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Dietary patterns and feeding problems of Turkish children with intellectual disabilities and typically developing children

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Abstract

This study aimed to determine whether dietary patterns and feeding problems differ among children with intellectual disabilities (ID) and typically developing children (TDC) in Turkey. This cross-sectional study was conducted in 220 (112 children with ID and 108 TDC) 7-12 aged children in Konya, Turkey. We assessed usual dietary intakes by a semi-quantitative food frequency questionnaire and gathered information on the children's problems about feeding by a feeding assessment survey. Children with ID were found to consume significantly more daily servings of Juice and sweetened non-dairy beverages (2.3 versus 1.2, p = 0.02) and desserts (4.2 versus 2.8, p = 0.01) and significantly fewer daily servings of vegetables (0.8 versus 1.8, p = 0.008) than TDC. The most common problems of children with ID were limited food variety, eating fast and eating too much. We found that limited food variety and food refusal problems are common in children with ID but not in TDC. Other problems, difficulty swallowing and skipping dinner, are less common in both groups.

Keywords: Children with intellectual disability, Dietary patterns, Feeding problems.

1. Introduction

We can summarize the concept of intellectual disabilities (ID) as meaningful limitations in mental functions and sensory, social, practical adaptation behaviours of the individual (Katz & Lazcano-Ponce 2008). Nutrition is an adaptation behaviour which is very effective in the quality of life of individual with ID. Because individual's nutrition pattern is a complicated sensorimotor process affected by the relations between the nervous system and muscular system and environmental factors (Eynat *et al.* 2011).

The percentage of mild nutrition problems in typically developing children varies between 25 to 30 percent (Colinand & Dana, 2002). Nutrition-related health problems occur more frequently in individuals with (ID) in comparison with the normal population. In the group with ID, a polarization for the distribution of weight comes into question. The number of both overweight and obese individuals and underweight and skinny individuals is greater than that of individuals with normal weight (Burkart *et al.* 1985; Stewart *et al.* 1994). When we look through the studies examining the body mass index values of persons with ID, there exist studies showing that adults with ID are at risk of being underweight (Bhaumik *et al.* 2008; Emerson, 2005; Temple *et al.* 2014). There is also evidence that children with ID may experience dietary problems and low weight risk (Marchall *et al.* 2003; Mauridsen *et al.* 2002; Sari & Bahceci, 2012).

Actually, besides there are so many types of nutrition problems in children with developmental retardation, Sisson & Van Hasselt (1989) express that nutrition problems can be categorized into four groups. These are; individual skills deficit, disruptive behaviours, eating too much or too little and choosing food according to its appearance. Development of cognitive skills such as attention and planning in teens often consuming food with low nutritive value is restricted. Moreover, the risk of occurrence of forward various social problems among these teens is greater than individuals eating healthily (Riggs *et al.* 2010).

Given the fact that they need more medical assistance, and have weaker state of health, and need more health resources and have more difficulty in accessing to health services compared to general population, individuals with ID constitute a vulnerable group in society (Hsu *et al.* 2009; Lin *et al.* 2006). Therefore, preserving their health with proper nutrition is of vital importance. Preventing the feeding problems and the state or quality of being overweight and underweight in children with ID is one of the basic methods for preventing health problems, improving the quality of life and decreasing mortality rate. In accordance with this purpose, first of all it is necessary to establish the feeding problems and nutrition resources for children with ID and determine the differences between children with ID and typically developing children.

Accordingly, in this study we: (1) assessed weight status and feeding problems of Turkish children with ID (2)

determined whether dietary patterns and feeding problems of children with ID differ from typically developing children (TDC).

2. Materials and Methods

2.1. Participants

7 to 12 year-old 220 children (mean age 8.2 years, 138 male) with ID and TDC were involved in this cross-sectional, observational study. These subjects were selected from 5 special educational needs schools and 3 normal education school in Konya, Turkey. Data were collected between September 2015 and February 2016.

2.2. Data collection

Body mass index (BMI) and BMI Z-scores were also calculated for each participant (Cole *et al.* 1995. Each child's age in years was calculated from birthday to the date of the data collection. The researchers instructed all participants on how to complete the questionnaire.

The parents of children were asked to complete a demographic questionnaire, a feeding assessment survey and a Food Frequency Questionnaire (FFQ). The items of the demographic questionnaire were constructed by the authors. The questionnaire included questions on the date of birth, weight of baby at birth, the medical history and education status of parents of the child. Feeding assessment survey aimed to gather information on the children's problems about feeding. Usual dietary patterns were assessed by using a 123-item semi-quantitative FFQ. The FFQ consisted of a list of foods with standard serving sizes commonly consumed by Turkish children and adolescents. Participants were asked to report their frequency of consumption of a given serving of each food item during the previous year on a daily, weekly or monthly basis. The reported frequency for each food item was then converted to a daily intake.

2.3. Analytic methods

All analyses were conducted using the Statistical Package for Social Sciences, SPSS (Version 17) (SPSS Inc., Chicago, IL, USA), with statistical significance set at $p < 0.05$.

Independent t-tests (or Mann Whitney U when distributions were not normal) were used to compare children with and without ID on the dairy serving of each food pattern, the percentage of selectivity, difficulty swallowing, eating fast, skipping breakfast, skipping dinner, picky eating and limited food variety. Chi-square tests were used to compare the prevalence of feeding problems between children with ID and TDC.

3. Results

Table 1 presents the characteristics of participants. The total of 220 parents completed the study, 112 children with ID and 108 TDC. Mean age, sex, parental education statuses were similar in the two groups. Children with ID were more likely to be overweight and underweight compared to TDC. Although the difference of born weight was non-significant, 8% of TDC, and 18% of children with ID had low birth weight.

Table 3 compares the mean number of daily servings for each dietary pattern between children with ID and TDC. Specifically, the estimates suggest that children with ID had higher level of consumption of Juice and sweetened non-dairy beverages and desserts and fewer vegetables than TDC. There was no significant difference in consumption of Dairy products, Fruits, Grains, Beans group, Meat group, Fish group, Oilseeds between two groups.

Table 1. Participants' demographic characteristics.

	Children with ID	*TDC*
Age	8.3 (2.6)	8.1 (2.1)
Sex, male (%)	68%	54%
BMI z-score (kg/m2)	0.44 ± 0.87	0.56 ±1.12
Underweight <5th percentile BMI%	8%	1%
Overweight ≥85th percentile BMI%	26%	19%
Obese >95th percentile BMI%	16%	12%

Table2. Food frequency questionnaire dietary pattern grouping.

Dietary patterns	*Included foods*
Dairy products	Milk, yogurt, cheese
Vegetables	Cabbage, cauliflower, kale, carrots, tomatoes, green leafy vegetables spinach, lettuce, cucumber, eggplant, celery, green peas, green beans, green pepper, turnip, corn, squash, mushrooms, onions, potato, garlic
Fruits	Pears, apricots, cherries, apples, raisins or grapes, bananas, cantaloupe, watermelon, oranges, grapefruit, kiwi, strawberries, peaches, nectarine, tangerine, mulberry, plums, persimmons, pomegranates, lemons, pineapples, fresh figs, dates
Grains	All kids of breads, cornflakes, rice, bulgur
Beans	Beans, chickpeas, broad beans, lentils, soy
Meat group	Red meats, chicken meat, turkey meat
Fish group	Canned tuna fish and other fish
Oilseeds	Peanuts, almonds, pistachios, hazelnuts, roasted seeds, walnuts
Juice and sweetened non-dairy beverages	Juice, iced tea, non-diet soda
Desserts	Chocolates, cookies, cakes, confections, jam, jelly, honey, sugars, candies, biscuits, wafers
Fried foods	Potato chips, corn puffs, crackers, popcorn

The feeding problems of the children are given in fig 1. The most common problems of children with ID were limited food variety, eating fast and eating too much. TDC had mostly eating fast and skipping breakfast problems. Limited food variety and shows food refusal problems are common in children with ID but not in TDC. Other problems, difficulty swallowing and skipping dinner, are less common in both groups. As shown in Table 4, a higher percentage of children with ID have food refusal and limited food variety problems (18% compared to 8%, p=0.02 and 34% compared to 18%, p=0.03 respectively). Children with ID have less dinner skipping and fast eating problems (5% compared to 11%, p=0.01 and 28.6% compared to 37%, p=0.01 respectively). Skipping breakfast rates did not differ significantly between the two groups.

Table 3. Comparison of daily servings of dietary patterns between children with ID and TDC

Dietary patterns	*TDC (108)*	*Children with ID (112)*	*P*
Dairy products	3.1±1.0	2.9±1.4	0.14
Vegetables	1.8±1.5	0.8±1.2	0.008
Fruits	2.9±2.3	2.4±1.9	0.10
Grains	3.1±2.9	3.8±3.4	0.12
Beans group	0.21±0.16	0.13±0.11	0.09
Meat group	0.52±0.12	0.87±0.57	0.12
Fish group	0.03±0.15	0.02±0.11	0.90
Oilseeds	2.8±1.5	2.4±1.8	0.10
Juice and sweetened non-dairy beverages	2.3±2.1	1.2±0.8	0.02
Desserts	2.8±1.1	4.2±2.4	0.01

Table 4. Comparison of feeding problems between children with ID and TDC

Feeding problems	*TDC (108)*	*Children with ID (112)*	*P*
Difficulty swallowing %	1.08%	5.35%	0.002
Eating fast	37%	28.6%	0.01
Skipping breakfast	32%	24%	0.08
Skipping dinner	11%	5%	0.01
Shows food refusal	8%	18%	0.02
Limited food variety	18%	34%	0.03

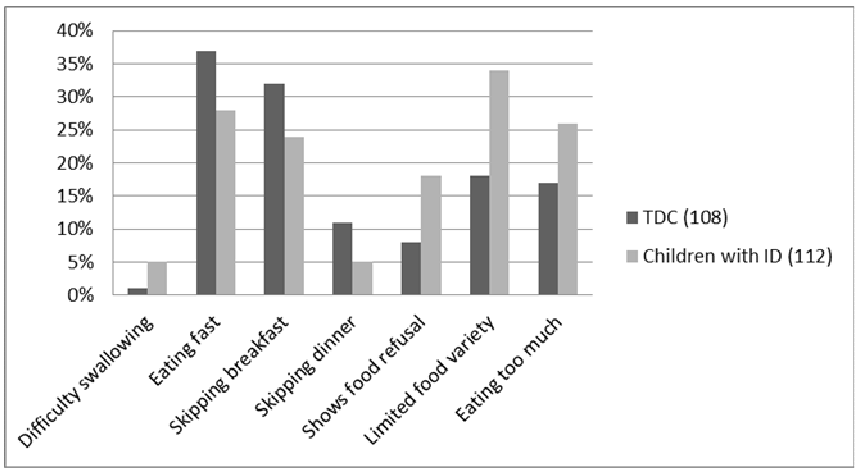

Figure 1. Comparison of feeding problems between children with ID and TD children

4. Discussion

There are some studies showing that children with delayed growth have more feeding problems compared to typically developing children. One of those is Schreck's study (2004) comparing eating behaviours of children with autism spectrum disorder and TDC. According to the research of Schreck (2004), children with autism

spectrum disorder consume less vegetable, fruit, protein and dairy products. Meanwhile, they show differences such as refusing food, feeding on a low dietary diversity and being selective about food's texture. In another study (Schmitt *et al.* 2008), besides it is seen that choosing and refusing foods is more common in children with autism spectrum disorder than typical children, they also seem to choose the foods according to their texture. There are also other studies that identify the problems of refusing to try new foods and selective eating (Lockner *et al*. 2008). Also, it is seen that adolescent girls with Asperger's Syndrome are more inclined to feeding problems such as bulimia, controlling the food intake and food preoccupation (Kalyva, 2009). Besides our study group differs from those studies, limited food variety turns out to be a general feeding problem in children with ID. The following issues are 'eating fast, eating too much and skipping breakfast'.

In our research, it is seen that vegetable consumption is relatively low in children with ID when compared to typically developing children. Low fruit and vegetable consumption shows parallelism with both low dietary diversity and increase in consumption of unhealthy food (Murphy, 2006). Moreover, it is seen that low consumption of vegetable but not fruit in children is in direct proportion to refusing to try new foods (Cooke, 2003). Limited dietary variety is a strong risk factor for poor nutrition Bandini *et al.* (2010) and Zimmer *et al*. (2012). As it is seen, diet on a limited food or food selectivity is not a temporary problem and self-overcoming simple issue, but it is an important one leading the children to eat foods rich in nutrient and feed on a high carbohydrate diet (Williams *et al.* 2005).

According to the researches, the obesity rate of individuals with ID in adults is greater when compared to general population (Melville, 2007; Rimmer & Yamaki, 2006; Yamaki, 2005; Hove, 2004). Besides that, the study results in the young population are conflicting because as well as studies (Takeuchi, 1994) showing that the obesity rates in youth and adolescents with ID are more than those of typically developing ones, there are also studies (Murphy,1992) showing that they are the same. In our study, it is seen that the number of underweight, overweight and obese children with ID is greater in comparison with typically developing children. When we examine the obesity rates among children with ID, there are studies showing that as they age, obesity increases (Emerson, 2010; Begarie et al., 2013; Choi et al., 2012), and that it is far greater in girls (Begarie et al., 2013), in children with down's syndrome (Begarie et al, 2013), in high-income countries (Lloyd et al., 2014).

Studies in this field have generally focused on the nutritional status of adults with ID. Thus, an available assessment survey of nutritional status approved for our group couldn't be used. This can be shown among the limitations of the study. Determining the nutritional status and problems of children with ID requires more specific and practical tools (Humphries et al. 2004, 2007, 2008).

5. Conclusion

It is seen in this survey that there are a number of differences between the nutritional status and feeding problems of typically developing children and children with ID. Feeding problems of children with ID are more exposed than TDC can be summarized as the limited dietary diversity, eating fast and refusing some kinds of food. Meanwhile, when we examine the feeding groups, it is seen that vegetable consumption of children with ID is lower but consumption of sweet and sugary drinks is greater in comparison with TDC.

While nutrition-related health problems and eating disorders attract a great deal of attention, eating disorders in children with ID attract little attention. The latest approach to create a healthy community is that people who care for individuals with ID and their families themselves should be informed of sufficient physical activity, better nutrition and smart food choices. Further studies are needed to clarify how a child with ID will be at a healthy weight and how he/she will maintain it.

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