



EXAMINING THE EFFICACY OF DIETARY SUPPLEMENTS IN ALLEVIATING NUTRITIONAL AND HEALTH ISSUES IN PEDIATRIC POPULATIONS

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Abstract

This study explored nutritional supplement attributes and consumption trends among youngsters facing dietary and health challenges. Surveying 2,100 parents of preschoolers, logistic regression models identified factors predicting supplement consumption, differentiating between vitamins/minerals and those with additional substances. The study investigated perspectives of parents not administering supplements. Approximately 15% of children reported supplement use, influenced by parental characteristics and a preference for natural products. Safety outweighed efficacy, with limited awareness of public authorities' food systems. Parents knowledgeable about child-specific vitamins made informed choices. These findings illuminate factors influencing parental decisions on nutritional supplements for preschoolers, emphasizing the need for targeted educational efforts to enhance awareness and informed decision-making.

Keywords: Dietary supplement; Nutrition deficiency; Children; Health.

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1. Introduction

One of the most important things we can do for a country is to raise healthy children who will be its future leaders. This goal's development may be measured using numerous health indicators developed by WHO. One such indicator is how well-nourished children under five years of age are. As defined by the World Health Organization (WHO), health is not only the absence of disease or illness. The physical aspect can be measured in numerical data and compared, even if it is equally vital as the other parts of it [1]. A child's healthy growth and development depend on their diet. When it comes to healthy development, the first five years of a child's life are critical. Children are especially susceptible to growth retardation, micronutrient deficiencies, and common childhood illnesses such as malnutrition, diarrhea, pneumonia, and acute respiratory infections [2]. More than just a source of calories and macronutrients, food is also a symbol of safety and civilization in our increasingly precarious modern world. Bread binds nations and civilizations together as much as any other common denominator. Yet, there are food shortages in many parts of the globe. Throughout history, hunger and malnutrition have been a constant source of ill will and conflict for humans. If hunger and malnutrition are rising, it is no surprise that they have become a major worldwide problem. There are several benefits to a well-balanced diet, such as providing enough energy and nutrients to sustain good health and a little reserve for emergencies like leanness in the future. Malnutrition in children may be caused by a lack of a well-rounded diet [3].

Today, malnutrition is a severe public health issue across the globe, especially for young children under five. Over half of the world's malnourished population suffers from protein-energy malnutrition (PEM). The nutritional profile of a community may be gleaned from data on the health of its children [4]. For the most part, preschool is a sensitive time for a child's growth and development. Keeping diseases like kwashiorkor and marasmus at bay requires an increased intake of energy-giving and protein-rich foods due to increased physical activity [5]. Children's malnutrition is a significant cause of death among the undernourished in India, as well as in many other nations throughout the world. Policymakers and scholars have been interested in the issue for many years now. Child malnutrition is a complex problem that has been studied extensively. While malnutrition has been linked to diverse factors including poverty, restricted healthcare access, inadequate awareness of nutrition and health, and

societal rules that discourage females 'tutoring, these research suggest that undernutrition does not stem from an only underlying source [6].

In Western societies, the consumption of dietary supplements has risen over the past few decades among individuals of all age brackets, with the aim of enhancing physical performance, preventing illness, and adopting healthier lifestyle practices [7]. "Dietary supplements" are concentrated nutrient sources or other substances with physiological or nutritional effects that, when added to a normal diet, increase total caloric intake. They are offered for sale as liquids, pills, tablets, capsules, and other dose-controlled forms [8,9].

Recent findings by Bailey et al., who assessed the prevalence of dietary supplement usage in the U.S. population through NHANES 2003–2006, reveal that 43% children in the 4–8 age group utilized health supplements, while 26% teenagers aged 14–18 were observed using them [10]. The use of dietary supplements is impacted by a number of factors, such as gender, age, education level, socioeconomic status, place of residence, and ethnicity. High school students, women, those living in rural regions, and people from higher socioeconomic backgrounds were the groups most likely to use supplements, according to Korean research of healthy teenagers [11]. The purpose of the present study was to look at the characteristics and use of dietary supplements for kids who have health and nutritional problems.

2. Material and method

2.1 Participants

From May to September 2020, 2,100 parents of children attending 21 cooperative kindergartens and childcare facilities were surveyed. The first category includes institutions that care for children older than three years for an average of four hours daily. Since these places are for child welfare, they can take care of kids under 1 year old while their parents are at work. However, to accommodate their parents' work schedules, they often care for 8 hours daily. 1,500 parents participated in the survey, with 96.5 per cent female and 72.6 per cent in their 30s (effective recovery rate: 72.1%). As long as you answered all of the questions truthfully, your participation in the survey was deemed informed. India's National Institute of Health and Nutrition Research Ethics Committee approved this study's conduct.

2.2 Questionnaires

This descriptive study employed a self-structured questionnaire distributed at kindergartens and childcare centers. Surveyors collected forms once

completed by the creche or kindergarten. The questionnaire covered information such as children's age, number of siblings, social background, parents' age and gender, and birth order. Food components, categorized as granules, capsules, chewable tablets, powders, tablets, or extracts, were identified as supplement types based on criteria similar to those used in the United States for dietary supplements. Participants were grouped into four supplement usage categories: "daily usage," "occasional use," "past use," and "never used."

Parents' opinion on nutrition: Indian parents expressed worry about their youngster's dietary habits through the NHNS ("National Health and Nutrition Survey"), which also investigated the parents' awareness of these issues. The frequency with which such labels were used indicated the parents' degree of interest in nutrition. To gauge the participants' level of nutrition knowledge, they were also given questions regarding the dietary balancing guide and the average daily calorie intake. To promote awareness regarding the importance of maintaining a healthy diet among the Japanese populace, the MHLW (Ministry of Health, Labor, and Welfare) collaborated with the MAFF (Ministry of Agriculture, Forestry, and Fisheries) to formulate a guide for dietary balance. This guide outlines the components of a nutritional intake and offers recommendations on the appropriate quantities of food to be consumed.

Exploring Children's Use of Supplements: A comprehensive nationwide survey on supplementation delved into various aspects. The survey included inquiries about the age at which children commenced supplement intake, the ingredients they encompassed (including vitamins and minerals), the forms they were available in, their intended purposes, the perceived effects on health, the purchasing sources, and the associated costs.

Parents of non-supplement users: Regarding children who abstain from supplement intake, parents should be queried about their knowledge regarding children's supplements, the suitable age for initiating supplement usage in kids, the likelihood of children using supplements, and their sentiments about children utilizing such augmentations.

2.3 Analysis of data

In comparing characteristics between children's supplement users and non-users, the supplement users were categorized into two groups: those

using only minerals and vitamins (Mineral-Vitamin group) and those using additional components (Non-Vitamin-Mineral group). Parents who didn't provide supplements were grouped based on their agreement levels regarding supplement provision. Continuous data between groups were compared using the t-test, while the chi-square test assessed categorical variables. Data analysis utilized SPSS 25.0 for Windows, with a p-value of 0.05 denoting statistical significance.

3. Results

3.1 Parental and Child Utilization of Supplements

The following are the results of supplement consumption by kids: "Daily usage" accounted for 2.1 per cent, "occasional use" for 7.0 per cent, "past use" for 5.9 per cent, and "never used" for 85.0 per cent of those polled, according to the findings. There was 11.8 per cent of "daily use" participants, 27.5 per cent of the "occasional use" participants, 34.0 per cent of the "past use" participants, and 26.7 per cent of the "never use" participants whose parents had previously used drugs. ANOVA was used to analyze these four categories of supplements since they were suggestive of parents' purchase habits. For daily, occasional, and prior usage, there was no statistically significant difference between the three groups. Accordingly, the three groups were labelled "users," and the "have never used" group was labelled "nonusers" throughout the remainder of the research.

3.2 Traits of Individuals Utilizing Nutritional Supplements

There was a significant difference in the mean age of children between those who used and those who did not ($p < 0.01$). Also, supplement consumption in kindergarten was substantially more significant than in daycare facilities ($p < 0.01$). Over half of respondents said that their children's nutritional habits needed improvement and that they wished they could do more to fix them. However, these parents' attitudes unaffected the children's supplement consumption. Parents of children who used nutritional labels were substantially more likely than nonusers ($p < 0.01$) to consult these labels whether eating out or shopping for food. Only approximately a quarter of Indian parents were familiar with two critical pieces of nutrition and food information developed by their country's government: the Dietary Reference Intakes (DRIs) and the Dietary Balance Guide (DBG). The fact that parents were aware of this information had nothing to do with their children's usage of supplements. Supplement consumption by parents

and children is linked ($p < 0.01$). Research on supplement consumption in children has shown that three features are independent predictors. Children's affiliations, parents' usage of nutritional labels, and parent supplementation were all addressed in the survey. Parents' usage of dietary supplements was positively correlated with the frequency with which they consulted nutrition labels and the number of dietary supplements they used on their children.

3.3 Specifics Regarding the Utilization of Supplements in Youngsters

Moreover, half (58%) of supplement users were taking vitamins and minerals solely, whereas the rest (32.5%) had previously used non-mineral/vitamin supplements. Fish oil (44.6 per cent), proteins (9.5 per cent), xylitol (11.8 per cent), vinegar (8.1 per cent), and herbs (8.1 per cent) were the most often reported non-Vitamin/Mineral supplements (4.1 per cent). The non- Mineral/Vitamin group was more likely than the Vitamin/Mineral group to have begun supplement usage at one year. However, the mean

age at which both groups first began supplement use was comparable.

Supplement usage by youngsters was compared between the Vitamin/Mineral and non-Vitamin/Mineral groups (Table 1). "Occasional" supplement usage was the most common response from both groups, while a few youngsters said "daily." In both categories, chewable or regular tablet vitamins were the most popular. Among those who did not take vitamins or minerals, capsules and powders were more popular than tablets. More than two-thirds of parents provided their children with goods that were "similar to those prepared for adults" or for which they were "not positive about their appropriateness for children". Both groups cited nutritional supplements as the most important goal. In contrast to the Mineral / Vitamin group, members in the non-Vitamin/Mineral group often cited health promotion and illness prevention as their primary goals. Regarding the sources of information, there were no significant variations among the two groups; the most common sources were over-the-counter, acquaintances and friends, and newspapers and magazines.

	Non-Vitamin Mineral Supplement group	Vitamin-Mineral Supplement group	P-value
Dosage form			
Granule	11.6%	15.9%	Insignificant
Tablet	48.5%	40.0%	Insignificant
Chewable	43.5%	55.2%	Insignificant
Capsule	48.5%	40.0%	<0.01
Powder	15.9%	6.2%	<0.05
Extract	1.4%	0%	Insignificant
Usage frequency			
Daily	20%	43%/11%	Insignificant
Occasional	48%	11%/45%	Insignificant
Past	31.1%	45%/43%	Insignificant
Purchase observation			
Inexpensive	17%	18.4%	Insignificant
Without additives	40%	36%	Insignificant
Non-allergenic	12%	10.7%	Insignificant
Foods for Nutrient Function Claims	28.4%	34%	Insignificant
Marketed aggressively	7.5%	8.5%	Insignificant
Well-known manufacturer	15%	24%	Insignificant
Natural materials	49.3%	33.3%	<0.05
Nutritional labels	43.3%	41.9%	Insignificant
Usage Purpose			
Chronic condition management	2.9%	1.4%	Insignificant
Physical stamina	5.9%	2.8%	Insignificant
Correcting constipation	4.4%	7.6%	Insignificant
Physical strength	8.8%	4.4%	Insignificant
Body constitution	19%	9.7%	Insignificant
Health prevention	41.2%	20.8%	<0.01
Disease promotion	35.3%	12.5%	<0.01
Nutritional supplement	57.4%	70%	Insignificant
On the basis of consultation			
Acquaintances and friends	29.4%	17.4%	Insignificant
Store clerk	8.8%	15.3%	Insignificant

Relatives and family	16.2%	17.4%	<0.05
Nutritionist	1.5%	3.5%	Insignificant
Pharmacist	11.8%	11.8%	Insignificant
Physician	10.3%	6.3%	Insignificant
None	42.6%	45.8%	Insignificant
Points to be noted while purchasing			
Efficacy	7.4%	9.7%	-
Safety	89.7%	88.2%	-
Neither	2.9%	2.1%	-
Opinion on efficacy on the basis of feeling			
Yes	53.7%	37.9%	-
No	46.3%	62%	-
Usage precautions			
Nothing	6%	10.4%	<0.05
Take regular meals	58.2%	59%	Insignificant
Avoid taking more than two types of supplements	13.4%	11.8%	Insignificant
Observe specified quantity	71.6%	74.3%	Insignificant

Of the products purchased, 41.7 percent came from pharmacies, while the remaining 37.4% came from online and catalogue sources. People who did not belong to the Vitamin/Mineral group often referenced natural materials instead of food additives or assertions about the functions of nutrients. Nonetheless, individuals who were vitamin/mineral noted nutritional labels more often. When making purchases, both groups gave security a high priority (greater than 80%). Children's supplements are often administered without consulting physicians, chemists, or dietitians. Participants in the Nonvitamin/Mineral category consulted with acquaintances, friends, and relatives more frequently than Vitamin/Mineral category ($p < 0.05$). Approximately 60% of users embraced the guideline to "Maintain regular meal patterns," while more than 70% of users adhered to the recommendation of "Monitor the specified

quantity." In comparison to the Vitamin/Mineral group, a higher proportion of parents in the Nonvitamin/Mineral group perceived the supplement as beneficial ($p < 0.05$).

3.4 Parental Views on Children Abstaining from Supplement Consumption

Of the parents whose children did not take supplements, 30.5% ($n=359$) did not know that there were supplements made specifically for kids ($n=362$). These groups were utilized for further study; the former was called the "aware group," and the latter the "unaware group" (Table 2). Anyone between the ages of 1 and 60 may consume supplements; nevertheless, the average age of the uninformed group was significantly higher ($p < 0.01$). Parents who were aware of their children's supplement use differed significantly from those who were unaware of it ($p < 0.01$).

	Familiarity with Dietary Supplements for Pediatric Use		P-value
	Aware group	Unaware group	
Children's use opinion			
Should not be consumed at all	10.6%	13.6%	<0.001
Only if necessary	70.3%	74.4%	<0.001
Allowable	19%	12%	<0.001
Possible to give own child			
Yes	32.2%	44.6%	<0.001
No	67.8%	55.4%	<0.001
Permitted age	14.7±6.0	13.1±5.7	<0.001
Total	30.5%	69.5%	

4. Discussion

International interest has grown in nutritional supplements, such as vitamins, minerals, and other supplemented natural components. However, these high-risk individuals are more likely to have negative reactions if these supplements are used inappropriately, especially by young children. In

order to better understand the factors and motivations behind supplement use, a study of kids in seven Indian prefectures was conducted. Supplement use is not as frequent as it is in the United States, as seen by the 15% of children under six who reported using them [12–14]. A recent survey found that 69% of parents whose children

did not take supplements did not know that there were supplements made especially for kids. Therefore, a lack of awareness of children's supplements may be the cause of the low frequency of supplement use in this research. Adult supplement use has increased in the US [15–17], and Japan [18–20] has seen comparable increases. Parents who were aware that supplements were available often had positive opinions about their children's use of them. These opinions are evident in the fact that they chose an early age at which to begin taking supplements and indicated a high likelihood of supplementing their kids. Therefore, it is anticipated that as children's supplements become more generally recognized and more readily available, their use will increase.

Three factors in this study support children's supplement use, the researchers found. The use of supplements by parents and the way that families interpreted nutritional labels were all variables in this research. On the other hand, parents who supplement their food on a regular basis are seventy percent more likely than those who do not to give their kids vitamins. Prior American research has shown that supplement use by parents has a major influence on the health of their offspring [21, 22]. These findings were expected since children are incapable of making judgements about the use of supplements. Children's supplementation is thus dependent on their parents. Children who get supplements are more likely to do so if their parents are involved and follow nutrition labels. There is a connection between parents' interest in food, nutrition, and their kids' well-being and their kids' supplement use, according to other studies [21, 23]. These results corroborate those of the preceding investigations. Rather than wanting their children to eat a diet high in nutrients, parents may add vitamins and minerals to their meals out of curiosity or a sense of obligation. This questionnaire revealed the use of non-vitamin/mineral supplements as well as parents' false beliefs about supplement use. Conversely, non-vitamin/mineral compounds need to be used cautiously since there is not always evidence of their safety or efficacy. We divided the supplements into two categories—vitamin/mineral and other substances—in order to analyze the study's findings.

Consequently, 32.5% of supplement users were aware that their supplements included non-Vitamin/Mineral components. In Japan, there are somewhat more people who do not take vitamin or mineral supplements than in the US, where over

80% of children who take supplements do so. It is important to note that 8.1% of children utilize prescription drugs and herbal supplements. In general, children who ingest these herbs may have unfavorable side effects since they have not been well investigated to establish their safety or usefulness. Interest in this subject has grown as a result of safety concerns about adult and pediatric herb usage [22, 24]. According to this study, parents may have erroneous beliefs and unreasonable expectations about dietary supplements. Parents can verify their kids are safe by looking for nutritional labels on supplements and making safety their first priority when making purchases. A common trait among parents who supplemented with non-nutritional minerals or vitamins was their aim to enhance their kids' well-being and prevent illness. There might be a connection between this issue and the media's oversupply of information. Consumption patterns and supplement use are greatly impacted by media content, which is often exaggerated yet is accepted by viewers as accurate [25]. The nutritional Reference Intakes, which provide nutritional guidelines for Indians, were unknown to less than 20% of the parents surveyed in this research. However, food labels that included nutritional claims about the required amount and health advantages of certain vitamins and minerals for Indians were taken into account. The results of this research show how difficult it is for parents to learn enough about nutrition and nutritional labels due to a deluge of media information and poor consumer-expert communication.

There are some inherent shortcomings in the present research. First, the results of this study cannot be applied to the entire population of India, since the subjects were not typical of that group. Secondly, because self-reporting was the only method used to gather data, it is probable that some of the information respondents submitted was inaccurate. Consequently, the data do not support any causal inferences. Third, respondent load constraints prevented the collection of the parent's income and educational background.

5. Conclusion

Relying too much on supplements might cause growing children who are still learning proper eating habits to despise the need of regular, well-balanced meals. It could be harder for youngsters to maintain a healthy diet in the future if supplements are easily accessible. Promoting precise nutrition and diet information for parents, emphasizing the importance of a balanced diet for

children, and advocating for comprehension of the food labeling system are crucial. Examining the impact of supplement usage on the daily or extended practices of participants of study and understanding its influence on parent-child relationships is essential for developing an effective approach to address supplement use.

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