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Original Research Article

Epidemiological and clinical aspects of respiratory pathologies during pregnancy and puerperality

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ABSTRACT

Background: The purpose of this study was to describe the characteristics of respiratory pathologies during pregnancy and postpartum.

Methods: This was a case-control study over a 7-year period from January 2008 to December 2014 at CHU de COCODY. We compiled 86 cases of the PPH department hospitalized patients for pulmonary disease during pregnancy and for postpartum up to 42 days after delivery. The control samples were represented by those hospitalized in Obstetrics for a non-respiratory general condition during the same gravido puerperal period.

Results: The age group of 20-29 years was the most affected in both groups with extremes ranging from 16 to 40 years ($p=0.827$). Respiratory pathology was common among housewives or unemployed women ($p=0.001$). Pauciparous and multiparous were the most affected ($p=0.020$). They had a medical history in 55.8% of cases versus 22.8% in controls ($p=0.001$). Positive HIV serology was also found ($p=0.001$) and was most often passive tobacco related ($p=0.015$). Respiratory pathology was progressive in 72.9% in cases vs 8.9% ($p=0.001$) with dyspnoea as the main sign (58%). Tuberculosis (29.70%) was the most common respiratory disease. Maternal complications accounted for 48.1% of PPH vs 25.6% ($p=0.001$) with maternal mortality of 11.6% ($p = 0.001$). As for foetal prognosis, 25.6% of foetal complications were noted in patients admitted to PPH versus 48.1% ($p = 0.001$).

Conclusions: Respiratory disease during the gravido puerperal period is severe with significant maternal repercussion.

Keywords: Pregnancy, Postpartum, Respiratory diseases

INTRODUCTION

WHO estimates that 303,000 women died in 2015, including 302,000 in developing countries.¹ Respiratory disease, which is often less pointed at, is still the third-highest cause of mortality in the world's female population in middle-income countries, with tuberculosis among the top five causes of death among women of reproductive age in developing countries.²

During pregnancy, women are exposed to nasal congestion, hyperventilation and the diaphragm moves up. These lead to changes in respiratory capacity for ventilation. Furthermore, respiratory responses are greatly affected by the stage of labour with a dramatic increase in oxygen consumption at the moment of parturition. Indeed, physiological changes of the respiratory system brought about by pregnancy weaken the said system, which associated with pathological

illness, significantly compromise the respiratory function with serious consequences for the mother-child couple.³ For example, 8-12% patients will experience Bronchial asthma during pregnancy. There will be an exacerbation for 12.6% of them; and 6% may require hospital admission which occurs mostly around end of the second trimester and the early third trimester. However, clinical presentation and management of pulmonary diseases in pregnant women are almost similar to non-pregnant one according to the literature.³ The general goal of our study was to describe the characteristics of respiratory pathologies during pregnancy and postpartum.

METHODS

This was a case-control study that took place at CHU de Cocody over a 7-year period from January 2008 to December 2014. The Cases were represented by pregnant or newly delivered women hospitalized at the PPH for respiratory disease. And the pregnant or delivered women hospitalized in Obstetrics for a non-respiratory general pathology constituted the controls. Pregnancies were unique and single deliveries were included in the study.

Inclusion criteria

With regard to inclusion criteria, we retained the following as:

- Cases: patients hospitalized at PPH for a respiratory disease that occurred during pregnancy or within 42 days after delivery (about 2 months).
- Control Sample: those hospitalized in Obstetrics for a non-respiratory general condition during the same gravido puerperal period.

Exclusion criteria

The criteria for non-inclusion were:

For cases

- any patient hospitalized with PPH outside the gravido puerperality period.
- any patient with pulmonary disease during pregnancy or post partum up to 42 after delivery but who have not been hospitalized at PPH

For the control sample

- all patients hospitalized in obstetrics for a pathology specifically related to gravido puerperal and / or its complication, and the files where diagnoses were not specified.
- any patient not hospitalized in Obstetrics for a non-respiratory general condition during the same gravido puerperal period.

The parameters studied were: socio-demographic characteristics, type of respiratory pathology, medical

history, HIV status, smoking status, maternal complications, maternal deaths, fetal complications and fetal deaths.

Statistical analysis

Data analysis was conducted using the Epi-info software with an alpha threshold of materiality less than 0.05.

RESULTS

Sociodemographic characteristics, pregnancy monitoring and history

Table 1: Epidemiological profile, pregnancy monitoring and history.

Parametres (OR, IC 95%)	Cases		Controls		P value
	N	%	n	%	
Age in year					0.827
≤18 years	7	8.14	5	6.33	
19-29 years	53	61.63	52	65.82	
30-40 years	26	30.23	22	27.85	
Profession					0.001
Employed	14	17.7	5	5.8	
Informal Sector	38	48.1	27	31.4	
Pupil/student	9	11.4	7	8.1%	
Housewife/unemployed	18	22.8	47	54.6	
Parity					0.020
0-1 (Nullipare, primipare)	38	44.2	54	68.4	
2+ (Paucipare, multipare)	48	55.8	25	31.6	
Place of CPN					<0.001
None	5	5.8	22	27.8	
CHU	0	0.0	7	8.9	
HG/CHR	0	0.0	2	2.5	
Maternity	70	81.4	39	49.4	
Clinic	11	12.8	9	11.4	
Quarter of statement					0.031
None	6	7.0	22	27.8	
1 st quarter	24	27.9	23	29.1	
2 nd quarter	56	65.1	33	41.8	
3 rd quarter	0	0.0	1	1.3	
Prenatal review					0.001
Complete	12	14.0	10	12.7	
Incomplete	42	48.8	18	22.8	
None	32	37.2	51	64.6	
Preexisting pathologies (OR=4.281; IC 95%: 2.177-8.419)					0.001
Yes	48	55.8	18	22.8	
No	38	44.2	61	77.2	
HIV status (OR=15.012; IC 95% :4.371-51.555)					0.001
Negative	54	62.8	76	96.2	
Positive	32	37.2	3	3.8	
Passive smoking (3.383; 1.177-9.725)					0.015
No	70	81.4	74	93.7	
Yes	16	18.6	5	6.3	
Total	86	100	79	100	

The 19-29 age group was the most affected in both groups. Housewives or unemployed women were significantly admitted for respiratory condition. Pauciparas and multiparas were the most concerned. Prenatal follow-up in the peripheral maternities and clinics, as well as the first prenatal consultation in the 2nd quarter were associated significantly with respiratory condition.

Antenatal assessment was incomplete in 48.8% in cases vs 22.8%. The existence of pre-existing pathologies was significantly associated with respiratory impairment. HIV serology in 37.2% was positive in cases vs 3.8%. Cases in 18.6% were passive smoking vs. 6.3%.

Clinical study

Pregnant women accounted for 64% (n=55/128) of the cases, these pregnant were admitted to the service of PPH of the CHU de Cocody most often in the 2nd and 3rd trimester of pregnancy (p=0.079). These patients were admitted mainly for dyspnoea (58%), wet cough (14%), and chest pain (13%). Of the cases, 36% (n=31/37) gave birth versus 7.6% in the control group (p=0.001). Tuberculosis (29.7%), acute bacterial pleuropneumopathy (9.7%) and asthma (6%) were the main diagnoses retained.

Maternal-foetal prognosis

Maternal prognosis

Maternal complications were 24.4% in the cases versus 6.3% in the controls (OR=4.782; IC 95%=1.706-13.402; p=0.001). Maternal complications were represented by cardiovascular complications in 4.2% of cases (n=7), followed by respiratory distress in 2.4% of cases (n=4), consciousness disorders in 2.4% cases (n=4), medicinal hepatitis in 1.8% of cases (n=3), severe anaemia in 1.8% of cases (n=3) and sepsis in 1.2% of cases (n=2). We had one case (0.9%) of kidney failure, thrombocytopenia, and metabolic disorder (hypoglycaemia).

Patients discharged against medical advice in 23.2% (n=20) in cases versus 5.1% (n=4) in controls (p=0.001). The transfer rate in another service was almost the same in the two study populations with 7% (n=6) in the cases and 7.6% in the controls. There was significantly less outcome after favourable outcome (p <0.001) in the cases (58.1%; n=50) than in the controls (87.3%, n=69)

Maternal deaths accounted for 11.6% (10/86) of the cases versus no deaths in the controls (p=0.001).

Foetal prognosis

Foetal complications accounted for 25.6% of cases vs. 48.1% of controls with statistically significant difference (p=0.002) with 10 in utero foetal deaths observed only in controls.

Foetal harm was most marked by threats of abortion or childbirth (13.8%), pre and post partum death (9%); 5 spontaneous abortions and 8 premature births observed either 7.8% followed by premature rupture of the membranes (2.4%) and 3 cases of IUGR (1.8%).

Table 2: Foetal complications.

Foetal Complications	Number (n=165)	Percentage
Threat of premature delivery	10	6
Premature delivery	8	4.8
Neonatal death	5	3
Wrong APGAR	2	1.2
Threat of abortion	13	7.8
Spontaneous abortion	5	3
In utero foetal death	10	6
Intrauterine growth retardation	3	1.8
Premature rupture of membranes	4	2.4

DISCUSSION

Pregnancy follow-up and socio-demographic characteristics

The most affected age group is between 19-29 years old, i.e. 63.64% of the total number, with an average of 27.39 years. It corresponds to the period of full genital activity in Africa. Indeed, the fact that the peak of fertility of Ivorian women in reproductive activity is between 25-29 years.⁴ Data from the African or even European literature show an average age of around 27 years in the case of pulmonary pathology and pregnancy.^{5,6}

Most of the patients came from the communes of Cocody (31.5%) and 3 popular communes of Abidjan namely Abobo (24.2%), Adjamé (12.1%) and Yopougon (12.1%); this is explained by the fact that the CHU de Cocody, place of our study is the first resort of these communities because of the geographical proximity. As for the aforementioned communal trio, it is inhabited by families with modest incomes even disadvantaged, living in promiscuity, poor hygiene conditions with lack of adequate sanitary infrastructure, and saturation of urban roads by a dilapidated and intense automobile traffic. Some authors draw attention to the respiratory risk of air pollution in southern countries.^{7,8}

Thus, this study revealed that housewives and the unemployed were significantly eligible for respiratory diseases (p=0.001). In fact, the health of these women is subject to increased risks, mainly because of their social and economic roles, which expose them to a greater number of environmental hazards. Because they are those who prepare food for the home, these women in the developing world are often exposed to very high levels of smoke from cooking stoves, smoke from indoor fireplaces burning wood and/or charcoal weakening the

respiratory tract. Present results are almost similar to that of Ago who found 41.3% of housewives.⁹

Patients admitted to PPH had declared their pregnancy in the 2nd quarter in 65.1% of the cases against 41.8% in the controls ($p=0.031$). This finding of late consultation in case of pregnancy is also made by several African authors such as Koffi NM and Mafuta who found respectively 60.8% and 59.8% of late consultation.^{10,11}

Concerning the prenatal assessment, 48.8% of the patients with respiratory diseases had an incomplete report compared to 22.8% in the controls with a statistically significant difference of 0.001. Poor prenatal care is an almost ineffective factor in maternal morbidity.^{12,13} The national prenatal survey in France also highlighted the link between social disparities and poor monitoring of pregnancy. It further noted that women who have declared their pregnancy outside the statutory period are characterized by the fact that they live alone, and that resorting to a general practitioner to report pregnancy mainly concerns women without a profession and women living alone (30% vs. 23% of those living in a couple).¹⁴

Similarly, the place of ANC was closely correlated with respiratory impairment ($p<0.001$), in fact 81.4% of patients admitted to PPH benefited from ANC in peripheral maternity clinics versus 49.4% of controls. Peripheral maternity clinics rank at the first level of our health pyramid, there are often no doctors, let alone specialists, so ANCs are most often provided by midwives who do not have all the skills required to adequately take care of patients. Cisse in Senegal did the same.¹⁵

History and respiratory disease

The main respiratory diseases identified in our study were tuberculosis (29.7%) followed by acute pleuro bacterial pneumonia (9.7%) and asthma (6%): main non-infectious pathology. Our results corroborate with those of authors among others Ago and Koffi in Côte d'Ivoire and Cissé in Dakar.^{8,15,16} The predominance of these pathologies can be explained by the fact that these are pathologies that are on the increase in our developing countries and occur willingly in debility ground. Thus, 55.8% of patients hospitalized with PPH already had a medical history versus 22.8% among the control sample with a statistically significant difference. These antecedents were dominated by asthma and allergic ground (14.6%), hemoglobinopathies (6.10%) and tuberculosis contagion (6.10%). The data in literature are unanimous as to the implication of these defects in the occurrence of respiratory pathologies.

Allergic inflammation is responsible for bronchial remodelling with definitive persistence of an obstruction, which if untreated and generates recurrence or worsening of attacks toward a severe acute asthma.¹⁷ As for sickle

cell disease, its pulmonary complications are well known and common. Koffi, in a series of 45 sickle cell patients, reported 94% non tuberculosis pneumonia and 6% tuberculosis.¹⁸

Resende also found a link between sickle cell disease in pregnant women and respiratory disease.¹⁹ Regarding tuberculosis contagion, the epidemiology and natural history of tuberculosis identify people close to patients with contagious tuberculosis as being most at risk of tuberculosis infection. This means family and communities reproducing conditions of promiscuity fairly similar to family promiscuity.²⁰

In our series, the first immunosuppressive factor is the pregnancy state, in fact, pregnant women were mainly represented at 77.60%, while the deliveries were 22.40%. Touré et al had the same results.^{5,6} These pregnant women were admitted mainly in the 2nd quarter (40.60%) and in the 3rd quarter (50.80%) of the pregnancy. Lakhdar and Alonso have made the same observation.^{21,22} The peculiarity of our study is that 36% of births were due to PPH compared to 7.6% in the control sample with a statistically significant difference ($p<0.001$). This shows that postpartum also remains a risk period for the mother.

In addition, HIV infection is a major factor for the outbreak of respiratory pathology. In fact, pulmonary condition is the first manifestation of AIDS, in more than 50% of cases.²⁰ In this study, HIV seropositivity was significantly related to respiratory condition ($p<0.001$). The study of Horo in the same department showed that HIV infection was associated with tuberculosis in 82.86%, acute bacterial pneumonopathy in 77.22% and febrile pulmonary pneumopathies in 92.23%.²³ Ouédraogo in Burkina Faso, noted that 92% of patients were infected with HIV1.²⁴ Not surprisingly, HIV infection poses major challenges to efforts to reduce the high rate of pneumonia-related mortality in sub-Saharan Africa areas where HIV is endemic.²⁵

Another and not the least factor, increasingly indicated with regard to susceptibility to respiratory pathologies is exposure to passive tobacco smoke. According to Jayet, passive smoking poses a much real threat to health nowadays.²⁶ In Switzerland, for example, about 1,000 deaths per year are attributed to passive smoking, a quarter of which is due to chronic respiratory or oncology diseases.²⁶ We identified 18.6% of patients admitted to PPH exposed to passive smoking compared to 6.3% in GO ($p=0.015$).

Regarding obstetrical history, literature identifies multiparity but increasingly pauciparity as a risk factor threatening maternal health.²⁷⁻²⁹ We recorded a predominance of pauciparous and multiparas (parity \geq 2) with respiratory conditions with a statistically significant difference ($p=0.020$). This once again demonstrates the importance of monitoring any pregnancy, as each

pregnancy is potentially considered at risk and may be subject to complications.

Clinical characteristics and maternal-foetal prognosis

Dyspnoea (58%) was the main reason for respiratory admission. AGO [9] also found this same pattern at a frequency of 49%.⁹ The dyspnoea is almost present during the woman because of the adaptation of the respiratory system to the gravidic state, 60% of pregnant women without pulmonary disease present a respiratory condition.³⁰ A pathological state grafted on this ground further worsens the respiratory function. In addition, the other respiratory signs (cough, chest pain) that are often forerunners are neglected by the population and do not motivate early consultation, but in the face of respiratory condition, fear sets in.

The first quarter of symptom onset was mainly (52.9%) in the first two quarters of pregnancy and 47.10% in the third quarter. It should also be noted that the onset of the disease was progressive in 72.9% of PPH and brutal in 91.1% with the control sample ($p < 0.001$). that is the reason behind the mixed maternal-foetal repercussions observed. Indeed, the maternal prognosis was more severe in cases of respiratory disease. Our study shows that mothers admitted to PPH had 24.4% complications compared to 6.3% in controls ($p = 0.002$). Maternal mortality was 11.60% in PPH when no patient died in the GO group ($p < 0.001$). This reflects the severity of respiratory impairment with mothers, which is on the one hand related to late diagnosis due to insidious progression of the pathology and on the other hand to generated multi-visceral failure. The main complications found in our study were cardiovascular disease (4.2%), respiratory distress (2.4%) and coma (2.4%). That is why the Iloki study in Brazzaville rightly identified respiratory pathologies as the second leading cause of death in women of childbearing age.³¹

The foetal prognosis, meanwhile, was less alarming in case of respiratory condition. 25.6% of foetal complications were found in PPH compared with 48.1% in controls with 10 in utero foetal deaths, found only in GO. Indeed, fever (61%), which was the main non-respiratory cause in our study, is a risk factor for foetal death.³² Other foetal complications were dominated by threats of abortion or childbirth (13.8%), premature delivery (4.8%), and neonatal death (3%). The Ago study also concluded that there is a poor maternal-foetal prognosis in case of low respiratory pathology during pregnancy.⁹

CONCLUSION

Respiratory disease during the gravido puerperal period remains serious with significant maternal repercussions. Knowledge of identified associated factors will better prevent and manage respiratory pathology during

pregnancy; and from there reduce the maternal mortality attached to it.

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