ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

ROLE OF DIETARY DIVERSITY SCORES IN PREDICTING MALNUTRITION AMONG PRE-SCHOOL CHILDREN- A QUALITATIVE STUDY

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Abstract

Introduction: A structured questionnaire was utilized to collect socio-demographic data, including age, gender, parental education, occupation, and income, alongside information on dietary diversity scores and anthropometric measurements. To determine dietary diversity scores, we classified various food items consumed into specific food groups and calculated both the "Individual Dietary Diversity Score" (IDDS) and "Minimum Dietary Diversity" (MDD).

Aim and Objectives: This study aims to provide valuable insights into the dietary practices and nutritional health of young children in the region.

Materials and Methods: The research was carried out in the anganwadi centers located in the Guntur district of Andhra Pradesh, involving 156 children aged between 1 and 5 years, comprising 68 females and 88 males.

Results: Among these children, 143 were identified as underweight, and 132 were classified as stunted, indicating prevalence rates of 91.6% and 84.6%, respectively. The prevalence rates for IDDS revealed that 20.5% of children scored less than 9, 57.05% scored between 10 and 11, and 22.4% scored 12 or higher. Regarding MDD, 22.4% of the children had scores of 4 or lower, while a notable 72.5% scored between 5 and 7.

Conclusion: The straightforward nature of Dietary Diversity Scores makes them an effective tool that can be easily utilized by local health workers, including ASHA, Anganwadi workers, and school teachers, thereby enhancing the early detection of malnutrition at both household and community levels.

Keywords: Malnutrition, Dietary Diversity Score, Under Nutrition.

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1. INTRODUCTION

Malnutrition is defined as a pathological condition that results from a deficiency or excess of one or more essential nutrients, whether relative or absolute. It encompasses four primary forms: undernutrition, over nutrition, imbalance, and specific deficiency. Under the umbrella of undernutrition, one finds stunting (chronic malnutrition), wasting (acute malnutrition), and underweight. According to the Global Nutrition Report (2016), more than 800 million people around the world suffer from hunger, and two billion do not fulfil their micronutrient requirements. In India, data from the National Family Health Survey 2015-16 (NFHS-4) reveals that 38% of children under five years are stunted, indicating chronic undernutrition. Furthermore, 21% of children in this age group are wasted, which signifies acute undernutrition, while 36% are underweight, and 2% are overweight. Children are the most at-risk segment of the population, making them particularly vulnerable to the negative consequences of malnutrition. A lack of adequate nutrient intake during childhood can severely obstruct physical development, cognitive growth, and, consequently, their ability to learn and succeed throughout their lives. This situation may lead to lifelong difficulties. Malnutrition in children is often a result of an unbalanced diet and insufficient diversity in their food options. To measure dietary diversity, we apply two essential indicators: the "Individual Dietary Diversity Score" (IDDS) and "Minimum Dietary Diversity" (MDD). These indicators are effective tools for assessing the nutritional quality of an individual's diet. This investigation is set to provide credible insights into the dietary behaviours and nutritional status of young children in the targeted study area (1). By identifying suboptimal dietary choices at an early stage, we can proactively address the immediate causes of malnutrition and lessen the risk of future diseases. Furthermore, understanding the root causes of malnutrition, including food accessibility and availability, will assist in the formulation of nutritional services aimed at supporting underserved communities and rural populations.

Aim and Objectives

This study aims to provide valuable insights into the dietary practices and nutritional health of young children in the region.

2. MATERIALS AND METHODS

A cross sectional observational study was done on preschool children attending the anganwadi centers. Preschool-aged children, specifically those between 1 and 5 years old, who are participants at Anganwadi Centers were included in the study. Parents who refuse to grant consent for their child's involvement in the study will be excluded. Data collection will be conducted through questionnaires employed in the Nutrition Baseline Survey India for the Global Programme on Food and Nutrition Security, Enhanced Resilience. The questionnaire is divided into two sections: Part A: This section gathers socio-demographic information about the participants, including age, gender, parental education, occupation, and annual income. Part B: This section includes inquiries related to dietary diversity scores and anthropometric measurements. Regarding Dietary Diversity Scores: Information on children's dietary intake will be obtained using a 24-hour recall method, wherein mothers will be asked to report the various types of food their children consumed in the 24 hours preceding the interview. Only food items consumed in a minimum quantity of over 15 grams (approximately one tablespoon) will be included. The different food items consumed will be categorized into predefined food

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

groups to calculate the "Individual Dietary Diversity Score" (IDDS) and the Minimum Dietary Diversity (MDD).

3. RESULTS

	MEANS
Age	3.52
Weight	12.54
Height	88.20
BMI	16.00
Wt/age%	31.89
Ht/age%	38.91
Wt/ht%	40.45
Right mid arm circumference	13.55
Left mid arm circumference	13.69
IDDS	40.99
MDD	45.91

Table 1- Table Showing Means of 1-5 Years' Children in different Anthropometric Measurements.

PARAMETRS	SD
Age	1.80
Weight	2.54
Height	10.43
BMI	2.54
Wt/age%	39.21
Ht/age%	44.29
Wt/ht%	49.09
Right mid arm circumference	2.53
Left mid arm circumference	2.61
IDDS	9.69
MDD	9.22

Table 2- Table Showing Standard Deviation (Sd) of 1-5 Years' Children in different Anthropometric Measurements

4. DISCUSSION

This research investigates the significance of the dietary diversity score in forecasting malnutrition among preschool-aged children attending Pedakakani anganwadi centers in the Guntur district of Andhra Pradesh. The study involved a sample of 156 children, aged between 1 and 5 years, from 11 different anganwadi centers. The Mean Dietary Diversity (MDD) score was recorded at 1.17, with 22.6% of participants scoring below 4 and 78.4% scoring above this threshold. It was observed that rice was the predominant food consumed, while lentils, milk, and eggs were regularly provided by the anganwadi centers. In a related cross-sectional study conducted with 379 preschool children in South Africa's North West Province, the Dietary Diversity Score (DDS) was determined by assessing 12 food groups, categorized as low (≤4), medium (5-8), and high (9-12). The findings indicated that 61% of the children had a low DDS, while 39% fell into the medium category. The food group most frequently consumed was

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

cereals, in contrast to fish and seafood, which were the least consumed. In a study conducted by Nazia Binre Ali involving 6,468 children aged 6 to 59 months in rural Bangladesh, the prevalence rates of stunting, wasting, and underweight were found to be 36.8%, 18.2%, and 37.7%, respectively. The prevalence of stunting and underweight was alarmingly high at 84.6% and 91.6%, respectively. The study revealed that almost all children consumed rice (a starch), followed by milk products and eggs provided daily by anganwadi centers, while the consumption of meat products was relatively low. The mean Minimum Dietary Diversity (MDD) was 1.43, with a standard deviation of 1.24. In a different research study, 512 mother-child pairs with children aged 6 to 59 months were randomly chosen for analysis. The mean Z-scores for weight-for-height/length, height/length-for-age, weight-for-age, and BMI-for-age were determined to be 1.35, -1.89, 0.05, and 1.39, respectively. The standard deviations for these Z-scores were 2.03, 1.79, 1.54, and 2.06. The prevalence of stunting and overweight/obesity was observed at 43% and 42%, respectively. Additionally, the rates of stunting and underweight were noted to be 84.6% and 91.6%, respectively. The average percentages for weight/height, height/age, weight/age, and BMI were 40.45%, 38.91%, 31.89%, and 16%, with standard deviations of 49.09, 44.29, 39.21, and 2.54, respectively. A study carried out by Ali Sie' involved a sample of 251 children aged between 6 and 59 months. The findings indicated prevalence rates of stunting, wasting, and underweight at 20.6%, 10.0%, and 13.9%, respectively. Notably, there was no observed association between Dietary Diversity Score (DDS) and wasting in this research. The prevalence rates for stunting and underweight were reported at 84.6% and 91.6%, respectively. In a separate study conducted in Tanzania, which included a population of 2,960 children aged 6 to 23 months, the prevalence rates for stunting, wasting, and underweight were found to be 31%, 6%, and 14%, respectively. Among the participants, 52% were female and 48% were male, with a significant majority (74%) failing to meet the Minimum Dietary Diversity (MDD) criteria. The diet predominantly consisted of grains, roots, and tubers, which represented 91% of the total food intake, followed by vitamin A-rich fruits and vegetables at 65%. The consumption of eggs was noted at 7%, while meat and fish were consumed by 36%. Milk and dairy products accounted for 22% of the diet, with legumes and nuts at 35%, and other vegetables at 21%. The prevalence of stunting and underweight among children was recorded at 84.6% and 91.6%, respectively. Among the children surveyed, 43.5% were female and 56.4% were male. Furthermore, 22.4% of the children did not achieve the Minimum Dietary Diversity (MDD). The regular consumption of grains, roots, tubers, legumes, nuts, and other vegetables, along with milk and eggs, was facilitated by the daily provisions from anganwadi centers, while the intake of vitamin A-rich fruits and vegetables, as well as meat and fish, was notably less frequent. Jacob P Beckerman-Hsu conducted a study in India involving a population of 67,247 children aged 6 to 23 months. The study revealed that 80.3% of the children experienced dietary failures, while 53.7% had at least one anthropometric failure. The prevalence of stunting and underweight among the children was recorded at 84.6% and 91.6%, respectively. Furthermore, 86.6% of the children exhibited at least one anthropometric failure. In a separate study by Jessica M Perkins in Sri Lanka, the research focused on children aged 6 to 59 months, assessing dietary diversity through a 24-hour recall method across seven food groups, with a minimum dietary diversity score of four or higher being necessary. The prevalence of stunting, wasting, and underweight among the population was determined to be 15%, 21%, and 26%, respectively. Furthermore, the occurrence of inadequate dietary diversity was reported at 9%. A significant association was observed between dietary diversity scores and malnutrition in children aged 24 to 59 months. The prevalence rates for stunting and underweight were notably high at 84.6% and 91.6%, respectively. The Minimum Dietary Diversity (MDD) score was derived from seven

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

food groups, with 35 children (22.4%) scoring ≤4 and 121 children (72.5%) scoring between 5 and 7. This suggests a link between dietary diversity and malnutrition. In a study conducted in Nigeria by Ukegbu Patrica Ogechi and Ogu Victoria Chilezie, the Dietary Diversity Score (DDS) was calculated based on a 24-hour recall of the child's food intake, categorizing the scores into percentiles: low (≤4), medium (5-8), and high (9-12). The results reveal that the average age of the children was 3.52 years, with a standard deviation of 1.8 years. In terms of gender, 52.4% of the participants were male, while 48.6% were female. The rates of stunting, wasting, and underweight were found to be 12.5%, 4.4%, and 2.5%, respectively. The mean Dietary Diversity Score (DDS) for all food groups was 6.09, with a standard deviation of 4.21. The DDS was assessed using a 24-hour recall method, which involved counting seven different food groups, with scores categorized as less than 5 and between 4-7.

5. CONCLUSION

This investigation represents a crucial source of information regarding the dietary habits and nutritional conditions of young children in our research area. Its capability to identify inappropriate dietary behaviours at an early stage holds significant promise for preventing immediate factors contributing to malnutrition and the subsequent emergence of related health issues. Furthermore, our exploration of the fundamental causes of malnutrition, including food accessibility and availability, establishes a framework for developing targeted and effective nutritional interventions, especially for marginalized and rural populations. Should this study confirm a robust link between Dietary Diversity Scores and childhood malnutrition, it could provide a critical basis for more extensive confirmatory studies. The user-friendly nature of Dietary Diversity Scores allows for their practical application by grassroots health workers, such as ASHA, Anganwadi workers, and school teachers, enabling the early identification of malnutrition at both household and community levels. Additionally, our findings emphasize the protective role of increased maternal education and higher household wealth in combating childhood stunting and undernutrition. They further suggest that enhancing dietary diversity could be a viable strategy for reducing the prevalence of stunting and chronic malnutrition among the youngest members of our communities.

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ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 12, 2024

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