

# Incidence and Risk Factors of Major Neonatal Birth Injuries in a Tertiary Care Hospital in Thailand: A Retrospective Cohort Study

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**Abstract:** Major neonatal birth injuries can cause short- and long-term negative neonatal outcomes. To date, there is still limited information on major neonatal birth injuries in Thailand, both in terms of incidence and associated factors. The objectives of this retrospective cohort study were to determine the incidence and associated factors of major neonatal birth injuries in a tertiary care hospital in Thailand. Medical records of 15,209 deliveries were reviewed and major neonatal birth injuries were identified. For each case of major neonatal birth injuries, another four controls were randomly selected as a comparison group to determine possible associated factors. A total of 81 cases with major neonatal birth injuries were identified, corresponding to incidence of 0.53%. Most common injuries were subgaleal hematoma (0.414%), fracture of clavicle (0.066%), and brachial plexus injuries (0.066%). Those with major neonatal birth injuries compared to those without injuries were significantly more likely to be nulliparous, had higher birth weight, higher rate of large for gestational age and macrosomia. They had significantly higher rate of birth asphyxia and neonatal intensive care unit admission with a longer hospital stay. Independent associated factors were abnormal second stage of labor, instrumental delivery, and large for gestational age infants. Understanding the incidence and associated factors could help raising awareness when caring women at higher risks for neonatal birth injuries. Anticipation, preparation, and early detection of the conditions would result in timely management and improvement of neonatal outcomes.

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## Introduction

Neonatal birth injuries are defined as the impairment of neonatal body function which occur during the process of labor and delivery<sup>1-3</sup> and can occur in both vaginal and cesarean deliveries.<sup>2,4,5</sup> The prognosis varies, depending on the type and severity of the injuries. While mild neonatal birth injuries can be self-limited, some other moderate

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or severe injuries may lead to significant neonatal morbidity or mortality. Moreover, every birth injury can also lead to adverse psychological effects on

the parents. Reported incidence of neonatal birth injuries varies between studies.<sup>1,2,4,6-9</sup> Such variations might be from differences in population characteristics, risk factors, care provided during labor and delivery, and definitions of neonatal birth injuries.

Although neonatal birth injuries account for less than 2% of neonatal deaths, injuries still occur occasionally and sometimes unavoidably. However, anticipation of major neonatal birth injuries in some women with specific characteristics could lead to early detection and intervention to avoid serious negative outcomes. Reported risk factors for neonatal birth injuries included advanced maternal age, maternal pelvic anomalies, abnormal presentation, abnormal labor, macrosomia, shoulder dystocia, route of delivery, use of instrumental delivery, and experience of the surgeons with normal, difficult, and instrumental deliveries.<sup>4-6,10-15</sup> However, some neonatal birth injuries occur in those without any identifiable risk factors.

Neonatal birth injuries can be considered “major” if they have the potential to produce negative neonatal outcomes leading to long-term difficulties, disablement, or illness. Major neonatal birth injuries have been classified according to the type of injury, occurrence, and subsequent outcomes.<sup>1</sup> Common sites for neonatal birth injuries can include the head, neck, and shoulders and other less common locations include the face, abdomen, and lower limbs.<sup>3</sup> Of commonly reported injuries, 40% involve blood vessels and some type of hemorrhage. Nerves or the nervous system is involved in 30% of the injuries, and a major organ is involved in 30%.<sup>1</sup>

Understanding both the situation and possible associated factors of major neonatal birth injuries could raise awareness among care providers and further improve care of the pregnant women and their infants. In addition, identifying women at higher risk could lead to anticipation and improved surveillance of the conditions which could lead to early diagnosis and timely treatment to minimize morbidities and mortalities.

## **Literature Review**

Neonatal birth injuries are defined as structural damage or functional impairment of a newborn secondary to a traumatic event that occurred during labor, delivery or both.<sup>1-3</sup> Injuries occur at birth for various reasons, secondary to maternal, fetal, or external risk factors.<sup>3</sup> Prognosis varies depending on the type and severity of the injuries. Previously reported incidence of neonatal birth injuries varied between studies, possibly due to different population characteristics, risks, intrapartum care provided, and definition of injuries.<sup>1,2,4,6-9</sup>

In a recent report of data in the US from 2006–2014, the prevalence rate of neonatal birth injuries increased by 23% (from 25.3 to 31.1 per 1000 births) but major injuries decreased from 5.44 to 4.67 per 1000 births due to decreases in clavicular fractures, brachial plexus injuries, and intracranial hemorrhage. In addition, major injuries were associated with higher odds of hypoxic-ischemic encephalopathy, seizures, need for mechanical ventilation, meconium aspiration, and sepsis.<sup>9</sup> Another study from Finland also reported a decreasing trend of neonatal birth injuries during 1997 to 2017 (from 34.0 to 16.6 per 1000 live births), mainly due to a decrease in the number of clavicle fractures.<sup>16</sup>

Major neonatal birth injuries have been classified according to the type of injury, occurrence, and subsequent outcomes.<sup>1</sup> The common sites for birth trauma can include the head, neck, and shoulders. Other less common locations include the face, abdomen, and lower limbs.<sup>3</sup> The 20 most frequently reported major neonatal birth injuries of various organs are displayed in **Table 1**.<sup>1</sup> Of these, 8 (40%) of the injuries involved blood vessels and some types of hemorrhage. Nerves or the nervous system is involved in 6 (30%) of the injuries, and a major organ is involved in 6 (30%) of the injuries.

**Table 1** Twenty most frequently reported major neonatal birth injuries <sup>1</sup>

Specific major neonatal birth injuries	Types of tissue(s) involved
Hyphema	Blood vessels
Retinal hemorrhage	Blood vessels
Intracranial hemorrhage	Blood vessels
Fractured clavicle	Clavicle
Cerebellar contusion	Cerebellum
Abducens nerve injury (cranial nerve VI)	Abducens nerve
Skull fracture	Cranium
Phrenic nerve injury	Phrenic nerve
Brachial plexus injuries	Brachial plexus
Fractured femur	Femur
Fractured humerus	Humerus
Facial palsy	Facial nerve
Nasal septum deviation	Nasal septum
Laryngeal nerve injury	Laryngeal nerve
Ruptured liver	Liver
Subdural hematoma	Blood vessels within the skull
Subluxation of cervical spine	Cervical vertebra
Subgaleal hemorrhage	Extracranial blood vessels
Epiphyseal separation	Any joint
Spinal cord injury	Spinal cord

Neonatal birth injuries can occur in both vaginal and cesarean deliveries.<sup>2,4,5</sup> Reported risk factors for neonatal birth injuries include advanced maternal age, maternal pelvic anomalies, abnormal presentation, abnormal labor, macrosomia, shoulder dystocia, route of delivery, use of instrumental delivery, and experience of the surgeons.<sup>4-6,10-16</sup> However, some neonatal birth injuries occur without any identifiable risk factors. A recent study also showed that the type of hospital was another determinant of major neonatal birth injuries and that the risk significantly increased among rural and medium-sized hospitals.<sup>17</sup>

To date, there is still limited information on major neonatal birth injuries in Thailand, in terms of both incidence and associated factors. A study from a tertiary care hospital in Thailand reported a birth injury incidence of 5.7-8.3% during 2014-16.<sup>18</sup> In addition, associated risk factors were reported

as including instrument delivery, birth weight  $\geq 3,500$  g and maternal age  $\geq 35$  years. However, minor injuries were also included. Additional investigations are needed to evaluate and explore the issue of major neonatal birth injuries in various aspects to provide more insights that could be helpful in improving the care of pregnant women and their infants.

### Study objectives

The primary objectives of this study were to determine incidence of major neonatal birth injuries and evaluate related risk factors in a university-based tertiary care hospital in Bangkok, Thailand. Other objectives were to describe the characteristics of major neonatal birth injuries and perinatal outcomes.

## **Methods**

**Design:** A retrospective cohort study with nested case-control study. This report follows STROBE Statement-Checklist of items that should be included in reports of cohort studies.

**Sample and Setting:** The study was conducted in the department of obstetrics and gynecology of the largest university-based tertiary care hospital in Bangkok, Thailand. Medical records of women with singleton pregnancy who delivered live born infants during 2017-2018 were retrieved and reviewed. Pregnant women whose fetus had anomalies or had intrauterine fetal death were excluded. To evaluate the risk factors associated with major neonatal birth injuries, a nested case-control study was also conducted. For each case of a woman with major neonatal birth injuries, another four women without neonatal birth injuries who delivered during the same period were randomly selected as controls. Cases and controls were compared with regard to various characteristics to evaluate risk factors and perinatal outcomes.

**Ethical Considerations:** The study was conducted after approval from Siriraj Institutional Review Board (COA number: Si 498/2019). Informed consent was not needed due to the retrospective data collection. Data were extracted from medical records and documented in a case record form without any identification of the pregnant women.

**Data Collection:** Data were extracted from medical records of singleton pregnant women with live born infants during 2017-2018. Medical records were accessed via an online system into which they were scanned and archived. Research assistants were trained by the researchers to extract the data and record them in a specific case record form. Data were audited for completeness and accuracy by the researchers.

Major neonatal birth injuries were identified and classified according to those of previous report.<sup>1</sup> All diagnoses of neonatal birth injuries were made

by pediatricians. Data collection included baseline characteristics and obstetrics information, including maternal age, parity, gestational age at delivery, pre-pregnancy body mass index (BMI), maternal complications, gestational weight gain, labor characteristics, labor progression, mode of deliveries, experience of surgeons, infant birth weight, and neonatal outcomes. Large for gestational age (LGA) was defined as infant birth weight of  $\geq 90^{\text{th}}$  percentile of each gestational age and macrosomia was defined as infant birth weight of  $\geq 4000$  g. According to the weight percentile used, all macrosomia are LGA but not all LGA are macrosomia. Both conditions were recoded and analyzed separately.

**Data Analysis:** Descriptive statistics were used to describe various baseline characteristics, using mean, standard deviation, number, and percentage, as appropriate. Incidence of major neonatal birth injuries was estimated. Comparisons were made between cases and controls using the student t-test chi-square test, and Mann-Whitney U test as appropriate. Logistic regression analysis was performed to determine independent associated factors of major neonatal birth injuries, adjusted for potential confounders. Adjusted odds ratios (OR) and 95% confidence intervals (CI) were estimated. A p-value  $< 0.05$  was considered statistically significant.

## **Results**

Among singleton pregnancies who delivered during 2017-2018, medical records of 15,209 deliveries were reviewed. Mean age of the women was 29.9 years, 49% were nulliparous, and 29% were overweight or obese. Gestational diabetes and pre-eclampsia were diagnosed in 18% and 6%, respectively. Mean gestational age at delivery was 38 weeks with mean birth weight of 3070 g. Primary and repeat cesarean section was performed in 27% and 18%, respectively. Infants with LGA and macrosomia was found in 24.5% and 2.7%, respectively.

Major neonatal birth injuries were identified in 81 cases which correspond to incidence of 0.53% (95%CI 0.43–0.66%). Descriptions of major neonatal birth injuries are shown in **Table 2**. Common injuries were subgaleal hematoma (63

cases, 0.414%), fracture of clavicle (10 cases, 0.066%), and brachial plexus injuries (10 cases, 0.066%). Subdural hematoma was found in 1 case (0.007%). There were 3 cases with both subgaleal hematoma and brachial plexus injuries.

**Table 2** Incidence of major neonatal birth injuries

Major neonatal birth injuries	N (%)
Overall major neonatal birth injuries	81 (0.53)
Types of major neonatal birth injuries	
Subgaleal hematoma	63 (0.414)
Fractured clavicle	10 (0.066)
Brachial plexus injuries*	10 (0.066)
Subdural hematoma	1 (0.007)

\* 3 cases occurred with subgaleal hematoma

For each of 81 cases of women with major neonatal birth injuries, another four women without neonatal birth injuries who delivered during the same period were randomly selected and served as 324 controls. **Table 3** shows the comparison of maternal characteristics between those with and

without major neonatal birth injuries. Mean age, BMI, and gestational weight gain were comparable between the two groups. However, those with major neonatal birth injuries were significantly more likely to be nulliparous (71.6% vs. 47.2%,  $p < 0.001$ ).

**Table 3** Comparison of maternal characteristics between those with and without major neonatal birth injuries

Characteristics	Birth injury N = 81	No birth injury N = 324	$\chi^2$	P value
	Mean $\pm$ SD	Mean $\pm$ SD		
Age (years)	29.7 $\pm$ 6.5	30.0 $\pm$ 5.9	0.38	0.705
BMI (kg/m <sup>2</sup> )	22.8 $\pm$ 4.9	22.2 $\pm$ 4.4	-0.98	0.329
Gestational weight gain (kg)	14.4 $\pm$ 4.4	14.1 $\pm$ 5.7	-0.72	0.473
	N (%)	N (%)		
BMI category			4.18	0.242
Normal	51 (63)	197 (60.8)		
Under	13 (16)	56 (17.3)		
Overweight	9 (11.1)	55 (17)		
Obese	8 (9.9)	16 (4.9)		
Nulliparous	58 (71.6)	153 (47.2)	15.44	<0.001
Maternal complications			0.99	0.804
None	60 (74.1)	248 (76.5)		
Gestational diabetes mellitus	11 (13.6)	34 (10.5)		
Hypertensive disorders	7 (8.6)	25 (7.7)		
Others	3 (3.7)	17 (5.2)		
Gestational weight gain category			3.81	0.149
Normal	27 (33.3)	116 (35.8)		
Inadequate	15 (18.5)	87 (26.9)		
Excessive	39 (48.1)	121 (37.3)		

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**Table 4** shows the comparison of delivery characteristics and neonatal outcomes between those with and without major neonatal birth injuries. While GA at delivery was comparable, those with major neonatal birth injuries were significantly more likely to have spontaneous labor than those without neonatal birth injuries (97.5% vs. 83.6%, p=0.003) and more likely to experienced arrest of descent (12.3% vs. 4.5%, p=0.009) and prolonged second stage of labor (23.5% vs. 3.1%, p<0.001). Those with major neonatal birth injuries had significantly higher birth weight (3254.4 g vs. 3035 g, p<0.001), higher rate of LGA (35.8% vs. 16%, p<0.001), macrosomia (6.2% vs. 1.9%, p=0.048), respectively. In addition, those with major neonatal birth injuries were significantly more likely

to have instrumental or breech deliveries (33.3% vs. 1.5%, p<0.001) and less likely to delivered by cesarean section (12.3% vs. 42.9%, p<0.001), respectively. Moreover, they were significantly more likely to have deliveries performed by a third-year resident or fellow (38.3% vs. 17.9%, p=0.001), respectively. In terms of neonatal outcomes, newborns with major neonatal birth injuries were significantly more likely to have an Apgar score <7 at 1 minute (27.2% vs. 2.5%, p<0.001) and required neonatal intensive care unit admission (NICU) (8.6% vs. 1.5%, p=0.003), respectively. Length of stay was also significantly higher among those with major neonatal birth injuries (5 days vs. 3 days, p<0.001), respectively.

**Table 4** Comparison of delivery and neonatal outcomes between those with and without major neonatal birth injuries

Characteristic	Birth injury N = 81	No birth injury N = 324	$\chi^2$	P value
	<b>Mean ± SD</b>	<b>Mean ± SD</b>		
Gestational age at delivery (weeks)	38.3 ± 1.5	37.9 ± 1.6	-1.42	0.156
Birth weight (g)	3254.5 ± 493.8	3035.5 ± 453.9	-3.81	<0.001
	<b>N (%)</b>	<b>N (%)</b>		
Labor characteristics			11.33	0.003
Spontaneous labor	79 (97.5)	271 (83.6)		
Induction of labor	2 (2.5)	20 (6.2)		
Pre-labor C/S	0	33 (10.2)		
Labor progression			32.41	
Normal progression	66 (81.5)	240 (82.5)		0.836
Protracted active phase	3 (3.7)	4 (1.4)		0.172
Arrest of descent	10 (12.3)	13 (4.5)		0.009
Prolonged second stage	19 (23.5)	9 (3.1)		<0.001
Mode of delivery			99.34	<0.001
Normal labor	44 (54.3)	180 (55.6)		
Instrumental or breech delivery	27 (33.3)	5 (1.5)		
Cesarean section	10 (12.3)	139 (42.9)		
Surgeons			18.39	0.001
1 <sup>st</sup> year Resident	21 (25.9)	103 (31.8)		
2 <sup>nd</sup> year Resident	13 (16)	100 (30.9)		
3 <sup>rd</sup> year Resident or Fellow	31 (38.3)	58 (17.9)		
Staff	16 (19.8)	63 (19.4)		
LGA	29 (35.8)	52 (16)	12.50	<0.001
Macrosomia	5 (6.2)	6 (1.9)	4.56	0.048
Apgar score <7				
At 1 minute	22 (27.2)	8 (2.5)	57.60	<0.001
At 5 minutes	3 (3.7)	2 (0.6)	5.06	0.057
NICU admission	7 (8.6)	5 (1.5)	11.36	0.003
	<b>Median (IQR)</b>	<b>Median (IQR)</b>		
Length of stay (days)	5 (4-7)	3 (3-4)	50.79	<0.001

**Table 5** shows the results of logistic regression analysis to determine independent associated factors of major neonatal birth injuries, adjusted for potential confounders. Significant factors associated with increased risk of major neonatal birth injuries were abnormal second stage of labor which included arrest of descent, failure to descent, and prolonged second stage of labor (adjusted OR 6.35, 95% CI

2.27–17.76,  $p < 0.001$ ), instrumental delivery (adjusted OR 7.26, 95% CI 2.07–25.52,  $p = 0.002$ ), and LGA infants (adjusted OR 6.61, 95% CI 3.28–13.32,  $p < 0.001$ ). On the other hand, cesarean section significantly reduced the risk of major neonatal birth injuries (adjusted OR 0.81, 95% CI 0.34–1.89,  $p < 0.001$ ).

**Table 5** Logistic regression analysis to determine factors independently associated with major neonatal birth injuries

Variables	Adjusted OR	95% CI	P value
Nulliparous	0.53	0.27–1.04	0.064
Abnormal second stage of labor	6.35	2.27–17.76	<0.001
Mode of delivery			
Spontaneous vaginal delivery	1.0		
Instrumental delivery	7.26	2.07–25.52	0.002
Cesarean section	0.81	0.34–1.89	<0.001
Surgeons			
1 <sup>st</sup> year Resident	1.0		
2 <sup>nd</sup> year Resident	0.81	0.34–1.89	0.625
3 <sup>rd</sup> year Resident 3 or Fellow	1.95	0.78–4.89	0.154
Staff	1.23	0.45–3.34	0.685
Birth weight for GA			
AGA	1.0		
SGA	0.91	0.28–2.93	0.876
LGA	6.61	3.28–13.32	<0.001

## Discussion

Despite a declining incidence of neonatal birth injuries as a result of improvements in obstetric care, they remain a significant cause of neonatal morbidity and mortality. In this study, the incidence of major neonatal birth injuries was 0.53%. Despite the advancement in obstetric care, major neonatal birth injuries still occurred in our institution with some associated morbidities. As the data were from a tertiary care hospital, cases were more likely to be complicated that could result in increased probability of major neonatal birth injuries. However, the incidence was comparable to many previous reports.<sup>4, 6–8, 19–21</sup>

Various risk factors for neonatal birth injuries have been reported, including advanced maternal age,

maternal pelvic anomalies, abnormal presentation, abnormal labor, macrosomia, shoulder dystocia, route of delivery, use of instrumental delivery, and experience of the surgeons.<sup>4–6, 10, 19, 22</sup> The results of this study showed that abnormal second stage of labor (arrest of descent, failure to descent, and prolonged second stage of labor), instrumental delivery, and LGA infants increased the risk of major neonatal birth injuries while cesarean section significantly reduced the risk.

Mode of delivery have been consistently reported to relate to neonatal birth injuries from many previous studies.<sup>2, 6, 8, 12, 14, 15</sup> Similar to the results of this study, the use of instrumental deliveries significantly increased the risk of major neonatal birth injuries. Although instrumental delivery is generally considered

safe, direct contact of fetal parts with the instruments used, either forceps or vacuum cup, could easily injure the fetus. Recent studies reported that the use of instrumental delivery was an important risk of neonatal birth fractures and brachial plexus injuries.<sup>12,13,15</sup> However, a previous study reported similar risk of neonatal birth injuries between instrumental and spontaneous vaginal deliveries.<sup>7</sup> Although the rate of instrumental deliveries declined in the past few decades, a previous study has reported that the rate of birth trauma remained unchanged in instrumental delivery and caesarean delivery.<sup>8</sup>

Delivery by cesarean section has also been consistently reported to decrease the risk of neonatal birth injuries<sup>2,6,7,15</sup> and similar results were also observed in this study. This might possibly be due to that the fetus did not go through the bony birth canal as a natural process of vaginal delivery. Delivery of the fetus by cesarean section is usually easier through uterine incision with less pressure and traction forces compared with vaginal birth. However, neonatal birth injuries can still occur with cesarean delivery and the incidence varied with the indications as well as with the duration of the incision-to-delivery interval and the type of uterine incision.<sup>2,8</sup>

In this study, abnormal second stage of labor, including arrest of descent, failure to descend, and prolonged second stage of labor also independently associated with increased risk of neonatal birth injuries. Abnormalities of the second stage of labor might be a proxy of difficult labor. The fetus could be relatively large or in abnormal position, or uterine contractions might be inadequate. This could lead to prolonged pushing, assisted delivery, or delivery with extra force that could increase the possibility of neonatal birth injuries. Previous studies have also demonstrated similar results that neonatal birth injuries frequently occurred during the second stage of labor, in which the fetus descends through the birth canal.<sup>1,19,22</sup> In addition, these abnormal second stage of labor are usually related to the

increased use of instrumental deliveries which is also a significant risk, and both could contribute to the increased risk of neonatal birth injuries.

Both LGA and macrosomia have commonly been reported to increase the risk of specific injuries, including fracture of clavicle and brachial plexus injuries.<sup>4,22</sup> This is similar to the results of this study. Larger infant size is usually associated with abnormal labor progression and difficult delivery, and might result in increased use of instrumental deliveries or increase in shoulder dystocia. The results of this study demonstrated that infants with major neonatal birth injuries were at increased risk of many adverse outcomes including a lower Apgar score, NICU admission, and longer hospital stay. Our findings were similar to other previous studies.<sup>4,6,9,19,23</sup>

A recent review reported that common sites for neonatal birth injuries can include the head, neck, and shoulders and other less common locations include the face, abdomen, and lower limbs.<sup>3</sup> The most common major neonatal birth injuries in this study were subgaleal hematoma in about 0.41% (77.8% of cases), followed by fracture of the clavicle and brachial plexus injuries in 0.07% (12.3% of cases). Previous studies also reported that the most frequent types of neonatal birth injuries were scalp injuries and clavicular fracture.<sup>6,9</sup> Another study reported incidence of birth trauma of 0.8% and the most common types of trauma were cephalohematoma (37.03%).<sup>7</sup>

Differences in the results might be from differences in population characteristics, risk factors, health care settings, care provided during labor and delivery, and definitions used. Although the majority of neonatal birth injuries occur in infants with risk factors, some occur in the absence of any identifiable risk factors. Many studies have reported risks for neonatal birth injuries but the ability to predict these injuries by these factors is markedly limited.<sup>6</sup> It is still a challenging issue to predict and avoid neonatal birth injuries as well as improve neonatal outcomes.



## Limitations

There are some limitations in this study. Samples might be limited in comparison between groups so the power of the study could be limited. In addition, risks and outcomes of specific types of injuries could not be determined accurately due to the small number of cases. This study was conducted in a single large tertiary care hospital so that generalization of the results to other hospitals could also be limited due to different health care settings and level of care. However, the results provide some additional information regarding this important issue and could be used as basic knowledge for future improvement of care of pregnant women and their infants.

## Conclusions and Implications for Nursing Practice

The incidence of major neonatal birth injuries was 0.53% with unsatisfactory neonatal outcomes. Most common injuries were subgaleal hematoma, fracture of clavicle, and brachial plexus injuries. Abnormal second stage of labor, instrumental delivery, and LGA infants increased the risk while cesarean delivery significantly reduced the risk of major neonatal birth injuries. For nursing practice, these factors could be applied to use as risk-assessment tool to increase awareness and anticipation of major neonatal birth injuries. Infants of these high-risk women should be carefully and thoroughly evaluated for any possible injuries. Timely diagnosis and treatment of the injuries could improve the prognosis and minimize the related morbidities of the infants in the future.

Further studies are still needed to understand neonatal birth injuries in various aspects, including important predictors and possible prevention program or interventions. At present, although not all neonatal birth injuries are predictable, understanding the incidence and possible associated factors could

help raising awareness when caring women at higher risks. This can also lead to better anticipation, preparation and early detection of the conditions that result in timely management and further improve neonatal outcomes.

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# อุบัติการณ์และปัจจัยเสี่ยงของการบาดเจ็บที่รุนแรงของทารกแรกเกิด ในโรงพยาบาลตติยภูมิในประเทศไทย: การศึกษาแบบ Retrospective cohort

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**บทคัดย่อ:** การบาดเจ็บที่รุนแรงของทารกแรกเกิดสามารถก่อให้เกิดผลเสียต่อทารกทั้งในระยะสั้นและระยะยาว ปัจจุบันยังมีข้อมูลที่จำกัดเกี่ยวกับการเกิดการบาดเจ็บที่รุนแรงของทารกแรกเกิดในประเทศไทย ทั้งในประเด็นของอุบัติการณ์และปัจจัยเสี่ยง วัตถุประสงค์ของการศึกษานี้คือ เพื่อศึกษาอุบัติการณ์และปัจจัยเสี่ยงของการบาดเจ็บที่รุนแรงของทารกแรกเกิด ในโรงพยาบาลตติยภูมิในประเทศไทย โดยทำการทบทวนเวชระเบียนการคลอดจำนวน 15,209 ราย และทำการสืบค้นการเกิดการบาดเจ็บที่รุนแรงของทารกแรกเกิด สำหรับทุกรายที่มีการบาดเจ็บที่รุนแรงของทารกแรกเกิด จะทำการสุ่มเลือกกลุ่มควบคุมจำนวน 4 ราย เพื่อเปรียบเทียบและประเมินหาปัจจัยเสี่ยง จากการทบทวนเวชระเบียน พบการบาดเจ็บที่รุนแรงของทารกแรกเกิด จำนวน 81 ราย คิดเป็นอุบัติการณ์ ร้อยละ 0.53 การบาดเจ็บที่รุนแรงของทารกแรกเกิดที่พบบ่อยได้แก่ การมีเลือดสะสมระหว่างเนื้อเยื่อพังพืดของกะโหลกกับเยื่อหุ้มกะโหลก (subgaleal hematoma ร้อยละ 0.414) กระดูกไหปลาร้าหัก (ร้อยละ 0.066) และการบาดเจ็บต่อชายประสาทบริเวณคอและรักแร้ (brachial plexus injury, ร้อยละ 0.066) เมื่อเปรียบเทียบกับกลุ่มควบคุม กลุ่มที่เกิดการบาดเจ็บที่รุนแรงของทารกแรกเกิด เป็นการคลอดครั้งแรกมากกว่า มีน้ำหนักแรกคลอด มีทารกมีขนาดโตกว่าอายุครรภ์ และมีทารกมีน้ำหนักแรกเกิดมากกว่า 4 กิโลกรัม สูงกว่าอย่างมีนัยสำคัญทางสถิติ ทารกที่เกิดการบาดเจ็บที่รุนแรงของทารกแรกเกิดจะมีการเกิดภาวะขาดออกซิเจนแรกคลอด ความต้องการการใช้หออภิบาลทารกแรกเกิดสูงกว่า และมีระยะเวลานอนโรงพยาบาลนานกว่าอย่างมีนัยสำคัญทางสถิติ ปัจจัยเสี่ยงที่สำคัญของการเกิดการบาดเจ็บที่รุนแรงของทารกแรกเกิดได้แก่ การมีความผิดปกติของระยะที่ 2 ของการคลอด การใช้เครื่องมือช่วยคลอด และทารกมีขนาดโตกว่าอายุครรภ์ ความรู้และความเข้าใจเกี่ยวกับอุบัติการณ์และปัจจัยเสี่ยงของการบาดเจ็บที่รุนแรงของทารกแรกเกิด จะสามารถช่วยเพิ่มความตระหนักในการดูแลสตรีตั้งครรภ์ที่มีความเสี่ยงสูงต่อการบาดเจ็บที่รุนแรงของทารกแรกเกิดได้ การคาดการณ์ล่วงหน้า การเตรียมตัวที่เหมาะสม และการตรวจพบการบาดเจ็บที่รุนแรงของทารกแรกเกิดตั้งแต่ในระยะแรกหลังคลอดจะส่งผลให้สามารถให้การดูแลรักษาได้อย่างรวดเร็วทันการณ์และอาจช่วยให้เกิดผลลัพธ์ที่ดีขึ้นได้

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