

## ORIGINAL ARTICLE

## ASSESSMENT OF NUTRITIONAL STATUS OF 1–5 YEAR OLD CHILDREN IN AN URBAN UNION COUNCIL OF ABBOTTABAD

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**Background:** Malnutrition is one the major public health problem in developing countries. In Pakistan more than 38% of the children are under weight and stunted. The current study is being done to access the nutrition status of children of 6 months to 5 years in District Abbottabad. The objectives of the study were to determine the macronutrient deficiency both acute and chronic in children 1–5 years of age, and recommend appropriate interventions. **Methods:** A cross-sectional descriptive survey was conducted in an urban Union Council (UC) of District Abbottabad, with a sample size of 100, selected through simple random sampling. For data collection a questionnaire was designed. **Results:** According to height for age Z-score, out of 100 children studied, 80 were normal while 17 were stunted and 3 were severely stunted. According to weight for age Z score, 79 children were normal, 11 were underweight and 10 were severely underweight. According to weight for height Z-score, 83 children were normal while 13 were wasted and 4 were severely wasted. **Conclusion:** Macronutrient deficiency is prevalent in our children. Macronutrient and micronutrient deficiencies can also occur concomitantly. The nutritional deficiency affects our children since their embryonic lives. The nutritional deficiency makes children vulnerable to contract diarrhoeal diseases, acute respiratory infections and other infections that further compound the situation.

**Keywords:** Malnutrition, Nutrition assessment, under-5 children, Anthropometry, wasting, stunting, urban Pakistan

## INTRODUCTION

Nutrition is the cornerstone of socioeconomic development of a country. It is an essential component of millennium development goals (MDGs) and Primary Health Care (PHC), and Pakistan is fully committed to implement both. It is necessary to make significant progress in nutrition in order to achieve other MDGs.<sup>1</sup> Half of the world's malnourished children reside in just three countries: Bangladesh, India and Pakistan.<sup>2</sup>

Better nutrition means stronger immune systems, less illness, better health and a productive community. Freedom from hunger and malnutrition is a basic human right and their alleviation is a fundamental prerequisite for human and national development.<sup>3</sup>

Malnutrition is one of the major public health challenges in developing countries. Usually referred to as a silent emergency, it has devastating effects on children, society and future humankind. Some of the factors that might explain the cause of such widespread malnutrition are low birth weight, insufficient supplies of food, prevalence of infectious diseases, lack of breastfeeding, and improper child care. The term malnutrition refers to both under-nutrition as well as over-nutrition. The later is a problem of the developed world, but in fact Pakistan is countering the double burden of over and under nutrition.<sup>4</sup>

Assessment of nutritional status of children is determined by: Anthropometry that includes weight, height, mid upper arm circumference (MUAC), measurement of skin fold thicknesses, and head and chest circumferences; biochemistry includes

haemoglobin level, urinary iodine, Iron status, levels of different nutrients or their by products; clinical examination which includes examination of skin, eyes, hairs, nails and thyroid and Dietary surveys that includes eating habits overall.<sup>5</sup>

Protein energy malnutrition has been identified as a major health and nutritional problem. It is not only an important cause of mortality and morbidity but also leads to physical and mental impairment in children. Protein energy malnutrition is mainly due to inadequate intake of food both in quantity and quality. It can also be due to different infections like diarrhoea, respiratory infections, measles and intestinal worms.<sup>6</sup>

Nutritional anaemia is also caused by malnutrition. Most frequent cause of nutritional anaemia is iron deficiency and less frequently folate and Vitamin B<sub>12</sub>. Nutritional anaemia is prevalent mostly in developing countries. It affects mostly children under five years and pregnant women. Iron deficiency may be present in under-five year children without anaemia. Iron deficiency can be due to less dietary iron intake or due to excessive loss of iron from body.<sup>7</sup>

Iodine deficiency is another major problem. Till recently iodine deficiency was equated with goitre. Now it is recognised that iodine deficiency is also associated with other disorders, commencing from intrauterine life and extending through childhood to adult life.<sup>8</sup>

Vitamin A deficiency is also considered as public health problem. Its deficiency leads to ocular and extra ocular manifestation. Ocular manifestations

include xerophthalmia which is common in children aged 1–3 years. In extra ocular manifestation follicular hyperkeratosis, anorexia, growth retardation, infections, degeneration of myelin sheath of nerve cells are included.<sup>7</sup>

Malnutrition is major health concern especially in developing countries. It affects almost 800 million people, with most of them in the developing countries. The proportions are 70% in Asia, 26% in Africa and 4% in Latin America and Caribbean.<sup>9</sup>

Malnutrition is associated with about half of child deaths worldwide due to frequent illness; their nutritional status saps down which lead to vicious cycle of recurring sickness and faltering growth.<sup>7</sup> The World Health Organization (WHO) estimates that some 3 billion people suffer from malnutrition of one kind or other. One out of five people suffer from the worst of variants of malnutrition—hunger.<sup>3</sup> All forms of malnutrition are associated with significant morbidity, mortality, and economic costs, particularly in countries where both under and over-nutrition co-exist as is the case in developing countries undergoing epidemiological transition.<sup>10</sup>

According to the national nutritional survey 2001–2002, 38% of children between ages of 6 months and 5 years reported underweight, and another 36.8% stunted. About 12.5% of women were malnourished, and for lactating mothers figures were 16.1%. Among school children of age 6–12 years, 6.5% were found to have palpable or visible goitre while 22.9% of school children were found to be severely iodine deficient. People in Pakistan suffer from 4 types of micronutrient deficiencies: zinc, iron, vitamin A and Iodine.<sup>11</sup>

Few comprehensive studies have been conducted to assess the nutritional status of children of this particular age group in Abbottabad. This study will try to know deficiency/excess of both macronutrients as well as some selective micronutrients. The results will be helpful for healthcare providers, planners, schools' administrators, and for parents to take appropriate steps to combat the problem of malnutrition.

## MATERIAL AND METHODS

This cross-sectional study was carried out during the period of July to September 2009. One hundred children of 1–5 years of age in Union Council (UC) Malikpura, District Abbottabad were included in the study selected through simple random sampling.

The heads of households were taken into confidence and after obtaining informed, written consent data was collected. They were assured of confidentiality of the data. List of children from 1 to 5 years was obtained from the lady health workers (LHWs) of UC Malikpura and EPI coordinator Abbottabad. From the list (sampling frame), 100 children of ages 1–5 years were selected using random

number tables. The variables which were studied were age, sex, conjunctiva, nails, hairs lustre, skin, oedema, history of ARI, history of diarrhoea, weight for age, height for age, weight for height, mid upper arm circumference (MUAC). The investigator himself collected all the data to take care of inter-rater bias. The instruments used in the process of data collection like measuring tapes, weighing machines and Shakir's tapes were the same for all data collection. Weighing scale was calibrated on daily basis.

Data was analysed using SPSS-16 and Epi-Info 3.5.1. Composite indices like Weight for Age, Height for Age, and Weight for Height were compared with the WHO reference data and categorised accordingly. Children with two Z-scores below the median of the reference population were considered as malnourished and 3 Z-scores below the median of the reference population were considered as suffering from severe malnutrition. Variable of interval scale were described as Mean±SD. Frequencies and percentages were calculated for ordinal and nominal variables. Based on this sample data, 95% confidence limits were calculated using *t*-test.

## RESULTS

Total number of children included in study was 100. Of these, 54 were male and 46 were female. Their ages ranged from 13 months to 59 months. Mean age was 38.10±13.68 months. Out of 100, 79 gave positive cases histories of cough and fever, 42 (77.7%) were male and 37 (80.4%) were female. Among 93 positive cases, 51 (94.4%) were male and 42 (91.13%) were female. Ninety-nine children had normal hair and normal skin only one male child had lustreless hair and scaly skin. Out of 63 children having normal conjunctivae, 32% were male and 31% were female. Among 37 children who were having pale conjunctiva 22 (40.7%) were male and 15 (32.6%) were female. All children (n=100) had normal nails. There was no oedema in any children.

According to height for age Z-score, out of 100 children, 80 were normal while 17 were stunted and 3 were severely stunted. Gender-wise, 41 (75.9%) male and 39 (84.7%) female were normal. Ten (18.5%) male children and 7 (15.2%) female children were stunted. Among severely stunted, all 3 (5.5%) were male children. According to weight for age Z-score, 79 children were normal, 11 were underweight and 10 were severely underweight. Gender-wise, 42 (77.7%) male and 37 (80.4%) female were having normal weight. Five (9.2%) male and 6 (13%) female were underweight. Among severely underweight 7 (12.9%) were male and 3 (6.5%) were female. According to weight for height Z-score, 83 children were normal while 13 were wasted and 4 were severely wasted. Gender-wise, 44 (81.4%) male and 39 (84.7%) female were normal. Eight male (14.8%) and 5 female (10.8%) were wasted. Among

severely wasted 2 (3.7%) were male and 2 (4.3%) were female.

**Table-1: Overall results**

Sex of Children	Height for Age Z score			Weight for Age Z score			Weight for Height Z score		
	Severe Stunted	Stunted	Normal	Severe Under weight	Under Weight	Normal	Severe Wasted	Wasted	Normal
Male	3	10	41	7	5	42	2	8	44
Female	0	7	39	3	6	37	2	5	39
Total	3	17	80	10	11	79	4	13	83

## DISCUSSION

In developing countries, malnutrition in children is a public health concern. Pakistan, where a larger chunk of population lives below the poverty line, has got a higher proportion of malnourished children of under-5 years of age among the countries of South Asian region.

In countries where GNP *per capita* is low, along with micronutrient deficiencies, macronutrient deficiency are also common owing to less or low quality intake of food due to poverty. In such scenarios, it is important to carryout nutritional assessment in comprehensive manner including micronutrient and macronutrient assessments. Vulnerable group of society, in this context, are children, women, and elderly.

Out of 100 children, there were 21% who were underweight with half of them severely underweight. Among male children there were 22% underweight and in female children the proportion was 19%. These figures are less compared to national figures that show that 38% of children under-5 years age are underweight. In our neighbouring countries like India (47%), in Nepal (48%), Bangladesh (48%) and Afghanistan (39%) children under-5 years age were reported as underweight.<sup>12</sup> These figures are the worst around the globe (in developing countries) with Pakistan doing better than its neighbours. Our figures are at variance with the national figures which may be attributed to the fact that our study was carried out in an urban population with better literacy rate (76.7%)<sup>13</sup> and may also be due to a small sample.

As far height for age is concerned, our study found 21% children stunted. Stunting was more common in males (24%) compared to female where it was 15%. National figures show that 37% children are stunted which again is at variance with our results. The figures for stunting in Afghanistan were 54%. In Nepal it was 51%, in India 46%, and in Sri Lanka it was 14%. Barring Sri Lanka, the figures regarding stunting are the worst in the world among the SAARC countries.<sup>12</sup> In Sri Lanka though the GNP *per capita* is not on the higher side but due high literacy rate the situation is much better. Our results are not in consonance with the national figures that again may be attributed to urban area, higher literacy rate and small sample size.

Out of 100, 17% of children were wasted that is 2 Z-score less than median weight for height as per the reference data. One fourth of wasted children were

severely wasted that is -3 Z-score from median of reference population. There was no significant difference between males and females as for weight for height measurement is concerned. The national figures show that 13% of children are wasted. Such figures in India are 16%, in Nepal 10%, Bangladesh 13%, Afghanistan 7% and Sri Lanka 14%.<sup>19</sup> Wasting is an indicator of acute malnutrition and our results are not in contrast with the national or regional figures. Wasting is usually observed during disasters and since our sampled population did not undergo such experience, therefore, not much difference is observed. During this study, clinical observations were also made that did not reveal much. Clinical observations are anyway not very specific.

This study was carried out on a small scale and its results can be generalised towards the population of under-5 children in the union council of Malikpura, District Abbottabad owing to maintaining the quality of data collection. However due to not including all the population of District Abbottabad, the results cannot be generalised towards to the population of under-5 years children of District Abbottabad. Nonetheless the results are an indication of the situation prevailing in this district with regard to the nutritional status of children under-5 years of age of district Abbottabad.

## RECOMMENDATIONS

- Health service should direct its efforts in combating the problems of ARI and diarrhoea, both at primary and secondary levels of preventions.
- Awareness programs regarding affordable but nutritious foods should be introduced by the government through community participation, involvement of NGOs and other sectors.
- Day meal programmes should be initiated in schools, like provision of milk or other energy and protein rich foods.
- Further studies, at larger scales and on different populations, regarding nutritional status of the population should be carried out.
- Special attention should be paid to children at appropriate age.

## CONCLUSION

Macronutrient deficiency is prevalent in our society in children. Owing to the deficiency of macronutrients,

micronutrient deficiency can also occur concomitantly. The nutritional deficiency is both acute and chronic that alludes to the ongoing process of less intake or low quality food in children since their embryonic lives to real lives. The deficiency exposes children to contract diarrhoeal diseases, acute respiratory infections and other infections that further compound the situation with adverse implications for the health of children. In the case of high prevalence of malnutrition, the cycle of poor health and poverty is bound to play havoc with the health of the children and consequently with the health of the nation.

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