cCMV: Congenital CMV Knowledge, Practices and Beliefs Among Maternal Child Nursing

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Congenital Cytomegalovirus

Despite its high prevalence and severe outcomes, cCMV is often underrecognized by both healthcare professionals and the general public.

This study examines nurses' knowledge in 32 U.S. states where cytomegalovirus (cCMV) screening is not standardized.

Pathophysiology of CMV in Pregnancy

Transmission:

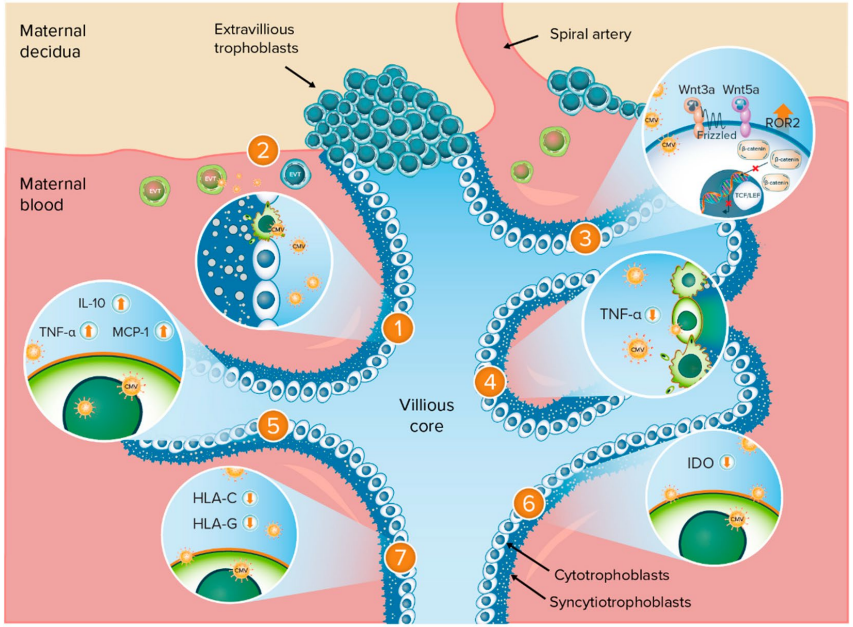
- Virus moves from maternal leukocytes to uterine endothelial cells (Ninjue et al., 2021).

Placental Impact:

- Cytotrophoblast infection leads to apoptosis of neighboring cells.
- Results in villitis, impaired placental vasculature, and reduced nutrient/gas exchange.

Fetal Effects:

- Virus spreads via amniotic tissue into the fetal bloodstream.



Symptoms at Birth

- 10% show symptoms at birth:
  - Jaundice
  - Petechiae(Blueberry muffin) Hepatosplenomegaly
  - Thrombocytopenia
  - Chorioretinitis
  - Intrauterine growth restriction
  - Microcephaly
  - Seizures
  - Intracranial calcifications

Challenges and Advances in cCMV Management

- **Lack of Vaccines**:
  - No approved vaccine; limited and undesirable treatment options.
- **Research Advances**:
  - Development of mRNA vaccines (Moderna, 2024).
- **Prevention Strategies**:
  - Hygiene practices (avoid kissing/sharing utensils with young children).
  - Education and antepartum screening.

Screening and Long-Term Impact of cCMV

- **Annual Statistics**:
  - 8,000 infants born with cCMV in the U.S.
- **Hearing Loss**:
  - Affects 1/3 of symptomatic and 1/10 asymptomatic infants (Dietrich & Schieffelin, 2019).
  - Can be delayed or progressive.
- **Screening Programs**:
  - Hearing-targeted: Tests infants failing newborn hearing tests.
  - Universal: Tests all infants for cCMV.
  - Potential to catch more cases with broader implementation.

Role of Nurses and Study Objectives

Nurses' Critical Role:

- Identify at-risk infants through observations and prenatal/medical history.
- Ensure timely screening and communicate results with the care team.
- Develop care plans and provide families with support and education.

Study Goals:

- Expand on prior research about nurses' knowledge, beliefs, and practices.
- Focus on states lacking standardized cCMV testing.
- Understand how nurses contribute to education, screening, and care coordination.

Methods

- Cross-sectional survey of 1,000 nurses affiliated with the Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN)
- States that do not have standardized screening
- 215 eligible participants responded anonymously.
- $10 Amazon gift card for their participation.
- Data analysis was evaluated using ANOVA and Spearman rho correlation.

Ethics and Institutional Review Board (IRB)

Approval Details:

- Study approved at the exempt level by Carlow University IRB (ID: man-ng-20231).
- Expiration date: May 4, 2024.

Data Collection:

- Anonymous survey distributed to participants.
- Results analyzed statistically to ensure confidentiality and accuracy.

Survey Design and Modifications

Survey Development:

- Adapted from Pesch and Muldoon (2022).
- Removed question on diagnosing/managing cCMV (outside nurses' scope).
- Inclusive language updates (e.g., “I test” to “we test”).
- Approved by original authors, research board for cCMV, and scientific advisory board.

Target Audience:

- Nurses in maternal-fetal, neonatal, and pediatric health with bachelor's, master's, or doctoral degrees.
- Participants from states lacking standardized cCMV testing.

States Lacking Standardized Testing

Alabama	Alaska	Arizona	Arkansas
California	Colorado	Delaware	Georgia
Hawaii	Idaho	Indiana	Kansas
Louisiana	Maryland	Massachusetts	Michigan
Mississippi	Missouri	Montana	Nebraska
Nevada	New Hampshire	New Jersey	New Mexico
North Carolina	North Dakota	Ohio	Oklahoma
Oregon	Rhode Island	South Carolina	South Dakota
Tennessee	Vermont	Washington	West Virginia
Wisconsin	Wyoming		

States Where cCMV testing is not standardized: survey was sent to nurses in these states.

Survey Distribution and Participation

Methodology:

- Distributed via AWHONN Journal to 1,000 participants in targeted states.
- Survey dates: February 22 – March 26, 2024 (reminders sent on March 2).
- Incentive: $10 gift voucher for survey completion.

Response Rate:

- 215 responses received, yielding a 21.5% response rate.

Funding and Statistical Analysis

Funding:

- $7,500 provided by the Congenital Cytomegalovirus Foundation.
- Supported survey incentives and program operations.

Statistical Analysis:

- Focused on 5 of 18 survey questions due to response rates and role relevance.
- Excluded 12 questions for limited applicability to nursing roles.

Overview of Knowledge Assessment

Key Areas Examined:

- Prevalence of congenital CMV (cCMV).
- Signs, symptoms, and outcomes for affected infants.

Findings:

- Significant knowledge gaps among nurses about cCMV.
- High interest in learning more about the infection and its treatments (Question 12).

Knowledge Scoring and Statistics

Scoring Details:

- 10-point scale: 1 point each for correct answers (Q1, Q2, Q8).
- Cronbach alpha: 0.76.
- Highest score: 8/10 (80% correct).
- Average score: 3.39/10, median: 3.00, standard deviation: 2.09.

Implications:

- Wide range of knowledge levels among respondents.
- Need for standardized education on cCMV.

Awareness of cCMV Prevalence

Findings:

- Only 31.6% correctly identified prevalence as 1 in 200 live births.
- Common misconceptions:
  - 33.5% believed prevalence is 1 in 500 live births.
  - 27.9% thought it was 1 in 5,000 live births.

Conclusion:

- Epidemiological knowledge of cCMV is underestimated among nurses.

Knowledge of Signs and Symptoms

Correctly Identified Symptoms:

- Hearing loss: 61%.
- Low birth weight: 64%.

Less Recognized Indicators:

- Elevated liver enzymes: 25.6%.
- Jaundice: 36.7%.
- "No signs at birth": Only 7.4%.

Implications:

- Nurses may miss less obvious signs, highlighting the need for targeted education.

Understanding Outcomes for Asymptomatic Infants

Findings:

- 47.9% knew asymptomatic infants are at increased risk for hearing loss later.
- 34.4% left the question unanswered.
- Common misconceptions:
  - 13% believed asymptomatic infants face no cognitive risks.
  - 2.8% thought they are not at risk for hearing loss.

Conclusion:

- Long-term effects like progressive hearing loss are poorly understood.

Roles and Desire to Learn More

Statistical Analysis:

- Spearman rho correlation: No significant association between knowledge scores and roles.
- ANOVA: No statistical difference in knowledge scores based on testing roles.

Takeaway:

- Nurses' roles in testing and their perceived knowledge indicate a need for improved education and resources on cCMV.

Key Findings and Challenges

Knowledge Gaps:

- Symptoms and long-term outcomes of cCMV.
- Unclear understanding of follow-up for newborns with negative hearing screens.

Challenges in RN Population:

- Nurses often administer tests/medications but do not write orders.
- Need for better integration of cCMV knowledge into nursing roles.

National Recommendations and Current Gaps

National Screening Recommendations:

- Advisory Committee on Heritable Disorders: 35 core and 26 secondary conditions.
- cCMV not yet included, but nominated for addition.

TORCH Infections:

- A comprehensive understanding is needed for maternal-child health nurses.
- cCMV education gaps mirror broader challenges in TORCH infection awareness.

Opportunities for Improvement

Educational Needs:

- Nurses expressed a strong desire to learn more about cCMV.
- Development of targeted educational programs and nursing curricula recommended.

Correlation Findings:

- No significant link between current knowledge and desire to learn more, highlighting a universal need for awareness efforts.

Survey Limitations

Flaws in the Survey Design:

- Originally designed for physicians, not nurses.
- Lacked pilot testing for reliability in the nursing population.
- Missed opportunity to create a tailored tool for nurses' knowledge and beliefs on cCMV.

Survey Structural Issues:

- Decrease in response rates for specific questions (Q7-Q9).
- Absence of response options like "does not apply" or "does not know."
- Technical error in Q6 limited data accuracy and its inclusion in analysis.

Knowledge Gaps and Educational Needs

Significant Knowledge Gaps Identified:

- Limited awareness of cCMV prevalence, symptoms, and long-term effects.
- Need for improved understanding of symptom presentation and testing practices.

Educational Opportunities:

- Bridging gaps through targeted training.
- Importance of integrating cCMV into nursing curricula.

Future Research and Methodological Insights

Further Research Areas:

- Qualitative research to explore decision-making for testing and symptom identification.
- Inclusion of demographic data to better understand influencing factors.
- Development of validated tools tailored to various nursing roles.

Participation Bias:

- Potential bias from participants with pre-existing knowledge of cCMV.

Policy and Practice Implications

Focus on States Without Standardized Testing:

- Opportunity to explore beliefs and practices where screening is not mandated.
- Raising awareness about preventable disabilities like cCMV.

Role of Nurses:

- Staff nurses: Advocate for testing and identify symptoms.
- Nurse practitioners: Focus on ordering/interpreting tests and patient education.

Conclusion and Call to Action

Key Takeaways:

- Nurses' significant knowledge gaps hinder effective cCMV management.
- Early detection and intervention are crucial for better outcomes.

Future Directions:

- Enhanced education and training programs for nurses at all levels.
- Continued research to improve tools and curricula.

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