Malnutrition is the principal cause of child deaths. Half of all child deaths in India could be prevented if this one issue is tackled. Children die because malnutrition lowers a child’s resistance to infection.

“Children are our future, and their mothers are its guardians”. Almost 11 million children will die before they reach the age of five; four million of them in the first month of life. A large number of them could be prevented by promoting their good health. In this country, almost one out of every 2 children goes to bed on an empty stomach.

Malnutrition is one of the largest factors suppressing India’s spectacular growth. In a country of lunar missions, billionaires and nuclear power, a staggering 46% of all Indian children under five years old are still underweight. Malnutrition is widespread in rural, tribal and urban slum areas and it is a significant public health problem described as a silent killer, silent emergency, invisible enemy affecting those who cannot express their voice and have to depend upon others for their advocacy. Growing children are most vulnerable to its consequences. Their nutritional status is a sensitive indicator of community health and nutrition.

Realizing the importance of children, World Health Organization (WHO) had declared themes relating to children for the following years:

1951 - Health for your child and world’s children.
1979 - A healthy child a sure future.
1984 - Children’s health tomorrow’s wealth.
2005 - Make every mother and child count.

**PATHOPHYSIOLOGY**

Malnutrition is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. There are two clinical forms of protein energy malnutrition: Kwashiorkor and marasmus (Table 1). It is not only an important cause of childhood morbidity and mortality, but also leads to permanent impairment of physical and mental growth of those who survive.

**DIAGNOSIS**

The current WHO recommendation is to use the Z-score or standard deviation (SD) system to grade...
undernutrition. This system allows us to measure all the three indices and express the results in terms of Z scores or SD units from the median of the international reference population, developed from anthropometric data collected in the United States by the National Center for Health Statistics (NCHS). Although widely recommended, the Z scores have not been widely in use in India, especially in community-based studies.4

Malnutrition in children depends on various factors like poor food quality, insufficient food intake and severe and repeated infectious diseases or most of the time the combination of all the factors. Assessment of growth thus not only serves as a means for evaluating the health and nutritional status of children, but also provides an indirect assessment of the quality-of-life of an entire population.5

**EPIDEMIOLOGY OF MALNUTRITION**

**Morbidity and Mortality**

In India, where everything is on a large scale malnutrition is daunting, an estimated 200 million children are underweight at any given time, with more than six million of those children suffering from the worst form of malnutrition, severe acute malnutrition. Experts estimate that malnutrition constitutes over 22% of India's disease burden, making malnutrition one of the nation's largest health threats.6

Prevalence of clinical protein energy malnutrition (PEM) in the form of marasmus was found to be more than kwashiorkor, while edema and vitamin A deficiency in the form of Bitot's spots and vitamin B complex deficiencies in the form of angular stomatitis and cheilosis were seen in few children. Many children were found to be suffering from upper respiratory tract infection (URTI).2 According to National Family Health Survey (NFHS-3), a large number of children with diarrhea and acute respiratory infection are malnourished.7

**Age**

The prevalence of malnutrition was much higher in the lower age groups of 12-35 months and it decreased in the older age groups of 36-47 months and in the age groups of 48-60 months.8,9

In a study conducted in Coimbatore slums among under-fives, the prevalence of wasting seen among 0-11, 12-23, 24-35, 36-47 and 48-59 months age group was 32.1%, 23.8%, 31.8%, 36.1% and 20.7%, respectively.8 In a drought-affected district of Odisha, the prevalence of stunting was found to be high in 37-48 months age group.10 According to a study done in Kenya, stunting was maximum in 12-24 months age group children and was statistically significant.11

**Sex**

A study conducted among under-five children of rural area of Karnataka, who attended anganwadi, 70%
of the children were malnourished. The prevalence of malnutrition was slightly more in females than in males.8,9 The mean MUAC among boys was higher than girls at all ages except five years. Significant sex differences were observed at ages 3 (p < 0.005) and 4 (p < 0.05) years.12

Religion
According to NFHS-3, it is reported that Hindu and Muslim children are equally likely to be undernourished, but Christian, Sikh and Jain children are considerably better nourished. It is also reported that the prevalence of underweight and wasting among Hindu children was slightly more than that of Muslim children.7

Socioeconomic Status
Father’s occupation had a significant bearing on the nutritional status of the child. The maximum prevalence of malnutrition was observed in children of laborers. In a study conducted in Uttar Pradesh, the prevalence of underweight was maximum among children of low socioeconomic status than among children of high socioeconomic status (p < 0.02).7,13

Literacy Status
Literacy of mother displayed a significant (p < 0.001) relationship, with malnutrition being highest among children whose mothers were illiterate.14
In Karnataka, it was observed that children of illiterate mothers were severely stunted.7,15 In a study conducted in West Bengal, substantial difference was observed in the prevalence of malnutrition among children of illiterate fathers versus literate fathers, which were statistically significant (p < 0.05).15

Birth Order and Birth Interval
A significant association (p < 0.001) was observed between birth order and the nutritional status of the child. Highest prevalence of malnutrition was observed in children with birth order 4 and above.14 Prevalence of underweight was more among children of birth interval <36 months, while it was significantly less (p < 0.05) in children with birth interval >36 months.15

Feeding Practices
Only few children were put on breastfeeding within two hours of birth. Colostrum was not given to majority of children and exclusive breastfeeding was not done in many children. Many children started supplementary feeding by six months.2

In a study conducted at Varanasi, some of rural children had delayed breastfeeding by one day and the colostrum was discarded in majority children and prelacteal feeds were commonly given, like goat’s milk and boiled water with honey and sugar water.16 It has been observed that lack of exclusive breastfeeding upto six months is significantly associated with underweight.11

Calorie and Protein Intake
An analysis of 24-hour dietary intake recall data revealed that undernourished children had significantly lower energy and protein intake than normal children (p < 0.05).17
The study undertaken in Ghaziabad revealed that the children’s diet was adequate for proteins but was deficient in energy.18 The caloric and protein intake was significantly (p < 0.001) lower among malnourished children. The caloric intake was <80% of RDA among majority of children and the protein intake was <80% of RDA among >90% children.14 Average caloric intake was 2271.7 kcals and nearly half of the studied families were getting <2,400 kcals.15
An ICMR study has observed that energy intakes are about 70% of RDA in children of 1-6 years age group, while the protein intake was found to be adequate.19 A study in a rural area near Mysore, Karnataka revealed that the nutrient intake was grossly inadequate.20

Immunization Status
According to the results observed in a multicentric survey in Karnataka, few children were partially immunized and some children did not receive any vaccine among children.21

Malnutrition
In studies conducted in an urban slum of Delhi and Jabalpur and evaluating the prevalence of underweight, stunting and severe underweight, it was observed that the prevalence stunting was more than that of wasting and severe wasting.11,17
In Karnataka, the prevalence of underweight, stunting and wasting was 43.9%, 36.6% and 20.0%, respectively and these are comparable to the results in our study.21
In a study conducted in a rural area in Faridabad district, malnutrition was detected in 27.2% of the
children by using mid-arm circumference. The sensitivity and specificity was found to be 34.1% and 80.8% and the authors concluded that this criterion detected moderately severe cases of malnutrition.22 In a study conducted at Vadodara city, among children’s <5 years attending Integrated Child Development Services (ICDS) anganwadis, the prevalence of malnutrition according to Indian Academy of Pediatrics (IAP) classification was 40.5%, 20.1% and 2.3%.13 The severe degree (below -3 SD) of underweight, stunting and wasting was 27.8%, 30.3% and 6.5%, respectively.2

RECOMMENDATIONS
- Mothers should be advised to initiate breastfeeding within one hour of delivery.
- Importance of exclusive breastfeeding for the first six months of baby’s life and proper weaning thereafter should be properly explained to mother.
- Nutritional education has to be imparted to the people regarding consumption of cost-effective nutritious diet.
- Special efforts have to be made to improve acceptance of family planning methods for limiting the family and to give adequate spacing between children.
- Environmental sanitation has to be promoted in reducing infection and breaking the vicious cycle of infection leading to undernutrition.
- Socioeconomic development among the rural masses needs to be ensured, which is the important factor to tackle malnutrition, mainly undernutrition.
- Government should allocate more money in health sector for integrated health packages and should ensure proper functioning of health programs.

CONCLUSION
Faulty feeding practices were commonly observed and most of the children’s diet was not adequate for calories and proteins as per ICMR guidelines. The mean height and weight of the children were lesser than the WHO reference data. No child was found to be overweight or obese.

Literacy of the mother had a much higher impact than father’s literacy on better nutritional status of children. Lower socioeconomic condition, higher birth order, lower birth interval and faulty feeding habits were found to have adverse effect on nutritional status of children. On the other hand, higher socioeconomic status, lower birth order, higher birth interval and proper feeding habits had beneficial effects in protecting children from malnutrition.

Among micronutrient deficiencies, nearly one-third of children were detected clinically to have anemia. One-tenth of children were found to have vitamin ‘A’ deficiency, which implies public health problem as per WHO criteria. Some children had vitamin ‘B’ complex deficiency while still lesser number of children were diagnosed to have rickets.

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**GERD Label in Infants Encourages Parents to Medicate**

Parents who were told that fussy infants had gastrointestinal reflux disorder (GERD) were more interested in giving them medications - even when told the drugs would likely be ineffective - than when the children were not diagnosed with a disease, according to a new study. *(Source: Medscape)*

**Sleep Disordered Breathing Takes Toll on Kids**

Children with sleep disordered breathing (SDB) are at significantly increased risk of behavioral problems, including hyperactivity, attention problems, aggressiveness, and reduced social competency, results of a longitudinal study showed. *(Source: Medpage Today)*

**Air Pollution Linked to Neural Tube Defects**

Early maternal exposure to high levels of air pollution can cause neural tube defects, according to new Stanford University research published online March 28 in the American Journal of Epidemiology. *(Source: Medscape)*

**Whole-cell Pertussis Vaccine Shot Boosts Later Protection**

Protection against whooping cough was better in the past, with an older whole-cell pertussis vaccine (wP), than it is now with a series of doses of acellular pertussis vaccine (aP), a new study shows. *(Source: Medscape)*

**Older Fathers more Likely to have Autistic Grandchildren**

Men who have children when they are older are more likely to have grandchildren with autism, according to a study which shows for the first time that risk factors for autism may build up over generations. Men who had a daughter when they were 50 or older were 1.79 times more likely to have a grandchild with autism than men between 20 and 24, and with sons the likelihood was 1.67 times. *(Source: Medscape)*