

ORIGINAL RESEARCH

A study on neonatal birth injuries in tertiary care teaching hospital: An observational prospective

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ABSTRACT

Background: A birth injury occurs when a baby sustains structural damage as a result of mechanical forces (traction or compression) during labor, delivery, or both. Sometimes birth injuries are preventable, and other times they are unavoidable. There are significant differences in the prevalence of birth trauma amongst emerging nations. Between 0.2 and 41.2 cases per 1000 live births are reported. With advancements in prenatal diagnostics and obstetric treatment, the prevalence of birth injuries has decreased. **Methods:** Maternal age, gestational age, birth order, presentation type, delivery method, infant weight and sex, length of labor, and any instrumental delivery were among the variables recorded. Investigations such as x-rays and ultrasounds were performed when needed. The research was carried out between November 2017 to February 2020. **Results:** Chi Square value is 15.4; P value <0.001 The above table shows that birth injuries are more common in babies with birth weight more than 3 kg. In chi-square statistical analysis showing that P value <0.001. Therefore, birth weight > 3 kg is significant risk factor for birth injury. **Conclusions:** Our research found that the incidence of birth damage was 1.926%, or 24 out of 1246 total newborns. Babies weighing more than 3 kg at delivery were more likely to have birth injuries. Two of the newborns with birth injuries were preterm, while the majority were delivered at term. There were 24 incidences of birth injuries in all. Normal delivery and infant weight over 3 kg were two of the main risk factors for birth injury.

Keywords: Birth Injuries, Neonatal period, Fractures, Nerve injuries.

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INTRODUCTION

Any structural harm to a baby caused by mechanical forces (compression or traction) during labor, delivery, or both is referred to as a birth injury.^{1, 2} Sometimes birth injuries are preventable, and other times they are unavoidable.³ There are significant differences in the prevalence of birth trauma amongst emerging nations.⁴ Between 0.2 and 41.2 cases per 1000 live births are reported. With advancements in prenatal diagnostics and obstetric treatment, the prevalence of birth injuries has decreased. Three groups comprise the risk variables: the delivery mode, maternal factors, and fetal factors. Prematurity, aberrant fetal presentation, and macrosomia are fetal factors. Age, parity, and pelvic anatomy are maternal influences. Obstetric instrumental procedures like as vacuum-assisted birth and forceps are examples of delivery mechanisms.⁵ There is little research on birth

trauma from an Indian viewpoint. In order to come up with ideas for lowering newborn mortality and morbidity, the current research was designed to record the incidence and risk factors for birth trauma.

METHODS**Study period**

The study was conducted during the period from November 2017 to February 2020.

Sample size

Out of 1266 newborn babies, 24 were observed to have birth injuries.

Inclusion criteria

A total of 1266 babies were observed during the study period. Among these 24 babies were found to have birth injuries which formed the study group.

Exclusion Criteria

1. Neonates whose parents have not given consent.
2. Still born / Intrauterine deaths / Terminated pregnancies.
3. Neonates with congenital malformations.

MATERIALS AND METHODS

Maternal age, gestational age, birth order, presentation type, delivery method, infant weight and sex, length of labor, and any instrumental delivery were among the variables recorded. Investigations such as x-rays and ultrasounds were performed when needed. The perinatal death certificate documented the mother's baseline traits as well as the risk variables that led to birth trauma.

Statistical analysis

Values are tabulated after the evaluation of birth injuries. Birth injuries were analyzed using descriptive and inferential statistics. Numbers and percentages are used to display descriptive data. To evaluate the relationship between birth injuries and other covariates, the chi-square test was used. Version 24.0 of the SPSS program was used to analyze the findings. For statistical significance, a p-value of 0.05 or less was taken into account.

TABLE 1: SPECTRUM OF BIRTH INJURIES

S.No	Type of Birth Injury	Number of Cases	%
1	Soft tissue injury	11	25
2	Nerve Injuries	5	11.3
3	Soft tissue Injuries + Nerve Injuries	3	6.8
4	Haemorrhages	6	13.6
5	Hemorrhages + Soft-tissue Injuries	4	9.0
6	Fracture dislocations & Epiphyseal Separations	5	11.3
7	Laceration	5	11.3
8	Laceration and contusion	3	6.8
9	Ecchymosis and bruising	3	6.8
TOTAL		44	100

11 (25%) of the cases have soft tissue injuries, 6 (13.6%) have hemorrhages, 5 (11.3%) have fractures, 5 have lacerations, 4 (9.0%) have nerve injuries, 4 (9.0%) have hemorrhages plus soft-tissue injuries, 3 (6.8%) has laceration and contusion, and 3 (6.8%) has ecchymosis and bruising.

TABLE 2: GESTATIONAL AGE AND BIRTH INJURIES

S.no	Gestational age	No of cases observed	Birth injuries observed	Percentage
1	PRETERM	109	7(15.9%)	8.6%
2	TERM	1157	37(84.0%)	91.3%
	N	1266	44	100%

According to the data in Table 2, the majority of the kids (91.3%) were delivered at term, and out of those 24 instances of birth injuries, two were preterm babies.

TABLE 3: MATERNAL AGE AND BIRTH INJURIES

Maternal age in years	With injuries	Without Injuries
< 20	10	414
21-25	13	325
26-30	12	337
31-36	9	165
	44	1242

Table 3 shows that the number of birth injuries were common in neonates born to mothers of age between 21- 30 yrs; under statistical chi-square analysis P value (0.00001) significant.

RESULTS**GENDER DISTRIBUTION AND BIRTH INJURIES**

Boys and girls were injured at rates of 42.4% and 59.1%, respectively. The ratio of men to women was 0.9: 2.14. Ten male infants and fourteen female newborns had birth injuries that were documented. The odds ratio is 0.59, the risk ratio is 1.17, and the attributable risk is 1.70.

TYPE OF PRESENTATION AND BIRTH INJURIES

Babies with vertex presentation accounted for the majority of birth injuries (21, or 80.3%), followed by breech (5, or 13.4%), brow (3, or 6.8%), and transverse (shoulder)3 (or 6.8%). However, looking at the whole research group, atypical presentations are more likely to have birth injuries.

COMPARISON OF BIRTH INJURIES IN RELATION TO NORMAL PRESENTATION VERSUS ABNORMAL PRESENTATION

In a total of 54 births, the rate of birth injuries was higher in instances with aberrant presentation (10.4%), while in 1196 deliveries, the incidence was only 2.4% for cases with vertex presentation.

The number of birth injury cases observed in neonates were 10, 13, 12 and 9 with maternal age group of <20 yrs, 21-25 yrs, 26-30 yrs and 31-36 yrs respectively.

TABLE 4: BIRTH INJURIES IN RELATION TO MODE OF DELIVERY

Delivery	With Injuries	Without Injuries	Total
Forceps	11	59	64(5.3%)
Normal Delivery	21	863	884(70.1%)
C-Section	12	320	332(26.7%)

TABLE 5: BIRTH INJURIES IN C-SECTION VS VAGINAL DELIVERY

Risk Factor	With Injuries	Without Injuries	Total
Yes (Vaginal Delivery)	19	861	880(70.3%)
No (C-Section)	11	319	330(26.8%)
Total	30	1180	

Chi Square value is 9.4 and P-value is <0.001.

The above table 5 shows that attributable risk is 1.41, odds ratio is 1.7. Table 4 & 5 shows that vaginal delivery when compared to C-Section is a clear risk factor with majority of birth injuries seen in normal vaginal delivery. Birth injuries are much more common in vaginal delivery with assisted forceps.

TABLE 6: WEIGHT OF THE BABY AND BIRTH INJURIES

Birth wt	With Injury	Without Injury	Total	% of Birth Injuries
1-2 kg	2	158	161	0.638%
2.1 to 3 kg	13	752	765	2.41%
>3 kg	14	342	356	4.39%

Chi Square value is 15.4; P value <0.001 The above table shows that birth injuries are more common in babies with birth weight more than 3 kg. In chi-square statistical analysis showing that P value <0.001. Therefore, birth weight > 3 kg is significant risk factor for birth injury.

DISCUSSION

An preventable or inevitable mechanical harm sustained during delivery is referred to as a birth injury. It is still one of the leading avoidable causes of newborn illness and a significant source of morbidity and death, despite a recent decline in incidence brought on by improvements in the quality of obstetrical care.

The prevalence of birth injuries varies greatly, however due to advancements in obstetric care, the morbidity and fatality rates from birth injuries have decreased to as low as 2% of newborn mortality and 3% of neonatal morbidity.

INCIDENCE OF BIRTH INJURIES

We saw 1246 births throughout the time we were studying. Twenty-four of them were born with different birth injuries. In our analysis, the incidence rate was 1.926%. According to a research by Warke et al., there are 3.26 birth injuries for every 1000 live births.⁶ Similar findings were made by Suleiman et al. (2016), who showed that 0.4% of birth injuries occurred.⁷

SEX DISTRIBUTION

Of the 1246 births in our research group, 41.67% of the kids were male and 57.33% were female; 10 of the male babies and 14 of the female babies experienced birth injuries. This outcome was similar to that of the research by Numan N. Hameed et al., which

discovered that 43 females and 57 men had birth injuries.⁸ According to our research, female newborns were more likely to have birth injuries. Although not statistically significant, birth injuries were 1.4 times more likely in female newborns than in male ones. In contrast, Osinaike et al. (2017) found that boys were more likely than females to have birth injuries, accounting for 62.7% of all cases.⁹

SPECTRUM OF BIRTH INJURIES

Eight (33.33%) of all birth injuries in our study were soft tissue injuries, followed by cephalhematomas in three, hemorrhages in four (16.67%), fractures, dislocations, and epiphyseal separations in three (12.5%), nerve injuries in two, laceration in three, and other injuries involving a combination of injuries. there were 29 birth trauma cases for every 1000 hospital deliveries. The most common birth trauma was scalp injuries (20.6 per 1000 births), which were followed by skeletal injuries (3.70 per 1000 births) and clavicle fractures (2.43 per 1000 births).¹⁰

MATERNAL AGE

The frequency of delivery injuries may be influenced by the mother's age. delivery injuries may happen from the head having to be molded under pressure and the body having to be pushed into a stiff delivery canal if the mother is extremely young or an older primi. Shoulder dystocia may lead to fractures and/or damage to peripheral nerves.

In our research, we found 5, 8, 7, and 4 instances of birth damage in neonates whose mothers were under 20, 21–25 years old, 26–30 years old, and 31–36 years old, respectively. It demonstrates that birth injuries are more prevalent among moms in the young, primi age range. delivery injuries are more likely to occur in young mothers because their delivery canals are more stiff. According to a research by Osinaike et al., 77.3% of the 17–30 age group had birth injuries.¹¹

PARITY

Ten kids with birth injuries were second-born (parity 2), nine were first-born (parity 1), three were third-born (parity 3), and two were fourth-born (parity 4), according to our research. As the birth order rose, the frequency of injuries decreased. The infant must travel through the birth canal under tension because to the inelastic birth channel in primi moms, which may cause birth injuries. The fetus may lay in an awkward posture due to the robust birth canal in grand multiparas, which may result in delivery damage. A research by Bhalla et al. similarly showed similar outcomes (66.6%).¹²

PRESENTATION

The infants delivered via vertex presentation had the majority of the damage. Nineteen (79.16%) of the 1246 births were vertex presentations, followed by breech three (12.5%), brow one (4.17%), and transverse (shoulder) in one (4.17%). It demonstrates that birth injuries are more prevalent when they occur abnormally. Instrumentation like forceps, which cause soft tissue injuries, may be the cause of the increased number of injuries seen with atypical presentations. Three (12.5%) of the newborns in this research were breech, one (4.17%) had a brow, and one (4.17%) had a transverse (shoulder) presentation. Of the wounded, 24 (88.9%) presented cephalic, and 3 (11.1%) were breech.^{10,11}

MODE OF DELIVERY

Many times, the kind of birth injury depends on the delivery method. Babies born vaginally may sustain soft tissue damage, but if labor lasts a long time, there is a risk of hypoxia. Four forceps births, six LSCS deliveries, and fourteen vaginal deliveries were among the 24 birth traumas in our research. The kind and prevalence of birth injuries are determined by the use of forceps, the obstetrician's expertise, the length of labor, and the size of the head. Bhalla et al.¹⁴ observed similar findings.

WEIGHT OF THE BABY

It should be kept in mind that big newborns are more likely to have birth injuries during labor. The incidence of delivery injuries among birth weights of >3.1 kg, 2.1-3 kg, and 1-2 kg was 3.39%, 1.47%, and 0.637%, respectively, in our research. Research indicates that newborns weighing more than 3.1 kg at birth were more likely to sustain injuries. Therefore, a

birth weight of more above 3.1 kg increases the risk of birth damage.

CONCLUSIONS

Our research found that the incidence of birth damage was 1.926%, or 24 out of 1246 total newborns. The bulk of birth injuries were seen in term neonates, and they were more prevalent in newborns weighing more than 3 kg at delivery. Compared to kids delivered by C-section, more incidences of birth injuries were seen in vaginal deliveries. Forceps-assisted deliveries resulted in higher birth injuries among vaginal births. Key elements in lowering traumatic birth injuries include instrumental births, early intervention in the form of LSCS where needed, early identification of risk factors for a difficult delivery and avoidance of traumatizing maneuvers, and routine follow-up throughout the prenatal period. Lastly, the kind and frequency of birth injuries depend on a number of circumstances, including the size of the baby's head, the length of labor, the obstetrician's expertise, and the use of forceps.

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