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Assessment of MUAC, Head and Chest Circumference of Anganwadi Children in Trivandram District, Kerala, India.

Abhina. B[1]
Ph.D. Research Scholar
College of Agriculture
Vellayani, Trivandrum,
Kerala Agricultural University

Anitha Chandran. C[2]
Assistant Professor
College of Agriculture
Vellayani, Trivandrum,
Kerala Agricultural University

Abstract: *AIM: To assess Mid Upper Arm Circumference, Head Circumference, Chest Circumference, Waist Circumference and Hip Circumference of anganwadi centers in Trivandrum district, Kerala, India. SAMPLE: Ninety children attending the anganwadi centers in the age group of two to six years were studied. STUDY DESIGN: A random study was done to assess Mid Upper Arm Circumference, Head Circumference, Chest Circumference, Waist Circumference and Hip Circumference of children (2-6 years) attending anganwadi centers in the Urban 2 project areas of Trivandrum district, Kerala. Children were selected randomly from sector 1 and sector 4. Data collected were compared with the standard values to find the disparities. LOCALE OF STUDY: Sectors I and IV in the Urban II project areas of Trivandrum district in Kerala was randomly selected for study. METHODOLOGY: In order to achieve the objectives, a suitable questionnaire was used to collect the required data. RESULTS: The mid upper arm circumference of 3 girls and 2 boys were indicating moderate malnutrition. 6 children in the study population were having their chest circumference less than head circumference. CONCLUSION: Children having the indication of malnutrition need special care and to be given extra nutrients.*

Keywords: *Anganwadi children, Chest, Circumference, Head, MUAC.*

I. Introduction

Children are the valuable resources of a country. The development of a country can be assessed through analysing the nutritional status and growth pattern of the children there [1].

The services distributed to children belonging to the lower layers of country are the leading duty in India as they are the sections of people vulnerable and typically the sufferers of mistreatment and misuse [2]. ICDS was incorporated in India in order to fore front these challenges and to provide a bright future for the little ones of the country. It provides a package of health, nutritional and educational services to the target group which is an effective vertical approach for child survival and development [3]. Anganwadi centre is the central point for the delivery of services to children and mothers. It is a targeted food transfer programme with a potential to improve the nutritional outcomes of the child beneficiaries [4]. Narayanan (2020) reported that Kerala is in first rank among the states for their children's wellbeing.

In this study an attempt is made to the assess influence of ICDS via collecting the anthropometric measurements such as Mid Upper Arm Circumference, Chest circumference and head circumference of children.

II. Materials and Methods

2.1. Location of Study

The present study was conducted in Trivandrum Urban Project II. 175 anganwadi centers are there in this project which is further subdivided into five sectors. From the five sectors under the Urban Project No: II, sector I and IV was selected randomly. Impact of the programme on the nutritional status of preschool children had not been systematically evaluated earlier in these areas.

2.2. Selection of the respondents

90 preschool children in the age group of 2-6 years were selected purposively from the two sectors under the urban project center II for assessing the Mid Upper Arm Circumference, Chest circumference and head circumference of children.

2.3. Design of the study

Determining the nutritional status of selected preschool children through collecting details such as,

2.3.1. Mid Upper Arm Circumference

2.3.2. Head Circumference

2.3.3. Chest Circumference

2.4. Development of Tools and conduct of study

90 mothers of the child (2-6 years) beneficiaries were also measured using a measuring tape to elicit information on the MUAC, Head Circumference and Chest Circumference.

MUAC, Head circumference and chest circumference were taken under anthropometric measurements in this study and were collected using standardized techniques. Anthropometric measurements are useful in collecting the qualitative information on the studies assessing nutritional status of children [6].

2.4.1. Measurement of Mid upper arm circumference

Mid Upper Arm Circumference measurements are helpful to evaluate impact of nutrition [7].

Mid upper arm circumference of children were taken using a measuring tape passing over the arm portion. In order to identify the mortality risk associated with malnutrition Mid Upper Arm Circumference is considered as a better indicator than weight for height. Children below 11cm indicates severe malnutrition, 11cm-12.5cm indicates moderate acute malnutrition, and 12.5-13.5cm indicates at risk of acute malnutrition and 13.5cm are well nourished child [8].

2.4.2. Measurement of head and chest circumference

Head measurement of children were taken using a measuring tape passing through the most projecting through the head. Chest circumference were taken by asking the child to keep their hand up and passing the tape through the nipples.

According to Bamji *et al.,* (2013) head circumference greater than chest circumference in a child after two years indicates the child is at the risk of malnutrition. Hence children were classified accordingly, those who were having head circumference less than chest circumference and chest circumference less than chest circumference. The study was approved to conduct among the anganwadi centers of Trivandrum district by the district programme officer Mrs. Sabeena Mam

III. RESULTS

Results obtained in the study were explained below in various relevant sub headings.

3.1. Mid Upper Arm Circumference of anganwadi children

In order to identify the mortality risk associated with malnutrition Mid Upper Arm Circumference is considered as a better indicator than weight for height (Sreelakshmi, 2019). MUAC of children below 11.00cm indicate severe malnutrition, 11.00cm-12.50cm indicates moderate acute malnutrition, and 12.50-13.50cm indicates at risk of acute malnutrition and 13.50cm are well nourished child [8].

Classification of anganwadi children according to their MUAC measurements are explained in the Table 1.

Results of Table 1, indicates that 46.70per cent of male and female children in the age group of 24-36 months were normal, 46.70per cent of male children and 33.30per cent of female children were at risk and 6.60per cent of male children and 20.00per cent of female children are at moderate level of malnutrition. Majority of children in the age group of 37-48 months are normal and 6.30per cent of male children are at moderate nutrition, while none of the female child are at moderate malnutrition. Majority of children in the age group of 49-60 months are normal and no one was found to be coming under the category of moderate malnutrition. All of the children in the age group of above 60 months were normal and no levels of malnourishment were found.

Table 1. Distribution of children according to their Mid Upper Arm Circumference.

Age group (Month)	Sex	Number	Mean value (15.2cm) SD	Normal	At risk	Moderate malnutrition
24-36	M F	15 15	±1.50 ±1.80	7 (46.70) 7 (46.70)	7 (46.70) 5 (33.30)	1 (6.60) 3 (20.00)
37-48	M F	12 16	±.38 ±.08	10 (83.40) 13 (81.30)	1 (6.30) 3 (18.70)	1 (6.30) 0
49-60	M F	12 16	±1.20 ±.91	11 (91.60) 15 (93.70)	1 (8.40) 1 (6.30)	0 0
Above 60	M F	4 0	±3.70	4 (100.00)	0	0

Values in parenthesis indicates percentage

3.2. Head and Chest Circumference

According to Bamji *et al.,* (2013) head circumference greater than chest circumference in a child after two years indicates the child is at the risk of malnutrition. Hence children are classified accordingly, those who were having head circumference less than chest circumference and head circumference greater than chest circumference were assessed and presented in the Table 2.

Table 2, shows that 13.30per cent of male children and 6.70per cent of female children in the age group of 24-36 months were having their head circumference greater than their chest circumference indicating malnourishment. 6.30per cent of female children in the age group of 37-48 months and 49-60 months were having head circumference less than chest circumference. 8.00per cent of male children in the age group of 49-60 months are malnourished. No one in the age group of above 60 months is having chest circumference less than their head circumference.

Table 2. Distribution of children having head circumference greater than their chest circumference.

Age group (Months)	Sex	Number	Mean value (50.2 cm) SD	No of children having head circumference < chest circumference	No of children having head circumference > chest circumference
24-36	M F	15 15	±.97 ±.87	13 (86.70) 14 (93.30)	2 (13.30) 1 (6.70)
37-48	M F	12 16	±.67 ±.77	12 (100.00) 15 (93.70)	0 1 (6.30)
49-60	M F	12 16	±1.50 ±.86	11 (92.00) 15 (93.70)	1 (8.00) 1 (6.30)
Above 60	M F	4 0	±4.20	4 (100.00) 0	0 0

Values in parenthesis indicates percentage

IV. Discussion

In order to identify the mortality risk associated with malnutrition Mid Upper Arm Circumference is considered as a better indicator than weight for height. Children below 11cm indicates severe malnutrition, 11cm-12.5cm indicates moderate acute malnutrition, and 12.5-13.5cm indicates at risk of acute malnutrition and 13.5cm are well nourished child [8]. Accordingly, 5 children (3 girls and 2 boys) were under the category of moderate malnutrition.

Head circumference and chest circumference of children were also collected. According to Bamji *et al.,* (2013) head circumference greater than chest circumference in a child after two years indicates the child is at the risk of malnutrition.

The chest in a normally nourished child grows faster than head during the second and third years of life. Hence children are classified accordingly, those who are having head circumference less than chest circumference and chest circumference less than chest circumference. 6 children in the study population were having their chest circumference less than head circumference.

One of the significant advantages of anthropometry which make it different from other assessments scales is if a child is deficient in any food in their actual intake physic al activity will be reduced to conserve energy and growth rates will be affected. If that stage continues clinical deficiencies will began to appear [10]. The study needs to be extended to all other districts in order to assess the nutritional status of Anganwadi children all over Kerala state.

V. Conclusion

Measurements of mid upper arm circumference indicates that 3 girls and 2 boys were having moderate malnutrition. 6 children in the study population were having their chest circumference less than head circumference.

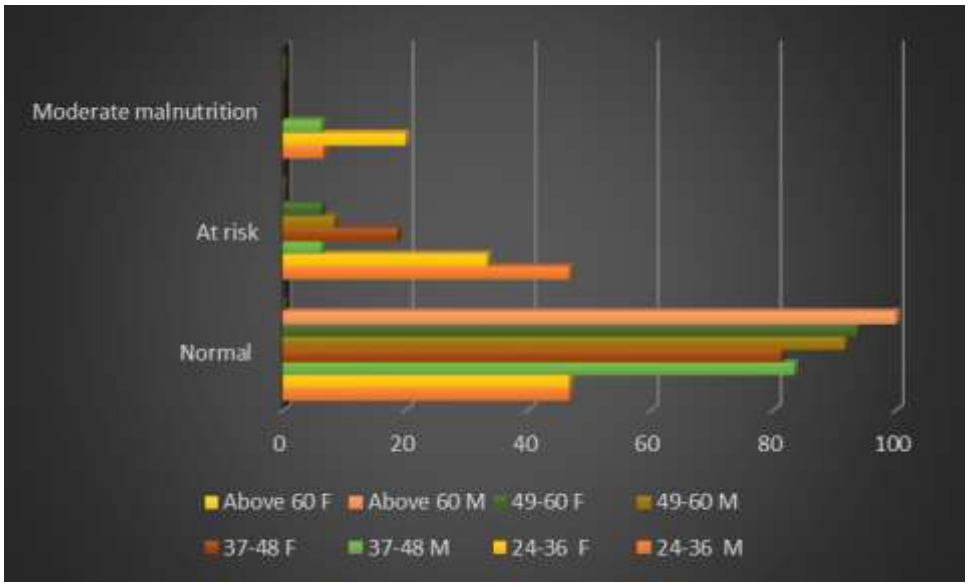

figure 1. muac of anganwadi children

Children showing the indications of malnutrition need to be considered specially. They should be given extra nutrients to meet the anthropometric standards according to their age and sex. Malnutrition need to be identified and treated at the earliest stage as soon as possible. A malnourished child can never grow up to become a normal individual with good nutritional status.

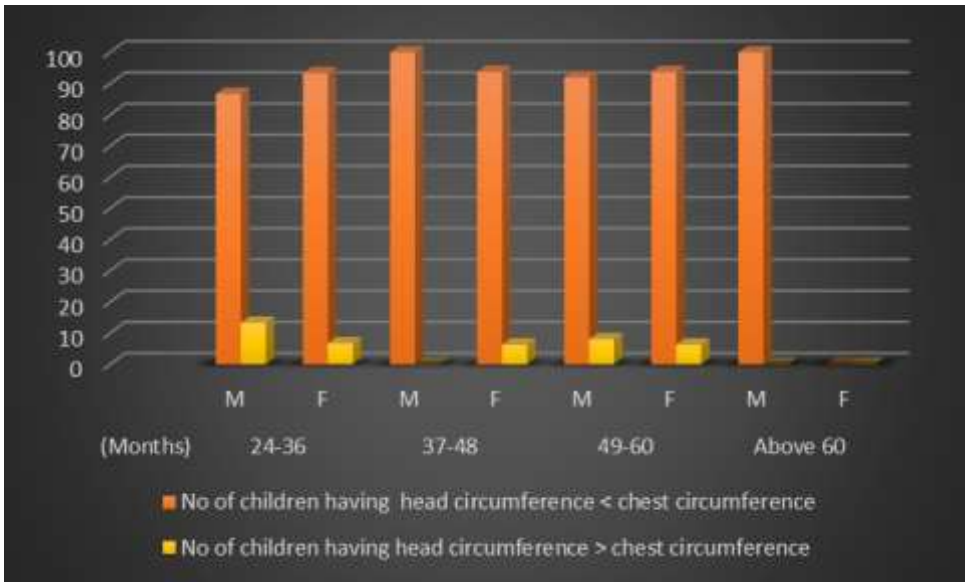

figure 2. distribution of children according to their chest and head circumference.

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