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A decade of experience with use of antenatal corticosteroids in preterm birth: Maternal and neonatal outcomes in the resource constraint setting of Maiduguri, North-Eastern Nigeria

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Abstract*: Background:* According to the American College of Obstetrics and Gynaecology (ACOG) and American Academy of Pediatrics (AAP), administration of antenatal corticosteroids to the woman who is at risk of imminent preterm delivery is strongly associated with decreased neonatal morbidity and mortality. It enhances lung maturity and surfactant production. Surfactant is phospholipid/ glycoprotein molecule that is produced by type II pneumocytes in the alveolar sacs between 22 and 28 weeks gestation. Also following preterm birth, there is poor lung fluid absorption that further compounds the preterm baby's smooth transition from intra-uterine life to extra-uterine life.
Objective: To review the beneficial effect of antenatal corticosteroids (dexamethasone) use among pregnant mothers presenting with imminent preterm birth at labour ward and admitted at special care baby unit of University of Maiduguri Teaching Hospital over a ten-year period (2012 to 2022).
Subjects and method: Over the ten year period, case notes of 425 women who had preterm birth with complete information were retrieved and analyzed after obtaining ethical clearance from the hospital's ethics and research committee. The study was conducted in accordance with Helsinki declaration of 2013 as amended.
Result: During the 10-year study period, 21,458 births were recorded and of these, 425 deliveries were below 37 completed weeks, and benefitted from treatment with antenatal corticosteroid. The preterm births had benefitted from at least two doses of dexamethasone at dose of 6 mg 12 hourly, with prevalence of (2.3%). before birth. There was improved APGAR score (≥7 at one and five minutes). Respiratory distress syndrome, and necrotizing enterocolitis were equally low.
Conclusion: Antenatal corticosteroid administration in preterm birth (2.3%) was very low. Similar observation has also been made across Nigeria and other (LMIC) low middle income countries. Dexamethasone use in preterm birth had proven beneficial in improving survival among preterm babies and thereby reducing the duration of hospitalization. We are suggesting further research in the use of antenatal/prenatal dexamethasone in imminent preterm birth.

Keywords: Antenatal corticosteroid, Dexamethasone, preterm premature rupture of membranes, respiratory distress syndrome, prematurity.

Résumé: Selon le Collège Américain de Gynécologie Obstétrique et l'Académie Américaine de Pédiatrie, l'administration de corticostéroïde en anténatal aux femmes qui risquent d'accoucher prématurément, est fortement associée à une diminution de la morbidité et de la mortalité néonatale.

Elle améliore la maturité des poumons et la production de surfactant, une molécule phospholipidique et glycoprotéique produite par les pneumocytes de type II dans les sacs alvéolaires entre la 22e et la 28e semaine de gestation. En outre, après une naissance prématurée, l'absorption du liquide pulmonaire est faible, ce qui compromet la transition du prématuré de la vie intra-utérine à la vie extra-utérine.
Objectifs: Evaluer l'effet bénéfique de l'utilisation de corticostéroïdes anténatals (dexaméthasone) chez les gestantes présentant un risque d'accouchement prématuré imminent, admises dans l'unité de soins spéciaux pour les nouveaunés de l'hôpital universitaire de Maiduguri sur une période de dix ans (2012 à 2022).
Méthodologie : Au cours de cette période de dix ans, les dossiers de 425 femmes ayant accouché prématurément et disposant d'informations complètes ont été récupérés et analysés. L'autorisation du comité d'éthique et de recherche de l'hôpital a été obtenue. L'étude a été menée conformément à la déclaration d'Helsinki de 2013.
Résultat : Au cours de la période d'étude de 10 ans, 21 458 naissances ont été enregistrées. Parmi elles, 425 accouchements ont eu lieu avant 37 semaines d'aménorrhée et ont bénéficié d'un traitement aux corticostéroïdes anténatals. Les naissances avant terme ont bénéficié d'au moins deux doses de dexaméthasone à raison de 6 mg toutes les 12 heures, avec une prévalence de (2,3%). Le score APGAR s'est amélioré (≥7 à une et cinq minutes). Le syndrome de détresse respiratoire et l'entérocolite nécrosante étaient également faibles.
Conclusion : L'administration prénatale de corticostéroïdes pour les naissances prématurées (2,3 %) était très faible. Une observation similaire a également été faite au Nigeria et dans d'autres pays à faible revenu ou intermédiaire. L'administration de la dexaméthasone à la gestante, en cas de naissance prématurée s'est avérée bénéfique pour améliorer la survie des bébés prématurés et réduire ainsi la durée de l'hospitalisation. Nous suggérons de poursuivre les recherches sur l'utilisation de la dexaméthasone anténatale/ prénatale en cas d'accouchement prématuré imminent.

Mots-clés: Corticostéroïde anténatal, Dexaméthasone, rupture prématurée des membranes, syndrome de détresse respiratoire, prématurité.

Introduction

According to the American College of Obstetrics and Gynaecology (ACOG) and the American Academy of Pediatrics (AAP), corticosteroid administration before an anticipated preterm delivery is one of the most important antenatal therapies available to improve the outcome of preterm births.[1,2] Antenatal administration of corticosteroids to a woman who is at risk of imminent preterm delivery is strongly associated with decreased neonatal morbidity and mortality.[3] The World Health Organization clearly outlined the benefits of antenatal corticosteroids to include significantly lower severity, frequency, or both, of respiratory distress syndrome, intraventricular haemorrhages and necrotizing enterocolitis compared with neonates whose mothers did not receive antenatal corticosteroids.[4] Most complications that are associated with prematurity, especially early and moderate preterm birth, involve respiratory insufficiency due to sub-optimal development of the pulmonary system, particularly, the absence or insufficiency of surfactant in the alveoli. Surfactant is a phospholipid/ glycoprotein molecule produced by type II pneumocytes in the alveolar sacs from 22 to 28 weeks gestation. Also following preterm birth, poor lung fluid absorption further compounds the preterm baby's smooth transition from intra-uterine life to extra-uterine life when the lungs become the sole route of oxygen delivery via adequate ventilation-perfusion at the alveolar levels.[5]

The estimated global prevalence rate of preterm birth in the year 2020 was 9.9%, translating to 13.4 million preterm livebirths.[5,6] Of these, the highest preterm birth rate (13.2%) occurred in Southern Asia.[6] Furthermore, over 50% of all preterm births in 2020 occurred in just eight countries; India had the highest preterm birth rate with approximately 3.02 million births in 2020, accounting for over 20% of all preterm births worldwide. Other countries in the same category included Pakistan, Nigeria, China, Ethiopia, Bangladesh, Democratic Republic of Congo (DRC) and USA.[7] Also in 2020, global report showed that 15% of the total 13.4 million preterm births (approximately two million) occurred before 32weeks of gestation.[6]

Preterm neonates are at increased risk of a wide range of short and long-term respiratory, infectious, metabolic and neurological morbidities, with higher risks of adverse outcomes at the lower gestational ages.[8] Notably, infants born prior to 34 weeks have significantly worse morbidity and mortality outcomes compared with late preterm infants (34 to < 37 weeks).[8] These morbidities include higher rates of respiratory distress syndrome, bronchopulmonary dysplasia, necrotizing enterocolitis, intraventricular haemorrhage and serious infections.[9,10] Infants born preterm also require hospital readmissions more frequently [10,11] as well as higher rates of neurodevelopmental disorders, cognitive impairments, behavioural problems, psychiatric disorders, attention-deficit hyperactivity disorder and poorer academic achievements later in life. [12-15] Preterm birth and its sequelae can have negative psychosocial and financial impacts on families.[16] The very survival of human newborn depends solely on his/her ability to effectively initiate respiratory effort immediately after birth; this is also dependent on the maturity of the lungs and the ability to allow adequate ventilation -perfusion across alveolar surfaces at birth. The lung, from its budding at 26 weeks gestation till the acino-alveolar stage at term, passes through various stages, until it reaches term when surfactant produc-

tion is sufficient to support spontaneous respiratory efforts and life after birth.[17]
Babies delivered at gestational age of less than 37 completed weeks, are at risk of respiratory distress syndrome, which remains the major cause of morbidity and mortality among them. Antenatal corticosteroids therapy has been identified as the intervention that enhances lung maturity and surfactant production in the alveolar lumen, to reduce morbidities from respiratory distress syndrome and improve overall outcome of preterm babies.

The World Health Organization (WHO) currently recommends that antenatal corticosteroids (ACSs) be administered to women at risk of preterm birth from 24 weeks to 34 weeks of gestation, when the following five criteria are met; [18] (1) gestational age assessment can be accurately undertaken; (2) preterm birth is considered imminent; (3) there is no clinical evidence of maternal infection; (4) adequate childbirth care is available (including the capacity to recognize and safely manage preterm labour and birth); and (5) the preterm newborn baby can receive adequate care if needed (including the presence of skilled assistance for resuscitation, thermal care, feeding support, infection treatment and safe oxygen use for respiratory support). These consensus-based treatment criteria were intended to address the issues regarding safety of ACS in resource-limited settings. The recommendation specifies that ACS should not be routinely administered in situations where the gestational age cannot be confirmed (particularly when gestational age is suspected to be more than 34 weeks), as the risk of neonatal harm may outweigh the benefits.[13,19]
Therefore, it is not surprising that antenatal corticosteroids (ACS) have long been regarded as a cornerstone intervention in mitigating the adverse effects of preterm birth.[20]

The WHO currently recommends either intra-muscular betamethasone acetate/phosphate 12 mg every 24 hours apart or four doses of 6mg dexamethasone phosphate intramuscularly six hourly; however, in our centre, like most (developing) low-resource settings, we use dexamethasone because we lack access to betamethasone.[21]
Also, prophylactic dexamethasone has been proven to enhance foetal lung maturation after the mother with imminent preterm birth has received four doses over 24-48 hours.[22] The WHO ACTION-1 Trials demonstrated that dexamethasone effectively reduced early neonatal deaths, without increasing maternal complications. Several secondary outcomes, including reduction in early neonatal deaths, severe respiratory distress, the need for major neonatal resuscitation, and the use of continuous positive airway pressure (CPAP), were consistent with the overall results of reduced neonatal deaths by 28 days of life.[5]

Therefore, antenatal corticosteroids are currently recommended between 24 weeks and 33 weeks and six days of gestation in women at risk of preterm birth within seven days: for example, in cases of threatened preterm labor, preterm premature rupture of membranes, and antepartum hemorrhage.[23,24] The evidence for the use of antenatal steroids at or after 34 weeks is still debatable.[22-24]
The American College of Obstetricians and Gynecologists recommended antenatal corticosteroids for women at risk of late premature delivery at greater than 34 weeks of gestation but not for women undergoing planned caesarean section at term. [24] On the other hand, the Royal College of Obstetricians and Gynaecologists recommended that antenatal corticosteroids should be given to all women with a planned elective cesarean section prior to 38 weeks and six days of gestation.
In our local practice, we have used antenatal dexamethasone for over a decade. The aim of this study is to review the effects of antenatal corticosteroid therapy in imminent preterm birth on neonatal outcomes at the University of Maiduguri Teaching Hospital, Maiduguri.

Subjects and methods

Study area

This retrospective study was conducted at the labour ward of the Department of Obstetrics and Gynaecology and the Special Care Baby Unit (SCBU) of the Department of Paediatrics of the University of Maiduguri Teaching Hospital (UMTH), Maiduguri, Nigeria. This tertiary institution with 1500 bed capacity serves as a referral hospital for the six states in the North-Eastern zone of Nigeria. It also receives referrals from neighbouring countries of Niger, Chad, Cameroon and Central African Republic. The labour ward has an eleven-bed delivery suite and an operating theatre, while the SCBU is a 36-bed neonatal unit which admits sick babies from the facility's labour ward and those referred from other hospitals. It has eight incubators, two warm cots, twenty neonatal beds, six resuscitaires and a central oxygen source. The unit has a personnel complement of two consultants, two senior registrars, two registrars and two-house officers and at least three nurses per shift.

Study sample

The records of all pregnant women who had history of premature rupture of amniotic membrane (PROM) or came to labour ward leaking liqour before the onset of labour and delivered at the hospital's labour ward between 2012 and 2021 were retrieved and entered into the study with their babies. The diagnosis of ruptured amniotic membrane was established by obstetric residents or the attending consultant obstetrician by clinical examination in the labour ward. The gestational age was established from the last menstrual period and/or dating ultrasound scan. Those excluded from the study were multiple gestations, women presenting in active labour or those with foetal malformations.

Data extraction

During the period studied, (January 2012 to December

2022), 493 deliveries with premature pre-labour rupture of membranes (PPROM) were identified. The hospital records of 425 cases were retrieved and the required data were extracted and stored in Excel spreadsheet, thereby giving the retrieval rate of 86.2%. The data that was entered into the proforma included: maternal age, parity, height, weight, history of hypertension, diabetes mellitus, history of urinary/genital tract infection, history of abortion or loss of pregnancy, antenatal care, previous PPROM, duration of PPROM to onset of labour, colour of liqour, and mode of delivery. Other data included were details of antenatal corticosteroids and/or antibiotics administrations. The data extracted from the neonates that were admitted into the SCBU included the APGAR scores at one minute and five minutes, birth weight, respiratory system findings, colour of the baby, and the indication for admission such as sepsis, pneumonia, RDS and prematurity.

Data analysis

Descriptive analyses of frequencies, mean, median, and percentages for categorical variables were performed using IBM Statistical Package for the Social Sciences 22.0 (IBM Corp., Armonk, NY USA). The univariate logistic regression analysis was used to determine the relationship between predictors of maternal and neonatal implications, morbidities and outcomes. Those variables that showed statistically significant association in the univariate logistic regression analysis were entered into multivariate logistic regression to identify independent factors associated with maternal and neonatal morbidities and outcomes. A 95% confidence interval with corresponding odd ratio was used to determine the statistical significance of the relationship among the variables. P value less than 0.05 was used as cut off point for a statistically significant association.

Ethical clearance

Ethical clearance for the study was granted by the Research and Ethics Committee of the University of Maiduguri Teaching Hospital (UMTH).

Results

This is a retrospective study conducted over a ten year period between (2012 to 2022) to review our experience with use of antenatal corticosteroid (ACS) principally dexamethasone which was administered to all pregnant women that presented with imminent preterm birth.
During the study period under review, there were 21,458 deliveries in the labour ward. Four hundred and ninety-three (2.3%) of the total birth were preterm birth at gestational age of less than or equal to 36 weeks 6 days, and 425 (86.2%) case notes with complete information were retrieved, giving a retrieval rate of 86.2%.
Three hundred women (60.9%) were delivered via emergency cesarean-section (EMCS) while 193 (39.1%) were delivered by spontaneous vaginal delivery. Of these193 births, 60 (31.1%) presented cephalic, while the remaining 133 (68.9%) had assisted vaginal delivery. These preterm births had benefitted from at least two doses of dexamethasone at dose of 6 mg 12 hourly apart, a proportion of 2.3%.

Table1, shows the maternal medical and obstetric risk factors of PROM. Two hundred thirty-nine 239/425 (48.7%) did not benefit from antenatal care (ANC). It was also observed that 289/493 (56.2%) were mothers of low social class based on the mothers' characteristics. Hypertension in pregnancy was equally high 139/425 (32.7%). Other obstetric conditions present included pre-eclampsia 156/425 (36.7%), and prolonged rupture of amniotic membranes 149/425 (35.1%).

Table 1: Medical and obstetric risk factors among mothers diagnosed with PROM

Variables	Responses	Frequency	Percent
ANC	Booked	186	43.8
	Unbooked	239	56.2
Socioeconomic status	High social class	92	21.6
	Middle social class	44	10.4
	Low social class	289	68.0
Hypertension	Yes	139	32.7
	No	286	67.3
Diabetes mellitus	Yes	20	4.7
	No	405	95.3
Anaemia	Yes	66	15.5
	No	359	84.5
Fever	Yes	40	9.4
	No	385	90.6
Urinary tract infection	Yes	22	5.2
	No	403	94.8
Malaria	Yes	34	8.0
	No	391	92.0
APH	Yes	92	21.6
	No	333	78.4
Pre-eclampsia	Yes	156	36.7
	No	269	63.3
Malpresentation	Yes	63	14.9
	No	362	85.1
PROM	Yes	149	35.1
	No	276	64.9
Multiple gestation	Yes	49	11.5
	No	376	88.5

* PROM=Premature rupture of membranes,
APH=Antepartum haemorrhages, ANC=antenatal care

Table 2 shows the characteristics of preterm newborns delivered following preterm premature rupture of amniotic membranes (PPROM). The number of neonates between 34 to <37 weeks were 277/425 (53.4%), the second category were those between <34 to 30 weeks gestation 148/425 (34.8%). Based on weight categories, majority of the neonates 300/425 (70.6%) were between 1500 to <2499 grams. Female neonates 234/425 (55.1%) were more than the male 191/425 (44.9%).

Two hundred and forty-five babies (56.5%) had APGAR

score of less than seven at one minute while three hundred and sixty five (85.9%) of the study population had APGAR score of less than seven at five minutes. Respiratory difficulty including respiratory distress syndrome and or congenital pneumonia was seen in one hundred and twenty five (29.4%). Of the 425 referred from health care facilities, 48 (11.3%) spent less than five days on admission while 120(28.2%) were admitted for between five to seven days. Most of the preterm babies 257/425 (60.7%) were admitted for between eight or more days at special care baby unit (SCBU). At the end of hospital admission, 149/425 (35.1%) were discharged without any complication after they have met the criteria for discharge. Another 200/425 (47.1%) were discharged but have various degrees of complication. Seventy-six of the four hundred and twenty-five babies (17.9%) died constituting a mortality rate of 17.9 %

Table 2: Neonatal characteristics and associated complications

Variables	Responses	Frequency	Percent
Gestational age(wks)	≥34-<37	277	65.2
	≥30-33	148	34.8
Birth weight(g)	1500-2499	300	70.6
	≤1000<1499	125	29.6
Sex	Male	191	44.9
	Female	234	55.1
APGAR SCORE at 1min	<7	240	56.5
	≥7	185	43.5
APGAR SCORE at 5min	<7	60	14.1
	≥7	365	85.9
Neonatal jaundice	Yes	64	15.1
	No	361	84.9
Perinatal asphyxia	Yes	49	11.5
	No	376	88.5
RDS/Pneumonia	Yes	125	29.4
	No	300	70.6
Sepsis	Yes	82	19.3
	No	343	80.7
NEC	Yes	10	2.4
	No	415	97.6
Duration of admission	<5days	48	11.3
	5-7days	120	28.2
	>7days	257	60.5
Outcome of neonates	Alive and stable	149	35.1
	Alive with complication	200	47.1
	Death	76	17.8

Table 3; Multivariate regression analyses of factors modifying neonatal outcome following PPROM and corticosteroid administration.

The unadjusted multivariate regression analyses showed that mothers who received antenatal care (p =0.008, OR; 95% CI:2.427[1.614-3.649]), and delivered babies with APGAR score of ≥ 7 at one minute (p =0.001, OR; 95% CI: 3.785 [2.487-5.761]) had improved outcomes of their preterm babies.

Adjusted regression analyses of those mothers who benefitted from ANC, (p =0.001, AOR; 95% CI:2.355 [1.441-3.847]) and had babies with APGAR score of ≥ 7 at five minutes (p =0.001, OR;95% CI: 4.110 [1.896-8.909]) had statistically significant favourable outcome.

Those babies delivered at gestational age between 26 weeks to <33 weeks whose mothers benefitted from corticosteroids administration (p =0 .011, OR;95% CI: 1.712 [1.132-1.589]) equally had favourable outcome.

Those babies delivered with birth weight of ≤ 1499 grams (p = 0.001, OR;95% CI: 2.285 [1.487-3.513]), by mothers who received corticosteroid administration 24-48 hours before delivery also had favourable outcome.

Absence of anaemia in pregnancy and administration of antenatal corticosteroid (p = 0.011, OR; 95% CI: 2.490 [1.200-4.212]), improved outcome. Preterm pregnancy that was not complicated by antepartum haemorrhages (p = 0.001, OR;95% CI: 4.602[2.414-8.773]), and had corticosteroid administration had a better outcome. Similarly, preterm babies delivered to mothers without pre-eclampsia had favourable outcome (p =0.023, OR,95%CI: 1.615 [1.054-2.474]).

Table 3: Factors modifying neonatal favourable outcome

Variable	Responses	Total number	COR Favourable	COR Un-favourable	p-value	OR	95% CI	p-value	AOR OR	AOR 95%CI
ANC	Yes	185	86(46.5)	99(53.5)	0.001	2.427	1.614-3.649	0.157	1.436	0.870-2.368
	No	239	63(26.4)	176(73.6)		REF			REF	
Mat age(yrs)	<25	160	65(40.6)	95(59.4)	0.127	1.482	0.894-2.458			
	26-30	150	48(32.0)	102(68.0)	0.942	1.020	0.604-1.720			
	>30	114	36(31.6)	78(68.4)		REF				
Parity	Primi	183	69(37.7)	114(62.3)	0.140	1.417	0.892-2.250			
	Multip	94	36(38.3)	58(61.7)	0.179	1.453	0.842-2.507			
	G/multip	147	64(29.9)	103(70.1)		REF				
APGAR SC at 1min	<7	239	53(22.2)	186(77.8)		REF			REF	
	>=7	185	96(51.9)	89(48.1)	0.001	3.785	2.487-5.761	0.001	2.355	1.441-3.847
APGAR SC at 5min	<7	68	8(13.3)	52(86.7)		REF				
	>=7	364	141(38.7)	223(61.3)	0.001	4.110	1.896-8.909	0.117	1.979	0.843-4.647
Gestational age	34-<37	276	85(30.8)	191(69.2)		REF				
	30-33	148	64(43.2)	84(56.8)	0.011	1.712	1,132-1.589	0.849	0.922	0.400-2.124
Birth weight (g)	1500-2499	299	88(29.4)	211(70.6)		REF				
	1000-1499	125	61(48.8)	64(51.2)	0.001	2.285	1.487-3.513	0.223	1.722	0.718-4.128
SEX	Male	191	63(33.0)	128(67.0)		REF				
	Female	233	86(36.9)	147(63.1)	0.400	1.189	0.795-1.770			
Anaemia in Preg	Yes	66	14(21.2)	52(78.8)		REF				
	No	258	135(37.7)	223(62.3)	0.011	2.249	1.200-4.212	0.258	1.488	0.749-2.955
Mat fever	Yes	40	16(40.0	24(60.0)	0.500	1.258	0.646-2.450			
	No	384	133(34.6)	251(65.4)		REF				
APH	Yes	91	12(13.2)	79(86.8)		REF				
	No	333	137(41.1)	196(58.9)	0.001	4.602	2.414-8.773	0.000	4.918	2.444-9.898
Preeclampsia	Yes	155	44(28.4)	111(71.6)		REF				
	No	269	105(39.0)	164(61.0)	0.028	1.615	1.054-2.474	0.162	1.399	0.874-2.239

Table 4: Shows antenatal corticosteroid administration and neonatal outcome.

Babies who had APGAR score of ≥ 7 at one minute had favourable outcome (p = 0.006, X^2 = 7.670). There was significant reduction in respiratory distress syndrome/ congenital pneumonia (p = 0.001, X^2 = 1.244).

NEC was also observed to be low among neonates delivered by mothers who had at least two doses of antenatal corticosteroid, (t-test = 0.232). Overall outcome was favourable among babies who benefitted from antenatal corticosteroid following preterm pre-labour rupture of amniotic membranes (PPROM) p = 0.001.

Table 4: Antenatal corticosteroid administration at least two doses and neonatal outcome

Variables	Responses	Total	ACS (2-doses)	ACS (4 doses)	X2	p-value
APGAR Score at 1min	<7	240	63(26.2)	177(73.8)	7.670	0.006
	≥7	185	28(15.1)	157(84.9)		
APGAR Score at 5min	<7	60	18(30.0)	42(70.0)	3.062	0.080
	≥7	365	73(20.0)	292(80.0)		
Neonatal Jaundice	Yes	64	16(25.0)	48(75.0)	0.577	0.448
	No	361	75(20.8)	286(79.2)		
Perinatal Asphyxia	Yes	49	14(28.6)	35(71.4)	1.687	0.194
	No	376	77(20.5)	299(79.5)		
Respiratory distress syndrome (RDS)	Yes	97	20(20.6)	77(79.4)	1.244	0.001
	No	328	102(31.1)	226(68.9)		
Neonatal Sepsis	Yes	82	20(24.4)	62(75.6)	0.536	0.464
	No	343	71(20.7)	272(79.3)		
Necrotizing enterocolitis (NEC)	Yes	10	4(40.0)	6(60.0)	2.103	0.232*
	No	415	87(21.0)	328(79.0		
Outcome	Favour-able	150	15(10.1)	135(89.9)	17.109	0.001
	Non-favourable	275	75(27.3)	200(72.7)		

* Fisher's exact test

Discussion

The findings in this study revealed that most of the women who presented to the labour room with preterm birth were unbooked and mostly from the low socio-economic class. The records of those that met the eligibility criteria as recommended by WHO[22,23] and had ACS administered were analysed. The prevalence of uptake and coverage of ACS was very low when compared with findings in Tanzania, and Ghana, both low resource settings where they reported 23.4% and 70% respectively.[24,25] The reason for this low uptake among obstetricians and care givers of pregnant mothers may be due to paucity of evidence supporting the benefit of ACS. Other reasons for the low uptake of ACS could include the non-readily availability of the drugs to the end users, and inadequate knowledge on their use.

In a study by Liu *et al* from low and middle income countries, Nigeria inclusive, poor leadership and governance in health, inadequate health financing, lack of availability of essential medical products and technologies, inaccessible health services deliveries, and poor health information system were among the indices they identified as barrier to scaling up of ACS use.[26]

Most of the PPROM babies recorded in this study were late preterm, however moderate preterm gestation also showed improvement in outcome following ACS administration. The American College of Obstetricians and Gynecologists recommended antenatal corticosteroid for women at risk of late premature delivery at greater than 34 weeks' gestation, whereas the Royal College of Obstetricians and Gynaecologists recommended antenatal corticosteroids to all women with a planned elective cesarean section prior to 38 6/7 weeks gestation.[27,28] The findings in this study clearly showed the benefit of ACS in the reduction of respiratory related morbidities. The APGAR score of >7 at five minutes suggested that transition and adaptation were smooth among the preterm babies who had at least two doses of ACS (dexamethasone) 6mg at 12 hours apart.

In this study, ACS administration was associated with favourable outcomes as revealed by both crude and adjusted regression analysis of the following variables: antenatal care booking, (p=0.008, OR; 95% CI: 2.427 [1.614-3.649]), APGAR scores at one minute, (p=0.001, OR;95% CI: 3.785 [2.487-5.761]).
The adjusted, (p=0.001, OR; 95% CI: 2.355[1.441-3.847]), at five minutes, (p=0.001,OR; 95% CI:4.110 [1.896-8.909]) also suggested that ACS was beneficial as it reduced morbidity from respiratory complications due respiratory distress syndrome, and persistent pulmonary hypertension of newborn and subsequently improved the overall outcome of these preterm babies.

Conclusion

There is a need to scale up the use of dexamethasone in all pregnant women facing imminent preterm birth to reduce morbidity and mortality related to respiratory failure from surfactant deficiency in preterm babies born to mothers in low- and middle-income countries (LMICs).

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