Peer Reviewed

Maternal Immunization: Enhancing Protection for Mothers, Infants, and Future Generations

Viveka Prakash-Zawisza, MD, MS, MBA, Mitchell Goldstein, MD, MBA, CML

The National Perinatal Association (NPA) is an interdisciplinary organization that strives to be a leading voice for perinatal care in the United States. Our diverse membership is comprised of healthcare providers, parents & caregivers, educators, and service providers, all driven by their desire to give voice to and support babies and families at risk across the country.

Members of the NPA write a regular peer-reviewed column in Neonatology Today.

National Perinatal Association

Educate. Advocate. Integrate.

"Despite ample safety data supporting vaccine use during pregnancy, maternal immunization remains underutilized due to concerns about vaccine safety among healthcare providers and pregnant women, which has resulted in low uptake rates, particularly during the COVID-19 pandemic."

"Maternal immunization is a critical component of prenatal care that offers many benefits to pregnant individuals and their developing fetuses. By reducing the severity and duration of certain illnesses, vaccines safeguard the health of pregnant individuals and protect the fetus from congenital and maternal infections."

Abstract:

Maternal immunization is an essential aspect of prenatal care that reduces the severity and duration of illnesses for pregnant individuals and provides crucial protection to the developing fetus from congenital infections and the adverse effects of maternal infections. Some vaccines even confer immunity to newborns by transferring antibodies via placenta and breastmilk, offering vital protection until the baby's immune system matures. Despite ample safety data supporting vaccine use during pregnancy, maternal immunization remains underutilized due to concerns about vaccine safety among healthcare providers and pregnant women, which has resulted in low uptake rates, particularly during the COVID-19 pandemic. This manuscript explores the history of maternal immunization, the safety considerations of different vaccines, current recommendations, and challenges, and proposes comprehensive strategies to increase vaccine confidence among pregnant individuals to optimize protection for mothers and infants. (1)

Introduction:

Maternal immunization is a critical component of prenatal care that offers many benefits to pregnant individuals and their developing fetuses. By reducing the severity and duration of certain illnesses, vaccines safeguard the health of pregnant individuals and protect the fetus from congenital and maternal infections. Moreover, certain vaccines play a pivotal role in conferring immunity to newborns through the transfer of protective antibodies, thus offering a critical shield until the baby's immune system matures.

"Moreover, certain vaccines play a pivotal role in conferring immunity to newborns through the transfer of protective antibodies, thus offering a critical shield until the baby's immune system matures. "

However, concerns about vaccine safety among healthcare providers and pregnant women have hindered the widespread adoption of maternal immunization, leading to low vaccine uptake rates, particularly during the challenging COVID-19 pandemic. (2) This manuscript delves into the historical context of maternal immunization, the safety considerations surrounding various vaccines, current recommendations, and existing challenges, and proposes comprehensive strategies to bolster vaccine confidence among pregnant individuals, ultimately optimizing protection for mothers and infants.

Historical Perspective:

The history of maternal immunization has evolved, marked by significant changes in policies and regulations. Initially, by FDA guidelines, pregnant women were excluded from drug and vaccine trials, a measure that persisted after the thalidomide tragedy. However, in 1993, the FDA reversed this decision, recognizing the necessity to

gather drug safety data on women of childbearing age. (3) Despite this change, pregnant and lactating women still face underrepresentation in vaccine trials, causing delays in obtaining sufficient safety data during disease outbreaks. Recognizing the importance of maternal immunization and the reversal of exclusionary policies highlight its critical role in prenatal care and disease prevention.

"Despite this change, pregnant and lactating women still face underrepresentation in vaccine trials, causing delays in obtaining sufficient safety data during disease outbreaks. Recognizing the importance of maternal immunization and the reversal of exclusionary policies highlight its critical role in prenatal care and disease prevention."

Safety Considerations and Recommended Vaccines:

Vaccines deemed safe for administration during pregnancy include killed or inactivated virus vaccines, protein subunit vaccines, toxoid-containing vaccines, and conjugate vaccines. (3) Live attenuated virus vaccines are generally avoided due to the theoretical risk of congenital infection and increased miscarriage risk. However, recent data from a meta-analysis have shown no evidence of increased adverse pregnancy outcomes related to live vaccines, except for smallpox vaccines. Nonetheless, ensuring safety for pregnant individuals and their fetuses remains a priority, with ongoing research and vaccine safety monitoring during pregnancy.

Current Recommendations and Challenges:

The universal recommendations for maternal vaccination include tetanus, diphtheria, pertussis (Tdap), influenza, and COVID-19 vaccines when the benefits outweigh the potential risks. (4) Tdap vaccine administration between 27 and 36 weeks of gestation, preferably earlier, optimizes neonatal antibody levels and protects newborns from pertussis and its life-threatening complications. The flu vaccine is safe to administer during any trimester and protects against flu-associated pregnancy complications. The World Health Organization (WHO) recommends COVID-19 vaccination for pregnant women based on individual risk assessment, providing information on risks, benefits, and limitations of safety data. Vaccines for other illnesses, such as hepatitis B, meningococcus, and polio, may be considered individually with thoughtful risk-benefit analysis.

Strategies to Increase Vaccine Confidence:

Low vaccine confidence among pregnant individuals remains a significant barrier to increasing vaccination coverage. Several factors influence vaccine uptake, including awareness, perceived disease severity, vaccine benefits, side effects, previous vaccination history, and recommendations from healthcare professionals. Proactive efforts are needed to enhance vaccine confidence, such as healthcare providers offering vaccines, providing ample information, and addressing concerns raised by pregnant individuals. (5) Multichannel approaches, community education programs, targeted messaging, and improved access to healthcare for marginalized populations are additional strategies to increase vaccine uptake among this vulnerable cohort. (6, 7) Encouragingly, research has shown that proactive and supportive healthcare provider recommendations are pivotal in positively influencing vaccine decisions among pregnant women.

"Despite ample safety data supporting vaccine use during pregnancy, concerns about vaccine safety have led to low vaccine uptake rates worldwide, even during critical times such as the COVID-19 pandemic. By addressing vaccine confidence, providing information, and implementing targeted strategies, healthcare providers can play a pivotal role in optimizing vaccination coverage and safeguarding the health of both mothers and infants."

Conclusion:

Maternal immunization is vital to prenatal care, protecting pregnant individuals and their unborn babies. Despite ample safety data supporting vaccine use during pregnancy, concerns about vaccine safety have led to low vaccine uptake rates worldwide, even during critical times such as the COVID-19 pandemic. By addressing vaccine confidence, providing information, and implementing targeted strategies, healthcare providers can play a pivotal role in optimizing vaccination coverage and safeguarding the health of both mothers and infants. Investing in maternal immunization has the potential to protect current generations and create a healthier future for generations to come, highlighting its significance in public health and disease prevention. Continued efforts to promote and implement maternal immunization will contribute to a safer and healthier world for pregnant individuals, their infants, and future generations. (8)

References:

1. https://www.cdc.gov/vaccines/pregnancy/hcp-toolkit/important-maternal-vaccines.html
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8582099/
3. Laris-González A., Bernal-Serrano D., Jarde A., Kampmann B. Safety of administering live vaccines during pregnancy: a systematic review and meta-analysis of pregnancy outcomes. Vaccines (Basel) 2020;8:124.

4. Health Alert Network COVID-19 vaccination for pregnant people to prevent serious illness, deaths, and adverse pregnancy outcomes from COVID-19. 2021. https://emergency.cdc.gov/han/2021/han00453.asp

5. Kilich E., Dada S., Francis M.R., et al. Factors that influence vaccination decision-making among pregnant women: a systematic review and meta-analysis. PLoS One. 2020;15

6. Wilson R.J., Paterson P., Jarrett C., Larson H.J. Understanding factors influencing vaccination acceptance during pregnancy globally: a literature review. Vaccine. 2015;33:6420–6429.

7. Buchy P., Badur S., Kassianos G., Preiss S., Tam J.S. Vaccinating pregnant women against influenza needs to be a priority for all countries: an expert commentary. Int J Infect Dis. 2020;92:1–12.

8. Adeyanju G.C., Engel E., Koch L., et al. Determinants of influenza vaccine hesitancy among pregnant women in Europe: a systematic review. Eur J Med Res. 2021;26:116.

Disclosures: *There are no reported disclosures.*

NT

Corresponding Author

Viveka Prakash-Zawisza, MD, FACOG
President, National Perinatal Association
Email: viveka.zawisza@gmail.com

Corresponding Author

Mitchell Goldstein, MD, MBA, CML
Professor of Pediatrics
Loma Linda University School of Medicine
Division of Neonatology
Department of Pediatrics
Loma Linda Universisty Children's Hospital
Loma Linda, CA
Email: mgoldstein@llu.edu