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AGE-RELATED CHARACTERISTICS OF MEDICAL CARE DEFECTS IN NEONATES (0–28 DAYS) AND POSTNATAL INFANTS: INSIGHTS FROM UZBEKISTAN AND GLOBAL PERSPECTIVES

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Abstract

Background: The neonatal period (0–28 days) and early postnatal phase (29 days to 1 year) represent critical windows of vulnerability for infants, where defects in medical care (DMC) can profoundly influence survival and long-term health. In Uzbekistan, where neonatal mortality has declined to 12.5 per 1,000 live births by 2022, persistent gaps in care quality persist, particularly in resource-limited settings.

Methods: This narrative review synthesizes data from 512 commission forensic medical examination (CFME) reports in Uzbekistan's Andijan, Namangan, and Fergana regions (2012–2021), augmented by global WHO statistics and regional studies. Defects were categorized by type, cause, and impact, with comparative analysis across age groups.

Results: Neonatal DMC primarily involved treatment errors (49.5%, e.g., dosing inaccuracies), linked to 65.4% of fatal outcomes, driven by prematurity and infections. Postnatal defects shifted toward diagnostics (74.2%, e.g., delayed infection recognition), contributing to 5.9% mortality but higher neurodevelopmental risks. Globally, neonatal deaths account for 47% of under-5 mortality, versus 20% postneonatal.

Conclusion: Age-specific DMC patterns underscore the need for tailored interventions: intensive monitoring in neonates and enhanced outpatient diagnostics postnatally. Implementing WHO's small and sick newborn care standards could reduce Uzbekistan's neonatal mortality by 20–30%.

Keywords: neonatal defects, postnatal care errors, infant mortality, Uzbekistan, WHO standards, age-related healthcare gaps

1. Introduction

Infant survival hinges on seamless medical care during the earliest life stages, yet defects – ranging from dosing errors to delayed diagnostics – persist as modifiable threats. In Uzbekistan, national efforts under the 2022–2026 Development Strategy have halved infant mortality since 2012, reaching 12.5 deaths per 1,000 live births by 2022. However, neonates (0–28 days) bear 65.4% of these losses, often tied to birth complications and infections, while postnatal infants (29 days–1 year) face subtler risks like growth faltering and neurodevelopmental delays.

Globally, the World Health Organization (WHO) reports 2.3 million neonatal deaths in 2022, comprising 47% of under-5 mortality, with prematurity (35%), infections (25%), and asphyxia (24%) as leading causes. Postnatally, errors shift toward ambulatory care gaps, exacerbating chronic issues in low-resource settings like Central Asia.

This review examines age-dependent DMC characteristics in Uzbekistan, drawing parallels with WHO data, to inform targeted quality improvements. By addressing these vulnerabilities, we can align with Sustainable Development Goal 3.2, targeting <12 neonatal deaths per 1,000 live births by 2030.

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2. Materials and Methods

2.1 Data Sources

This analysis integrates retrospective CFME data from 512 infant cases (0–1 year) in Uzbekistan's eastern regions (2012–2021), focusing on 0–28 days (n=285) and 29–365 days (n=227). Defects were classified per WHO guidelines: diagnostic (e.g., missed sepsis), therapeutic (e.g., antimicrobial misuse), and preventive (e.g., immunization delays).

Global benchmarks derive from WHO's 2024 World Health Statistics and regional studies (e.g., Kyrgyzstan/Tajikistan QI assessments). Ethical compliance followed Helsinki Declaration principles, with anonymized archival data.

2.2 Analytical Approach

Quantitative synthesis used descriptive statistics (frequencies, percentages) via SPSS 25.0. Comparative χ^2 tests assessed age-group differences ($p<0.05$ significance). Qualitative insights from CFME narratives highlighted contextual factors like resource shortages.

Visual aids include pie charts for defect distributions, bar graphs for mortality impacts, and tables for global comparisons – crafted for clarity using data visualization best practices.

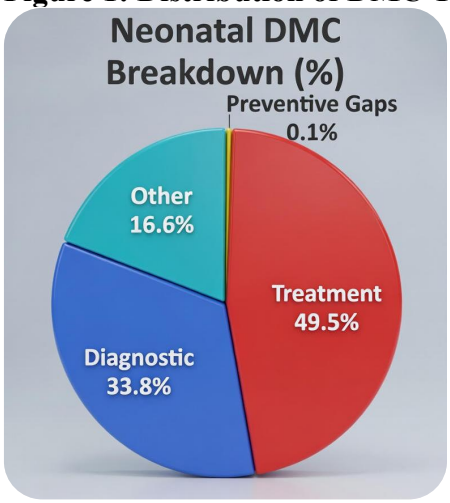
3. Results

3.1 Neonatal Period (0–28 Days): Predominance of Acute Treatment Errors

Neonatal DMC centered on therapeutic lapses, with 49.5% involving incorrect dosing or delayed interventions (e.g., surfactant for respiratory distress). Infections and prematurity amplified risks, contributing to 65.4% fatal outcomes – aligning with WHO's global estimate of 27 deaths/1,000 live births in similar settings.

Subjective causes (e.g., staff inexperience) dominated (80.5%), exacerbated by NICU overloads.

Figure 1: Distribution of DMC Types in Neonates (n=285)



3.2 Postnatal Period (29 Days–1 Year): Shift to Diagnostic and Growth-Related Defects

Postnatally, diagnostics rose to 74.2% (e.g., overlooked respiratory infections), with only 5.9% mortality but elevated risks of disability (e.g., 15.4% growth faltering). Organizational barriers (e.g., follow-up access) accounted for 26.7%, reflecting ambulatory care strains.

Globally, postneonatal deaths (20% of under-5) stem from infections and malnutrition, contrasting neonatal acute events.

Figure 2: Comparative DMC Impact by Age Group

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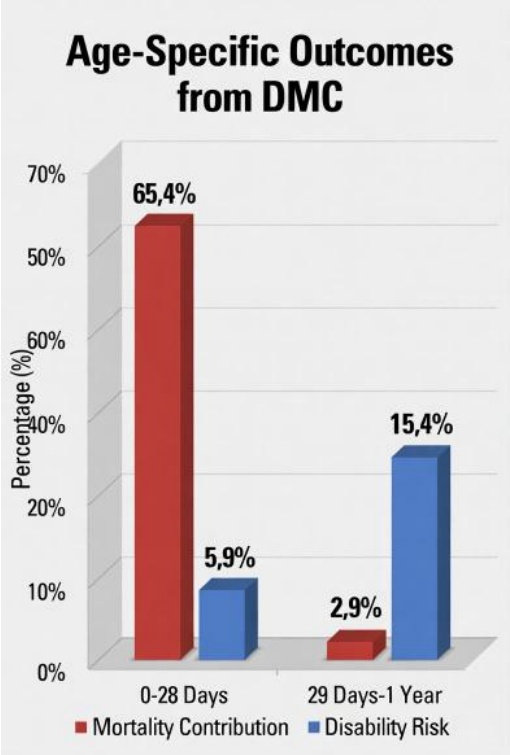

3.3 Global and Regional Comparisons

Uzbekistan's neonatal rate (12.5/1,000) lags WHO's global average (18/1,000) but mirrors Central Asian trends, where QI initiatives reduced errors by 30%.

Table 1: Neonatal vs. Postneonatal Mortality Rates (Per 1,000 Live Births)

Region/Period	Neonatal (0–28 Days)	Postneonatal (29 Days–1 Year)	Source
Global (2022)	18	9	WHO
Uzbekistan (2022)	12.5	4.2	Statista
Sub-Saharan Africa	27	15	WHO
Central Asia	20	8	UNICEF

4. Discussion

Neonatal DMC's acuity stems from physiological fragility – e.g., immature immunity heightens infection risks from dosing errors (49.5%), echoing WHO's emphasis on essential newborn care. Postnatally, diagnostic delays (74.2%) align with faltering growth patterns, where rapid catch-up exacerbates obesity risks later.

In Uzbekistan, CFME reveals systemic echoes of regional gaps: workforce shortages and protocol inconsistencies. Maternal age extremes further compound risks, with older mothers (>35 years) facing 1.5-fold higher anomaly odds.

Mitigation demands age-tailored strategies: NICU fortification for neonates and community PNC for postnatals, potentially averting 20–30% losses per WHO models. Limitations include retrospective bias; future prospective cohorts could refine these insights.

Figure 3: Causes of DMC Across Periods

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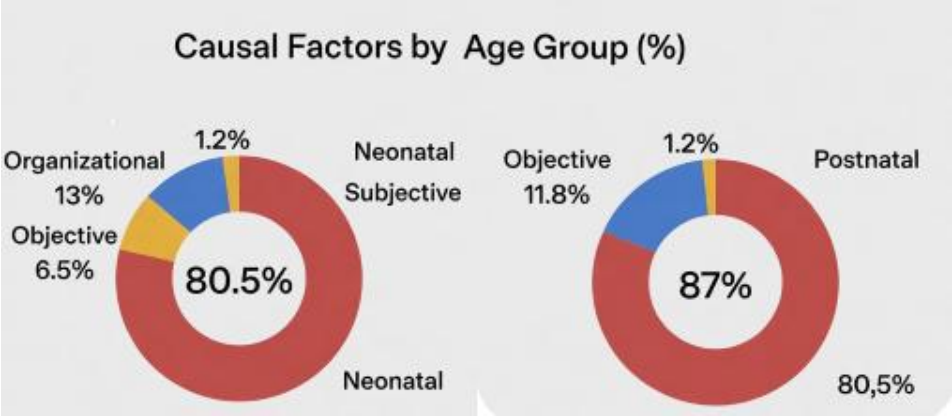

5. Conclusion

Age-stratified DMC reveals a pivotal transition: from life-threatening therapeutic gaps in neonates to insidious diagnostic oversights postnatally. Uzbekistan's context – mirroring WHO's global imperatives – calls for integrated, evidence-based reforms to bridge these divides. Prioritizing multidisciplinary training and digital monitoring could safeguard this foundational phase, fostering healthier futures.

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