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Supplementation of Ragi Cookies among Under Nourished Preschool Children in Primary Schools at Chennai

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ABSTRACT: A cookie is a baked or cooked good that is small, flat and sweet. It contains flour, sugar and some type of oil or fat. English-speaking countries except for the US and Canada, cookies are called biscuits. Ragi cookie is supplemented for under nourished preschool children. A significant difference was observed between the supplemented days with regards height, weight, mid arm circumference, height for age and weight for age. After supplementation of cookies, children are improved their height and gain weight. It has been concluded that Ragi cookies are well-accepted, rich source of nutrients.

I.INTRODUCTION

In India, Protein Energy Malnutrition(PEM) among children under five years still continues to be a major public health problem, and poor infant feeding coupled to weaning practices are major contributory factors in malnutrition especially among the under fives. Weaning diets of the low-income families are often cereal gruels or regular family diet with or without small quantities of pulses thus inadequate in both calories and proteins. As a result prevalence of PEM along with other micronutrient deficiencies is the order of the day. (Waggle, 2010). Sensory scores revealed the preference of consumers towards formulated cookies. Overall analysis disclosed that the cookies prepared from *A. paeoniifolius* flour proved acceptable not only in quality characteristics but also fulfill the demand of functional foods in preparation of cookies. (Suriya.M, 2017). Childhood and adolescent malnutrition is increasing especially among the low- and middle-income countries. Most of the affected children suffer from hidden hunger because their diets are mainly carbohydrate based. (Ochola and Masibo, 2014).

II. MATERIALS AND METHOD

a).Assessment of Nutritional Status for preschool children:

To assess the nutritional status among children in the age group of 3-5 years. General questionnaires and anthropometric measurements were used for the assessment of mal nutrition. It is a cross-sectional descriptive study. Background information, Lifestyle pattern, Anthropometric measurement, Clinical assessment and Dietary pattern have been collected from the children with the help of their parents. In general, all interviewees are usually asked the same questions and are requested to choose answers from the same set of alternatives. This format is useful only for those who do not have enough practice in interviewing. These types of interviews are also called as structured (Moore, 2014). Anthropometric measurements are measurements of body size, weight and proportions. These measurements can be used to assess nutritional status, as well as growth and development of infants and children. (Lee. R. D, 2012).

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Anthropometric Measurements and Cookies Supplementation for the selected Subjects



b).Supplementation of Ragi cookie among undernourished preschool children

Supplementation of Ragi cookie as well as nutrient rich cereal based cookie among under nourished preschool children in selected Primary Schools at Chennai. Among the 100 samples, 50 were supplemented with the developed product for 60 days. Every day approximately 20 grams of cookies were given to the selected under nourished children. The selected cookies were packed with aluminum foil sheet. Consumption of cereal foods, including in biscuits and

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bread is very popular in Nigeria especially among children and adolescents. Children and adolescents are the main consumers. In support of this, (Olapade and Adeyemo, 2014) affirmed that cookies, otherwise known as biscuits, are popular cereal foods, commonly consumed by the populace, especially the preschool and school-aged children in Nigeria. In Nigeria, consumption of cookies has been observed to be growing continuously which has led to reliance on imported wheat for the production of biscuits and baked products (Giwa EO, 2010). Most of the developing countries interested in the possibility of replacing the wheat needed for baking foods, wholly or partly, with flour obtained from home-grown products (Adeleke RO, 2010).

C). Check anthropometric measurements of children within the supplemented days and Monitoring with the Supplement on (0 day, 20th day, 45th and 60th day)

Supplementation of most accepted and nutrient rich cereal based cookies were given among undernourished preschool children in selected primary schools at Chennai. The anthropometric measurements of children have taken within the supplemented days. Children's growths were monitored for every 15 days. Anthropometric measurements of children have been taken within the supplemented days. Their growth was explained to the teachers in kinder garden schools at each contact and during the last visit to the school (60th day), they were advised about the nutritious food to the undernourished children.

Nutrition intervention programs initially focused on increasing the target population. But sub optimal growth observed in children in developing countries has shown to be related to micronutrients deficiencies as well several studies with single or combined micronutrients supplements, especially zinc and iron improved growth in children but more information is needed or optimal growth (Gopalanetal, 1973).

III. RESULT AND DISCUSSION

ANTHROPOMETRIC MEASUREMENT FOR THE CHILDREN BEFORE SUPPLEMENTATION

ANTHROPOMETRIC MEASUREMENTS FOR THE CHILDREN

Anthropometric measurement	Mean	Std. Deviation
Height at normal	102.712	4.0415
Weight at normal	16.474	1.0973
Height at present	91.168	6.5099
Weight at present	14.152	1.3455
MAC	12.958	1.5662
Height for age	89.022	6.9143
weight for age	86.769	9.7063

The mean value of height at normal for the children were 102.7, the mean value of weight at normal for the children were 16.4, the mean value of height at present for the children were 91.9, the mean value of weight at present for the children were 14.1, the mean value of BMI for the children were 17, the mean value of mid arm circumference of the children were 12.9 the mean value of height for age were 89, and the mean value of weights for age were 86.7. Anthropometric measurements of baby size, weight and proportions. These measurements can be used to assess nutritional status, as well as growth and development of infants and children (Lee RD, 2012).

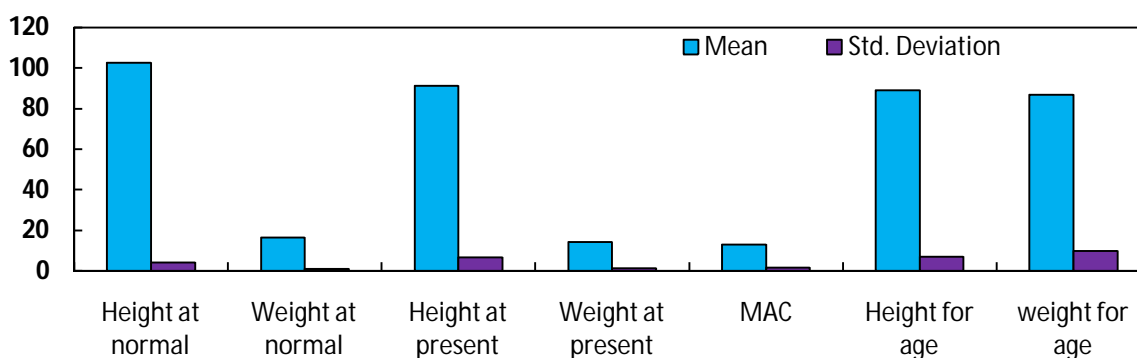
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ANTHROPOMETRIC MEASUREMENTS FOR THE CHILDREN



ANTHROPOMETRIC MEASUREMENTS FOR SUPPLEMENTED DAYS

ANOVA FOR SIGNIFICANT DIFFERENCE BETWEEN ANTHROPOMETRIC MEASUREMENTS WITHIN THE SUPPLEMENTED DAYS

Anthropometrics measurements	Mean and S.D for the supplemented days				F value	P value
	0 day	20 th day	40 th day	60 th day		
Height	90.61 ± 4.89	91.07 ± 4.89	91.49 ± 4.88	91.90 ± 4.88	0.642	0.589
Weight	14.22 ^a ± 1.46	14.65 ^{ab} ± 1.46	15.07 ^{bc} ± 1.47	15.52 ^c ± 1.48	7.168	<0.001**
Mid Arm Circumferences	12.82 ± 1.30	12.97 ± 1.28	13.15 ± 1.30	13.35 ± 1.28	1.615	0.187
Height for age	88.37 ± 5.69	88.81 ± 5.68	89.22 ± 5.68	89.62 ± 5.70	0.449	0.718
Weight for age	86.73 ^a ± 10.1	89.36 ^{ab} ± 10.27	91.93 ^{bc} ± 10.43	94.63 ^c ± 10.52	5.383	0.001**

Note: 1. ** denotes significance at 1% level

2. Different alphabets between days of supplementation denotes statistically significance at 5% level using DMRT

Since $P < 0.01$, there exists significant difference between the supplemented days with regards to anthropometric measurements. Based on DMRT, the children's weight in 1st day of supplementation is significantly differing with the 40th day of supplementation. The Children's Body mass index (BMI) in 1st day of supplementation is significantly differs with in the supplemented days. The children's weight for age in the 1st day of supplementation

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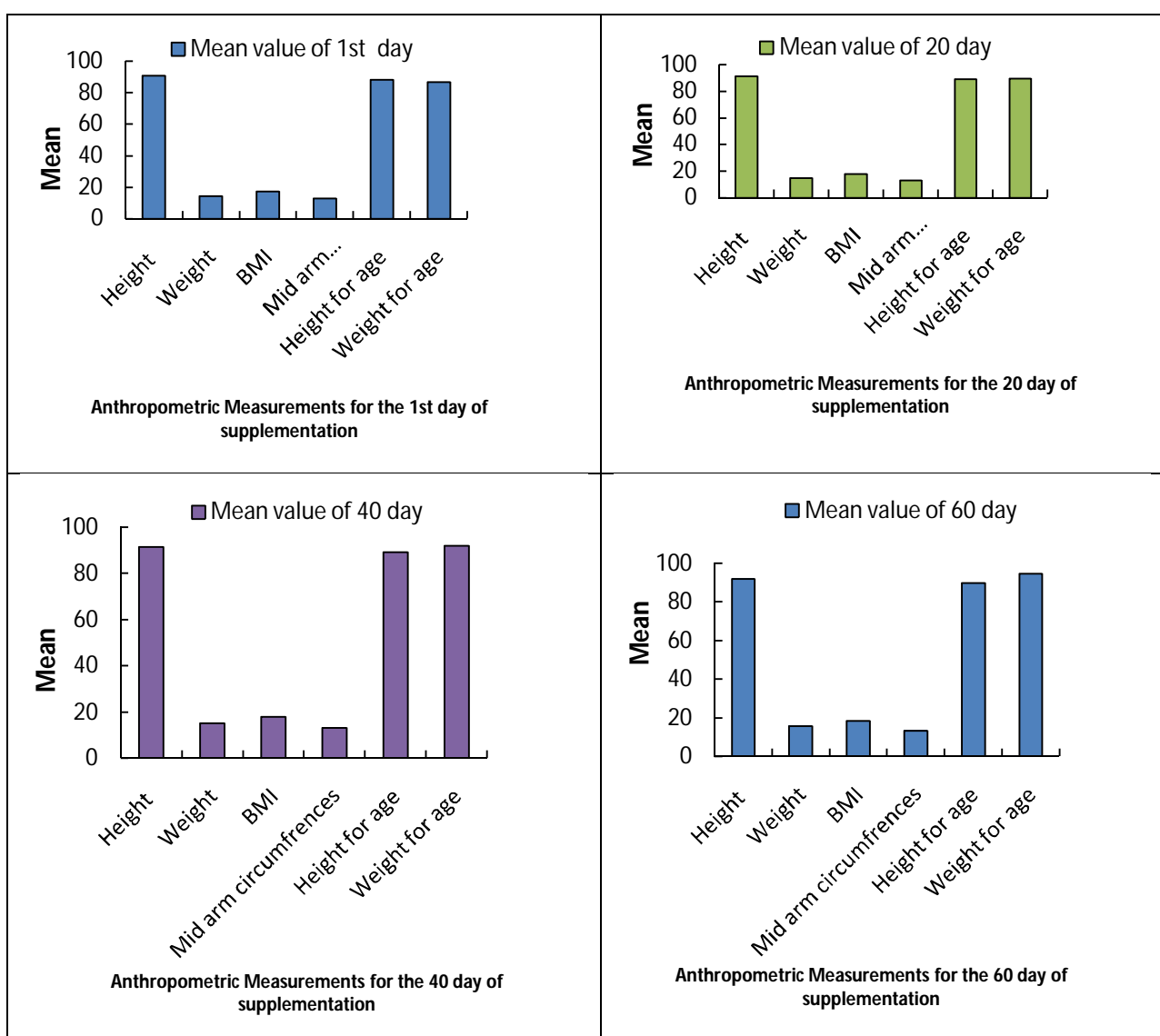
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significantly differs with 40th day of supplementation. There is no significance difference between the supplemented days with regards height, mid arm circumference and height for age.

ANOVA for significant difference between anthropometric measurements within the supplemented days



IV. SUMMARY AND CONCLUSION

This study was focused on the need and important of low cost cereal based cookies and the product development in extending the shelf life of cookies. We have taken into consideration in the present study Children aged between 3 to 5 years, as the brain reaches its full development by the age of five. From the above summary, it is clearly evident that Ragi cookies has rich source of nutritional value. Various factors are taken into consideration for selecting

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the best cookie among the all viz., Analysis of various nutrients found in the cookies, physico chemical properties, organoleptic evaluation, etc. It has been concluded that Ragi cookies are well-accepted, rich source of nutrients and an economical one. The study concluded that at the end of the supplementation there is an significant changes to their nutritional status.

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