

Malnutrition Scenario of West Bengal

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Abstract: The nutritional scenario in the urban slums of Kolkata is not satisfactory. The situation of malnutrition is more severe in other districts of W. B. compared to Kolkata city. Malnutrition is widely prevalent among the socio-economically backward communities. It is more profound in rural and tribal areas than the urban areas. Reviewing a large number of malnutrition studies in different parts of West Bengal clearly indicate that malnutrition is not confined to a specific age-group, rather it is well-spread among individuals from different age-groups. Undernutrition sets in the very early age of life, starting from infancy, and continues throughout the childhood, adolescent period and adulthood. However, the extent and type of malnutrition vary from one age to another. The dietary inadequacy of the poor people results in a deficiency of both macronutrients and micronutrients which causes undernutrition among all age groups. The tribal populations are suffering from severe nutritional stress. The alarming situation of malnutrition in West Bengal needs an urgent attention of the government and non-government organizations working in this field. To overcome the problem of widespread malnutrition various low-cost nutritious foods are to be popularized in the rural and tribal areas and the awareness regarding health and nutrition of the poor people should be improved. Improvement of the literacy level of the common people is essential.

Keywords: Malnutrition, underweight, stunting, wasting, thinness, Kolkata, West Bengal.

I. INTRODUCTION

The state West Bengal comprises of 23 districts, including a Metro city Kolkata, with several large and small cities. It covers 31.87% urban population and 68.13% rural population. Large chunks of the population (28.80% in rural areas and 22.0% in urban areas) lives below the poverty line in this state [1].

According to the National Family Health Survey 2015-16 (NFHS-4) 70.9% women (79.4% urban and 66.9% rural) and 81.1% men (83.9% urban and 79.7% rural) are literate in this state. The Infant mortality rate (IMR) is 28 (16 in urban and 32 in rural areas) whereas under-five mortality rate is 32 (16 in urban and 38 in rural areas). Among adults, around 21.3% women and 19.9% men are underweight (BMI<18.5 kg/m²) whereas 19.9% women and 14.2% men are overweight or obese (BMI≥25.0 kg/m²) respectively. 54.2% Children (6-59 months), 62.8% non-pregnant women (15-49years), 53.6% pregnant women (15-49years) and 30.3% men (15-49years) of the W.B. are anaemic [2].

Several large and small studies were carried out by many researchers in the last decades to evaluate the current malnutrition scenario of the poorer section of West Bengal. Data on the nutritional status of city dwellers as well as rural and urban people are collected by an extensive review of the literature, which is systematically presented below.

II. MALNUTRITION SITUATION IN AN A1 METRO CITY - KOLKATA

Kolkata is an A1 Metro city of India, with a history of more than 300 years. A lot of studies are going on to assess the nutritional status of the Kolkata children particularly those from the lower socio-economic classes, inhabiting the slum areas. Some are described below-

► Bandyopadhyay, S. et al. (2014) assessed the prevalence of undernutrition among the 188 under-five children in the slum area of Chetla, Kolkata. This study indicated that around 60% of children were undernourished [3].

- ▶ Mandal S. et al. (2014) conducted a community-based analytical study in an urban slum of Chetla, Kolkata involving 120 children (0-14 years) which indicated that the nutritional status of these children was not satisfactory in spite of proper immunization coverage and institutional deliveries. According to this study, 45% of children were undernourished. Among infants 25% were underweight, 8.3% were stunted, 61.1% were wasted and 63.9% suffered from thinness. Among 1-5 years old children, 30.5% were underweight, 28.8% were stunted, 28.8% were wasted, and 20.3% had MUAC 12.5-13.5 cm and 28.8% showed thinness. Among 5-14 years old children, 44% were underweight, 40% were stunted and 48% had thinness [4].
- ▶ A recent study by Das A. et al. (2014) assessed the nutritional standard of 319 boys (9 – 12 years) from urban slums of Kolkata. Mean height ranged from 123.9-134.9 cm for 9-12 years old boys with corresponding weights ranging between 22.2-29.4 kg. The height and weight were much lower than those of the urban children (57). According to this study, the rate of stunting increases with age, 49% in 9 years to 59.5% in 12 years whereas the rate of wasting decreases with age, 48% in the 9-year group which declined abruptly to 27% in the 10-year group [5].
- ▶ Das P. et al. (2012) carried out a cross-sectional descriptive study on 918 adolescent boys (12 -17years), studying in class VI to XII, of North Kolkata to assess their health and nutritional status. 32.79% and 3.92% students suffered from Anaemia and Vitamin B complex deficiency respectively in the study population. Mean height, weight, and BMI of the students (both individual class and all students) were below normal, except those of class-XII students [6].
- ▶ Mitra S.P. (2007) estimated the dietary intake and nutritional status of 540 under-five children in urban slums of Kolkata municipal area. This study revealed that only 38.9% of the under-five children were within the normal limit whereas 61.1% were suffered from different grades of malnutrition. Calorie and protein intakes of more than 81% and 68% under five pre-school children were below 50% and 70% of RDA respectively. Only about 60% of the under-five children consumed more than 50% of RDA of vitamin A whereas iron intake of more than 80% subjects was less than 50% of RDA [7].
- ▶ Another study by Sen, P.K. (1994) assessed the nutritional status of 1280 under-five children from the urban slum area of Chetla, Kolkata. The children were graded using the Indian Academy of Pediatrics classification. It was evident that more than half of the under-five children were undernourished among which 27.7%, 16.8%, 5.3% and 1.8% were suffered from grade I, II, III and IV undernutrition respectively [8].

The above studies carried out among the children and adolescents of the Kolkata city [3], [4], [5], [6], [7]&[9] showed that malnutrition is widely prevalent among the boys and girls, particularly in slum areas. Widespread undernutrition, in terms of stunting, wasting, thinness, suggest a gross deficiency of calorie and micronutrients in the population. Anemia and deficiency of B-vitamins are also common among Kolkata children, which indicate the deficiency of micronutrients. Undernutrition sets in a very early age of life, starting from infancy, continues throughout the childhood and adolescent period but the extent and type of malnutrition vary from one age to another. Inadequate intake of proteins and calories, as well as micronutrients by the children, is the major cause of the high prevalence of undernutrition, stunting and wasting in the slum areas. The other contributory factors include low purchasing capacity, poor drinking water quality and sanitary facilities, repeated infections, inadequate medical facilities, lack of awareness and food fads and taboos.

III. MALNUTRITION SITUATION IN THE DISTRICTS OF WEST BENGAL

There were several studies carried out to judge the nutritional status of the people living in many districts outside the city Kolkata, some of the selected research works are mentioned below-

STATE LEVEL STUDIES:

- ▶ A large, multistage, district-wise, school-based, cross-sectional study was conducted by Pal, D et. al. (2016) on 24,108 primary and upper-primary students (6-13 years) from the whole state of West Bengal. A stratified cluster random sampling method was used to recruit the students. The students were interviewed followed by anthropometric measurement and haemoglobin estimation to determine the prevalence of under-nutrition and identify its predictors. All relevant information was collected using a structured questionnaire by teams of trained field workers. Anthropometric measurements such as height and weight were conducted (following Indian Academy of Paediatrics guideline) using anthropometric rods and digital weighing machines. This study revealed that –

- The prevalence of under-nutrition was alarmingly high (around 23%).
 - Another 54% of students were at risk of developing under-nutrition.
 - Only 17% of primary students had ideal nutritional status.
 - Odds of being malnourished were higher among
 - ✓ male students compared to females
 - ✓ those belonging to younger age i.e. studying in primary compared to upper-primary classes
 - ✓ Muslims than Hindus
 - ✓ those from underprivileged caste compared to those from general caste
 - ✓ those residing in rural areas than those from urban areas
 - ✓ those who had more than three siblings, those who had unemployed father
 - ✓ students with maternal death
 - ✓ Those with illiterate parent(s). Parental education was negatively associated with the likelihood of under-nutrition [9].
- Bharati S. et. al. (2010) studied the extent of undernutrition among the children (0-71 months) at the district level of West Bengal. 7550 children (3880 and 3670 girls), selected from all the districts of W.B. were considered as subjects. The result of the study revealed that-
- Among the selected children (0-71 months), 29% boys and 26% girls were under-weight but there were substantial variations among the districts.
 - Murshidabad, Burdwan, Purulia, Medinipur Howrah and South 24 Parganas were the districts with a high prevalence of underweight children. These districts also have low per capita income.
 - The districts with a low prevalence of underweight were South Dinajpur and Nadia.
 - Kolkata is the only district with a very low prevalence of underweight children.
 - Differences in the percentage of underweight children between rural and urban areas were not so marked as socioeconomic variables.
 - The educational status of mothers and the standard of living of the households had a significant influence on minimizing the level of under-nutrition in children [10].

DISTRICTS LEVEL STUDIES:

Darjeeling:

- Sarkar, R (2016) studied the health problems of the tribal women in Godam Line Village of Phansidewa Block of Darjeeling District in West Bengal. A total of 50 tribal women were selected, comprising of 40% of younger adult women (21-40 years) 60% of older adult women (41-60 years). Most of them were tea workers by occupation. Rice and wheat were the major staple food of these tribal women. 50% of them consumed pulse. Most of them (86%) did not consume milk even though they domesticated cows. All of them were habituated to drink tea. They mainly ate vegetables (100%), fish (94%), and rarely had mutton (only 32%) [11].
- The cross-sectional study, conducted by Modal, N. (2014), among 1165 adolescents (602 boys and 563 girls aged 10-18 years) in Darjeeling district, West Bengal, India revealed that 49.10% rural adolescents (51.16% boys, 46.89% girls) were suffered from thinness. Boys suffered more than girls in the different grades of thinness which included mild (grade I; 27.41% vs. 27.11%), moderate (grade II; 14.62% vs. 12.08%) and severe (grade III; 9.14% vs. 8.70%) degree of thinness [12].
- Das S. et al. (2012), carried out an ethnic-based survey on 1872 Bengali preschool children, aged 2-6 years (48.7% boys and 51.5% girls) from rural areas of Purulia, Paschim Medinipur and Darjeeling districts of W.B., India which showed that rural Bengali preschool children had substantially lower body mass index in comparison with new WHO reference standards. This study suggested that Bengalee children are currently facing an increasing level of undernutrition [13].

► In another study, Dey I et al. (2011) evaluated the nutritional status of 420 school-going adolescent participants (11-19 years) from Darjeeling district which showed that while about 40% adolescents were undernourished, 27% boys and 29% girls were severely malnourished. 44% participants were stunted of which 14% were severely stunted [14].

► According to the cross-sectional study conducted by Mondal N. et al (2010) on 5-12 years old children (906 boys and 964 girls) from the Rajbanshi, Tea-labourer and Bengali Muslim communities residing in North Bengal, there were wide variations in stunting, undernutrition and wasting among the children of 3 ethnic communities. There were significant gender differences between and within the communities. Children from Tea-labourer and Bengali Muslim were more affected than the Rajbanshi children [15].

Malda:

► Ismail, M et al. (2013) assessed the nutritional status of different age groups of population in Malda district of West Bengal, India. 1,246 adults and children (0-14 years) were taken from the 506 households from selected 15 villages of Malda district. One male, one female, and one child have been taken from every household.

Based on the Indian Academy of Pediatrics classification of malnutrition only 42.30% children (0-14 years) were normal whereas rest were suffered from different grades of malnutrition. 20.17% children were Grade-1 malnourished, 12.32% were Grade-II malnourished, 14.85% were Grade-III malnourished and 10.36% were Grade-IV malnourished. According to height for age 57.98% children were normally followed by 23.25% stunted and 18.77% were severely stunted. According to weight for height 55.74%, children were normal whereas 25.77% were wasted and 18.49% were severely wasted.

According to this study, 64% adult were normal who had BMI in between 18.5 and 25.0 whereas 18.79% were overweight /obese and 17.21% were underweight [16].

Paschim Medinipur:

► Chatterjee, K, et. al. (2015) studied the nutritional status of the 12,342 high school going children from Paschim Medinipur. 4756 boys and 3564 girls (12-15 years) were selected from the 154 high schools across the district. The study reported that 7.80% and 8.09% of children were lean and severely lean respectively. Leanness was more prevalent among boys than girls [17].

► Sinha, NK et. al. (2012) carried out a community-based, cross-sectional survey among 658 underprivileged children (315 boys and 343 girls) of 2-6 years from Midnapore town. This study showed that the prevalence of underweight, stunting, and wasting was higher in boys (46.98%, 43.17%, and 25.40% respectively) than girls (40.82%, 38.19%, and 21.57% respectively) [18].

► A study conducted by Bisai S. et al. (2012) on 65 Munda and Oraon children (13-60 months) in Paschim Medinipur district of West Bengal, India indicated that 61.5%, 38.5% and 55.4% of the tribal pre-school children were underweight, stunted and wasted respectively in comparison with the new WHO reference standards [19].

► Mandal, S et al (2011) assessed the nutritional status of 491 college-going girls (18-20 years) of Midnapore, West Bengal, India. According to this study, 28.3% of women were suffering from chronic energy deficiency whereas 4.5% of women were overweight [20].

► The community-based cross-sectional study conducted by Bisai S. et al. (2011) among 119 Kora-Mudi children (2-13 years) of Paschim Medinipur, W.B. indicated towards the critical condition of nutritional status of tribal populations. This study showed that 52.9%, 49.6%, and 22.7% children were underweight, stunted and wasted of which 16%, 24.4%, and 1.7% subjects suffered from severe underweight, stunting and wasting respectively [21].

► Another study (Bisai S. et al., 2009) on 123 nonpregnant and nonlactating Kora Mudi tribal women, selected from Jamunapar and Krishnanagar villages of Paschim Medinipur, revealed that this tribal population suffered from severe nutritional stress. 55.3% of subjects had chronic energy deficiency (CED) viz. BMI<18.5, Consisting of 12.2% women had grade-III CED, 17.9% had grade-II CED, and 25.2% had grade-I CED [22].

► Bisai S. et al. (2008) evaluated the nutritional status of 165 Lodha children (1-14 years) of Paschim Medinipur, WB, India using NCHS (National Centre for Health Statistics) standards which indicated that 33.9%, 26.1% and 19.4 %,

children were underweight, stunted and wasted respectively of which 9.1%, 9.7% and 3.6% of children suffered from severe underweight, stunting, and wasting. Underweight and stunting were significantly more prevalent among pre-school children than school children [23].

► Bose, K, et. al. (2008) evaluated the nutritional status of the 1094 students from a rural area of Paschim Medinipur. 665 boys and 429 girls (11-18 years) were randomly selected as subjects. This study revealed a consistently increasing trend in mean BMI with age among both sexes. The overall prevalence of undernutrition was 35.3%. There was a consistent decreasing trend in the rate of undernutrition from 11 years (48.9%) to 18 years (20.7%) in boys and from 11 years (42.4%) to 18 years (6.5 %) in girls. The prevalence of undernutrition was higher in boys (41.8%) than the girls (25.2%) [24].

► Bisai S. et al. (2008) evaluated the prevalence of undernutrition among 113 slum children (56 boys and 57 girls), aged 3-6years, of Midnapore town, West Bengal using NCHS reference standards. This study indicated that 63.7%, 47.8 % and 32.7% of slum children were underweight, stunted and wasted respectively [25].

Purba Medinipur:

► Mandal, GC, et al. (2011) conducted a cross-sectional survey of 110 boys and 115 girls (3-6 years). The children were randomly selected from Argoal Gram Panchayat, East Midnapore. According to this study, 42.7% children (sex combined) were under-weight, comprising 44.5% boys and 40.9% girls [26].

Purulia:

► Das S. et. al. (2011) conducted a community-based cross-sectional study on 251 (116 boys and 135 girls) Santal pre-school (2-6 years) from Purulia district, WB, India to know the prevalence of undernutrition by measuring height, weight and calculating body mass index (BMI). Based on BMI, more pre-school boys (59.5%) were undernourished than girls (53.3%). Among boys 37.1%, 13.8%, and 8.62% were grades-I, II and III undernourished whereas 29.6%, 15.6%, and 8.15% girls suffered from grades-I, II, and III undernutrition [27].

► Another study conducted by Chowdhury S.D. et al. (2008) on 442 randomly selected Santal children (5-12 years) from Balarampur and Baghmundi areas of Purulia district West Bengal, India revealed that 17.9%, 33.7% and 29.4% of Santal children were stunted, underweight and wasted respectively whereas severe stunting, underweight and wasting were present in 4.98%, 7.92% and 9.51% of children respectively. Prevalence of stunting and wasting was higher in girls (21.7% and 35.8%) than boys (13.8% stunted and 22.7% wasted) [28].

Howrah, Birbhum, and East and West Midnapore districts:

► Pal, A et al. (2017) undertake a cross-sectional study to investigate the prevalence of undernutrition among 560 rural adolescents (10-17 years), comprising of 279 boys and 281 girls selected from different villages of Howrah, Birbhum, and East and West Midnapore districts of West Bengal state, India. This study revealed that

- The mean weight and height were significantly ($P < 0.001$) increased with the advancement of age.
- The mean BMI also significantly ($P < 0.001$) increased when boys and girls approached higher ages, except among 11-15 old girls.
- The overall mean BMI of the boys was slightly higher than girls.
- Among the participants, 53.57% were stunted and 48.75% were thin whereas only 4.64% were in the overweight-obesity category.
- The prevalence of stunting was significantly higher among girls (58.4%) than boys (48.7%).
- The prevalence of thinness was also higher among girls (50.89%) than boys (46.59%).
- With an increase in age, the adolescent showed a significantly higher prevalence of stunting.
- The prevalence of thinness was significantly higher in early adolescents than the late adolescents. The highest prevalence of thinness was observed among 10-12 years old adolescents.

The higher prevalence of undernutrition among girls is a well-known fact in almost every Indian community. Several studies have already reported the discriminations made against the girls in India [29].

Birbhum:

► Ghosh J.R. et al. (2013) studied the prevalence of stunting, underweight and thinness among 203 Santal Children (2-16 years old) of Birbhum district, WB, India which revealed the poor nutritional status of Santal children with higher prevalence of undernutrition; 47.8%, 31.1% and 29.6% children suffered from stunting, underweight and thinness respectively [30].

Bankura

► Karak, P et. al. (2018) assessed the nutritional status of 40 rural and 40 urban school going children (16 - 18 years) of Bankura district, West Bengal. The important clinical signs of nutritional deficiencies like pallor, hair changes, eye changes, teeth changes, skeletal changes, goitre, skin changes and bones etc., were found significantly higher for rural school children than their urban counterpart whereas mean height, weight and body mass index were significantly higher in the urban school children compared to their rural counterparts. The prevalence of underweight was significantly higher in rural children compared with urban children according to their BMI, WC, and WHR [31].

Hooghly

► Mondol, GC et al. (2010) assessed the nutritional status of the 894 rural preschool (2-5 years) children (441 boys and 453 girls) from 20 ICDS centers of Arambag, Hooghly district, using head circumference based on new WHO (2007) recommended cut-off points. The overall (age combined) rate of undernutrition among girls was slightly higher (64.9%) than boys (62.8%). This study indicated that the nutritional status of these pre-school children was serious with very high rates of undernutrition in both genders [32].

► A large cross-sectional study was carried out by Bose K et al. (2009), on 1203 Bengali adults (> 18 years of age) from Dearah, Hooghly District, West Bengal, India which evaluated the prevalence of undernutrition and the interrelationship between educational level and food habit and undernutrition. Overall 27.7% subjects were undernourished which was significantly more prevalent among females (31.7%) than males (23.6%). Among subjects with no formal education 43.5% individuals suffered from chronic energy deficiency (CED) whereas the prevalence of CED is only 25.7% among subjects with 1-8 years of formal education. Prevalence of undernutrition was significantly ($p < 0.001$) higher among vegetarians (48.3%) compared to non-vegetarians (25.5%). 46.9% male and 49.3% female vegetarians suffered from CED whereas 21.5% men and 29.6% women non-vegetarians suffered from CED. So, vegetarianism is significantly associated with CED. Both educational status, as well as food habit, significantly affects BMI irrespective of their sex. Generally, the educational status has more impact than food habit on BMI. There is a strong inverse relationship between educational level and CED [33].

Nadia

► Biswas, S. et al. (2009) conducted a large cross-sectional study to know the age and sex variations in thinness among 2016 (930 boys and 1086 girls) 3-5 years old rural Bengali children from Chapra Block, Nadia District, West Bengal, India. All the pre-school children (3-5 years old) living in Chapra Block were enrolled. Prevalence of thinness was 51.57% and 49.68% among girls and boys respectively and the frequency of thinness increased with increasing age in both the sexes. The rates of Grade-III and Grade-II thinness were higher among girls (7.46% Grade-III and 13.44% Grade-II) than boys (5.48% Grade-III and 11.72% Grade-II) whereas Grade-I thinness was higher among boys (32.47%) than girls (30.66%) [34].

► Biswas, S. et. al. (2008) investigated the prevalence of undernutrition among 673 (boys = 323; girls = 350) Bengali rural children (1-5 years) from 30 ICDS centers of Chapra Block, Nadia. Height-for-age (HAZ) was used to evaluate stunting following the National Centre for Health Statistics (NCHS) Guidelines. Results showed that boys were significantly heavier and taller than girls at ages 2-4 years. Significant age differences existed in mean height and weight in both sexes. Mean HAZ was less than those of NCHS for both sexes at all ages. The overall (age and sex combined) rate of stunting was 39.2 %. The prevalence of stunting was higher among boys (43.4 %) than girls (35.4). Based on WHO classification of severity of malnutrition, the overall prevalence of stunting was very high (≥ 40 %) among boys and high (30-39 %) among girls [35].

South and North 24 Parganas:

► Bhowal, K, et al. (2015) randomly selected 560 school children (280 boys & 280 girls), aged 6-8 years from the Shimulpur, Salka, Kumarhut and Ramnagar Villages, in the districts of North 24 Parganas & South 24 Parganas and evaluated their nutritional status. According to this study, 26.77%, 15.35% and 29.82% of children were underweight, stunted & wasted, respectively [36].

► Mukhopadhyay A. et al. (2005) estimated the nutritional status of 559 Bengalee adolescents (11-14 years old) of North 24 Parganas, West Bengal, to study their age and sex-wise differences in nutritional status. The subjects (314 boys and 245 girls) were classified into 4 age groups with one-year intervals. Overall 36.49% of adolescents are undernourished. With the advancement of age, the prevalence of undernutrition progressively increased regardless of sex. The overall prevalence of undernutrition varied between boys (41.08%) and girls (30.61%), irrespective of age [37].

A large number of community-based, cross-sectional studies were carried out in West Bengal to know the prevalence of malnutrition in different age-groups, to compare the prevalence rate in males and female, to know the causes of malnutrition and to know the at-risk population. From the extensive review of few state level and several district-level studies indicate the following key findings-

□ Pre-school children

- Compared to WHO reference, Bengali pre-school children have substantially low BMI [13].
- Pre-school boys and girls are suffered from different grades of undernutrition [18], [19], [25], [26], [27], [32], [34], [35].
- The incidence of underweight, stunting, and wasting was more common among pre-school boys than girls [18].

□ School Children

There is wide variation in the prevalence of stunting and wasting among the school children from different ethnic communities [15]. The incidence of malnutrition is higher among those school children

- belonging to Muslim families than those from Hindu families [9]
- belonging to backward caste than those from general caste [9]
- residing in rural areas than those from urban areas [9]
- who had more than 3 siblings [9]
- who had an unemployed father [9]
- who had illiterate parents [9]

□ Adolescents

- Prevalence of undernutrition, stunting, and wasting are very high among adolescents [12], [14].
- The prevalence of undernutrition is higher in adolescent boys than in adolescent girls [12], [17]&[24].
- Prevalence of stunting is significantly higher in adolescent girls than adolescent boys [29].
- With an advancement of the age of adolescent boys and girls, consistently mean BMI increases and the prevalence of malnutrition decreases [29].
- Mean height, weight, and BMI of urban adolescents are significantly higher than that of rural adolescents and consequently, prevalence of underweight and nutritional deficiency signs are comparatively higher among rural adolescents than their urban counterparts [31].

□ Adults

- Among young adult women (18-20 years), the incidence of chronic energy deficiency is high [20].
- Undernutrition is significantly more common among adult women than the adult men [33].
- Illiteracy and vegetarianism increase the risk of being malnourished among adults [33].

□ Tribal Population

- Among Munda and Oraon pre-school children, the prevalence of undernutrition, stunting, and wasting are very high [19].
- Among the pre-school and school children of Kora-Mudi tribe incidence of severely underweight and severely stunting are very high [21].
- The prevalence of underweight, stunting and wasting as well as that of severe underweight and severe stunting were comparatively less in Lodha Children (1-14 years) than that in Kora-Mudi children (2-13 years) but the incidence of severe wasting is higher among Lodha children compared to Kora-Mudi children [21]&[23].
- The incidence of underweight, thinness, and stunting are high among Santhal children [28]&[30].
- Among the Santhal pre-school children, grades-I and III undernutrition is more common among boys whereas grade-II undernutrition is more prevalent among girls [27].
- The prevalence of stunting and wasting are higher in Santhal girls than that of Santhal boys [28].
- Among the Kora-Mudi women, different grades of chronic energy deficiency are very high [22].
- Most of the tribal adult women from Darjeeling district usually do not consume milk (86%) even though they domesticate cows and some of them also avoid pulses and meats which make them susceptible to protein deficiency [11].

IV. CONCLUSION

The nutritional scenario in the urban slums of Kolkata is not satisfactory. The situation of malnutrition is more severe in other districts of W. B. compared to Kolkata city. Malnutrition is profound among the socio-economically backward communities. It is more prevalent in rural and tribal areas than the urban areas. Reviewing a large number of malnutrition studies in different parts of West Bengal clearly indicate that malnutrition is not confined to a specific age-group, rather it is well-spread among individuals from different age-groups. Undernutrition sets in a very early age of life, starting from infancy, continues throughout the childhood, adolescent period and adulthood but the extent and type of malnutrition vary from one age to another. Malnourished adults have low earning ability and low purchasing capacity leading to dietary inadequacy. A malnourished adult woman have a greater risk of delivering a low birth weight baby and a LBW baby has a greater risk of being malnourished during infancy and childhood.

High prevalence of undernutrition, in terms of stunting, wasting, thinness, suggest a gross deficiency of calorie and macronutrients in the population whereas wide-spread anaemia and deficiency signs of B-vitamins indicate micronutrients deficiency. Inadequate intake of proteins and calories as well as micronutrients by the children is the major cause of the high prevalence of undernutrition, stunting and wasting among the different age-groups in the rural areas, tribal pockets and urban slums. The poor people have very low purchasing capacity which compels them to pass their days in semi-starved condition. They have a very poor standard of living, poor access to medical facilities and widespread illiteracy. Superstitions, taboos, and myths regarding foods and various types of ignorance are widely prevalent in these communities. The tribal populations are suffering from severe nutritional stress, which may be caused by their very low purchasing capacity and lack of food availability due to poverty and seasonal unemployment.

The alarming situation of malnutrition in West Bengal needs an urgent attention of the government and non-government organizations working in this field. To overcome the problem of widespread malnutrition various low-cost nutritious foods are to be popularized in the rural and tribal areas and the awareness regarding health and nutrition of the poor people should be improved. Improvement of the literacy level of the common people is essential.

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