EDSB-V) 2017–2018* (p. 675). Institut National de la Statistique et de l'Analyse Économique.
- Kouame, C. A. (2015). *Disparités régionales du début de la vie féconde chez les adolescentes en Côte d'Ivoire*. Working paper (p. 21). Institut National de la Statistique-Côte d'Ivoire.
- Kyriazis, S. (1987). Approches économiques de la fécondité: Une analyse comparative des théories du New Home Economics et d'Easterlin. *Cahiers québécois de démographie*, 16(2), 167–185. <https://doi.org/10.7202/600612ar>.
- Leppälähti, S., Heikinheimo, O., Kalliala, I., Santalahti, P., & Gissler, M. (2016). Is underage abortion associated with adverse outcomes in early adulthood? A longitudinal birth cohort study up to 25 years old. *Human Reproduction*, 31(9), 2142–2149. <https://doi.org/10.1093/humrep/dew178>.
- Leridon, H. (2015). Théories de la fécondité: Des démographes sous influence? *Population*, 70(2), 331. <https://doi.org/10.3917/popu.1502.0331>.
- May, J. F., & Mcqueston, K. (2014). *Afrique de l'ouest: Un agenda de recherche en population et développement*. Note de recherche (p. 16). Population Référence Bureau.
- Mchunu, G., Peltzer, K., Tutshana, B., & Seutlwadi, L. (2013). Adolescent pregnancy and associated factors in South African youth. *African Health Sciences*. <https://doi.org/10.4314/ahs.v12i4.5>.

- Ngaba, D. (2012). *Fécondité des adolescentes au Tchad: Recherche des facteurs explicatifs*. Université de Yahoué II.
- Nkwini, O., & Naidoo, A. (2016). *Teenagers pregnancy and socioeconomic outcomes in South Africa* (p. 4). Statistics South Africa.
- November, L., & Sandall, J. (2018). 'Just because she's young, it doesn't mean she has to die': Exploring the contributing factors to high maternal mortality in adolescents in Eastern Freetown; a qualitative study. *Reproductive Health*, 15(1), 1–18. <https://doi.org/10.1186/s12978-018-0475-x>.
- Oakley, L., Penn, N., Papi, M., Oteng-Ntim, E., & Doyle, P. (2016). Risk of adverse obstetric and neonatal outcomes by maternal age: Quantifying individual and population level risk using routine UK maternity data. *PLoS ONE*, 11(10), 1–14. <https://doi.org/10.1371/journal.pone.0164462>.
- OMS. (2012). *Prévenir les grossesses précoces et leurs conséquences en matière de santé reproductive chez les adolescentes dans les pays en développement: Les faits* (p. 8). https://www.who.int/maternal_child_adolescent/fr/index.html.
- OMS. (2019). *Mortalité maternelle* (Mondial). <https://www.who.int/fr/news-room/fact-sheets/detail/maternal-mortality>.
- Osili, U. O., & Long, B. T. (2008). Does female schooling reduce fertility? Evidence from Nigeria. *Journal of Development Economics*, 87(1), 57–75. <https://doi.org/10.1016/j.jdevec.2007.10.003>.
- Pradhan, E., & Canning, D. (2015). *The effect of schooling on teenage fertility: Evidence from the 1994 Education Reform in Ethiopia* (N° 128; p. 33). <https://www.hsph.harvard.edu/pgda/working/>.
- Rutaremwaga, G. (2013). Factors associated with adolescent pregnancy and fertility in Uganda: Analysis of the 2011 Demographic and Health Survey Data. *American Journal of Sociological Research*, 2(3), 30–35. <https://doi.org/10.5923/j.sociology.20130302.03>.
- Salifou, M., & Alladatin, J. (2017). Profil et facteurs explicatifs de la maternité des adolescentes dans la commune de Tchaourou: Une approche basée sur les variables intermédiaires. *El Paradigm Journal*, 1–20.
- SE/CNLS-TP, ONUSIDA, & UNICEF. (2018). *Enquête sur les adolescents et le VIH: Évaluation de l'état de l'épidémie et des programmes en faveur des jeunes et adolescents pour la prise de décision au Bénin*. Rapport final (p. 118). Présidence de la République du Bénin.
- Shiateya, N. (2016). *Factors contributing to teenage fertility in coastal Kenya: A case of Mombasa County* (p. 90). Nairobi: University of Nairobi.
- UN IGME. (2018). *Levels and trends in child mortality* (p. 48). United Nations Children's Fund.
- UNESCO. (2017). *Grossesses précoces et non désirées: Recommandations à l'usage du secteur de l'éducation*. ED-2017/WS/27-CLD 2624.17 (p. 12).
- UNFPA. (2017). *Etat de la population mondiale 2016 (French): Comment cet âge déterminant chez les filles conditionne notre avenir*. United Nations UNFPA for Population.
- UNFPA, & GEEP. (2015). *Sénégal: Etude sur les grossesses précoces en milieu scolaire* (p. 115).
- Yadufashije, C., Sangano, G. B., & Samuel, R. (2017). The study of factors influencing teenagers pregnancy in Africa. *International Journal of Interdisciplinary Innovative Research and Development*, 2(1), 13–18.

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