DOI: https://doi.org/10.53350/pjmhs02023171184

ORIGINAL ARTICLE

Gynaecological Interventions to Improve Outcomes of Preterm Infants

SANIA PIRZADO[1], YASMEEN KHATOON[2], SHABANA BANO SOOMRO[3], KASHF-UL-KHAIR[4], BUSHRA NOOR KHUHRO[5], GHULAM FATIMA[6]

[1]Assistant Professor, Department of Obstetrics & Gynaecology, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat
[2]Consultant, [3]Assistant Professor, Department of Obstetrics & Gynaecology, Shaeed Mohtarma Benazir Bhutto Medical University, Chandka Medical College, Shaikh Zaid Women Hospital Larkana
[4]Consultant Gynaecologist, Shahani Bone & General Hospital, Khairpur Mir's
[5]Associate Professor, Department of Obstetrics & Gynaecology, Khairpur Medical College, Khairpur Mir's
[6]Consultnt Gynaecologist & Obstetrician, Sindh Government Anwar Paracha Teaching Hospital, Sukkur
Correspondence to: Dr. Sania Pirzado, E-mail: pirzadasania@gmail.com, Cell: 0330-2388774

ABSTRACT

Background: Preterm infants are at higher risk of health and mental issues and conditions in comparison with full term delivered infants. Specialist follow-up care, involving a multidisciplinary approach, is essential for identifying potential issues early, which can help reduce associated risks**.**
Objective: To assess the outcomes of gyanecological interventions in reducing preterm births.
Study Design: Prospective study
Place and Duration of Study: Department of Obstetrics & Gynaecology, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat from 1st January 2023 to 30th June 2023.
Methodology: Two hundred preterm pregnant women based on clinical diagnosis of the pregnant women were enrolled. Preterm pregnant women within the age group of 21 to 44 years were included in this study. Various gynaecological interventions including aspirin usage in 16 weeks, magnesium sulfate and delayed clamping at peripartum, vaginal progesterone, cervical cerclage, cardiotocograph monitoring, caesarean section, antennal corticosteroid, tocolysis as well as continuous positive airway pressure. Kangaroo Mother Care was also provided to the majority of the preterm delivered newborns.
Results: Mean age of 30.3±3.5 years and vaginal progesterone and cardiotocograph as well as caesarean section and application of antenatal corticosteroid to bring positive outcomes in the preterm delivery. The interventions of cervical cerclage and tocolysis had more likely to bring negatives outcomes as positive outcomes. The relative risk for Kangaroo Mother Care was 0.95 (0.82 to 0.99).
Conclusion: The gynaecological interventions of antenatal corticosteroids, caesarean section, cardiotocograph as well as vaginal progesterone in addition to kangaroo mother care and continuous positive airway pressure usage are associated with significant positive outcomes for preterm infants followed by magnesium sulfate usage as well as delayed clamping.
Keywords: Outcome, Preterm infants, Gynaecological intervention.

INTRODUCTION

The 2023 WHO report emphasizes that preterm birth remains a primary global health challenge, as it is the leading cause of neonatal and infant mortality and significantly contributes to the loss of human potential. Termed as delivery prior to 37 gestational weeks, preterm birth is related with both immediate and long-term health complications. Short-term risks include conditions like intraventricular haemorrhage and necrotizing enterocolitis, while long-term effects often involve developmental delays, cerebral palsy, and chronic lung diseases.[1-3]

In 2020, 10% of all infants worldwide, approximately 13.4 million, were born prematurely. Preterm birth complications continue to be the leading cause of death among children under five, contributing to around 1 million deaths in 2021.[4] Moreover, neonatal complications due to preterm birth are the primary contributor to the global loss of daily adjusted life-years.[5]

There is a significant demographic divide in the rates of preterm birth, with low- and middle-income countries (LMICs) accounting for more than 80% of preterm deliveries. These nations face added challenges, such as limited access to advanced neonatal care and follow-up services, compounded by infrastructural and economic constraints. In contrast, high-income countries (HICs) benefit from well-established care bundles and neonatal care systems, which help mitigate the risks associated with preterm birth. However, in many LMICs, the assumption that high-level neonatal care will be available is often unrealistic due to resource shortages.[6-8]

This discrepancy highlights the need for region-specific approaches to reduce preterm birth rates and improve outcomes for preterm infants in LMICs. Such strategies should prioritize both prevention and the provision of essential care within the limits of available resources, ensuring that feasible and sustainable care models are developed.[7,9]

A key practical consideration in antenatal and intrapartum care planning is the accurate estimation of gestational age. It is recommended that this estimation be performed using the most advanced method available at the healthcare facility providing care, with the understanding that care protocols can be adjusted based on evidence of any error after delivery. The absence of ultrasound should not prevent the implementation of this care bundle, as alternative methods such as measuring symphyseal fundal height or palpation can provide strong indications of a viable preterm fetus.[10]

The present study was designed to assess the outcomes of gynaecological interventions in reducing the preterm births. The result of this study lead to beneficial interpretation which are significantly valuable in reducing preterm negative outcomes and providing health benefits to mother and its newborn.

MATERIALS AND METHODS

This prospective study was conducted at Department of Obstetrics & Gynaecology, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences Gambat from 1st January 2023 to 30th June 2023. A total 200 preterm pregnant women enrolled after gaining a written informed consent from them. The selection of the cases was based on clinical diagnosis of the pregnant women. Preterm pregnant women within the age group of 21 to 44 years were included in this study. Those preterm pregnant women who were having hypo hyper thyroids psychotic drugs and multiple miscarriage history was excluded. The sample size was calculated using WHO sample size calculation wherein 95% CI, 80% power of test and 5% margin of error were applied in addition to the 10% prevalence of preterm deliveries. Various gynaecological interventions were performed in

Received on 15-07-2023
Accepted on 16-11-2023

accordance with the need and condition of the patients through a skilful gynaecologist. The interventions of aspirin usage were started from the 16 weeks of gestations in few pregnant women while other few cases were administered with magnesium sulphate or delayed umbilical cord clamping during the infusion peripartum. A 4-gram loading dose of Magnesium sulphate was followed by 1 gram per hour of maintenance dose for 24 hours or by the time of delivery. The delay in umbilical cord clamping was performed for least 30–60 seconds post birth. Other interventions included the application of vaginal progesterone, cervical cerclage, cardiotocograph (CTG) Monitoring, caesarean section, antennal corticosteroid, tocolysis as well as continuous positive airway pressure (CPAP). Kangaroo Mother Care was also provided to majority of the preterm delivered newborns. A well-structured questionnaire was design for documenting all variables and their outcomes. The preterm newborns were followed until delivery 3 days for their positive and negative outcomes. The data was analyzed using SPSS-26.0. T test was applied for comparing the variables wherein p value 0.05 was taken as significant.

RESULTS

The mean age was 30.3±3.5 years. The obesity was observed in 61.5% of the cases. The preterm profile presented that majority of the pregnant preterm women were having a history of one live birth with 40% were having most recent preterm event. The gestational diabetes was observed in 24.5% while preeclampsia was presented in 20% of the cases (Table 1).

Within the various gynaecological interventions conducted in the enrolled patients, the most followed practices include application of antenatal corticosteroids, caesarean section, CTG as well as vaginal progesterone usage. The other significant gynaecological interventions included delayed cord clamping and tocolysis (Fig. 1)

The positive and negative outcomes of the gynaecological interventions interpreted showed intervention of vaginal progesterone and CTG, as well as caesarean section and application of antenatal corticosteroid to bring positive outcomes on the preterm delivery with lower risk of haemorrhages, bronchopulmonary dysplasia and critical morbidities (fetal growth restriction) and mortality. The interventions of cervical cerclage and tocolysis had more likely to bring negatives outcomes than positive outcomes and were not well supported in the research results (Table 2).

Table 1: Demographic details of preterm women (200)

Characteristic	No.	%
Age (years)	30.3±3.5	
Obesity	123	61.5
Preterm Profile History		
1 Live birth	122	61.0
2 Live births	88	44.0
Most recent preterm	80	40.0
Gestational diabetes	49	24.5
Severe features of preeclampsia	40	20.0

Table 2: Preterm Outcomes of the gynecological interventions (n=200)

Intervention	Number of Patients Given	Positive Outcomes	Negative Outcomes	P value
During Pregnancy				
Low Dose Aspirin (Before 16 Weeks)	12 (6%)	5 (2.5%)	7 (3.5%)	0.345
Infusion Peripartum				
Magnesium Sulphate	21 (10.5%)	12 (6%)	9 (4.5%)	0.275
Delayed Cord Clamping	30 (15%)	19 (9.5%)	11 (5.5%)	0.381
During Preterm Labor				
Cardiotocograph (CTG) Monitoring	101 (50.5)	88 (44)	13 (12.5)	0.021
Vaginal Progestogen	52 (26%)	43 (21.5%)	9 (4.5%)	0.033
Cervical Cerclage	13 (6.5%)	6 (3%)	7 (3.5%)	0.672
Cesarean Section	123 (61.5%)	74 (37%)	49 (24.5%)	0.063
Tocolysis	29(14.5%)	11(5.5%)	18 (9%)	0.431
Antenatal Corticosteroids	167 (83.5%)	122 (61%)	45 (22.5%)	0.012

Majority of the enrolled cases were provided Kangaroo Mother Care as well as CPAP support resulting in significant higher positive outcomes. The relative risk for Kangaroo Mother Care was 0.95 (0.82 to 0.99) while for CPAP was 0.90 (0.83 to 0.98) with 95% confidence interval (Table 3).

Table 3: Relative Risk Ratio for kangaroo mother care and CPAP interventions (n=200)

Gynaecological Intervention	Yes (n=150)		No (n=50)		Relative Risk (95% CI)
	Positive outcomes	Negative outcomes	Positive outcomes	Negative outcomes	
Kangaroo Mother Care	150	--	12	38	0.95 (0.82 to 0.99)
Continuous Positive Airway Pressure (CPAP)	132	18	9	41	0.90 (0.83 to 0.98)

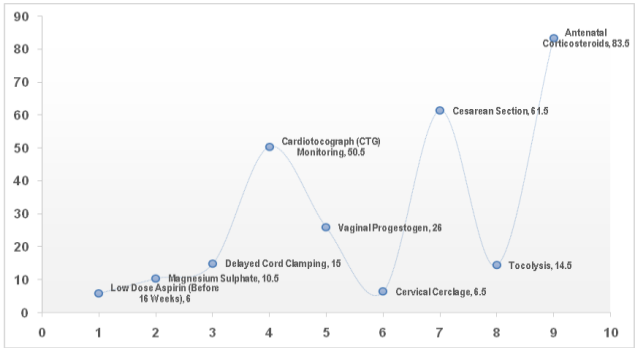

Fig. 1: Percentage of various gynecological interventions performed within cases

DISCUSSION

In full-term infants, delaying umbilical cord clamping enhances haemoglobin levels at birth and improves iron reserves during the first few months of life, potentially benefiting developmental outcomes. This practice is also linked to significant neonatal advantages in preterm infants, such as better transitional circulation, more stable red blood cell volume, a reduced need for blood transfusions, and lower rates of necrotizing enterocolitis and intraventricular haemorrhage.[11]

Due to the benefits for most newborns and in alignment with recommendations from other professional organizations, the American College of Obstetricians and Gynaecologists now advises delaying umbilical cord clamping for at least 30-60 seconds after birth in both vigorous term and preterm infants. While delayed cord clamping can slightly increase the incidence of jaundice requiring phototherapy in term infants, healthcare providers adopting this practice should ensure systems are in place to monitor and treat neonatal jaundice. Importantly, delayed umbilical cord clamping does not raise the risk of postpartum haemorrhage.[12]

The administering magnesium sulfate infusion peripartum, delayed cord clamping or vaginal progesterone during delivery should be considered when appropriate.[13-16] During preterm labour, foetal heart rate monitoring using cardiotocography (CTG) can be challenging due to frequent signal loss, which occurs because of the foetus's small size. The present study results also interpreted favourable outcomes with the application of CTG and magnesium sulfate. Literature reveals that in cases of the preterm births the foetal nervous as well as autoimmune system in not completely formulated with absence of patterns of heart rate. There are limited studies available which supports CTG usage within preterm deliveries. The foetal hypoxia has although been related with the baseline abnormalities ad variable-declarations [17-19]

The choice of delivery method is more contentious. There has been inconclusive results presentation in various systematic-reviews covering randomised control trials. There are evidences relating to the application of caesarean section to prevent maternal haemorrhages and restriction in the foetal growth. These results

were similar to the findings of the current research wherein caesarean section was proven to facilitate positive outcomes for preterm infants.[20,21]

Scientists have also evidently reported that there is a decision time to resuscitate the neonate, where labour could negatively impact the outcome. The research has proven that post delivery the delayed clamping of cord facilitates in placental-transfusion. The cord "milking" should be side-stepped, as is linked with escalated intraventricular haemorrhage risk. Despite the act that delayed clamping of the cord is a well-supported procedure and endorsed by parents , yet it may not be suitable in cases with placental abruption.[22,23]

CONCLUSION

The gynaecological interventions of antenatal corticosteroids, caesarean section, CTG as well as vaginal progesterone in addition to kangaroo mother care and CPAP usage are associated with significant positive outcomes for preterm infants followed by magnesium sulfate usage as well as delayed clamping.

REFERENCES

1. World Health Organization. Preterm birth factsheet. https://www.who.int/news-room/fact-sheets/detail/preterm-birth. 2018
2. Morgan AS, Waheed S, Gajree S, Marlow N, David AL. Maternal and infant morbidity following birth before 27 weeks of gestation: a single centre study. Sci Rep 2021;11:288.
3. Torchin H, Morgan AS, Ancel P-Y. International comparisons of neurodevelopmental outcomes in infants born very preterm. Semin Fetal Neonatal Med 2020;25:101109.
4. Morgan AS, Zeitlin J, Kallen K, et al.Birth outcomes between 22-26 weeks' gestation in national population-based cohorts from Sweden, England and France. Acta Paediatrica 2021;00:1-17
5. Chawanpaiboon S, Vogel JP, Moller AB, Lumbiganon P, Petzold M, Hogan D. Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis. Lancet Glob Health 2019;7:e37-46.
6. Draper ES, Gallimore ID, Smith LK, Fenton AC, Kurinczuk JJ, Smith PW, et al. MBRRACE-UK perinatal mortality surveillance report: UK perinatal deaths for births from January to December 2019. Infant Mortality and Morbidity Studies, 2021
7. Norman M, Hallberg B, Abrahamsson T, Björklund LJ, Domellöf M, Farooqi A, et al. Association between year of birth and 1-year survival among extremely preterm infants in Sweden during 2004-2007 and 2014-2016. JAMA 2019;321(12):1188-99.
8. Ancel P-Y, Goffinet F, Kuhn P. EPIPAGE-2 Writing Group. Survival and morbidity of preterm children born at 22 through 34 weeks' gestation in France in 2011: results of the EPIPAGE-2 cohort study. JAMA Pediatr 2015;169:230-8.
9. Smith LK, Hindori-Mohangoo AD, Delnord M, Durox M, Szamotulska K, Macfarlane A, et al. Quantifying the burden of stillbirths before 28 weeks of completed gestational age in high-income countries: A population-based study of 19 European countries. Lancet 2018;392(10158):1639-46.
10. Smith LK, Blondel B, Zeitlin J, Euro-Peristat Scientific Committee. Producing valid statistics when legislation, culture and medical practices differ for births at or before the threshold of survival: report of a European workshop. BJOG 2020;127:314-8.
11. Myrhaug HT, Brurberg KG, Hov L, Markestad T. Survival and impairment of extremely premature infants: a meta-analysis. Pediatrics 2019;143:e20180933.
12. Gallagher K, Martin J, Keller M, Marlow N. European variation in decision-making and parental involvement during preterm birth. Arch Dis Child Fetal Neonatal Ed 2014;99:F245-9.
13. National Institute for Health and Care Excellence. Preterm labour and birth (NICE guideline [NG25]). 2019.
14. Jayaram PM, Mohan MK, Farid I, Lindow S. Antenatal magnesium sulfate for fetal neuroprotection: a critical appraisal and systematic review of clinical practice guidelines. J Perinat Med 2019;47:262-9.
15. ACOG Committee Opinion. Delayed umbilical cord clamping after birth: Obstet Gynecol 2020;136(6):1238-9.
16. National Institute for Clinical Excellence. 2020 surveillance of preterm labour and birth (NICE guideline NG25). 2020.
17. Tarnow-Mordi W, Morris J, Kirby A, Robledo K, Biostat M, Askie L, et al. Australian Placental Transfusion Study Collaborative Group. Delayed versus immediate cord clamping in preterm infants. N Engl J Med 2017;377:2445-55.
18. Duley L, Dorling J, Pushpa-Rajah A, Oddie SJ, Yoxall CW, Schoonakker B, Bradshaw L, et al., Cord Pilot Trial Collaborative Group. Randomised trial of cord clamping and initial stabilisation at very preterm birth. Arch Dis Child Fetal Neonatal Ed 2018;103(1):F6-14.
19. Alfirevic Z, Milan SJ, Livio S. Caesarean section versus vaginal delivery for preterm birth in singletons. Cochrane Database Syst Rev2013;9:CD000078.
20. Katheria A, Reister F, Essers J, et al. Association of umbilical cord milking vs delayed umbilical cord clamping with death or severe intraventricular haemorrhage among preterm infants. JAMA 2019;322:1877-86.
21. Katheri AC, Sorkhi SR, Hassen K, et al.Acceptability of bedside resuscitation with intact umbilical cord to clinicians and patients' families in the United States. Front Paediatr 2018;6:100
22. Meyer MP, Nevill E. Optimizing cord clamping in preterm infants: One strategy does not fit all. Front Pediatr 2019;7:46.
23. Weeks AD, Watt P, Yoxall CW, et al. Innovation in immediate neonatal care: development of the Bedside Assessment, Stabilisation and Initial Cardiorespiratory Support (BASICS) trolley. BMJ Innov 2015;1: 53-8.

This article may be cited as: Pirzado S, Khatoon Y, Soomro SB, Khair KU, Khuhro BN, Fatima G: Gynaecological Interventions to Improve Outcomes of Preterm Infants. Pak J Med Health Sci, 2023;18(11): 84-86.