



Optimising the Management of Preterm Newborns at the Mother and Child Academic Hospital of N'DJAMENA: Implementation of the Premprep-5 Interventions and Prospects for Improvement

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Abstract

Background: Prematurity is a major cause of neonatal morbidity and mortality, especially in low-income settings like Chad, where neonatal survival rates are critically low. The PremPrep-5 initiative, created by FIGO, suggests five low-cost, evidence-based interventions to enhance outcomes for preterm infants. This study evaluated the feasibility, implementation, and impact of these interventions at the Mother and Child Academic Hospital (MCAH) in N'Djamena.

Methods: A descriptive cross-sectional study combining quantitative and qualitative approaches was conducted from March to May 2025 at MCAH. Thirty-one healthcare professionals were interviewed using structured questionnaires, and sixty-four medical records of preterm newborns were reviewed. Data were analysed using SPSS software with Chi-square statistical tests, with significance set at $p < 0.05$.

Results: Among the five PremPrep-5 interventions, antenatal corticosteroids (87.5%), kangaroo mother care (62.5%), and early initiation of breastfeeding (31.3%) were most frequently utilised. Magnesium sulphate therapy (14.1%) and delayed cord clamping (15.6%) were seldom implemented. Major barriers to implementation included lack of training (35.4%) and the absence of standardised clinical protocols (35.4%). Antenatal corticosteroids significantly reduced respiratory distress syndrome ($p = 0.03$), while early initiation of breastfeeding improved neonatal survival ($p = 0.01$). The study shows a good understanding of specific interventions; however, their implementation remains inconsistent. The results confirm the positive impact of several components of the PremPrep-5 initiative on neonatal outcomes. The lack of standardised practices and insufficient training limits their effective implementation. Efforts are needed to overcome these obstacles, particularly through ongoing training, the development of national protocols, and the improvement of available resources.

Conclusion: Integrating PremPrep-5 interventions is a practical approach that significantly improves neonatal outcomes in Chad. Successful implementation necessitates enhanced clinical training, the standardisation of neonatal protocols across the country, and reliable access to essential medicines and supplies.

Keywords: Prematurity; PremPrep-5; Neonatal care; Chad; Kangaroo mother care; Antenatal corticosteroids.

Introduction

Prematurity, defined by the World Health Organisation (WHO) as birth before 37 completed weeks of gestation, is a major public health challenge globally. In 2020, approximately 13.4 million babies were born prematurely, accounting for 10% of all live births [1]. Prematurity remains the leading cause of neonatal death and long-term health issues, including respiratory, neurological, and developmental disorders [2].

The burden of prematurity is disproportionately high in low- and middle-income countries, especially in sub-Saharan Africa and South Asia, which together account for 65% of global preterm births [3]. In Chad, neonatal mortality remains among the highest worldwide—approximately 32 deaths per 1,000 live births—driven by limited access to specialised neonatal care, inadequate equipment, and insufficiently trained personnel [4].

To address these disparities, FIGO launched the *PremPrep-5* initiative in 2024 [5]. This model encompasses five vital, evidence-based interventions for managing preterm labour and neonatal care.

1. **Antenatal corticosteroid administration** for lung maturation in preterm foetuses [6].
2. **Magnesium sulphate therapy** for neuroprotection in foetuses under 32 weeks [7].
3. **Delayed cord clamping** for improved haematological status [8].
4. **Early initiation of breastfeeding** within the first hour after birth [9].
5. **Immediate kangaroo mother care (KMC)** for thermal regulation and bonding [10].

Despite their proven efficacy and low cost, these interventions are applied inconsistently in many low-resource hospitals. This study aimed to evaluate the feasibility and impact of implementing PremPrep-5 interventions at the MCAH of N'Djamena.

Methods

Study design and setting

A descriptive, analytical cross-sectional study was carried out from March to May 2025 at the Mother and Child Academic Hospital of N'Djamena, the nation's main referral centre for neonatal care.

Population and sampling

The study targeted:

- **Healthcare professionals** working in maternity and neonatal units (n = 31).
- **Preterm newborns** (gestational age < 37 weeks) admitted during the study period (n = 64).

A non-probabilistic recruitment approach was employed due to the limited number of eligible cases and staff.

Data collection

- A **structured questionnaire** was given to healthcare professionals to evaluate their knowledge, practices, and perceived barriers concerning PremPrep-5.
- A **data extraction grid** was utilised to gather clinical information from the medical records of preterm newborns, including interventions carried out and outcomes.

Variables

Independent variables included healthcare worker characteristics, knowledge level, and institutional barriers. Dependent variables were the implementation of PremPrep-5 interventions and neonatal outcomes (survival, complications).

Data analysis

Data were entered and analysed using SPSS version 26.0. Descriptive statistics summarised frequencies and percentages, while Chi-square tests assessed associations between interventions and neonatal outcomes. Significance was set at $p < 0.05$.

Ethical considerations

The Ethics Committee for Health Research granted ethical approval at the Faculty of Health Sciences, University of N'Djamena. Written informed consent was obtained from all participants, and confidentiality was maintained throughout the study.

Results**Characteristics of healthcare professionals**

Of the 31 respondents, 61.2% were women, and most (54.8%) had between one and five years of experience. Paediatricians (45.1%) and Obstetricians (29.0%) represented the largest professional groups.

Knowledge of PremPrep-5

Most respondents (87.1%) lacked comprehensive knowledge of all five PremPrep-5 components.

Figure 1: Proportion of respondents aware of PremPrep-5 implementation guidelines

Awareness was highest for antenatal corticosteroids and KMC (100%), while knowledge of magnesium sulphate therapy was limited (12.9%).

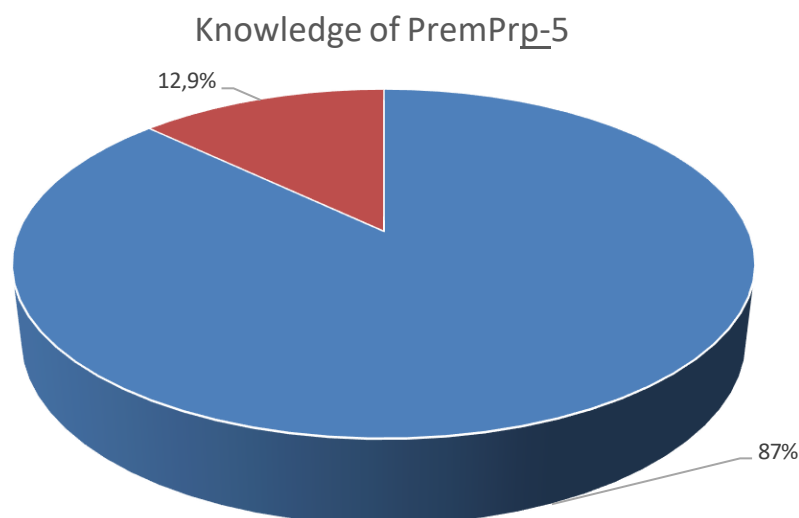


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Implementation of interventions

Intervention	Implementation Rate
Antenatal corticosteroids	87.5%
Kangaroo mother care	62.5%
Early initiation of breastfeeding	31.3%
Delayed cord clamping	15.6%
Magnesium sulphate therapy	14.1%

Table 1. Implementation Rates of PremPrep-5 Interventions Among Reviewed Neonatal Cases

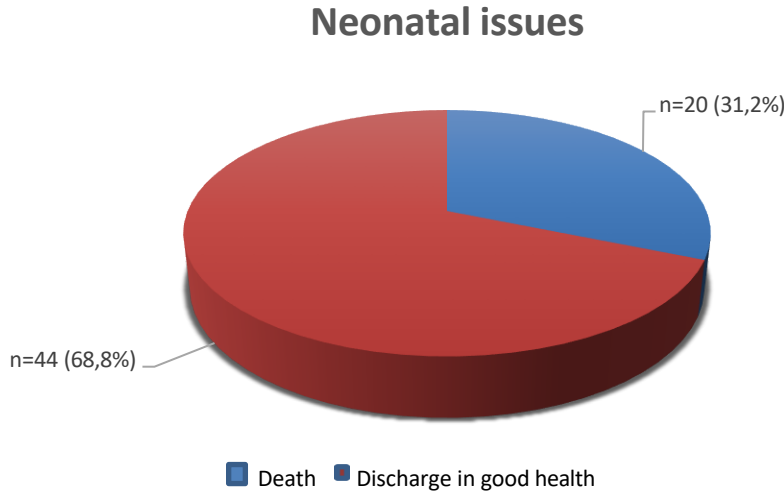
Barriers to implementation

Main barriers to the integration of PremPrep-5 interventions	n	%
Lack of training	15	48,3
Absence of established protocols	11	35,4
Resistance to change	5	16,1
Total	31	100

Table 2. Reported challenges affecting the implementation of PremPrep-5 interventions

Neonatal outcomes

The overall neonatal mortality rate was 31.2%. The most common complications were respiratory distress syndrome (64.1%), infection (51.6%), and hypothermia (45.3%).



Significant associations were observed between:

- Antenatal corticosteroids and reduced respiratory distress (p = 0.03).
- Early breastfeeding initiation and improved survival (p = 0.01).
- Delayed cord clamping and reduced anaemia (p = 0.02).

Complications occurred	Yes	No
Respiratory distress syndrome	41 (64,1%)	23 (35,9%)
Neonatal infection	31 (51,6%)	33 (48,4%)
Hypothermia	29 (45,3%)	35 (54,7%)
Anaemia	13 (20,3%)	51 (79,7%)
Others (hypoglycaemia)	10 (15,6%)	54 (84,4%)

Table 3. Frequency of Neonatal Complications Observed Among the Study Population

Discussion

This study shows that integrating PremPrep-5 interventions into clinical practice is both feasible and effective in resource-limited neonatal settings. Despite high awareness of specific components, actual implementation remains inconsistent—particularly for magnesium sulphate therapy and delayed cord clamping.

The studied group mainly consists of young paediatricians and obstetricians. Continuing education is vital for

these less experienced staff members to perform neonatal procedures competently, as emphasised by Bhuta et al. (2014) [11].

Prenatal corticosteroids, KMC, and early breastfeeding are universally recognised, but magnesium sulphate neuroprotection remains underused despite its proven benefits in reducing the risk of cerebral palsy in premature infants [12].

These findings reflect those reported in Benin and Burkina Faso, where limited training and a lack of standardisation were major barriers to effective neonatal care [13]. The observed link between antenatal corticosteroids and reduced respiratory distress syndrome aligns with Cochrane evidence [14]. Meanwhile, early initiation of breastfeeding has been shown to significantly improve neonatal survival, consistent with UNICEF's 2018 findings [15].

The inconsistent results for KMC may be due to inadequate adherence to the protocol or inconsistent implementation, rather than a lack of effectiveness. Evidence from WHO (2023) strongly supports continuous skin-to-skin contact as a vital, life-saving measure [16].

Respiratory distress syndrome and infections continue to be the most common complications, aligning with trends observed in sub-Saharan Africa [17-20]. However, the neonatal mortality rate is notably higher than the regional average, reflecting a particularly high-risk hospital environment worsened by poor hygiene, limited resources, and inadequate training.

Study limitations

This study's limitations include a relatively small sample size, potential reporting bias in self-reported practices, and incomplete medical records. However, it provides essential baseline data for enhancing neonatal care practices in Chad.

Conclusion

The PremPrep-5 initiative provides a practical and cost-effective approach to enhancing neonatal outcomes in low-resource settings. Implementation at MCAH demonstrated clear benefits, particularly in reducing respiratory distress syndrome and improving survival rates among preterm infants. Ensuring sustainable impact requires ongoing professional training, standardised national protocols, and sufficient resource allocation. Commitment at the institutional and policy levels to the PremPrep-5 framework could significantly decrease neonatal mortality in Chad.

Declarations

Ethics approval and consent to participate: Approved by the Ethics Committee for Health Research at the

Faculty of Health Sciences. Written consent obtained.

Competing interests: None declared.

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