



Ijapc 2018

Volume 8 Issue 2

www.ijapc.com

10/3/2018

Greentree Group



An Epidemiological Study of Nutritional Status among Children in Haridwar, Uttarakhand, India

Deepshikha^{1*}, Amit Kumar Rai², Utkarsh Gupta³ and Garg G P⁴

^{1,2}Central Ayurveda Research Institute for Respiratory Diseases (under CCRAS), MotiBagh Road, Patiala, India

^{3,4}Department of BalRoga, UttarakhandAyurved University, Gurukul campus, Haridwar, Uttarakhand, India

ABSTRACT

Background: Malnutrition is a major threat to health of children. It is influenced by several socio demographic factors.

Objective of study: To study the prevalence of malnutrition in children visiting BalRoga OPD at a state Ayurveda medical college in Haridwar, Uttarakhand and establish their relation with coexisting factors like age, sex, birth weight, socio economic status, parent`s education, number of siblings, etc.

Methodology: The epidemiological study was carried out at BalRoga (Pediatrics) OPD at Uttarakhand Ayurved University, Gurukul campus, Haridwar. A case record format comprising of demographic profile, parent`s education, child`s height and weight, date of birth, birth weight, perinatal history, immunization history, hemoglobin level, family tree etc was prepared. A total of 84 patients were surveyed using the format.

Results: A total of 39.28% of all surveyed children were stunted with a maximum incidence in age group of less than five years. A total of 36.90% of children were underweight.

Conclusion: This study concludes that children from low socio economic status, illiterate parents, rural background, those born with a low birth weight and having low hemoglobin levels are more prone to be malnourished. The present epidemiological study was executed on a small sample size. Further studies comprising of a larger population should be taken up to arrive at more precise figures.

KEYWORDS

Malnutrition in Haridwar, Nutritional status, Epidemiological study, PEM



Greentree Group

Received 06/02/18 Accepted 19/02/18 Published 10/03/18



INTRODUCTION

The condition of a person's health that is influenced by the intake and utilization of nutrients is called nutritional status. When there is a deficient or excess intake of one or more nutrients, it results in a state of imbalance in the body called malnutrition. Malnutrition may be undernutrition or overnutrition. Protein energy malnutrition results from lack of protein and/or energy and is categorized as Kwashiorkor and Marasmus. Parameters for determining PEM are underweight (low weight for age), wasting (low weight for height) and stunting (low height for age). The prevalence of stunting and underweight in Indian children under five years of age are 38.70% and 29.40% respectively¹. Kwashiorkor results in marked weight loss, decrease of muscle mass, distended abdomen, enlarged liver, skin changes and anemia. Marasmus is characterized by severe weight loss reducing the child to skin and bones, with a prominence of ribs, growth retardation, chronic diarrhea, muscle atrophy and old man like face. PEM results in complications like hypoglycemia, hypothermia, dehydration, electrolyte imbalance, recurrent infections and micronutrient deficiencies.

NEED OF STUDY

Malnutrition has several underlying reasons like poverty, lack of education, lack of health related knowledge, genetic causes, overcrowding in family, deprivation of female child, chronic diseases, worm infestation, local traditions etc. This epidemiological study is aimed at finding the prevalence of underweight and stunted children visiting the OPD facility of Government Ayurvedic medical college in Haridwar, India and its association with underlying factors.

METHODOLOGY

The epidemiological study was carried out in March-May, 2016 at *BalRoga* (Pediatrics) OPD at Uttarakhand Ayurved University, Gurukul campus, Haridwar, India mostly visited by locals of Haridwar district. Case record format comprising of demographic profile, parent's education, child's height and weight, birth weight, perinatal history, immunization history, hemoglobin level, family tree etc. was prepared before initiation of study. The case record form was self-made and not adopted from any standard source/ organization. Patients were registered after informed consent. A total of 84 patients were surveyed using the format. The observations were entered on Microsoft excel sheet. The result was statistically



analyzed and conclusion was drawn regarding nutritional status of children visiting the OPD facility of Government Ayurvedic medical college in Haridwar, India. The height and weight of children were classified as normal/stunted and underweight respectively as per recommendation of Indian Academy of Pediatrics². Anemia was diagnosed on the basis of hemoglobin concentration range for given age and sex³.

OBSERVATION

The following observations were made from the collected data of 84 children:

- A total of 39.28% of all surveyed children were stunted with a maximum incidence in below five age group i.e., 44.82% followed by 39.39% stunted children in age group from 5- 10 years. (Table No. 1)

Table 1 Prevalence of malnutrition in relation to age

S. No.	Age	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	< 5 years	29	13	44.82%	15	51.72%
2.	5 - 10 years	33	13	39.39%	11	33.33%
3.	> 10 yrs	22	07	31.81%	05	22.72%
4.	Total	84	33	39.28%	31	36.90%

- A total of 36.90% of children were underweight. Age wise prevalence of underweight children was 51.72%, 33.33%

and 22.72% in age group below five, five to ten years and above ten years, respectively. (Table No. 1)

Table 2 Prevalence of malnutrition in relation to sex

S. No.	Sex	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Male	47	19	40.42%	19	40.42%
2.	Female	37	14	37.83%	12	32.43%
3.	Total	84	33	39.28%	31	36.90%

Table 3 Prevalence of malnutrition in relation to locality

S. No.	Locality	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Urban	42	12	28.57%	14	33.33%
2.	Rural	42	21	50.00%	17	80.95%
3.	Total	84	33	39.28%	31	36.90%

- Results showed that 40.42% of male children and 37.83% of female children were stunted. Percentage of underweight children was 40.42% and 32.43% in male

and female children, respectively. (Table No. 2)

- Amongst urban population 28.57% children were stunted and 33.33% children



were underweight. On the other hand, 50% and 80.95% of rural children were observed to be stunted and underweight respectively. (Table No. 3)

- Amongst all children surveyed 42.22% of Hindu children and 35.89% of Muslim

Table 4 Prevalence of malnutrition in relation to religion

S. No.	Religion	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Hindu	45	19	42.22%	15	33.33%
2.	Muslim	39	14	35.89%	16	41.02%
3.	Other religion	00	00	00%	00	00%
4.	Total	84	33	39.28%	31	36.90%

Table 5 Prevalence of malnutrition in relation to Socio-economic status and Number of siblings

S. No.	Socio economic status /Number of siblings	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Low	40	19	47.50%	16	40.00%
2.	Middle	44	14	31.81%	15	34.09%
3.	High	00	00	00%	00	00%
4.	</=2 Siblings	48	19	39.58%	19	39.58%
5.	>/=3 Siblings	36	14	38.88%	12	33.33%

- Percentage of stunted and underweight children was highest in low socioeconomic group i.e., 47.50% and 40% respectively. (Table No. 5)
- Percentage of stunted and underweight children were found almost equal in families having two or less children (39.58% and 39.58% respectively) and in families having three or more children (38.88% and 33.33% respectively). (Table No. 5)

Table 6 Prevalence of malnutrition in relation to parent`s education

S. No.	Parent`s education	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Illiterate father	21	7	33.33%	7	33.33%
2.	Father`s education upto 12 th .	51	23	45.09%	17	33.33%
3.	Graduate father	12	3	25.00%	7	58.33%
4.	Illiterate mother	33	15	45.45%	13	39.39%

children were observed to be stunted. As far as weight of children is concerned, 33.33% of Hindu children and 41.02% of Muslim children were underweight. (Table No. 4)

- A total of 33.33% children of illiterate fathers were stunted whereas 45.45% children of illiterate mothers were stunted. Percentage of underweight children was 33.33% and 39.39% in children of illiterate father and mother respectively. The incidence of stunted and underweight children was lower in mothers who were educated upto intermediate (32.60% and 30.43% respectively). (Table No. 6)



5.	Mother`s education upto 12 th .	46	15	32.60%	14	30.43%
6.	Graduate mother	5	3	60.00%	4	80.00%

Table 7 Prevalence of malnutrition in relation to perinatal history

S. No.	Perinatal history	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Low Birth Weight	18	11	61.11%	12	66.66%
2.	Appropriate for Gestational Age	66	22	33.33%	19	28.78%
3.	Large for Gestational Age	00	00	00%	00	00%
4.	Birth at Full term	82	32	39.02%	29	35.36%
5.	Birth at Preterm	02	01	50%	02	100%
6.	Birth at Post term	00	00	00%	00	00%

- Babies born with low birth weight were observed to be more undernourished as 61.11% of them were stunted and 66.66% were underweight. On the contrary, only 33.33% of Appropriate for Gestational Age (AGA) born children was stunted and 28.78% of them were underweight. (Table No. 7)

- Incidence of stunting and underweight was found highest in children born prematurely. 50% of them were stunted compared to 39.02% of children born at full term. Also 100% of prematurely born

children were underweight while 35.36% of children born at full term were of weight less than 3rd percentile for their age and sex. (Table No.7)

- No significant difference was noted with respect to under nutrition, in children, who were immunized appropriately up to the age and those who were not. (Table No.8)

- Anemic children were observed to be more prone for under nutrition rendering 52.50% of them stunted and 50% of them underweight. (Table No.9)

Table 8 Prevalence of malnutrition in relation to immunization history

S. No.	Immunization history	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Immunization appropriate upto age	66	26	39.39%	25	37.87%
2.	Immunization not appropriate upto age	18	07	38.88%	06	33.33%

DISCUSSION

The incidence of malnutrition in children below five years is higher than the national

average of malnourished under five children in India. Percentage of stunted children (44.82%) is also higher than 38.70% of the

**Table 9** Prevalence of malnutrition in relation to anemia

S. No.	Hemoglobin level	No. of children	Stunted children	Stunted children (in %)	Underweight children	Underweight children (in %)
1.	Anemic child	40	21	52.5%	20	50.00%
2.	Child with normal Hb	44	12	27.27%	11	25.00%
3.	Total	84	33	39.28%	31	36.90%

country. Similarly prevalence of underweight children (51.72%) is also higher than that for the country (29.40%). Reports also suggest states like Uttar Pradesh, Uttarakhand, Bihar, Orissa and Madhya Pradesh to be most poorly performing states over the years as far as child nutrition is concerned^{4,5}.

The problem of malnutrition seems more alarming in rural population with half of the children being stunted and nearly 80% being underweight. The causative factors may be poverty, female illiteracy; lack of health awareness, low accessibility to health services etc⁶. Percentage of stunted and underweight children was highest in low socioeconomic group i.e., 47.50% and 40% respectively. It is also in accordance to a previous study regarding Protein Energy Malnutrition (PEM) among 1-6 years children in Lucknow, Uttar Pradesh, India⁷. Children of illiterate mothers showed greater incidence (45.45%) of stunting, thus emphasizing on importance of female education in family health⁸. Children born prematurely and with a low birth weight

were at greater risk of being malnourished which is also confirmed by earlier surveys in various parts of world⁹.

Among 84 children surveyed, 40 children were recorded as anemic. This incidence is in accordance to national survey data of Uttarakhand¹⁰. This observation also justifies that malnutrition is more prevalent in anemic children.

CONCLUSION

Under nutrition is both a health outcome and a risk factor for recurrent and chronic diseases. Protein energy malnutrition is a major cause of childhood morbidity and mortality as it initiates a vicious cycle causing several infectious diseases like respiratory and gastrointestinal illnesses and further deteriorates nutritional status of a child. Thus it is need of the hour to focus on the root causes of malnutrition to build healthy, optimally nourished children, realizing their growth and development potential, active learning capacity and adult productivity, as discussed in Vision 2022 of National Nutrition strategy¹¹. This study



concludes that children from low socio economic status, illiterate parents, rural background, those born with a low birth weight and having low hemoglobin levels are more prone to be malnourished. The present epidemiological study was executed on a small sample size, thus providing only brief clues about actual status of malnutrition and its contributing factors. Further studies comprising of a larger population should be taken up to arrive at more precise figures.

Conflict of interest: None

Sources of support: NA



REFERENCES

1. India - Malnutrition prevalence. Downloaded from <https://www.indexmundi.com/facts/india/malnutrition-prevalence>
2. IAP growth charts. Indian Academy of Pediatrics. Downloaded from <http://www.iapindia.org/page.php?id=79> assessed on 02/01/2018.
3. WHO. *Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity*. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, 2011 (WHO/NMH/NHD/MNM/11.1) (<http://www.who.int/vmnis/indicators/haemoglobin.pdf>, accessed [02/02/2018])
4. Attaining the millennium development goals in India. Child malnutrition. P 4-8. (<http://siteresources.worldbank.org/INTINDIA/Resources/ChildMalnutrition.pdf>, accessed 02/02/2018).
5. Sahu SK, Kumar SG, Bhat BV, et al. Malnutrition among under-five children in India and strategies for control. *Journal of Natural Science, Biology, and Medicine*. 2015;6(1):18-23.
6. Peter Svedberg. Why malnutrition in shining India persists. NFHS123rev3 text doc. /2008-11-25/ (revision for ISI conference).P 8-9 https://www.isid.ac.in/~pu/conference/dec_08_conf/Papers/PeterSvedberg.pdf, accessed on 05/02/2018.
7. Mukesh Kr. Kanaujiya, Ram Milan Prasot, Sudhir Kumar Verma, SaurabhKashyap. An epidemiological study of Protein Energy Malnutrition (PEM) among 1-6 years children in rural Lucknow. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). Volume 13, Issue 3 Ver. II. PP 10-14. 2014available online at www.iosrjournals.org
8. Vani K. Borooah. The Role of Maternal Literacy in Reducing the Risk of Child Malnutrition in India. Munich Personal RePEc Archive. MPRA Paper No. 19833, p-2-3. Posted 8. January 2010. Available online at https://mpra.ub.uni-muenchen.de/19833/1/MPRA_paper_19833.pdf. accessed on 5/02/2018
9. Rahman MS, Howlader T, Masud MS, Rahman ML. Association of Low-Birth Weight with Malnutrition in Children under Five Years in Bangladesh: Do Mother's Education, Socio-Economic Status, and Birth Interval Matter? PLoS ONE 11(6): p 3. (2016).
10. Annual Health Survey Report. Office Of The Registrar General & Census Commissioner, 2014. India. p 12-13 http://www.censusindia.gov.in/vital_statistic



[s/AHS/AHS_report_part2.pdf](#) accessed on 5/02/2018.

11. NITI Aayog. Nourishing India. National Nutrition strategy. Government of India. p 24 available on http://niti.gov.in/writereaddata/files/document_publication/Nutrition_Strategy_Booklet.pdf accessed on 06/02/2018.