Journal of Scientific Research and Reports

Volume 30, Issue 2, Page 47-54, 2024; Article no.JSRR.111711
ISSN: 2320-0227

Assessment of Nutritional Status of 3–8-Year Mawasi Tribal Children Using Anthropometric Indices

Soumya Negi [a], Kalpana Gupta [a], A. Jagre [b] and R. S. Negi [b*]

[a] Department of Home Science, Banaras Hindu University, Varanasi, India.
[b] Deendayal Research Institute, Krishi Vigyan Kendra, Satna, Madhya Pradesh, India.

Authors' contributions

This work was carried out in collaboration among all authors. Author SN designed the questionnaire, performed the study and authors KG and AJ perform the data analysis and paper writing work. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JSRR/2024/v30i21842

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/111711

Original Research Article

Received: 02/01/2024
Accepted: 17/01/2024
Published: 24/01/2024

ABSTRACT

Nearly 45 lakh children, mostly tribal suffer from stunted growth in Madhya Pradesh. Hence a cross sectional study was undertaken in two villages of Majhgawan block in which height, weight, and mid upper arm circumference of 112 Mawasi tribal were measured and recorded via standard techniques. Body mass index was computed using the conventional method, the data was then analysed using anthro plus software of WHO. The overall prevalence of stunting among tribal children (3-5 years) was 60.65%, with 47.54% moderate and 13.11% severe stunting. The prevalence of underweight among these children was 59.03% (47.55% moderate and 11.48% severe). The prevalence of wasting among these children was 26.24% (22.26% moderate acute malnutrition (MAM) and 3.28% severe acute malnutrition (SAM)). Among 6–8-year children it was found that the prevalence of stunting and underweight was 64.36% and 83.5% respectively. 20.13% of children were thin (1.81% had severe thinness, and 18.02% had moderate thinness) in

**Corresponding author: E-mail: rsnegi007@rediffmail.com;*

6-8 years. The prevalence of thinness among 6,7- and 8-year children was 15.38%, 20.0% and 23.50% respectively. Thus, the overall results indicate high level of underweight and stunting, therefore based on the results, it can be stated that there is a urgent need for lot of work to be done on improvement of nutritional and health status of Mawasi children. The hand in hand support of government and the local bodies for upliftment of tribal community can make a huge difference in current scenario.

Keywords: Malnutrition; BMI; underweight; tribal; stunting; wasting; thinness; Madhya Pradesh.

1. INTRODUCTION

India is the fastest growing country among South Asian region in several aspect such as education, technology and economy but despite of all the development and progress, India has not been able to counter the problem of under nutrition [1]. India alone accounts for more than 61 million stunted children (low height for age), 47 million underweight children (low weight for age) and 25 million wasted children (weight for height). Estimates from the National Family and Health Survey (2015–16) also shows that in India, about 38% of the children under the age of five year are stunted (low height for age), 36% of the children are underweight (low weight for age), and 18% children are wasted (weight for height), it has also revealed that children nutritional status (stunted) among the Scheduled Caste is 43 per cent, Scheduled Tribes is 44 per cent, OBCs is 39 per cent and among General is 31 per cent. Which clearly indicates that Scheduled Tribes and Scheduled Caste children are suffering more stunted nutritional problem as compared to other children nutritional status [2-4].

Scheduled Tribes constitute 8.6% of India's population or about 104 million tribal individuals [5]. There are 645 distinct tribes in India, and the latest available data reveals that 4.7 million tribal children of India suffer from chronic nutrition deprivation affecting their survival, growth, learning, performance in school and productivity as adults. (UNICEF)and according to UNICEF INDIA about 80 per cent of the 5 million chronically undernourished tribal children live in just eight states of Karnataka, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan and Odisha. Tribal Children at early age are more prone to be under nourished due to the lack of the awareness among the parents, like importance of breast feeding, proper nutritious food intake, immunization, care during sickness, clean drinking water, sanitation practices etc [6].

Madhya Pradesh is home to the largest number of Scheduled Tribes includes significant tribal population which constitutes of more than one-fourth of its total population and 14.7 percent of India's total tribal population. Madhya Pradesh consists of 46 recognized Scheduled Tribes and three of them have been identified as "Special Primitive Tribal Groups [4]. District Satna of Madhya Pradesh is a homeland of four tribal races which includes Gond, Kol, Mawasi and Khairwar. Among these four ethnic races, Mawasi are more sensitive to nutrition and health issues because of their dependence on forest, forest produce, traditional unproductive agricultural lands that too only in monsoon, unbalanced diet deficient in micronutrients and non-availability of modern health services resulting into burden of various diseases targeting specifically to children below age of ten. Prevalence of hunger and under nutrition among children is always there in Mawasi hamlets for years together because of their forest habitats, extreme poverty and nutritional taboos. The child health and nutrition has always been sensitive core issues for this much neglected segment in this district population where malnutrition and disease burden are at their peaks almost in all three seasons. The seriousness of this issue has acted as a major motivation for conducting the study for this tribal race. The main objective of this study was to observe the variations of anthropometry and nutritional status in the form of underweight, thinness, and stunting among tribal children aged 3-8years of the of Majhgawan block of Satna District. As the under nourished children are at higher risk of getting infection which can further lead to other health issue, delayed physical development, decreased cognitive abilities and increase in number of school dropouts. Most of the health programs and research studies focuses on children under 5 year of age, overlooking the health of school going children .Thus assessing the health status of school going children can also play important role in

understanding the transition period of childhood to adolescence [7].

2. MATERIALS AND METHODS

2.1 Selection of Locale and Study Subject

A Cross sectional community-based survey was carried out during 2022-23 in tribal villages of Majhgawan block of Satna district of Madhya Pradesh under the guidance and technical support from Department of Food and Nutrition, MMV, BHU, Varanasi (UP) and Krishi Vigyan Kendra, Satna (MP). The list of villages having more than 50% Mawasi tribal population was accessed from the Department of Tribal Development. Two villages with highest population of Mawasi tribal population and children's deaths during the last three years were selected for data collection. Mawasi community is a scheduled tribe that lives in the hills of Madhya Pradesh which is deprived of many facilities. These Mawasi Tribal have their distinct customs, traditions and dietary patterns. Most Mawasi villages are situated at the beginning of the forest and have pathways leading to the jungle. From food to livelihood, the forest used to be an integral part of the Mawasi life. The tribal used to collect forest produce like aonla, *Char*, *Mahua*, Ber, bael and Tendu *patta*, and tribal women are engaged in cutting and selling wood.

The various research studies have mentioned the importance of healthy dietary intake and nutritional status in the childhood for overall growth and development of an individual in early stages of their growth. Thus 3–8-yearMawasi tribal children were selected for this study through stratified random sampling. In the present Investigation, the list of 3–5-year children was collected from the nearby Anganwadi of the village with the help of child development project officer. For selection of 6–8-year children government school were contacted for providing the list of Mawasi tribal children under this age group.

2.2 Data Collection Tools and Technique

Data on age, sex, height, weight, mid upper arm circumference was collected using a pretested questionnaire and an informed consent was taken from the parents of children before collection of the data. Age of the children was recorded with the help of Anganwadi data and birth certificates provided by their parents during home visit. For anthropometric measurements standard procedures were followed .Height was measured using stadiometer, to the nearest 0.1 cm. The measurements were repeated twice to obtain two readings within 0.1cm. The average of the two closest measurements was recorded [8]. A weighing machine was used to measure the body weight to the nearest 0.5 kg. For measurement of mid upper arm circumference Shakir tape was used.

2.3 Statistical Analysis of Data

The nutritional status was determined using Z score analysis. Weights for height, height for age, weight for age and BMI for age are the parameters calculated and classification of wasting, stunting and under nutrition were made on the basis of latest WHO guidelines. According to which children were considered with stunting, wasting, and underweight when Z score is < -2 SD, where as they are considered as moderate stunting, wasting ,underweight when Z score is ranging from <-2SD to <- 3SD and severe stunting, wasting and underweight when Z score is < -3SD. The data was recorded and classified using anthro plus software and presented in form of tables.

3. RESULTS

3.1 Anthropometry of Children (Height, Weight and MUAC of Children)

The data on mean height (cm), weight (kg), and MUAC (cm) and BMI for male and female children by age are presented in Table 1. The mean height of male and female children aged 3- year was 89.07 cmand 90.94 cm, 4- year was 96.13 cm and 98.81 cm, 5-year 97.91 cm and 101.61 cm, 6 -year was 105.75 and 105.97 cm, 7- year was 111.34 cm and 109.60 cm and 8-year was 113.45 cm and 113.53 cm, respectively. The height of the children showed an increasing trend with an increase in their age.

The mean weight of male and female children in the 3-year age group was 11.10 kg and 11.14 kg, respectively. The mean weight was 13.75 kg and 14.67 kg for male and female childrenaged5-years. In the 8-year age group, the mean weight was 18.08 and 17.58 kg for male and female children respectively. The mean MUAC for male children aged 3 year and 8 year was 14.17 cm and 16.08 cm, respectively. In female children, it was 14.38 cm and 15.74cm at ages 3 year and 8 years respectively.

Table 1. Mean height, weight, MUAC and BMI of Mawasi Tribal children (3-8 Years)

Mean Height of the Boys and Girls						
Age	**Boys**			**Girls**		
	No.	**Mean Height(cm)**	**SD**	**No.**	**Mean Height(cm)**	**SD**
3	6	89.07	2.86	5	90.94	1.75
4	19	96.13	6.38	9	98.81	5.31
5	10	97.91	3.7	12	101.61	5.24
6	6	105.75	3.03	7	105.97	1.58
7	10	111.34	3.48	9	109.6	3.53
8	11	113.45	4.48	8	113.53	3.5
Mean Weight of the Boys and Girls						
Age	**No.**	**Mean Weight(kg)**	**SD**	**No.**	**Mean Weight(kg)**	**SD**
3	6	11.1	1.24	5	11.14	0.95
4	19	12.98	2.26	9	13.54	1.95
5	10	13.75	1.16	12	14.67	2.04
6	6	15.45	0.84	7	15.66	1.27
7	10	17.13	1.53	9	16.21	1.31
8	11	18.08	2.42	8	17.58	1.37
Mean MUAC of the Boys and Girls						
Age	**No.**	**Mean MUAC (cm)**	**SD**	**No.**	**Mean MUAC (cm)**	**SD**
3	6	14.17	0.69	5	14.38	0.76
4	19	14.62	0.97	9	14.6	0.72
5	10	14.68	0.52	12	14.64	0.68
6	6	15.03	44	7	15.09	0.42
7	10	15.84	0.95	9	15.41	0.73
8	11	16.08	0.81	8	15.74	0.62
Mean BMI of the Boys and Girls						
Age	**No.**	**Mean BMI(Kg/m^2)**	**SD**	**No.**	**Mean BMI(Kg/m^2)**	**SD**
3	6	13.96	1.12	5	13.48	1.19
4	19	13.92	0.76	9	13.8	0.73
5	10	14.33	0.66	12	14.13	0.85
6	6	13.81	0.26	7	13.94	1.07
7	10	13.8	0.84	9	13.47	0.42
8	11	14.06	1.84	8	13.65	0.96

3.2 Prevalence of Underweight, Stunting and Wasting in Children (3-5 years)

The data on prevalence of underweight, stunting, and wasting among tribal children are presented in Table 2. Among the children (3-5 years), the prevalence of underweight, stunting, and wasting was 59.03%, 60.656%, and 26.24%, respectively. Out of the 11 children in the age group of 3-4 years, 18.2% were severely underweight, 45.5 % children were moderately underweight, 18.2% had moderately stunted growth, and 9.1% had acute under-nutrition (wasting). The prevalence of total underweight among children (48-60 months) was 58%, with 48% moderately underweight and 10% severely underweight. Similarly, the overall prevalence of stunting among tribal children (48-60 months) was 70%, with 54% moderate and 16% severe stunting. The prevalence of wasting among these children was 20% (18% moderate acute malnutrition (MAM) and 2% severe acute malnutrition (SAM). Almost 6 in every 10 tribal children in *Mawasi* tribal children have a low height for their age (stunted growth) and low weight for age (under weight).

3.3 Prevalence of Underweight, Stunting and Thinness in Children (6-8 years)

The nutrition status of children (6-8 years) was assessed using BMI-for-age (BAZ) scores.BAZ scores were generated for 51 children (6-8years). Table 3 present the prevalence of thinness (BAZ<-2SD) and over weight (BAZ >+1SD) among children (6-8 years). It was found that 20.13% of these children were thin (1.81% had severe thinness, and 18.02% had moderate thinness).The prevalence of thinness among 6,7- and 8-yearchildren was 15.38%, 20.0% and 23.50% respectively.

Table 2. Prevalence of underweight, stunting and wasting among children (3-5 years)

Age		**Weight for Age**			
In months	**No. of children**	**Severe under malnutrition WAZ < -3SD (%)**	**Moderate under malnutrition WAZ -3SD to -2SD (%)**	**Total under nutrition WAZ <-2SD (%)**	**Normal WAZ≥-2SD (%)**
(36-47)	(36-47)	11	18.2	45.5	63.7
(48-60)	(48-60)	50	10	48	58
		61	**11.48**	**47.55**	**59.03**
Age		**Height for Age**			
In months	**No. of children**	**Severe under malnutrition HAZ < -3SD (%)**	**Moderate under malnutrition HAZ -3SD to -2SD (%)**	**Total Under Nutrition HAZ <-2SD (%)**	**Normal HAZ≥-2SD (%)**
(36-47)	11	0	18.2	18.2	81.8
(48-60)	50	16	54	70	30
	61	**13.11**	**47.54**	**60.65**	39.35
Age		**Weight for Height for Age**			
In years	**No. of children**	**Severe under malnutrition WHZ < -3SD (%)**	**Moderate under malnutrition WHZ -3SD to -2SD (%)**	**Total Under Nutrition WHZ<-2SD (%)**	**Normal WHZ≥ -2SD (%)**
(36-47)	11	9.1	45.5	54.7	45.3
(48-60)	50	2	18	20	80
	61	**3.28**	**22.26**	**26.24**	73.76
Age		**BMI for Age**			
In years	**No. of children**	**Severe under malnutrition BAZ < -3SD (%)**	**Moderate under malnutrition BAZ -3SD to -2SD (%)**	**Total Under Nutrition BAZ <-2SD (%)**	**Normal BAZ≥ -2SD (%)**
(36-47)	11	9.1	45.5	54.7	45.3
(48-60)	50	0	10	10	90
	61	**1.64**	**16.4**	**18.04**	81.96

**Nutritional status based on WHO classification SD: Standard Deviation*

Table 3. Distribution (%) of children (5-8 years) according to their nutritional status

Age Group			**Weight for Age**			
In years	**In months**	**No. of children**	**Severe under malnutrition WAZ < -3SD (%)**	**Moderate under malnutrition WAZ -3SD to -2SD (%)**	**Total Under Nutrition <-2SD (%)**	**Normal WAZ≥ -2SD (%)**
6 years	72	13	14.3	42.9	57.2	42.8
7 years	84	19	10	75	85	15
8 years	96	19	23.5	76.5	100	0
		51	**16.13**	**67.38**	**83.5**	16.5
Age Group			**Height for Age**			
In years	**In months**	**No. of children**	**Severe under malnutrition HAZ < -3SD (%)**	**Moderate under malnutrition HAZ -3SD to -2SD (%)**	**Under Nutrition HAZ <-2SD (%)**	**Normal HAZ≥-2SD (%)**
6 years	72	13	0	28.6	28.6	71.4
7 years	84	19	10	55	65	35
8 years	96	19	23.5	64.7	88.2	11.8
		51	**12.48**	**51.88**	**64.36**	35.64
Age Group			**BMI for Age**			
In years	**In months**	**No. of children**	**Severe under malnutrition BAZ < -3SD (%)**	**Moderate under malnutrition BAZ -3SD to -2SD (%)**	**Under Nutrition % < +1SD BAZ <-2SD (%)**	**Normal BAZ≥-2SD (%)**
6 years	72	13	7.1	7.1	15.38	84.62
7 years	84	19	0	20	20	80
8 years	96	19	0	23.5	23.5	76.5
		51	**1.81**	**18.02**	**20.13**	79.87

** Nutritional status based on WHO classification SD: Standard Deviation*

4. DISCUSSION

Based on the results of the study, it appears that the malnutrition in the form of underweight, and stunting along with different grades of malnutrition and nutritional deficiency signs was found to be widely prevalent among preschool children of the Mawasi tribe of Kanpur and Devlaha villages of Satna district of Madhya Pradesh. Among the children (3-5 years), the prevalence of underweight and stunting, wasting was 59.03% and 60.656%, respectively. The National Family Health Survey (NFHS -5, 2019-21) reported prevalence of underweight (33%), stunting (35.7%) and wasting (19%) among preschool children of Tribal community in Madhya Pradesh [9]. Almost 6 in every 10 tribal children in Mawasi tribal children have a low height for their age (stunted growth) and low weight for age(underweight).The overall prevalence of stunting among tribal children (4-5years) was 70%,with 54% moderate and 16% severe stunting. The prevalence of wasting among these children was 20% (18% moderate acute malnutrition (MAM) and 2% severe acute malnutrition (SAM). The present study also found that 83.50% children in the age group of 6-8 years were underweight and 64.36% children in this age group were having stunted growth. 20.13% of children were thin (1.81% had severe thinness, and 18.02% had moderate thinness) in 6-8 years age.The prevalence of thinness among 6,7- and 8-yearchildren was 15.38%, 20.0% and 23.50% respectively. The malnutrition burden among the Mawasi tribal children in these villages is higher than that of the overall burden of Madhya Pradesh. It was also reported in a study the presence of higher prevalence of underweight, thinness and stunting in tribal children aged 3-11 years of Paschimancahal area of West Bengal and similar results were seen in a study conducted for under 16 children of tribal community of Odissa [10,11]. The prevalence of under nutrition among Mawasi children is reported much higher than of Juang tribe in Keonjhar District of Odisha and Sartang and Miji, lesser-known tribes of Arunachal Pradesh [12-15].

5. CONCLUSION

Based on the result, it can be stated that there is an urgent need for lot of work to be done on improvement of nutritional and health status of Mawasi children. To address malnutrition among children and adolescents, the quality of Mid-Day Meal (MDM) and Integrated child Development Services (ICDS) supplement must be increased with the participation and monitoring of the PRIs, and other agencies. The MDM should be able to provide all the essential macro and micro-nutrients to the children. Gram Panchayats may create nutritional gardens for each school/ICDS Anganwadi with the help of MGNREGP workers. A healthy diet protects individuals from all forms of malnutrition, and it protects people from infections and arrange of non-communicable diseases. A healthy diet contains macronutrients and micronutrients in appropriate proportions. Macro nutrients provide the energy required for the cellular processes for daily functioning and micro nutrients facilitate normal growth, development, metabolism, and physiologic functioning.The hand in hand support of government and the local bodies for upliftment of tribal community can make a huge difference in current scenario.

ACKNOWLEDGEMENTS

Authors are thankful to District Magistrate, Sub Divisional magistrate and Medical officers and field staff of Community health Centre for their full cooperation in conducting the study. We are thankful to the study participants and village heads for their full cooperation to conduct the study.

CONSENT

The written consent from the selected family head was obtained for conducting anthropometric tests. Guardian or family head sign or thumb print on the consent form were taken for participation in the study.

ETHICAL APPROVAL

Prior to the study, the District Health Administration (DHA) and the Community Health Centre (CHC) in Majhgawan block were officially informed.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Getting to Know the World Bank. World Bank; 2019.
Available:https://www.worldbank.org/en/news/feature/2012/07/26/getting_to_know_theworldbank

2. Singh S, Srivastava S, Upadhyay AK. Socio-economic inequality in malnutrition among children in India: An analysis of 640 districts from National Family Health Survey (2015-16). International Journal for Equity in Health. 2019;18(1):203. Available:https://doi.org/10.1186/s12939-019-1093-0
3. UNICEF: Underlying Causes of Undernutrition: Food Insecurity. Food Insecurity. Geneva: UNICEF. Available:http://www.unicef.org/nutrition/training/25/9.html
4. Divya K. Children out of schools: status of tribal children in madhya Pradesh. International Journal of Research in Social Sciences. 2015;7(12). IIPS and ICF. National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS; 2017.
5. Census of India | Office of the Registrar General & Census Commissioner, India. India. [Web Archive] Retrieved from the Library of Congress; 2011. https://www.loc.gov/item/lcwaN0017959/
6. Dey U, Bisai S. The prevalence of under-nutrition among the tribal children in India: A systematic review. Anthropological Review. 2019;82:203-207.
7. WHO Multicentre Growth Reference Study Group. WHO child growth standards: length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: methods and development. Geneva: World Health Organization; 2006.
8. Casadei K, Kiel J. Anthropometric Measurement. [Updated 2022 Sep 26]. In: Stat Pearls [Internet]. Treasure Island (FL): Stat Pearls Publishing; 2023 Jan-. Available:https://www.ncbi.nlm.nih.gov/books/NBK537315/
9. National Family Health Survey. International Journal for Equity in Health. 2015-16;18(1):203. Available:https://doi.org/10.1186/s12939-019-1093-0
10. Mollah U, et al. Nutritional status based on anthropometry of tribal children aged 3-11 years of paschimanchal area in west bengal.International Journal of Current Research and Review. 2021;13(18):144-150.
11. Jeyakumar A, Godbharle S, Giri BR. Determinants of anthropometric failure among tribal children younger than 5 years of age in palghar, maharashtra, India. Food and Nutrition Bulletin. 2021;42(1):55-64.
12. Ashgar M, Amung R, Chakrabarty S. Nutritional status of children (5-18 years) by using anthropometric indices: across-sectional study among the sartang and miji, lesser-knowntribes of Arunachal Pradesh, India. Journal of Nepal Paediatric Society. 2021;41(3):413-418.
13. Kuiti BK, Acharya S, Satapathy KC, Barik DK, Patra PK. Assessment of Nutritional Status among Children and Adolescents of Juang Tribe in Keonjhar District of Odisha, India. The Oriental Anthropologist. 2022; 22(2):336-347.
14. Raghavendra RH. Literacy and health status of scheduled castes in India. Contemporary Voice of Dalit. 2020;12(1): 97-110.
15. Vastrad P, Neelopant S, Prasad UV, Kirte R, Chandan N, Barvaliya MJ, et al. Undernutrition among rural school-age children: A major public health challenge for an aspirational district in Karnataka, India. Frontiers in Nutrition. 2023, July 12;10. Available:https://doi.org/10.3389/fnut.2023.1209949

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/111711