Original Article

Clinical and Socio-Demographic Profile of Chidren Aged 6-59 Month with Severe Acute Malnutrition Presenting in a Tertiary Care Hospital in Nuh, Haryana

Meetu Yadav[1], Pawan Yadav[2], Maha Singh[3], Suraj Chawla, Priyanka Tank[5]

[1]Associate Professor Department of pediatrics SHKMGMC Nalhar, Nuh, [2]Secondary DNB Resident, Department of Pediatrics SHKMGMC, Nalhar, Nuh, [3]Professor Department of Pediatrics, SHKMGMC Nalhar, Nuh, [4]Associate Professor, Department of Community Medicine SHKMGMC Nalhar, Nuh, [5]Assistant professor, Department of pediatrics SHKM GMC Nuh.

How to cite this article: Meetu Yadav, Pawan Yadav, Maha Singh et. al. Clinical and Socio-Demographic Profile of Chidren Aged 6-59 Month with Severe Acute Malnutrition Presenting in a Tertiary Care Hospital in Nuh, Haryana. Indian Journal of Public Health Research and Development / Vol. 16 No. 1, January-March 2025.

Abstract

Background: Malnutrition adversely affects achievement of all the milestones namely motor, sensory, cognitive and social.

Methods: The records of 150 patients with severe acute malnutrition over a period of one year (July 2022-July 2023) were reviewed, and a statistical comparison of various variables were made.

Results: As per study, mean weight(kg) 7.48 ± 2.02, mostly i.e., 78.67% were having weight <-3 SD. Mean height or length(cm) was 77.5 ± 11.14, majority was in between 2SD to -3SD i.e., 48.00%, MUAC was < 11.5 among 123 (82%), 11.6-12.5 among 10 (6.67%), 12.6-13.5 among 17 (11.33%). There were 41.33% males and 58.67% females. Of study population, Birth order was 1st among 9 (6.0%), 2nd among 11 (7.33%), 3rd among 38 (25.33%) and 4th and above among 92 (61.34%) subjects with a mean of 4.05± 1.52. Among my study most of children were mixed Feeding 53.34%, while only 13.33% were Exclusive breast feed while 33.33% were Top feed. Immunization was Complete among 10.67%, Incomplete among 62.67% and Unimmunized among 26.67% subjects. Pedal Edema was present among 44 (29.33%) subjects and absent in 106(70.67%). The presenting complaint reported were anemia (38.67%), pneumonia (26.67%), acute gastroenteritis (12.67%), hypoglycemia (10.00%), Dehydration (8.0%) and UTI (4.00%) and most common presenting complication wasanemia (80%), followed by pneumonia (52%), acute gastroenteritis (34.00%), dehydration (29.67%), Lethargy/hypoglycaemia (30%), meningitis (8.00%), tuberculosis(5.33%) and UTI (4.00%) As per my study, complication are more severe unvaccinated children, however effect is statistically insignificant (p> 0.05)

Conclusion: SAM was most common in 13-24 months age group and with increasing age, a lesser proportion of children were affected with SAM. There was a strong correlation between adverse outcomes and dietary risk factors such as the length of time spent nursing exclusively, using a bottle, and delaying the introduction of supplementary foods. Most common co-morbidities were anaemia and pneumonia.

Keywords: Malnutrition, Anthropometry, Socio-Demographic Profile.

Corresponding Author: Meetu Yadav, Associate Professor Department of pediatrics SHKMGMC Nalhar, Nuh.

E-mail: raomeetu26@gmai.com

Submission date: April 7, 2024 **Revision date:** May 7, 2024 **Published date: December 28, 2024:**

Introduction

Approximately 11 million children under the age of five succumb to preventable causes of mortality each year. According to UNICEF statistics, 46% of children under the age of 5 are underweight[1] UNICEF, WHO and World Bank Group Joint Malnutrition Estimates May 2023, estimated that global prevalence of malnutrition was 6.85% (45 millions)[2]. Prevalence of infectious diseases increase by manifold with malnourishment (e.g. pneumonia by 10.94%, septicaemia by 7.8%, UTI by 6.8%, tuberculosis (TB) by 1.5%)[3]. It is distressing to note that prevalence of SAM has gradually increased from 6.6% in 2005-06 to 7.4% in 2015-16 and 7.7% in 2019-20 as per National Family Health Survey 5(NFHS-5)[6]. The prevalence of SAM in Haryana is at 4.4%, and it increased to 7.1% in Mewat(Nuh) district (NFHS-5)[7]. In India, undernutrition plays a significant role in over 50% of all deaths of children under the age of five. The 2030 Sustainable Development Agenda's Goal 2 calls for the eradication of all kinds of hunger and undernourishment.[6,7] For assessment of nutritional status of child, anthropometric parameters such as height or length, weight and MUAC are recorded accurately and these parameter are used to derive anthropometric indices such as height-for-age, weight-for-age, and weight-for-length.[8,9] Children who are suffering from severe acute malnutrition should be managed as "inpatients," ideally in a Nutrition Rehabilitation Centre where standard protocols laid down by WHO, are followed for the management of such patients.[10] Aim of this study is to describe clinical and sociodemographic profile and co morbidities of children aged 6-59 months with severe acute malnutrition presenting in Department Of Paediatrics.

Methods

A total of 150 patients with severe acute malnutrition were included after approval of Institutional ethical committee and after obtaining written informed consent from parents. A detailed history was elicited from parents (usually mother) and was recorded on Performa which include the patient personal details like age, birth order, sex, socioeconomicstatus (following modified Kuppuswamy scale), parental education (both mother and father), immunisation status. In addition, information regarding feeding details-breastfeeding/ top feeding (method of feeding, dilution, container used for feeding), the recent introduction of animal milk was elicited and documented on Performa. Associated complication like anaemia, pneumonia, acute gastroenteritis, presence of dehydration, hypoglycemia and fever were noted.A thorough physical examination from head to toe emphasizing on sign of malnutrition [like loss of fat, dermatosis, sparse hair, bilateral pedal Pitting Oedema] done. Weight (digital weighing machine by Omron), Length (upto 2 years by Infantometer by MCP , Height (> 2 years to 5 years) by stadiometer by MCP analog measuring tape, Mid upper-arm circumference (MUAC) midway between tip of acromian process of scapula and olecranon of ulna by fibre tape, head circumference(by measuring tape) was noted as described in NRC manual. Baseline investigations, Complete blood count, ESR, Urine and stool examination, Mantoux Test, HIV ELISA, Chest X-Ray, Liver Function Test, Electrolyte & Kidney Function Test, Random blood sugar, Blood culture & sensitivity were done in institution. Added investigations were individualized based on clinical status and examination. The indices of nutritional status weight for age, height/length for age was plotted and compared with the WHO age and sex specific growth Multicentre Growth Reference Study (MGRS) WHO standards and then classified according to WHO classification.

Statistical Analysis

The presentation of the Categorical variables was done in the form of number and percentage (%). On the other hand, the quantitative data were presented as the means ± SD and as median with 25th and 75th percentiles (interquartile range). The association of the variables which were qualitative in nature were analyzed using Chi-Square test. If any cell had an expected value of less than 5 then Fisher's exact test was used. The data entry was done in the Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 25.0. For statistical significance, p value of less than 0.05 was considered statistically significant.

Results

A total of 150 cases of severe acute malnutrition were analyzed.

Table 1: Age (months) distribution.

Age (months)	Frequency	Percentage
6 to 12 months	47	31.33%
13 to 24 months	50	33.33%
25 to 36 months	22	14.67%
37 to 48 months	20	13.33%
49 to 59 months	11	7.33%
Mean ± SD	24.73 ± 15	
Median(25th-75th percentile)	21(12-36)	
Range	6-59	

Of study population, 31.33% belonged to age group 6-12 months, 33.33% belonged to 13-24 months, 14.67% belonged to 25-36 months age group, 13.33% belonged to 37-48 months and 7.33% belonged to 49-59 months with a mean of 24.73 ± 15 (table 1). As per study, there were 41.33% males and 58.67% females.Of study population, Birth order was 1st among 9 (6.0%), 2nd among 11 (7.33%), 3rd among 38 (25.33%) and 4th and above among 92 (61.34%) subjects with a mean of 4.05± 1.52. As per study, 64.00% belongs to Lower socioeconomic status, 31.33% belongs to lower middle, 3.33% of Upper Middle and 1.33% belongs to Upper class status. As per study, majority of them will Read + Write only among 71.34%, Primary school among 24.66%, Pre-primary school among 2.67%, Secondary school among 1.33% while no one graduated. As per study, mostly were illiterate and can Read + Write only, 65.33%, Primary school among 24.00%, Pre-primary school among 9.33%, Secondary school among 1.34%. Among my study most of children were mixed Feeding 53.34%,while only 13.33% were Exclusive breast feed while 33.33% were Top feed. As per study, Immunization was Complete among 10.67%, Incomplete among 62.67% Unimmunized among 26.67% subjects(figure 1). As per study, Pedal Edema was present among 44 (29.33%) subjects and absent in 106(70.67%).

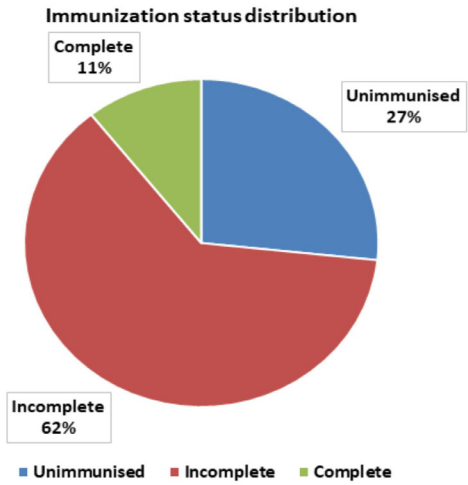

Figure 1: Immunization status distribution.

Table 2: Anthropometric parameters distribution.

Anthropometric parameters	Frequency	Percentage
Weight(interpretation)		
Between -1SD to -2SD	1	0.67%
Between -2SD to -3SD	31	20.67%
<-3SD	118	78.67%
Weight(kg)		
Mean ± SD	7.48 ± 2.02	
Median(25th-75th percentile)	7.1(6-9)	
Range	3.4-12.2	
Height or length(interpretation)		
Between median to -1SD	2	1.33%
Between -1SD to -2SD	27	18.00%
Between -2SD to -3SD	72	48.00%
<-3SD	49	32.67%
Height or length(cm)		
Mean ± SD	77.5 ± 11.14	
Median(25th-75th percentile)	76(70-86)	
Range	56-106	
MUAC(cm)	**Frequency**	**Percentage**
< 11.5	123	82.00%
11.6-12.5	10	6.67%
12.6-13.5	17	11.33%
Mean ± SD	10.96 ± 1.07	
Median(25th-75th percentile)	10.9(10.2-11.5)	
Range	9-13.6	

As per study, mean weight(kg) 7.48 ± 2.02, mostly i.e.78.67% were having weight <-3 SD. Mean height or length(cm) was 77.5 ± 11.14 ,majority was in between 2SD to -3SD i.e. 48.00%, MUAC was < 11.5 among 123 (82%), 11.6-12.5 among 10 (6.67%), 12.6-13.5 among 17 (11.33%) (table 2). The presenting complaint reported were anaemia (38.67%), pneumonia (26.67%), acute gastroenteritis (12.67%), hypoglycemia (10.00%), Dehydration (8.0%) and UTI (4.00%)(figure 2).

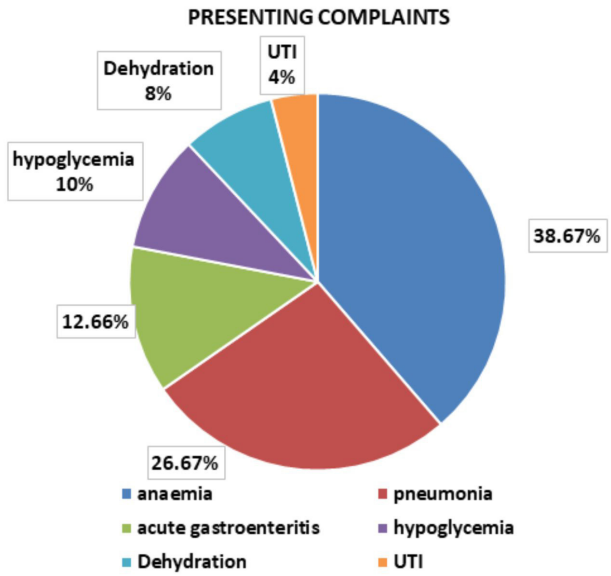

Figure 2: Presenting complaint distribution.

Table 3: Complications distribution.

Complications	Frequency	Percentage
Anaemia		
No anaemia	30	20.00%
Mild anaemia	62	41.33%
Severe anaemia	58	38.67%
Blood transfusion		
Not required	62	51.67%
Required	58	48.33%
Pneumonia		
No pneumonia	72	48.00%
Mild pneumonia	38	25.33%
Severe pneumonia	40	26.67%
AGE		
No AGE	99	66.00%
AGE without dehydration	32	21.33%
AGE with dehydration	19	12.67%
Hypoglycemia		
No hypoglycemia	105	70.00%
Hypoglycemia	45	30.00%
Meningitis	12	8.00%
Tuberculosis	8	5.33%
UTI	6	4.00%

As per my study most common presenting complication was anaemia (80%), followed by pneumonia (52%), acute gastroenteritis (34.00%), dehydration (29.67%), Lethargy/hypoglycemia (30%), meningitis (8.00%), tuberculosis(5.33%) and UTI (4.00%)(table 3).As per my study, mostly malnutrition presenting age group between 6 to 24 months accounting 64.66% while age group does not have any significance with age of presentation (P> 0.05).

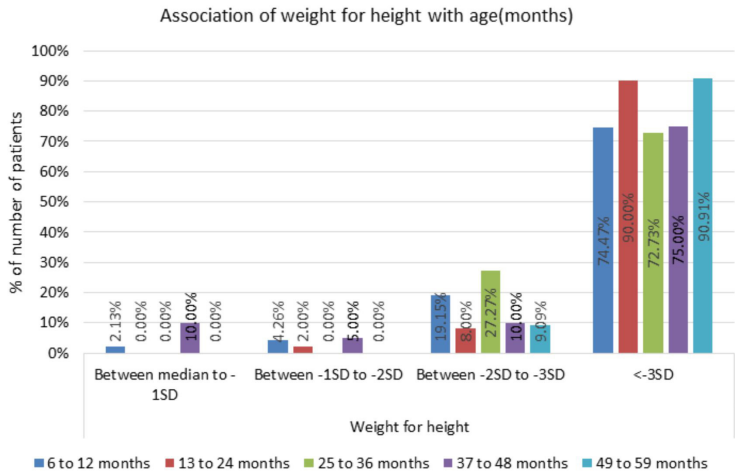

Figure 3: Association of weight for height with age (months).

Table 4: Association of complications with age (months).

Complications	6 to 12 months	13 to 24 months	25 to 36 months	37 to 48 months	49 to 59 months	Total	P value
Anaemia							
No anaemia	10 (21.28%)	14 (28%)	3 (13.64%)	3 (15%)	0 (0%)	30 (20%)	0.254*
Mild anaemia	20 (42.55%)	20 (40%)	9 (40.91%)	6 (30%)	7 (63.64%)	62 (41.33%)	0.515*
Severe anaemia	17 (36.17%)	16 (32%)	10 (45.45%)	11 (55%)	4 (36.36%)	58 (38.67%)	0.442*
Blood transfusion							
Not required	20 (54.05%)	20 (55.56%)	9 (47.37%)	6 (35.29%)	7 (63.64%)	62 (51.67%)	0.575†
Required	17 (45.95%)	16 (44.44%)	10 (52.63%)	11 (64.71%)	4 (36.36%)	58 (48.33%)	
Pneumonia							
No pneumonia	22 (46.81%)	24 (48%)	10 (45.45%)	11 (55%)	5 (45.45%)	72 (48%)	0.973†
Mild pneumonia	9 (19.15%)	14 (28%)	7 (31.82%)	7 (35%)	1 (9.09%)	38 (25.33%)	0.396*
Severe pneumonia	16 (34.04%)	12 (24%)	5 (22.73%)	2 (10%)	5 (45.45%)	40 (26.67%)	0.162*
AGE							
No AGE	55(82.00%)	20(76.92%)	15 (45.45%)	10(58.82%%)	4(33.33%)	99(66.00%)	0.595*
AGE without dehydration	2(2.98%)	3(11.54%)	16(48.48%)	5(29.42%%)	6(50%)	32(21.33%)	0.456*
AGE with dehydration	10(14.92%)	3(11.54%)	2(6.07%)	2(11.76%)	2(16.17%)	19(12.67%)	0.377*
Hypoglycemia							
No hypoglycemia	30 (63.83%)	39 (78%)	15 (68.18%)	11 (55%)	10 (90.91%)	105 (70%)	0.15*
Hypoglycemia	17(37.37%)	11(22%)	7(31.72%)	9(45%)	1 (9.1%)	45(30.00%)	0.071*
Meningitis	3 (6.38%)	4 (8%)	3 (13.64%)	2 (10%)	0 (0%)	12 (8%)	0.778*
Tuberculosis	3 (6.38%)	2 (4%)	3 (13.64%)	0 (0%)	0 (0%)	8 (5.33%)	0.365*
UTI	1 (2.13%)	4 (8%)	1 (4.55%)	0 (0%)	0 (0%)	6 (4%)	0.573*

* Fisher's exact test, † Chi square test

The incidence of complication with malnutrition does not have any relationship with age of children. Its value is statistically insignificant with age of children(table. 4). As per my study, complication are more severe in top feed children also more complication occurring in top feed children, however effect is statistically insignificant (p> 0.05). As per my study, complication are more severe unvaccinated children, however effect is statistically insignificant (p> 0.05)

Discussion

Malnutrition is a condition that can be caused by a number of different factors, such as an inadequate intake of protein, calories, vitamins, and minerals, as well as recurrent illnesses. Malnutrition leads to lost opportunities in life as well as economic growth. SAM can lead to mortality directly or it can act as indirect cause by significantly increasing the case fatality rate in children suffering from other common childhood illness such as diarrhea and pneumonia. In current study, 31.3% belonged to age group of 6-12 months, 33.3% belonged to 13-24 months, 14.6% belonged to 25-36 months age group, 13.3% belonged to 37-48 months and 7.3% belonged to 49-60 months. Similar to our study, Chaurasia et al.[11] included 152 individuals with 76.97 percent of the patients being younger than 24 months old. In the study conducted by Aguayo et al.,[12] 77.7 percent of the children were younger than 24 months old. It was found in the current study that

there were 41.3% male and 58.7% female children. In similarity with our findings, In our study, it was found that increasing birth order was associated with higher prevalence of SAM. Birth order was 1st among 9 (6.0%), 2nd among 11 (7.3%), 3rd among 38 (25.3%) and 4th and above among 92 (61.3%) subjects. Ahmad et al.[13] reported that Birth order was First among 36.1%, Second among 21.7%, Third among 13.0% and Fourth or above among 29.2% subjects.In the study carried out by us, 64.0% of children belongs to lower socioeconomic status, 31.3% were among lower middle class, 3.33% were from Upper Middle class and 1.33% were from upper socioeconomic class. Chaurasia et al.[11] stated that 83.55% children belonged to lower socioeconomic status followed by Upper lower (7.89%), Upper middle (5.92%) and Lower middle (2.63%). In current investigation, Maternal Education was Read + Write only among 71.33%, Pre primary school among 2.67%, primary school among 24.67% and 1.3% were educated till Secondary school . Reddy et al.[14] have shown that lack of education among mothers is a significant risk factor for malnutrition in their offspring. Joshi S et al. and Sharma LM et al. both reported that were quite similar to ours.[15,16] According to the findings of Devi et al.,[17] an independent predictor of malnutrition among hospitalised children is the level of education attained by the mother. Insufficient vaccination and a lower level of mat. In the study by us, feeding was Exclusive breastfeeding among 13.3%, partial breast feeding among 33.3% and mixed among 53.34% subjects. Reddy et al.[14] stated that proper feeding procedures, especially breast feeding methods, were of an extremely low standard. Mathew et al.[19] found that only 26% of children were offered exclusive breast feeding (EBF) up to the age of six months. Forty percent were nursed exclusively during the first three months of their lives. Only 28 percent of these infants started receiving supplemental feed between the ages of six and eight months. In current study work, Immunization was Complete among 10.67%, Incomplete among 62.7% and Unimmunized among 26.67% subjects. Similar to our research work, Mathew et al.[19] showed that 17% of the children had not received their vaccinations, while 58% of the youngsters had only had some of their vaccinations. In our investigation, Pedal edema was present among 44 (29.33%) subjects and absent in 106(70.67%). This was in similar to the work done by Abate et al.,[20] edema was reported among 11% subjects. In current research work, MUAC was < 11.5 among 123 (82%), 11.6-12.5 among 10 (6.67%), 12.6-13.5 among 17 (11.33%). Abate et al.,[20] stated that MUAC <11.5 cms was found among 69% subjects. We found that in the current study Weight for Height was Median to -1SD among 3 (2.0%),B/w -1SD to -2 SD among 4 (2.67%), B/w -2SD to -3SD among 22 (14.67%) and < -3 SD among 121(80.66%) subjects. Similar result were found in other studies. According to Aguayo et al.,[12] 97.4 percent of children had severe wasting, however Kumar et al.,[23] stated that 24.03 percent of children had severe visual wasting. In present research work, the complications reported were Anaemia (80.0%), Pneumonia (52%), Acute gastroenteritis (34%), Hypoglycaemia (30%), Dehydration (29.0%) and UTI (4.0%) and Meningitis (8%) including Tubercular Meningitis (5.33%). Panigrahi et al.[21] found that Anemia was the most common finding in SAM patients(94%) followed by anorexia(33.6%), pneumonia(28%), diarrhoea (9.8%), fever (5.6%), and hypoglycaemia (2.6 Limitation-This observational research study was conducted in a tertiary health care institute. So, the sample may not represent the community as a whole and the result may not be extrapolated to the general population due to selection bias. There was not a consistent documentation of the patients' follow-ups. Though most common factors, but not all the factors affecting malnutrition in children were evaluated in the study. No follow up was done.

Conclusion

On the basis of this study, we conclude that the problem of severe malnutrition is multi-dimensional and inter-generational in nature. SAM was most common in 13-24 months age group and with increasing age, a lesser proportion of children were affected with SAM. Sociodemographic factors such as sex of the child, lesser educational level of parents, occupational level of parents, rural background, households having more than 2 under-five children was the profile of the majority of children. There was a strong correlation between adverse outcomes and dietary risk factors such as the length of time spent nursing exclusively, using a bottle, and delaying the introduction of supplementary foods. Most common co-morbidities were anaemia and pneumonia.

Ethics clearance: Institutional Ethical Committee, SHKM GMC;No. SHKM/Acad/2024/2404, dated April 21,2023.

Contributors: AD, SD, MY: conceptualized the study, collected and interpreted the data and prepared the initial manuscript; SD, DM supervised the study, revived literature and revised the initial manuscript. All authors approved the final version of the manuscript and are accountable for all.

Funding: None; Competing interests: None stated.

References

1. Blössner M, de Onis M. Malnutrition: Quantifying the Health Impact at National and Local Levels. WHO Environmental Burden of Disease Series, No. 12. Geneva: World Health Organization; 2005.
2. Yadav DK, Gupta N, Shrestha N. An assessment of nutritional status of children less than 3 years in rural areas of Mahottari district of Nepal. International Journal of Medical Research and Health Sciences. 2014;3(3):597–603.
3. Abeway. Stunting and Its Determinants among Children Aged 6–59 Months in Northern Ethiopia: A Cross-Sectional Study.
4. World Health Organization. Levels and trends in child malnutrition: Joint child malnutrition estimates by UNICEF, WHO and World Bank Group [Internet]. Geneva: WHO; 2019. [cited 2019 Dec 21]. Available from: http://www.unicef.org/ JME2019edition/ Jan2019.pdf.
5. Dewey G, Begum K. Long term consequences of stunting in early life. Matern Child Nutr2011;7(Suppl 3):5 18.
6. Wells JCK. Associations of intrauterine and postnatal weight and length gains with adolescent body composition: Prospective birth cohort study from Brazil. J Adolesc Health. 2012;51(Suppl 6):58 64.
7. World Health Organization (WHO), United Nations Children's Fund (UNICEF). WHO Child Growth Standards and the identification of severe acute malnutrition in infants and children. Geneva, Switzerland:2009
8. WHO child growth standards and the identification of severe acute malnutrition in infants and children A Joint Statement by the World Health Organization and the United Nations Children's Fund. Available from: https://apps.who.int/iris/ bitstream/ handle/10665/44129/9789241598163_eng.pdf;jsessionid=6217617354D6EAC2AB9C50443907ECB2?sequence=1.
9. WHO | Description [Internet]. WHO. [cited 2019 Oct 19]. Available from: https://www.who.int/ nutgrowthdb/about/introduction/en/index2.html
10. Progress for children, A Report Card on Nutrition, Number 4,Unicef (Online); 2006 May. Available at:https://www.unicef.org/ publications/files/ Progress_ for_Children_-_No._4.pdf. [Last accessed on 2014 Oct 12].
11. Malnutrition in children [Internet]. UNICEF DATA. 2023 [cited 2023 Aug 24]. Available from: https://data.unicef.org/topic/nutrition/malnutrition/
12. Bajinka O, Akemokwe M, Bah Y. A Retrospective Study on Infectious Diseases Occurrence in Undernourished and Well-Nourished Children in Rural Sub-Saharan Africa Primary Care Center-Gambia.
13. Over 33 lakh children in India malnourished, 17.7 lakh of them severely malnourished: Govt data. The Indian Express [Internet]. 2021 Nov 7 [cited 2022 Aug 22]; Available from: https://indianexpress.com/article/ india/33-lakh-children-india-malnourished-17-lakh-severely-malnourished-govt-data-7611676/
14. Fact sheet: National Family Health Survey NFHS-V 2019-2020. Ministry of Health and Family Welfare. Govt. of India and District Fact Sheet-Mewat Haryana. Mumbai: International Institute for Population Sciences, Ministry of Health and Family Welfare, Government of India. National Family Health Survey-5. Available at http://rchiips.org/nfhs/ FCTS/HR/HR_FactSheet_87_ Mewat. (last accessed on 2.07.2023
15. Sustainable developmental goals. United Nations in India. Accessed from http://in.one.un.org/page/ sustainable-development-goals/sdg-2/
16. Gragnolati M, Shekar M, Gupta MD, Bredenkamp C, Lee Y. India's Undernourished Children: A Call for Reform and Action. Health, Nutrition and Population (HNP) Discussion Paper. The World Bank, August 2005.
17. WHO multi-center growth reference study group. WHO child growth standards based on length/height, weight and age. Acta paediatrica 2006;450: 76-85.
18. World Health Organization. The use and interpretation of anthropometry – report of WHO expert committee. WHO Tech Rep Series 854. WHO, Geneva. 1995.