Adverse outcomes of childbirth in high-risk maternity hospitals

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Abstract

Objectives: to analyze adverse outcomes in teaching maternity hospitals in Maceió, Alagoas, Brazil.

Methods: a cross-sectional, retrospective and analytical study was carried out with a random sample of 480 medical records of postpartum women in 2016 using the Adverse Outcome Index: in-hospital maternal death, neonatal in-hospital death> 2500g and> 37 weeks, uterine rupture, unplanned maternal admission to intensive care unit, delivery trauma to the newborn, return to the operating room, admission to an intensive neonatal unit with >2500g and > 37 weeks for more than one day, Apgar <7 at the fifth minute, maternal hemotransfusion and fourth-degree perineal laceration. The data were analyzed using the Statistical Package for Social Sciences software version 22.0.

Results: the results showed a 21% rate of adverse outcomes, at a rate of 26.4 for every 1,000 births, with a greater occurrence of neonatal intensive care admission with>2500g and>37 weeks for more than one day (52. 5%), maternal blood transfusion (20.8%) and unplanned maternal admission in intensive care (17.8%).

Conclusions: the evaluation of adverse outcomes evidenced a high proportion of births with undesirable results, which allowed the analysis of the outlook of unfavorable outcomes related to safety in maternity wards through the use of indicators.

Key wods *Outcome assessment, Quality indicators health care, Patient safety, Maternity, Nursing*

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Introduction

Pregnancy and childbirth are physiological events that represent the third cause of hospitalization in Brazil, with varying degrees of complexity, from natural conditions, in the absence of complications, to the presence of pathologies and situations that require specialized demands from health services.[1,2] Health services in the obstetric area represent critical nodes for the quality of hospital service and patient safety.[3] It is estimated that 29% of hospitalizations for childbirth present some type of complication,[4,5] with the damage related to care (adverse events) corresponding to 5 to 26% of births.[4,5]

In addition to incidents common to all health services, such as falls, events related to drugs and blood components, there is a range of damage characteristic of perinatal care: maternal death, eclampsia, uterine rupture, perineal lacerations and vaginal fistulas, among others, which bring high social, economic, environmental impact, significant discomfort in the sexual and reproductive life of women.[6-8] These incidents are related to direct damages from the assistance or omission of recommended behaviors during pregnancy and childbirth.8 Unfavorable outcomes or complications of childbirth can be used to assess the quality of care, through indicators of the damage profile, which provides the analysis of causes, risk factors and care results.[9,10] The evaluation of results in health services is shown to be advantageous for associating outcome measures with patient safety assessment, 11 representing incidents and adverse situations that impact health systems.

The Adverse Outcome Index (AOI) of the National Perinatal Information Center (NPIC) reflects an overview of adverse outcomes in perinatal care. The AOI includes 10 indicators: maternal in-hospital death, neonatal in-hospital death >2500g and >37 weeks, uterine rupture, unplanned maternal admission to the intensive care unit, birth trauma in the newborn, return to the delivery / surgical room , admission to a neonatal intensive care unit >2500g and >37 weeks for more than one day, Apgar <7 in the fifth minute, maternal blood transfusion and 4th degree perineal laceration.[3]

The analysis of adverse results in teaching hospitals in Alagoas, Brazil represented results of care for the binomial, and incorporates significant assessment strategies in the prevention, risk reduction and damage resulting from care processes.[2,11] The construction of management and evaluation based on care outcomes that represent risk situations should be encouraged in educational institutions as a tool for including the safety culture in the teaching-learning process in the health area.

Considering the great assistance demand involved in perinatal care, the scope of the undesirable results for this clientele and the association of these events with the biopsychosocial process that covers delivery and birth,[3,12] the objective of this study was to analyze the index of adverse results in high-risk maternity hospitals in Maceió, Alagoas, Brazil.

Methods

Cross-sectional, retrospective and analytical study, using secondary data from medical records performed in two teaching hospitals in Maceió, Alagoas, Brazil. The maternity hospitals are linked to two public universities in Alagoas, with several courses that use the maternity settings for supervised practices, internships, medical residency, nursing and multiprofessional programs, in addition to extension and research projects.

The high-risk clientele is diverse and includes maternal and neonatal conditions that require a specialized structure to resolve possible complications, in addition to rear beds for adult and neonatal intensive care, with specific equipment and physical resources. This public profile was chosen due to the close relationship with maternal and child morbidity and mortality.[12]

The sample consisted of 480 medical records and considered as a calculation reference the guidelines proposed by the instrument adapted from the Institute for Healthcare Improvement (IHI) for the assessment of adverse events in childbirth,[13,14] evaluating the year 2016, with the analysis of 10 medical records referring to each fortnight of 2016. The sampling technique was simple random with the draw tool available at: http://www.randomizer.org/form.htm, to provide an equal possibility of the medical records being included in the study.

The inclusion criteria were: women who have evolved to surgical delivery outcome, with gestational age above 20 weeks to the date of the last menstruation (LMP or early ultrasound) who remained at least 24 hours hospitalized in any sector of the maternity hospitals; and who were discharged from the service, regardless of the outcome, and their medical records were closed and forwarded to the Medical Archive Service. Patients who had deliveries at other services and who were later referred to the maternity hospitals of the study were excluded.

AOI indicators were related to admission vari-

ables (sociodemographic and hospitalization profile), delivery outcomes and characteristics of cesarean sections. Severity score indicators were obtained - weighted score of adverse results (severity score according to total deliveries) and severity index (severity score according to deliveries with adverse results).[15]

The data were stored in a Microsoft Office Excel 2013 spreadsheet and the IBM Statistical Package for the Social Sciences (SPSS) version 22.0 software was used for statistical analysis, both for Windows. Descriptive data were operationalized through tables, averages, frequencies, standard deviation, and inferential statistics with chi-square and Fisher's exact tests for qualitative variables. The level of statistical significance considered was $p<0.05$, with an established confidence interval of 95%.

The approval of the Ethics Committee was obtained under CAAE opinion 61093616.8. 0000.5013 and the consent of hospital managers was obtained. The study followed the rules of Resolution Nº 466 of 2012 from the National Health Council of Brazil.

Results

In 2016 there were 1,958 cesarean sections in the hospitals analyzed. 480 (24.5% of all cesarean sections) medical records of women undergoing surgical delivery were reviewed, which represented 3,812 delivery days (total days of hospitalization for delivery). The age ranged from 13 to 46 years, with an average of 25 years (± 7.3), with 16.2% under 18 years old; 58.6% of women had less than nine years of schooling, 56.3% had some paid activity, 97.3% were of mixed ethnicity, 52.4% had a partner and 52.3% came from other municipalities in the interior of State.

On admission, 73.5% had a companion, 37.3% were primiparous, 33.3% had previous cesarean sections and 26.6% had abortions. Gestational age at admission was of 20 to 42 weeks, with an average of 36 weeks and five days (± 3.2), with 51.8% admitted before 37 weeks. The average length of stay was eight days (± 7.6). Upon admission, only 10.4% were in labor, and headache was reported in 36.3% of admissions, despite the fact that information was absent in 60% of records. The report of liquid loss and rupture of membranes was present in 24.9% of the medical records. Blood pressure at admission was high, with systolic averages 137 mmHg (± 23 mmHg) and diastolic 87 mmHg (± 17 mmHg).

The causes of hospitalization were similar to the profile of cesarean section indications, with 38.1% related to hypertensive disorders, 18.3% to complications in childbirth and 15.2% to acute fetal distress. C-sections occurred when women were in labor in 13.8% of cases. A quarter of the procedures were urgent and the type of anesthesia in 96.5% was neuraxial block. After delivery, 4.2% of the mothers were referred to the ICU and 36.9% of the newborns needed specific neonatal care, with an average birth weight of 2,984g (± 869 g). There were 12 fetal deaths in the surveyed sample.

The frequency of adverse results was 21%, with 26.4 / 1000 deliveries-day and the weighted score of adverse results was 8.11 and the severity index was 38.56. Table 1 describes the frequency of adverse outcomes and the severity index.

The most frequent indicators were neonatal admission to the ICU in 11%, maternal blood transfusion in 4.3% and unplanned maternal admission to the ICU in 3.7%. Indicators of maternal death, neonatal in-hospital death of NBs> 2500g /> 37 weeks and fourth degree perineal laceration were not found.

The service profile was characteristic of high-risk services. Women admitted with a history of previous pregnancies (multi-gestation), referred via bed regulation from another institution, admitted before 37 weeks and who had a companion at the time of admission evolved more frequently to adverse results.

Blood pressure values <120/80 mmHg were associated with a higher occurrence of the outcome, although the increase motivates a high share of hospitalization in more complex services, and was responsible for 53.5% of the hospitalization causes related to the occurrence of adverse results.

Women aged between 19 and 34 years, who exercised paid activity, hospitalized for hypertensive causes and whose NB had low birth weight had a higher incidence of admission to neonatal ICU. Brown women presented more returns to the operating room and those referred to the infirmary after delivery needed blood transfusion more frequently. The factors that influenced unplanned maternal admission to the ICU were admission and delivery before 37 weeks, presence of a companion, high blood pressure at admission, urgent / emergency delivery and newborn weight. Tables 2 and 3 detail the relationship between the most frequent indicators and the sociodemographic variables, access to the service and delivery outcomes.

Table 1

Adverse outcome indicators and severity scores* in maternity hospitals in Maceió, AL, Brazil, 2016.

Indicator	N	%	Severity index	
			Points	Total
In-hospital maternal death	0	-	750	0
In-hospital neonatal death of >2500 grams or >37 weeks	0	-	400	0
Uterine rupture in labor	2	2.0	100	200
Unplanned maternal admission to the ICU†	18	17.8	65	1170
Birth trauma	0	-	60	0
Early return to the operating room	5	4.9	40	200
Admission to the ICU† neonate >2500 grams or >37 weeks more than >1 day	53	52.5	35	1855
Apgar <7 in the 5th minute	2	2.0	25	50
Maternal blood transfusion	21	20.8	20	420
4th degree perineal laceration	0	-	5	0
Total	101	100.0	-	3895

*Mann *et al*.[15]; †ICU = Intensive Care Unit.

Discussion

The frequency of AOI in this study (21%) was high when compared to other authors.[11,15] This index was more frequent among brown women, from the countryside, from the adult-young age group (19-34 years old), with less education (less than nine years of study), without a partner and who exercise paid activity.

Such associations between unfavorable outcomes and sociodemographic profile are the result of direct influence on access to health services and income issues, which is reflected in the profile of maternal and child morbidity and mortality in general. In another study, non-white pregnant women, married, with incomplete high school education, coming from the countryside and with family income of up to one minimum wage were subject to a higher risk of potentially lethal complications.[16]

The contemporary obstetric model, especially in Brazil, exposes women and newborns to high rates of interventions with great potential to cause harm. Such interventions, such as episiotomy, the use of oxytocin and surgery are routine and affect almost all women in maternity hospitals. Even in situations where complications already exist, inadequate care is not able to reduce the resulting injuries, in addition to potentiating them, often resulting in the avoidable death of women and children or permanent injuries and sequelae.[17]

Adverse results may reflect the occurrence of AE when analyzed from the point of view of care results and unintentional damage resulting from problems related to the care and clinical follow-up of pregnancy and childbirth. The assessment of AEs from the global point of view through the tracking of indicators in medical records can signal complications or damage that are mostly preventable in childbirth care, but represent great repercussions on the health of women and the newborn.[18-21]

Maternal and neonatal mortality are considered sentinel events and indirect indicators of living conditions and health in a country.[22] As indicators of final outcome, there is a tendency of decreasing growth, but, despite being infrequent, maternal death presents with a high predictive value for the occurrence of damage during care.[20] There were no reports of maternal or neonatal death in the hospital (≥37 weeks and ≥2500g) in the analyzed sample, a fact possibly associated with the high complexity profile of the services analyzed, access to technologies and resources for solving potentially fatal situations.

Unplanned events during hospitalization for childbirth can also be related to adverse outcomes. In this study, unplanned maternal admission to the ICU, maternal blood transfusion and return to the operating room represented 43% of adverse results, and may represent an attempt to correct an incident during care for women. These clinical outcomes of women, as well as newborns, are related to the level and complexity of care involved, as well as to operational and assistance difficulties in the management of childbirth and birth.

In Belgian hospitals, it was estimated that a quarter of admissions to more complex services are due to damages resulting from care.[23] The return to the operating room or delivery room represented low specificity, due to the relationship with the reason

Table 2

Distribution of adverse results according to the sample profile in maternity hospitals, Maceió, AL, Brazil, 2016.

Variables	Maternal blood transfusion			Maternal admission to the ICU*			Return to the operating room			Neonatal admission to the ICU*		
	n	%	*p**	n	%	*p**	n	%	*p**	n	%	*p**
Age range (years)			0.298			0.404			0.609			<0.001
<18	5	23.8		1	5.5		0	-		3	5.7	
19 - 34	15	71.4		12	66.7		4	80.0		32	60.3	
>35	1	4.7		5	27.8		1	20.0		18	34.0	
Years of study			0.676			0.373‡			0.79‡			0.794
Until nine	8	53.3		9	75.0		5	100.0		23	60.5	
>9	7	46.7		3	25.0		0	-		15	39.5	
Job			0.329			0.677			1‡			0.01
Yes	14	66.7		11	61.1		2	50.0		38	73.0	
No	7	33.3		7	38.9		2	50.0		14	27.0	
Ethnicity			0.087			0.807			<0.001			0.777
White	1	5.5		0	-		1	20.0		0	-	
Brown	17	94.4		15	100.0		4	80.0		46	97.9	
Black	0	-		0	-		0	-		1	2.1	
Public place	2		0.649			0.213			1‡			0.934
Maceió	9	42.9		6	33.3		2	40.0		25	47.1	
Other	12	57.1		12	66.7		3	60.0		28	52.8	
Marital status			0.063			0.211‡			1‡			0.412
With companion	6	31.6		11	68.7		3	60.0		24	47.0	
No companion	13	68.4		5	31.3		2	40.0		27	53.0	
Prenatal			1			1‡			1‡			1‡
Yes	8	100.0		8	100.0		3	100.0		23	100.0	
No	0	-		0	-		0	-		0	-	
Obstetric history			0.611			0.463‡			0.369‡			0.378
Primigest	9	42.9		5	27.2		3	60.0		17	31.0	
Multigest	12	57.1		13	72.2		2	40.0		36	69.0	
Gestational age in admission (weeks)			0.065			0.002‡			1‡			1
<37	15	71.4		15	88.2		3	60.0		27	51.0	
>37	6	28.6		2	11.8		2	40.0		26	49.0	
Escort			0.160†			0.03‡			1‡			0.161‡
Yes	9	81.9		8	72.7		4	100.0		34	87.1	
No	2	18.1		3	27.3		0	-		5	12.9	

*Chi-square test; ‡ Fisher's test.

Table 3

Distribution of adverse results according to the characteristics of care and cesarean sections in maternity hospitals, Maceió, AL, Brazil, 2016.

Variables	Maternal blood transfusion			Unplanned maternal admission to the ICU*			Return to the operating room			Neonatal admission to the ICU*		
	n	%	*p*	n	%	*p*†	n	%	*p*†	n	%	*p*†
Referral from another service			0.580†			1‡			0.576‡			0.654
Yes	14	82.3		12	80.0		4	100.0		32	78.0	
No	3	17.7		3	20.0		0	-		9	22.0	
Systolic blood pressure§			0.264			<0.001			0.416			0.784
<120	7	38.9		4	23.5		2	40.0		10	24.4	
121-139	3	16.7		3	16.7		0	-		7	17.0	
140-159	3	16.7		2	11.8		3	60.0		12	29.3	
160-179	2	11.1		2	11.8		0	-		9	22.0	
>180	3	16.7		6	35.3		0	-		3	7.3	
Diastolic blood pressure§			0.749			0.342			0.789			0.765
<80	8	44.4		6	35.3		2	40.0		16	39.0	
81-89	0	-		0	-		0	-		0	-	
90-99	4	22.2		4	23.5		1	20.0		9	21.9	
100-109	2	11.1		2	11.8		2	40.0		11	26.8	
>110	4	22.2		5	29.4		0	-		5	12.2	
Birth-related causes of hospitalization	2	9.5	0.175	0	-	0.294	1	20.0	0.972	3	7.3	0.002
Hypertensive problems	10	47.6		11	61.1		4	80.0		26	63.4	
Diabetes mellitus	0	-		0	-		0	-		6	14.6	
Hemorrhage	3	14.3		2	11.1		0	-		1	2.4	
Other maternal conditions	3	14.3		3	16.7		0	-		5	12.2	
Fetal suffering	1	4.8		0	-		0	-		3	7.3	
Fetal malformations	0	-		0	-		0	-		3	7.3	
Other fetal	0	-		0	-		0	-		0	-	
Hypertension and diabetes	2	9.5		2	11.1		0	-		6	14.6	
Character of the procedure			0.156			0.002			1‡			0.355
Urgency and emergency	8	38.0		10	55.6		1	20.0		16	30.2	
Elective	13	62.0		8	44.4		4	80.0		37	69.8	
Gestational age at delivery (weeks)			0.073			0.005‡			1‡			0.896
<37	14	66.7		14	82.3		3	60.0		27	51.0	
>37	7	33.3		3	17.6		2	40.0		26	49.0	
Woman's destination			0.001†			<0.001			1‡			0.713‡
Nursery	16	76.2		7	38.9		5	100.0		52	98.1	
Intensive care unit	5	23.8		11	61.1		0	-		1	1.9	
Newborn's destination			0.577			0.187			1‡			<0.001‡
Nursery	13	68.4		7	43.7		3	60.0		1	1,9	
Neonatal unit	6	31.6		9	56.3		2	40.0		52.0	98.1	
Newborn weight (grams)			1†			0.020			0.611‡			<0.001‡
<2500	5	23.8		9	50.0		2	40.0		4	7.5	
>2500	16	76.2		9	50.0		3	60.0		49	92.5	

*ICU = intensive care unit; †Chi-square test; ‡ Fisher's test; § In millimeters of mercury.

that led to the return, which could be due to damage within care or specific needs associated with women's clinical conditions.[18,19]

Uterine rupture during labor, as an adverse result, is related to the speed, effectiveness and safety of care for women; despite being infrequent, it is associated with high morbidity and mortality, in addition to causing permanent damage to the woman's reproductive life.[21-24] In the medical records analyzed, uterine rupture was present in 0.4% of the sample, which represented 2 % of adverse results found, an indicator similar to that reported by other authors[24] and acting as a key indicator of poorly conducted hemorrhagic complications.

The newborn's birth conditions may indicate flaws in the management of pregnancy and childbirth, and in the case of unfavorable outcomes, bring consequences for the child's growth and development. The admission to the ICU of full-term newborns weighing ≥2500g was the most frequent result (52.5%) and had a significant relationship with the mother's age group (19-34 years) and the work variable. This fact can be justified by the type of delivery analyzed and the characteristics of the clientele, with high-risk situations and demands of greater complexity, which may increase the risk of neonatal admission to the ICU.

Along with neonatal admission to the ICU, Apgar <7 in the fifth minute represents an indicator with greater predictive value compared to the presence of birth trauma in the newborn, which was associated with registration errors and identification difficulties in other studies,[19] and particularly in this research, it was a result without any occurrence.

Damages in perinatal care cover several aspects: errors resulting from care; unnecessary and / or untimely interventions that compromise the evolution of childbirth and cause damage; omissions of proven effective conducts, which implies less favorable, negative or unexpected results for the clinical follow-up of pregnancy, childbirth and the puerperium.[25] The use of sets of indicators to represent different aspects can provide surveillance of incidents, sentinel events and care results.

The index of adverse results in the sample was 21%, being 26.4 for every 1,000 deliveries-day, and the weighted score of 8.11 and 38.56 in relation to the severity index. Women of the young-adult age group (19-34 years), brown, without a partner, with paid activity and with less education had a higher occurrence of adverse results.

Blood pressure values at admission at normal levels, presence of a companion, referral from another service, history of previous pregnancies and admission before term were related to the higher frequency of adverse results. Women who evolved to elective cesarean sections and who were referred to the infirmary after delivery also had a greater expression of adverse results.

Therefore, the most representative outcome indicators were neonatal admission to the ICU ≥37 weeks and / or ≥2500g, maternal blood transfusion and unplanned maternal admission to the ICU. The indicators that did not appear in the sample were maternal in-hospital death, neonatal in-hospital death >37 weeks and / or >2500g, birth trauma and 4th degree perineal laceration.

The limitations of the study were related to the fact that the research is retrospective documentary, due to the low quality of the records in medical records, which contributes to the omission of information and the absence of relevant data.

Authors' contribution

Oliveira TC contributed to the design, data collection, writing and review of the article. Oliveira e Silva, Nagliate PC, Veríssimo RCSS, Sales MLH and Lucena TS performed the evaluation and review of the article. All authors approved the final version of the article.

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