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Study of the Maternal and Neonatal Prognosis during Teenage Childbirth at the University Teaching Hospital of Libreville-Gabon

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Abstract

Introduction: This study aimed to assess neonatal and teen mother's prognosis when giving birth in our structure and to determine the frequency of teen mothers.

Method: This case-control study involved mothers and their newborn children in the neonatology and neonatal intensive care unit at Centre Hospitalier Universitaire de Libreville, Gabon, from January 1st 2010, to December 31st 2012. Teen mothers of less than 18 years old were compared to adult mothers of 18 years old and more. Maternal and sociodemographic factors, pregnancy monitoring, gyneco-obstetrical antecedents, morbidity and intercurrent pathologies during pregnancy, the pregnancy type, the presentation, the mode and practices of delivery were analyzed. The newborn characteristics involved gender, birth weight, gestational age, APGAR score at first and fifth minute, morbidity and mortality aspects, resuscitation procedures and related pathologies and hospitalization delay.

Results: The frequency of teen mothers giving birth was 13.5%. Compare to adult mothers, most of teen mothers were students (79.5%, p<0,001), primigests (82.1%, p<0,001), the pregnancy follow-up was insufficient (82.1%, p<0,001) and delivery was vaginal (88.5%, p=0.04). Morbidity and mortality rates of teen mothers' newborns did not differ from adult mothers babies.

Conclusion: Our study did not reveal any statistical association between the teen mother's delivery and poor maternal or ante-natal prognosis. It raised the issue of preventing early pregnancy through education for young girls and contraception, of increasing awareness of teen mothers to attend Maternal and Child Health Centres and being taken care of by skilled childbirth staff and adapted support.

Keywords: Teen mother; Maternal; Neonatal prognosis

Introduction

Adolescence is defined by the World Health Organization (WHO) by a chronological age between 10 and 19 years old [1]. In 2012 [2], WHO estimated that nearly 16 million girls aged 15 to 19 and 2 million girls under the age of 15 give birth each year around the world. Pregnancy and teenage childbirth are a very high risk of morbidity and mortality. This situation is linked to the physiological and sociological characteristics of adolescent girls. Adolescent pregnancies constitute increased risks for maternal health such as anemia, high blood pressure, eclampsia [3] also for low birth weight babies, prematurity and poor adaptation to extrauterine life [4]. Complications of pregnancy and childbirth are one of the leading causes of death for girls aged 15-19. Deaths at birth and neonatal deaths are 50% higher among children of teenage mothers than among women aged 20 to 29 [2,5].

This problem affects most developing countries and few recent data exist in Gabon. We aimed to assess the maternal and neonatal prognosis during teenage childbirth by conducting this study in the neonatal resuscitation and neonatology unit of the University Hospital Center of Libreville (CHUL).

Patients and Methods

We made a retrospective, comparative study covering a two years period, from 1 January 2010 to 31 December 2012. The CHUL is the largest health facility in the country. Its capacity and geographical location in the center of city allow it to receive the majority of parturients of the city and its periphery.

During this period, we recorded deliveries for which newborns were hospitalized in the ward. We divided mothers

of newborns into two groups, according to their age: a group comprising women aged 18 or younger and a second group comprising women over 18 years of age. Maternal socio-demographic characteristics, maternal morbidity-related parameters, neonatal morbidity and mortality were collected from the delivery room register, the pregnancy tracking log and the department's medical record.

The maternal socio-demographic characteristics included: nationality (Gabonese, non-Gabonese); maternal age (less than or equal to 18 years and over 18 years); marital status (married, single/couple); profession (pupil) (female/male, female worker with gainful activity/employed, unemployed); socioeconomic level (low, medium, high); gynecological-obstetrical history (number of pregnancies or gestations, number of deliveries or parity) and follow-up pregnancy (number of antenatal visits: CPN). A socio-economic level was qualified low when the monthly family income was less than 150,000 CFA francs, middle when income was between 150,000 and 300,000 CFA francs and high for an income of more than 300,000 CFA francs. For teenage mothers, the socio-economic level of the parents or the spouse was the reference. Pregnancy was considered poorly followed if the number of ANC was less than 3 and well followed if the number was 3 or more.

Parameters related to maternal morbidity included: cesarean section delivery, vicious sore or transverse presentation, maternal complications or pathologies that occurred during pregnancy and laboring maneuvers, such as episiotomy, the use of forceps and the type of pregnancy. We classified maternal pathologies into syndromes: hematological; infectious, vascular, obstetric, metabolic, painful, neuropsychic and bronchial.

Parameters related to neonatal morbidity and mortality included low birth weight in grams (g), prematurity; poor or poor uterine adaptation to APGAR score at first and fifth minute; performing resuscitation maneuvers; associated pathologies; hospital stay and neonatal death. The low birth weight corresponded to a value of less than 2500 g and the very low weight to a value of less than 1000 g. Prematurity was defined by lower gestational age (GA) of 37 weeks of amenorrhea. We classified as prematurity between 33 and 36 weeks old, very prematurely between 28 and 32 weeks and extremely premature for a GA below 28 weeks. Adaptation to ectopic life was considered poor for an APGAR score of less than 3 and mediocre for a score of 3 to 6.

Ethics

All the mothers signed the consent form before being included in the survey.

Statistics, we used the chi2 test or the Fisher exact test for categorical variables and the Student's test for continuous variables. The threshold of significance was set at $p<0.05$. Free and informed consent of all persons involved in this study was obtained verbally.

Results

Out of a total of 577 newborns consecutively recorded during the study period, we identified 78 newborns born to mothers aged 18 or younger, representing a frequency of 13.5%. Teenage mothers were Gabonese in 94.9% (n=74) of cases and foreigners for 5.1% (n=4). Adult parturients were Gabonese in 88.2% (n=440) of cases and foreigners 11.8% (n=59).

Table 1: Distribution of socio-demographic characteristics, pregnancy monitoring and gynecological-obstetrical history among teenage and adult mothers.

Parameters	Teenage mothers (age ≤ 18 years) n (%)	Adult mothers (age>18 ans) n (%)	p
Nationality			
Gabonese	74 (94.9)	440 (88.2)	-
Non-Gabonese	4 (5.1%)	59 (11.8)	0.07
Marital status			
Single/free union	75 (96.2)	436 (87.4)	0.02
Married	3 (3.8)	63 (12.6)	-
Activity			
Student	62 (79.5)	128 (25.7)	<0.001
Working	1 (1.3)	110 (22.0)	<0.001
Unemployed	15 (19.2)	261 (52.3)	<0.001
Socioeconomic level			
Low	69 (88.5)	432 (86.5)	0.2
Middle	9 (11.5)	47 (9.4)	0.5
High	0 (0.0)	20 (4.0)	-
Number of ANC			
<3	27 (34.6)	121 (24.2)	0.05
≥ 3	51 (65.4)	378 (75.8)	-
Pregnancy			
1	64 (82.1)	90 (18.0)	<0.001
02-Mar	12 (15.4)	239 (47.9)	<0.001
≥ 4	2 (2.6)	170 (34.1)	<0.001
Delivery			
1	70 (89.7)	161 (32.3)	<0.001
02-Mar	5 (6.4)	235 (47.1)	<0.001
≥ 4	3 (3.8)	103 (20.6)	<0.001
Total	**78 (13.5)**	**499 (86.5)**	

Mean age was 16.9 ± 1.1 years for adolescent mothers and 27.4 ± 3.5 years for adult mothers. In the group of teenage mothers, 96.2% were single, 79.5% were students and 19.2%

were unemployed compared to 87.4%, 25.7% and 52.3% respectively in the group of adult deliveries. The socio-economic level was low for 88.5% of teenage deliveries compared to 86.5% of adult deliveries. In the follow-up of pregnancy, the proportion of unattended pregnancies was 34.6% among teenage deliveries while it was 24.2% among adult deliveries. Adolescent mothers were more frequently primigest (82.1%) and primiparous (89.7%) than adult mothers with respectively 18.0% and 32.3%. **Table 1** summarizes the socio-demographic characteristics, pregnancy monitoring and gynecological-obstetrical history of adolescent and adult mothers.

The intercurrent diseases observed during the pregnancy of teenage mothers consisted of infectious syndrome (5.1%), obstetric syndrome (5.1%), hematological syndrome (2.6%) and vascular syndrome (1, 3%). In adult mothers, the rates were 5.2%, 1.4%, 6.0% and 4.0%. The infectious syndrome included urinary tract infection, positive serology for Human Immunodeficiency Virus (HIV), malaria and vaginal candidiasis.

The obstetric syndrome consisted of cervical-isthmic open-bite, placenta previa hemorrhagic, and the threat of premature labor. The hematological syndrome took into account anemia, sickle cell disease. The vascular-renal syndrome included arterial hypertension, toxemia of pregnancy, pre-eclampsia. The metabolic syndrome was represented by diabetes/obesity; bronchial syndrome by asthma.

Pregnancy was unique among 93.6% of teenage mothers, compared to 86.2% of adult mothers and 14.1% of teenage mothers and 14.4% of adult mothers reported having a seated presentation. Cesarean section was the mode of delivery for 11.5% of adolescent girls and 21.2% of adults. Maneuvers at delivery were observed in 1.3% of adolescent cases compared to 2.6% of adults. **Table 2** shows the morbidity parameters reported for adolescent mothers and adult mothers.

The proportion of newborns with very low birth weight accounted for 9.0% of teenage mothers, compared to 4.4% for adult mothers, while low birth weight was 39.7% vs. 43.7%, respectively. Adaptation to ectopic life in the first minute of life was poor in 1.3% of newborns of adolescent mothers compared to 2.8% in those of adult mothers; by the fifth minute of life, it remained poor for 17.6% of newborns of teenage mothers and 17.6% of those of adult mothers. Resuscitation maneuvers were performed in 25.6% of neonates of teenage mothers vs. 30.7% of those of adult mothers. The associated neonatal pathologies were respiratory distress in 37.2% of neonates of teenage mothers vs. 38.1% of those of adult mothers and hypoxic-ischemic encephalopathy for 16.7% and 18.0%, respectively.

Table 2: Distribution of morbidity parameters in adolescent mothers and adult mothers.

Parameters	Teenage mothers age ≤ 18 years) n (%)	Adult mothers (age>18 ans) n (%)	p
Intercurrent diseases			
Infectious syndrome	4 (5.1)	26 (5.2)	0.8
Obstetrical syndrome	4 (5.1)	7 (1.4)	0.07
Hematologic syndrome	2 (2.6)	30 (6.0)	0.3
Vascular syndrome	1 (1.3)	20 (4.0)	0.3
Pain syndrome	1 (1.3)	5 (1.0)	-
Bronchial syndrome	1 (1.3)	3 (0.6)	-
Metabolic syndrome	0 (0.0)	6 (1.2)	-
Syndrome neuropsychique	0 (0.0)	4 (0.8)	-
Type of pregnancy			
Unique	73 (93.6)	430 (86.2)	0.06
Twins	5 (6.4)	68 (13.6)	0.07
Triple	0 (0.0)	1 (0.2)	-
Presentation			
Cephalic	67 (85.9)	403 (80.8)	0.2
Seat	11 (14.1)	87 (17.4)	0.4
Transverse	0 (0.0)	9 (1.8)	-
Mode of delivery			
Vaginal	69 (88.5)	393 (78.8)	0.04
Cesarean	9 (11.5)	499 (86.5)	-
Maneuvers at delivery			
Yes	1 (1.3)	13 (2.6)	-
No	77 (98.7)	486 (97.4)	0.7

The other pathologies were mainly convulsions, malaria, diarrhea and malformations. The duration of hospitalization was greater than 15 days for 38.5% of newborns of teenage mothers compared to 31.5% of those of adult mothers. The evolution was marked by the death of 34.6% of newborns of teenage mothers and 39.3% of newborns of adult mothers.

Parameters related to neonatal morbidity and mortality in neonates of adolescent mothers and adult mothers are summarized in **Table 3**.

Table 3: Distribution of morbidity and mortality outcomes in newborns of adolescent mothers and adult mothers.

Parameters	Teen mothers age ≤ 18 y n (%)	Adult mothers age>18 y n (%)	p
Birth weight (g)			
<1000	7 (9.0)	22 (4.4)	0.1
1000-2499	31 (39.7)	218 (43.7)	0.5
≥ 2500	40 (51.3)	259 (51.9)	0.9
Gestational age (weeks)			
<28	5 (6.4)	27 (5.4)	0.9
28-32	26 (33.3)	120 (24.0)	0.07
33-36	15 (19.2)	121 (24.2)	0.3
≥ 37	32 (41.0)	231 (46.3)	0.3
APGAR at first min			
<3	1 (1.3)	14 (2.8)	0.6
03-Jun	28 (35.9)	173 (34.7)	0.8
≥ 7	49 (63.0)	312 (62.5)	0.002
APGAR at 5th min			
<3	0 (0.0)	2 (0.4)	-
03-Jun	12 (15.4)	88 (17.6)	0.6
≥ 7	66 (85.0)	409 (82.0)	0.3
Resuscitation maneuvers			
No	58 (74.4)	346 (69.3)	0.3
Yes	20 (25.6)	153 (30.7)	-
Associated conditions			
Respiratory distress	29 (37.2)	190 (38.1)	0.8
IHE*	13 (16.7)	90 (18.0)	0.7
Bacterial infection	8 (10.3)	32 (6.4)	0.2
Icterus	6 (7.7)	33 (6.6)	0.7
Others	45 (57.7)	274 (54.9)	0.6
Hospitalization duration (days)			
≤ 7	28 (35.9)	222 (44.5)	0.1
Aug-15	20 (25.6)	120 (24.0)	0.7
>15	30 (38.5)	157 (31.5)	0.2
Evolution			
Live	51 (65.4)	303 (60.7)	-
Deads	27 (34.6)	196 (39.3)	0.4

IHE*: Ischemic Hypoxic Encephalopathy

Discussion

Our frequency is close to that found by Tambwe in the Democratic Republic of Congo with 13.9% [6] and Fouelifack et al. in Cameroon (9.3%) and Gandzien et al. in Congo-Brazzaville whose rates vary between 7. 0% and 13.0% [7,8]. It is higher than the rate reported by Ezegwui in Nigeria [9] which finds a frequency lower than 2.0%. This regional difference can be explained by the cultural or religious context that influences society's view of a young mother's situation. In some ethnic groups, becoming a mother is important because this state is a proof of fertility and in others, the teenage mother cannot

declare her pregnancy on pain of attracting an unfavorable judgment on her family unless she is married. We note that women of non-Gabonese nationality become mothers after 18 years, although the difference with Gabonese nationality is not significant. The cultural habits of these communities seem to have a positive impact on their sexuality. The result observed among women of Gabonese nationality emphasizes the importance of reinforcing the program of sex education and family planning, which has insufficient coverage at the national level.

The average age of adolescent deliveries is similar to that found by other authors, such as Fouelifack et al. Cameroon with 17 ± 1.3 years; Hamada et al. in Morocco [10] with 17 years and four months. Socio-demographic parameters, pregnancy follow-up and gynecological, obstetrical history showed unfavorable criteria for teenage mothers compared to adult mothers, such as being single, being a student, not having their pregnancies have already experienced the first pregnancy or have given birth at least once. According to a British study, many teenagers become pregnant with intention and not by accident [11]. Several authors have noted the adverse socio-demographic aspects and the poor or lack of prenatal care of adolescent mothers [12]. Alouina et al. [13] in France found that 20.0% of adolescent girls were in school, the majorities were unemployed, lived in a couple and 23.5% had less than four NPCs. The rate of unattended pregnancies is similar to that of Tambwe [6] who finds 30.2%. These results raise the problem of early adolescent pregnancy, the absence of screening for high-risk pregnancies and the resulting complications. According to the WHO, in developing countries, young pregnant women come late or not at all for antenatal care. The causes found are the ignorance of the importance of ANC, the lack of family support, the lack of care by a specialized social agency, the reproving look of the caregiver on an adolescent girl who is pregnant and fear of HIV testing [14,15].

Our teenage girls have no more intercurrent pregnancy pathologies compared to adult mothers such as vascular syndrome such as arterial or hematologic hypertension such as anemia. We did not note a relationship between the young age of mothers, presentation in the siege, multiple pregnancy, cesarean section, or episiotomy. Kakudji et al. [16] in the Democratic Republic of Congo, found that fetal presentation, soft-tissue lesions, were not significantly related to young age, but compared to adult mothers, adolescent to give birth by cesarean section, to undergo an episiotomy and to have a pathological delivery. The frequency of cesarean section in children under 20 was found by Ayuba et al. [17]; Ebeigbe et al. [18], both in Nigeria whose studies report a significantly higher incidence of cesarean section in adolescents (respectively p=0.014 and 0.0002). Maryam et al. [19] in Iran found that the high rate of caesarean section was associated with an age of less than 17 years.

In adolescents, the pelvis grows more slowly and gradually until old age, explaining the need for frequent use of this practice. Conde-Agudelo et al. [20] in Colombia reports that adolescent girls were at higher risk of early neonatal death, anemia, operative vaginal delivery, episiotomy, low birth weight, childbirth premature but less likely to deliver by cesarean section. The significantly greater practice of vaginal delivery is similar to that found by Mahavarkar et al. [21] in India who find that adolescent mothers are more likely to deliver vaginally without a significant increase in the risk of vaginal delivery. Assisted or cesarean section like Leppälahti et al. [22] in Finland, report that teenage mothers were more likely to have a vaginal birth without complications. In Caesarean section practice, our results are similar to those of Kongnyuy et al. [23] in Cameroon, who found that cesarean delivery was not significantly associated with teenage pregnancy. In a meta-analysis, Scholl et al. [24] in New Jersey show that the risk of preterm birth was associated with early maternal age in both developed and developing countries. In developed countries, the risk of cesarean delivery was reduced for adolescent girls with a decrease in maternal anemia and pregnancy-induced hypertension compared to the risk in more mature women. In developing countries, adolescent girls were at increased risk of maternal anemia, premature labor and cesarean delivery. These differences confirm that comprehensive prenatal care programs reduce the risk of complications.

Tebeu et al. [25] in Cameroon shows that the occurrence of vascular syndrome depends on the biological and endocrine immaturity, the primigestity and the lack of prenatal follow-up in the young woman. We did not find the prevalence among teenage mothers, preterm newborns and low birth weight, unlike other authors. For Mahavarkar et al., adolescent mothers were nearly three times more likely to develop preterm birth ($p<0.0001$) and nearly twice as likely to give birth to low birth weight babies ($p<0, 0001$). Ganchimeg et al. [26] in Japan, in a WHO multi-country study reports that compared to mothers aged 20 to 24, teenage mothers aged 10 to 19 years were at increased risk of eclampsia, endometritis puerperal, systemic infections, low birth weight, premature labor and severe neonatal problems; and that the increased risk of early intra-hospital neonatal death in infants born to adolescent mothers has been reduced and is statistically insignificant after adjusting for gestational age and birth weight. Black et al. [27] in Canada concludes that teen pregnancy is at high risk for the newborn because of its relationship to prematurity, low birth weight, neonatal and infant mortality. In adolescents, the physical immaturity of the uterus associated with specific nutritional and dietary needs is responsible for the birth of a preterm or born child with low birth weight [28]. This risk of low weight is attributed to factors that may be associated with young age, such as anemia, maternal physical state, premature delivery, pregnancy-related conditions, inadequate maternal weight gain, maternal nutrition and quality of pregnancy monitoring. Ndiaye et al. [29] in a Senegalese study of adolescent girls under 20 years of age found that giving birth to a newborn with low birth weight was more common in women who had low weight gain during pregnancy ($p=0.04$) or a low number of antenatal visits ($p=0.006$).

The poor or poor adaptation to ectopic life at the first minute of similar life in both groups was reported by Usta [30]

in Lebanon. We did not find an association between young maternal age and neonatal mortality. Our results are comparable to those of Ayuba et al. in Nigeria [17] who found no significant difference in perinatal mortality rate among teenage mothers compared to that of adult mothers. Like Raatikainen et al. [31] in Finland, there is no relationship between increased risk of preterm birth, fetal growth restriction, low birth weight or fetal or perinatal death and adolescent motherhood. This result is contrary to other studies that found an increased risk of perinatal mortality in neonates of teenage mothers [4,5]. Chen et al., [32] in the United States had demonstrated that when gestational age was adjusted at birth, there was no link between teenage pregnancy and neonatal mortality, while there was a significant association with postnatal mortality. The increased risk of neonatal death associated with teenage pregnancy is therefore largely attributable to a higher risk of premature births.

Conclusion

Adolescent pregnancy compared to adult women has often been associated with poor maternal and neonatal prognosis. This fragility is due to unfavorable socio-economic conditions and the inadequacy of antenatal surveillance. In this work, teenage pregnancy does not appear to be at hµd on sensitizing pregnant adolescents about pregnancy-related complications, correct care and psychological support during pregnancy, childbirth and postpartum by a multidisciplinary team.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. World Health Organization (2002) Adolescent friendly health services. A program for change WHO. Geneva, Switzerland. p. 48.
2. World Health Organization (2018) Adolescent pregnancy.
3. Dryburgh H (2000) Grossesse chez les adolescentes. Rapports sur la santé 12: 9-19.
4. Chen XK, Wen SW, Fleming N, Demissie K, Rhoads GG, et al. (2007) Teenage pregnancy and adverse birth outcomes: A large population based retrospective cohort study. Int J Epidemiol 36: 368-373.
5. World Health Organization (2013) World statistics. WHO, Geneva, Switzerland. p. 172.
6. Tambwe MNK, Kalenga MK, Kakoma SZ (1999) La parturition chez les adolescentes aux cliniques universitaires de Lubumbashi (Congo). Revue française de gynécologie et d'obstétrique 94: 379-383.
7. Fouelifack FY, Tameh TY, Mbong EN, Nana PN, Fouedjio JH, et al. (2014) Outcome of deliveries among adolescent girls at the Yaoundé central hospital. BMC Pregnancy Childbirth 14: 102.
8. Gandzien PC, Ekoundzola JR (2005) Pregnancy and teenage delivery at Talangai Maternity Hospital, Brazzaville, Congo. Méd Afr Noire 52: 429-433.
9. Ezegwui HU, Ikeako LC, Ogbuefi F (2012) Obstetric outcome of teenage pregnancies at a tertiary hospital in Enugu, Nigeria. Niger J Clin Pract 15: 147-150.
10. Hamada H, Zaki A, Nejjar H, Filali A, Chraibi C, et al. (2004) Pregnancy and adolescent birth: Characteristics and profile about 311 cases. J Gynecol Obstet Biol Reprod 33: 607-614.
11. Seamerk C (2001) Design or accident? The natural history of teenage pregnancy. J R Soc Med 94: 282-285.
12. Kumar C, Rai RK, Singh PK, Singh L (2013) Socioeconomic disparities in maternity care among indian adolescents, 1990-2006. PLoS One 8: e69094.
13. Alouina S, Randriambololonaa D, Randriamboavonjyc R (2015) Risk factors of pregnancy, childbirth and postpartum adolescent girls in the department of Loiret. J Gynecol Obstet Biol Reprod 44: 443-450.
14. World Health Organization (2004) Adolescent pregnancy (Issues in Adolescent Health and Development). WHO, Geneva.
15. Chaibva CN, Ehlers VJ, Roos JH (2009) Midwives' perceptions about adolescents' utilisation of public prenatal services in Bulawayo, Zimbabwe. Midwifery 26: e16-e20.
16. Kakudji Luhete P, Mukuku O, Mwembo Tambwe A, Kalenga Muenze Kayamba P (2017) Maternal and perinatal prognosis study in adolescent delivery in Lubumbashi, Democratic Republic of Congo. Pan Afr Med J 26 : 182-190.
17. Ayuba II, Gani O (2012) Outcome of teenage pregnancy in the Niger delta of Nigeria. Ethiop J Health Sci 22: 45-50.
18. Ebeigbe PN, Gharoro EP (2007) Obstetric complications, intervention rates and materno-fetal outcome in teenage nullipara in Benin City, Nigeria. Trop Doct 37: 79-83.
19. Maryam K, Ali S (2008) Pregnancy outcome in teenagers in East Sauterne of Iran. J Pak Med Assoc 58: 541-544.
20. Conde-Agudelo A, Belizán JM, Lammers C (2005) Maternal-perinatal morbidity and mortality associated with adolescent pregnancy in Latin America: Cross-sectional study. Am J Obstet Gynecol 192: 342-349.
21. Mahavarkar SH, Madhu CK, Mule VD (2008) A comparative study of teenage pregnancy. J Obstet Gynecol 28: 604-607.
22. Leppälahti S, Gissler M, Mentula M, Heikinheimo O (2013) Is teenage pregnancy an obstetric risk in a welfare society? A population-based study in Finland, from 2006 to 2011. BMJ Open 3: e003225.
23. Kongnyuy EJ, Nana PN, Fomulu N, Wiysonge SC, Kouam L, et al. (2008) Adverse perinatal outcomes of adolescent pregnancies in Cameroon. Matern Child Health J 12: 149-154.
24. Scholl T, Hediger M, Belsky D (1994) Prenatal care and maternal health during adolescent: A review and meta-analysis. J Adolesc Health 15: 444-456.
25. Tebeu PM, Halle G, Lemogoum D, Simo Wambo AG, Kengne Fosso G, et al. (2012) Risk factors for eclampsia among patients with pregnancy-related hypertension at Maroua Regional Hospital, Cameroon. Int J Gynaecol Obstet 118: 254-256.
26. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, et al. (2014) WHO Multicountry Survey on Maternal Newborn Health Research Network. Pregnancy and childbirth outcomes among adolescent mothers: A World Health Organization multicountry study. BJOG 121: 40-48.

27. Black AY, Fleming NA, Rome ES (2012) Pregnancy in adolescents. Adolesc Med State Art Rev 23: 123-138.

28. Ayoubi JM, Hirt R, Badiou W, Hininger-Favier I, Favrier M, et al. (2012) Nutrition and pregnant woman. Gynecol/Obstet 5: 042-A10.

29. Ndiaye O, Diallo D, Ba MG, Diagne I, Moreau JC, et al. (2001) Maternal risk factors and low birth weight in Senegalese adolescents: The example of a hospital center in Dakar. Health Notebooks 11: 241-244.

30. Usta IM, Zoorob D, Abu-Musa A, Naassan G, Nassar AH (2008) Obstetric outcome of teenage pregnancies compared with adult pregnancies. Acta Obstet Gynecol Scand 87: 178-183.

31. Raatikainen K, Heiskanen N, Verkasalo PK, Heinonen S (2006) Good outcome of teenage pregnancies in high-quality maternity care. Eur J Public Health 16: 157-161.

32. Chen XK, Wen SW, Fleming N, Yang Q, Walker MC (2008) Increased risks of neonatal and postneonatal mortality associated with teenage pregnancy had different explanations. J Clin Epidemiol 61: 688-694.