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Original Article

The Association Between Parental Behavior Patterns and the Dietary Intake of Preschool Children in Tehran Kindergartens

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ABSTRACT

Background and Objectives: This study was designed to investigate the association between parental behavior and the dietary intake of Tehranian preschool children aged 2-6 years.

Materials and Methods: In a cross-sectional study conducted on 310 children aged 2-6 years from the kindergartens of 22 districts of Tehran, a qualitative validated 85-item food frequency questionnaire was completed by interviewing with their parents. Also the effect of parental behavior on the children's dietary intake was assessed using a validated comprehensive feeding practices questionnaire (CFPQ).

Results: 47 and 53% of children were girls and boys, respectively. Among the parental behavior patterns, encouraging children to eat healthy foods, using food rewards, teaching and talking with children about the value of foods, encouraging the children to participate in food purchasing and preparation, making available the healthy foods, parental controlling behavior, child's control, restricted behaviors because of having weight loss diet, and role modeling were significantly associated with the dietary intake of food groups (P<0.05).

Conclusions: Any effort to promote children's dietary intake needs considering the role of parents in the development of feeding patterns, and interest in children to consume healthy foods.

Keywords: Children, Dietary intake, Parental behavior patterns, Kindergarten

Introduction

The first 2-3 years of life is the most crucial period for the normal physical and mental development of every child.

Children in the developing countries constitute one-half to two-thirds of the whole population. Nutrition-related health problems during the first 3 years of life lead to many short and long-term consequences, such as cardiovascular disease that limit human potential within the society. Therefore, improving infants' and young children's nutrition should be a priority, and must be seen as an integral part of social and economic development (1). Results of several studies show that the diet of children in most cases is not based on the recommendations for this age group (1-3). Problems of dietary intake in this age group such as low intake of water, fruits and vegetables, high intake of sweetened beverages, and high calorie, high fat, and low nutrient density snacks may bring about various short- and long-term health consequences. Nowadays, 15-35% of toddlers and children aged 2-6 years in the world have nutritional disorders including disability and weakness in eating enough food, religious or cultural inhibitions of having or not having special foods, inappropriate behavior at mealtime, and unhealthy food habits. These problems are often temporary; however, they may become a chronic and disruptive issue in some children. these disorders are associated with delayed and retarded physical and mental growth, and are underlying factors for several chronic

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diseases (2). In addition, overweight and obesity is a significant threat, and its prevalence in the children of developing countries has been increased two to three times in the last decade (3). It worth mentioning that 3% of children <3 years are obese in the world (4). Destructive consequences of childhood obesity are not only related to physical symptoms and some diseases but also to the overall health, as well as social and mental issues. The first five years of life is the period of rapid growth, physical change, and forming eating behaviors in children, which is the base of their future dietary intake and patterns(5). The main factors that may effect the eating behaviors and the amount of food intake of children include demographic, economic, environmental, social and family factors(6). During the early years of childhood, children learn "what, when, and how much to eat", based on differences on the eating practices, attitudes and cultural beliefs (5). Family environment is one of the main factors, which its rules and priorities determine the type and amount of food availability and physical activity to a large extent(4). Furthermore, parents' applied methods and strategies to feed children (using restrictive, obligatory, encouraging, punishing, or suggesting behaviors), their choices for type and amount of food accessible to children and their own behavior during the mealtime (role modeling for children) can underlie healthy nutrition for children (7). In some cases, strategies applied by parents may have negative results on the dietary intake of children (8).

Considering the priority of this issue, several studies in the world have evaluated the association between parental behavior patterns and dietary intake of children. However, in Iran, studies regarding this issue, especially among the toddlers, are very limited. Therefore, the current study aimed to assess the association between the parental behavior patterns and the dietary intake of preschool children aged 2-6 years in Tehran, Iran.

Materials and Methods

Study design and subjects: This cross-sectional descriptive analytical study was conducted on 310 children aged 2-6 years, from the preschools of 22 districts of Tehran, Iran. The children were selected using proportional multistage sampling method. In order to have enough number of children in each district, K coefficient was calculated as the number of children going to kindergarten in each district divided by the total number of children in the district, which has the lowest number of children. Then two kindergartens were chosen from each district (and one kindergarten from districts number 17 and 19 because of their low weight population). The children were selected randomly based on the population weight of the two kindergartens.

Parental behavior patterns assessment: To assess the parental behavior patterns, a validated 36-item questionnaire, namely Comprehensive Feeding Practices Questionnaire (CFPQ), was used (9). The questionnaire included questions on parental controlling, restrictive, obligatory, encouraging, and role modeling behaviors for children, using food rewards, regulating the child's emotional feeling about food, using teaching methods, participation of children in food purchasing and preparation, and making available healthy and unhealthy food items. The responses were "never", "rarely", "sometimes", "often", and "always". All questionnaires were completed by the mothers.

Dietary intake assessment*:* Qualitative pattern of dietary intake was assessed by using a validated 85-item food frequency questionnaire (10-13). Usual frequency consumption of each food item on a daily, weekly, and monthly basis was determined by interviewing the mothers. Food items that were markedas never eaten were reported too.

Statistical analysis: The Statistical Package for Social Science (SPSS Inc, Chicago TL. Version 18) was used for statistical analysis. The Shapiro-Wilk test was used to test the normality of quantitative variables. Mean difference of the frequency of food groups' intake between the parental behavior patterns was tested with the Student's t-test and the Mann–Whitney's test for normal and non-normal distributed variables, respectively. To explore the association between the categorical variables, $\chi 2$ and Fisher's exact test were used. P-values < 0.05 were considered statistically significant. Multiple Linear Regression Analysis (MLRA) was used for determining the frequency of daily food groups eating according to the parental behavior patterns.

Results

Among the 310 children, 39% and 61% were in the 2-3 years and 4-6 years age groups, respectively. These two age groups were compared regarding each variable of parental behavior patterns. The results indicated a significant association between teaching behavior and talking to children about the nutritional value of foods in both groups. Teaching strategy and talking to children about the value of food were more prevalent (70%) in the 4-6 years age group. There was no significant difference among the other parental behaviors between the two age groups.

Mean value of the food group's frequency of daily intake in two age groups is shown in Table 1. Mean frequency of intake of most of the food groups was lower in the 4-6 years age group than in the 2-3 years age group; however, the mean frequency of consumption of fast foods and deep fried foods was higher in the 4-6 years age group in comparison to the 2-3 years age group. Processed meat intake was significantly higher in children aged 4-6 years than those aged 2-3 years, and the intake of nutritious snacks and dairy products was higher in children aged 2-3 years.

Table 1. Mean and SD of the frequency of the food groups' daily intake in children aged 2-6 years in Tehran

	2-3years (n=121)		4-6years (n=189)		Total percent of consumers
	Mean	SD	Mean	SD	
Bread and grains	2.65	0.95	2.71	0.84	100
Bread	1.28	0.71	0.140	0.7	99
Rice	1.14	0.60	1.10	0.61	99
Pasta and dough compounds	0.24	0.24	0.22	0.31	97.5
Total meats	1.90	0.7	0.85	0.77	100
Red meat	0.36	0.24	0.38	0.43	92
Minced meat	0.37	0.22	0.33	0.20	96
Fish and tuna	0.27	0.36	0.34	0.35	96
Poultry	0.34	0.18	0.32	0.23	96.5
Kebab and chicken kebab	0.17	0.16	0.15	0.11	97
Eggs	0.48	0.53	0.40	0.28	98
Processed meat	0.06[a]	0.13	0.08	0.17	87
Total fruits	5.10	2.99	4.69	3.27	100
Vitamin C sources (strawberries, prunes, orange, tangerine)	1.19	1.02	1.13	1.01	95
Vitamin A sources (apricot, cantaloupe, peaches, nectarine)	1.45	1.36	1.25	1.28	92
Other fruits (apple, banana, grapes, cherry, watermelon)	2.51	1.35	2.42	1.68	100
Homemade fruit juice	0.39	0.48	0.36	0.81	85
Vegetables	3.31	1.83	3.29	1.83	100
Cooked vegetables (squash, eggplant, green vegetables, potato)	2.71	1.73	2.72	1.66	99
Uncooked vegetables (cucumber, tomato, salad, fresh herbs, lettuce, onion, carrots)	0.60	0.37	0.57	0.40	99
Snacks	2.16	1.48	1.90	1.26	98
Sweetened and fatty snacks (chips, puff, chocolate)	0.79	0.94	0.70	0.73	95
Biscuits (biscuits, cake, pancake)	1.36	0.84	1.20	0.75	98
Nutritious snacks (nuts, dried fruit)	3.44	2.87	2.82	2.64	99
Ice cream	0.42	0.50	0.45	0.45	94
Simple sugars	1.36	1.00	1.28	0.88	97
Sugar	0.75	0.75	0.74	0.71	83
Candy, jam, and honey	0.92	3.72	0.54	0.53	91
Butter and fat (cream, butter, olive oil)	0.84	0.89	0.84	0.73	94
Dairy	4.51	1.80	4.03	1.62	100
Milk or flavored milk	2.29[a]	1.27	1.91	1.06	99
Yogurt	1.1[a]	0.70	0.95	0.68	96
Cheese	0.71[a]	0.55	0.70	0.47	90
Cooked food	0.99	0.76	1.03	0.61	100
Fast foods	0.83	0.72	0.85	0.59	100
Deep fried foods	0.35	0.24	0.40	0.33	99
Legumes	0.44	0.27	0.43	0.31	97
Beverages	0.58	0.59	0.61	0.57	100
Synthetic beverages and carbonated drinks	0.60	1.06	0.51	0.48	95
Soft drinks	0.23	0.53	0.20	0.24	82
Water	4.88	2.46	4.71	2.17	100

[a] Different from the 4-6 years' age group, Mann-Whitney's test $P<0.05$

Among the parental behavior patterns, child's emotion regulation using foods and pressuring child did not show any significant relationship with the frequency of food groups' type or amount of consumption. Food rewards had significant associations with the consumption of fatty and sweetened snacks, puffs and chips, and chocolate. There was also a significant association between the teaching behavior and talking to children about the nutritional value of foods, and the total frequency intake of meat and egg, meat, fruits, vitamin A sources of fruits, vitamin C sources of fruits, and soft drinks. Modeling for children had associations with the mean frequency intake of processed meat, legumes, snacks, nutritious snacks, nuts, dried fruits, beverages, and synthetic beverages. The findings indicated significant associations between participation of children in the food purchase, and the mean frequency intake of nutritious snacks, dried fruits, nuts, total vegetables, and cooked vegetables. Participation of children in preparation of food had significant association with the mean frequency intake of deep fried foods, simple sugar, and cooked vegetables. Making the healthy and nutritious foods available had significant relations with the consumption of processed meat, snacks, fatty and sweetened snacks, puffs and chips, chocolate, biscuits, beverages, and soft drinks. Parental controlling behavior had significant associations with processes meat, puffs and chips, cooked foods, fast food, beverages, and soft drinks. Controlling the behavior of child showed significant relation with the mean frequency intake of uncooked vegetables. MLRA results showed the association between the daily food groups frequency eaten by children aged 2-6 years and parental behavior patterns (Table 2).

Table 2. Multiple Linear Regression Analysis for the mean frequency of the food groups' daily intake in children aged 2-6 years according to the parental behavior patterns in Tehran

	Bread and grains N=193	Meats and eggs N=194	Dairy products N=204	Fruits N=210	Vegetables N=209	Cooked foods N=197	Fats N=205	Sugar N=203	Snacks N=198	Beverages N=218
	β	β	β	β	β	β	β	β	β	β
Encouragement	-.020	-.060†	-.060	.026	.053	.041	.010	.056	.007	-.004
Food reward	.010	.000	-.105†	-.032	-.071	.020	-.026	-.005	.113†	.004
Excitement control	.045	.039	.104	.219	.078	.042	.037	-.022	-.013	.082
Teaching	.080	.009	.089	.161	.113	-.008	.015	.178	-.086	-.021
Role modeling	.029	-.050	.017	-.123	-.074	-.049	-.022	-.107	-.165†	.013
Participation in food purchase	.048	.094	.211	.237	.129	.053	.038	-.096	-.136	.032
Participation in food preparation	-.019	-.005	-.001	-.001	.036	-.003	-.003	.107	.120*	.057
Availability of healthy and nutritious foods	.024	.047*	.060	.171	.069	.057†	.008	.030	.107*	.043
Parental control	-.019	.003	.027	.139	.001	-.051†	.047†	.044	-.004	.057
Children's own control	-.025	.012	-.023	-.078	-.093*	-.001	-.018	-.152*	-.066*	.041
Restriction for health	-.001	-.023	-.034	-.163†	-.041	-.009	3.377×10^{-5}	.030	.063*	.022
Restriction to lose weight	-.011	.000	.015	.052	.024	.016	-.027*	-.080*	.002	-.002
Pressure	.008	-.002	-.027	-.205	-.067	.005	-.065	-.140	-.110	-.152
Child's age	.027	-.022	-.214	-.091	.006	.042	.033	-.129	-.070	-.070
Child's sex	-.018	.164	.167	-.081	-.207	.009	.034	-.226	.155	.365

* P <0.05, † P<0.01

Discussion

The current study found an association between parental behavior patterns and food group frequency eaten by children. Children aged 2-6 years are dependent to their parents and caregivers for food. Parents' choices for food and feeding methods are among the crucial factors of feeding experiences of children. Parental behaviors with regard to the children's nutrition have important roles in forming the food interests and preferences, amount of food intake, children's behavior during the mealtime, and weight status of children. Our findings regarding the association of parental controlling behaviors with children's dietary intake showed that increasing the supervision of parents would reduce the intake of processed meat, puffs and chips, fast foods, and soft drinks. Other researchers have confirmed the current findings; Klesges et al. showed that threat to monitor and real monitoring of parents are effective in reducing the intake of foods with low nutrition values (14). These results show that awareness of children being monitored through their parents would cause them to choose healthier foods; otherwise, children usually prefer foods with low nutritious values and high content of sugar, saturated fatty acids, and sodium because of their taste. Children in this age obey the rules of their parents. Our findings indicated an association between the children's own control and the reduced intake of uncooked vegetables. Campbell et al. and Ogden et al. also showed similar results (15, 16). Kern and coworkers in a laboratory research found that children's food selection in a free situation is attended to higher energy dense foods (17). Also De Bourdeaudhuij showed that easygoing nutritional behavioral style for children leads to higher intake of sweetened and fatty snacks and lower intake of nutritious and healthy foods (18). The taste and energy density of foods affect children's preferences. Increasing the restrictive behaviors of parents about their children losing weight would cause a decrease in their bread, grains, sugar, fats, and butter intake, and an increase in the intake of puffs, chips and chocolate. This finding shows that nutritional restriction strategies can increase the preference and amount of intake of high calories and delicious foods, which can increase the pleasant feeling of eating these foods in children. Ritchie et al. found that limiting delicious foods have inverse effects on children as

they have desire for such foods (19). In other terms, when restrictive foods are available, children are excited, lose their control, and eat a lot from those foods. High limitation in long term may decrease energy self-regulation reactions of children. These reactions respond to the satiety and hunger and food intake modification. Birch and Fisher, and also Liem et al. showed that higher restrictive behaviors of parents are associated with more intakes of sweetened and fatty snacks (20, 21). With monitoring the children's nutrition, parents usually attempt to encourage them to have higher intake of nutritious and healthy foods or limit the intake of non-nutritive foods to prevent obesity. However, the current study and several other studies showed that these efforts may have inverse effects on children's food preferences and energy intake; limitation draws children's attention to restrictive foods, and increases their intake of those foods.

Our results showed that increment of parental encouraging behavior is associated with higher intakes of legumes and cooked vegetables, which is consistent with findings of Gable et al. and Patrick et al., who found a significant relationship between parental encouragement and increasing intake of fruits and vegetables (22; 23). It may be concluded that the greater amount of encouragement from parents will result in higher intake of nutritious foods among children. This may be due to the emotional space of feeding that affects the children's intake. Other studies showed that rewarding foods to children, who have no positive sense, could increase their joy and tendency to the intake of those foods (24-26). These findings may be related to the fact that food rewards, usually used in a positive emotional space, are often sweetened and fatty snacks, which are energy dense, and provide more pleasure to children. Some reasons for likes or dislikes of a food are the emotional space of the food eaten or the sense gained by the child. Therefore, this strategy causes propagation of delicious and energy dense foods, which are usually unhealthy foods. Our findings showed that modeling for children is related to lower intakes of processed meat and synthetic beverages and higher intakes of nutritious snacks, nuts, and dried fruits. Cullen et al. and Faith et al. found similar results, and showed that modeling of healthy foods for children may develop a healthier nutritional program for them (27, 28). Food intake is a social event for children, and includes others whom the child eats with. If children have good experience about eating foods with their parents, when they model eating nutritious and healthy foods, it will develop a positive sense, which may help children to have higher intakes of healthy foods. Our finding reveals that teaching children to consume healthy foods leads to higher intakes of nutritious and healthy foods and lower intakes of non-nutritious foods. In a study by Werle et al., the functional role of nutrition education in promoting children's nutrition was confirmed (29), which is the similar to the findings of Nicola et al. who showed that higher intakes of nutritious and healthy foods such as fruits and vegetables have significant associations with the lower availability of non-nutritious foods at home, such as synthetic fruit juice as well as sweetened, fatty and salty snacks (3). These results show that higher availability of nutritious foods leads to higher intake of those foods and, therefore, lower intake of non-nutritious foods. Children eat foods, which are easily accessible at home. Frequent exposure of foods and frequent experiences of consuming foods in non-obligatory situations can cause loss of resistance and hate toward foods. As parents are responsible for food supply and access in home, they can affect children's food preference and intake. Our findings revealed that participation of children in food purchase and preparation is related to higher intakes of nutritious snacks, nuts, dried fruits, vegetables and cooked vegetables. Similarly, Ogden et al. showed that increasing the participation of children in food preparation leads to higher intake of vegetables in this group (16). In conclusion, any attempt to improve dietary intake of children requires parental role in making interest, dietary behaviors, and eating patterns in children. Indeed, participation of children helps them to be familiar with and have access to foods. It is a kind of active encouragement for the intake of nutritious and healthy foods and increasing the preference of children toward those foods. Therefore, it seems that participation of children in food preparation has both positive and negative effects. So beside participation of children in food preparation, the healthy dietary patterns should be taught to them and they must be educated in this regard.

As this study was done only through kindergartens and many of childrens aged 2-6 years, especially in lower SES (socio-economic status) districts, might not go to kindergartens, our sampling is not a good representative for Tehranian preschool children.

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