RISK FACTORS FOR SPONTANEOUS ABORTIONS IN TWO YAOUNDÉ DISTRICT HOSPITALS

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ABSTRACT **Background.** Abortion is the termination of a pregnancy before the age of fetal viability which, according to the WHO, is 22 weeks of pregnancy and/or with the fetus weigh less than 500 g. Spontaneous abortion is a public health problem. It's one of the most common complications of pregnancy. In order to contribute to the decrease of the morbidity and mortality linked to spontaneous abortions, we conducted this study, which the general objective was to study risk factors of spontaneous abortion. **Methods.** We carried out a cross-sectional case-control study in the District Hospitals of Biyem - Assi and Efoulan in Yaoundé. During six months, we collected 3774 records of pregnant women from January 1, 2020 to December 31.,2020. For each case (record of woman who had a spontaneous abortion), two controls (records of those who gave birth spontaneously at term) of the same age, were immediately recruited. Data were analyzed using IBM SPSS Version.23.0 software. Tools used to assess our results were: Fischer's exact test, frequency, odds ratio (OR) and P, with P significant for any value less than 5%. **Results.** We recruited 104 cases and 208 controls. Being unmarried, being from the littoral region, having a history of stress, smoking, having started antenatal care and having had prenuptial check-up, independently increased the risk of spontaneous abortion with respectively $\alpha OR = 2.8$ IC=1.24-6.31 αP= 0.013, αOR=4.31 IC= 1.09-17.02 αP= 0.037, αOR=11.86; CI=3.88-36.19; αP=<0.001, αOR=8.57; CI=3.41-21.54; αP=<0.001, αOR=10.4; CI=1.12-96.82; αP=0.04) and αOR=3.37; CI=1.67-6.79; αP<0.001). **Conclusion.** These risk factors being mostly modifiable, should be sought and prevented in order to improve the prognosis of pregnancies in our context.

KEYWORDS : Risk factors. spontaneous abortion. District hospital. Yaoundé

INTRODUCTION

The World Health Organization (WHO) defines abortion as a spontaneous or induced termination (voluntary, medical or therapeutic) of pregnancy with partial or complete expulsion of the conceptus before the period of fetal viability. This term of viability varies depends to the country according to the resources and the technical platform. It is 22 weeks gestation and/or with fetal weight less than 500 g according to WHO and in developed countries [1–3,4], and is traditionally set at 28 weeks of gestation and/or with fetal weight less than 1000 g in developing countries [5,6].

Spontaneous abortion is one of the most common complications of pregnancy [7]. Its rate varies with age from 10% at 20 years to 90% beyond 45 years [8]. In France, 12 to 24% of pregnancies are affected each year [7]. The prevalence in Nigeria is 4.2% [9]. In Cameroon, the results of the 2011 Demographic Health Survey (DHS) revealed that 18% of sexually active women had at least one spontaneous abortion [6]. Tiako et al. in 2017 in 3 university hospitals. found 24.2% of maternal mortality attributed to abortions. of which 60% were induced and 40% spontaneous [10].

This type of abortion has many complications: anemia (12.4%). infections (2.6%) or anemia associated with hypovolemic shock (0.3%) and even maternal death [11]. Thus, the identification of risk factors for spontaneous abortions would allow early management of pregnant women and therefore an improvement in the prognosis of pregnancies, thus contributing to the achievement of the 3rd Sustainable Development Goals.

Our general objective was to determine risk factors of spontaneous abortions in our context.

METHODS

1- Type. duration. places of study

It was a cross-sectional case-control study, It lasted 6 months and the collection of file data was retrospective from January 1, 2020 to December 31, 2020 in 2 district hospitals: the Biyem Assi District Hospital (BADH) and the Efoulan District Hospital (EDH). These 2 hospitals are 4th category hospitals in the Cameroon health pyramid and have in common a high attendance rate (about 300 deliveries per month) and their well-organized archiving services.

Furthermore, their obstetrics and gynecology units have qualified personnel and adequate technical platform for the management of comprehensive abortion care. This allowed us not only to easily reach the minimum sample size but, also to easily find the files.

2- Sampling

Our sampling was consecutive and exhaustive. The study population consisted of the files of women of childbearing age, who consulted in the concerned hospitals. Were included all records of patients who have had spontaneous abortion (case), the diagnosis of miscarriage being confirmed by ultrasound. and records of women who have had spontaneous term delivery (control). All file that did not have enough information to fill the technical sheet. and for which the woman could not be reached to complete the information was excluded. For each case, 2 controls were recruited. Age was used as a matching criterion.

The minimum case size was estimated using the Charan and Biswas formula [12]: $N = [(r+1)/r] \times [(z\,1-\alpha/2 + z\,1-\beta)2 \times p\,(1-p) / (p1-p2)2]$, where n = minimum sample size, r = control/case ratio (2 controls for 1 case) = 2/1. P1 = proportion of main factor in group I = 50%, P2 = proportion of the main factor in group II = 25%, P = (p1+p2)/2 = average of the proportions, p1-p2 = the difference between the proportions, $Z\alpha$ = standardized significance level = 1.96, $Z\beta$ = standardized power = 0.84. After numerical application N= 44.1. that`s 45 cases and 90 controls.

3- Procedure

After authorization from the hospital administrators, we went to their Obstetrics and Gynecology Departments. Of 3774 pregnant women consulted in the 2 hospitals during the study period, 104 (2.76%) had spontaneous abortion. Names of women admitted for spontaneous abortion were retrieved in admission and/or antenatal care registers of the maternity wards. and their medical files found in the archives department. To complete the information, these women were contacted by telephone. After obtention of their informed verbal or written consent, they then answered the questions on the collection sheet, either face-to-face or during a telephone interview. For those who were able, they received electronic questionnaire for completion. Studied variables were sociodemographic, obstetrical, history, clinical and prognostic. Information in these registers and files was recorded in a pre-established and tested technical sheet.

Statistical analysis

Data collected on the technical sheets were entered, proceed and analyzed using version 4.6.0.2 Epidata manager software, Microsoft Office 2010, Microsoft Excel 2013 and version 23.0 IBM SPSS (Statistical Package for Social Sciences). Tools used to assess our results were the mean with its standard deviation, frequency, Fischer's chi-square, odds ratio (OR) and P. P was considered statistically significant less than 0.05.

Ethical considerations

Prior to the study, we obtained ethical clearance N° 2867 CEI-Udo/07/2021/T of July 21, 2021, from the Institutional Ethics Committee for Human Health Research of University of Douala, as well as research authorizations in the concerned District Hospitals. This study was conducted in strict compliance with the fundamental principles of medical research, namely fairness, safety and confidentiality.

RESULTS

We identified 104 cases of spontaneous abortion and therefore 208 controls. The average age of the cases was 33.4 ± 6.2 years with extremes of 18 to 44, and that of the controls was 32.9 ± 6.1 years with extremes of 20 and 42.

Sociodemographic factors associated with spontaneous abortion

The association between the sociodemographic factors and the occurrence of spontaneous abortions is sought in table 1.

Table 1. Sociodemographic characteristics

Variable	Case	Control	Total	P	OR (95%CI)	αP	αOR (95%CI)
	N(%)	N(%)	N(%)				
Age of the woman in years							
[20 – 25[	9(8.7)	18(8.7)	27(8.7)	0.999			
[25 – 30[	24(23.1)	50(24.0)	74(23.7)				
[30 – 35[	17(16.3)	34(16.3)	51(16.3)				
[35 – 40[	38(36.5)	76(36.5)	114(36.5)				
>40	16(15.4)	30(14.4)	46(14.7)				
Age of the partner							
[25 – 30[	7 (6.7)	20 (9.6)	27 (8.7)	0.518			
[30 – 35[	22(21.2)	44(21.2)	66(21.2)				
[35 – 40[	17(16.3)	28(13.5)	45(14.4)				
[40 – 45[	22(21.2)	50(24.0)	72(23.1)				
[45 – 50[	13(12.5)	14(6.7)	27(8.7)				
≥50	23(22.1)	52(25.0)	75(24.0)				
Marital Status							
Not maried	40(38.5)	50(24)	00(28.8)	0.008	1.975(1.15-3.38)	0.013	2.8(1.24-6.31)
Maried	64(61.5)	158 (76)	222(71.2)				
Level of education							
primary	20(19.2)	28(13.5)	48(15.4)	0.003	0.93(0.46-1.87)	0.21	1.92(0.7-53)
secondary	41(39.4)	124(59.6)	165(52.9)		0.43(0.25-0.74)	0.009	0.52(0.25-1.10)
High education	43(41.3)	56(26.9)	99(31.7)				
Profession							
Public sector	17(16.3)	40(19.2)	57(18.3)	0.812			
Pprivate sector	29(27.9)	64(30.8)	93(29.8)				
Informal Sector	27(26.0)	48(23.1)	75(24.0)				
House wife	31(29.8)	56(26.9)	87(27.9)				
Residency							
Yaoundé	98(94.2)	188(90.4)	286(91.7)	0.247			
Other town	6 (5.8)	20 (9.6)	26(8.3)				
Region of origine							
Northern	11(10.6)	54(26.0)	65(20.8)	0.010			
Forest	31(29.8)	52(25.0)	83(26.6)		2.93(1.3-6.58)	0.054	3.44(0.98-12.1)
Coastal region	14(13.5)	16(7.7)	30(9.6)		4.3(1.54-11.96)	0.037	4.31(1.09-17.02)
Grass field	48(46.2)	86(41.3)	134(82.9)		2.74(1.29-5.83)	0.17	2.2(0.71-7.2)
Woman's income level (FCFA)							

	Case N(%)	Control N(%)	Total N(%)	P	OR(95%CI)	αP	αOR(95%CI)
>100,000	89 (85.6)	152(73.1)	241(77.2)	0.023	0.26(0.09-0.79)	0.058	3.94(0.95-16.28)
GMW-100,000	11(10.6)	30(14.4)	41(13.1)		0.63(0.3-1.31)	0.43	1.81(0.37-8.89)
≤ GMW	4 (3.8)	26 (12.5)	30 (9.6)				
Partner income level							
>100,000	84 (81.6)	154 (74.0)	238 (76.5)	0.102			
GMW-100,000	17 (16.5)	38 (18.3)	55(17.7)				
≤ GMW	2(1.9)	16(7.7)	18(5.8)				
Moving means							
Walking	52 (50.0)	112 (53.8)	164 (52.6)	0.029			
Motobyke taxi	6(5.8)	20(9.6)	26(8.3)		0.65(0.24-1.72)	0.26	0.47(0.12-1.75)
Car	46(44.2)	76(36.5)	122 (39.1)		1.3(0.8-2.14)	0.98	0.99(0.49-2)

GMW= Guarantee Minimum wage in Cameroon = 41.875 FCFA [13].

The fact of not being unmarried., and being from the coastal region independently increased the risk of spontaneous abortion with respectively αOR = 2.8 CI=1.24-6.31 αP= 0.013 and αOR= 4.31 CI= 1.09-17.02 αP= 0.037.

History associated with spontaneous abortions
Past history associated with spontaneous abortions is shown in Table 2.

Table 2: History associated with spontaneous abortions

History	Case	Control	Total	P	OR(95% CI)	αP	αOR (95%CI)
	N(%)	N(%)	N(%)				
Thyroid disease							
.yes	12 (11.54)	2 (0.96)	14 (12.5)	<0.001	13.43(2.88-124.93)	0.47	2.09(0.28-15.37)
No	92 (88.46)	206 (99.04)	298(95.51)	1			
High blood Presure							
.yes	44 (63.8)	34 (77.3)	78 (69.0)	0.13			
No	25 (36.2)	10 (22.7)	35 (31)	1			
HIV							
.yes	35 (33.65)	6 (2.88)	41 (37.3)	<0.001	17.08(6.24-46.75)	0.18	2.46(0.67-9.06)
No	69 (66.35)	202 (97.12)	271 (86.7)	1			
Diabetis							
.yes		8 (18.2)	17 (15.5)	0.518			
No	57 (86.4)	36 (81.8)	93 (84.5)	1			
Obesitéy							
Oui	26 (37.7)	16 (36.4)	42 (37.2)	0.888			
.No	43 (62.3)	28 (63.6)	71 (62.8)				
Hereditary thrombopathy							
.yes	5 (7.7)	0 (0.0)	5 (4.6)	0.06			
.No	60 (92.3)	44 (100)	104(95.4)				
Stress							
.yes	61 (58.7)	18 (8.7))	79 (69.3)	<0.001	14.97(7.74-29.46)	<0.001	11.86(3.88-36.19)
.No	43 (41.3)	190 (91.3)	233 (74.7)	1			
Alcohol							
.yes	64 (79.0)	56 (90.3)	120 (83.9)	0.068			
.No	17 (21)	6 (9.7)	23 (16.1)				
Tobacco							
.yes	57 (54.81)	20 (34.5)	77 (24.68)	<0.001	11.4(6.02-21.89)	<0.001	8.57(3.41-21.54)
.No	47 (45.19)	188 (90.38)	235 (75.32)	1			
Traditional pharmacopoeia							
.yes	33 (42.9)	10 (4.8)	33 (31.8)	<0.001	9.2(4.14-21.88)	0.27	1.8(0.63-5.19)
.No	71 (68.1)	198 (95.2)	269 (86.2)	1			
Drugs							
.yes	23 (22.1)	0 (0.0)	23 (7.37)	<0.001	NA	NA	NA
.No	81 (77.9)	208 (100)	289(92.63)				
Rhésus négatif							
.yes	16 (15.7)	4 (1.9)	20 (6.5)	<0.001	9.49(2.92-39.82)	0.219	2.78(0.54-14.2)
.No	86 (94.3)	204 (98.1)	290 (93.5)	1			
History of prematurity							
.yes	27(25.96)	32 (15.4)	59 (18.9)	0.025	1.93(1.03-3.57)	0.58	0.72(0.23-2.27)
.No	77(70.04)	176(84.6)	253(81.1)	0	1		

Only a history of stress (αOR=11.86; IC=3.88-36.19; αP=<0.001) and smoking (αOR=8.57; IC=3.41-21.54; αP=<0.001) independently increased the risk of spontaneous abortions.

Factors associated with pregnancy monitoring
Factors related to the monitoring of the pregnancy which were associated with the spontaneous abortions were shown in table 3.

Table 3: Pregnancy monitoring factors, associated with spontaneous abortions

Variable	Case	Control	Total	P	OR(95%CI)	αP	αOR(95%CI)
	N(%)	N(%)	N(%)				
Has started antenatal care							
.yes	71(68.27)	88(42.31)	159(50.96)	<0.001	2.93(1.79-4.82)	0.04	10.4(1.12-96.82)
.No	33(31.73)	120(57.69)	153(49.04)				
Biologic check-up							
.yes	68(65.38)	96(46.15)	164(52.56)	0.001	2.20(1.35-3.59)	0.64	0.53(0.04-7.49)
.No	36(34.62)	112(53.85)	148(47.44)				
Morphological check-up							
.yes	65(62.50)	104(50)	169(54.17)	0.0037	1.67(1.03-2.70)	0.23	0.41(0.1-6.79)
.No	39	104(50)	143				
Prenuptial check-up							
.yes	38(36.54)	22(10.58)	60(19.23)	<0.001	4.87(2.68-8.83)	0.001	3.37(1.67-6.79)
.No	66(63.46)	186(89.77)	252(80.77)				
History of cerclage							
.yes	18(17.31)	10(4.81)	28(8.97)	0.001	4.14(1.84-9.35)	0.12	2.14(0.82-5.57)
.No	86(82.69)	198(95.19)	284(91.03)				

The fact of having started antenatal care (αOR=10.4; CI=1.12-96.82; αP=0.04) and of having had prenuptial check-up (αOR=3.37; CI=1.67-6.79; αP=0.001) independently increased the risks spontaneous abortion.

DISCUSSION
Limits of the study
The retrospective quality of the study does not often make it possible to find all the data, given that they are not often computerized in our context. Women who voluntarily terminated their pregnancies could not accept it and report it as spontaneous abortion.

Socio-demographic characteristics associated with spontaneous abortions
The number of children, the age of the last child, the number of abortions, the number of premature babies had a heterogeneous distribution in the two groups. However, age at menarche, age at first pregnancy, the total number of pregnancies, the age of premature babies, spacing between births had a homogeneous distribution (table 1). Unmarried women independently had a higher risk of having spontaneous abortions (table 1) (αOR =4.31; CI =0.25-1.1; αP =0.09). This would be due to the lack of financial and social support by the author of the pregnancy, which can lead to psychological disorders including stress, which have harmful effects on the pregnancy [14]. Regarding the level of education, this could be explained by the fact that women who have a higher level of education tend to have children later

and studies have shown that advancing age increases the risk of miscarriages [15]. However, the age of the woman as well as that of the partner, woman's profession, his city of residence and partner income level had a homogeneous distribution (table 1).

Past History associated with spontaneous abortions
Stress and smoking independently increased the risk of abortion (table 2). This agrees with several studies which have shown that stress, depression or anxiety, as well as a traumatic event, considerably increase the occurrence of abortions [14]. We emphasize here that Rhesus negative women were blood type "O". A study conducted by Mohammad et al. in Iran on ABO incompatibility in pregnant women showed that ABO incompatibility was involved in the occurrence of spontaneous miscarriages and this relationship was more dramatic with Rh incompatibility [14]. As for smoking, our results are in agreement with those of Baba et al. who demonstrated on the Japanese population that the consumption of more than twenty sticks of cigarettes per day increased the risk of miscarriage more than twice [16]. Sachiko et al. showed that women who smoked tobacco were more likely to have miscarriages than those who did not smoke. In smoking pregnant women, placental insufficiency and fetal hypoxia occur, increasing the risk of abortion.

After logistic regression, stress and smoking independently increased the risk of occurrence of spontaneous abortion respectively (table 2) (αOR: 11.86; CI: 3.88-36.19; αP < 0.001) and (α0R: 8.57; CI: 3.41-21.54; αP <0.001).

Factors of pregnancy monitoring associated with spontaneous abortions
The fact to have started antenatal care and to have already done prenatal check-up were independently increased spontaneous abortions (table 3) with respectively (αOR: 10.4; CI:1.12-96.82 αP:0.04) and (αOR: 3.37; CI:1.67-6.79; αP: 0.001). These results differ from those obtained by Keita et al in Mali who found nearly 77.8% of women who had an abortion and had not done a prenatal check-up [17]. We believe that in our case the symptomatology could have precipitated the consultation and the execution of the assessment requested by the consultant.

CONCLUSION
Not being married, being from the coastal region, Having history of stress, history of smoking, having started antenatal care and having had prenuptial check up, independently increased the risk of spontaneous abortion. Most of these risk factors are modifiable. It would be preferable to look for them in order to prevent them and improve the prognosis of pregnancies in our context. The intensification of campaigns for provider behavior change communication would also contribute to improving the prognosis of pregnancies to achieving the 3rd sustainable development goal.

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