

Exclusive breast feeding-

Exclusive breast feeding is nature's best gift for the mother and the baby. It lays the foundations for life long health, happiness and productivity. However, it requires considerable effort and a strong will for its success from the mother, and the baby, with support from the family, community, health care providers health centers and hospitals and the government. Every mother must have a conviction and a firm mindset to make sure that breast feeding succeeds. This is the only option for her child barring rare exceptions. There is no doubt that she will have numerous problems in making it a success but with a firm mind set and support of others, she is bound to succeed. The reasons for not breast feeding the baby are rare, yet only 38% of mothers in the world successfully breast fed their babies.

Even in breast feeding, the best option is that the baby should be given his/her own mother's milk and not of any other woman. Optimum breast feeding means giving the baby the first breast feed within one hour of birth, exclusive breast feeding for the first 6 months of life (breast feeding should not be supplemented even with water during this period) and continuation of breast feeding with complementary foods for upto 2 years age and beyond.

In this communication, some prominent advantages of exclusive breast feeding are highlighted based on systematic reviews and meta analysis that includes experience and evidence around the world with rigorous methods of analysis. The numerous advantages for the mother are not included in this communication. According to WHA resolution 65.6, the target for exclusive breast feeding for a period of first six months after birth was set at 50% by the year 2025. Many resource constrained countries (Sri Lanka, Cambodia and Malawi) have succeeded in rapidly increasing the rates of exclusive breast feeding and have already exceeded the 2025 global targets. For India, efforts should be made to exceed this target in order to achieve several health and development targets of SDG by 2030.

Prominent advantages of exclusive breast feeding for the child

1. At least a 10% reduction in child mortality
2. Lower risk for undernutrition, wasting and stunting
3. Reduction in the risk of deaths due to diarrhea and under-five mortality due to diarrhea, a reduction in occurrence of diarrhea and reduced rates of hospitalization
4. Reduction in the morbidity due to acute respiratory infections, reduced rates of hospitalization and a reduction in deaths due to acute respiratory infections in children with reduction in child mortality
5. A lower risk of overweight and obesity in adult life
6. A lower risk of hypertension in adult life
7. A lower risk of type II diabetes in adult life
8. Lower cholesterol levels in adult life
9. Higher intelligence, higher cognitive development, better academic achievements in the school and college and some evidence for increased brain volumes, grey and white matter.

A pooled analysis of exclusive breast feeding in low and middle income countries showed lower rates of infections in exclusively breast fed infants. A millennium cohort study from United Kingdom showed that the hospitalization rates in babies who are exclusively breast fed are lower than those who are not. A systematic review showed that the gastrointestinal infections and allergies are lower in exclusively

breast fed babies than in those who were not exclusively breast fed. The protective effects on allergies are not included in this brief.



Effect on acute diarrhea

A review has shown that 800,000 children died of diarrhea in 2010. The lancet child survival series showed that exclusive breast feeding is a highly cost effective strategy to reduce under-fives mortality in general and particularly in reduction of mortality due to diarrhea. Breast milk provides protection through its nutritional advantage, anti-infective and immunological advantages over artificial milk. Breast milk contains several antimicrobial and anti-inflammatory factors, hormones, digestive enzymes and growth modulators that protect against infections. The protective effect of breast feeding is related to oligosaccharides, IgA antibodies transferred from the mother and lactoferrin. Exclusively breast fed babies are not exposed to pathogens that contaminate artificial milk. This contamination is likely to occur in homes where hygienic conditions are sub optimal. The nutritional disadvantage of artificial milk is related to the widespread practice of dilution of the milk which is done for economic reasons or fear of occurrence of diarrhea in the belief that the undiluted milk may be too strong for the sensitive baby. Contamination is also likely to occur by feeding babies through unhygienic bottle feeding practices.

At least 5 systematic reviews have been done on the issue of role of exclusive breast feeding on occurrence of diarrhea. The reviews and meta-analysis show the following (1) the risk of diarrhea is lower in the exclusively breast fed children and this protective effect is most prominent below the age of 6 months (2) the lower risk continues beyond 6 months age though it is not as prominent as in the first 6 months age (3) mortality from diarrhea is 10 times lower in breast fed babies (4) the hospitalization rates are significantly lower in breast fed babies (5) the protective effect of exclusive breast feeding is in bacterial infections but not significant in Rota virus infections The lower risk of diarrhoeal disease by reducing morbidity offers additionally, a considerable nutritional advantage to the child. In children who are exclusively breast feeding and if they develop diarrhea, exclusive breast feeding reduces the need to give oral rehydration solution for prevention of diarrhea and the need for IV treatment is reduced.

The meta analysis carried out by Horta and Victora has considered the previously published literature and also covered studies that were not included in the previous reviews by the search methodology. It

does not include studies on low birth weight and preterm infants. The key findings are that (1) the protective effect is maximal in the first 4 months of life, (2) the data between 4-6 months somewhat reduces the overall impact, (3) the protective effect continues beyond 6 months age upto 59 months of age. The protective effect beyond 6 months of age is dependent on the intensity of breast feeding. All efforts were made to examine the possible biases and the review suggests that the biases are not having an impact on the effect of breast feeding.

Breastfeeding also decreased severity of diarrhea; hospitalization (72%) and mortality was (77%) lower among breastfed infants. Furthermore, in three randomized trials of breastfeeding promotion, morbidity was lower in the group receiving the intervention [pooled relative risk: 0.69 (95% confidence interval: 0.49; 0.96)]. The evidence is conclusive that exclusive breast feeding protects against diarrhea in infancy.

Acute respiratory infections

Despite considerable progress, deaths due to acute respiratory infections continues to be a serious global concern especially in low and middle income countries. In 2010, it was estimated that some 1.38 million deaths were attributed to acute respiratory infections in children under the age of 5 years, Exclusive breast feeding reduces the risk from deaths A systematic review in 2009 has shown that exclusive breast feeding reduces mortality due to acute respiratory illness also in the industrialized countries.

Breast milk contains immune cells, antibodies, immune modulators and growth modulators that protect the child against respiratory infection. For example, secretory IgA antibodies may transfer immunity from previously exposed mothers to their children. Cytokines and growth factors may be transferred via human milk and stimulate the infant's immune system. Oligosaccharides may inhibit the attachment of pathogens to the infant's mucosa, preventing respiratory infections. In low-income settings breastfeeding can reduce the risk of undernutrition due to repeated infections and use of improper weaning foods. This is also likely to be related to nutritional advantage that the breast feeding offers.

The evidence in favor of impact of exclusive breast feeding was not conclusive in the review in 1984 because of methodological reasons. The review in 1997 was also not conclusive. The review of cohort studies in 2003 showed significant lowering of rates of hospitalization amongst the exclusively breast fed infants. Then a review done in 2009 showed the protective effect of breast feeding in 9 out of 13 studies reviewed by using a more robust study methodology. The systematic review done by Horta and Victora included research carried out in the United Kingdom, Brazil, Bangladesh, Philippines, Zimbabwe, Guinea, Canada, Hong Kong, and Netherlands. Seven of these ten studies reported statistically significant protective effects of breastfeeding. In pooled analysis of hospitalization there was 57% reduction in rates of hospitalization in exclusively breast fed babies. This protective effect was not affected by the age of the child. Breast fed group had a 70% reduced risk of death due to acute respiratory infections. Exclusive breast feeding also had reduced incidence of lower respiratory infections. Overall Levels of protection were around 30% for morbidity, about 50% for hospital admissions and about 60% for mortality, suggesting that breastfeeding affects not only the incidence but also the severity of these infections. These results are robust, being observed in high and low-income settings, across different respiratory infections related outcomes, and evident in studies using different definitions of breastfeeding categories.

For respiratory infection, the protective effect of breastfeeding was not modified by age. Breastfeeding also reduced the risk of hospitalization [pooled relative risk: 0.43 (95% confidence interval: 0.33; 0.55)] and mortality [pooled relative risk: 0.30 (95% confidence interval: 0.16; 0.56)]. The overall conclusion was that breast feeding protects against acute respiratory infections in children.

Breast feeding and mental development

Studies demonstrate advantages of exclusive breast feeding observed right from the neonatal period, through to infancy, early childhood, mid childhood, adolescence and into midlife. The mental morbidity is higher amongst babies who were breast fed for shorter period of time in comparison to those who were exclusively breast fed. This difference was observed right from infancy up to adolescent age.

Five studies indicated higher intelligence quotients by 4.9 points in babies who had been breast fed for more than 1 month. These studies were controlled for intellectual stimulation and infant feeding practices. Three studies showed a higher educational performance in adolescence and young adult age amongst the exclusively breast fed babies. There are potential limitations that should be considered on account of self-selection and the fact that studies under represent low/middle income countries where social and cultural considerations can be different. Although the results are statistically significant, the differences are modest. Some researchers have claimed that the benefits of breastfeeding include increased school achievement or performance in intelligence tests. The systematic review provides biological plausibility for the numerous protective effects of exclusive breast feeding.

Studies from Christchurch New Zealand, England and Brazil have shown better achievements in school in terms of number of years of schooling, and performance in the school. This was related to duration of breast feeding for 7 months or more. In England, the advantage was demonstrated even up to 26 years of age. The confounding factors did not make any difference in the conclusions reached.

Two studies including evidence from meta-analysis have shown a better visual acuity and higher cognitive development in babies who were exclusively breast feeding as compared to those who were not given exclusive breast feeding. This is attributed to differences in fatty acid composition between breast milk and artificial milk. It has to be acknowledged that mothers who exclusively breast feed their babies stimulate and support their babies better than those who give artificial milk. The effects of exclusive breast feeding continue from childhood to adult age. It is possible that the mothers who breast feed their babies exclusively have a different motivation, they are likely to stimulate their child more and understand their child more intimately because of greater sensitivity and responsiveness. However, the difference is not likely to be due to confounding variables.

A study with support from MRI scans showed higher brain volumes, total grey and white matter volumes and verbal intelligence quotients in adolescents. The effects were more prominent in males than in females. It was concluded that there is good correlation especially with white matter. This study was done on pre term babies who were given expressed breast milk which helps to further substantiate that other factors like motivation, stimulation and support do not confound the results. A positive effect on cognitive development was seen amongst children of mothers from low socio economic status although the difference in non-cognitive development was not so prominent.

The cognition and performance in very low birth weight babies who are exclusively breast fed is impressive with higher IQs up to 10 points and a strong association between exclusive breast feeding

and cognitive development. There is some evidence to show that males benefit more than females if they are exclusively breast fed. This is attributed to hormonal differences.

Exclusive breastfeeding impacts on development, cognitive development, IQ, educational attainment and mental health from infancy to adolescence and beyond. The developmental domains of adaptability and communication were most responsive to the effects of breastfeeding duration. Clearly, there is strong evidence that shows a relationship between breast feeding developmental milestones and cognition from longitudinal and neuro developmental studies. There is a dose response taking into consideration the duration of exclusive breast feeding. There may be conflicting evidence for psychological development or behavior indicators that might be related to other confounding factors. The effect on development of motor milestones may not be as conclusive as the developmental domains.

Breast feeding helps mental development through its clear nutrition and improved health advantage, through attachment and bonding. The unique nutrient content of breast milk e.g. fatty acids (essential for development of central nervous system in early life), the hormone leptin reduces the stress response through its action on the hippocampus, hypothalamus, pituitary gland, and adrenal gland, the mediation through various neurotransmitters (e.g. acetyl choline, nor adrenaline). This provides scientific basis for short and long term neuro development advantage of exclusive breast feeding. These are influenced to a large extent by the amount of mutual touch, tactile stimulation and mother's gaze to infant early in life. The contribution of stimulation attachment and bonding may be substantial.

A 30 year follow up study was published in Lancet on the effect of exclusive breast feeding in Brazilian children has shown significantly higher levels of IQs, educational attainments and higher income. The effects show a dose response relationship with higher attainments in babies who were breast fed for longer than one year than those who were breast fed for less than one month.

Long term effects of exclusive breast feeding

The interest in reviewing the long term impact was fueled by the studies of Barker that suggested fetal malnutrition as the origin of early onset of chronic adulthood diseases. It is also related to the concept of programming early in life. This is defined as the process whereby a stimulus or insult applied at a critical or sensitive period of development results in a long-term or permanent effect on the structure or function of the organism. This hypothesis is currently described as the "developmental origins of health and disease. Over 400 scientific publications are available on the association between breastfeeding and health outcomes beyond infancy.

Systematic reviews and meta- analysis was undertaken by two independent reviewers for the period 1966-2006. Systolic as well as diastolic blood pressure (30 and 25 studies selected for review) was significantly lower in exclusively breast fed infants than in those who were not exclusively breast fed. The differences were found in studies with large sample size and after eliminating the confounding socio economic and demographic variables as well as other prominent biases.

There were lower cholesterol levels in exclusively breast fed babies. Although the differences were not observed amongst children and adolescents, these became significant in adult life. There was a protective effect on obesity and overweight and this protective effect was also not influenced by parental anthropometry, socio economic status or by more than 1500 subjects in the studies. The

protective effect on obesity resulted from a review of 39 studies. Based on a review of five studies, it can be concluded that type II diabetes was lower in the groups that were exclusively breast fed than those who did not get exclusive breast feeding.

Breastfeeding for six months or longer is preferable to shorter breastfeeding or formula feeding because it is lifesaving through reduced risk of hospitalization and death due to diarrhea and acute respiratory infections as well as improved nutritional status. It offers continued advantage in mental development cognition educational advantage throughout childhood and adolescence as well as adult life. This is an important contribution to prevention of early onset of chronic adulthood diseases and therefore a key public health intervention.

Exclusive breast feeding is the way forward to address the current problems of double burden of disease in India. To achieve the goal of exclusive breast feeding mothers should be encouraged, enabled and supported to continue breastfeeding for six months and longer in order to promote the optimum developmental health and well-being of their infants into childhood and adolescence

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