Prevalence of Malnutrition Among Rural Children Under 5 Years in Rural Area of Agra District

Ms Priyanka Singh[1], Dr Shubhra Saraswat[2], Ms Sneh Singh[3]

[1,3]Research Student, Dayalbagh Educational Institute, Agrast

[2]Assistant Professor, Dayalbagh Educational Institute, Agra

ABSTRACT

India is the world's second-largest country in food production and also the home of malnourished children. Adequate nutrition is the foundation of children's health, growth, and development. In India nearly half of the children under 5 years old are scummed to death every year due to malnutrition. The study's objective was to estimate the prevalence of undernutrition in children aged 1-5 years. Nutritional assessment of children was conducted in rural areas using standard anthropometric measurements of height and weight, MUAC, and HC analysed using WHO AnthroPlus software. Purposive random sampling was used in this research. Among 200 children studied 142 were more than 2.5 years old and 58 were below 2.5 years old. The prevalence of underweight (WAZ) in the above 2.5 years old category was 66(92.95%) out of 71 in boys and 63(90%) out of 70 in girls. The prevalence of stunting (HAZ) was 64(90.14 %) out of 71 in boys and 61(87.14%) out of 70 in girls. Among the below 2.5 years old category were 25(80.64%) out of 31 boys and 25(89.28%) out of 28 girls were underweight (WAZ). 26(83.87%) out of 31 boys and 26(92.85%) out of 28 girls were stunted (HAZ). The observed percentage for Mid-upper arm circumference (MUAC) and Head circumference (HC) is 85.71 % and 64.28 % in girls and 77.41% and 70.96% in boys respectively. The dietary intake of girls was lower than boys as compared to the RDA by ICMR. Malnutrition is highly prevalent in rural schoolchildren in line with the national prevalence

KEYWORDS: MUAC, HC, underweight, stunting, Anthroplus software

INTRODUCTION

Approximately 70.0% of the world's malnourished children live in Asia, resulting in the region having the highest concentration of childhood malnutrition. About half of the preschool children are malnourished ranging from 16.0% in the People's Republic of China to 64.0% in Bangladesh. The prevalence of stunting and underweight is high, especially in South Asia where one in every two preschool children is stunted. Besides protein-energy malnutrition, Asian children also suffer from micronutrient deficiency. Iron deficiency anemia affects 40.0-50.0% of preschool and primary school children. Nearly half of all vitamin A deficiency and xeropthalmia in the world occurs in South and Southeast Asia, with large numbers of cases in India (35.3 million), Indonesia (12.6 million), and China (11.4 million). (Khor Lin, G. (2003)) Another major micronutrient problem in the region is iodine deficiency disorders, resulting in high goiter rates in India, Pakistan, and parts of Indonesia. While the undernutrition problem persists, the overweight

problem in children has emerged in Asia, including Taiwan, Singapore, urban China, and Malaysia. The etiology of childhood malnutrition is complex involving interactions of multiple determinants that include biological, cultural, and socio-economic influences. Protein-energy malnutrition and micronutrient deficiency leading to early growth failure often can be traced to poor maternal nutrition and health care before and during pregnancy, resulting in intrauterine growth retardation and children born with low birth weight. (Khor Lin, G. (2003))

India is the world's largest contributor of undernourished people (World Meter), with around 194.4 million people, or 14.37% of its population not receiving enough nutrition.

India has one of the worst rates of child malnutrition in the world, with one-third of malnourished children globally being Indian. As per the Government of India's National Family Health Survey 5 (NFHS 5), from 2019 to 2021, 35.5% of children under the age of five years are stunted; 19.3% are wasted; 32.1% are underweight. Children born to mothers with no schooling and children in the lowest wealth quintile are most likely undernourished. (Saha, S. Singh, R. (2021))

In India, over 40% of youngsters receive less food than they should, and almost a third of Indians are thought to be malnourished. Maharashtra followed by Bihar and Gujarat have the worst levels of malnourishment in children in the country. Madhya Pradesh, Andhra Pradesh, and Jharkhand have very high rates of undernutrition. Incidentally, these regions also have the highest population of children and the highest poverty rates. Even states with the lowest percentage of undernutrition, such as Mizoram, Sikkim, and Manipur have much higher malnutrition rates than developed nations. (Saha, S. Singh, R. (2021))

The Global Hunger Index (GHI) 2022 has handed India more dismal news. India came in at position 107 out of 121.

In India, malnutrition among children is a major health problem. Mostly, in developing countries, malnutrition seems more severe. The rural area faces this problem more than the urban area. Growing children in particular are most vulnerable to its consequences Cases with mild to moderate malnutrition are likely to remain unrecognized because clinical criteria for their diagnosis are imprecise and are difficult to interpret accurately. (Sahu, S, K. Kumar, S, K. Bhat, B, V. Premarajan, K,C. Sarkar, S. Roy, G. Joseph, N. (2015))

Adequate nutrition is essential for the holistic development of children. Malnutrition hits the academic achievement of children. Malnutrition is when children do not get the proper amount of nutrition. Nutrition is essential for mental and physical development, and academic achievement. (Singh. A (2020))

Adequate nutrition is the foundation of children's health, growth, and development. In India nearly half of the children under 5 years old are scummed to death every year due to malnutrition. (Singh. A (2020)) India is the second largest country of food production in the world and also the home of malnutrition children.

Malnutrition is divided into 3 categories
- Stunting. (Height-for-Age (HAZ)) <-2 SD of the WHO Child growth standards median
- Wasting (Weight-for-Height (WHZ)) <-2 SD of the WHO Child growth standards median
- Undernutrition. (Weight-for-Age (WAZ)) <-2 SD of the WHO Child growth standards median

There are a lot of factors why malnutrition hits so hard to children such as the economic condition of the house, skipping meals, poor quality of hygiene, sanitation, and water supply.

Malnutrition is a condition that develops when the body is deprived of vitamins, minerals, and other nutrients that are required to maintain healthy tissues and organ functions of the body. (Johns Hopkins Medicine)

Malnutrition occurs in people who are either undernourished or over-nourished.

Protein-energy malnutrition or PEM is the condition of lack of energy due to the deficiency of all the macronutrients and many micronutrients. It can occur suddenly or gradually. It can be graded as mild, moderate, or severe. In developing countries, it affects children who are not provided with calories and proteins. (Johns Hopkins Medicine)

The major cause of PEM is poverty, which leads to low food availability and unsanitary living conditions which is the root cause of infections and other diseases. Improper distribution of food among the family members. Improper child care, neglect, etc. may also lead to PEM. Misconceptions, food and fallacies, poor child-rearing practices lack of knowledge, and lack of adequate feeding during illness may all lead to PEM.

METHODOLOGY

As calculated through RAOSOFT calculator for sample size calculation the study was performed on approx. 200 children with a 6.86% margin of error. The geographical area of the research was SikandarPur, Bahadarpur, Nagla Talfi, and Khaashpur. A purposive random sampling of 1–5-year-old children in the selected village was done. The duration of this study was 3 months.

TOOLS USED	
Anthropometric Measurements	Weight
	Height
	BMI
Equipment Used	Weighting Scale
	Stadiometer
	Non-Stretchable Measure
Study Tools	Questionnaire- Socio-Demographic Profile Food Frequency Questionnaire
	Who Anthro Plus Software
Indices	Weight for Age
	Height for Age
	BMI for Age

WHO Anthroplus Software

It is software for the global application of the WHO Reference 2007 for 2-19 years to monitor the growth of school-age children and adolescents. It includes three of the child growth standards (i.e., weight-for-age, length/height-for-age, and BMI-for-age)

FINDINGS

The study was conducted on randomly selected 200 rural children residing in three villages of Agra city. The gender and age profile of the children as under

TABLE 1: - GENDER AND AGE DISTRIBUTION

The Anthropometric measurements like underweight, stunting, BMI, mid-upper arm circumference, and head circumference were assessed for the selected population.

ABOVE 2.5-YEAR-OLD CATEGORY

Among 71 boys WHO, 66 boys (92.9%) were found to be underweight (weight for age) as per the who criteria. In Fig.1, the graph shows the z-score of the underweight (WAZ) boys was lower than the comparison of the WHO child growth standards. Most of the underweight boys lie between the -0.5 to -2 z-score of the graph.
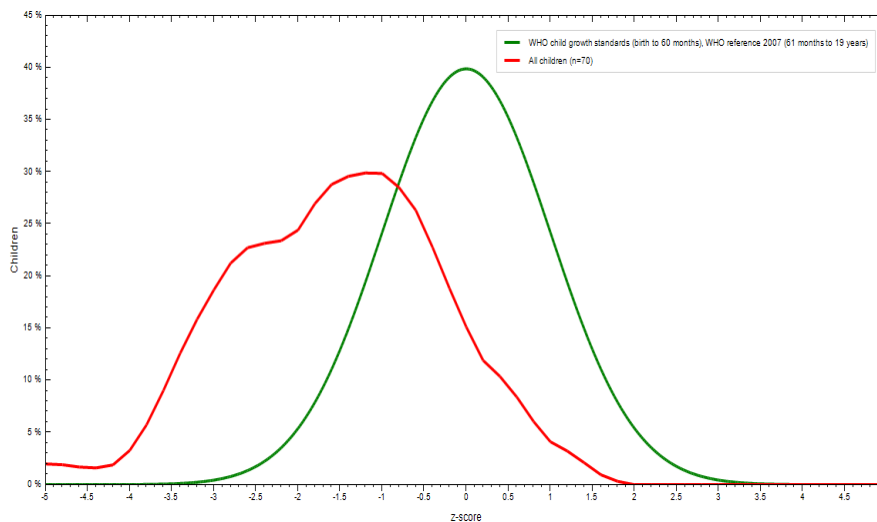
Figure 1 graph shows the comparison of the weight-for-age z-score for the underweight of the study group versus the World Health Organization reference curve of boys above 2.5 years old category

Also, 64 boys (90.14%) out of 71 were found to be stunted (height for age) as per the who criteria. In Fig. 2, the graph shows the z-score of the stunting (HAZ) boys was lower than the comparison of the WHO child growth standards. Most of the stunting boys lie between the -1.5 to -2.5 z-score of the graph.
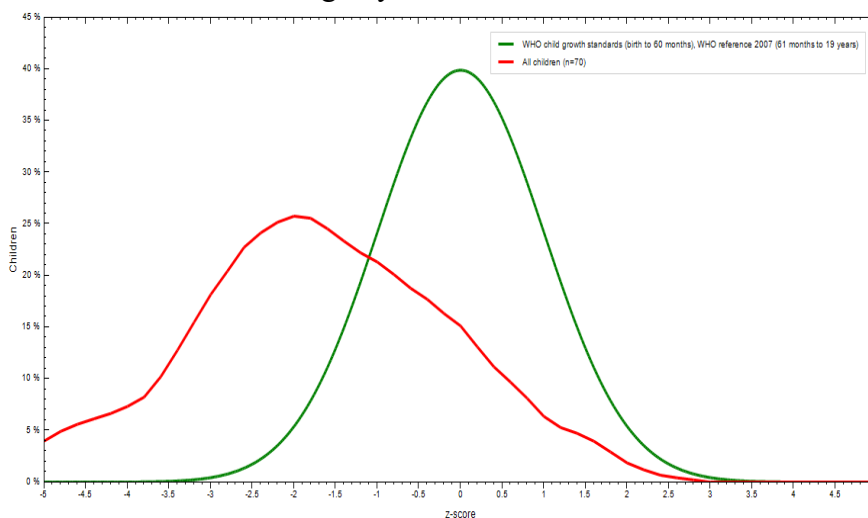

Figure 2 graph shows the comparison of the height-for-age z-score for the stunting of the study group versus the World Health Organization reference curve of boys above 2.5 years old category

Among 70 girl WHO , 63 girls (90%) were found to be underweight (weight for age) as per the who criteria. The Fig 3, the graph shows the z-score of the underweight (WAZ) girls was lower than the comparison of the WHO child growth standards. Most of the underweight boys lie between the -0.5 to -2 z-score of the graph
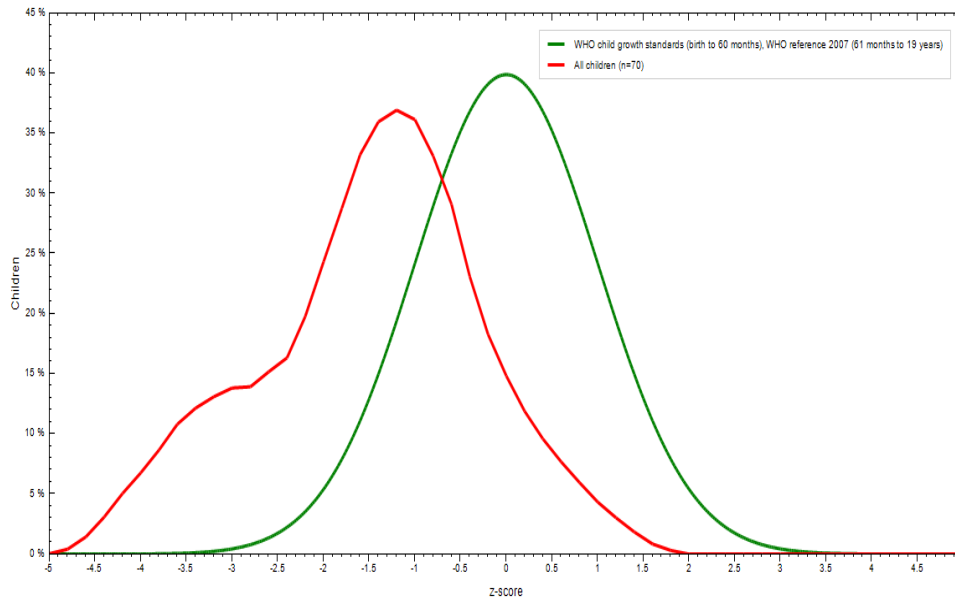

Figure 3 graph shows the comparison of the weight-for-age z-score for the underweight study group versus the World Health Organization reference curve of girls above 2.5 years old category.

Also, 61 girls (87.14%) out of 70 were found to be stunted (height for age) as per the who criteria. In Fig.4, the graph shows that the z-score of the girls underweight (HAZ) was lower than the comparison of the WHO child growth standards. Most of the underweight boys lie between the -0.5 to -2 z-score of the graph.
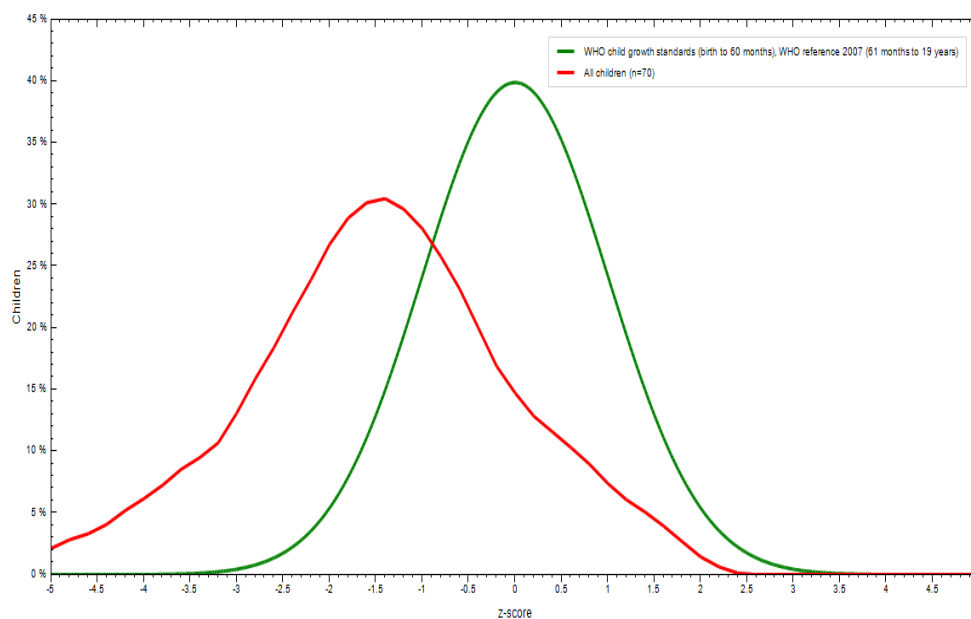

Figure 4 graph shows the comparison of the height-for-age z-score for stunting of the study group versus the World Health Organization reference curve of girls above 2.5 years old category

BELOW 2.5-YEAR-OLD: -

Among 31 boys in below 2.5 years category, 25 boys (80.64%) were found to be underweight (weight for age) as per the who criteria. In Fig 5, the graph shows the z-score of the underweight (WAZ) boys was lower than the comparison of the WHO child growth standards. Most of the underweight boys lie between the -0.5 to -2 z-score of the graph
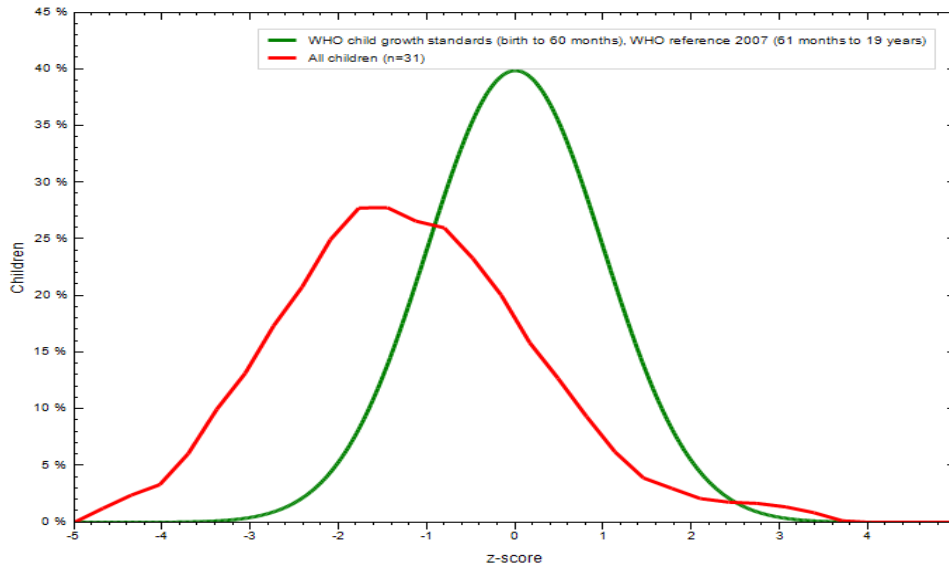

Figure 5 graph shows the comparison of the weight-for-age z-score for the underweight of the study group versus the World Health Organization reference curve of boys below 2.5 years old category

Also, 26 boys (83.87%) out of 31 were found to be stunted (height for age) as per the who criteria. In Fig.23 the graph shows the z-score of the stunting (HAZ) boys was lower than the comparison of the WHO child growth standards. Most of the stunting boys lie between the -1.5 to -2.5 z-score of the graph
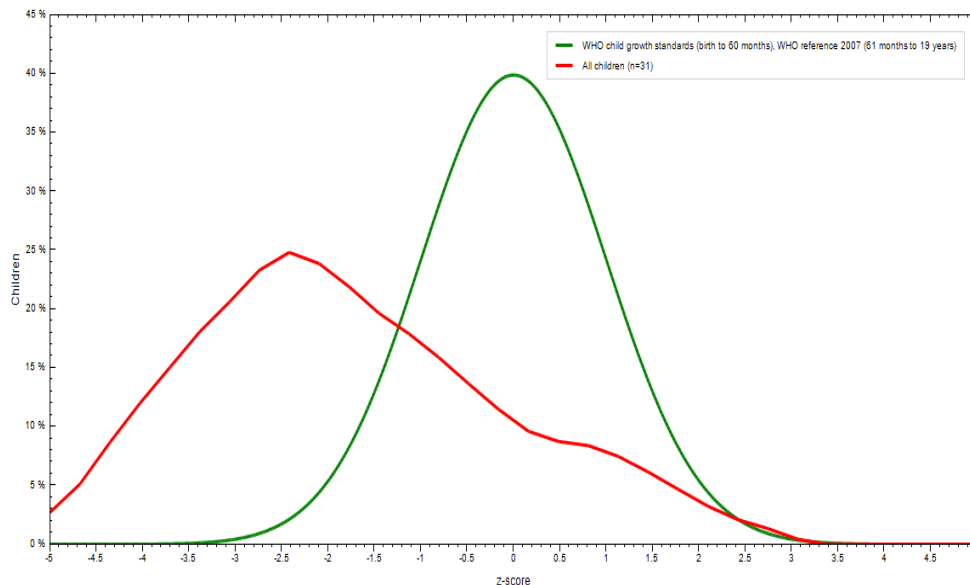

Figure 6 graph shows the comparison of the height-for-age z-score for the stunting of the study group versus the World Health Organization reference curve of boys below 2.5 years old category

Similarly, 28 girls in below 2.5 years category, 25 girls (89.28%) were found to be underweight (weight for age) as per the who criteria. The Fig 7. the graph shows the z-score of the underweight (WAZ) girls was lower than the comparison of the WHO child growth standards. Most of the underweight boys lie between the -0.5 to -2 z-score of the graph.
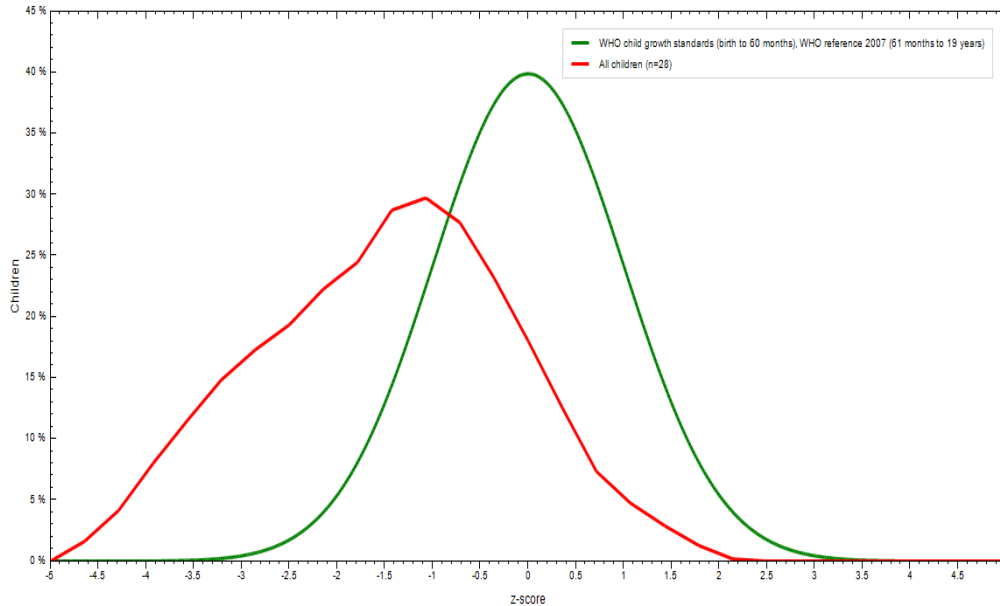

Figure 7 graph shows the comparison of the weight-for-age z-score for the underweight of the study group versus the World Health Organization reference curve of girls below 2.5 years old category

26 girls (92.85%) out of 28 were found to be stunted (height for age) as per the who criteria. Fig 8. The graph shows the z-score of the girls underweight (HAZ) was lower than the comparison of the WHO child growth standards. Most of the underweight boys lie between the -0.5 to -2 z-score of the graph
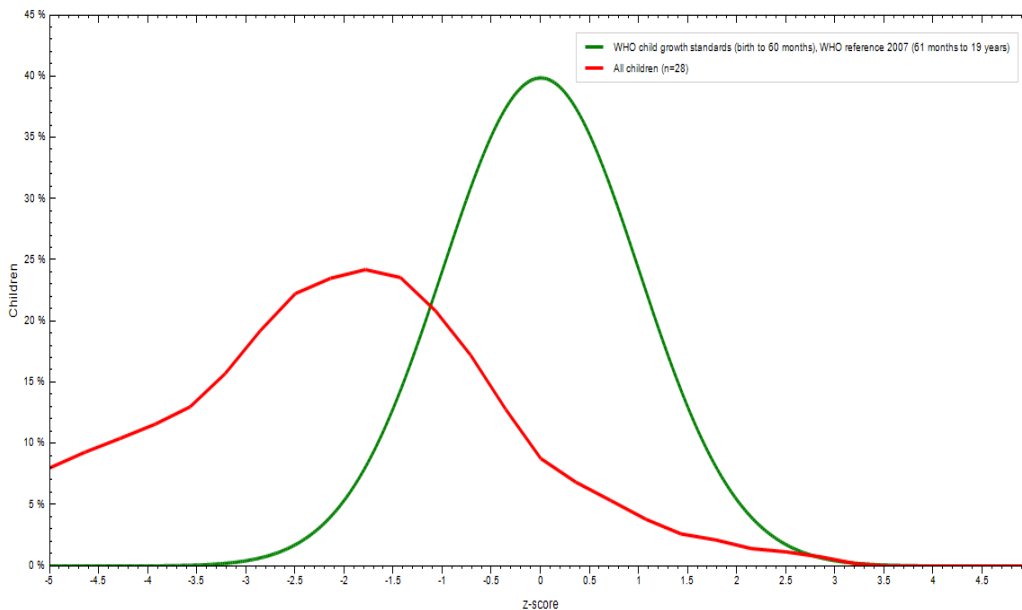

Figure 8 graph shows the comparison of the height-for-age z-score for stunting of the study group versus the World Health Organization reference curve of girls below 2.5 years old category

The observed percentage of mid-upper arm circumference (MUAC) was 77.41% in boys and 85.71% in girls and head circumference (HC) was 70.96% in boys and 64.28% in girls below 2.5 years old children. MUAC was found to be a moderately accurate predictor of thinness and stunting and a highly accurate predictor of overweight and obesity.

The Government schemes for children such as ICDS and the Mid-Day Meal Program implemented across the nation including this region for several decades. The number of children whose families were availing government schemes in the children above 2.5-year age category was (60%) 42 boys out of 71 and, (60.5%) 43 girls out of 70. Similarly in the children below 2.5 years age category mothers of 28(90.3%) boys out of 31were aware of the running government schemes like ICDS and Mid-day meals, mothers of 22(78.58%) girls out of 28 were aware and availing of the schemes like ICDS and Mid-day meal. In the ICDS scheme, they give refined, rice, dahlia, and pulse to children who are 3 to 5 years old from the Anganwadi centers. Below 3-year-old children, they give 0.5kg rice,1kg dahlia, 1kg pulse every month, and 1kg rice in three months, and above 3-year-old children, they give 0.5kg dahlia, 0.5 pulses, and sometimes rice.

The survey identified 60.5% (43) of boys out of 71 were attending the school and 78.5% (55) of girls out of 70 were attending the school.

A dietary assessment survey was conducted using a 24-hour dietary recall and food frequency questionnaire.

The 24-hour recall is a dietary survey for collecting data on nutritional status, providing essential information on nutrition intake, habits, attitudes, and beliefs about food. The information on the dietary intake of children was collected through their mother's reference. It was found that most children below 2 years were mostly on breastfeed and bananas, cow milk, and sometimes half chapatis. Children above 2 years consumed 1 to 1.5 chapatis with seasonal vegetables and sometimes pulses (daal), milk, curd, ghee, and seasonal fruits. The major intake of energy was from the carbohydrate and fats. The subjects consumed 60% staple food and 40% junk food like chips, chocolate, namkeen, biscuits, and puff fries snacks. A higher intake of snacks and treats and less intake of fruits and vegetables was observed.

A food frequency questionnaire (FFQ) is a tool (questionnaire) used for collecting data using specific food lists to estimate the usual diet trend. This questionnaire included all seven food groups. The higher intake food groups were cereals, milk and milk products, and oil.

The intake of calories was lower as compared to the RDA of children. The dietary intake of girls was lower than boys as compared to the recommended dietary allowances. A higher intake of carbohydrates, fats, chips, snacks, treats, and chocolates and lower protein, vitamins, and minerals intake was recorded.

Clinical symptoms- A few children were suffering from skin diseases such as white big patches with white powder-like skin, and rough and dry skin with irritation and inching. Hair texture was dry and rough with lower hair volume, followed by nails that had white line scars and pale eyes.

DISCUSSION

Malnutrition is a wide spread problem that poses serious threat life. India is the home of the undernutrition and stunting children in the world. The current nutritional status of children not only reflects their well-being of the present time but also reflects future outcomes in terms of their health and development. The prevalence of malnutrition among children residing in rural areas of the Agra district was highly significant. Murakar.S, et.al showed similar results in 2020, Prevalence and determinants of undernutrition among under-five children residing in urban slums and rural areas, in Maharashtra, India [18] found that

the Prevalence of stunting among children under five was 45.9%, 35.4% of children were underweighted. In our research, malnutrition among children was found in more than 85% of children which is more as compared to the above research. Another study conducted on Prevalence and Risk Factors for Malnutrition among Rural School Children in Anantapur District, Andhra Pradesh, India by Goruntla Narayana et. al in 2021 [19] found that the prevalence of stunting and underweight among school children was 25.4% and 11.5%, respectively but in our research area the prevalence of malnutrition in children was higher.

In this study, the prevalence of underweight and stunting below 2.5-year-old category children was 84.74% and 88% respectively. These findings are higher than the Malnutrition and associated factors among rural children between 1 to 3 years of age residing in Saharanpur district, Uttar Pradesh, India by Vandana at. El. in 2022 [20] found that the prevalence was 14% and 21 % respectively.

A study conducted by Pankaj Patil et. al in the 2019 Assessment Of 24-Hour Dietary Recall in Under Five Children with Moderate Acute Malnutrition found that Calorie and protein intakes were generally lower than recommended dietary allowances whereas infants 6 to 23 months of age were significantly at risk and these similar results were found in our study also. [21]

CONCLUSION AND RECOMMENDATIONS

From the selected 200 children of the four villages of Agra city which reported more than 85% of malnutrition among the children. The prevalence of malnutrition in the above 2.5-year-old category is more in boys than girls and the below 2.5-year category is lower in boys than girls. The observed percentage of MUAC in girls is higher than the boys and the percentage of HC in boys is higher than in girls.

The schemes started to crack malnutrition among the children in India from the government such as ICDS and the Mid-Day Meal Program implemented across the nation for several decades. In both schemes, they provide food to the children such as refined, rice, dahlia, and pulse to children who are below 5 years old from the Anganwadi centers of the villages and in the government schools below 8 standards.

The dietary intake of girls was lower than boys as compared to the recommended dietary allowances. The major intake of energy was from carbohydrates and fats and a lower intake of protein, vitamins, and minerals this leads to a deficiency of vitamins and minerals in the children and Symptoms appeared in children such as rough and dry skin with irritation and inching. Hair texture was dry and rough with lower hair volume, followed by nails that had white line scars and pale eyes. The higher intake of food groups were cereals, milk and milk products, and oils. From the collected information, most children consume junk food such as chips, snacks, treats, chocolate, and local open food from the shop daily.

The result of the present study revealed the widespread prevalence of malnutrition among under–5–year–old children. Data show that more than 85% of children under 5 years of age are malnourished in our study area which was shocking, which is much higher than national figures and highlights the need for an integrated approach toward improving child health as well as nutritional status in this area.

REFERENCES

1. Govender, I. Rangiah, S. Kaswa, R. Nzaumvila, D. Malnutrition in children under the age of 5 years in a primary health care setting. 2021. 10.4102/safp.v63i1.5337
2. World Health Organization. 2021. Https://www.who.int/news-room/fact-sheets/detail/malnutrition
3. Khor Lin, G. National library of medicine. Update on the prevalence of malnutrition among children in Asia. 2003. 113-22

4. Understanding the malnutrition crisis in India. 2022. Feeding India. Https://www.feedingindia.org/blog/understanding-the-malnutrition-crisis-in-india

5. Saha, S. Singh, R. Child malnutrition in India: A systemic failure. 2021. Downtoearth.org.in

6. Global health index. 2022. Https://www.globalhungerindex.org/ranking.html

7. Malnutrition-free India. 2021. PIB Delhi

8. Gupta, K, S. CHILD MALNUTRITION IN UTTAR PRADESH: INTER DISTRICT ANALYSIS. 2019. IJRAR. Volume 6. Issue 2. 2349-5138

9. Times of India. Over 9 lakh kids, most from UP, are acutely malnourished. 2021. Https://timesofindia.indiatimes.com/india/over-9-lakh-kids-most-from-up-acutely-malnourished/articleshow/84874886.cms

10. Lavania, D. Times of India. Over 5,000 highly malnourished children were identified in Agra district. 2021

11. Sahu, S, K. Kumar, S, K. Bhat, B, V. Premarajan, K,C. Sarkar, S. Roy, G. Joseph, N. Malnutrition among under-five children in India and strategies for control. 2015. 25810629

12. Singh, A. National library of medicine. Childhood Malnutrition in India. 2020

13. Prabhu, A., S. Shukla, k, N. Mandala, R., S. National Library of Medicine. Assessment of Nutritional Status of Rural Children (0-18 years) in Central India Using World Health Organization (WHO) Child Growth Standards 2007. 2020. 33354012

14. Johns Hopkins Medicine. Malnutrition. Https://www.hopkinsmedicine.org/health/conditions-and-diseases/malnutrition

15. World Health Organization. Child Growth Standards. 2007

16. Anwar, F. Gupta, K, M. Prabha, C. Srivastava, R, K. Malnutrition among rural Indian children: An assessment using a web of indices. 2013

17. Shinsugi, C. Gunasekara, D. Takimoto, H. Use of Mid-Upper Arm Circumference (MUAC) to Predict Malnutrition among Sri Lankan Schoolchildren. 2020. 10.3390/nu12010168

18. Murarkar, S. Gothankar, J. Doke, P. Pore, P. Lalwani, S. Dhumale, G. Quraishi, S. Patil, R. Waghachavare, V. Dhobale, R. Rasote, K. Palkar, S. Malshe, N. BMC public health. Prevalence and determinants of undernutrition among under-five children residing in urban slums and rural area, Maharashtra, India: a community-based cross-sectional study. 2020. Article number: 1559 (2020).

19. Narayana, G. Thasmiya, D, R. Chowdary, P, P. Veerabhadrappa, K, P. Milka, M. Usharani, K. Reetha, M. Prevalence and Risk Factors for Malnutrition among Rural School Children in Anantapur District, Andhra Pradesh, India. 2021. Vol 13 • Issue 22

20. Vandana. Jain, N. Singh, C. Jain, M. Journal of Positive School Psychology. Malnutrition and associated factors among rural children between 1 to 3 years of age residing in Saharanpur district, Uttar Pradesh, India. 2022. Vol. 6. No. 5. 5671–5684.

21. Patil.P, Thamke.R, Pareek.P, Ballamudi.K, New Indian Journal of Pediatrics. Assessment Of 24 Hour Dietary Recall In Under Five Children With Moderate Acute Malnutrition. 2019. 8.4 : 171-177