

The recent Policy Brief -5 by Nutrition Discussion Group, CTARA on “*Anticipating Vulnerability of Malnourished Young Children to Covid-19 and Taking Corrective Steps*” argued on the strong need for sharp surveillance, early detection and repositioning the health system to combat the crisis through preventive measures. In this regard, massive promotion on colostrum feeding as the first immunity provider and exclusive breastfeeding as an immunity booster along with proper infant and young child feeding (IYCF) practices are considered very crucial. This is further elaborated in this technical supplement.

Human milk is a complex biological fluid, which serves as the initial source of nutrition for a newborn child and is essentially required for the developing infant.¹ Breast milk ensures transference of multiple immune factors, maturation of gut immunity, and anti-inflammatory effects.²

The first breast milk is known as ‘**colostrum**’ which gets secreted as yellowish, sticky, thick milk during first days postpartum. High concentration of nutrients in colostrum is ideal to meet nutrient requirement of newborn having small digestive capacity. Per unit volume of colostrum supplies high concentration of nutrients (carbohydrates, easily digestible proteins like casein, lacto albumin and lacto globulin, fat, minerals, iron, vitamins, enzymes like lysozyme, lactoferrin etc.), a variety of bioactive factors (soluble immune factors, antimicrobial proteins and peptides, functional fatty acids, hormones, oligosaccharides, nucleic acids, stem cells, antioxidants), unspecific defense cells (epithelial cells and macrophages, neutrophils, eosinophils, lymphocytes, and other cells), immunological factors (bifidus factor, lysozyme, lactoferrin, interferon, complement and lipids) and a wide array of microbes known as the human milk microbiome (HMM).³

Colostrum also harbors various growth factors such as hepatocyte growth factor (HGF), transforming growth factor- β (TGF- β), insulin like growth factor etc. to provide anti-inflammatory benefits.

HGF supports proliferation, angiogenesis, and intestinal tissue maturation along with providing a complementary effect with pro-inflammatory vascular endothelial growth factor (VEGF) on the neonatal gut.^{4,5} On the other hand, TGF- β is responsible for the production of antibodies by B-lymphocytes especially immunoglobulins (IgA, IgM, IgG, IgD and IgE) to provide passive immune protection. Since the newborn cannot synthesize antibodies till postpartum 30 days, TGF- β mediated synthesis of immunoglobulins and antibodies are very much crucial for immune development among infants.⁶

Compared to mature milk, colostrum has higher levels of immunoglobulins (Ig), cytokines and immune cells due to their passage between the interstitial spaces of mammary epithelium, tightness of which progressively gets increased during maturation of milk.⁷⁻¹¹ Thus, colostrum is the most potent natural immune booster which not only protects infants against bacterial and virus infection but also decrease the risk of non-communicable diseases at later stage of life.

Like colostrum, mature breast milk also contains nutrients as best source for infant-nutrition during the first six months of life.¹²⁻¹⁵ This also contains immune cells, bioactive molecules providing anti-inflammatory and anti-infective functions to promote formation of the immune system and supports organ development.¹⁶⁻¹⁹

Breastfed neonates thus receive passive immunity through antimicrobial and immunomodulatory factors present in human milk.¹⁸⁻²⁰ Interestingly antimicrobial factors present both in colostrum and milk are resistant to degradation by digestive enzymes but provide protection to the mucosal surfaces and eliminate bacteria without initiating inflammatory reactions.²¹

A previous study showed association between New Haven Coronavirus infection and Kawasaki disease (KD) which is a systemic vasculitis which mainly affects children aged below five years causing high-grade fever and inflammation.²² In Japan where Kawasaki disease is most common, a nationwide, population-based, longitudinal survey reported that 6-30mo old children breastfed exclusively (OR 0.26, CI 0.12–0.55) or partially (OR 0.27, CI 0.13–0.55) were less likely to be found hospitalized with KD compared to children formula fed without colostrum. Feeding only colostrum was also found to provide a protective effect.²³

In present pandemic situation due to COVID outbreak, reports started coming from western world on the emergence of a pediatric inflammatory multisystem syndrome associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).²⁴⁻²⁷

In India also, Kawasaki-like symptoms were being seen among young COVID cases (<https://indianexpress.com/article/cities/mumbai/mumbai-hospitals-are-seeing-kawasaki-like-symptoms-among-young-covid-cases-6479694/>). Moreover acute respiratory infection is one of the significant factors of mortality among preschoolers and young children in India.

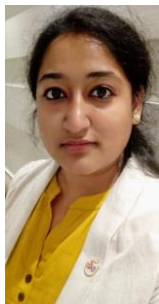
Contextually, breastfeeding for 6 months or longer was found to be associated with a reduced risk of lower respiratory tract infection up to 4 years of age (OR: 0.71; 95% CI: 0.51-0.98) in Dutch population-based prospective cohort study.²⁸ Recent systematic review and meta-analysis study also reported higher risk of infection-related mortality among 0-5mo infants who were predominantly (RR 1.7), partially (RR 4.56) and non-breastfed (RR 8.66) compared to exclusive breastfed infants and the risk was 2 folds higher in non-breastfed infants compared to breastfed children aged 6-23 months.²⁹

Thus, in the given context of the immunological importance of colostrum-exclusive breastfeeding and vulnerability of preschoolers towards COVID pandemic, the present time is the most crucial phase to concentrate research focus, programmes, policy and campaigns on such preventive approach.

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To view Policy Brief 5, please visit:
<http://www.iitbnutritiongroup.in/anticipating-vulnerability-of-malnourished-young-children-to-covid-19-and-taking-corrective-steps>



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