CHAPTER-II

REVIEW OF LITERATURE
CHAPTER-II

REVIEW OF LITERATURE

In this chapter the investigator has presented an extensive review of literature relevant to the topic to understand the subject and gather relevant information for building up the foundation of the study. The review of the literature relevant to the study helps the researcher to design the theoretical framework of the study and assess the nature and quantum of studies already undertaken in that particular area of research. It helps the researcher to discover what is already known, what others have attempted to find out and what problems remain to be solved.

This chapter attempts to present a broad overview of studies and literature reviewed under the following headings:-

1. Related research studies on prevalence of PEM among under five children in different parts of India and other countries.
2. Related research studies on prevalence of PEM among under five children of slums.
3. Related research studies on factors influencing PEM.
1. Related research studies on prevalence of PEM among under five children in different parts of India and other countries.

Despite all time India’s high economic growth, improving literacy and even declining infant mortality, India continues to have the dubious distinction of being among the worst of in the world: a high percentage of malnourished children. It is not only an important cause of childhood morbidities and mortality, but also leads to permanent impairment of physical and possibly mental growth of those who survive. However the different studies shown varied results in the prevalence of PEM among under five children.

A study done by Vella A, et al (1987)\textsuperscript{23} in Uganda to determine the nutritional status of the children aged 0 - 59 months showed that there was high (42.4\%) of stunting (≤ 2SD) but little (24.8 \%) of wasting.

Another study on epidemiology of protein energy malnutrition among children of under five years of age in Parna, Brazil by Eli E et al (1992)\textsuperscript{24} reported 28.1 \% had malnutrition and 3.6 \% being of second & third degree of malnutrition.

Chirmulay D and Nisal R (1993)\textsuperscript{25} conducted a study to find out nutritional status in relation to weaning and feeding practices of under five tribal children in Ahmadnagar, Maharastra. It was found that various grades of malnutrition were present among children (71.6 \%) and prolong breast
feeding beyond two years was observed in 18.8 % of mothers and only 14.5 % started weaning between 6 - 9 months whereas rest of the mothers started between 9 -12 months.

Kumar R, et al (1996)\textsuperscript{26} observed in their study in Ambala reported that prevalence of severe stunting, underweight, and wasting (Z score $<- 3$ SD) was 18.1 %, 11.5 % and 0.6 % respectively. It was also found that almost every second child was undernourished.

Getanesh (1998)\textsuperscript{27} studied on prevalence of PEM and its determinants among urban children living in Jimma town Ethiopia. The study revealed that 48% of them were malnourished. The prevalence of underweight, wasting and stunting were 36 %, 9 % and 36 % respectively. It was observed that severe PEM was detected in 2 % of children.

As per the study conducted by Kapil U, et al (1999)\textsuperscript{28} in Rajasthan observed that 25.2 % of children belongs to grade I, followed by 26.1 % grade II, 6.5 % grade III and 1.5 % of children belongs to grade IV malnutrition.

Roy S, Ray S (2000)\textsuperscript{29} observed in their study in different demographical areas in the state of West Bengal and found that malnutrition was more among children of less than two years of age. In their study they found that
prevalence of malnutrition was highest (74.19\%) among children in the age group 12-23 months followed by 66.2 \% in the age group of 24-35 months and 60.5\% in the age group of 36-59 months. It was also reported that severe degree malnutrition (grade III and IV) was in 6-11 months of age group (12.8\%) followed by 12-23 months (9.7 \%) age group.

Yimer Gugsa (2000)\(^{30}\) conducted a study to estimate the level of malnutrition among under five children in the five densely populated zones of the Southern Nations Nationalities and Peoples Region reported that the prevalence of stunted, underweight and wasted of children were about 45 \%, 42 \% and 12 \% respectively.

Ray SP, et al. (2000)\(^{31}\) studied to assess the nutritional status and dietary pattern among under five children in a Municipal area of Siliguri, West Bengal. The result of the study revealed that, prevalence of malnutrition was 62.9 \% and severe degree malnutrition was observed 6.7 \%.

Laxmaiah A, et al. (2001)\(^{32}\) carried out a study to find out diet and nutritional status of rural preschool children in Punjab. The study revealed that about a half (50.3 \%) of the preschool children were undernourished
(<2SD WFA), 60 % were stunted (<2SD HFA) and 12 % were wasted (<2SD WFH).

A cross sectional study conducted by Bhalani KD and Kotecha PV (2002)\(^3\) in Vododara to find out nutritional status and gender difference in the children of less than five years of age. The study results revealed that the prevalence of moderate to severe malnutrition among girls was 28.4 % compared to boys' i.e. 16.9 %. More than 60 % of infant were found normal against 23.5 % of children age group 1-2 years, 29.3 % of children of 2-3 years and 23.5 % of children 3 years and above were found to be malnourished.

Banerjee B, Mandal ON (2005)\(^4\) carried out a study to find out the magnitude of the malnutrition among infants in a tribal community in Jamboni block in Midnapore district, West Bengal. They found that the prevalence of malnutrition was 50.7 % among the infants and was more common in females than males. Among the infants grade I malnutrition was more in males, while grade II and III were more in females. None were suffering from grade IV malnutrition. Prevalence of malnutrition was also increased with increasing age and it was significantly more (p<0.001) among infants > 6 months of age than among those < 6 months.
Semval J (2006)\textsuperscript{35} had undertaken a study to assess the nutritional status of school children in rural areas of Dehradun district. The results showed that the prevalence of wasting and stunting was 52.6 \% and 26.3 \% respectively. The findings also revealed 28.4 \% had anemia, out of which girls suffered more than boys.

A cross sectional study was carried out by Mitra M et al (2006)\textsuperscript{36} to assess the nutritional status among children aged 4-12 years of Kamar tribe in Chattisgarh and it revealed that under nutrition in the form of PEM was found to be widely prevalent among children in different age groups and more than 90 \% of children in the age group of 4-6 years suffered from underweight <-2SD.

Sing M.B, et al (2006)\textsuperscript{37} studied to assess the nutritional status of children aged 0-5 years from a rural population in a desert area of Jodhpur District of Western Rajasthan. The results revealed that stunting was observed in 53 \% of children and underweight in 60\%. Wasting was present in 28 percent of children. The degree of malnutrition was significantly higher in girls than boys (P<0.05). Prevalence of marasmus (PEM) was 1.7 percent (2.3 \% in boys and 1.1 \% in girls).
A cross-sectional study was carried out by Mandal GC (2006)\textsuperscript{38} in Arambag, Hoogly district, West Bengal to determine the nutritional status among the children aged 2-6 years of age and the result revealed a very high prevalence of undernutrition among the children in Hoogly district, West Bengal.

Alasfoor D, et al (2007)\textsuperscript{39} studied the prevalence of protein energy malnutrition among preschool children in Oman. The study revealed that 7\% of children had wasting, 10.6\% had stunt growth and 17.9\% had underweight.

Deshmukh P. et al (2007)\textsuperscript{40} conducted a cross sectional study to estimate the prevalence of protein energy malnutrition among children of 0-6 years in 20 Anganwadi centres under Primary health centre, Anji. It was found that prevalence of underweight and severe underweight were 47.4\% and 16.9\% respectively.

Bhatia V et al (2007)\textsuperscript{41} carried out a community based cross sectional study in Chandigarh to find out the prevalence of PEM among children of under 6 years and observed that overall prevalence of PEM was 62.6\%, which was higher among boys (65.9\%) as compared to girls (58.9\%). The peak prevalence was found in the age group of 6 -12 months. A significant
association between acute ailments (diarrhoea, ARI and fever with rash) and PEM was observed (p <0.001). Prevalence of worm infestation on the basis of history was recorded as 35.7 percent.

Agarwal RK (2007)\textsuperscript{42} reported that prevalence of PEM was 24.4 % which was more common among female 25.4 % in comparison to male 23.5 %. Prevalence of PEM was higher in those with birth order two or more. The maximum (21.6%) had Grade-I while only 2.8 % had grade II and none had severe (Grade III and IV) form of PEM. Exclusive breast feeding upto six month of age and introduction of complementary at 6 months of age were major factors contributing to low prevalence of PEM in his study. Only 20.5 % of those who were given complementary feeding at six month of age were malnourished.

Das P and Bose K (2008)\textsuperscript{43} carried out a community based cross-sectional study on nutritional status of Pre-school children of Bauri caste in West Bengal, the age-combined prevalence of undernutrition (Grades I, II and III combined) among boys and girls were 61.5 % and 70.8 % respectively. In general, the prevalence of Grade III thinness was less than the rate of Grade I thinness. The prevalence of Grade II thinness was intermediate, between Grade I and Grade III.
Biswas S et al (2009)\textsuperscript{44} conducted a study to investigate the prevalence of under nutrition among children 3.0-5.9 years old in a rural area of West Bengal covered by the Integrated Child Development Service scheme (ICDS). The outcome of the study was that boys were heavier and taller than girls at all ages. Significant age differences existed in mean height and weight in boys as well as in girls. Among the children 48.20 \%, 10.60 \% and 48.30 \% were stunted, wasted and underweight. The CIAF showed a higher prevalence of under-nutrition with 60-40 \% of the studied children suffering from anthropometric failure.

Shubhada S. et al (2009)\textsuperscript{45} studied the epidemiology of malnutrition among under five children in a section of rural area of Loni, Taluka - Rahata, Ahmednagar, Maharashtra. The results showed that the prevalence of malnutrition was 50.5 \% and was significantly higher in 1-3 years of age group. Majority of malnourished children belong to grade I (51\%) & grade II (41.9\%) and only 0.2 \% children were severely malnourished. The study concluded that socioeconomic status, birth weight, age have impact on prevalence of protein energy malnutrition.

Thakur S et al (2011)\textsuperscript{46} reported that the prevalence of moderate and severe malnutrition (Grade II, III, and IV) in admitted patients below five years was 10.18 percent.
Inderpal I Meshram et al (2012)\textsuperscript{47} in their cross sectional study in the tribal areas of Odissa state revealed that prevalence of underweight, stunting and wasting were 58 %, 65 % and 20 %, respectively. The underweight and stunting was 1.9 and 2.4 times higher among children of illiterate mothers, whereas underweight and wasting was 1.4 times higher among children who had morbidities during the preceding fortnight.

2. Related research studies on prevalence of PEM among under five children in slums.

PEM is the most widely prevalent form of malnutrition among under five children of slums. Severe PEM, often associated with infection contributes to high child mortality in underprivileged communities. This section focuses on the current scenario in relation to the nutritional status of children in urban slums in India.

Gupta PP, \textit{et al}. (1985)\textsuperscript{48} evaluate the growth and development of children in six slums of Kanpur and found that the growth standard was lower than the normal growth standard. A high incidence of different grades of PEM (71\%) was observed. The main factors responsible for PEM were found to be poor hygienic conditions, low socio-economic status, recurrent infection, poor nutrition and ignorance about health knowledge.
Kapil U, Bali P (1989)\textsuperscript{49} revealed in their study, prevalence of protein energy malnutrition was 81.8 %. Out of which 31.8 %, 44.1 %, 5.7 % and 0.2 % of children had Grade I, II, III and IV PEM respectively. The age, sex of the children and education of parents had a significant association with PEM.

A cross sectional study carried out by Roy P, et al. (1990)\textsuperscript{50} on undernutrion among children 0-5 years of age in an urban community, observed that the overall prevalence of malnutrition was 57.9 % among 0-5 years. The factors identified for undernutrition were sex of the child, (more in female children), parental illiteracy and large family size.

Dwivedi S.N, et al. (1992)\textsuperscript{51} conducted a cross sectional study to examine the prevalence of malnutrition and its associations among children in an Indian urban slum. The prevalence of malnutrition was 65.0 % among females compare to 61.9 % in males. However higher grades of malnutrition (III+ IV) were 13.1 % among females in comparison to 7.87 % among males. Whereas lower grades of malnutrition (I+II) were 54.0 % among males and 51.9 percent among females.
Garg S.K, et al. (1997)\textsuperscript{52} carried out a study to find nutritional status and deficiency disorders of children (1-6yrs) in slums of Ghaziabad city. The results revealed that majority of children (58.2\%) were having undernutrition and 41.8\% have normal nutritional status. It was also revealed that 39.8\%, 16.0\% and 2.4\% were suffering from malnutrition of grade I, II and III respectively. None of the children were found to have grade IV malnutrition. Grade I, malnutrition was found to be more (p<0.001) in 3-6 years age group (44.2\%) than 1-3 years (32.4\%) whereas moderate to severely malnourished (grade II and III) were more (p<0.001) in 1-3 years age group (21.5\%) as compared to 3-6 years (16.6\%). The nutritional status was found to be significantly better (p<0.001) in ICDS beneficiaries as compared to non beneficiaries.

Rao S, et al. (2000)\textsuperscript{53} carried out a study to find out the changes in nutritional status and morbidity among the preschool children in urban slums of Pune. The study revealed that the peak prevalence of malnutrition was observed around 18 months and shorter period (3.5 months) of exclusive breastfeeding was probably responsible. Morbidity was associated with wasting but not stunting. Gastrointestinal illness and fever contributed 50\% of total morbidity. Higher morbidity was observed in younger children (<2 years) led to deterioration of nutritional status over time in 30\% to 50\%
children and it was concluded that shorter period of exclusive breastfeeding results in undernutrition.

Swami HM, et al. (2000)\textsuperscript{54} conducted a study on the nutritional status of under five children in slums of Chandigarh. The study revealed that 42% of under five children had protein energy malnutrition and the prevalence of PEM with grade I, II, III and IV were 22.7%, 14.5%, 4.1%, 0.7% respectively.

Aneja B, et al. (2001)\textsuperscript{55} conducted a study to find out the etiological factors of malnutrition among infants in two urban slums of Delhi. The result revealed that 11%, 9%, 2% and 4% children were in grades I, II, III and IV category of under nutrition respectively. 74.0% of the children were in normal nutrition grade.

Arshad F, et al. (2002)\textsuperscript{56} assessed the nutritional status of under five children of urban, rural & slum areas of Srinagar by using weight for age criteria. Protein energy malnutrition was found to be 44.8% of cases. Out of which 24.1%, 14.9%, 5.1%, 0.1% had grade I, II, III and IV PEM respectively. The prevalence of PEM was higher among females (49.6%) as compared to males (41.48%). It was also high in the age of 1-3 yrs (55.8) and in the children of labour class (59%). The prevalence of malnutrition
increased with the increased birth order and family size and decreased with high literacy rate in parents.

**Mridula D, et al. (2004)**\(^57\) conducted a study to assess the nutritional status of “At Risk” under fives in urban slums of Varanasi found that 60.5% of under five children were suffering from various grades of protein energy malnutrition and 39.5% were normal (IAP). Severe PEM was present in 5.2% “At Risk” and 0.7% “No Risk” children with an overall figure of 4.2% Stunting was significantly more in “At Risk” (50.9%) than “No Risk” (40.9%) children.

**Bhattacharjee J (2005)**\(^58\) conducted a study on nutritional status and common morbidities among the 0 - 5 years children in the urban slums of Guwahati city. The study revealed that 43.8% were having varying degrees of malnutrition while 56.2% of children had normal weight for age. The age wise prevalence of malnutrition showed a peak (52.5%) at 13-24 months before declining at 49 - 60 months. The relationship between malnutrition and mother’s literacy status, number of family members and morbidities among the children were found significant.

**Tripathi MS, Sharma V (2006)**\(^59\) conducted a study to assess the nutritional status of preschoolers from Anganwadi Centres in slums of
Udaipur city. The results revealed that more than 50% preschoolers showed symptoms of protein energy malnutrition. The results also showed that according to IAP majority of these children (66%) were underweight (Grade I & II). Water low's classification revealed that majority of this preschooler was wasted (30%) and stunted (42%).

**Ranpura N, et al. (2006)** carried out a study to find out prevalence of PEM in children 6 months to 6 years old in Saraspur slums of Ahmedabad. It was also intended to correlate the prevalence of PEM with various socioeconomic variables. The findings revealed that the prevalence of PEM is high 54.7% according to IAP classification i.e. weight for age below 80% of NCHS standards. It was also observed that the girls have a statistically significant higher prevalence of PEM as compared to boys. Maximum prevalence of PEM is observed in children 70% in 5-6 years of age and children with higher birth order. No significant difference is found in the prevalence of PEM between joint and nuclear families. Over 90% of the Children in class III of modified Prasad's classification are either normal or in Grade I. i.e. over 70% weight for age.

**Mitra SP (2007)** conducted a study to find out the dietary intake and nutritional status of under five children of slums of Kolkata city. It was found that only 38.9% of the under five children were within the normal limit while 61.1% were in different grades of malnutrition. 2% of
them were suffering from Grade III & IV malnutrition together whereas 37.6 % and 21.6 % were in grade I and II malnutrition.

Seetharam N, et al. (2007)\textsuperscript{62} conducted a study to estimate the prevalence of undemutrition among under five children in Coimbatore slums and revealed that 49.6 % were underweight, 48.4 % were stunted and 20.2 % were wasted out of which most of the undernourished children were females in the age group of 48-59 months.

Goel M.K, et al. (2007)\textsuperscript{63} conducted nutritional surveillance among 1-6 years old children in urban slums of Rohtak city, Northern India. It was found that 57.4 % of children were undernourished and the proportion of malnourishment was more in males. Birth order, age, type of family, number of living children, literacy status of mother and calorie intake were statistically significant association with grades of malnutrition.

Mittal A, et al. (2007)\textsuperscript{64} studied the effect of maternal factors on nutritional status of 1-5 year old children in urban slums of Tripuri town, Patiala. It was observed that 38.4 % had low weight for age whereas 46.5 % had low height for age. Both kind of malnutrition were common in females than in males. The prevalence of malnutrition was more in mothers whose age was less
than twenty years and also it was observed that children of educated mothers were better nourished as compared to illiterate ones.

Peter R, et al. (2010)\textsuperscript{65} conducted a study in urban slums of Hyderabad to find out malnutrition among children aged 1-5 years. The study revealed that the overall prevalence of under nutrition was 69\% and severe malnutrition was 33\%.

Sengupta P, et al. (2010)\textsuperscript{66} studied to determine the prevalence and risk factors of under-nutrition amongst under-five children living in an urban slum of Ludhiana. The findings revealed that 74\% of the children were found to be stunted, 42\% of them wasted and 29.5\% of them were under-weight. Female children, aged 48 - 59 months, children born to older mothers aged 30 - 49 years, children with >3 siblings, low birth weight, those exclusively breast-fed for >6 months or <4 months, having an illiterate mother or unskilled labourer father were observed to be at the highest risk of being under-nourished. Birth spacing of <2 years, incomplete vaccination status, frequent infections and worm infestation were also found to be important predisposing factors for childhood malnutrition.

Narkhede V, et al. (2011)\textsuperscript{67} studied to find out the nutritional status and dietary pattern of children below five years of age in urban slum, Nagpur. The study revealed that 52.2\% were suffering from various grades of malnutrition. 32.2\% children were in grade I, 16.1\% in grade II, 3.5\% in grade III and 0.5\% in grade IV malnutrition. Age wise prevalence of
undernutrition was highest in 13-24 months age group (13.8%), followed by 0-12 months (10.9 %), 25-36 months (10.4 %), 49-60 months (8.7%) and 37-48 months (8.4%). In age group of 0-12 months and 25-36 months prevalence was almost equal i.e. 10.9% and 10.4% respectively.

Srivastava A, et al. (2012)\textsuperscript{68} carried out a community based cross sectional study to find out the prevalence of malnutrition and also to identify the different variable which influence the nutritional status among under five children of urban slums of Bareilli district, Utter Pradesh. The results showed that 66.3 % were malnourished. Nearly 32.5 %, 16.9 %, 8.4 % and 8.4 % were suffering from grade I, II, III and IV malnutrition respectively. Malnutrition was slightly more prevalent among the boys (51.8%) as compared to girls (48.2%).

3. Related research studies on different factors influencing Protein Energy Malnutrition.

Protein energy malnutrition (PEM) is the result of a complex interplay of interacting and related factors in the individual, family and community. Inadequate dietary intake and disease are immediate determinants of PEM. It may increase susceptibility to and severity of infections. The causes in individual are infectious diseases, inadequate intakes of breast milk, early
weaning from breast, late weaning, and inadequate access to food. The familial causes are maternal illiteracy, poor knowledge and practices of child rearing, maternal malnutrition, poverty and overcrowding, poor living and sanitary conditions, unemployment and alcoholism. The community causes include poor educational status, inadequate medical facilities, cultural practices and beliefs, marginalizing of girls and women.

As per NFHS -III (2005-06) reports the demographic and socioeconomic factors which influence child malnutrition in India are child’s age, child’s birth order, mothers’ education and household standards of living, older children and children of higher birth order. Main victims of protein energy malnutrition are children under the age of five years. This has been reported by many studies as mentioned below.

Ray SK et al (2000) conducted a cross sectional study in municipal area of Siliguri, North Bengal. Overall prevalence of malnutrition was highest (74.2%) in the age group 12-23 months, followed by 24-35 months (66.2%) and 36-59 months (60.47%). But the trend was somewhat different in case of severe degree malnutrition (Grade III and IV) which was highest in 6-11 months of age group (12.8%) followed by 12-23 months (9.68%) age group. The study reported that 64.7% of males and 61.6% of females were malnourished. Overall prevalence of malnutrition, the sex of child was not
statistically significant, but statistically significant association was observed in prevalence of severe degree malnutrition, which was almost double in female children (8.47%) in comparison to male children (4.3%). The prevalence of malnutrition among the children of literate mothers was comparatively lower (54.9%) than the illiterate mothers (69.6%) and the difference was also statistically significant. The study also revealed that substantial differences in the prevalence of malnutrition were observed among children belonging to illiterate fathers (74.8%) which were statistically significant.

In a study by Bloss Emily et al (2004), conducted in Keniya, Africa both under weight and stunting was maximum in 12-24 months age group children at 46.2% and 60.5% and was statistically significant.

A study in rural areas of Allahabad by Harishankar et al. (2004) revealed that overall prevalence of malnutrition was recorded 32.0% in the age group of 13-24 months followed by 28.09% in the age group 37-72 months, 24.31% were in the age group of 0-12 months and 21.68% in the age group of 25-36 months. Majority of children having grade II malnutrition were in age group of 13-24 months. While grade III malnutrition were recorded in the age group of 0-12 months. Prevalence of malnutrition was found to be more
in female children (53.0%) as compared to males (45.9%). Severe grade of malnutrition was also prevalent in females (2.2%) as compared to their counterparts. Prevalence of all grades of malnutrition increases with birth order, 20.4% in birth order one, 26.9% in birth order two and 43.5% in birth order three and above. Prevalence of malnutrition was found to be 52.2%, 35.7% and 11.9% in children belonging to low, middle and high socio-economic status group respectively. In high socio-economic status, only grade I (9.7%) and grade II (3.8%) malnourished children were observed. Nutritional grade with socio-economic status was found to be highly significant.

According to study conducted by Chakraborty S et al(2006)\textsuperscript{72}, in a rural population of Jhansi district, the prevalence of PEM found to be significantly higher in the age group of 1-3 years(80.9%) as compared to other age groups(52.3%) in 0-1 year age and 59.4% in 3-6 years age.

Narkhede V, et al. (2011)\textsuperscript{67} observed in their study age wise prevalence of undernutrition was highest in 13-24 months age group (13.8%), followed by 0-12 months (10.9 %), 25-36 months (10.4 %), 49-60 months (8.7%) and 37-48 months (8.4%). In age group of 0-12 months and 25-36 months prevalence was almost equal i.e. 10.9% and 10.4% respectively.
Srivastava A, et al. (2012) identified the different variable which influence the nutritional status among under five children of urban slums of Bareilli district, Utter Pradesh. The results revealed that 19.3 % children aged between 1-11 months, 19.3 % aged between 12-23 months, 21.7 % aged between 24 - 35 months, 21.7 % aged between 36-47 months and 18.1 % children aged between 48-59 months were malnourished. Malnutrition was slightly more prevalent among the boys (51.8%) as compared to girls (48.2%). Malnutrition was higher among those belonging to nuclear families and also higher (19.1%) among those living in semipucca houses, using water from well or hand pump and among those using public latrines (8.3%). Many studies have found the association of being a female child to be susceptible to malnutrition while compared to the prevalence in a male child. The difference may be due to negligence of girls, more morbidity, less health care facilities and preferential treatment given to male children who receive better nutrition and attention than the female.

In a study Bhalani KD and Kotecha (2002) in urban slums of Vadodara city, observed more girls (68.2%) were malnourished than boys (58%) and the difference was statistically significant, even in severity of malnutrition this difference persisted.

Banerjee B and Bandyopadhyay I (2005) study in Midnapur district of West Bengal, consisting mainly tribal population prevalence of malnutrition was found to be 50.67%. Malnutrition was observed more common among
females than males, though difference was not found statistically significant. Grade I malnutrition was more common among males while grade II and grade III were more among female children.

In a study Mittal et al, (2007)\textsuperscript{61} found prevalence of PEM was highest whose mothers were illiterate (60.9%) and 21.2% whose mothers had education more than high school. Similarly figures for stunting were 65.3% whose mothers were illiterate and 31.3% whose mother’s education level was more than high school.

Chakravorty S et al (2006)\textsuperscript{72} in their study found the overall prevalence was higher among children of illiterate mothers, whereas Grade II, III, IV PEM was higher amongst children of mothers having primary education. Significant difference was found between mothers who were illiterate or having primary education and mothers having education upto middle school and or above.

In a study Jyoti Lakshmi et al (2001)\textsuperscript{73}, observed higher rate of undernutrition among underfive children in illiterate mothers (53.0%), than literate mothers (47%) which is statistically significant.

Anoop I et al, (1993)\textsuperscript{74}, study revealed 43.8% of the children of the poorest families (with monthly income of under Rs. 1000) were malnourished, while 32.6% of those with monthly income of Rs 1000- 1999, and 16.9% of those
with monthly family income of Rs 2000 or more were suffering from PEM. However, nutritional status with economic status was found to be statistically not significant.

**Agarwal D.K et al (1980)**\(^75\) carried out a community based cross-sectional study among under five children in Varanasi and found morbidities like gastrointestinal tract disorder (33.5%), ARI (19.3%), disease of eye (7.8%) and disease of ear (2.7%). They also reported that in 22.8 % of illness, no health care facilities was availed, while allopathy was tried in 37.5 %, home remedies in 27.5 %, mixopathy in 26.3 % and folk practice in 11.1 %.

**Kaitiyar et al (1981)**\(^76\) in slums of Varanasi found that milk was the most common (46.1%), pre-lacteal feed followed by water (26.4%), honey with water (19.7), sugar water (7.8%).

**Sing J, et al. (1986)**\(^77\) found out the ecological determinants of malnutrition among preschool children in Ganderbal Block of Kashmir Valley and results revealed that the literacy status, environmental sanitation, occupation of the parents, personal hygiene had direct influence upon grades of malnutrition.

**Choudhary M, et al. (1986)**\(^78\) studied the nutritional status of children of working and non working mothers of Udaypur city, Rajasthan. The study
showed a high percentage of malnourished children among the working mothers of nuclear families.

Prabhakhara GN, et al. (1987)\textsuperscript{79} studied the infant feeding pattern in slums of Bangalore city. The study observed that breast milk and honey were used as prelacteal feeds. Complimentary feeding at the age of 6 months was observed to be only 0.5 percent whereas, majority (90.8\%) of mothers started after one year which was due to ignorance.

Kapil V and Bali P (1989)\textsuperscript{80} observed a significant association between nutritional status and age and sex of the child and educational status of parents of pre-school children residing in an urban slum community in Delhi.

Gupta M. C, et al. (1991)\textsuperscript{81} identified a strong relationship between childhood malnutrition and educational level of the mothers. Maternal education and knowledge, attitude and practice regarding nutrition were also significantly associated with children’s nutritional status.

To find out the associations between malnutrition and its influencing factors Dwivedi S.N, et al. (1992)\textsuperscript{51} conducted a cross sectional study among children in an Indian urban slum. It was revealed that prevalence of
malnutrition was significantly higher among those children whose fathers were illiterate. The prevalence of malnutrition had a positive association with family size: With 3 members (47.0%), 4-6 members (63.9%) and 7 members and above by (70.6%) On the other hand an inverse correlation was observed between socio economic status and the prevalence of malnutrition. There is relationship between PEM and history of infection (81.8%) and worm infestation (77.0%). This is significant at 0.05 level of significance. (<0.05)Similarly non immunized children experienced more malnutrition (66.4%) in comparison to immunized children (57.0%).

In a study by Ighogboja SI (1992) in the middle belt of Nigeria revealed that the malnourished group, 60.5 % of mother breast fed their babies for 13 – 24 months. In the control group, the majority 74 % stopped breast feeding by 18 months. Halting breast feeding before the age of 6 months significantly contributed to malnutrition (p <0.05).

Vella A, et al. (1993) carried out a study in North-West Uganda and found that prolonged breast feeding and age affects negatively on child’s nutrition; in contrast, parental education level improves nutrition of the child.

Serventi M and Kimaro DN (1995) conducted a study among 110 severely affected protein energy malnutrition children under two years of age at Dodoma region, Tanzania with the objective of identifying the
precipitating cause for the PEM. The study revealed that 62% of them had a history of early weaning from the breast before 2 years which was followed by a drastic drop of the growth curve.

Rao S, et al. (1995) conducted a longitudinal study to investigate changes in nutritional status and morbidity over time among preschool slum children in Pune, India. They found that peak prevalence of malnutrition, i.e., stunting and underweight occurs at an earlier age (around 18 months of age) and shorter period (3.5 months) of exclusive breast feeding. They also found that prevalence of gastrointestinal illnesses and fever as well as mean days of illness were higher among underweight boys and girls. Mean days of illness due to Respiratory tract Infection (RTI) were higher in younger children. Prevalence of RTI was higher (P<0.01) among younger boys than the older boys.

Kumar R, et al. (1996) conducted a cross sectional study to determine the nutritional status among preschool children in Ambala, Haryana and the study revealed that Stunting and underweight were significantly more among girls compared to boys. It was also observed that undernutrition showed a significant rise after the 12 months of age and almost every second child were undernourished.
Jeyaseelan L and Lakshman M (1997)\textsuperscript{85} in their study revealed that there was impact of hygiene, housing and socio-demographic variables on acute malnutrition. The study also revealed that overall prevalence of severe malnutrition was 8.2\%. Older age, male, mother’s poor education, lower family income, higher birth order of the child, use of dung or fire wood as fuel and defecation within the premises were significantly associated with malnutrition.

A cross sectional survey conducted by Awasthi S, Pande UK (1997)\textsuperscript{86} on prevalence of malnutrition and intestinal parasite in preschool children in slums of Lucknow and the study revealed that 67.65\% of preschool children were underweight, 62.8\% were stunted and 26.5\% were wasted. Association between intestinal parasite and prevalence of PEM was found to be significant.

Saito K et al (1997)\textsuperscript{87} found that poor nutritional status was associated with socio economic variables such as sex of the child and fathers’ occupation. Female gender (OR=3.4, p=.02) and fathers’ occupation as a labourer (OR=3, p=.05) were risk factors for severe malnutrition. The two groups showed a significant difference in nutrition related knowledge of mild and moderate malnutrition. (OR=2.6, p=.05).
Joyce K. Kikafunda, et al. (1998) carried out a cross-sectional survey to assess the dietary and environmental factors influencing stunting and other signs of poor nutritional status of children < 30 months of age in a central Ugandan community. A high proportion of children were stunted (23.8 %), underweight (24.1 %), or had low MUAC (21.6 %). Although rural living, poor health, the use of unprotected water supplies, lack of charcoal as fuel, lack of milk consumption, and lack of personal hygiene were shown as risk factors for marasmus and underweight, different factors were found to be associated with risk of stunting and low MUAC, despite these three parameters being significantly correlated. For stunting the risk factors were: age of the child, poor health, prolonged breastfeeding (from >18 months to < 24 months), low socioeconomic status of the family, poor education of the mother of infants <12 months, consumption of food of low energy density (< 350 kcal/100 gm dry matter), and consumption of small meals. Food taboos had no influence on any of the anthropometric measurements. Although 93.1 percent of the children had been immunized against tuberculosis, polio, diphtheria, and measles and showed better general health than children who were not immunized, there was a high prevalence of infection in the week preceding the survey interview, including diarrhoea (23.0 %), malaria (32.3 %), or cough/influenza (72.8 %).

A study conducted by Rasania SK, Sachdev TR (1999) to assess the nutritional status and breast feeding practices among children and to
correlate the findings with determinants in Mehrauli, Delhi. The study showed 71.5% children were underweight as per weight for age while 70.1% and 62.7% of children had deficit in height for age (stunting) and weight for height (wasting) respectively. The result also revealed that children who were not breast fed were found to be significantly more underweight and stunted. Prevalence of malnutrition was higher (p<0.001) in bottle fed children (83%) than children on katori/cup feeding (55.1%).

Baranwal K, et al. (2000)\textsuperscript{90} carried out a cross-sectional epidemiological study to assess the biological, socio-economic, maternal and dietary factors with nutritional status of under five children among urban-slum area of Varanasi. The prevalence of PEM was 63.3% which was higher in 3\textsuperscript{rd} year of age periods as compared to 4\textsuperscript{th} and 5\textsuperscript{th} year. Prevalence of PEM in male children was 58.3% as compared to female children 68.6%, the difference was significant. Among the Socio-economic factors mother’s literacy, and caste, were significantly associated with PEM. Children deprived of colostrum and exclusive breast feeding also showed significant difference in prevalence of PEM.

Swami H. M, et al. (2000)\textsuperscript{54} reported in their study protein energy malnutrition was significantly higher among females (47.6) in the age group
1 – 3 yrs (53 %) in slum areas (67%). With increase in family size the prevalence of malnutrition increases.

Diouf S, et al. (2000)\textsuperscript{91} surveyed to assess the protein energy malnutrition in children under five years in rural areas in Senegal in order to evaluate the existence of malnutrition and the hazard factors link to it. The results revealed 4.5 percent suffered from severe malnutrition. The researcher found that intestinal parasite and anaemia, were closely related to chronic malnutrition.

To find the etiological factors in causation of PEM among infants of two urban slums of Delhi Aneja B, et al. (2001)\textsuperscript{55} conducted a study and the result revealed that, the possible etiological factors found in causation of PEM were non feeding of colostrum (44%), lack of exclusive breast feeding (20%) till the age of 5-6 months and 41% children were less than two months, late introduction of semi-solid(47%) and solid foods(55%) by age of six months, dilution of top milk (86%), faulty weaning practices and use of bottle milk (28%) were common practices in urban slum communities.

The diet and nutrition assessment surveys carried out by Brahman GNV, (National Nutrition Monitoring Bureau in India 2002)\textsuperscript{92} in eight states of India, revealed that the prevalence of undernutrition was relatively higher among low socioeconomic category of households, those residing in
'Kutcha' houses, those from lower income groups, and in households where in the adult female were illiterate. The major source of drinking water was taps in about 40 percent, while about 26 percent were dependent on bore wells and about 32 percent on open wells. This indicates that though there is an improvement in the intake of dietary energy among adults, it is not reflected among young children. This reflects lack of knowledge among the women about proper child feeding practices.

**Tada Y, et al. (2002)**\(^93\) conducted a cross sectional study to examine the nutritional status of preschool children (1-5 years) of the Klong Touy slums, Bangkok. The result of the study showed that family income, maternal unemployment, food practice and maternal education level lower than primary school were associated with low nutritional status of under five children.

**Thathola A, Srivastava S (2002)**\(^94\) examine the association between complementary feeding practices and mother’s education status in Islamabad. The study result showed a positive relationship between the nutritional status of infants and educational status of mother (p<0.001). A similar relationship was observed between the educational status of respondents and the introduction of complementary foods at an appropriate age (6 months) of infants (p<0.001).
A clinico-epidemiological study on protein energy malnutrition among Assamese children was conducted by Peters TR (2005). It was observed that prevalence of PEM were highest in the age group of 13-18 months and lowest (0.8%) in the age group <6 months. It was also observed that the incidence of PEM among the female were more than male and more prevalent among the Hindu community (63.2%). Family size, birth order, social class, occupation and education of the father were correlated with prevalence of PEM. It was also found that early weaning from breast milk attributed to severe malnutrition.

The association of nutritional status and morbidity is a major determining factor for growth retardation. NFHS - III (2005-06) collected information on the prevalence and treatment health problems in children like ARI and diarrhoea. 6 percent and 9 percent of children under age five years showed symptoms of ARI and diarrhoea respectively.

Studies show that individuals belonging to Hindu or Muslim backgrounds in India tend to be more malnourished than those from Sikh, Christian, or Jain backgrounds. But the data revealed from NFHS – III (2005-06) showed that malnutrition (according to WFA, <-2SD) is more in Muslims (43.6 %) followed by Christian (40.1 %) and Hindus (31.6 %).
A cross sectional study was carried by Chakraborty S, et al. (2006)\textsuperscript{96} to determine the association between effect of breastfeeding practices on child undernutrition and some socio-economic and socio-demographic variables among mothers and their last child aged up to 5 years in Shabar tribal community in Cuttack districts of Orissa. The prevalence of underweight was significantly (p<0.05) associated with age of children and undernourished mothers. Initiation of breastfeeding after 24 hours was found to be significantly (P<0.05) associated with male children and mothers’ occupation. The results also revealed that high percentage of mothers (51.7 \%) with primary level of education stopped exclusive breastfeeding before 6 months (P<0.05). Estimation of odd ratio (OR) suggested that exclusive breastfeeding less than 6 months is a risk factor for underweight children.

Senbanjo I, et al. (2006)\textsuperscript{97} conducted a cross sectional, community based survey to determine the nutritional status and the influence of feeding practices of under-five rural Nigerian children. Study revealed that the prevalence of PEM was 20.5 \% whereas the prevalence of underweight, wasting and stunting were 23.1 \%,9.0 \% and 26.7 \% respectively. Young age was significantly associated with a higher prevalence of underweight (P = 0.004). Overcrowding, low maternal income and the use of infant formula feeds in children who have attained the age of 6 months and above were
associated with a higher prevalence of wasting ($P = 0.029$, $P = 0.031$ and $P = 0.005$ respectively).

Kumar D, et al. (2006) a cross sectional study conducted to find out the socio-demographic factors associated with initiation of breast-feeding. The variables were social and demographic characteristics like age, socioeconomic status, educational level, birth interval, parity, gender preference, natal care practices, etc.; and variables related to various aspects of breast-feeding practices like prelacteal feed, initiation of feeding, colostrum feeding, reasons of discarding colostrum, etc. It was observed that 58.9% initiated breast-feeding within 6 hours of birth, only 15.9% discarded colostrum and 40.0% mothers gave prelacteal feed. Illiterate/just literate mothers who delivered at home were found at significantly higher risk of delay in initiation of breast-feeding on the basis of multiple logistic regression analysis.

Nutritional deficiency in the growing period is one of the leading causes of malnutrition. The timing & type of complementary foods introduced in an infant’s diet also have significant effects on the child’s nutritional status. Malnutrition also results from early or delays in starting complementary feeding. According to NFHS III (2006), at age 6-8 months, only about half of children (53 percent) are given timely complementary feeding. The timely
complementary feeding rate increases to 74 percent at age 9-11 months and 81 percent at age 12-17 months.

R.Md. Israt et al (2006)\textsuperscript{99}, et al studied on factors causing malnutrition among under-five children in Bangladesh. The analysis revealed that 45% of the children of under-five age were suffering from chronic malnutrition (stunted). 10.5% were acutely malnourished (wasted) and 48% had under nutrition problem. The main contributing factors were found to be previous birth interval, size at birth and parents education.

Bhatia V, et al. (2007)\textsuperscript{100} in their study reported that overall prevalence of PEM was 62.6 %, which was higher among boys (65.9 %) as compared to girls (58.9 %). A significant association between acute ailments (diarrhoea, ARI, fever with rash) and PEM was observed (\(P<0.001\)) where 73.0 % children were suffering from malnutrition in comparison with 42.0% children when no acute ailment had occurred (\(p<0.001\)).

Liaqqat P, et al. (2007)\textsuperscript{101} carried out a study to examine the association between mother’s education, complementary feeding practices of infants and malnutrition in Islamabad. The result revealed that the majority of the infants with evidenced of malnutrition belong to the mothers with no school
education and there was a positive relation between the nutritional status of infant and mothers educational level.

**Badar S, et al. (2007)** reported significant association between the major determinants of malnutrition in this study like illiteracy of parents, poverty, lack of initiation of breast feeding and exclusive breast feeding, introduction of breast milk substitute such as formula feeding or animal milk, improper weaning practices, food fads, diarrhoea and respiratory diseases of the under five children.

**Verma R, Prinja S (2008)** studied nutritional status and dietary intake of preschool children an urban pocket of Rohtak city. The results revealed that 48.7% children were malnourished with 33.2% falling in grade-I, 14.3 % in grade II and rest in grade III. It reveals that grade I malnutrition was more common in boys while grade II and grade III malnutrition was significantly higher in girls (p<0.001). Literacy of mother displayed a significant (p<0.001) inverse relationship with malnutrition being highest (70%) among children whose mothers were illiterate. Fathers occupation also had a significant bearing on the nutritional status of the child (p<0.005). Maximum prevalence of malnutrition (61.2%) being among children of labourers. A significant association (p<0.001) was observed between birth order and nutritional status of the child. Highest prevalence of malnutrition (76.2%) was observed in children with birth order 4 and above.
Aggarwal A. et al. (2008)\textsuperscript{104} conduct a study to assess the knowledge on complementary feeding and reasons for inappropriate complementary feeding practices among the mothers of 6 months to 2 years children in Delhi. It was observed that only 17.5 percent received complementary feeding from 6 months. The mean age of starting complementary feeding was 13 months. Quantity was adequate in 25 percent and consistency of food was thick in 38 percent cases. Only 3.5 percent mothers started complementary feeding at proper time, in adequate quantity and with proper consistency.

Solomon A, Zemene T (2008)\textsuperscript{105} conducted a study to determine the risk factors for severe malnutrition in children under the age of five admitted to Gondar University Hospital. The socioeconomic risk factors for severe malnutrition were maternal illiteracy, paternal illiteracy monthly family income of less than and large family size with the number of children greater than three. Inappropriate infant and young child feeding practices were commonly seen in children with severe acute malnutrition. The identified inappropriate feeding practices were supplementation with prelacteal feeds, lack of exclusive breastfeeding in the first six months of age, late initiation (12 months of age or beyond) of complementary diet, and bottle-feeding. Similarly there was a significant difference between the parents/caregivers
of the cases and the controls in their knowledge for infant and young child feeding practices. Further analysis with logistic regression revealed that the risk for severe malnutrition was independently associated with lack of exclusive breastfeeding for the first six months of life and late initiation of complementary diet after the effects of other significant risk factors were controlled for.

**Luthra M, et al (2009)** conducted studies to find out prevalence of undernutrition in children in the age group of 0-5 years and the epidemiological correlations. The result showed that 41.2% children suffered from undernutrition of varying degrees. Epidemiological factors related to undernutrition as 47.6% undernourished children were in the age group of 37-60 months, 40.5% in 13-36 months and only 11.9% in 0-12 months. 38.3% males had undernutrition compared to 44.9% females. 55.0% mothers were educated below matriculation had underweight children as compared to 28.2% mothers educated till matriculation and above. 47.9% children from nuclear families were undernourished as compared to 31.4% from joint families. 61.5% children from low socio economic classes were undernourished as compared to 37.2% and 29.4% from middle and upper classes respectively. Home deliveries were associated with higher percentage of subsequent undernutrition in children (50.8%) as compared to institutional deliveries (36.5%). Prevalence of various child feeding
practices in the community: practices of giving colostrum, prelacteal feeding, exclusive breast feeding, weaning at 6 months, initiation of breast feeding (within 1 hour of birth, within 24 hours of birth) are 71.1 %, 28.4 %, 28.9 %, 28.9 %, 41.0 % and 65.7 % respectively. There was significant correlation observed between PEM and epidemiologic factors such as increasing family size, socio economic status, women's education, child feeding practices, antenatal care, institutional delivery and incomplete immunization.

Roy S, et al. (2009) conducted a cross-sectional study in the field practice area of the Urban Health Centre, Chetla of the All India Institute of Hygiene and Public Health, Kolkata. The results shows that 72.5% were Hindus, 25.8% were Muslims, and 1.7% belonged to other religions. 65.9% were from nuclear families. Mothers of 81.6% were literate and of 69.1% were housewives. 41.7% of the children belonged to families whose per capita income per month was less than Rs.500. A total of 93.3% of the children were delivered at health facilities and the rest at home. 29.2 % received prelacteal feed in the form of water, infant milk formula, cow milk and honey. Mothers of 41.7% of the children were informed about EBF and it was obtained mostly from the health facility (56.7%). Most of the children (76.7%) received breast milk within 24 h. 90% were fed with colostrums. 28.3% received exclusive breast feeding for 6 months. EBF was less in literate mothers and the relationship was statistically significant. Inadequate
milk production is the most common reason for not giving EBF, which is about 62.8%. Rest were due to lack of information, prematurity, illness of mother, and the summer season. 71% were given complementary feeding at 6 months. Common foods used were rice, dal, mashed potato, suji, cerelac etc.

Borah R (2010) studied to find the relation between Protein Energy Malnutrition and Mid Upper Arm Circumference (MUAC) among 12 to 60 months of age in well baby clinic of selected hospitals of Kamrup Metro, Assam. It was observed that the prevalence of malnutrition among the children of 12 to 60 months was highest on the basis MUAC 84.7% followed by WFA (66.0 %) and HFA (24.7%). Highest percentage of malnutrition (92.5 %) was observed at the age of 1-1.9 years followed by 2 to 2.9 years (85.7%), 4 to 5 years (80.0 %) and 3 to 3.9 years (67.9 %). A positive correlation was observed between MUAC and other anthropometric measurements like weight, height, head circumference and chest circumference. All associations are statistically significant (P< 0.001) with MUAC. Selected demographic variables like age, birth weight, exclusive breast feeding, age of the mother and monthly family income were positively associated with MUAC, where as frequent illness and birth order were negatively associated with MUAC. Again PEM on the basis of MUAC was found to be significant at 5 percent level with age, frequent illness and dietary habit of the children and age of the father.
Nahar B, et al. (2010) assessed the risk factors associated with severe underweight among young children aged 6-24 months reporting to a diarrhoea treatment facility in Bangladesh. There were no significant differences between the groups in age [overall mean ± standard deviation (SD) 12.6 ± 4.1 month] or sex ratio (44 percent girls), area of residence, or year of enrollment. Results of logistic regression analysis revealed that severely-underweight children were more likely to have: undernourished mothers, who were aged < 19 years and completed < 5 years of education, had a history of shorter duration of predominant breastfeeding (< 4 months) and had higher birth-order (≥ 3); and fathers who were rickshaw-pullers or unskilled day-labourers and completed < 5 years of education, came from poorer families. Parental education, economic and nutritional characteristics, child-feeding practices, and birth-order were important risk factors for severe underweight in this population.

Khokhar A et al (2003) conducted a study to find out the prevalence of malnutrition among children aged 6 months to 2 years from a resettlement colony of Delhi. The results showed that 60.7% of total sample were malnourished. Undesirable practices of discarding the colostrum, not exclusively breast feeding the child till at least 4 months of age, delayed...
weaning, dilution of top milk, use of bottle and nipple for feeding the children are still widely prevalent.

Ahmad E, et al. (2011)\textsuperscript{111} carried out a cross sectional study in Aligarh to find out nutritional status of 1-5 years old children. The results showed 51.4% males and 49.6% were females. 56.4% were found to be suffering from PEM according to IAP classification. The result also revealed that 54.2% children were malnourished with (30.9%) from grade I, 18.5% from grade II , 4.2% from grade III and 0.6% from grade IV as compared to 58.6% female 32.0% from grade I , 17.3% from grade II , 5.8% from grade III and 3.5% from grade IV malnutrition . Majority of the children suffering from PEM, 60.5% belong to social class IV, 35.7% to social class III, 2.2% to social class II and 1.6% to social class I. The children suffering from PEM, 29.3% belongs to family size of 5 – 6 while 29.0% belongs to family size of 7 – 8 members. Children belonging to higher caste had better nutritional status as compared to children of backward caste and scheduled caste. However 27.1% children belongs to higher caste and out of this 34.6% are normal children and 21.3% belongs to children with PEM. Association between PEM and literacy of mothers was also found to be significant.
Nzala S H, et al (2011)\textsuperscript{112} conducted a study to determine the associations of demographic, cultural and environmental factors with frequency and severity of malnutrition among children less than five years of age in Zambia. The prevalence rates for "underweight", "stunted" and "wasted" were 17.6 \%, 37.5 \%, and 4.1 \%, respectively. Further analysis indicated that male gender, low educational level of householder and mother, poverty, vaccination status, diarrhoea in past seven days, and absence of toilet or use of traditional pit latrine were positively associated with all three types of malnutrition.

The nutritional status of preschool children (36-59 months) in selected urban slums of Guwahati city a cross sectional study was conducted by Chetia S (2011)\textsuperscript{113} and found that 60 percent of the preschool children were malnourished as per Gomez Classification. Among the malnourished children 43 percent were mild malnourished and 17 percent were moderate malnourished. It was also observed that sex, religion, birth order and socio economic status are significantly related with nutritional status of the child.

Thakur S and Lakhar B (2011)\textsuperscript{46} reported in their study prevalence of moderate and severe malnutrition (Grade II, III, and IV) in admitted patients below five years was 10.18 percent. Majority of malnourished children were under age of 3 years (91.4\%) with maximum number between 6 months to 1 year (51.8\%). Lower socio economic status was significantly associated
with severe forms of malnutrition. 1st born child contributed to 84.4% of grade II patients whereas 2nd and beyond children contributed to about 90.0% grade III and grade IV. Higher the birth order and number of siblings was associated with severe forms of malnutrition. Around 88.7% of grade III patients and all patients of grade-IV received either improper breast feeding or not received breast feeding at all. About 64.4% of grade III and 100% patients of Grade IV had faulty weaning practices.

Narkhede V, et al. (2011)\(^6\) carried out a community based cross-sectional study to assess the nutritional status and dietary pattern of children below five years of age in Urban slums of Nagpur. It was observed that 16.8% children were given prelacteal feeds. Maximum numbers of children were given Jaggery water (67.6%) followed by 23.5% given honey and 8.8 percent were given ghutti as first fed. Breast feeding was given to 100 percent children. It was observed that mothers fed breast milk to their children upto 1 to 2 years of age. Maximum number of women started weaning at 4-6 months of age (62.6%), followed by 7-9 months of age (20.5%), 10-12 months of age (3.2%), in 0.74% children, weaning started after 12 months and in 12.9% children weaning was not started. In general weaning was started with rice and dal·water in majority of cases, few children were given daliya, khichadi and fruit juice as weaning food. Age group wise prevalence of undernutrition was highest in 13-24 months age
group (13.8%), followed by 0-12 months (10.9 percent), 25-36 months (10.4 percent), 49-60 months (8.66 percent) and 37-48 months (8.41 percent). In age group of 0-12 months and 25-36 months prevalence was almost equal i.e. 10.9% and 10.4% respectively. On comparing prevalence of undernutrition in 0-6 months age group with 7-60 months age group it was observed that former group had a better nutritional status as compared to later group. The difference was statistically significant ($\chi^2 = 43.07$, df=1, $p<0.001$) probably indicating faulty weaning practices and dietary habits. Sex wise prevalence of undernutrition was slightly higher in females (26.5%) as compared to males (25.7%), however no significant difference was observed. Grade IV undernutrition was found only in female (0.5 percent) children.

**Sharma M K et al (2011)**\(^{114}\) examined the prevalence of under nutrition among under-five children and find out the association of under nutrition with social factors in Rural, Urban and Slum population of Allahabad. They reported 72.5% were suffering from malnutrition and 22.4% from grade-III & IV (severe form) of malnutrition. Children belonging to slum area and of low standard of living index (SLI) were at significantly higher risk (P<0.001) of being undernourished. In the study it was observed prevalence rates of underweight in the age group of < 1 year was 50.0% which reached peak levels of 67.7% in the age group of 25-36 months and then it decreased gradually with increasing age.
Katara PS (2011)\textsuperscript{115} carried out a cross sectional study to find out the feeding practices in infant’s upto 6 months of age in urban slums of Vadodara. Results revealed that early initiation of breast feeding was seen in 75% of infants. Pre lacteal feed was given in 36% of infants and colostrums was given in 87% of infants. 15.5% infants received exclusive breastfeeding while majority (76.8%) were given water with breast feeding. Still early initiation of breast feeding and exclusive breast feeding is not practiced at a desired level.

Agozie C et al (2012)\textsuperscript{116} carried out study to determine the prevalence, risk factors, co-morbidities and case fatality rates of Protein Energy Malnutrition among aged 0 to 59 months in paediatric ward of the University of Nigeria Teaching Hospital Enugu, South-east Nigeria. The most common age groups with PEM were 6 to 12 months (55.7 percent) and 13 to 24 months (36.8 percent). Marasmus (34.9 percent) was the most common form of PEM noted in this review. Diarrhoea and malaria were the most common associated co-morbidities. Majority (64.9 percent) of the children were from the lower socio-economic class. The overall case fatality rate was 40.1 percent which was slightly higher among males (50.9 percent). Mortality in those with marasmic-kwashiokor and in the unclassified group was 53.3 percent and 54.5 percent respectively.
Saiprasad B, et al. (2012)\textsuperscript{117} carried out a descriptive epidemiological study to find out maternal and environmental factors affecting the nutritional status of children in Rafiq Nagar urban slum of Mumbai. According to WHO malnutrition grading, 59.8% children were malnourished and only 46.4% were completely immunized. Parents' higher education, exclusive breast feeding for 6 months, proper weaning, immunization and higher socioeconomic status had beneficial effect on nutritional status of children. Also environmental conditions, birth order and total number of children in family had effect on nutritional status of children. Malnutrition was prevalent in the age group of 1-2 years.

Santosh K A, et al. (2012)\textsuperscript{118} carried out a cross sectional study to estimate the prevalence of PEM in children aged 1 to 5 years and to find association between immunization status, common morbidities and PEM of children aged 1 to 5 years in urban slums of Mysore city. Results revealed that prevalence of PEM was found to be higher in children who were partially immunized and was statistically significant. Among the children with history of ARI (77.1%) were found to be underweight, 38.7% were stunted and 58.9% were wasted and was statistically significant (p<0.05). Underweight, stunting and wasting were seen in 53.6%, 54.1% and 17.1% children respectively among children with history of diarrhoea and it was statistically significant.
Srivastava DK, et al (2012)\textsuperscript{119}, carried out a cross sectional study to find out the morbidity profile of under five children in urban slums of Etwa District. The study findings were only 33.94% children were completely immunized. Diarrhoea and upper respiratory tract infection were the most common morbidities reported in the age group of 1-5 years. The higher prevalence of diarrhoea and other communicable diseases may be due to poor environmental conditions, improper cooking practices, overcrowding etc. However authors are in opinion that a separate study should be carried out to assess the reasons for higher prevalence among children of slum dwellers.

Kumar AS et al (2012)\textsuperscript{120} studied to estimate the prevalence of PEM in children aged 1 to 5 years and to study the association of mothers educational status with feeding practices and nutritional status of children aged 1 to 5 years in urban slums of Mysore city. The results revealed that 47.5% were males and 52.5% were females. Exclusive breast feeding was given in 49.2% of children. Pre lacteal feeds and top milk feeds were given 20.5% and 18% of children respectively. The prevalence of underweight, stunting and wasting was observed to be 31.3%, 42.2% and 14.2% respectively. About 12.8% of mothers were illiterate and this was significantly associated with feeding practices and nutritional status of children.