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Evaluation of nutritional behaviors and dietary supplement use of preschool children: A cross-sectional study from Türkiye

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ABSTRACT

Objective: This study aimed to evaluate preschool children's (aged 3-6 years) nutritional behaviors and dietary supplement usage.

Material and Methods: This descriptive, cross-sectional study was conducted between February 2024 and June 2024. The study sample consisted of 180 parents who live in the city center of Kastamonu. A questionnaire form including demographic characteristics of parents and children, children's eating habits, and information about the dietary supplements used was applied.

Results: The mean age of the children participating in the study was 60.9±9.3 months, and 35.6% of them used dietary supplements. The most commonly used supplements by children were multivitamins (15.6%), vitamin D (15.6%), fish oil (13.3%), omega-3 (11.1%), and probiotics (6.1%). As a result of multivariate logistic regression analysis, gender, number of siblings, age of the child, mother and father, education level of the mother and father, family type, and family income were not found to have a significant effect on the use of dietary supplements (p>0.050). Among the parents whose children use dietary supplements, 85.9% stated that they use them to make the child-resistant to diseases, 31.3% to make the child well-being, 26.6% to improve mental performance, and 10.9% to address a health problem.

Conclusion: Approximately one-third of parents use dietary supplements to support their children's immunity or improve their health. It should be remembered that there is very little data on the health benefits of dietary supplements in children with adequate and balanced nutrition and that unnecessary use may lead to negative consequences.

Keywords: Children, Dietary supplement, Multivitamin, Nutrition, Preschool

INTRODUCTION

Nutrition in preschool children significantly affects general health, especially brain development, both in the short and long term (1). Therefore, during the preschool period, healthy nutrition should aim to ensure proper growth and development, support cognitive development, prevent health issues associated with this age group (e.g., anemia, malnutrition), and protect against nutrition-related chronic diseases in adulthood (2). In particular, essential macro and micronutrients adequacy is critical in preschool nutrition (3). Generally, the basic nutritional needs are met through a balanced diet. However, deficiencies in certain nutrients such as iron, iodine, and vitamin D are frequently observed in a significant portion of the population (2).

Dietary supplements are orally administered products used to address nutrient deficiencies and support the diets of healthy individuals (2). In our country, legal regulations regarding dietary supplements have been prepared in parallel with the European Parliament and Council Directive No. 2002/46/EC. In line with this, the "Turkish Food Codex Supplementary Foods Communiqué" has been in force since 2013. In this communiqué, dietary supplements are defined as "products prepared in capsule, tablet, pastille, single-use powder packet, liquid ampule, dropper bottle, or other similar liquid or powder forms with a specified daily dosage, which contain concentrated extracts or the isolated forms of nutrients such as vitamins, minerals, protein, carbohydrate, fiber, fatty acid, amino acid, or other nutritional components, as well as plant-, plant-derived-, or animal-based substances, bioactive

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substances, and similar materials (4). In Türkiye, the 'Vitamin D Deficiency Prevention and Control Program' (0-1 year) and the 'Iron Like Türkiye Program' (2-12 months) are implemented nationally by the Ministry of Health. However, there is no specific vitamin and mineral supplementation program for children aged 3-6 years. In our country, there are nutritional supplements available on the market for children aged 2-4 and 4-10. For younger children, there are products that can only be used with a doctor's recommendation. Parents who wish to give supplements to their children in these age groups should check the label information of the products and ensure they do not give products intended for older children or adults to younger children (2).

The use of dietary supplements is widespread and increasing in developed countries (5). The most commonly used supplements are multivitamins and minerals (6-8). However, despite having specific indications, dietary supplements are often not prescribed by a healthcare professional, and there are no standardized guidelines for their use. As a result, the safety and efficacy of dietary supplements are an increasing concern for healthcare professionals. Raising awareness among healthcare professionals and parents about the use of dietary supplements and providing more information on their safety and efficacy is crucial for child health (9).

A literature review reveals a limited number of studies in Türkiye investigating the use of dietary supplements among children with certain diseases or school-aged children. However, no studies have examined healthy preschool children's nutritional habits and dietary supplement use (aged 3-6 years) (10,11). In Türkiye, comprehensive research on dietary habits and dietary supplement use in healthy preschool children needs to be improved. This study aimed to fill the gap in the literature and raise awareness for health professionals and parents. This study aimed to evaluate preschool children's (aged 3-6 years) nutritional behaviors and dietary supplement usage.

MATERIALS and METHODS

This descriptive and cross-sectional study was conducted in Kastamonu city center between February 2024 and June 2024. The sample of this study consisted of 180 parents of children aged 3-6 years attending public preschools and was selected using a random sampling method.

The sample size was calculated with G*Power 3.1 software and was determined to be at least 172. Data were collected with a questionnaire form with 46 questions, including demographic characteristics of parents and children, dietary habits of children, dietary supplements used (vitamins, minerals, and herbal supplements), purposes of using these supplements, and sources of information. The questionnaires were administered using a face-to-face interview method. Parents with children aged 3-6 years without any chronic disease who voluntarily agreed to participate were included in the study. However, parents who did not have children in this age group or were illiterate were excluded.

Statistical analysis

The study's data were analyzed and evaluated using the "Statistical Package for Social Sciences" (SPSS 25.0) program. The values of descriptive variables were given as frequency (n), percentage (%), arithmetic mean, and standard deviation (SD). Differences between categorical variables were analyzed using Pearson's chi-square test. Logistic regression analysis was used to identify the factors affecting children's use of dietary supplements.The level of significance was set at $p<0.050$ in the study

RESULTS

A total of 180 parents participated in this study. The demographic characteristics of children and parents according to the use of dietary supplements are given in Table I. The mean age of the children participating in the study was 60.9±9.3 months, and 35.6% of them used dietary supplements. The mean age of the mothers of children who used supplements (36.1±5.1 years) was higher than that of non-users (34.0±5.7 years) ($p=0.022$), but there was no difference between the ages of fathers and children ($p=0.142$). There was no difference between the gender of the child, the educational level of the parents, the number of children in the family, the income of the family, and the use of dietary supplements ($p=0.147$, $p=0.607$, $p=0.133$, and $p=0.501$ respectively). While 93.8% of dietary supplement users lived in nuclear families, 4.7% lived in extended families, and 1.6% had separated families or deceased parents. Among those who did not use dietary supplements, 80.2% lived in nuclear families, 12.1% lived in extended families, and 7.8% had separated families or deceased parents ($p=0.047$).

The children's dietary habits and physical activity status are given in Table II. While 53.1% of the children who used dietary supplements skipped meals, 30.2% of the children who did not use dietary supplements skipped meals ($p=0.002$). There was no significant difference in other eating habits or physical activity status concerning dietary supplement use ($p>0.050$).

Percentages of dietary supplement use among all participants and children using dietary supplements are given in Figure 1. Among all participants, 15.6% used multivitamins and vitamin D, 13.3% used fish oil, 11.1% used omega-3, and 6.1% used probiotic supplements. Percentages of children's dietary supplement use by gender are given in Figure 2. Girls mostly use vitamin D (10.6%), while boys (7.8%) use multivitamins.

The parent's responses to questions about dietary supplements are given in Table III. Half of the parents who do not use dietary supplements for their children refrain from doing so because they do not believe their children need them, 34.5% because their doctors do not recommend them, and 15.5% because

Table I: Demographic characteristics of children and parents according to their use of dietary supplements

	Children who use dietary supplements	Children who do not use dietary supplements	Total	p
Total participants (n)	64	116	180	-
Child's age*	62.1±8.9	60.3±9.6	60.9±9.3	0.118†
Mother's age*	36.1±5.1	34.0±5.7	34.8±5.6	0.022†
Father's age*	38.5±5.9	36.9±6.0	37.5±6.0	0.142†
Gender of the child‡				
Male	33(51.6)	71 (61.2)	104 (57.8)	0.210§
Girl	31(48.4)	45 (38.8)	76 (42.2)	
Mother's education level‡				
Primary school graduate	5 (7.8)	8 (6.9)	13 (7.2)	
Secondary school graduate	1 (1.6)	6 (5.2)	7 (3.9)	
High school graduate	13 (20.3)	40 (34.5)	53 (29.4)	0.147§
University graduate	40 (62.5)	52 (44.8)	92 (51.1)	
Postgraduate	5 (7.8)	10 (8.6)	15 (8.3)	
Father's education level‡				
Primary school graduate	1 (1.6)	6 (5.2)	7 (3.9)	
Secondary school graduate	4 (6.2)	12 (10.3)	16 (8.9)	
High school graduate	16 (25.0)	30 (25.9)	46 (25.6)	0.607§
University graduate	36 (56.3)	58 (50.0)	94 (52.2)	
Postgraduate	7 (10.9)	10 (8.6)	17 (9.4)	
Family type‡				
Nuclear	60 (93.8)	93 (80.2)	153 (85.0)	0.047§
Extended	3 (4.7)	14 (12.1)	17 (9.4)	
Parents separated/dead	1 (1.6)	9 (7.8)	10 (5.6)	
Number of children in the family‡				
1	20 (31.3)	45 (38.8)	65 (36.1)	
2	37 (57.8)	48 (41.4)	85 (47.2)	
3	6 (9.4)	12 (10.3)	18 (10.0)	0.133§
4	1 (1.6)	8 (6.9)	9 (5.0)	
5	-	3 (2.6)	3 (1.7)	
Family income status‡				
17.000 - 20.000	16 (25.0)	37 (31.9)	53 (29.4)	
20.000 - 40.000	18 (28.1)	29 (25.0)	47 (26.1)	0.501§
45.000 - 70.000	27 (42.2)	40 (34.5)	67 (37.2)	
70.001 and above	3 (4.7)	10 (8.6)	13 (7.2)	

** : mean±SD, † : Mann Whitney U Test, ‡ : n(%), § : Pearson Chi-Square Test*

they do not consider them appropriate. Among the parents who used dietary supplements for their children, 85.9% stated that they used dietary supplements to make their child-resistant to diseases, 31.3% to make them well-being, 26.6% to improve their mental performance, and 10.9% to address a health problem. Parents reported that they received the most information about the use of dietary supplements from doctors (84.4%) and the least from visual media (7.8%) and the internet (7.8%). Naturalness (57.8%) and quality (56.3%) were the factors that parents paid the most attention to when purchasing dietary supplements. Furthermore, it was found that 47.8% of parents reported being uninfluenced by advertisements when choosing dietary supplements for their children.

Table IV displays the results of the logistic regression analysis identifying determinants of dietary supplement use among children. Multivariate logistic regression analysis indicated that gender, number of siblings, age of the child, parental age and education, family structure, and household income were not significant predictors of dietary supplement use (p=0.354, p=0.343, p=0.830, p=0.205, p=0.894, p=0.401, p=0.537, p=0.818, p=0.587, p=0.209, p=0.257, p=0.372, p=0.172, p=0.060, p=0.233, p=0.331, p=0.474, and p=0.182 respectively).

DISCUSSION

Dietary supplements have become more widely used around the world in the last 20 years, and the public health crisis brought on by the COVID-19 pandemic has highlighted the importance of boosting the immune system (5,12). Cowan et al. (5) reported that the use of dietary supplements increased from 50% in 2007 to 56% in 2018. Many dietary supplements are marketed today, including various combinations of vitamins, minerals, herbal products, and single-ingredient products. They are generally used in healthy children to achieve optimal nutrition and health (13). According to the Türkiye Dietary Guidelines (TUBER) 2022, nutrient requirements can be met

Table II: Children's eating habits and physical activity status

	Children who use dietary supplements*	Children who do not use dietary supplements*	Total*	p†
Number of meals				
1-2 Meals	9 (14.1)	20 (17.2)	29 (16.1)	0.832
3-4 Meals	51 (79.7)	90 (77.6)	141 (78.3)	
5-6 Meals	4 (6.3)	6 (5.2)	10 (5.6)	
Skipping meals				
Yes	34 (53.1)	35 (30.2)	69 (38.3)	0.002
No	30 (46.9)	81 (69.8)	111 (61.7)	
Which meal did he skip?				
Morning	8 (23.5)	12 (34.2)	20 (29.0)	0.064
Noon	5 (14.7)	11 (31.4)	16 (23.2)	
Afternoon	21 (61.8)	12 (34.3)	33 (47.8)	
Evening	-	-	-	
Fast food consumption frequency				
None	3 (4.7)	12 (10.3)	15 (8.3)	0.159
One day every two weeks	16 (25)	49 (42.2)	65 (36.1)	
One day a week	29 (45.3)	22 (19)	51 (28.3)	
A few days a week	13 (20.3)	23 (19.8)	36 (20.0)	
Every day	3 (4.7)	10 (8.7)	13 (7.3)	
Snack preference				
Fruit	24 (37.5)	26 (22.4)	50 (27.8)	0.470
Nuts	9 (14.1)	17 (14.7)	26 (14.4)	0.058
Chocolate/wafer	16 (25.0)	16 (13.8)	32 (17.8)	0.911
Chips	4 (6.3)	11 (9.5)	15 (8.3)	0.048
Biscuit/cake	15 (23.4)	18 (15.5)	33 (18.3)	0.543
Ready-made fruit juice	15 (23.4)	16 (13.8)	31 (17.2)	0.808
Carbonated drinks	6 (9.4)	5 (4.3)	11 (6.1)	0.742
Milk	21 (32.8)	13 (11.2)	34 (18.9)	0.052
Tea	6 (9.4)	4 (3.4)	10 (5.6)	0.493
Wanting foods seen in advertisements				
Yes	10 (15.6)	19 (16.4)	29 (16.1)	0.290
Sometimes	15 (23.4)	39 (33.6)	54 (30.0)	
No	39 (60.9)	58 (50.0)	97 (53.9)	
Outdoor play time per day				
None	8 (12.5)	8 (6.9)	16 (8.9)	0.198
0-1 hour	20 (31.3)	27 (23.3)	47 (26.1)	
1-2 hours	23 (35.9)	60 (51.7)	83 (46.1)	
2-3 hours	10 (15.6)	19 (16.4)	29 (16.1)	
More than 4 hours	3 (4.7)	2 (1.7)	5 (2.8)	
Television watching time per day				
None	6 (9.4)	21 (18.1)	27 (15)	0.084
0-1 hour	19 (29.7)	40 (34.5)	59 (32.8)	
1-2 hours	34 (53.1)	40 (34.5)	74 (41.1)	
2-3 hours	3 (4.7)	13 (11.2)	16 (8.9)	
More than 4 hours	2 (3.1)	2 (1.7)	4 (2.2)	
Time spent on computer/tablet				
None	15 (23.4)	32 (27.6)	47 (26.1)	0.265
1-2 hours	34 (53.1)	63 (54.3)	97 (53.9)	
2-3 hours	9 (14.1)	19 (16.4)	28 (15.6)	
More than 4 hours	6 (9.4)	2 (1.7)	8 (4.4)	
Doing regular sports (swimming, basketball, folk dances, etc.)				
Yes	21 (32.8)	33 (28.4)	54 (30)	0.542
No	43 (67.2)	83 (71.6)	126 (70)	

**: n(%), †: Pearson Chi-Square Test*

with adequate and balanced nutrition. However, nutritional supplements should be used if adequate and balanced nutrition cannot be provided (2). Although there are many studies on the use of dietary supplements among adults in Türkiye, there

Table III: Parents' responses to questions about dietary supplements

	n (%)
Reasons for not using dietary supplements for their children (n=116)	58 (50)
I don't believe it's needed	
My doctor did not recommend it	40 (34.5)
I don't think it's appropriate to take dietary supplements from outside.	18 (15.5)
Reasons for using dietary supplements for their children (n=64)*	
I use dietary supplements to address my child's health problems	7 (10.9)
I use dietary supplements to make my child well-being	20 (31.3)
I use dietary supplements to improve my child's mental performance	17 (26.6)
I use dietary supplements to make my child-resistant to diseases	55 (85.9)
Primary sources of information regarding dietary supplement use (n=64)*	
Doctor	54 (84.4)
Pharmacist	24 (37.5)
Dietician	8 (12.5)
Other healthcare professionals	11 (17.2)
Circle of Friends	9 (14.1)
Visual press	5 (7.8)
Internet	5 (7.8)
Factors to consider when purchasing dietary supplements (n=64)*	
Price	4 (6.3)
Brand	20 (31.3)
Quality	37 (57.8)
Naturalness	36 (56.3)
Being domestically produced	9 (14.1)
Being affected by advertisements when choosing dietary supplements for their children (n=64)*	
Yes	27 (42.2)
No	37 (47.8)

***:** *Multiple response analysis*

is a lack of research on their use among preschool children. This study aimed to evaluate preschool children's nutritional behaviors and dietary supplement usage (aged 3-6 years). To the best of our knowledge, this is the first study in Türkiye to examine the use of dietary supplements in children aged 3-6 years.

According to the Türkiye Nutrition and Health Survey (TBSA) 2017, 9.9% of individuals aged 15 and above (6.3% of males and 13.4% of females) reported using dietary supplements. However, as the TBSA 2017 included only individuals aged 15 and older, it does not provide data on dietary supplement use among preschool children (2). In a study conducted in Türkiye investigating healthy eating behaviors and dietary supplement use in children aged 3–12, 48.2% of participants reported having previously used dietary supplements for their children (14). In another study investigating the use of dietary supplements among children aged 2 to 18 years in Türkiye, 32.5% were found to use dietary supplements (15). In Brazil, the prevalence of vitamin use among children aged 0 to 12 years is 4.8% (7). In a study conducted in Japan in 2009 among 2,125 parents of preschool children, 15% of children were found to use dietary supplements (16). A study conducted in the United States found that about one-third (32%) of children used dietary supplements, primarily multivitamins and minerals (24%) (6). Supplement use in Flemish preschool children was reported to be more than 30% (17). In a study conducted in Iranian children and adolescents (7-18 years), the prevalence of dietary supplement use was 34.1%. It was found that the prevalence of dietary supplement use increased as the age group increased (18). It was found that more than one-third (35.6%) of the children participating in this study used dietary supplements. The results of the studies may differ due to variations in the age groups included. However, all studies highlight the high use of dietary supplements among children, underlining the importance of evaluating the safety of these products for children.

According to the TBSA 2010, the most frequently used dietary supplements are reported to be 71.7% vitamin D, 46.8% iron, and 9.2% multivitamin-mineral for children aged 0-5 (19). The vitamin D (0-1 year) and iron (2-12 months) supplementation programs implemented in our country may explain why these dietary supplements are used more frequently. According to the results of the CS Mott Children's Hospital Child Health National Survey, the most commonly used dietary supplements by children aged 1-10 years are multivitamins (78%), probiotics (45%), and Omega 3 (22%) (18-20). According to the results of another study investigating the prevalence of dietary supplement use in preschool children in Australia and China, the most commonly used dietary supplements in China were calcium (58.5%) and zinc (40.4%). In comparison, the most commonly used types in Australia were multivitamins/minerals (46.2%) and fish oil (42.3%) (13). In another study conducted in the United States, the most commonly used dietary supplement was found to be multivitamin-minerals (24%) (6).

Table IV : Logistic regression analysis of factors affecting children's dietary supplement use

Predictor	B	SE	OR	95% CI for OR	p
Gender*	-0.34	0.367	0.71	0.35-1.46	0.354
Child's age	-0.018	0.019	0.98	0.95-1.02	0.343
Number of siblings	0.047	0.217	1.05	0.69-1.60	0.830
Mother's age	-0.081	0.064	0.92	0.81-1.05	0.205
Father's age	0.008	0.059		0.90-1.13	0.894
Mother's education status†					
Secondary school graduate	1.134	1.351	3.10	0.22-43.89	0.401
High school graduate	0.521	0.843	1.68	0.32-8.78	0.537
University graduate	-0.204	0.889	0.82	0.14-4.66	0.818
Postgraduate	-0.715	1.314	0.49	0.04-6.43	0.587
Father's education level†					
Secondary school graduate	-1.771	1.408	0.17	0.01-2.7	0.209
High school graduate	-1.49	1.316	0.23	0.02-2.97	0.257
University graduate	-1.189	1.330	0.31	0.02-4.13	0.372
Postgraduate	-2.026	0.064	0.13	0.01-2.4	0.172
Family Type‡					
Extended	1.324	0.704	3.76	0.95-14.94	0.060
Parents separated/dead	1.352	1.135	3.87	0.42-35.77	0.233
Family income status§					
20.000-40.000	-0.46	0.473	0.63	0.25-1.60	0.331
45.000-70.000	-0.332	0.463	0.72	0.29-1.78	0.474
70.001 and above	1.66	1.245	5.26	0.46-60.33	0.182

**** Ref:** Male, **†Ref:** Primary school graduate,**‡Ref:** Nuclear, **§Ref:** 17.000-20.000, **OR:** Odds Ratio, **CI:** Confidence Interval, **SE:** Standard Error (Cox & Snell R^2 = 0.134, Nagelkerke R^2 = 0.183, Model Accuracy = 73.3%)*

A study conducted in three Korean cities reported that vitamin-mineral supplements (77.5%) were the most commonly used dietary supplements among preschool children, followed by ginseng (49.3%) and probiotics (25.6%) (21). In another study conducted in Türkiye, similar to our data, it was found that the most commonly used dietary supplement was vitamin-mineral supplements (23.2%), and 53.9% of children using vitamin-mineral products used multivitamin-mineral, 17.2% used vitamin D, and 13.4% used multivitamin-mineral-omega 3 combinations (15). In this study, the most commonly used dietary supplements were multivitamins (15.6%), vitamin D (15.6%), fish oil (13.3%), omega-3 (11.1%) and probiotics (6.1%). Females used vitamin D the most (10.6%), while males used multivitamins the most (7.8%). These results emphasize that supplement use in children varies regionally, and the most commonly used supplements are vitamin D, multivitamin-mineral, and fish oil. Many variables, such as various societies' different health sensitivities and health policies, may influence dietary supplement choices. Although multivitamin and mineral supplements are gradually decreasing, they are still the most preferred dietary supplements (5).

The primary reasons for using dietary supplements in young children include preventing or treating nutrient deficiencies, improving and maintaining general health, preventing health problems, and strengthening immunity (8). According to NHANES 2011-2014 data, the most common reasons for dietary supplement use in children were reported to be to improve (42%) and maintain (34%) children's health and to support their diet (23%) (6). A study conducted in China found that the primary purpose of dietary supplement use in children was to increase children's immunity and support physical development rather than to support diet (22). In this study, 85.9% of parents who used dietary supplements for their children stated that they used them to make the child-resistant to diseases, 31.3% to make the child well-being, 26.6% to improve mental performance and 10.9% to address a health problem. In recent years, understanding the importance of the immune system in protecting preschool children from diseases and improving their health in the following years has led to an increased interest in dietary supplements.

In TUBER 2022, it is recommended that nutritional supplements should not be used without an assessment of nutritional status by a dietitian and evaluation of biochemical findings, and that a physician's advice should be sought (2). According to the results of the CS Mott Children's Hospital National Survey on Child Health, the majority of parents (65%) stated that they made their decisions about the use of dietary supplements based on the advice of a doctor (20). However, according to the data from many studies conducted in previous years, it has been reported that parents usually receive advice on dietary supplements from family and friends, not health professionals (6,16,21). This study observed that parents received the most information about dietary supplement use from health professionals such as doctors (84.4%) and pharmacists (37.5%). The differences in the foreign literature suggest that cultural differences play a significant role. The increased awareness of parents about

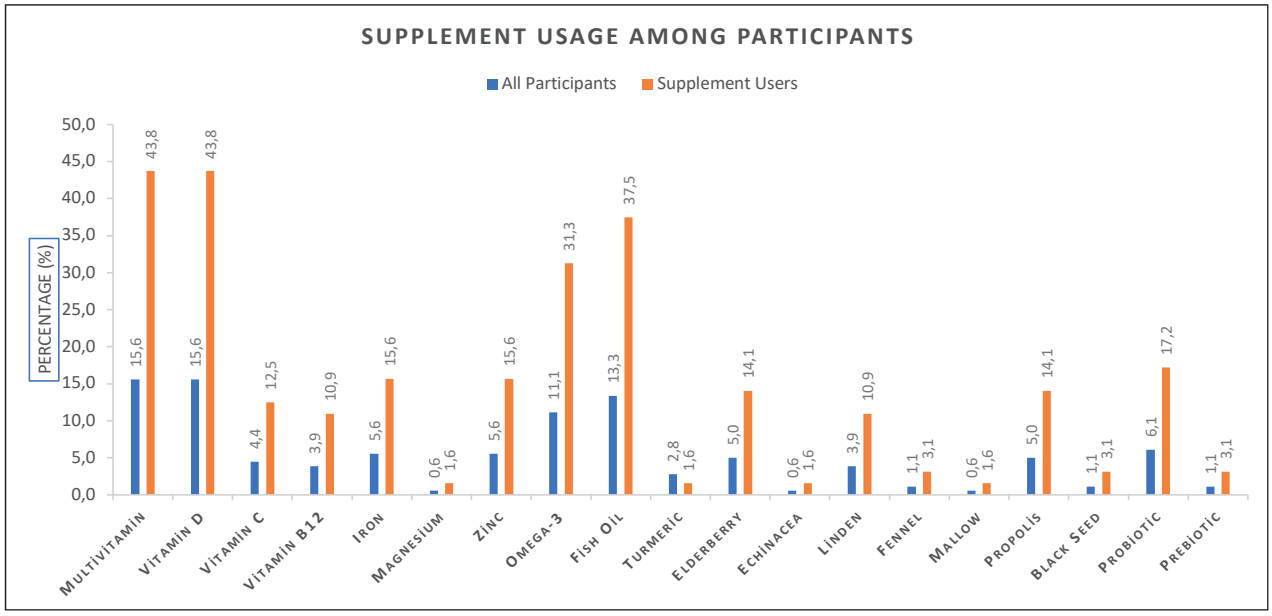


Figure 1: Percentages of dietary supplement use among all participants and children using dietary supplements. Fish oil is contains Omega-3 fatty acids (EPA and DHA), as well as Omega-6, Omega-9, and other fatty acids. Omega-3 supplements refer to supplements that contain only EPA and DHA.

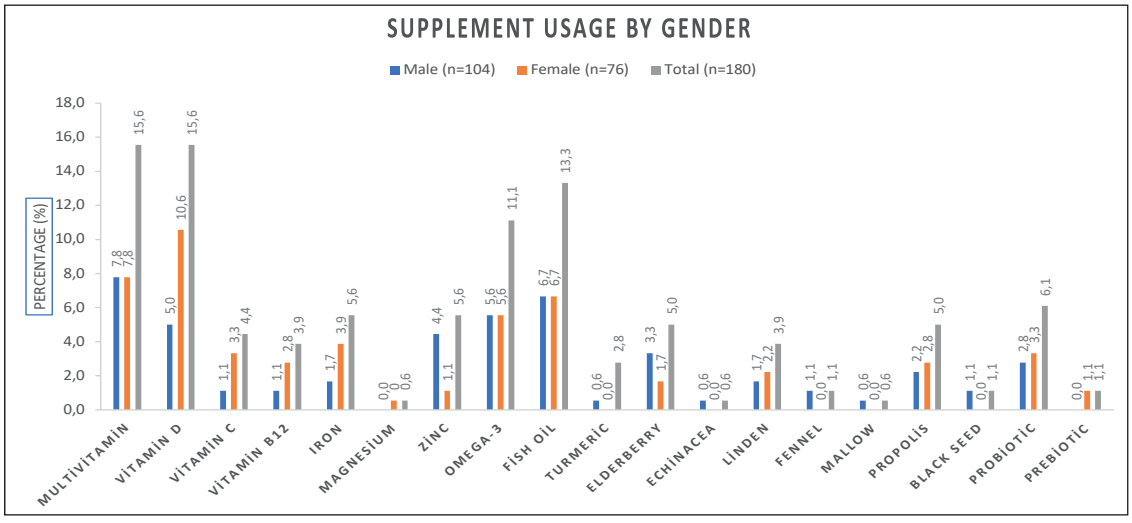


Figure 2: Percentages of children's dietary supplement use by gender. Fish oil is contains Omega-3 fatty acids (EPA and DHA), as well as Omega-6, Omega-9, and other fatty acids. Omega-3 supplements refer to supplements that contain only EPA and DHA.

dietary supplements in recent years may have contributed to parents taking into account the recommendations of health professionals more.

In addition to the positive effects of dietary supplements on health, their content has become a topic of discussion in recent years. For this reason, consumers have become more selective when purchasing dietary supplements. In a study conducted on preschool children in Japan, parents stated that they preferred dietary supplements with natural ingredients (16). In this study, naturalness (57.8%) and quality (56.3%) were the factors that parents paid the most attention to when purchasing dietary supplements. With a better understanding of the adverse effects of food additives on health, parents' interest in natural and organic foods is increasing. Although dietary supplements may seem harmless, they can contain many additives. For this reason, families are turning to more natural products.

Sociodemographic characteristics of children and their parents may affect dietary supplement use (6). In a study examining the use of dietary supplements by children aged one to ten years, it was found that parents in high-income households (>$100.000) were more likely than parents in low-income families (<$50.000) to report that their children regularly took a dietary supplement (57% vs. 44%) (20). In the study conducted using NHANES 2011-2014 data, lower age, higher income, and lower BMI were associated with higher dietary supplement use. (6). In a study examining factors associated

with supplement use in preschool children in Japan, children who used supplements tended to be older than children who did not use supplements. Still, as in this study, mothers' education level and household income were not associated with supplement use among their children (23). Another study found that "higher mother's education level" and "older age of the child" were significantly associated with supplement use for preschool children in Australia, and "higher household income" was significantly associated with supplement use in China (13). In both a study conducted among children aged 1-8 years in South Korea and another study conducted among preschool children in 3 Korean cities, supplement use was associated with household income, mother's age, and education level (21,24). In this study, multivariate logistic regression analysis revealed no significant effect of gender, number of siblings, age of the child, age of the parents, education level of the parents, family type, and family income on supplement use. Although studies generally associate supplement use with family income, mother's education, and age, this relationship was not found in this study. This may be due to the small sample size. Studies with larger sample sizes are needed to understand these relationships better.

In a study conducted on preschool children, children who used dietary supplements were likelier to skip breakfast and eat out more frequently (23). However, another study on preschool children found that supplement users had more regular meal times (21). In this study, when children's dietary habits and physical activity were analyzed according to their dietary supplement use, it was found that children who used dietary supplements skipped more meals than children who did not (53.1%-30.2%, respectively). No difference was found between the children's other eating habits and physical activity status regarding supplement use. The relationship between children's dietary habits and dietary supplement use is multifaceted and complex. Therefore, future studies should include comprehensive and holistic analyses that take into account parental attitudes, nutritional knowledge, and socioeconomic characteristics.

CONCLUSION

Adequate and balanced nutrition optimizes a child's growth and development, while an unhealthy diet can negatively affect short- and long-term health outcomes and school performance. The best way for preschool children to get the nutrients they need to be healthy is through a balanced diet with adequate amounts of fruits and vegetables, protein and fiber, and limited amounts of processed foods. However, about one-third of parents use dietary supplements to support their child's immunity or improve their health. It is important to note that there is limited evidence supporting the effectiveness of dietary supplements in improving health for children who have adequate and balanced diets, and unnecessary use may lead to negative consequences. Supplements should only be considered when children are not receiving enough nutrients from their diet, and parents should consult appropriate health professionals before using them.

Limitations of the study: This study does not fully represent the use of dietary supplements among preschool children in the country due to the small sample size and the fact that it was conducted in only one region. Additionally, dietary intake was not assessed to determine whether the overall nutrient intake of the children in our study was adequate. However, the results of this study may provide a preliminary overview of dietary supplement use among preschool children in Türkiye and could help improve parents' perceptions of dietary supplements and their purchasing behavior.

Ethics committee approval

This study was conducted in accordance with the Helsinki Declaration Principles. Ethical approval for this study was obtained from Kastamonu University Clinical Ethics Committee (Date: 17.01.2024 Decision no: 2024-KAEK-6).

Contribution of the authors

Zengin FH: Idea/concept, design, control/supervision, analysis and/or interpretation, literature review, writing the article, critical review, references and fundings, materials, ***Çetin E:*** Idea/concept, design, data collection and/or processıng, literature review, references and fundings, materials

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Conflict of interest

The authors declare that there is no conflict of interest.

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