



MATERNAL NEAR MISS IN AN OBSTETRIC INTENSIVE CARE UNIT

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ABSTRACT

The Pregnancy is a phenomenon of physiological, physical, social and emotional changes. However, obstetric complications may occur, which if not timely treated and/or if incorrectly managed, can evolve in severe manners, requiring hospitalization at Obstetric Intensive Care Unit. In this scenario, maternal near miss can occur, defined as a near-death experience of woman who survived a serious complication occurring during pregnancy, delivery or within 42 hours after pregnancy ends. The objective of this study was to analyze the women profiles during pregnancy-puerperal cycle, who did or did not evolved with maternal near miss, admitted in an obstetric intensive care unit at Fundação Santa Casa de Misericórdia do Pará. This is an exploratory-descriptive research, with retrospective and quantitative approach covering the period from July 2016 to June 2017. 111 medical records of women admitted in the Unit at the said Foundation were used. It was sought to use different criteria to identify maternal near miss by using the approach World Health Organization approach. The study pointed the importance of knowing the socio-demographic profile of women and showed characteristics to be identified by the health professionals in order to prevent future complications.

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INTRODUCTION

Pregnancy is a physiological phenomenon and must be seen by pregnant women and health care staff as part of a healthy life experience involving dynamic changes from a physical, social and emotional point of view. However, it is a limit situation that may involve risks for both the mother and the baby and there are a number of pregnant women who, by particular characteristics, are more likely to unfavorable evolution of pregnancy, which are called as "high-risk pregnant women" (BRAZIL, 2012).

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Pregnancy is a time of great changings for woman, her partner and the whole family. These are intense experiences and sometimes contradictory feelings, moment of doubt, anxiety, especially if the woman is a teenager. Moment so dreamy or even unexpected. Planned or not, those women need time to adapt to a new routine (BRAZIL, 2016). The woman during pregnancy-puerperal cycle, even triggering important anatomical, endocrine, hemodynamic and immunological changes in the female organism, maintains a dynamic equilibrium through compensatory mechanisms. The limit between normality and the installed pathology is extremely tenuous and it is imbalance represents a high risk of maternal-fetal morbidity and mortality (RODRIGUES, 2011). Faced with these challenges, the Ministry of Health, objecting to

qualifying the Maternal and Child Care Networks throughout the country and reducing the still high rate of maternal and child morbimortality in Brazil, established the Cegonha Network (BRAZIL, 2012). The CegonhaNetwork represents a set of initiatives that involve changes in the process of care for pregnancy, childbirth and birth; the articulation of network attention points and obstetric regulation at the time of delivery; the technical qualification of primary care teams and within the maternities; the environment improvement of health services (primary care and maternities); the expansion of services and professionals to stimulate the practice of physiological delivery; and the humanization of childbirth and birth (Normal Delivery House, obstetric nurses, midwives, Mother and Baby House) (BRAZIL, 2012). Identifying the limit at which the normality ends and the disease begins has fundamental importance for preventing health complications for the pregnant woman and the concept, because when the obstetric interferences are not timely treated and/or incorrectly managed, they can evolve to a clinical condition that includes complex care, and may need hospitalization in an intensive care unit (ICU) (MONTENEGRO; REZENDE, 2017). The World Health Organization (WHO)(2011), states that the maternal near miss is defined as a woman who almost died but survived a serious complication during pregnancy, childbirth or within 42 hours of termination of pregnancy. In practical terms, women are considered to be near miss cases when they survive a life threatening condition (ie, organic dysfunction). Serious maternal outcomes are cases of maternal near miss.

In the United States, 8% to 27% of women were hospitalized at least once during pregnancy and the most common causes were: preterm labor, hyperemesis gravidarum, urinary tract infection and pregnancy-specific hypertensive syndromes. In Brazil, it is estimated that 26.7% of all hospital admissions of women of reproductive age occurred due to obstetric complications, which represent the most serious fraction of these diseases, which deserves hospital care, which justifies the importance of studies to evaluate (VICTORA *et al.*, 2011). Maternal death is defined as the death of a woman during pregnancy or within 42 days after ending, regardless the duration or location of pregnancy, due to any cause related to or aggravated by pregnancy or its management, but not due to accidental or incidental causes (WHO, 2011). WHO estimated that in 2010, about 290,000 women worldwide died during pregnancy and childbirth. This represents a decline of 47 per cent from 1990 levels but is far from the fifth Millennium Development Goal target of 75 per cent reduction in maternal deaths by 2015. Most of these deaths are concentrated in developing countries development and it is due to the lack of adequate access routine care and emergency care when needed (GUERREIRO *et al.*, 2014). In Dias *et al.*, (2014) study, 243 cases of maternal near miss were identified during the research period and 23,747 cases of maternal near miss were estimated for a total of 2,325.394 live births expected in Brazil, resulting in an incidence of 10.2 per thousand live births (95% CI: 7.5-13.7 per thousand). A total of 684 maternal deaths were identified in the Mortality Information System, establishing a Mortality Ratio of 29.41 to 100,000 live births. The number of women with severe maternal outcomes was estimated in 24,431 cases, with the mortality rate among maternal near miss cases of 34.71: 1 and the mortality rate of women with severe maternal outcomes of 2.79%. Whereas in Oliveira and Costa (2015) study, 255 cases of maternal near miss were identified among patients admitted in obstetric ICU. During the study

period, 19,940 live births (LB) occurred, resulting in a maternal near miss ratio of 12.8 / 1,000 LB. The length of hospitalization ranged from 5 to 86 days, with an average of 14.8 ± 10.27 . The participants' ages ranged from 14 to 45 years, with a mean of 25.6 ± 6.99 , and among them 57.3% were brown, 64.3% had partners, 43.2% had less than 8 years of study and 81.2% came from countryside. Despite worldwide efforts to control maternal mortality, this phenomenon still remains one of the major problems in world public health, justifying the elaboration of more research in this area. Thus, the objective of the study was to analyze the profile of women in the pregnancy-puerperal cycle, whether or not they evolved with maternal near miss, admitted to the obstetric intensive care unit at Fundação Santa Casa de Misericórdia of Pará (FSCMPa).

MATERIALS AND METHODS

The study has an exploratory-descriptive character with retrospective and quantitative approach. The research was made at FSCMPa, located in Oliveira Belo Street, Umarizal neighborhood, county of Belém/Pa. It is a reference in attending High Risk Pregnancy, this service is considered as one of the strengths of health care in the State. It receives patients referred by the Basic Network, Specialized Network or spontaneous demand (PARÁ, 2017). For this research, only the data referring to the period between July 1, 2016 and June 31, 2017 were used. As inclusion criteria, were used all medical records of women who were in the pregnancy-puerperal cycle and presented some maternal complications that led them to be admitted in Obstetric Intensive Care Unit (OICU) at FSCMPa, during the period mentioned in the study. Thus, after analyzing the reports for this period and excluding the medical records of men and women who were not in the puerperal pregnancy cycle, there were 122 medical records, however, when accessing each of these medical records, 11 were excluded because they were erroneously registered in the system, totaling 111 charts included in the survey. The information was collected in a systematized form through data collection form (Appendix A), obtained directly from the records stored in Personnel Information Management (PIM), responsible for the management and filing of medical records. This form was divided into six categories, which are: identification (in order to characterize women according to age, scholarship, marital status); obstetric history (parity number, number of visits during prenatal care and possible gestational complications); gestation, type of delivery, severe maternal complications and life-threatening conditions) and perinatal outcomes (maternal and fetal death). To rate the serious maternal complications as life-threatening conditions (maternal near miss), the criteria for the classification of maternal near miss of the World Health Organization were used, according to Appendix A.

For data analysis, the distribution of absolute and relative frequencies and simple tabulation analysis of the variables were used. A database was built in spreadsheets of the program Microsoft Office Excel 2013, which were analyzed and presented through simple statistics. Statistical tests such as Mann-Whitney Test, Spearman Correlation Test, Kruskal-Wallis Test and Chi-Square Test were performed using the Minitab 18 program (MINITAB, 2017). In this study, all the principles contained in Resolution No. 466/2012 of National Health Council, which establishes guidelines and regulatory norms for the ethical aspects of research involving human

beings, have been preserved. The research was approved by the Research Ethics Committee of FSCMPa, under CAAE No. 69400417.2.0000.5171.

RESULTS AND DISCUSSION

The great interest using the concept of maternal near miss as an instrument to subsidize the reduction of maternal mortality is increasing more and more around the world. However, the incidence of maternal near miss varies greatly due to the use of different diagnostic criteria. This research took into account the WHO criteria.

Sociodemographic profile of women with maternal near miss admitted at fscmpa icu: From 111 women included in the study, 88 women were classified with maternal near miss and 23 presented only severe maternal complications, but without organic dysfunctions.

Women of approximately 25 years old (25.48 ± 8.20) had a low prevalence in the group that developed severe maternal complications, as observed in Table 1. Women with maternal near miss group age up to 25 years were the most frequent with 61.36%. Only 4.55% of women had a higher education level, to the detriment of the majority with a high school education (38.64%) and 25% did not have this information in the medical record. As for skin color, 92.05% of the women declared themselves to be brown, 2.27% declared themselves white and 4.55% did not report or did not fill this in their medical records. Only one woman declared herself as black, according to Table 2. The category of single marital status represented 47.72% among women with maternal near miss, while 46.59% are married or have a stable union and 5.68% did not report or did not fill this information in their medical records. Regarding the origin, there were predominance ($p = 0.000$) of women from the countryside region of the State (68.18%) and most did not have paid work (61.36%), also observed in Table 2.

All other variables were analyzed statistically and were not significant between the groups. The data shown in table 2 are commonly found in other studies, such as that of Nakamura-Pereira *et al.*, 2013; Rosendo and Roncalli, 2015 and 2016; Oliveira and Costa, 2015; Dias *et al.*, 2014; Souza *et al.*, 2015. A single study turned out to be different, Aguiar and Tanaka, 2016 presents in their research that women profile with near miss is 83% white women, 58% with upper level and 58% living at the city capital. These divergent findings can be explained by the nature of the research, where the researchers had the Internet as a tool to capture these women. Analyzing the demographic factors associated with maternal near miss, it is possible to observe that the variables non-white race, single marital status, low scholary, low family income and patients coming from countryside regions had high frequency. These data are in agreement with what is reported in literature, which these variables have being associated with a significant risk for near miss (SOUZA *et al.*, 2015). In another Brazilian study, with a retrospective approach, using a database that included more than 4,000 women from the northeast region, the risk of maternal near miss was higher among women up to 35 years of age and with low scholary (88.3%) and from the countryside State of Pernambuco (81.2%), which corroborates the results found in the OICU atFSCMPa, where the frequency of women up to 30 years of age was 77.27% and those from the countryside of Pará were 68.18%. Thus, there seems to be a tendency for a greater association of the near miss among older women, unmarried, primigravidae, with low scholary and coming from the countryside Brazilian states (OLIVEIRA and COSTA, 2015). The unsafe conjugal situation, that is, without the presence of a partner, is an aggravating factor to maternal health and, according to the Ministry of Health, it is considered as a risk factor for pregnancy, especially when it comes to pregnant women which are more susceptible to emotional imbalance, in the absence of the paternal figure, and can therefore trigger emotional crises and a pathological outcome (BRAZIL, 2010 and 2012; LEAL *et al.*, 2017).

Table 1 - Difference between the mean age of women who evolved with Near Miss

Age	Average	Standard Deviation	Median	IC(95%)	p-value*
Near Miss	25,15	8,26	23	[21;24]	0,000
Serious Maternal Complications	25,48	8,20	23		

Source: author; *Mann-Whitney Test

Table 2. Sociodemographic characteristics of women in the study population

General characteristics	Maternal Near miss n (%)	Serious Maternal Complicatinos n (%)	Total n (%)	p-value*
Age Range				
Until 25 years	54 (61,36)	12 (52,17)	66 (59,46)	0,424**
More than 25 years	34 (38,64)	11 (47,83)	45 (40,54)	
Scholary				
No study	1 (1,14)	0 (0,00)	1 (0,90)	
1° degree	27 (30,68)	3 (13,04)	30 (27,03)	
2° degree	34 (38,64)	10 (43,48)	44 (39,64)	0,548*
Superior	4 (4,55)	2 (8,70)	6 (5,41)	
Not informed	22 (25,00)	8 (34,78)	30 (27,03)	
Skin Color				
White	2 (2,27)	0 (0,00)	2 (1,80)	
Brown	81 (92,05)	22 (95,65)	103 (92,79)	
Black	1 (1,14)	0 (0,00)	1 (0,90)	0,766*
Not informed	4 (4,55)	1 (4,35)	5 (4,50)	
Marital situation				
Single	42 (47,73)	11 (47,83)	53 (47,75)	
Uniãoestável	32 (36,36)	8 (34,78)	40 (36,04)	
Married	9 (10,23)	1 (4,35)	10 (9,01)	0,322*
Not informed	5 (5,68)	3 (13,04)	8 (7,21)	
Procedência				
Capital	15 (17,05)	8 (34,78)	23 (20,72)	0,000*
Metopolitan region	13 (14,77)	3 (13,04)	16 (14,41)	
Countryside	60 (68,18)	12 (52,17)	72 (64,86)	

Source: author *Kruskal-Wallis Test **Qui-Square Test

In the OICU atFSCMPa, the difference between the marital status of the women with the maternal near miss was not significant, since the single women were 47.73% of the cases, and those who had a companion were 46.59%. Only 5.68% did not have this information in their medical records or did not report it. Regarding the race of women with maternal near miss hospitalized in ICU atFSCMPa, 92.05% declared themselves to be brown. No articles were found that described in their results a relevance of this data for the near miss analysis. What could justify these findings are the official socio-demographic data of the region where the survey was conducted, where 73% of the population declares themselves to be brown (IBGE, 2010). As mentioned earlier, a percentage of 68.18% of women hospitalized with maternal near miss in OICU at FSCMPa from the countryside state of Pará were found, but attention must be drawn to this finding, as this reflects the precariousness of care where these women came from. Therefore, there is a need for improvements, which can be achieved through the organization of regional assistance and the decentralization of prenatal care and high-risk childbirth, providing these interior regions with equipment, complementary tests, medicines and specialized professionals (OLIVEIRA and COSTA, 2015).

Obstetric background of women with maternal near miss materno admitted at fscmpa ICU: As can be seen in Table 3, regarding to the number of pregnancies, 59.09% of the women had already become pregnant at least once before the current pregnancy.

Regarding the way of delivery, 53.41% never had vaginal delivery and 69.31% had at least one cesarean surgery. The vast majority of women (85.23%) had not an abortion in previous pregnancies. Regarding prenatal care, 63.64% reported having performed it, 17.05% did not inform or did not have this information in their medical records, but of those who underwent prenatal care, only 29.55% had more than six visits. The gestational clinic profile of women with maternal near miss of this study is composed of multigested women, most with previous cesarean section and precarious pre-natal care. It is important to evaluate these clinical characteristics, since women with a high number of pregnancies have a high risk of morbidity and mortality (LEAL *et al.*, 2017; XAVIER *et al.*, 2013; JANTSCH *et al.*, 2017). It is well known that cesarean surgery, when mislabeled or misidentified, increases the chances of women having complications. In a study involving approximately 370,000 Dutch women, it was found that patients who had undergone a caesarean section in an earlier pregnancy had the 5.2 highest risk of developing into a maternal near miss situation (HADDAD *et al.*, 2014 BHATTACHARYYA *et al.*, 2014). Regarding the type of delivery, it is worth noticing the high prevalence of previous cesarean sections (69.32%) among women with maternal near miss admitted in OICU atFSCMPa. Based on the rate of cesarean sections advocated by the WHO (up to 15% for the general population and 30% for pregnancies with complications), the rate verified in this investigation is quite high Reis *et al.*, 2015, study conducted in Minas Gerais, the rate of previous cesarean sections (38.3%) had a significant

Table 3. Studied sample of women clinic characteristics

Pregant woman characteristics	Maternal near miss n (%)	Serious maternal complications n (%)	Total n (%)	p-value
Number of pregnancies				0,087**
Primigesta	36(40,91)	14 (60,87)	50 (45,05)	
Multigesta	52 (59,09)	9 (39,13)	61 (54,95)	
Vaginal birth				0,677*
None	47 (53,41)	9 (39,13)	56 (50,45)	
Until 2	31 (35,23)	10 (43,48)	41 (36,94)	
More than 2	10 (11,36)	4 (17,39)	14 (12,61)	
Cesarean section				0,505
None	27 (30,68)	10 (43,48)	37 (33,33)	
Until 2	54 (61,36)	13 (56,52)	67 (60,36)	
More than 2	7 (7,95)	0 (0,00)	7 (6,31)	
Abortion				0,676*
None	75 (85,23)	20 (86,96)	95 (85,59)	
1	8 (9,09)	3 (13,04)	11 (9,91)	
2	5 (5,68)	0 (0,00)	5 (4,50)	
Pre-natal care				0,782**
No	17 (19,32)	3 (13,04)	20 (18,02)	
Yes	56 (63,64)	12 (52,17)	68 (61,26)	
Not informed	15 (17,05)	8 (34,78)	23 (20,72)	
Number of appointments				0,872*
None	17 (19,32)	3 (13,04)	20 (18,02)	
<6	30 (34,09)	5 (21,74)	35 (31,53)	
>6	26 (29,55)	7 (30,43)	33 (29,73)	
Not informed	15 (17,05)	8 (34,78)	23 (20,72)	

Source: author *Kruskal-Wallis Test **Qui-Square Test

Table 4. Correlation between variables expressing quantities among patients who do presented or do not Maternal Near Miss

Correlation	Near Miss answer	Nº of pregnancies	Nº of pre-natal appointments	Tipo de Parto
Nº of pregnancies	-0,013 *0,025			
Nº of Pre-Natal appointments	0,560 *0,000	-0,144 0,131		
Type of delivery	0,164 0,085	-0,133 0,164	0,063 0,513	
Gestacional age	0,009 0,923	0,007 0,942	0,018 0,854	-0,412 *0,000
Age	-0,125 0,190	0,644 *0,000	-0,132 0,166	-0,183 0,055

Source: author; *Spearman Correlation Test; *value-p

influence on gestational risk, and of these surgeries, 57.8% of the women were considered high-risk pregnant women and 23.7% of low risk. The increase of cesarean rates in the country is an important aspect in management of high-risk pregnancies, however, high-risk pregnancies should not be considered as a cesarean section. In obstetrical practice, the Partogram should be used to monitor the evolution of labor, which will provide subsidies for choosing the most appropriate way of delivery (BRAZIL, 2017). Among the women admitted to the ICU at FSCMPa with maternal near miss, 63.64% reported having undergone prenatal care, 17.05% did not inform or did not have this information in their medical records, but of those who underwent prenatal care, only 29.55% had more than 6 consultations.

rigorous follow-up at high risk. It is known that adequate prenatal care has an important role for the perinatal outcome, directly reflecting the reduction of the perinatal morbidity and mortality rate, consequently in the near miss maternal indices (LEAL *et al.*, 2017; BRASIL, 2012). When correlating the number of prenatal appointments, pregnancies, gestational age, type of delivery, age in years, with the occurrence of near miss or serious maternal complications, a statistical difference was obtained. Spearman's Correlation Test showed a negative dependence between the number of pregnancies and the occurrence of near miss or severe maternal complications, but statistically significant ($p = 0.025$), the latter, in turn, was influenced by the number of prenatal appointments, with positive and strong dependence ($p = 0.000$) and vice versa.

Table 5. Clinical characteristics during hospitalization in the intensive care unit of women in the study sample

Pregnant woman characteristics	Maternal near miss n (%)	Serious maternal complications n (%)	Total n (%)	p-value
Situação atual durante internação				
Pregnant	5 (5,68)	6 (26,09)	11 (9,91)	0,004**
Puerperal	83 (94,32)	17 (73,91)	100 (90,09)	
Gestacional age during admission				
1° Trimester	7 (7,95)	2 (8,70)	9 (8,11)	0,636*
2° Trimester	24 (27,27)	2 (8,70)	26 (23,42)	
3° Trimester	39 (44,32)	10 (43,48)	49 (44,14)	
Not informed	18 (20,45)	9 (39,13)	27 (24,32)	
Type of pregnancy when admitted				
Uterine	84 (95,45)	23 (100)	107 (96,40)	0,002***
Ectopic	4 (4,55)	0	4 (3,60)	
Last pregnancy delivery				
Cesarean	60 (68,18)	13 (56,52)	73 (65,77)	0,837*
Laparotomic	4 (4,55)	1 (4,35)	5 (4,50)	
Vaginal	19 (21,59)	8 (34,78)	27 (24,32)	
Did not have	5 (5,68)	1 (4,35)	6 (5,41)	

Source: author; *Kruskal-Wallis Test; **Qui-Square Test; *** Mann-Whitney Test

Table 6. Organic dysfunctions found in the sample studied

Organic Disfunction	Near Miss n (%)	Serious maternal complications n (%)	Total (%)	p-value*
Cardiovascular	18 (9,23)	10 (23,33)	28 (11,76)	0,643
Hematologic	43 (22,05)	9 (20,93)	52 (21,85)	
Hepatic	8 (4,10)	0 (0,00)	8 (3,36)	
Neurologic	34 (17,44)	3 (6,98)	37 (15,55)	
Renal	20 (10,26)	2 (4,65)	22 (9,24)	
Respiratory	54 (27,69)	13 (30,23)	67 (28,15)	
Uterine	18 (9,23)	6 (13,95)	24 (10,08)	
Total	195 (100)	43 (100)	238 (100)	

Source: author; *Kruskal-Wallis Test

Table 7. Maternal mortality among women in the sample studied

Maternal mortality	Near Miss	Serious maternal complications	Total (%)	p-value*
Deaths	0	14(60,87)	14(12,61)	0,000
Survival	88(100)	9(12,61)	97(87,39)	
Total	88(100)	23(100)	111(100)	

Source: author; *Qui-Square Test

Table 8. Concept mortality among women in the sample studied

Concept mortality	Near Miss	Serious maternal complications	Total (%)	p-value*
Deaths	28(31,82)	2(8,7)	14(12,61)	0,026
Survival	60(68,18)	21(91,3)	97(87,39)	
Total	88(100)	23(100)	111(100)	

Source: author; *Qui-Square Test

In a study with 42 cases with maternal near miss, 72.4% of the cases reported not having performed more than 5 visits during prenatal care (SOUZA E GONÇALVES, 2015). One of quality indicators of prenatal care is the number of appointments and the Ministry of Health recommends a number equal to or greater than six prenatal appointments at usual risk and a more

Other correlation findings were found between the type of delivery and the gestational age ($p = 0.000$) and the age in years of the women who were primiparous or multigested, with positive and strong dependence ($p = 0.000$), and vice-versa, as can be observed in Table 4. No scientific articles were found that analyzed the correlation presented in this

research in order to carry out the comparison of the data. Regarding the number of complications during pregnancy, 56.82% of the women with near miss said they did not present any type of complication, 21.59% reported having at least one complication and 21.59% did not have this information in their medical records. According to Figure 1, the women with near miss who reported some type of intercurrent during pregnancy, Urinary Tract Infections (UTI) were the most frequent with 28.57%, followed by pregnancy-specific hypertension syndromes (SHEG) 17, 14%, leukorrhea and fever with 5.71% of cases each.

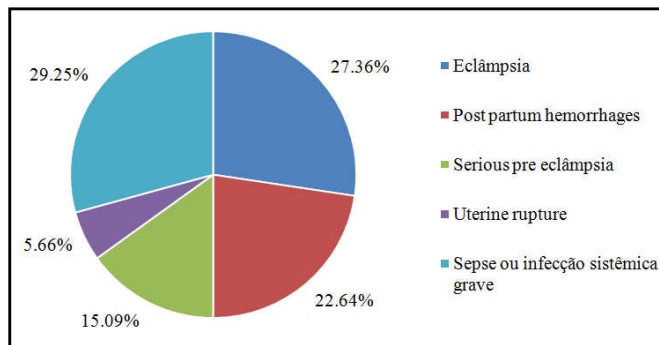


Figure 1. Main intercurrents during pregnancy of women with maternal near miss

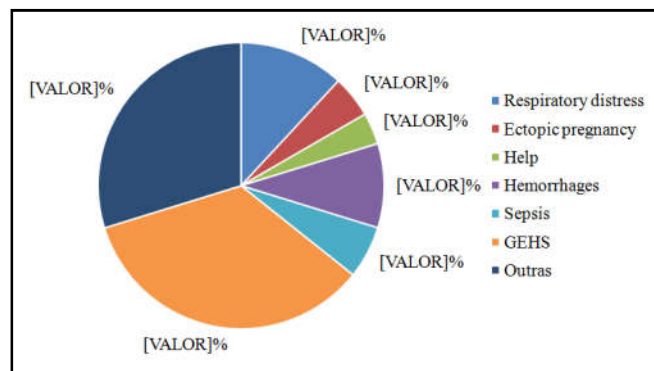


Figure 2. Diagnostic impression of hospitalizations during pregnancy with maternal near miss

According to Zanette *et al.*, 2014, in Brazil, 70% of cases of severe maternal morbidity are related to SHEG and 10.7% of the causes of maternal mortality. Brito *et al.*, 2015, in its study concluded that a greater planning of prenatal care is necessary, aiming at the reduction / control of SHEG, which in Brazil is the main cause of maternal mortality (SZWARCOWALD *et al.*, 2014). Sepsis or severe systemic infection ranked second (29.25%) among the serious maternal complications that cause the need for intensive care, a finding of great concern, since in other studies it does not appear in the first places. Rosendo and Roncalli cite 4.29%; Oliveira and Costa, 2015 found only 16.9%; and Souza and Gonçalves, 2015 with 23.8% cases of sepsis, similar to the results achieved in this study. Therefore, it is necessary to monitor the infection with clearer guidelines for patients and professionals, such as hand washing and patient handling. The hemorrhagic disorders appear in third place (28,30%) among the complications that caused the cases of maternal near miss hospitalization. Severe postpartum haemorrhage affects approximately 2% of all women who "give birth", and is not only associated with approximately one quarter of all maternal deaths globally, but it is also the leading cause of maternal mortality in most low-income countries (WHO, 2014).

According to WHO (2014), severe postpartum haemorrhage is a significant contributor to severe maternal morbidity, to prolonged disability, as well as to several other serious maternal conditions usually associated with more substantial blood loss, including shock and organic dysfunction. Souza and Gonçalves, 2015, classified severe bleeding as the second most frequent maternal complication, with 21.4% of cases related to maternal near miss. It is worth mentioning that most of the patients in this study had cesarean surgery as the delivery method and that patients with hemorrhage had a higher risk of death than patients with hypertensive diseases. Near miss cases with hemorrhage during or after caesarean sections are severe enough to require interventions, which avoid serious complications. These interventions require qualified professionals, functional obstetrical service with access to medicines, blood transfusion, transportation and ICUs (MASWIME and BUCHMANN, 2017; RUDEY, 2017). The survey was also carried out to verify if these women were hospitalized during gestation before being classified with near miss, so in 56.82% of the cases there was a need for hospitalization for some reason and 6.82% did not have this information in their medical records. The most frequent diagnosis was pregnancy-specific hypertension syndrome (PSHS) with 34.52%, followed by respiratory discomfort with 11.90%, hemorrhage with 9.52%, sepsis with 5.95%, ectopic pregnancy with 4, 76%, and, finally, HELLP with 3.57% of cases, as shown in Figure 2.

Clinical characteristics of current management of women maternal with near miss:

At the time of admission to the obstetric intensive care unit, 90.09% of 88 women classified as near miss maternal were already puerperal, with a predominance of this group ($p = 0.004$) and had as main route cesarean surgery (65, 77%), the route of vaginal delivery was in second place (24.32%) and those who had to undergo laparotomy due to ectopic pregnancy totaled 4.50%. Those who remained pregnant (5.41%) were referred for high-risk prenatal care, according to Table 5. Regarding gestational age during intensive care unit admission, 44.14% were in the third trimester, 23.42% were in the second trimester, 8.11% were in the first trimester and 24.32% did not have this information in the medical records. The predominant type of gestation was uterine with 96.40% and ectopic pregnancy occurred in 3.60% of the cases, as can be seen in Table 5.

Profile of serious maternal complications associated with maternal near miss/conditions threatening the life:

Concerning severe maternal complications related to the near miss, which were hospitalized for intensive care, sepsis or severe systemic infection ranked first with 29.25% of the cases, followed by eclampsia with 27.36%; third, postpartum haemorrhage was severe with 22.64%, followed by severe preeclampsia with 15.09%; and finally, uterine rupture with 5.66%, according to Figure 3. Pregnancy-specific hypertension syndrome (PSHS) in this study ranked second in relation to symptoms during pregnancy (17.14%), and it was the severe maternal complication that most often caused the need for intensive care (42.45%). In case of serious maternal complications, the study by Oliveira and Costa, 2015, 255 cases of maternal near miss were identified. According to the authors' own criteria, the main complications presented by the study participants were hypertensive (62.7%), hemorrhagic (53.7%), infectious (49%), cardiogenic (4.7%) and thromboembolic (2.4%).

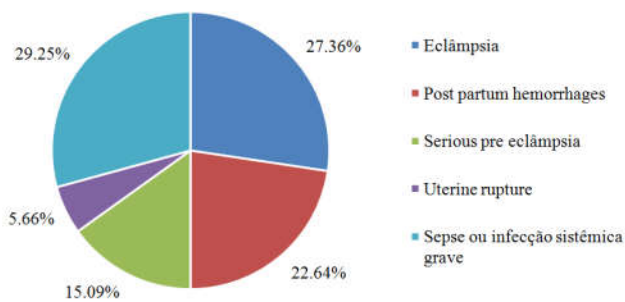


Figure 3. Severe maternal complications associated with maternal near miss

Taking into account women in pregnancy-puerperal cycle, the most important criteria was respiratory dysfunction with 28.15%, followed by hematologic dysfunction with 21.85%; thirdly, the neurological dysfunction was 15.55%, then the cardiologic dysfunction was 11.76%, the uterine dysfunction was 10.28%, the renal dysfunction was 9.24%, and finally the hepatic dysfunction was 3.36%. The association between organic dysfunctions among the groups of women did not present statistical significance, as shown in Table 6. The main clinical criteria of maternal near miss observed by Oliveira and Costa, 2015, were shock, respiratory rate higher than 40 ipm and loss of consciousness for 12 or more hours, ie, cardiologic, respiratory and neurological disorders, respectively. In the study conducted in OICU atFSCMPa, the main disturbance was respiratory (27.69%), followed by haematological (22.05%), neurological (17.44%), renal (10.26%), cardiovascular 9.23%), uterine (9.23%) and, lastly, hepatic (4.10%). The research by Oliveira and Costa, 2015, reports that the respiratory disorder, characterized by the need for intubation and mechanical ventilation for more than 60 minutes, without being related to anesthesia, was the most found criteria of near miss (23.5%). These data are similar to those obtained from the research in OICU at FSCMPa. The study by Dias *et al.*, 2014, referring to the criteria that identifies the respiratory disorder, it was verified that this occurred in 10.3% of the cases.

The study by Monte *et al.*, 2017, 215 cases of maternal near miss and, as a management of hemorrhagic disorders, 754 transfusions of red blood cell bags were identified, representing an average of 3.6 bags per patient. It is considered that the blood transfusion of more than 3 pouches is a criteria to classify the hematological disorder, which identifies the maternal near miss. The study by Rudey *et al.*, 2017, the most commonly performed invasive procedure was red blood cell transfusion (53%), leading to an average use of four units of red blood cells per patient, ranging from one to 12 units; which converges with the studies of Monte *et al.*, 2017. The neurological disorder ranked third among the disorders that lead to the maternal near miss, according to this research in OICU atFSCMPa. This position is justified by the convulsion criteria, since 27.36% of the women with near miss had a severe maternal complication of eclampsia, which has as a symptom the seizure. The study by Dias *et al.*, 2014, the neurological disorder was identified in 7.5% of the cases.

Perinatal Outcomes

Maternal mortality was also evaluated, observing a statistical difference between the groups of women. It is important to note that women who presented near miss (life threatening

condition) had a 100% discharge from the ICU, while women who did not meet the near miss criteria had a mortality rate of 60.87% as shown in the Table 7. Maternal mortality is an indicator of disparity and inequity between men and women and their access to social and health services, as well as economic opportunities, reporting on the reproductive health situation, reflecting the living conditions of population (FERNANDES *et al.*, 2015). The chi-square test showed that fetal mortality also presented a statistical difference between the groups of women. It is important to note that 31.82% of the women who presented near miss maternal died, while those who did not meet the near miss criteria had a mortality rate of 8.7% (Table 8). A study conducted in France concluded that perinatal mortality occurs mainly in the uterus, which may be related to obstetric complications (BOISRAMÉ *et al.*, 2014).

A total of 14 maternal deaths were found among the 111 women in this study, and fetal death among women with maternal near miss was relatively high (28 cases = 32%). The aforeciteddata resemble those of Nardello *et al.*, 2017, in its research, with a total of 79 cases of maternal near miss, 17 cases of maternal death and 24 fetal deaths.

Ratio of severe maternal outcome refers to the number of women with life-threatening conditions per 1,000 live births. Maternal Near Miss reason refers to the number of maternal near miss cases per 1,000 live births. Mortality ratio of the maternal near miss refers to the ratio between near miss cases and maternal deaths, higher ratios indicate a better care. The death rate refers to the number of maternal deaths divided by the number of women with life-threatening conditions, expressed as a percentage [IM = MM / (NMM + MM)]. The higher the index, the more women with life-threatening conditions will die, thus, this index may express a poor quality of care for this population and vice versa. The maternal near miss ratio identified in this study was 8.9 for every 1,000 live births. Another important finding was the ratio of maternal near miss maternal death (6.3: 1), indicating that the number of maternal near miss cases was 6.3 times greater than that of maternal death, similar data were found by Dias *et al.*, 2014 (10.2 per thousand live births) and by Oliveira and Costa, 2015 (12.8 per thousand live births), in both surveys, WHO criteria were used. In relation to studies that take into account other criteria, such as admission to an intensive care unit or other pathologies, this ratio was higher. Rosendo and Roncalli, 2015 found a ratio of 36.67 / 1,000 using ICU admission criteria, and in 2016, the same authors found a ratio of 41.1 per thousand live births, using gestational diabetes as the criterion. The incidence of maternal near miss has a wide variability between the studies, and this is justified by the fact that different criteria are used to determine near miss cases. Studies that used the WHO criteria were the ones that most resembled those of this research, since they were the same criteria used.

Final Considerations

The present study evidenced that among the patients with maternal near miss, there was a high frequency of women of up to 25 years of age, with low scholarship, non white, from the countryside of Pará State, with a history of previous cesarean section, without experience of abortion, and with incomplete prenatal care. The main interurrences reported during prenatal care were related to urinary tract infections and those due to the specific hypertensive syndrome of pregnancy. The last one was the main reason for hospitalization, followed by respiratory discomfort.

At the time of admission to the intensive care unit, these women were mostly puerperal, and prior to delivery were in the third trimester of pregnancy. The main route of delivery was cesarean surgery and the most frequent type of pregnancy was uterine. The most frequent serious maternal complication in this study was severe sepsis or systemic infection, followed by eclampsia and then severe postpartum haemorrhage. The organic dysfunction, criterion for classification of maternal near miss, was more frequent referring to the respiratory and hematological systems. Prenatal care plays a key role in preventing and/or early detectibg of both maternal and fetal pathologies, allowing a healthy development of the baby and reducing the risks of the pregnant woman. To date, there are not many studies that evaluated the maternal near miss in an intensive care unit and, at the national level, the present study is one of the few to perform this analysis, which makes it important to contribute to the subject. The results found may help to establish public policies and strategies in assistance with the intention of intervening significantly in the problem of maternal morbidity and mortality in Brazil.

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