ORIGINAL RESEARCH ARTICLE

USE OF AGE INDEPENDENT ANTHROPOMETRIC INDICES FOR COMPARING THE NUTRITIONAL STATUS OF CHILDREN IN RURAL ICDS AND NON-ICDS VILLAGES: COMMUNITY BASED CROSS SECTIONAL STUDY

Prateek Kumarpanda[1], Kalpana panda[2*], Pramod Kumar Panda[3], Nirnajan Nagaraj[2]

1. Senior resident, pediatrics,AIIMS New Delhi.2. Senior Resident, PGIMER, Dr.RML Hospital, Dept. of Pediatrics, New Delhi. 3. Pediatric specialist, District hospital, Koraput, Odisha.

*Author for correspondence: Dr.Kalpana panda, Senior Resident, PGIMER, Dr.RML Hospital, Dept. of Pediatrics, New Delhi. Pin: 110001. Email: kalpanapanda@gmail.com

Abstract

Background: ICDS scheme continues to be one of the largest and unique schemes in the world underpinning holistic development of under-six years of children in the country. This study aims at finding the nutritional status of the children from 3 to 5 years age group in rural I.C.D. S villages and to compare with same number of children in nearby non I.C.D.S villages. **Methods:** The study was done with house to house survey with the help of a prepared scheduled proforma by personal interview and taking necessary anthropometric measurements and clinical examination. In the present study the following age independent criteria's are taken into account for the assessment of the nutritional status of the (3-5 years) age group of children in both the I.C.D.S and non I.C.D.S area separately: Mid upper arm circumference; Kanwati's index; Rao's index; Bangle screening method. **Results:** Most of the children are from the low socioeconomic group class IV and class V. In all the age independent anthropometnc criteria, the nutritional status is better in I.C.D.S than in non – I.C.D.S area.Rao's index reveals better picture of chronic malnutrition. The difference of the nutritional status in both the I.C.D.S and non – I.C.D.S are significant (P<0.05).The sensitivity and specificity of mid upper arm circumference with standard Weight/Age method for comparison of the mutational status in I.C.D.S and non – I.C.D.S area Sensitivity - 70.5% Specificity - 76.5%. Immunisation status is better in I.C.D.S area in comparison to non – I.C.D.S area. **Conclusion:**I.C.D.S is a biggest multisectorial involvement project in Asia which has a tremendous potential for improving health and nutrition. Therefore Government of India should make some bold innovation to give further momentum in achieving better service facility. The Intensive study is carried out especially for public utility and utilization of data for future research.

Key-words: Nutrition, Anthropometry, villages, mid- arm circumference, Integrated child development services (ICDS).

Introduction

The nutritional status of children has become an important indicator of the development status of the country.An increased rate of morbidity and mortality in children is also directly related to malnutrition or in other hand nutritional status [1]. This is more seen among pre-school children Nutrition plays the primary role with paramount importance to achieve, promote and maintain the physical growth.Children population constitute about 40 % of our national population, who are our natural resources upon which our country's future, prospect entirely stands [2]. In India around 80 million children fall below normal nutritional status.Prevalence of under-nutrition as almost 47 per cent of urban poor children are reported to be underweight and 54 per cent as stunted with almost 60per cent of urban poor children miss total immunization before completing one year (NFHS-4)[3].The scenario of Broad Mortality data shows that 50 % of all the deaths occur below 5 yrs. of age. Owing to above important reasons, simple and basic health care has to be provided to millions of children important to preserve their normal physical growth or the nutritional status throughout the growing phase of life.

ICDS scheme continues to be one of the largest and unique schemes in the world underpinning holistic development of under-six years of children in the country [4]. Being implemented nationwide under the aegis of the Union Ministry of Women and Child Development (MWCD), the scheme is a powerful driving force designed to break the vicious cycle of child malnutrition, morbidity, reduced learning capacity and mortality. I.C.D.S is also a result oriented programme. By the way of feedback method it provides facility to evaluate the health status of children by monitoring device in the shape of field survey. On our rural setup where exact date of birth cannot be properly ascertained and the weighing machine is not available, age independent anthropometric measurement in the shape of mid upper arm

80

circumference and other age independent indices (ratios) are taken into account to assess the nutritional status in children [5].

Owing to all above reasons this study aims at finding the nutritional status of the children from 3 to 5 years age group in rural I.C.D. S villages and to compare with same number of children in nearby non I.C.D.S villages adapting similar natural environment so as to asses and evaluate the impact of the I.C.D.S which subserves the monitoring mechanism of I.C.D.S function and further course of the action can be formulated to augment the action of the project towards better survival of the children to whom the programme is designed and totally meant.

Material And Methods

Type of Study: Community based, Cross sectional study. Study Population: The study was carried out in 3 subcentres each in 2 PHCs of Bargarh District. In I.C.D.S areas, 300 children registered for supplementary nutrition and Preschool education were included in study. In non I.C.D.S. areas, 300 children in age group 3-5 years obtained during house to house survey were included. Study Period: 05 January 2014 to 05 January 2015.

Selection criteria: For this study three subcentre area as (Tejagola, Kamagaon and Mulbar) of the primary health center, Bhatli (covered by I.C.D.S scheme more than 3 years) were selected as rural I.C.D.S area which is situated in Baragarh District and is about 60 km away from V.S.S. Medical College, Burla. The population of this area is 15818 and consists of the 21 Anganwadi centers. The rural non I.C.D.S area was also selected from the adjacent P.H.C Paharsirigida P.H.C also in Bargarh District. Three subcentre area of this P.H.C (Kharmunda, Tangarpali and Lachidal) which are adjacent to the above I.C.D.S area with a population of 14661 were selected. These two areas are selected because for comparison, both areas are found identical with respect to their Geographical location, climate communication of the place, identical socioeconomic status, literacy status, social habit and food habit of the people.

Sample size:Standard 30 cluster sampling methods 'described by W.H.O was employed to select the cohorts to be studied in both the I.C.D.S and non I.C.D.S area. In each area 30 clusters were randomly selected taking panchayat ward as the clustering unit, 300 children in 3-5 years age groups (10 against 7 per cluster for better appreciation) and their mothers were taken by door to door survey, with of prepared schedule.

Methods:The study was done with house to house survey with the help of a prepared scheduled proforma by personal interview and taking necessary anthropometric measurements and clinical examination. All the data were primarily collected by single person to avoid bias, who is a pediatrician and well trained already in assessing anthropometry and nutritional status of children. Modified Kuppuswamy socioeconomic scale was adopted to assess the socioeconomic status of the parents [6]. In the present study the following age independent criteria's are taken into account for the assessment of the nutritional status of the (3-5 years) age group of children in both the I.C.D.S and non I.C.D.S area separately: Mid upper arm circumference; Kanwati's index; Rao's index; Bangle screening method [7] In Bangle screening method, a particular Bangle was tried to pass over the elbow, which is possible only in children with malnutrition. Kanawati-Mc Lauren's index is MUAC/Head circumference ratio. The normal value is 0.32-0.33 and value <0.25 suggests severe malnutrition. Similarly, Rao and Singh's index is weight in kg/height in cm^2 X 100, 0.12-0.14 is normal value and value <0.12 suggests malnutrition. Statistical analysis: All collected data was tabulated, t-test, chi-square test is used and statistically analysed by using SPSS.20 Software

Results

Baseline demographic profiles of children in I.C.D.S as well as non I.C.D.S. areas were comparable. Male children are predominant in both the I.C.D.S and non I.C.D.S area. Maximum numbers of children were of middle and low socioeconomic status, predominant in both the groups. Socioeconomic status was overall comparable in both the area. In both Male and Female children, in I.C.D.S and Non I.C.D.S areas MUAC were less than I.C.M.R standard. Average mid upper arm circumference in I.C.D.S area was higher than the non I.C.D.S area. Average height in male and female in both I.C.D.S and non I.C.D.S area were less than I.C.M.R standard. Height of the children in I.C.D.S area was marginally higher than the non I.C.D.S area. Head circumference was almost equal in both the I.C.D.S and non I.C.D.S group of children and Average head circumference was < ICMR standard (Marginally less).Mean average weight was higher in I.C.D.S area than non I.C.D.S area. In our study children having mid arm circumference >13.5 are more in the I.C.D.S than non I.C.D.S i.e. the children having normal nutritional status were more in I.C.D.S than non I.C.D.S area. Children having mid-arm circumference Between 13.5 to 12.5 cm were the predominant group, which are having mild and moderate malnutrition. Children with normal nutritional status were more in I.C.D.S group than non I.C.D.S group. Mild, moderate and severe malnutrition all were higher in Non I.C.D.S group.

In our study, MAC/HC ratio was higher among the 4-5 years age group in both the I.C.D.S and non I.C.D.S areas. In non I.C.D.S area all grades of malnutrition were higher, especially for severe malnutrition difference was statistically significant (p=0.04). Our study showed that malnourished children are more present in 4 – 5 years are group. Malnourished children were more present in the non I.C.D.S area.

Table 1: Comparison of the nutritional status in I.C.D.S and non I.C.D.S area with relation to mid arm circumference.

No Malnutrition	Number of children			
	I.C.D.S		Non I.C.D.S	
	No.	%	No	%
Normal	114	38%	87	30.30%
Mild and moderate	177	59%	198	65.30%
Severe	9	3%	15	4.40%

Degree of freedom=2, Chi square=6.3, p=0.04(difference is statistically significant)

Table 2: Comparison of the children in both the I.C.D.S and non I.C.D.S area age wise having different kanawati ratio.

Kanawati ratio	Number of children			
	I.C.D.S		Non I.C.D.S	
	(37-48m)	(49-60m)	(37-48m)	(49-60m)
>.310	57	65	47	55
.310-.280	47	57	41	51
.280-.250	28	36	45	48
<.250	4	6	5	8
Total	136	164	138	162

Table 3: Comparison of the nutritional status of children by kanawati ratio in both the I.C.D.S group and non I.C.D.S group.

Grade of Malnutrition	Number of children			
	I.C.D.S		Non I.C.D.S	
	No.	%	No.	%
Normal	122	40.60%	102	34%
Mild	104	34.70%	92	30.60%
Moderate	64	21.60%	93	31%
Severe	10	3.10%	13	4.30%
Total	300	100%	300	100%

Degree of freedom=3, Chi square=8.27, p=0.04(difference is statistically significant)

Table 4: Immunization status of the children in I.C.D.S and non I.C.D.S areas

Immunization status	ICDS area	Non ICDS area
Immunized	240(80%)	210(70%)
Partially immunized	52(17.4%)	74(24.6%)
Non immunized	8(2.6%)	16(5.4%)
Total	**300(100%)**	**300(100%)**

Degree of freedom=2, Chi square=8.51, p=0.01(difference is statistically significant)

The Bangle method was also used for the comparison of the nutritional status of 3-5 years age group children in I.C.D.S and non – I.C.D.S area. The number of children in I.C.D.S area with passing of the bangle above the elbow are only 28 and in non – I.C.D.S area, it is 42. That shows the picture of severe malnutrition and to some extent of moderate malnutrition in both the I.C.D.S and

non – I.C.D.S area. The difference between two groups are statistically significant (p=0.03). The correlation between Age/Weight and the MUAC/HC ratio in relation to comparison of the nutritional status and assessment was good (Pearson's co-efficient 0.6). The specificity and sensitivity of the MUAC/HC ratio (Kanawati index), when compared with standard Weight/Age method for comparison of the nutritional status in I.C.D.S and non – I.C.D.S area were found to be 91.9% and 85.3% respectively .This is a reliable age independent indicator for assessment nutritional status. The correlation between Weight/Age and mid arm circumference in relation to the assessment of nutritional assessment was also good (Pearson's co-efficient 0.7). The sensitivity and specificity of mid upper arm circumference compared with standard Weight/Age method for comparison of the nutritional status in I.C.D.S and non – I.C.D.S area were 70.5% and 76.5% respectively.

MAC/HC ratio was higher in all grade of malnutrition in non I.C.D.S area and the difference was statistically significant (p=0.04), more for moderate and severe grades of malnutrition [table 3]. The age wise distribution and comparison of the nutritional status by the Rao's index in both the I.C.D.S and non – I.C.D.S area showed children with normal nutritional status are found more in the age group of 4-5 years and malnutrition cases are found more in 3 to 4 years age group in the both the I.C.D.S and non – I.C.D.S area.

In I.C.D.S area, the immunization status was better where compared to non I.C.D.S. area with immunization coverage being 80% in I.C.D.S. area and about 70% in non I.C.D.S. area [table 4]. The difference between the immunization status of two areas is statistically significant (p=0.01)

Discussion

The study showed that age independent anthropometric indices can be successfully used to assess nutritional status in community surveys with accuracy and nutritional status of children in I.C.D.S areas are better than those in non I.C.D.S. areas. The mean mid-arm circumference of the children in I.C.D.S. area was higher than their counterpart in non I.C.D.S. areas. It was seen that the average height, weight and head circumference of the children of the different age, sex were lower than the I.C.M.R standard in both areas. The difference in malnutrition status between both areas was more significant for severe grade malnutrition group, who are most likely to have more serious life threatening complications. Thereby, this study establishes the usefulness and justification for universalization of I.C.D.S scheme over the country.

This is more due to the low socioeconomic status and poor health awareness and illiteracy in non I.C.D.S. areas. Supplementary nutrition might be taking the main role in

lowering incidence of malnutrition in I.C.D.S area. The difference in the nutritional status of both I.C.D.S and non I.C.D.S was significant. (P=0.04)

Kanawati ratio was found to be a better index than only MUAC measurement for the assessment of the nutritional status in our study. Rao's index reveals better picture of chronic malnutrition. Similar findings were also reported in literature by Bashir et al [8]. Kanawati suggested the use of mid-arm / head circumference for detection of marginal cases of malnutrition as they claimed it as a useful age independent method of assessment of the nutritional status in pre-school children [8]. The difference between I.C.D.S. and non I.C.D.S. areas remained statistically significant, while using all the three indices without ambiguity. Previously, Mitra et al and Bhatia et al have used these indices in Indian setting successfully and the result of this study more firmly favors its use in routine clinical practice for precise nutritional status assessment [10, 11].

UIP program states that immunization is to be done to keep the child free from vaccine preventable disease like tuberculosis, and others which indirectly affects the nutritional status of the child. Here immunisation status is better in I.C.D.S area in comparison to non – I.C.D.S area, where the complete immunization is 70% only. Population in I.C.D.S and non – I.C.D.S area.I.C.D.S project had covered BCG 39.6%, DPT 35%, and Polio 37.3% in project with 5 years old[9,10]. In both the area upper respiratory tract infection is predominant, which mainly contributes the major morbidity of the children. Anemia cases are more found in I.C.D.S area than non – I.C.D.S area. The vitamin A and other deficiency are also more or less present in both the I.C.D.S and non – I.C.D.S group. Oral dehydration therapy no doubt help to avert deaths but not to correct malnutrition induced by repeated episodes of infection[11].Number of the children suffering from the diarrhea is decreasing as the popularity of use of ORS is increasing and health awareness too.

Conclusion: In this study better nutritional status and immunization coverage seen among children of I.C.D.S area than non-I.C.D.S area area. Children of parents with better socioeconomic status show better nutritional status, attempts must be taken to avoid this discrepancy among our people as far as possible. Both the Anganwadi worker and MPW health worker should work jointly in field for the distribution of the fortifier tablet and vitamin A solution in field for the control of anemia and vitamin A deficiency. Proper health education and motivation must be imparted regarding the health awareness and personal hygiene. Good supplementary nutrition programme can be made by the regular supply of the ration without any disruption. Food distribution must be good and community participation must be adequate. Effective intersectoral coordination particularly between Anganwadi worker and health worker in distribution of Fortifier tablets, vitamin A solution among children

delivery of the nutritional health education and delivery of the other health care package can help further in the improvement of the nutritional status of children beneficiary. I.C.D.S is a biggest multisectorial involvement project in Asia which has a tremendous potential for improving health and nutrition. Therefore Government of India should make some bold innovation to give further momentum in achieving better service facility. The Intensive study is carried out especially for public utility and utilization of data for future research, so that the shortcomings can be found out by then and there by field survey and monitoring technique and the course of action can be designed to intensify better service to the children and mothers of our country for whom the intensive service is entirely meant.

References

1. Forum for Creche and Child Care Services. A Social Audit of ICDS in the State of Uttar Pradesh. New Delhi, India, 2005:51-53

2. Society for Economic Development and Environmental Management (SEDEM). Nutritional Status of Women and Children and Working of ICDS in Flood-Prone Districts of Bihar. New Delhi; 2005:170-73

3. Pandey DD. Quality of Pre-Schooling under Different Programmes Including ICDS: a study, 2008; 241–44

4. Forum for Creche and Child Care Services. The Status of the Young Child in Rajasthan. New Delhi, India, 2005; 1:23-25

5. Davey A, Davey S, Datta U. Perception regarding quality of services in urban ICDS blocks in Delhi. Indian J Public Health 2008; 52:156–8

6. Khosla R, Kaul M. Time Management by Anganwadi Workers of ICDS, 1997; 1:34-35

7. Planning Commission. Nutrition and Social Safety Net, Eleventh Five Year Plan. New Delhi: Govt. of India, 2002; 2: 341–46.

8. Bashir A, Bashir U, Ganie Z, Ahmad. Evaluation Study of Integrated Child Development Scheme (ICDS) In District Bandipora of Jammu and Kashmir. Int. Res. J. Social Sci. 2014;3(2):34-6

9. Park K. Text Book of Preventive and Social Medicine; 23rd.M/s Banarsidas Bhanot Publishers 1167, Prem Nagar, Jabalpur, 482001(M.P.) India 2011:101.

10. Bhatia V, Puri S, Swami H M, Gupta M, Singh G. Malnutrition among Under-Six Children in Chandigarh: Scarcity in Plenty. Journal of Clinical and Diagnostic Research. 2007;1(6):483-7.

11. Mitra SP. A Study of Dietary Intake and Nutritional Status of Under Five Children in Slums of Kolkata City. Indian Journal of Community Medicine. 2007;1(1):92.

Conflict of Interest: None

Source of funding support: Nil

How to cite this article: Prateek Kumarpanda, Kalpana panda, Pramod Kumar Panda, Nirnajan Nagaraj. Use Of Age Independent Anthropometric Indices For Comparing The Nutritional Status Of Children In Rural ICDS And Non-ICDS Villages: Community Based Cross Sectional Study. Nat J Res Community Med 2018;7(2):80-83.