



MEDITERRANEAN DIET AND ADOLESCENTS WITH INTELLECTUAL DISABILITIES

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Abstract:

The purpose of the present study is to evaluate the adoption of Mediterranean diet in adolescents with intellectual disabilities. The sample of the study consisted of 24 adolescents (8 boys and 16 girls) with intellectual disabilities who were studying at a secondary education school, with an average age of 17.63±2.018 years. For data collection, the Mediterranean Diet Quality Index for Children and Adolescents (KIDMED) by Serra-Majem et al. (2004) was used. KIDMED is supported by specific principles sustaining traditional healthy Mediterranean dietary patterns. KIDMED is based on a 16-item food consumption log questionnaire that can be answered either self-administered or in interview. As for the pupils with intellectual disabilities, the answers were recorded in an individual interview. For the statistical analysis the Statistical Package for Social Sciences ver. 23.0 for windows was used. Data processing showed that over the 1/3 of adolescents with intellectual disabilities (37.5%) has a very low diet quality, while the proportion of adolescents following an optimal Mediterranean diet was zero. In addition, the diet of the adolescents with intellectual disabilities in a very large proportion (62.5%) needs improvement for the adaptation of the consumption / intake to Mediterranean patterns. The results show that adolescents with intellectual disabilities do not follow the Mediterranean diet. Therefore, priority should be given to the application and implementation of health educational programs on diet in general, and more specifically on the benefits of Mediterranean diet to adolescents with intellectual disabilities, in order

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to adopt the Mediterranean diet patterns aiming on the beneficial effects, both directly and long-term in their adult life.

Keywords: youth, mental retardation, food, diet quality index

1. Introduction

The term “Mediterranean diet” reflects the characteristics of dietary patterns of several countries in the Mediterranean Basin during the early 1960s (Serra-Majem et al., 2004). The Mediterranean diet is a good for the health and well-balanced diet, that provides most of the nutrients in their right proportions (Ríos-Hernández et al., 2017).

More specifically, the Mediterranean dietary pattern has its base in high consumption of vegetables and fruits, cereals and whole grains, pulses as source of dietary fibre, nuts, fish, olive oil as the main added fat, and low-fat dairy products. Additionally, it is noted that there is a relationship between the Mediterranean dietary pattern and reduced risk of the most common chronic degenerative diseases. On the contrary, increased total calorie intake, overconsumption of animal fat and (red) meat, sugar and processed food, as well as body weight, and especially excess body fat, were found to be associated with a greater risk of the most common chronic degenerative diseases (Donini et al., 2015). It is worth to be mentioning that obesity alone presents a higher risk of developing many chronic conditions, such as hypertension, diabetes, heart disease, arthritis, stroke, stress, depression, respiratory diseases and even sleep disorders (Ells et al, 2006; Haveman et al, 2010).

Concerning people with intellectual disability (ID), they confront a significant health problem as they are more overweight or obese in comparison with people of the general population in a rate higher by 59% (Marshall et al, 2003; Draheim, 2006). The causes are multifactorial and dependent on a number of factors, such as hypotonia, endocrine abnormalities depressed metabolic rate, reduced exercise, and mainly poor eating behaviours and high inappropriate caloric eating (Mokdad et al, 2004; Fisher and Ketti, 2005). Concerning young people with ID, they have a higher risk of developing health disorders related to obesity, earlier in their life, because they present high levels of obesity (Janiciki et al, 2002).

Unfortunately, healthy eating aiming on health promotion does not adopted early in the life, but begins only when obesity is already a clearly perceptible problem for the people with intellectual disability. However, at this point of time, every day diet habits that resulted to obesity are well established and the process to re-educate the subjects is more difficult (Jobling, 2001).

So, given the vulnerability of young people with ID regarding obesity mainly due to poor diet, it is understood, that more studies are needed, which may provide more data overeating behaviors of young people with ID. However, despite the observed sufficient number of studies on eating behaviors of people of general population there is a lack of studies examining the adherence to the Mediterranean Diet and almost no study examining the adherence to the Mediterranean Diet of the adolescents with ID in Greece.

Thus, the aim of the present study is to examine the adherence to the MED of adolescents with ID.

2. Methods

2.1 Sample

Twenty-four adolescents with ID (eight boys and sixteen girls) volunteered to participate in the research. All the subjects were pupils attending courses in a secondary education school for pupils with ID in Greece. During the conduction of the survey, the school year was in progress. Subjects' age ranged from 13 to 21 years ($M=17.63$, $SD=2.018$).

2.2 Procedure

An approval for conducting the research was given by the director of the school, after the aim and the conditions of the research were described. The procedures were in agreement with the ethical standards of the Declaration of Helsinki of the World Medical Association (2000).

Before the beginning of the research, a written informed consent for the participation in the research was obtained from the parents or guardians of each pupil. In continuity, a description of general requirements, in a simple and understandable way for the pupils was given. The need for absolute honesty and precision was particularly emphasized. Subsequently all the pupils answered to a questionnaire once, in an individual interview with the researcher, during which simple instructions were given and pupils' questions were explained. Additionally, measurements of anthropomorphological characteristics, such as height and weight were carried out.

2.3 Scale of Measurements

For data collection, the Mediterranean Diet Quality Index for children and adolescents (KIDMED) of Serra-Majem and his colleagues (2004) was used. The KIDMED index is used for the evaluation of adherence in Mediterranean diet. The KIDMED is based on certain principles sustaining and challenging traditional healthy Mediterranean dietary patterns.

The KIDMED index was inspired by instruments previously developed for adult (Alberti-Fidanza, & Fidanza, 2004) and elderly (Trichopoulou et al., 1995) populations. Thus, the KIDMED index, consist the first index evaluating the adequacy of Mediterranean dietary patterns in children and youth that is for population aged 2-24 years.

The KIDMED was based on a 16-question test that could be self-administered or conducted by interview (teacher, pediatrician, dietitian, etc.). As for the pupils with ID, the answers were recorded personally for each subject by interview with the researcher, who is pupils' teacher. KIDMED index ranged from -4 to 12 degrees. Questions denoting a negative connotation with respect to the Mediterranean diet were assigned a value of -1. Questions denoting a positive aspect were assigned a value of +1 (see Table 1).

Table 1: KIDMED test to assess the Mediterranean diet quality

Scoring	
+1	I take a fruit or a fruit juice every day
+1	I have a second fruit every day
+1	I have fresh or cooked vegetables regularly once a day
+1	I have fresh or cooked vegetables more than once a day
+1	I consume fish regularly (at least 2-3 times per week)
-1	I go more than once a week to a fast-food (hamburger) restaurant
+1	I like pulses and eats them more than once a week
+1	I consume pasta or rice almost every day (5 or more times per week)
+1	I have cereals or grains (bread, etc.) for breakfast
+1	I consume nuts regularly (at least 2-3 times per week)
+1	We use olive oil at home
-1	I skip breakfast
+1	I have a dairy product for breakfast (yoghurt, milk, etc.)
-1	I have commercially baked goods or pastries for breakfast
+1	I take two yoghurts and/or some cheese (40 g) daily
-1	I take sweets and candy several times every day

The sums of the values from the administered test were classified into three categories/levels:

1. ≥ 8 : optimal Mediterranean diet;
2. 4-7: improvement needed to adjust intake to Mediterranean patterns;
3. ≤ 3 : very low diet quality.

Thus, higher scores in KIDMED show a higher adherence in Mediterranean diet.

2.4 Statistical Analyses

For data analysis the *SPSS ver. 23.0 for Windows* was used. Descriptive analysis and frequencies were applied. Descriptive statistics were used for participants' profile analysis and variable description. Results were expressed as mean values, standard deviation, and percentages.

3. Results

In Table 2, the anthropomorphological characteristics of the sample are presented.

Table 2: Sample's anthropomorphological characteristics

	Mean	Standard Deviation
Age (years)	17.63	2.018
Height (cm)	165.29	8.18
Body Weight (Kg)	71.13	17.23
BMI (Kg/m ²)	26.09	6.23

In Table 3, pupils' frequencies of adherence of the principles sustaining traditional healthy Mediterranean dietary patterns are presented.

Table 3: Frequencies of adherence of the principles sustaining traditional healthy Mediterranean dietary patterns

Principles sustaining traditional healthy Mediterranean dietary patterns	Adherence	
	YES %	NO %
Fruit or fruit juice daily	87.5%	12.5%
Second serving of fruit daily	75%	25%
Fresh or cooked vegetables daily	79.2%	20.8%
Fresh or cooked vegetables >1 time/day	62.5%	37.5%
Regular fish consumption (at least 2-3 times/week)	0%	100%
>1 time/week fast-food (hamburger) restaurant	62.5%	37.5%
Pulses >1 time/week	91.7%	8.3%
Pasta or rice almost daily (>5 times/week)	83.3%	16.7%
Cereal or cereal product for breakfast	12.5%	87.5%
Regular nut consumption (at least 2-3 times/week)	0%	100%
Use of olive oil at home	95.8%	4.2%
Skip breakfast	25%	75%
Dairy product for breakfast	37.5%	62.5%
Commercially baked goods or pastries for breakfast	62.5%	37.5%
Two yoghurts and/or 40 gr cheese daily	12.5%	87.5%
Sweets and candy several times a day	70.8%	29.2%

As it is shown in Table 3, and concerning eating habits denoting a positive connotation with respect to the Mediterranean diet, the pupils act positively in seven of them and negatively in the other five. More specifically, pupils' bigger percentages take a fruit or a fruit juice every day (87.5%), have a second fruit every day (75%), have fresh or cooked vegetables regularly once a day (79.2%) or/and more than once a day (62.5%), eat pulses more than once a week (91.7%), consume pasta or rice almost every day (5 or more times per week) (83.3%) and use olive oil at home (95.8%). However, pupils with ID in the present study do not consume fish and nuts regularly that is at least 2-3 times/week, and their bigger percentage (87.5%) do not consume cereals or cereal products for breakfast and two yoghurts and/or 40 gr cheese daily. Moreover, pupils' bigger percentage (62.5%) do not consume dairy products for breakfast.

As for eating habits denoting a negative connotation with respect to the Mediterranean diet, unfortunately, the pupils act positively in the most of them. More specifically, the bigger percentage consume sweets and candy several times a day (70.8%), consume commercially baked goods or pastries for breakfast (62.5%), and eat more than 1 time/week at a fast-food (hamburger) restaurant (62.5%). Fortunately, only 25% of the pupils skip the breakfast.

Thus, the pupils follow only half of the principles sustaining traditional healthy Mediterranean dietary patterns in percentages from 62.5% to 95.8%. Consequently, it could be said that pupils' percentages of adherence of the principles sustaining traditional healthy Mediterranean dietary patterns are very low or/and zero.

In Figure 1 are presented the frequencies of the pupils as they were classified into the three categories/levels according to the sums of the values from the KIDMED test.

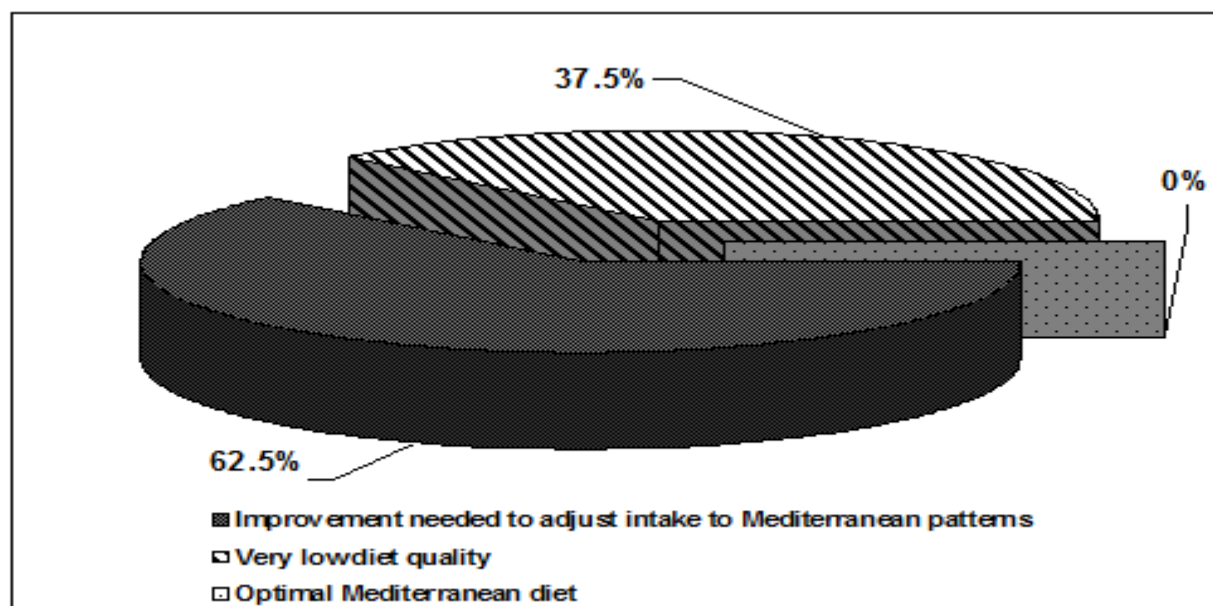


Figure 1: The frequencies of the pupils on the three categories/levels according to the KIDMED test

As it is shown in Figure 1, for the bigger percentage of the pupils with ID (62.5%) improvement needed to adjust intake to Mediterranean patterns. In addition, the adolescents with intellectual disabilities in a percentage of 37.5% have a diet of a very low quality. Finally, the proportion of adolescents with ID following optimal Mediterranean diet was zero.

4. Discussion

From the results of the present study it was found that the adolescents with ID of the present study have a diet of a very poor quality, or a diet that needs improvement in order to be adjusted to Mediterranean diet patterns. It is worth mentioning that no adolescent of the present sample follows optimal Mediterranean diet. In agreement to the results of the present study, Ptomey (2013) found that adolescents with intellectual and developmental disabilities have a diet that needs improvement, according to Healthy Eating Index (score 57.3). More specifically, the diet intake of adolescents with intellectual and developmental disabilities is high in sodium, very low in dark green and orange vegetables and whole grains, low in total fruit, medium in whole fruit, total vegetables, non-hydrogenated oils and saturated fat, good in total grains, milk, meat and beans, and calories from solid fats, alcoholic beverages and added sugars, but not very good or optimal in any food group. Besides, the lower adherence to a Mediterranean diet has been found to be associated with attention-deficit/hyperactivity disorder diagnosis (Ríos-Hernández et al., 2017).

In similar findings resulted a research that examined data from overweight adults with intellectual and developmental disabilities who participated in a weight loss program (Ptomey et al., 2013). Adults with intellectual and developmental disabilities consumed diets low in fruits, whole grains, and healthy oils, meeting 25.2%, 23.0%, and

1.1% of the federal dietary guidelines, respectively. These individuals also consumed a diet high in sodium with 87.3% consuming more than the recommended intake of sodium (0.7 grams per 1000 kcals). Additionally, they had a lower Healthy Eating Index score than the general population (45.6 vs. 58.2, respectively), with lower scores for fruits, vegetables, meat and beans, oils, and sodium, indicating poor quality of diet for subjects with intellectual and developmental disabilities vs a diet that needs improvement for the general population (Ptomey et al., 2013).

In agreement the adolescents with ID in the present study in a percentage of 37.5% have a diet of very low quality. In addition, the diet for the bigger percentage of the adolescents (62.5%) needs improvement in order to be adjusted to Mediterranean patterns. However, only 25% of the pupils skip the breakfast, indicating that breakfast was consumed by 75% of the adolescents with ID. In similar results a research of Ptomey et al., (2013), in adults with intellectual and developmental disabilities, indicating that breakfast was consumed 75% of the time.

As for eating habits denoting a negative connotation with respect to the Mediterranean diet, the bigger percentage of the adolescents with ID in the present study consume sweets and candy several times a day (70.8%), consume commercially baked goods or pastries for breakfast (62.5%), and eat more than 1 time/week at a fast-food (hamburger) restaurant (62.5%). In agreement, Draheim et al. (2007) who assessed the dietary fat intake consumption of adults with ID found that 70.7% of adults with ID living with family consumed a high-fat diet (>30% of calories from dietary fat). On the contrary, only 29.3% consumed the recommended 30% or less of calories from fat. It is worth mentioning that unhealthy dietary patterns (usually high in saturated fat, refined sugars, and processed food and low in fruit and vegetables) are often associated with attention deficit/hyperactivity disorder (Ríos-Hernández et al., 2017).

According to Adolfsson et al. (2008), the main energy sources for adults with ID were milk products, bread, meat products, buns and cakes. The researchers pointed out that the daily intake of fruit and vegetables (320 ± 221 g) as well as dietary fiber (21 ± 9.6 g) was generally low. The daily intake of fruit and vegetables for the adolescents with ID in the present study is low, too, as 75% of them take a fruit or a fruit juice every day or/and have a second fruit every day, while 62.5% have fresh or cooked vegetables >1 time/day. On the contrary, 12.5% of the present sample do not consume any fruit or fruit juice daily and 20.8% do not consume any fresh or cooked vegetables daily.

Concerning fruit and vegetable consumption of adults with ID living with family, Draheim et al. (2007), also, found that the 58.2% consumed less than three fruits and vegetable daily. On average subjects with ID consume 1.0 ± 1.2 servings of vegetables, 2.8 ± 2.6 servings of fruit, and 1.6 ± 1.9 servings of dairy (Braunschweig et al., 2004). It is worth mentioning that no community-dwelling adults or living with family members consumed the recommended five servings of fruits and vegetables per day (Braunschweig et al., 2004; Draheim et al., 2007). Thus, daily intake of fruits and vegetables for subjects with ID is far away from the recommended servings. Moreover, daily intake of fruits and vegetables for adults with ID is, also, far away from the observed in adults without ID. More specifically, adults without ID in USA consume the

recommended daily fruits and vegetables in percentages from 17% to 40% (Guenther et al., 2006; Thompson et al., 1999).

In addition, in Europe of the 28 Member States, on average, more than half of the general population aged 15 and over (51.4%) reported that they consume from one to four portions of fruit and vegetables per day, one in seven persons (14.1%) consume 5 portions of fruit and vegetables or more per day, while more than 1/3 (34.4%) do not consume fruits and vegetables on a daily basis. However, the daily consumption of fruit and vegetables differed widely across the EU-28. Thus, in Greece, 1/3 (30%) of the population aged 15 and over do not consume fruits and vegetables on a daily basis, 62% consume from one to four portions of fruit and vegetables per day, while only 8% consume 5 portions of fruit and vegetables or more per day, that is the recommended fruits and vegetables per day (Eurostat, 2018). Consequently, it is of concern that the percentage of adults with ID consuming adequate fruits and vegetables is considerably less than that of adults in the general population (Draheim et al., 2007).

Moreover, Adolfsson et al., (2008) examined diets of 32 adults with ID in Sweden. They found that the diets were low in fiber, vitamin A, thiamin, riboflavin, folic acid, iron, and selenium, and the majority of the daily calories came from milk products, bread, meat, and sweets. In addition, most food was consumed as snacks.

Taking into account the results of other researches as well as the findings of the present study, it could be said that the subjects with ID, adults, youth, as well as adolescents, have a poor diet quality. However, poor diet is not just an observation. Poor nutritional intake is believed to contribute to the increased risk of obesity. In fact, the prevalence of obesity in both adults and adolescents with intellectual and developmental disabilities is approximately 2-3 times greater than in the general population (Ptomey, 2013).

Poor diet, together with physical inactivity, are risk factors for numerous conditions that affect overall health and quality of life, and many of these conditions can lead to chronic diseases. Intermediate outcomes such as obesity, metabolic syndrome, inadequate bone health, undernutrition, iron deficiency, eating disorders, and dental caries can begin in childhood, leading to earlier onset of disease and subsequent premature death (CDC, 2011).

On the other side, engaging children and adolescents in healthy eating and regular physical activity can lower their risk for obesity and related chronic diseases. The major goals in healthy eating are to provide appropriate calorie intake, provide optimum nutrition for the maintenance of health and normal growth, and to help the child develop and sustain healthful eating habits (Daniels et al., 2005).

Concerning Mediterranean diet, it is one of the healthiest eating patterns. Mediterranean diet is associated with lower rates of chronic morbidity and higher life expectancy. The Mediterranean diet showed favorable effects on lipoprotein levels, endothelium vasodilatation, insulin resistance, metabolic syndrome, antioxidant capacity, myocardial and cardiovascular mortality, and cancer incidence in obese patients and in those with previous myocardial infarction (Serra-Majem et al., 2004)

In addition, it has been proven that far fewer children and youth with special health care needs (CYSHCN) have a healthy weight, while they are much more overweight or obese in comparison with their peers without special health care needs. More specifically, according to the Results of the National Survey on Children's Health (2011/2012) aiming on comparison of CYSHCN with non-CYSHCN ages 0-17 years in Montana, in terms of child's weight status, it was observed that the percentages for CYSHCN were: underweight 6%, healthy weight 55.1% and overweight or obese 38.8%, while for non- CYSHCN were: underweight 6%, healthy weight 69% and overweight or obese 25%.

Consequently, as the rates of obesity are higher in individuals with ID than in the general population, special attention should be given to the results of the present study as they suggest high consumption of refined grains and sugar, and low consumption of whole fruits, vegetables, whole grains and fish, and a diet that needs improvement in order to be adjusted to Mediterranean diet patterns, all of which may contribute to the development of diabetes, cardiovascular disease, cancer or other health complications. It is worth mentioning that weight of adults with intellectual and developmental disabilities has been found to be significantly associated with fruit consumption, total vegetables consumption, dark green and orange consumption, and whole grains consumption, such that as the weight of participants is increased, consumption of these foods is decreased (Ptomey et al., 2013). Thus, engaging adolescents with ID in healthy eating in general, and in Mediterranean diet in particular is a cornerstone.

5. Conclusions

Consequently, priority should be given to the application and implementation of health educational programs on diet in general, and more specifically on the benefits of Mediterranean diet to adolescents with ID, in order to adopt the Mediterranean diet patterns aiming on the beneficial effects, both directly and long-term in their adult life. It is worth mentioning that the implementation of Mediterranean diet programs in a school environment targeting adolescents at a time in their lives when they develop health attitude behaviors, may be effective throughout their lives.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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