OPEN ACCESS

Scholars International Journal of Obstetrics and Gynecology

Abbreviated Key Title: Sch Int J Obstet Gynec
ISSN 2616-8235 (Print) | ISSN 2617-3492 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

Maternal Mortality from 2014 To 2017: Trend and Risk Factors at the Kintambo Maternity Ward, Democratic Republic of Congo

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DOI: 10.36348/sijog.2024.v07i03.007 | **Received:** 08.02.2024 | **Accepted:** 14.03.2024 | **Published:** 17.03.2024

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Abstract

Introduction: Maternal mortality is a tragedy and constitutes a triple scourge. It is dramatic for the family (which falls apart after the death of the woman), unacceptable for the medical profession (since there are obstetric means to save mothers), and unacceptable for society (dying while giving birth). However, it seems to increase every year in the city of Kinshasa, due to several factors including the lack of easy access to quality care and childbirth services. The main objective for this study was to investigate the trend in maternal mortality at the Kintambo maternity ward from 2014-2017 including the relative contribution of risk factors linked to the lack of easy access to care and services quality delivery. ***Methods*:** This is an observational case-control study among pregnant women who followed ANC or not at the Kintambo maternity ward, but who all gave birth from January 2014 until December 2017. The use of the survey method, based on the analysis of registers, with a data collection sheet (check list) which was used for the collection of data, proved essential to bring this to fruition research. The sample size was exhaustive for cases (63 cases) and 63 controls. ***Results*:** Trend in female mortality between 2014-2017 at the Kitambo maternity ward in the city of Kinshasa has been decreasing, i.e. 22 cases in 2014, 17 cases in 2015, 14 cases in 2016 and 10 cases in 2017. It was observed that the variables show a very significant difference in relation to the factors which are the age of the pregnant woman, attendance at the CPN, delivery in the same center, the number of doctors in the delivery room and the distance between the residence and the center with an added value (P) less than 0.008; In comparison to pregnant women who die or not during childbirth and the factors in relation to their Chi-square, the age of gestation has a higher. ***Conclusion*:** Reducing this mortality requires strengthening the capacities of midwives /midwives in the care of pregnant women from conception to delivery and in the postpartum period , providing maternity wards with all the assets for good operationalization in the farthest corners of the city center , raising awareness among pregnant women of the importance of attending the CPN, ensuring good monitoring of the pregnant woman during her pregnancy and during childbirth, and for women to be always accompanied by their husbands during the CPN in order to help them internalize certain notions.

Keywords: Maternal mortality, Trend, Risk factors, Kintambo maternity ward.

1. INTRODUCTION

One of the major challenges that the human species faces daily is the preservation of life. All his actions directly or indirectly reflect his desire to prevent or cure illnesses likely to lead to death. For a woman, giving birth should be a normal situation, a source of joy, and a means of human and social fulfillment. Unfortunately, it still happens that many women give life by losing their own, or by having after-effects which can handicap them for the rest of their days on earth, due to numerous complications of pregnancy and/or childbirth (Anker, 2012).

Worldwide, maternal mortality is very high, which is unacceptable. Around 800 women per 100,000

live births die every day due to complications related to pregnancy or childbirth (PNSR, 2012).

According to the WHO, UNICEF, UNFPA and the World Bank (2012), the majority of maternal deaths are observed in developing countries, particularly African ones. It remains a scourge in West African countries.

The maternal mortality ratio is estimated at 500 deaths per 100,000 live births in sub-Saharan Africa, while it is 220 per 100,000 in South Asia and 16 per 100,000 in developed countries (WHO, 2012).

This indicator reveals the extent of the differences in terms of maternal health between industrialized countries and developing countries, especially since in certain African countries, in Cameroon and Ivory Coast for example, this phenomenon even tends to increase. In Cameroon in particular, the maternal mortality ratio increased from 430 maternal deaths in 1998 to 669 maternal deaths in 2010 (Kochou, SHA & Rwenge, MJR, 2014).

In Burkina Faso, the maternal mortality rate is estimated at 566 per 100,000 live births (SHAKO P, 2013). This is due to multiple factors including late referral of complicated cases (hemorrhages, infections, dystocia, induced abortions, anemia). But maternal mortality also results from severe maternal morbidity which may have affected women, before pregnancy, or during pregnancy considered as severe maternal morbidity.

In 2013, 289,000 women per 100,000 live births died during, after pregnancy or childbirth. The majority of these deaths occurred in low-income countries and most could have been avoided (WHO, 2014).

Based on these estimates provided by the WHO, UNICEF and the World Bank, trends in maternal mortality indicate that too little progress has been made towards achieving target A of MDG 5 (75% reduction in the maternal mortality rate between 1990 and 2015); Given that the global maternal mortality rate was 430 deaths per 100,000 live births in 1990 and 400 in 2005, a reduction of more than 70% from 2005 to 2015 will be required to achieve this target. In general, there have been years when the maternal mortality ratio was generally declining; example, between 1990 and 2013; it fell to 45% in 1990 and 2013 and experienced a very rapid decline of 49% in Africa (WHO, 2016), This rapid decline has been attributed to various factors including: the presence of skilled birth attendants, access easy access to quality care and delivery services, easy access to prenatal consultation (ANC), reduction of population poverty, improvement of maternal care services, etc.

In any case, this decline is still far from reaching the global objectives of 70 maternal deaths per 100,000 live births by the year 2030. More efforts are absolutely recommended in third world countries such as the DRC where even the trends in maternal mortality still seem to be rising, perhaps because of the poverty of the populations or a rapid deterioration of their socio-economic status accentuated by intense uncontrolled migratory movements.

The health situation of Congolese women (Congo-Kinshasa) is essentially characterized by malnutrition which influences a disruption of several physical phenomena and numerous disabilities linked to childbirth due to the fact that they are exposed to too many pregnancies (>7), pregnancies occurring too close together (<2 years), pregnancies occurring too early (<20 years), and pregnancies occurring too late (>30 years) (WHO, 2012).

This often results in serious consequences, including high maternal mortality in the city. Added to all this is the alarming state of reference hospitals characterized by: lack of water, unforeseen power cuts, absence emergency services and specialized workforce, repeated strikes by doctors, the absence of ambulance drivers for the rapid transport of pregnant women in emergency to maternity wards, the dilapidated state of the roads and generally congested every day and does not allow rapid transport of pregnant women to hospital structures (UNFPA, 2022).

During this period, there was an almost total absence of No studies to elucidate the trends in maternal mortality in this overpopulated city. Is the trend of this variable increasing or decreasing? The answers to these questions are imperative for the planning and effective implementation of health programs aimed not only at meeting the global goals of 2030, but also for the improvement of our health system which at the moment seems to be failing.

The study aims to determine the trend in maternal mortality in the city of Kinshasa precisely at the Kintambo maternity ward, and the significant risk factors that contribute to it.

2. MATERIAL AND METHOD

2.1 Type of study, target population and sample

This is a quantitative, descriptive correlational study. In its epidemiological aspect, it is an observational case-control study among pregnant women who followed ANC or not at the Kintambo maternity ward, but who all gave birth from January 2014 until December 2017.

Cases were defined as women who gave birth during the period from 2014 to 2017 and who were unlucky enough to die (i.e. 63 cases). Any woman who gave birth in the same period and in the same hospital structure but who was lucky enough to survive and whose name on the register is classified directly after the

name of a case is considered to be a control. Participants will therefore be identified from the maternity register, the obstetric intervention register and the morgue register.

2.2 Data collection method

The use of the survey method, based on the analysis of registers, with a data collection sheet (check list) which was used for data collection, proved essential to bring this research to fruition.

The sample size was exhaustive for the cases (63 cases). This means that the sample consisted of all women who died as cases. The controls were part of the frequency matched to the cases for a ratio of 1:1 (63 controls).

2.3 Data Analysis

The data was entered into the Excel file, this software also facilitated cleaning before transferring it to IBM SPSS version 21 (Chicago, IL) for analysis. The results of the descriptive analysis are presented in proportion or percentage for each variable, the proportions are compared between the cases and the controls using the Chi Square test in the bivariate analysis. The identification of the major risk factors for maternal mortality in the study is done based on the multivariate logistic analysis performed with mortality of pregnant women during childbirth as an independent variable**.** To eliminate any other variable suspected of being a confounding factor such as the age of the parturient, morbidities present during gestation, etc., only significant variables were considered in this part of the analysis, i.e. .d. who achieved a $P < 0.05$ during the univariate exploratory analysis.

Determining the contribution of each variable included in the main model of the study in maternal mortality, they were classified according to the scope of their Odd Ratios. That is to say, the greater the odd ratio of a variable, the greater its contribution to the mortality of pregnant women during childbirth. The presentation of the trend is made by demonstrating the existence of an upward or downward slope in the mortality of pregnant women during childbirth, a graphic presentation of the MMR by year from 2013 – 2017 is given with the support of a linear regression line for good visibility of upward or downward slope.

3. RESULTS

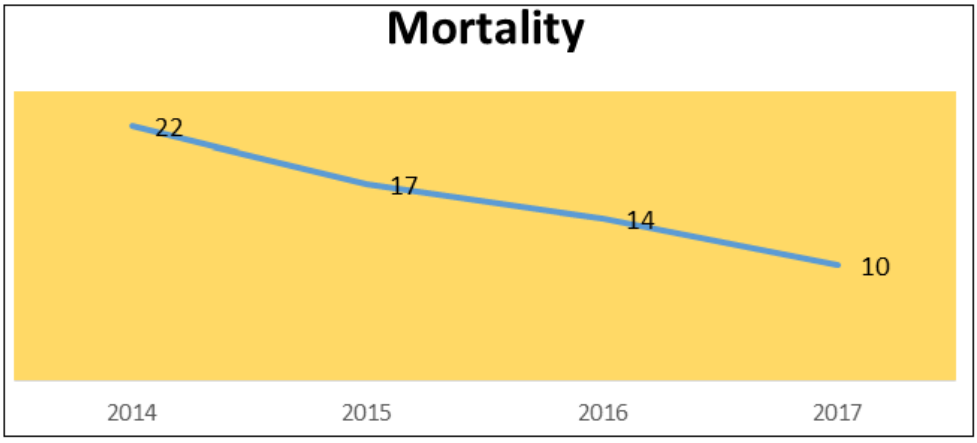

Figure I: Trend in female mortality between 2014-2017 at the Kitambo maternity ward in the city of Kinshasa

Mortality linked to women who give birth shows a significant evolution from 2014-2017. There are more cases in 2014 and the decline is noticeable as the years progress.

Table 1: Proportion of pregnant women who died or not, compared to the level of study from 2014 to 2017 at the Kintambo maternity ward in the city province of Kinshasa

Period/outcome of pregnant women			Level of study					Total
			illiterate	State diploma	Graduated	Licensed	Primary	
2014		death cases	6.8%	22.7%	4.5%	0.0%	15.9%	50.0%
		normal case	0.0%	20.5%	9.1%	2.3%	18.2%	50.0%
	Total		6.8%	43.2%	13.6%	2.3%	34.1%	100.0%
2015		death cases	5.6%	27.8%	0.0%	0.0%	16.7%	50.0%
		normal case	0.0%	27.8%	11.1%	0.0%	11.1%	50.0%
	Total		5.6%	55.6%	11.1%	0.0%	27.8%	100.0%
2016		death cases	0.0%	20.0%	13.3%	0.0%	16.7%	50.0%
		normal case	0.0%	23.3%	10.0%	0.0%	16.7%	50.0%
	Total		0.0%	43.3%	23.3%	0.0%	33.3%	100.0%

Period/outcome of pregnant women			Level of study					Total
			illiterate	State diploma	Graduated	Licensed	Primary	
2017		death cases	4.5%	18.2%	0.0%	0.0%	27.3%	50.0%
		normal case	0.0%	27.3%	0.0%	9.1%	13.6%	50.0%
	Total		4.5%	45.5%	0.0%	9.1%	40.9%	100.0%
Total		death cases	4.5%	22.7%	4.5%	0.0%	18.2%	50.0%
		normal case	0.0%	24.2%	8.3%	2.3%	15.2%	50.0%
	Total		**4.5%**	**47.0%**	**12.9%**	**2.3%**	**33.3%**	**100.0%**

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on the level of study, the average proportion of 22.7% deaths is observed among state graduates and 18.2 % to those at the primary level than the others.

Table 2: Proportion of pregnant women who died or not during childbirth in relation to their marital status from 2014 – 2017 at the Kintambo maternity ward in the city province of Kinshasa

Period/outcome of pregnant women			Marital status			Total
			Single	Divorce	Bride	
2014		death cases	15.9%	2.3%	31.8%	50.0%
		normal case	13.6%	2.3%	34.1%	50.0%
	Total		29.5%	4.5%	65.9%	100.0%
2015		death cases	19.4%	0.0%	30.6%	50.0%
		normal case	11.1%	0.0%	38.9%	50.0%
	Total		30.6%	0.0%	69.4%	100.0%
2016		death cases	26.7%	0.0%	23.3%	50.0%
		normal case	16.7%	0.0%	33.3%	50.0%
	Total		43.3%	0.0%	56.7%	100.0%
2017		death cases	36.4%	4.5%	9.1%	50.0%
		normal case	13.6%	0.0%	36.4%	50.0%
	Total		50.0%	4.5%	45.5%	100.0%
Total		death cases	22.7%	1.5%	25.8%	50.0%
		normal case	13.6%	.8%	35.6%	50.0%
	Total		**36.4%**	**2.3%**	**61.4%**	**100.0%**

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on marital status, the average proportion of deaths is 25.8% among married women and 22.7% among single women. the other categories.

Table 3: Proportion of pregnant women who died or not during childbirth according to ethnic group 2014 to 2017 at the Kintambo maternity ward in the city province of Kinshasa

Period/Outcome of pregnant women			ETHNIC GROUP					Total
			Anamongo	Bashi	Kongo	Luba	Rega	
2014		death cases	4.5%	2.3%	29.5%	13.6%	0.0%	50.0%
		normal case	13.6%	0.0%	25.0%	9.1%	2.3%	50.0%
	Total		18.2%	2.3%	54.5%	22.7%	2.3%	100.0%
2015		death cases	2.8%	2.8%	22.2%	19.4%	2.8%	50.0%
		normal case	11.1%	2.8%	22.2%	11.1%	2.8%	50.0%
	Total		13.9%	5.6%	44.4%	30.6%	5.6%	100.0%
2016		death cases	3.3%	0.0%	33.3%	10.0%	3.3%	50.0%
		normal case	3.3%	0.0%	33.3%	6.7%	6.7%	50.0%
	Total		6.7%	0.0%	66.7%	16.7%	10.0%	100.0%
2017		death cases	4.5%	0.0%	27.3%	18.2%	0.0%	50.0%
		normal case	0.0%	0.0%	22.7%	13.6%	13.6%	50.0%
	Total		4.5%	0.0%	50.0%	31.8%	13.6%	100.0%
Total		death cases	3.8%	1.5%	28.0%	15.2%	1.5%	50.0%
		normal case	8.3%	.8%	25.8%	9.8%	5.3%	50.0%
	Total		**12.1%**	**2.3%**	**53.8%**	**25.0%**	**6.8%**	**100.0%**

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on the ethnic group, the average proportion of 28.0% deaths is observed among the Bakongo and 15.2% among the Baluba. the other categories.

Table 4: Proportion of pregnant women who died or not during childbirth in relation to religious affiliation from 2014 – 2017 at the Kintambo maternity ward in the city province of Kinshasa

Period/Outcome of pregnant women			RELIGIOUS GROUP					Total
			Catholic	kimbanguist	Muslim	protestant	awakening	
2014		death cases	11.4%	2.3%	4.5%	6.8%	25.0%	50.0%
		normal case	20.5%	0.0%	0.0%	6.8%	22.7%	50.0%
	Total		31.8%	2.3%	4.5%	13.6%	47.7%	100.0%
2015		death cases	8.3%	5.6%	5.6%	13.9%	16.7%	50.0%
		normal case	16.7%	2.8%	0.0%	16.7%	13.9%	50.0%
	Total		25.0%	8.3%	5.6%	30.6%	30.6%	100.0%
2016		death cases	13.3%	3.3%	0.0%	13.3%	20.0%	50.0%
		normal case	16.7%	6.7%	6.7%	0.0%	20.0%	50.0%
	Total		30.0%	10.0%	6.7%	13.3%	40.0%	100.0%
2017		death cases	9.1%	13.6%	0.0%	4.5%	22.7%	50.0%
		normal case	4.5%	4.5%	9.1%	4.5%	27.3%	50.0%
	Total		13.6%	18.2%	9.1%	9.1%	50.0%	100.0%
Total		death cases	10.6%	5.3%	3.0%	9.8%	21.2%	50.0%
		normal case	15.9%	3.0%	3.0%	7.6%	20.5%	50.0%
	Total		**26.5%**	**8.3%**	**6.1%**	**17.4%**	**41.7%**	**100.0%**

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on the religious group, the average proportion of 21.2% deaths is observed at the revival church and 10.6% at Catholics than other categories.

Table 5: Proportion of pregnant women who died or not during childbirth from 2014 – 2017 depending on the age group and development of anemia during pregnancy at the Kintambo Maternity in the city province of Kinshasa

AGE GROUP /From pregnant women		Illness during pregnancy (Anemia)		Total
		Yes	No	
10-19	death cases	0.00%	92.3%	92.3%
	normal case	0.00%	7.7%	7.7%
	Total	0.00%	100.0%	100.0%
20-29	death cases	2.0%	39.2%	41.2%
	normal case	3.9%	54.9%	58.8%
	Total	5.9%	94.1%	100.0%
30-39	death cases	7.1%	37.5%	44.6%
	normal case	1.8%	53.6%	55.4%
	Total	8.9%	91.1%	100.0%
40-49	death cases	16.7%	50.0%	66.7%
	normal case	8.3%	25.0%	33.3%
	Total	25.0%	75.0%	100.0%
Total	death cases	5.3%	44.7%	50.0%
	normal case	3.0%	47.0%	50.0%
	Total	**8.3%**	**91.7%**	**100.0%**

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on age (age group) and anemia during pregnancy, the average proportions of 5.3% Death is observed in women who developed anemia with Chi-square of 0.893 at P> 0.05 the variables remained combined.

Table 6: Proportion of pregnant women who died or not during childbirth from 2014 to 2017 depending on age group and development of arterial hypertension (HTA), during pregnancy at the Kintambo maternity ward in the city province of Kinshasa

SLICING/From pregnant women		Illness during pregnancy (hypertension)		Total
		Yes	No	
10-19	death cases	0.0%	92.3%	92.3%
	normal case	0.0%	7.7%	7.7%
	Total	0.0%	100.0%	100.0%
20-29	death cases	2.0%	39.2%	41.2%
	normal case	2.0%	56.9%	58.8%
	Total	3.9%	96.1%	100.0%
30-39	death cases	10.7%	33.9%	44.6%
	normal case	10.7%	44.6%	55.4%
	Total	21.4%	78.6%	100.0%
40-49	death cases	8.3%	58.3%	66.7%
	normal case	0.0%	33.3%	33.3%
	Total	8.3%	91.7%	100.0%
Total	death cases	6.1%	43.9%	50.0%
	normal case	5.3%	44.7%	50.0%
	Total	**11.4%**	**88.6%**	**100.0%**

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on age (age group) and high blood pressure during pregnancy, the average proportions of 6.1 % death is observed in women who developed hypertension with Chi-square of 0.075 at P> 0.05 the variables remained combined.

Table 7 : Proportion of pregnant women who died or not during childbirth from 2014 – 2017 depending on age group and the distance between FOSA (health facility) and place of delivery > 8 km at the Kintambo maternity ward in the city province of Kinshasa

AGE GROUP/From pregnant women		Distance from place of residence and FOSA		Total
		< 8 km	>8 km	
10-19	death cases	23.1%	69.2%	92.3%
	normal case	0.0%	7.7%	7.7%
	Total	23.1%	76.9%	100.0%
20-29	death cases	3.9%	37.3%	41.2%
	normal case	29.4%	29.4%	58.8%
	Total	33.3%	66.7%	100.0%
30-39	death cases	8.9%	35.7%	44.6%
	normal case	17.9%	37.5%	55.4%
	Total	26.8%	73.2%	100.0%
40-49	death cases	16.7%	50.0%	66.7%
	normal case	16.7%	16.7%	33.3%
	Total	33.3%	66.7%	100.0%
Total	death cases	9.1%	40.9%	50.0%
	normal case	20.5%	29.5%	50.0%
	Total	29.5%	70.5%	100.0%

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on age (age group) and the distance greater than 8 km between the structure and the place of residence, the average proportion of 9.1% deaths is observed in women with a place of residence greater than 8 km and the structure with Chi-square of 8.189 at P < 0.04; a significant difference was observed between the variables.

Table 8: Logistic regression of variables according to women who die or not during childbirth and important factors between 2014 and 2017 in the city of Kinshasa

Wording		B	SE	Z	P
outcome (women who died or not during childbirth)	Distance between structure and place of residence (1)	1.014	0.511	3,939	0.047
	CPN attendance (1)	-1.081	0.604	3,198	0.074
	Delivery in the same center (1)	-1.373	0.572	5,770	0.016
	Number of pregnancies	-0.325	0.137	5,613	0.018
	Gestational age	0.435	0.199	4,803	0.028
	Number of doctors during childbirth	-0.701	0.300	5,451	0.020
	Constant	-13,852			

A very significant difference was observed between women who die or not during childbirth and the factors demonstrating a positive and negative relationship, including the distance greater than 8 km between the center and the place of residence with the coefficient of regression from 1.014 to P of 0.047; the frequency at the CPN with the regression coefficient of -1.081 at P of 0.074; delivery in the same center with the regression coefficient of -1.373 at P of 0.016; the number of pregnancies with the regression coefficient of -0.325 at P of 0.018; the gestational age with the regression coefficient of 0.435 at P of 0.028 and the number of doctors in the delivery room with the regression coefficient of -0.701 at P of 0.020. The regression line is then: $Y= -13.852+1.014X_1 -1.081X_2 -1.373X_3 -0.325X_4 +0.435X_5 -0.701X_6$

Table 9: Important risk factors for women who die or not during childbirth between 2014 -2017 in the city province of Kinshasa

	Women who died or not during childbirth and important risk factors	X^2	P	GOLD (RR)	95% CI
1	Aze of pregnant woman	30,696	0.006	-	-
2	Pregnant women attending CPN	27,788	0.000	8.595	3.65-20.228
3	Childbirth in same center	22,983	0.000	6.272	2,869-13,712
4	Number of doctors in the delivery room	12,145	0.007	-	-
5	Number of pregnancies	9.840	0.276	-	-
6	Distance between residence and center	8.189	0.004	1.385	1,099-1,744

It was observed that the variables show a very significant difference in relation to the factors which are the age of the pregnant woman, attendance at the CPN, delivery in the same center, the number of doctors in the delivery room and the distance between the residence and the center with an added value (P) less than 0.008.

In comparison to pregnant women who die or not during childbirth and the factors in relation to their Chi-square, the age of gestation has a higher.

4. DISCUSSION

In 2014, 2015 and 2016 there were more maternal deaths in the commune of Ngaliema than the others, i.e. 20.5%, 13.9% and 20.5% of the entire population surveyed and in 2017, more deaths are observed in the commune of Selembao, Bumbu as the others are 18.2%, 9.1% of the entire population surveyed. Overall from 2014 to 2017, the average proportion of cases of deaths observed is 15.9% in Ngaliema, 6.1% in Selembao than the other municipalities in the population surveyed.

According to Tabutin (2012) environmental and community characteristics are important factors in problem and behavior. Physical inaccessibility such as relief, poor road conditions, etc. contribute greatly to the occurrence of maternal mortality; which explains the phenomena observed after our investigation.

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on the level of study, the average proportion of 22.7% deaths is observed among state graduates and 18.2% % to those at the primary level than the others, WHO (2023), explains this statement based on the too low level of study which affects 85% of African women, but this represents an obstacle to family planning and prenatal monitoring. and assisted childbirth.

Among other things, the proportional status of these women presents an average proportion of 13.6% deaths is observed among housewives and 12.1% among traders than other categories. And the WHO (2013), increased in relation to difficult work in the field, at home, itinerant trade and transport of heavy goods vehicles, the non-involvement of men in certain household tasks, the cult of endurance in the face of Pain is a major cause of maternal mortality.

In the entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on marital status, the average proportion of 25.8% deaths is observed among married women and 22.7% among single women. than the other categories.

The entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on the ethical group, the average proportion of 28.0% deaths is observed among the Baluba and 15.2% among the Bakongo than the other categories. WHO (2023) on this subject, mentions the importance often given by certain ethnic groups to the preference of children. For example boys instead of girl children, so the woman wishing to have a boy child seeks to be pregnant again as soon as possible if her first child is a girl, which leads to repeated pregnancies and therefore constitutes a danger for women (too many pregnancies) which are the factors favoring maternal mortality.

The population of pregnant women who died or not during childbirth from 2014 to 2017 depending on the religious group the average proportions of 21.2% deaths are observed in the revival church and 10.6% among Catholics than others categories. The socio-cultural environment in which a woman lives, her religious practices with their interpretations as well as beliefs constitute factors favoring maternal mortality, because these prevent women from making good decisions (Tabutin, 2012).

The entire population of pregnant women who died or not during childbirth from 2014 to 2017 depending on age (age group) and anemia during pregnancy, the average proportion of 5.3% deaths is observed in women who developed anemia with Chi-square of 0.893 at P> 0.05 the variables remained combined.

This is explained by the periodic blood loss associated with a diet low in iron, in connection with this, many women find themselves in a state of hemoglobin deficiency. It is inevitable that at the time of gestation, when fetal blood must be formed at the mother's expense, anemia due to lack of iron occurs, especially if the deficient diet continues. This is why health personnel advise the systematic administration of iron to all women 4 months before childbirth and 3 months after childbirth. Iron is a hematopoietic element (NGUENDE I, 2014).

The population of pregnant women who died or not during childbirth from 2014 to 2017 depending on age (age group) and high blood pressure during pregnancy, the average proportion of 6.1% death is observed in women who developed hypertension with chi-square of 0.075 at P > 0.05 the variables remained confounded. According to the WHO (2012), pregnancy-induced hypertension, pre-eclampsia and eclampsia account for approximately 12% of maternal deaths. Pregnancy-induced hypertension can begin after 20 weeks of gestation, but it is more common during pregnancy. Symptoms may worsen during the first few days postpartum.

According to Fournier and Hadad, (2012), environmental characteristics are among the important factors of the problem, the distance between place of residence and place of birth is a factor which strongly favors the occurrence of maternal mentality, long distances, poor road conditions are also factors. Which explains the phenomena observed after our investigation.

The population of pregnant women who died or not during childbirth from 2014 to 2017 according to age (age group) and the distance greater than 8 km between the structure and the place of residence, the average of the proportions of 9.1% death is observed in women with a place of residence greater than 8 km and the structure with Chi-square of 8.189 at P < 0.04; a significant difference was observed between the variables.

A very significant difference was observed between women who die or not during childbirth and the factors demonstrating a positive and negative relationship, including the distance greater than 8 km between the center and the place of residence with the coefficient of regression from 1.014 to P of 0.047; the frequency at the CPN with the regression coefficient of -1.081 at P of 0.074; delivery in the same center with the regression coefficient of -1.373 at P of 0.016; the number of pregnancies with the regression coefficient of -0.325 at P of 0.018; the gestational age with the regression coefficient of 0.435 at P of 0.028 and the number of doctors in the delivery room with the regression coefficient of -0.701 at P of 0.020. The regression line is then: $Y= -13.852+1.014X_1 -1.081X_2 -1.373X_3 -0.325X_4 +0.435X_5 -0.701X_6$

According to Fournier and S. Hadad (2010). The influence of service quality on usage behavior refers to available technical components, continuity of services and interpersonal relationships between patients and providers and organizational aspects of services. The technical component takes into account the population's considerations regarding the health service regarding the competence of the nursing staff but also the search for providers with advanced technical equipment. It affects use in terms of the population's reluctance to use health services which they believe do not meet their needs. Interpersonal relationships as for them. Often reflect the fundamentally different reference that caregivers and patients make to their disease paradigms. Certain behaviors of healthcare personnel in health facilities, notably harshness towards their patients, surprisingly short contact times between caregivers and patients, and sometimes very long waiting times, are all factors likely to put off patients patients.

CONCLUSION

Ultimately, it should be noted that pregnant women who die or not during childbirth and the factors which influence this mortality are significant depending on whether the average age of the women who die or not. The average distance between place of residence and structure was 8 km, parity, CPN attendance, delivery in

the same CPN attendance center, number of doctors during delivery.

Reducing this mortality requires strengthening the capacities of midwives /midwives in the care of pregnant women from conception to delivery and in the postpartum period , providing maternity wards with all the assets for good operationalization on in the farthest corners of the city center , raise awareness among pregnant women of the importance of attending the CPN, ensure good supervision of the pregnant woman during her pregnancy and during childbirth, and for women to always be accompanied by their husbands during the CPN in order to help them internalize certain notions.

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