CHAPTER – 2

REVIEW OF LITERATURE

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There is a wide range of publication regarding nutritional status among school going children. For their nutritional assessment there is several indicators used for this purpose. Stunting, wasting and underweight are also important for child nutrition. High rate of child mortality and morbidity are also related to under nutrition. BMI is another important indicator of nutritional status. Socio-economic factors are closely related to child nutrition.

The distributions of weight and length/height around the mean remained remarkably stable over age but were much greater in India than the international norms. The rates of growth of mean weight and length/height were far lower in India than the international norms up to the age of 2 years. The temporal trend indicates declines in the percentages of undernourished (low weight-for-age) and stunted (low height-for-age) children over the 7-year period, although the degree of improvement was far better for stunting than for underweight. Mother's educational status is the only variable that has been found to influence child nutrition (Sen et al., 2011)

2.1: International Studies

Chinn and Rona, (2001) worked on British children of primary school (4-12 years) in England. The study reported that prevalence of overweight was 5-6% in white boys and 9-10% white girls. Kavosi et al., 2014 a cross – sectional study on under nutrition among under six years children of Iran and presented that the rate of stunting, under weight and wasting were 9.53%, 9.66% and 8.19% respectively. Male children were more stunted than female. Stunting was also significantly associated with low family income and low maternal education. A comparative study represented that nutritional status among primary school going children aged 6-9 years old. Under weight, stunting and wasting were 3.2%, 1.5% and 4.1% children of India and 0.2%, 5.4% and 1.7% children of Iran (Hooshmand and Udipi, 2014).

Ashraf et al., (2001), studied on 100 school going children (age 4-12 years) of Allied and National Hospital of Faisalabad and outdoor Patient Dept, Allied hospital. Out of 100 children 85 were malnourished and 15 were apparently healthy. All these children were grouped on the basis of their age (4-6 years, 7-9 years, and 10-12 years), socio-economic status (low and middle classes), and living area (industrial and non-industrial). Mid Arm Circumference was significantly ($P<0.05$) low among the children at the age of 4-6 and 7-9 years than 10-12 year. Prevalence of weight and body mass index showed no significant differences between age

groups in each degree of malnutrition. Overall higher (P<0.001) number of cases of malnutrition were observed, those belonged to low socio-economic status (90.0%) than middle socio-economic status (10.0%). The data of this study revealed that malnutrition was more prevalent (P<0.001) in diseased children lived in non industrial than industrial area.

A study on school going children sample were collected from two type of school in Jos Plateau, Nigeria. 519 selected from public school and 245 pupils were selected from private school. Their ages ranged from 5-12 years. Pupils from private schools were significantly taller (118.2±6.52) than the public school (115.7±8.44). The prevalence of the underweight, stunting and wasting was 10.3%, 11.1% and 2.4% respectively (Angela, 2010).

Another study (Bukhari, 2013) proposed that nutritional status of old primary school going girls in Makkah city. The prevalence of overweight and obesity, underweight, wasting, and stunting were 29.5%, 20%, 20% and 11% respectively. Low vitamin (B12) intake was associated with stunting and also associated with underweight. Total calories come from carbohydrate 48.9%, Protein 18.5%, and Fat 32.6%. A higher percentage of school breakfast consumers had low physical activity level compared to their counterparts (50.6% vs. 28.8%). Moreover, the former group had low school achievement level vs. home breakfast consumers (89%vs.57.8%).

Ray and chandra, (2013) worked on Tripura children 0-18 years old and observed that the problems of stunting and overweight-cum-obesity were more prevalent (p<0.001) among under-five years children, and the problem of wasting/thinness more prevalent among above-five (p<0.001) and above-ten years children (p<0.001) than the remaining groups. On the other hand, <-2SD and <3rd percentile based prevalence of stunting and thinness differed significantly (p<0.001) among above-six years children.

Teblick et al., (2017) studied on nutritional status among school going children aged 5-19 years old in Tanjania. Basic anthropometric values of the study participants were significantly lower than those of the reference population. No gender differences in the prevalence of stunting and thinness were found. Three hundred and twenty-six children (23.7%) suffered from at least one form of undernutrition: 225 (16.3%) were stunted while 156 (11.3%) were thin. The low prevalence of both stunting and thinness was found in youngest children (5 - 9 years) than oldest

children (14 - 19 years). Furthermore 54 (16.5%) of the undernourished children were suffered from multiple forms of undernutrition.

Eze, (2017) studied on Physical growth and nutritional status assessment of school children in Enugu a total of 1305 males and 1311 females were enrolled in the study. The mean age was 8.9 ± 1.9 years. Their mean height, weight, and BMI were 136.6 ± 10.2 cm, 29.7 ± 7.7 kg, 15.7 ± 2.4 kg/m2, respectively. Their mean ± SD scores of the WAZ, HAZ, and BAZ were 0.33 ± 1.20, 0.78 ± 1.17, and − 0.51 ± 1.27, respectively. A majority (78.9%, 2090/2616) were in the normal growth category. Wasting, overweight, obesity, underweight, and stunting were noted 9.3% (243/2616), 6.3% (166/2616), 4.4% (117/2616), 0.9% (26/2616), and 0.4% (13/2616) of the children, respectively.

2.2: National Studies

Another study on 5-14 years old 940 children of North India (Kashmir) i.e. females had comparatively higher mean than males in respect of mean height and weight. Overall prevalence of underweight was 19.2%. The prevalence of underweight was higher of 6 year males (21.5%) than 5 year females (0.0%), highest prevalence of stunting was observed (28.05%) among male at the age of 12 year and lower male (0.0%) in 7 years. The highest Prevalence of wasting was found at 9 years old male (24.6%) than in 6 years old females (2.56%) (Fazili, 2012).

Rawat et al., (2014) studied on 5-14 years aged children in Meerut. The study was conducted on a slum area among families which were registered at Urban Health Training Centre of LLRM Medical College. The prevalence of underweight among children was 48.0% (95% CI 43.00-52.99). 56% undernourished children were boys. Significantly higher prevalence rates were observed among children having unpiped water supply to the house {(P<0.01), OR=4.64 (95% CI 1.52-14.13)}, having suffered from diarrhea in last 1 year {(P<0.001), OR=4.93 (95% CI 3.22-7.55)}, having history of passing worms in last 6 months {(P<0.01), OR=2.00 (95% CI 1.25- 3.20)}, and among those children who had never taken deworming {(P<0.001), OR=2.95 (95% CI 1.83-4.76)}.

Chudasama et al., (2015) studied on Sourastra region 8-18 years aged children and adolescent. A total of 1496 children including 79.1% boys and 20.9% girls participated. Boys grow taller than girls from 12 years age and also gains more weight than girls from 11 years. The

mean BMI of boys remain more than girls for all the age except age 16. Significant difference was observed (independent t test) for difference age groups when height, weight and BMI of boys were compared with girls.

Mondal et al., (2015) worked on school going Bodo chidren (5-11 years) of Assam and observed that overall prevalence of overweight (boys 13.45%; girls 11.04%) was found to be slightly greater than obesity (boys 11.93%; girls 10.02%). Mondal et al., (2015) reported that 11.93% and 11.04% were suffering from thinness among boys and girls, respectively and also reporetd that binary logistic regression analysis showed that the odds were found to be significantly associated with ≤ 10th standard mothers' education, 1st earning head and Rupees <10000 income households ($p < 0.05$) for thinness. Similarly, greater risks were observed in 5-6 years, 7-9 years, ≥7 household members and a lower association with ≤ 10th standard mothers' education for being overweight-obesity ($p < 0.05$)

Yadav et al., (2016) studied on 5-11 years aged children of urban area in Pune. The prevalence of stunting wasting and under nutrition were 4.47% (95% CI, 3-5.94), 6.32% (95% CI 4.59-8.05%) and 5.00% (95% CI 3.45-6) respectively. Parent's educational levels were significantly associated with the nutritional status of the child. However no statistically significant association was found with regard to family income and family size. Only wasting was significantly associated with mother's occupation.

The study of Nayek et al., (2017) revealed that prevalence of undernutrition among children of JNMC Belgaum, Karnataka. A 2-5 years old children total of 339 boys and 358 girls were studied. Result showed that age-combined prevalence of under-nutrition (Grades I, II, and III combined) among boys and girls were 63.4% and 58.6% respectively. Overall age and sex combined prevalence of undernutrition was 61.7%. It was also represented that significant mean differences between ages among boys in weight ($F = 4.160$; $P < 0.001$) and height ($F = 6.502$; $P < 0.001$). However, no significant mean differences between ages for BMI ($F = 1.098$; $P = 0.295$). Similar findings were seen among girls that is significant differences were observed in weight ($F = 3.125$, $P < 0.001$) and height ($F = 6.895$; $P < 0.001$) but not with BMI ($F = 1.091$; $P = 0.311$).

Bharati et al., (2017) worked on kolam tribe 6-18 years old in India, tribal population is among the most deprived and undernourished people. In this study it was showed that the prevalence of undernutrition among Kolam tribal children and adolescents by comparing different Body Mass Index (BMI) cut off points. Age and sex specific nutritional status of studied population showed 15.01% boys and 18.35% girls were in Chronic Energy Deficiency (CED) III category, 16.22% boys and 19.32% girls were in CEDII, 31.71% boys and 2.72% girls were in CEDI only 0.96% boys and 1.69% girls were in overweight category.

Sahu et al., (2018) study proposed that nutritional status among under five school going children in India. The recent study presented that children were 39-75% under – weight, 15.4-74% stunted, and 10.6-42.3% wasted.

2.3: Regional Studies

Malnutrition is a global health problem in developing countries (Victora et al., 2004). CIAF is an appropriate index to identify the overall under nourished children developed by Nandy et al., (2005). This is also closely associated with high rate of mortality and morbidity. Under-nourished children are suffering from different type illness than the well nourished children. There are several studies represented proportion of underweight, wasting, stunting and CIAF traditionally. Nandy reported 59.8% children were suffering from CIAF. Using the CIAF a very high prevalence of under nutrition has been reported among children in West Bengal. There are several studies represented that prevalence of CIAF among children of different state i.e. Tamilnaru (86.6%, Seetharaman et al., 2007), Uttar Praderh (62.8%, Kumar et al., 2010), Kasmir (25.7%, Fazili et al., 2012) and Jammu (73.2%, Dewan et al., 2015). In recent time some study have been reported prevalence of CIAF among preschool going children of West Bengal that was Nadia (60.4%, Biswas et al., 2009), Purulia (66.3%, Das and Bose, 2009), Midnapore town (58.2%, Sinha and Miti, 2012), Singur (32.7%, Das Gupta et al., 2015). Another recent study in west Bengal was reported that 61.28% preschool going children were suffered from CIAF (Biswas et al., 2018). All these studies have been conducted among 1-6 years children.

Sen et al., (2011) conducted a cross sectional study among school going children aged 5-11 years and reported that 17.4%, 38.5%, 47.0% and 57.6% children were wasting, stunting, underweight and CIAF respectively.

A cross-sectional study Chowdhury et al., (2008) worked on Santal children of Puruliya district. Out of 442 Santals children 216 boys and 226 girls were 5-12 years old. Nutritional status was analyzed by Z- score values according to height for age, Weight for age and weight – for height reference value of NCHS. The prevalence of stunting, under weight and wasting was 17.9%, 33.7% and 29.4% children respectively. In girls prevalence of stunting and wasting was higher in comparison to boys.

Another study Biswas et al., (2009) studied on pre-school children in Chapra, Nadia District. This cross-sectional study was conducted on 3 -5 years aged children. They were observed that out of 2016 children 49.68 % boys and 51.57 % girls were nutritionally thin. There were significant sex difference in height, weight and BMI. The rate of Grade II and III thinness was higher.

A cross-sectional study was conducted by Mandal et al., (2012) it was represented that undernutrition among preschool going children of Purba Medinipur. Total sample size was 225 between the age group 3-6 years. The overall prevalence of thinness was 59.1%. Boys (61.8%) were comparatively more malnourished than girls (56.8%).

Mandal et al., (2014) worked on kolkata 0 to 14 years old children and observed that the overall prevalence of under-nutrition among the study population was found to be 54 (45%). Among infants 9 (25%) were underweight, 3 (8.3%) were stunted, 22 (61.1%) were wasted and 23 (63.9%) showed thinness. Among 1-5 years aged children, 18 (30.5%) were underweight, 17 (28.8%) were stunted, 17 (28.8%) were wasted and 17 (28.8%) showed thinness. Among 5-14 years aged children, 11 (44%) were underweight, 10 (40%) were stunted and 12 (48%) showed thinness.

This study was conducted on 430 school going children (203 boys and 223 girls). The overall prevalence of underweight was 40.23% (173), thinness 55.11% (237) and stunting was 19.76% (85). All the above under nutrition indices were higher in boys than girls. Overall 42.32% (182) children had low health status (Rohrer index > 1.12). Pramanik et al., (2015) concluded that there was high prevalence of under nutrition among rural school children having age limit 5-9 years in Burdwan, West Bengal.

Another cross sectional study Sarkar, (2016) conducted among children aged under five in West Bengal. Sarkar (2016) reported that 51%, 41% and 22% children were stunting, underweight and wasting. Child nutritional status closely associated with caste, religion and age and birth order. Another recent study Pal et al., (2017) represented nutritional status among adolescent. This study revealed that 54% adolescent in West Bengal were stunted and 49% were thin. Parent education, income, and sanitation were closely related with nutritional status of adolescent.

2.4: Socio Economic Condition and Nutritional Status

Socio economic conditions play a very vital role on nutritional status of any individual. There are different studies on socio economic condition and nutritional status, where discuss role of socio economic conditions on nutritional status. There are difference factors such as wealth, education, caste, geography, and birth of years are related to differences in prevalence of undernutrition. Socio-economic position (SEP) and prevalence of undernutrition are negatively associated. Data from developed countries suggest an inverse association between undernutrition and cause of mortality (Batty et al., 2009; Subramanian and Smith, 2006). There are several chronic disease may also inverse associated with undernutrition (Koch et al., 2010). In developing countries, there are several studies suggested that individuals are tend to overweight and obesity (Popkin, 2003; Mondal et al., 2015). With their decreased quality of life style associated with nutritional disease. There are several studies demonstrated a strong relationship between socio-economic status and nutritional status and that is differs through the level of development of the population. Generally a negative relationship between SES and obesity in developed nations, but a positive in developing countries there are several studies discuss that (Godoy et al., 2005 & 2006; Komlos and Baur, 2004; Monterio et al., 2002; Popkin, 2001, 2002: Stunkard and Sorensen, 1993; Ulijaszek, 2003; Valeggia et al., 2010). It also seen that some studies already reported that improving socio-economic and demographic conditions along with parental education and preventing infections through personal hygiene might help to improve the nutritional status among the children (Meshram et al., 2011; Meshram et al., 2012; Owoaje et al., 2014; Kavosi et al., 2014; Pal et al., 2017; Vollmer et al., 2017; Yadav et al., 2016; Arora et al., 2014; Sarkar, 2016).