IMPACT OF CORTICOSTEROIDS ON PERINATAL OUTCOME

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ABSTRACT

Objective: The study's main aim was to demonstrate the efficacy of antenatal corticosteroids (betamethasone) to prevent respiratory distress syndrome (RDS) and other related complications in premature babies and to study the outcomes of neonates whose mothers received corticosteroids during the antenatal period.

Methods: A total of 50 pregnant women with a risk of preterm delivery admitted to the labor ward of Prathima Institute of Medical Sciences were included in the study. It is a prospective, hospital-based, and longitudinal study. All women coming to the antenatal outpatient department of Prathima Institute of Medical Sciences who are at risk of preterm delivery were selected. The follow-up component of the study involved women identified as at high risk for premature delivery and who had received betamethasone. The neonatologist diagnosed the neonatal complications was taken as an outcome.

Results: Of the 50 babies that were enrolled in the study, 27 (54%) were delivered by spontaneous vaginal delivery, 1 by assisted breech (2%), 1 by instrumental delivery (2%), and 18 (36%) were delivered by cesarean section. The occurrence of RDS among babies with low APGAR was 4 (44.44%). Only one intraventricular hemorrhage occurred among the category, with a low APGAR score (11.11%). Out of 19 cases, ten deaths were identified, and nine were alive within 24 h due to the action of steroids. Among 31 cases, two cases were death, and 29 were alive after 24 h of the duration of action of steroid. Even though mothers of all babies in this study admitted to the neonatal unit had received corticosteroids, there was still 24% mortality by 28 days. The results suggest that once admitted to NICU, having only received a single dose of corticosteroids <24 h previously (as opposed to more than 24 h), gestational age <34 weeks, and having any listed neonatal complications were associated with mortality by 28 days.

Conclusion: Even though 50% of the neonates suffered complications, over 40% of the subjects were delivered before betamethasone could take effect. Several other factors, apart from betamethasone, influenced the outcome of neonates. The present study showed that the use of ANCS administration is the single most intervention to prevent complications of prematurity which can be done at a public health center or by a private practitioner, even in rural areas.

Keywords: Corticosteroid, Premature neonate, Gestational age, APGAR score, Respiratory distress syndrome.

INTRODUCTION

In most developing countries, the infant mortality rate is 30/1000 live births (UNICEF, 2010). The use of corticosteroids throughout the antenatal period for expectant mothers at high risk of premature delivery is one of the most effective therapies to lower neonatal morbidity and mortality (NIH consensus, 1994). Despite the data from numerous research, <30% of preterm labor mothers in underdeveloped countries use prenatal corticosteroids (WHO, 2010). Obstetricians and neonatologists have faced difficulties caring for newborns born prematurely due to fetal lung maturity. The leading cause of newborn death in preterm infants is respiratory distress syndrome (RDS); therefore, treating the fetal lungs' immaturity is of utmost importance. All women between 28 and 34 weeks of gestation at high risk of preterm delivery should get prenatal corticosteroids (ANCS) medication. They are also advised when there is an indication of pulmonary immaturity after 34 weeks of gestation. Antenatal corticosteroid therapy is most helpful in lowering RDS in pregnancies that give birth 24 h or more — up to 7 days — after administering the second dose of corticosteroids. Steroid effectiveness may be affected by the interval between dosage and delivery [1,2]. Use of antenatal corticosteroids has not been demonstrated to increase the mother's risk of dying, developing chorioamnionitis, or developing puerperal sepsis, nor has it been linked to an increased risk of infection in women who have pre-term premature rupture of the membranes (PPROM) or a higher rate of stillbirth in women who have pregnancy-related hypertension [1,3]. The biggest obstacle to administering prenatal corticosteroids is quickly identifying pregnant women at risk of premature delivery. The total number of neonates giving birth in the late pre-term period and needing admission to the neonatal hospital for RDS is higher, even if the risk of RDS is higher under 34 weeks. Almost 50% of newborns require critical care at 34 weeks of gestation; this number lowers to 15% at 35 weeks and 8% at 36 weeks [4]. Since 1972, when Liggins *et al.* demonstrated that corticosteroids could stop RDS. In affluent nations, several additional trials on prenatal corticosteroids have been conducted. The findings revealed a proportionate decrease in infant mortality, intraventricular hemorrhage (IVH), and RDS. It was discovered in South Africa that the limited use of corticosteroids was a significant problem, leading to the conclusion that newborns in underdeveloped nations receive scant or no care. No particular organizational and infrastructure modifications are also required [5]. In contrast to the developed countries, however, the coverage of use has been minimal there. Prenatal corticosteroids are advised by the national standard treatment recommendations for mainland Tanzania to prevent RDS in pregnant women at risk of pre-term delivery before 36 weeks. Dexamethasone is recommended as a backup treatment after hydrocortisone [6]. A pre-term baby is born alive before the full 37 weeks of pregnancy, according to the WHO. In 184 nations, the percentage of pre-term births ranges from 5 to 8%. The majority of pre-term births and prematurity-related newborn mortality occur in India. Many survivors may live with difficulties for the rest of their lives, including learning, hearing, and vision impairments. Pre-term delivery is the second most prevalent cause of mortality in children under five (behind pneumonia) and is a risk factor in at least 50% of all neonatal fatalities. This study's objectives were to examine

the outcomes of neonates whose mothers had received corticosteroids during the prenatal period and to show the effectiveness of antenatal corticosteroids (betamethasone) in preventing RDS and other related issues in premature newborns.

METHODS

Sample size
A total of 50 pregnant women with the risk of pre-term delivery were admitted to the labor ward of Prathima Institute of Medical Sciences.

Study design
This was a prospective, hospital-based, and longitudinal study.

Study protocol
All women coming to the antenatal outpatient department of Prathima Institute of Medical Sciences who are at risk of preterm delivery were selected. The follow-up component of the study involved women identified as at high risk for premature delivery and who had received betamethasone. These were asked to participate after being given information about the study. Those who accepted to participate were followed to delivery and the babies that were admitted to the neonatal ICU were enrolled in the study. These babies were followed to discharge day, day of death, or up to the 28th day. The neonatologist diagnosed the neonatal complications was taken as an outcome. Patients are referred from city municipal hospitals, nearby villages, and private maternity homes. Apart from the referred patients, many patients with or without obstetric complications come directly from home. Delivery data were recorded in the proforma that has been included in the study. The basis is case sheets, operation theater notes, parturition registers, and NICU records.

Sampling procedure
This study was by convenience sampling.

Inclusion criteria
The following criteria were included in the study:
- All antenatal women who delivered pre-term spontaneously or by elective or emergency cesarean section (28–38 weeks) at labor ward of Prathima Institute of Medical Sciences
- Singleton pregnancies.

Exclusion criteria
The following criteria were excluded from the study:
- Women who had severe infections such as chorioamnionitis before delivery
- Intrauterine fetal death, congenital anomalies
- Neonates delivered at a gestational age of <28 weeks.

Ethical consideration
Ethical approval was sought and obtained from our college's Institutional Ethics Committee. This was done before commencing the enrolment of participants and data collection. Client confidentiality was maintained throughout the study and the identities of the participants were only known by the core study staff. The main ethical issue in this observational study was confidentiality, which was well maintained. Consent was taken from the client, the proforma of which has been included in the study. Customs in local communities associate prematurity with problems of development. Some women did not want it to be known that their baby was admitted to the neonatal ICU.

Data analysis and statistics
The impact of corticosteroids on perinatal outcomes was made. Qualitative data such as neonates with no complications, RDS, SEPSIS, IVH, necrotizing enterocolitis (NEC), and their results were presented as numbers and percentages. Chi-square and Fisher's exact tests were used as significance tests for qualitative data. A significant difference was considered when p<0.05. All data were analyzed using Statistical Packages for the Social Sciences 20.0 version.

RESULTS

A total of 50 neonates were enrolled during the antenatal period and were followed for the first 28 days of their life or to either date of discharge or death. All these babies were born of mothers who had received betamethasone injections during the antenatal period. Only mothers who agreed to have their babies participate in the study were followed up until delivery. Of the 50 neonates, 25 (%) did not have complications, 14 (28%) had respiratory distress, and the other 9 (18%) had sepsis. Only one baby had NEC (2%). One (2%) neonate was diagnosed with intraventricular hemorrhage (Table 1).

Table 2 shows the complications among neonates delivered by different delivery methods. Of the 50 babies enrolled in the study, the majority were 27 (54%), delivered by spontaneous vaginal delivery (SVD). The incidence of RDS among babies delivered by cesarean section 4 (22.22%) was lower than that of babies delivered by spontaneous vaginal delivery 8 (29.6%). The number of babies delivered by SVD, who had no complications 15 (55.55%), was equal to those delivered by cesarean section 10 (55.55%). The occurrence of sepsis among SVDs 4 (14.81%) was slightly lower than those delivered by cesarean section 3 (16.66%). Only one baby delivered by cesarean section suffered from the rare NEC (5.55%), and one baby suffered from intraventricular hemorrhage (25%). A total of 12 neonates (24%) died before 28 days (Fig. 1). The odds ratio of a baby that did not have a cesarean dying = 1.167 (i.e., not having cesarean birth was detrimental). Approximate 95% confidence interval = 0.2967–4.588 is non-significant (p=0.99).

Table 3 shows how neonatal complications were distributed among the different APGAR scores at 5 min. The scores were divided into three blocks: Very low, low, and normal. A very low APGAR score had a prevalence of RDS 3 (60%) compared with a good APGAR 7 (50%). The occurrence of RDS among babies with low APGAR was 4 (44.44%). A low APGAR score was associated with a lower occurrence of sepsis 1 (11.11%) compared to a good APGAR score of 7 (77.77%). More babies were born with no complications in the good APGAR score group 21 (58.33%) compared with the low APGAR score group 3 (33.33%). The only case of NEC that occurred among the category was with a good APGAR score (2.77%). The only case of intraventricular hemorrhage among the category was a low APGAR score (11.11%). An odds ratio of the baby that had an APGAR score
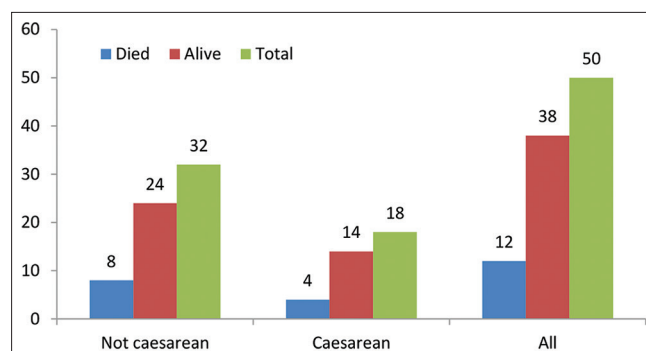

Fig. 1: Deaths in association with mode of delivery

Table 1: Neonatal outcome

Neonatal outcome	n (%)	Confidence interval
RDS	14 (28)	17.47–41.66
SEPSIS	9 (18)	9.771–30.80
NEC	1 (2)	0.354–10.49
No complications	25 (50)	36.65–63.35
IVH	1 (2)	0.354–10.49
Total	50 (100)	

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

of 7 or less dying was 4.714 (i.e., having a very low APGAR score at 5 min is detrimental). The approximate 95% confidence interval was 1.069–20.79, which is significant p=0.047 (Fig. 2).

Table 4 shows the distribution of neonatal complications among the different groups of gestational ages at which neonates were born. RDS among neonates born 30–34 weeks was 8 (61.53%) compared with babies born between 34 and 38 weeks was 6 (16.21%). The number of neonates who developed sepsis for those delivered between 30 and 34 weeks was 2 (15.38%) and those at 34–38 weeks was 7 (18.91%). The incidence of having no complications for neonates delivered between 30 and 34 weeks gestation was 3 (23.07%), and those at 34–38 weeks were 22 (59.45%). IVH was in one neonate born at 34–38 weeks (2.7%). The odds ratio of baby that had a gestation 30–34 weeks (compared to >34 weeks) dying was 25.5 (i.e., gestational age 30–34 weeks is detrimental compared to >34 weeks). About 95% confidence interval was 4.813–135.1, and that is significant p=0.001 (Fig. 3).

Table 5 below shows how neonatal complications occurred among the different weight categories. The occurrence of RDS was higher among the low-birth-weight category 10(71.42%), followed by the normal weight group 4 (11.11%). The prevalence of sepsis in the normal-weight category was 7 (19.44%) and 2 (14.28%) in the low-birth-weight category. The low-birth-weight category had 2 (14.28%) with no complications, while the normal-weight group category had
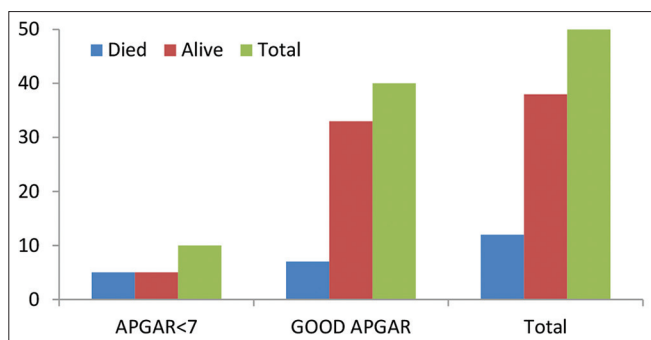

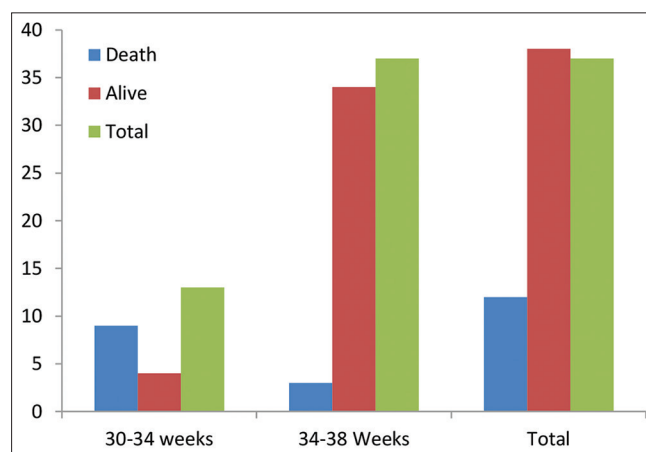Fig. 2: Deaths associated with APGAR scoring

Fig. 3: Deaths associated with gestational age

Table 2: Neonatal complications and mode of delivery

Mode of delivery	RDS, n (%)	NEC, n (%)	Sepsis, n (%)	IVH, n (%)	No complications, n (%)	Total, n (%)
SVD	8 (29.6)	0	4 (14.81)	0	15 (55.55)	27 (100)
Caesarean	4 (22.22)	1 (5.55)	3 (16.66)	0	10 (55.55)	18 (100)
Assisted breech delivery	0	0	1 (100)	0	0	1 (100)
Instrumental delivery	2 (50)	0	1 (25)	1 (25)	0	4 (100)
Total	14 (28)	1 (2)	9 (18)	1 (2)	25 (50)	50 (100)

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular haemorrhage, SVD: Spontaneous vaginal delivery

Table 3: APGAR scores at 5 min and neonatal complications

APGAR	RDS, n (%)	NEC, n (%)	Sepsis, n (%)	No complications, n (%)	IVH, n (%)	Total, n (%)
APGAR very low (<5)	3 (60)	0	1 (20)	1 (20)	0	5 (100)
Low APGAR (5,6,7)	4 (44.44)	0	1 (11.11)	3 (33.33)	1 (11.11)	9 (100)
Good APGAR (8,9,10)	7 (19.44)	1 (2.77)	7 (19.4)	21 (58.33)	0	36 (100)
Total	14 (28)	1 (2)	9 (18)	25 (50)	1 (2)	50 (100)

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

Table 4: Neonatal complications and gestational age

Gestational age (weeks)	RDS, n (%)	NEC, n (%)	Sepsis, n (%)	IVH, n (%)	No complications, n (%)	Total, n (%)
30–34	8 (61.53)	0	2 (15.38)	0	3 (23.07)	13 (100)
34–38	6 (16.21)	1 (2.7)	7 (18.91)	1 (2.7)	22 (59.45)	37 (100)
Total	14 (28)	1 (2)	9 (18)	1 (2)	25 (50)	50 (100)

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

Table 5: Categories of birth weight and neonatal complications

Birth weight (g)	RDS, n (%)	NEC, n (%)	Sepsis, n (%)	IVH, n (%)	No complications, n (%)	Total, n (%)
Very LBW (<1000)	0	0	0	0	0	0
LBW (1000–2000)	10 (71.42)	0	2 (14.28)	0	2 (14.28)	14 (100)
Normal birth weight (2000–3500)	4 (11.11)	1 (2.77)	7 (19.44)	1 (2.77)	23 (63.88)	36 (100)
Total	14 (28)	1 (2)	9 (18)	1 (2)	25 (50)	50 (100)

LBW: Low birth weight, RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

23 (63.88%). The odds ratio of a baby with a birth weight <2000 g (compared to a birth weight >2000) dying was 51.8. 95% confidence interval=5.225–513.5, that is significant p=0.001 (Fig. 4).

Table 6 shows the distribution of neonatal complications in the three categories of duration of action of betamethasone. The prevalence of RDS in neonates with a duration of action <24 h was 7 (36.84%) and 5 (23.80%) for neonates with a duration of 1 week. Only 2 (20%) neonates had more than 1 week of duration. Among neonates with a duration of <24 h, the prevalence of sepsis was 1 (5.2%) within 24 h, within 1 week was 5 (23.80%), and more than 1 week was 2 (20%). The prevalence of NEC in the duration of action of <1 week was 1 (4.76%). The prevalence of IVH in the category of the duration of action <24 h was 1 (5.2%). Those with no complications were 10 (52.63%) in <24 h, 10 (47.61%) in 1–7 days, 5 (50%) in >7 days. Out of 19 cases, ten deaths were identified, and nine were alive within 24 h due to the action of steroids, and among 31 cases, two cases were death, and 29 were alive after 24 h of the duration of the action of steroids. The odds ratio of a

baby with betamethasone <24 h before delivery (Compared with a baby delivered more than 24 h of betamethasone injection) dying was 16.11 with a 95% confidence interval was 2.966–87.51and that is a significant p<0.001. Table 7 shows neonatal complications distributed according to either presence or absence of chronic maternal disease. Out of the 50 neonates enrolled in the study, ten were born to mothers with a pre-existing chronic disease (including chronic hypertension, asthma, and diabetes mellitus), one of the ten neonates developed sepsis, four had RDS and four had no complication, and one had IVH. On the other hand, 21 (52.5%) neonates born to mothers with no pre-existing disease had no complication, 8 (20%) had sepsis, and one had NEC.

Table 8 shows the distribution of neonatal complications among four different causes of birth. Out of the 42 neonates born due to premature labor, 11 (26.19%) had RDS, 5 (11.9%) had sepsis, 1 (2.3%) had NEC (2.3%), and 24 (57.14%) had no complications. A total of six neonates were born due to hypertensive disorders. Oned (16.66%) of these had RDS, 4 (66.66%) had sepsis, and 1 (16.66%) had no complication. Neonates delivered due to antepartum hemorrhage were only two, out of which both (100%) had RDS. The two cases of APH were reported to be death cases; among the 48 non-APH cases, 10 died, and 38 were alive. There were two neonatal deaths among the six reported gestational hypertensive disorder cases, and four were live. Out of 44 gestational non-hypertensive disorder cases, ten were neonatal death cases, and 34 were live. Table 9 shows neonatal complications related to the neonate's status at the exit from the study. Thirty-eight (76%) babies were discharged from the study by the 28th day of life. Out of those discharged, 7 (18.4%) had been treated for RDS, 7 (18.42) had sepsis, 22 (57.89%) had no complication, one had IVH (2.63%), and one had NEC. A total of 12 (24%) neonates died, and of those, 7 (58.33%) had RDS, 2 (16.66%) had sepsis, and 3(25%) had no complications. Due to neonatal complications, nine died, and 16 were alive among the 25 cases of neonatal complications. At the same time, three died, and 22 were alive among the 25 cases of non-neonatal complications. During neonatal death, out of 12 cases, 10 (83.33%) died within the 1st week of life, and only 2 (16.66%) died after the 1st week of life. Even though
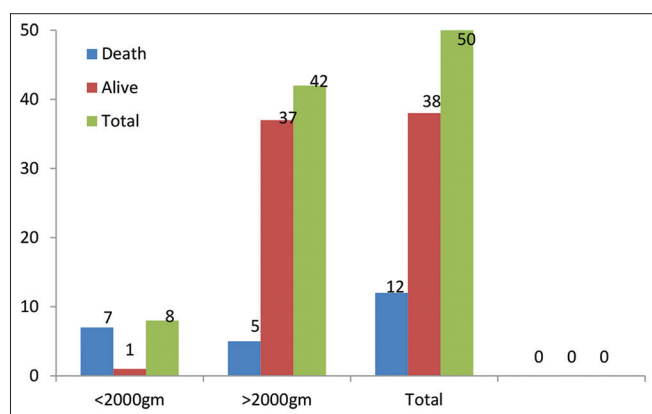

Fig. 4: Deaths associated with birth weight

Table 6: Duration of betamethasone action and neonatal complications

Duration of action	Neonatal complications					Total, n (%)
	RDS, n (%)	NEC, n (%)	Sepsis, n (%)	No complications, n (%)	IVH, n (%)	
<24 h	7 (36.84)	0	1 (5.2)	10 (52.63)	1 (5.2)	19 (100)
1–7 d	5 (23.80)	1 (4.76)	5 (23.80)	10 (47.61)	0	21 (100)
>7 d	2 (20)	0	3 (30)	5 (50)	0	10 (100)
Total	14 (28)	1 (2)	9 (18)	25 (50)	1 (2)	50 (100)

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

Table 7: Neonatal complications and maternal chronic disease

Maternal disease	RDS (%)	NEC (%)	Sepsis (%)	IVH (%)	No complications (%)	Total (%)
No disease	10 (71.4) (25)	1 (100) (2.5)	8 (88.88) (20)	-	21 (84) (52.5)	40 (80) (100)
With disease	4 (28.87) (40)	-	1 (11.11) (10)	1 (100) (10)	4 (16) (40)	10 (20) (100)
Total	14	1	9	1	25	50

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

Table 8: Cause of premature birth and neonatal complications

The condition, leading to delivery	Neonatal complications					Total, n (%)
	RDS, n (%)	NEC, n (%)	Sepsis, n (%)	IVH, n (%)	No complications, n (%)	
Antepartum hemorrhage	2 (100)	0	0	0	0	2 (100)
Hypertensive disorder	1 (16.66)	0	4 (66.66)	0	1 (16.66)	6 (100)
Other causes	11 (26.19)	1 (2.3)	5 (11.9)	1 (2.35)	24 (57.14)	42 (100)
Total	14 (28)	1 (2)	9 (18)	1 (2)	25 (50)	50 (100) p=0.053

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

Table 9: Neonatal complications and status at exit from the study

Exit status	RDS, n (%)	NEC, n (%)	Sepsis, n (%)	IVH, n (%)	No complications, n (%)	Total, n (%)
Discharged	7 (18.4)	1 (2.63)	7 (18.42)	1 (2.63)	22 (57.89)	38 (100)
Died	7 (58.33)	0	2 (16.66)	0	3 (25)	12 (100)
Total	14 (28)	1 (2)	9 (18)	1 (2)	25 (50)	50 (100)

RDS: Respiratory distress syndrome, NEC: Necrotizing enterocolitis, IVH: Intraventricular hemorrhage

mothers of all babies in this study admitted to the neonatal unit had received corticosteroids, there was still 24% mortality by 28 days. The results suggest that once admitted to NICU, having only received a single dose of corticosteroids <24 h previously (as opposed to more than 24 h), gestational age <34 weeks, and having any listed neonatal complications were associated with mortality by 28 days.

DISCUSSION

The goal of the present study was to investigate the prenatal usage of corticosteroids in preterm births that occurred at Prathima Hospital's labor ward between 2015 and 2017. In this study, all moms at risk of preterm delivery received betamethasone, the sole prenatal corticosteroid administered. In contrast to studies conducted around the world, where prenatal corticosteroids use ranged between 40% and 70% [7-9] in impoverished countries and 70–80% [10,11] in wealthy countries, the prevalence of use of antenatal corticosteroids was 70% in the Prathima labor ward. Just 10% of pre-term infants in low- and middle-income countries presently get prenatal corticosteroids. This figure stands in stark contrast to the more than 70% of pre-term babies in high-income nations who receive the intervention [12]. The likelihood of receiving prenatal corticosteroids was lower in women who gave birth at a gestational age >34 weeks. This was in line with findings from a study conducted in Thailand, which sought to track changes in the use of prenatal corticosteroids in preterm birth by examining the prescription process and identifying risk factors. In that study, practically all doctors agreed that prenatal corticosteroid usage was suitable between 28 and 34 weeks of gestation [9]. Betamethasone uses increased with preterm births linked to PPROM. A similar finding was made in a California study, which found that multiple pregnancies and membrane rupture before birth were linked to a higher risk of taking prenatal corticosteroids. About 70% of the premature newborns connected to PPROM received the full dose of prenatal steroids. Many patients with PPROM were not exposed to prenatal corticosteroids, which may have been caused by a delay from the patient's home or referring hospital [10].

The use of prenatal corticosteroids at Prathima Hospital was discovered to be related to a number of variables. The duration from admission to birth was significantly correlated with the usage of prenatal corticosteroids. Contrary to shorter hospital stays, women with longer stays were more likely to receive prenatal corticosteroids. As the interval from admission to birth lengthened, there was a favorable trend in the usage of prenatal corticosteroids. This result is comparable to that of a study conducted in Latin America, where it was found that women who spent a long period in the hospital were more likely to be prescribed corticosteroids since there was ample time to identify them and administer them [8]. The present study revealed that hypertensive disorders of pregnancy and prolonged rupture of membranes were common problems, leading to preterm delivery, which seems to be common according to other studies on preterm delivery worldwide [7-13].

RDS prevalence was decreased in cesarean deliveries of newborns. Compared to vaginal delivery, those who underwent elective cesarean sections were more likely to get corticosteroids. This can be explained by having enough time to provide prenatal corticosteroids. The same results were observed in a research conducted in the United States of America, where mothers who gave birth preterm with a diagnosis of fetal distress were less likely to receive prenatal corticosteroids when they gave birth vaginally through an elective cesarean section [10].

According to population-based case–control research by Gerten *et al.* from 2005, having a cesarean delivery increases the likelihood of developing RDS. Their last observation noted that, although still increased, the risk of RDS was decreased with labor before cesarean section [14]. The present study, therefore, agreed with the previous investigations. Furthermore, it was discovered that neonates exposed to betamethasone had lower 5-min APGAR scores, lower needs for resuscitation, and lower rates of RDS than neonates who were not disclosed. The same results were reported in research conducted as part of the SEA-ORCHID project on the use of prenatal corticosteroids before preterm delivery in four countries in South-east Asia [14]. In the current study, 72% of individuals who took steroids had a good APGAR score (>7). In light of this, the current investigation aligns with the SEA-ORCHID project. The prevalence of RDS in newborns of mothers who received betamethasone in the present study was 28% (14), significantly lower than that reported in the literature. The low incidence of IVH (2% [1]) suggests that betamethasone is to hold responsible. The incidence of one case of NEC may be acceptable since this condition is not shared. Sepsis, an infective process, was as high as 18% (9). This might imply that something is going on in the environment that may contribute to this infection level. This finding is inconsistent with the research results that a single course of antenatal corticosteroids was not significantly associated with neonatal infectious complications (Vermillion *et al.*, 1999) [15]. Lee *et al.* (2006) [16] recommended using dexamethasone 6 mg every 4 h, given intramuscularly. The duration from betamethasone injection to delivery for 20 neonates enrolled in the study was <24 h. Only 21 neonates had a period lasting up to 1 week. The course of action of more than 24 h is associated with better outcomes (Riley and Boozer, 2011) [17] which is consistent with our study. In the present study, it has also been observed that pregnant women without corticosteroids had higher neonatal RDS (80%) and Sepsis (10%) within the first 24 h of birth. Finally, those not receiving corticosteroids also had much higher neonatal mortality (72%) within the first 24 h. In contrast, in the present study in which all women received steroids, neonatal mortality was 52.6% within the first 24 h, and overall mortality was only 24%. Hence, the administration of corticosteroids has been proven to decrease perinatal morbidity and mortality significantly, especially when the time interval between the second dose of steroid administration and delivery is more than 24 h [18-20].

Study limitations
The sample size was small. The study was performed at Prathima Institute and did not represent the country's population. Neonates whose mothers did not receive betamethasone were not followed to see if they would have had different outcomes.

CONCLUSION

More than 40% of the individuals were delivered before betamethasone could start working, despite the fact that 50% of the neonates experienced problems. In addition to betamethasone, several other factors affected the outcomes of newborns. The critical determinants of its use were the availability of betamethasone and the stage of labor (advanced stage of labor) when pregnant women were referred from other hospitals. Pregnant women at Prathima Hospital who delivered preterm babies used prenatal corticosteroids at a rate comparable to further research. Yet, compared to moms referred from other institutions for the care of an anticipated premature newborn, utilization was higher in mothers who were admitted straight to the Prathima labor unit. This observation necessitates educating the health

workers on antenatal corticosteroids in anticipated pre-term delivery in peripheral, private hospitals. The present study showed that the use of ANCS administration is the single most intervention to prevent complications of prematurity which can be done at a public health center or by a private practitioner, even in rural areas.

AUTHORS' CONTRIBUTION

Divya KSK contributed study conception and design and performed the work, analysis, and interpretation of results. Barla Komal Sahithi contributed draft manuscript preparation and statistical data analysis. Vivarna Gedala corrected the manuscript.

CONFLICTS OF INTEREST

The authors declared no conflicts of interest.

AUTHORS' FUNDING

Any funds did not support the work.

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