

An evaluation of dietary supplements for children with nutritional and health problems

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Abstract

Aim: This research aimed to investigate the features and utilization of dietary supplements for children with nutritional and health issues.

Method: For this study, a sample of 2,100 parents of preschoolers were polled to find out how many of them use nutritional supplements, as well as how they feel about their children using them. Using logistic regression models, it was determined which features predicted supplement usage among this cohort. Children who took supplements were divided into two groups based on whether they simply took vitamins and minerals or took supplements with other ingredients, which allowed researchers to characterize them more precisely. Specifically, the researchers looked at the attitudes and understanding of parents who didn't utilize supplements on their children.

Result: Approximately 15% of youngsters had used nutritional supplements. Parental characteristics, such as how often they consulted nutrition labels and whether or not they used supplements themselves, had a substantial positive impact on their children's supplement usage. The parents of children who took supplements had a poor understanding of the government's diet and food system, prioritized safety over effectiveness, and chose products with natural components rather than seeking professional advice from experts. Nevertheless, there was a favourable reaction from these parents, particularly those aware of the child-specific supplements.

Conclusion: According to the research findings, their current level of understanding is woefully inadequate. Nutrition, food consumption, and dietary supplements must be better documented and distributed.

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

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, diarrhoea, 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. Even while malnutrition has been linked to a variety of variables, such as poverty, lack of access to health care insurance, lack of knowledge about nutrition and health, and societal norms against women seeking education, these studies show that malnutrition does not have a single root cause [6].

Consumption of nutritional supplements has expanded over the last several decades across all age groups in the West as a means of illness prevention, correcting unhealthy lifestyle choices, and enhancing physical performance [7]. "Dietary supplements" refers to concentrated sources of nutrients or other substances having a nutritional or physiological impact that increases the total amount of calories consumed when added to a regular diet. They are sold in dose-controlled forms, such as pills, tablets, capsules, liquids, etc. [8,9].

According to recent data supplied by Bailey et al., who used the NHANES 2003–2006 to estimate dietary supplement usage in the US population, it was found that 4–8-year-old children used nutritional supplements at a rate of 43 percent, compared to 14–18-year-old teenagers at a rate of 26 percent [10]. Numerous variables, including gender, age, education level, socioeconomic situation, area of residence, and ethnicity, impact the usage of dietary supplements. According to a Korean study of healthy teens, high school students, women, residents of rural areas, and those with high socioeconomic positions were most likely to utilize supplements [11]. The current research aimed to investigate the features and utilization of dietary supplements for children with nutritional and health issues.

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 percent female and 72.6 percent 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

We conducted descriptive research using an anonymous, self-reported questionnaire. Kindergartens and daycare facilities were the locations where the questionnaire was handed out. Sheets from each kindergarten or daycare facility were sent to the surveyors as soon as they were gathered. Below is a list of the questions that were asked.

The parents' age and gender, the birth order, the social context, the number of siblings, and the children's age, were all gathered.

According to the criteria comparable to dietary supplements in the United States, they were described as food ingredients in granule, capsule, chewable tablet, powder, tablet, or extract form in the present study. "Daily usage," "occasional use," "past use," and "never used" were the four types of supplementations used by parents and children.

Parents' views on nutrition: Concerns about their children's food were expressed via the National Health and Nutrition Survey in India, which asked about the parents' knowledge of these concerns. The level of interest in diet shown by parents was deduced from the frequency with which those labels were utilized. In addition, participants were quizzed on the typical daily calorie intake and the dietary balancing guide to see how much they knew about nutrition. The Japanese Ministry of Health, Labour and Welfare and the Ministry of Agriculture, Forestry and Fisheries collaborated on developing a dietary balance guide that outlines a healthy diet and estimates how much food should be consumed to educate the Japanese public on the importance of eating healthfully.

A look at supplement usage in children: a nationwide survey concerning supplementation: how old were they when they started taking them, what kinds of ingredients were in them (Vitamin/Mineral and others), what form they came in, what they were used for and how they felt about the effects they had on their health, where they bought them from, and how much they paid for them.

Parents of non-supplement users: The following questions should be asked about kids who don't take supplements: how much the parent knows about supplements for kids, what age should be permitted for supplement usage, how likely it is that kids will take supplements, and how they feel about kids using supplements.

2.3 Data analysis

Children's supplement users were compared to nonusers in terms of their characteristics. For the sake of comparison, the youngsters taking the supplements were separated into two groups: those who had only used minerals and vitamins (the Mineral - Vitamin group) and those who had used additional components (the Non-Vitamin-Mineral group). Parents who did not offer supplements to their children were divided into groups based on how much they

agreed with the notion of giving supplements to children. The t-test was used to compare continuous data between groups, while the chi-square test was employed to compare categorical variables. SPSS 25.0 for Windows was used to analyze the data, and a p-value of 0.05 was used to indicate statistical significance.

3. Results

3.1 Supplement use in parents and their children

The following are the results of supplement consumption by kids: "Daily usage" accounted for 2.1 percent, "occasional use" for 7.0 percent, "past use" for 5.9 percent, and "never used" for 85.0 percent of those polled, according to the findings. There was 11.8 percent of "daily use" participants, 27.5 percent of the "occasional use" participants, 34.0 percent of the "past use" participants, and 26.7 percent 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 Characteristics of dietary supplement users

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 Details of supplement use by children

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 percent), proteins (9.5 percent), xylitol (11.8 percent), vinegar (8.1 percent), and herbs (8.1 percent) were the most often reported non-Vitamin/Mineral supplements (4.1 percent). 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.

Table 1 Status of supplement use by children

	Non-Vitamin Supplement group	Mineral	Vitamin-Mineral Supplement group	P-value
Dosage form				
Chewable	43.5%		55.2%	Not significant
Extract	1.4%		0%	Not significant
Granule	11.6%		15.9%	Not significant
Powder	15.9%		6.2%	<0.05

Capsule	48.5%	40.0%	<0.01
Tablet	48.5%	40.0%	Not significant
Frequency of use			
Past	31.1%	43%	Not significant
Daily	20%	11%	Not significant
Occasional	48%	45%	Not significant
Observed/Noted at purchase			
Extensively marketed	7.5%	8.5%	Not significant
Inexpensive	17%	18.4%	Not significant
Foods for Nutrient Function Claims	28.4%	34%	Not significant
Non-allergenic	12%	10.7%	Not significant
Without additives	40%	36%	Not significant
Nutritional labels	43.3%	41.9%	Not significant
Natural materials	49.3%	33.3%	<0.05
Well-known manufacturer	15%	24%	Not significant
Purpose of use			
Management of a chronic condition	2.9%	1.4%	Not significant
Physical stamina	5.9%	2.8%	Not significant
Physical strength	8.8%	4.9%	Not significant
Correcting constipation	4.4%	7.6%	Not significant
Body constitution	19%	9.7%	Not significant
Disease prevention	35.3%	12.5%	<0.01
Health promotion	41.2%	20.8%	<0.01
Nutritional supplement	57.4%	70%	Not significant
Consulted with			
Store clerk	8.8%	15.3%	Non-significant
Acquaintances and friends	29.4%	17.4%	Not significant
Family and relatives	16.2%	17.4%	<0.05
Pharmacist	11.8%	11.8%	Not significant
Nutritionist	1.5%	3.5%	Not significant
Physician	10.3%	6.3%	Not significant
None	42.6%	45.8%	Not

			significant
Important points when purchasing			
Safety	89.7%	88.2%	-
Efficacy	7.4%	9.7%	-
Neither	2.9%	2.1%	-
Felt efficacy			
No	46.3%	62%	-
Yes	53.7%	37.9%	-
Precautions for use			
Nothing in particular	6%	10.4%	<0.05
Eat regular meals	58.2%	59%	Not significant
Do not take more than two types of supplements	13.4%	11.8%	Not significant
Observe specified quantity	71.6%	74.3%	Not significant

41.7 percent of the items were bought via pharmacies, while the rest came from online and catalogue sources (37.4 percent). Natural materials, rather than food additives or nutrient function claims, were commonly mentioned by individuals who were not in the Vitamin/Mineral group. Still, nutritional labels were more frequently mentioned by those who were Vitamin/Mineral. Both groups placed a high value on security while making purchases (more than 80 percent).

Supplements for children are often given without seeking advice from health experts like pharmacists, nutritionists, or doctors. Nonvitamin/Mineral group members sought advice from family members, friends, and acquaintances more often than those in the Mineral/Vitamin group ($p < 0.05$). More than 70% of the users took the precaution of "Observe the specified quantity", and almost 60% of the users took the precaution of "Eat regular meals." More parents in the non-Mineral / Vitamin group felt the supplement administered was effective than in the Vitamin/Mineral group ($p < 0.05$).

3.4 Parents' perspectives on children who don't take supplements

30.5% ($n=359$) of parents whose children did not use supplements were unaware that children's-specific supplements existed ($n=362$). The former was designated as the "aware group" and the latter as the "unaware group," and these categories were used for further analysis (Table 2). Supplements may be used by anybody between the ages of 1 and 60; however, the average age of those who were ignorant was substantially greater ($p < 0.01$). There was a significant difference between informed parents and those who were oblivious regarding their children's usage of supplements ($p < 0.01$).

	Awareness of supplements for children		P-value
	Unaware group	Aware group	
Opinion of children's use			
Should not be used at all	13.6%	10.6%	<0.001
Only if necessary	74.4%	70.3%	<0.001
Allowable	12%	19%	<0.001
Possible to give own child			
No	67.8%	55.4%	<0.001
Yes	32.2%	44.6%	<0.001
Allowable age	14.7±6.0	13.1±5.7	<0.001
Total	30.5%	69.5%	

4. Discussion

Nutritional supplements, such as vitamins, minerals, and other natural compounds that have been supplemented, have gained international interest. However, inappropriate use of these supplements, particularly by young children, may lead to unpleasant responses, which are more likely to occur in high-risk populations like these. As a result, a

survey of children in seven prefectures in India was done with the purpose of better understanding the reasons and features associated with supplement usage.

15% of children under six years old used supplements, indicating that supplement usage is not as common as in the United States [12-14]. 69 percent of supplement-nonuser children's parents were unaware of the availability of supplements specifically targeted at children, according to a new study. As a result, this study's low frequency of children's supplement usage might be due to a lack of knowledge about children's supplements. There has been an increase in supplement usage by adults in the United States [15-17] and similar trends in Japan [18-20]. Children's supplement usage was typically viewed favourably by parents who were aware of their availability. These views may be seen in the fact that they selected a low starting age for supplement use and showed a significant chance of giving supplements to their children. As a result, the usage of children's supplements is projected to rise as the availability of children's supplements becomes more widely known.

Children's supplement consumption is promoted by three variables in this study, according to researchers. Families' nutritional label usage and their supplement use by parents were all factors in this study. However, parents who regularly supplement their diet are 70 percent more likely to give their children vitamins than those who do not do so. Previous studies from the United States have shown that supplement usage in the parents significantly impacts children's health [21,22]. Because children cannot make decisions regarding their supplement usage, these results were not surprising. As a result, children's supplement consumption relies entirely on their parents. Parental involvement and adherence to nutritional labelling are factors that increase the likelihood that a kid may get supplementation. Other research [21, 23] has shown a correlation between parental interest in nutritional balance, food, and the wellbeing of their children and the usage of supplements in their children. These findings support those earlier studies' findings. As a result of their curiosity or feeling of duty, rather than their desire to get nutrients, parents may supplement their children's diets with vitamins and minerals. The usage of non-vitamin/mineral supplements and parents' misconceptions regarding supplement use were found in this questionnaire. Non-Vitamin/Mineral substances, on the other hand, sometimes lack proof of effectiveness or safety and must be used with caution. To examine the results of this study, we separated the supplements into two categories: vitamin/mineral and other substances.

As a consequence, 32.5 percent of supplement consumers were familiar with non-Vitamin/Mineral compounds in their supplements. There are slightly more non-vitamin/mineral supplement users in Japan than in the US, where about 80% of child supplement users take vitamins/minerals. It's worth noting that some youngsters use herbal supplements and prescription medications (8.1 percent). Generally speaking, these herbs have not been studied to determine their effectiveness or safety; thus, children who consume them might have negative side effects. Safety concerns about the use of herbs by adults and children have prompted increased interest in this topic [22, 24]. This research suggests that parents have unrealistic expectations and misconceptions about nutritional supplements. To ensure their children's safety, parents check whether supplements have nutritional labelling and prioritize safety over effectiveness when buying supplements. Parents who used non- Mineral /Vitamin supplements were also characterized by their desire to improve their children's health and avoid sickness. This problem may be linked to the overabundance of information the media provides. Supplement usage and eating habits are highly influenced by media material, often overstated yet viewed as truthful by consumers [25]. Less than 20% of parents in this study were aware of the Dietary Reference Intakes, dietary recommendations for Indians. Still, the labels of foods that made nutrient claims regarding the necessary quantity and the health benefits of specific vitamins and minerals for Indians were considered. Findings from this study demonstrate the difficulty parents have in obtaining enough nutrition and nutritional labelling knowledge because of inadequate communication between consumers and experts and a flood of media information.

The current study contains several intrinsic flaws. First, because the participants in this research were not representative of India's population as a whole, the findings cannot be generalized. Second, it's possible that some of the information respondents provided were incorrect since all of our data was collected via self-reporting. As a consequence, no causal conclusions can be inferred from the data. Third, the parent's level of education and income could not be gathered because of respondent load limits.

5. Conclusion

In growing youngsters still learning appropriate eating habits, relying on supplements might lead to a disdain for the significance of regular, balanced meals. Easy access to supplements may make it more difficult for kids in the future to maintain a nutritious diet. Providing parents with accurate information on nutrition and diet, the need for a well-balanced diet for children, and the food labelling system can be encouraged. It's essential to look at how supplement usage affects the daily or long-term use of research participants, as well as how the supplement use affects parent-child relationships, so that an effective response to supplement use may be developed.

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