How the unique components of breast milk protect health in later life

11th International Breastfeeding and Lactation Symposium, Berlin, April 2016

Now in its 11th year, the Breastfeeding and Lactation Symposium hosted by Medela was, yet again, a huge success. The 400+ participants from 41 countries enjoyed presentations from nine of the world's leading scientists in this field who presented the latest research on the importance of breast milk and the implementation of findings into clinical practice.

The unique components of human milk contribute to protecting health in later life in multiple ways. Professor Donna Geddes, University of Western Australia, Perth, provided a fascinating insight into the link between the quality and the type of fats in babies' food and the predisposition to a metabolic syndrome. Babies who are breastfed have a lower risk of developing a non-communicable chronic disease such as cardiovascular disease, cancer, respiratory disease and diabetes mellitus. Breast milk, with its nutrient content precisely tailored to an infant's needs and a unique diversity of bioactive ingredients, reduces the risk of obesity in later life. Studies show that infants who are breastfed gain weight more slowly, which seems to reduce the risk of them becoming overweight in later life.

The different types of human milk oligosaccharides (HMOs) in breast milk continue to attract attention. Professor Lars Bode, University of California, San Diego, USA, described how HMOs promote colonisation of the infant's intestine by beneficial microorganisms to protect against infections caused by bacteria, fungi and parasites that adhere to the mucous membranes.

Benefits of breastfeeding on infant brain development

Associate Professor Sean Deoni, Children's Hospital Colorado and University of Colorado (School of Medicine), USA, discussed the influence of breast milk *vs* formula on early brain development and later cognitive outcomes. He informed the audience that the process of myelination is particularly sensitive to environmental conditions and is highly dependent upon optimal delivery of nutrients, in particular lipids and long-chain fatty acids, as well as iron. Myelin increases the rate of transmission and speed of messaging across the brain; the most rapid myelination occurs outside the uterus in the first 1,000 days.

Speakers and delegates at the Breastfeeding and Lactation Symposium.

To explore the effects of infant feeding practice he discussed his latest research using magnetic resonance imaging (MRI) to compare measures of white matter microstructure in healthy children from three months of age to six years. The children were either exclusively breastfed, exclusively formula fed, or received a mixture of breast milk and infant formula. Exclusively breastfed children were found to exhibit increased white matter development and myelination in late maturing white matter regions, including the frontal and temporal white matter and associated brain regions, in comparison to formula fed infants. While the exact mechanisms underlying these observations remain uncertain, it is reasonable to conclude that breastfeeding has a positive impact on brain development.

Optimum food for preterm infants

With the symposium focusing on preterm and sick infants, questions were raised about feeding choices in the neonatal intensive care unit (NICU) and on enhancing nutritional support for these infants beyond their NICU stay.

The NICU team repeatedly faces great challenges when feeding very low birthweight infants. The advantages of feeding babies with their own mother's milk and milk from human milk banks was discussed at great length, including how to best preserve the bioactive substances in human milk.

Although milk from the baby's mother is regarded as gold standard, often it is not available from the start and donor breast milk (DBM) is given. However, the pasteurisation of DBM deactivates valuable bioactive substances, such as immunoglobulins, enzymes and hormones. Dr Susanne Herber-Jonat, Ludwig Maximilian University, Munich, Germany, described the debatable use of unpasteurised DBM in her unit.


Professor Josef Neu.

Following on from this, Professor Per Torp Sangild, University of Copenhagen, Denmark, addressed the question of how the treatment of human milk affects the constituents and what this means for the infant. In terms of nutritional and health benefits, untreated human milk or milk sterilised using the gentle UV-C method proved to be superior to pasteurised milk.

The value of human milk in the NICU

The health value of human milk has been a core talking point at the symposium for several years and this year was no different. For preterm infants human milk offers improved health outcomes for short- and long-term neurodevelopment and reduces the risks of necrotising enterocolitis (NEC), retinopathy of prematurity and nosocomial infections. These benefits have played a significant role in supporting the use of DBM as a driver to improve health outcomes and minimise the risks associated with using formula.

Professor Josef Neu, University of Florida, USA, explained the differences in the constituents of human breast milk, DBM and formula, and the significance of these differences for feeding in the NICU. He emphasised that neither DBM nor formula offer protection against NEC to the same extent as that provided by mother's own milk. Where possible, it is essential to supplement DBM with small quantities of breast milk from the mother in the first few days after birth.

It was especially inspiring to hear Thomas Kühn of the Vivantes Centre of Perinatology in Berlin-Neukoelln, Germany, discuss the misconceptions that influence neonatologists' and dieticians' clinical interventions when using human milk for infants in the NICU.

Providing preterm infants with exactly the right nutrients and energy that they need for development is challenging. To optimise growth it was normal practice to give more carbohydrates and fat – this led to 'fatter' infants who still didn't follow the anthropometric goals as defined by growth charts. It was also a given that more protein made healthier babies and that this enhanced body and brain growth. It is now thought, however, that too much protein can lead to excess weight and encourage infections, with the potential high risk of causing metabolic disorders later in life.

A most enlightening misconception that Dr Kühn raised was that preterm infants who are exclusively breastfed are at risk for

Dr Thomas Kühn.

adverse outcomes. While exclusive breastfeeding results in less favourable growth in hospital due to the challenges around protein and calorific under-nutrition, it is now emerging that these infants have better psychomotor development and higher weight, height and cranial measurements at two and five years of age in a dose-dependent manner in comparison to non-breastfed preterm infants.

NeoPAss: family-integrated care in the NICU

The treatment pathway NeoPAss focuses on the family, supporting the parents as well as the preterm infant. Professor Matthias Keller told the audience how, since its introduction to the Children's Hospital, Kinderklinik Dritter Orden Passau, Germany, preterm mortality and morbidity have been reduced; preterm babies are discharged from hospital earlier; serious illnesses are less common; parents are more confident about looking after their baby, and a higher proportion of babies are being breastfed at discharge. Professor Keller emphasised the importance of infant nutrition: preterm babies should receive breast milk at the earliest possible opportunity on the neonatal ward.

Lactational mastitis

Mastitis, a painful and debilitating condition that often results in mothers ceasing to breastfeed and infants receiving less breast milk, accounts for 35% of undesired lactational weaning and as such should be considered a public health issue with an objective to reduce its occurrence globally. With the emphasis on recommending exclusive breastfeeding for the first six months, this requires urgent attention.

Professor Juan Miguel Rodríguez of Complutense University of Madrid, Spain, explored the aetiology, pathogenesis and treatment of lactational mastitis and provided food-for-thought for standardising the diagnosis and treatment for mothers who experience acute and subacute mastitis.

When mastitis presents there is often obstruction of the milk ducts leading to engorgement. This in turn presents milk stasis and further narrows the lumen of the duct resulting in an increase in inter-ductal pressure. Milk flow is impaired and babies feed more frequently due to decreased milk secretion. Mammary dysbiosis occurs when there is a microbial imbalance, with increased levels of 'harmful' bacteria and reduced levels of 'beneficial' bacteria within the breast tissue. Unless diagnosis (via bacterial culture) and treatment of mastitis are better understood, mothers will continue to experience lactation failure. Appropriate targeted treatment must be made available to enhance comfortable and effective lactation.

The use of probiotics for management of mastitis is appealing and early studies with certain live lactobacilli strains isolated from human milk have shown favourable efficacy for treatment and prevention of mastitis.

All speakers agreed that love and optimal nutrition are important for babies to thrive. Breast milk as a food combines both for healthy infants: close contact with the mother and a supply of nutrients and protective substances tailored to their individual needs. For preterm infants, breast milk and skin-to-skin contact at the earliest possible opportunity make a decisive contribution to a healthy life.


Question time with the lactation experts.

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