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ORIGINAL ARTICLE

Adherence to a Mediterranean-like dietary pattern in children from eight European countries. The IDEFICS study

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BACKGROUND: Despite documented benefits of a Mediterranean-like dietary pattern, there is a lack of knowledge about how children from different European countries compare with each other in relation to the adherence to this pattern. In response to this need, we calculated the Mediterranean diet score (MDS) in 2–9-year-old children from the Identification and prevention of dietary- and lifestyle-induced health effects in children and infants (IDEFICS) eight-country study.

SUBJECTS AND METHODS: Using 24 h dietary recall data obtained during the IDEFICS study ($n = 7940$), an MDS score was calculated based on the age- and sex-specific population median intakes of six food groups (vegetables and legumes, fruit and nuts, cereal grains and potatoes, meat products and dairy products) and the ratio of unsaturated to saturated fats. For fish and seafood, which was consumed by 10% of the population, one point was given to consumers. The percentages of children with high MDS levels (>3) were calculated and stratified by sex, age and by having at least one migrant parent or both native parents. Demographic (sex and age) and socioeconomic characteristics (parental education and income) of children showing high (>3) vs low ($\leqslant 3$) MDS levels were examined.

RESULTS: The highest prevalence of children with MDS >3 was found among the Italian pre-school boys (55.9%) and the lowest among the Spanish school-aged girls (26.0%). Higher adherence to a Mediterranean-like dietary pattern was not associated with living in a Mediterranean country or in a highly educated or high-income family, although with some exceptions. Differences in adherence between boys and girls or age groups varied between countries without any general pattern.

CONCLUSIONS: With the exception of Italian pre-schoolers, similar adherence levels to a Mediterranean-like dietary pattern have been observed among European children.

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INTRODUCTION

The traditional Mediterranean diet is characterised by a high intake of vegetables, legumes, fruits, nuts and cereal grains (largely unrefined in the past), moderate-to-high fish intakes, high intakes of unsaturated lipids (particularly from olive oil) but low intakes of saturated fats, a low-to-moderate intake of dairy products (mostly cheese and yoghurt) and finally, a low intake of meat products.[1,2]

In adults, a Mediterranean-like dietary pattern is known to be inversely associated with mortality,[3] as well as with a number of chronic diseases including cardiovascular diseases,[4] cancer,[5,6] obesity,[7] metabolic syndrome[8,9] and also diabetes type 2,[10] probably due to the relatively low glycaemic load in spite of the potentially high carbohydrate content.[11] This dietary pattern has also been suggested to improve cognition[12] and to increase longevity[13] and appears to be associated with a better health status overall.[14] Such benefits have been observed both in Mediterranean[15] as well as in non-Mediterranean countries.[16]

Adherence to a Mediterranean-like dietary pattern has often been evaluated based on scores. The most commonly applied Mediterranean diet score (MDS) used in studies on adults was developed by Trichopoulou *et al.*[17] The score was subsequently modified to include fish[18,19] or calculated based on tertile rather than median intakes for application in large population studies.[20] The MDS is often calculated by allocating one point each when the energy-adjusted intakes for any of the most common Mediterranean foods (vegetables, legumes, fruit, nuts and so on) or the ratio of unsaturated to saturated fats is above the population median, as well as by allocating one point each when the intakes for any food that is atypical of the Mediterranean pattern (meat and dairy products) is below the population median.

In children and adolescents, scores have been developed to measure adherence to a Mediterranean-like diet, but they have usually been applied in children from Mediterranean countries, with few exceptions, that is, Mexico,[21] UK,[22] and a multi-centre study including 20 countries.[23] Another household-based study[24] was performed in Portugal, which is considered very close to the Mediterranean countries concerning dietary habits.[25] A number of scoring systems have been used to assess the adherence to a Mediterranean-like dietary pattern in children and adolescents. These include the above-mentioned MDS[3,26] as well as a similar

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score developed by Garcia-Marcos *et al*.[27] The latter, in particular, was based on a three-level scoring system where food intake frequency was rated 0, 1 or 2 from less to more typical Mediterranean foods and from more to less atypical foods. Finally, Serra-Majem *et al*.[28] developed the Mediterranean Diet Quality Index for children and adolescents (generally referred to as KIDMED), based on 16 different frequency questions of food intake.

We have recently published results based on a 43-item food frequency questionnaire (FFQ) of the eight-country cohort study Identification and prevention of dietary- and lifestyle-induced health effects in children and infants (IDEFICS), where we applied a version of the MDS adapted to food frequencies (rather than quantities) adjusted for the total daily consumption frequency of all food items in the FFQ.[29] Our results showed an unexpected distribution of the adherence levels to a Mediterranean-like pattern: the Swedish children had the highest scores and the Cypriot children had the lowest scores. As our previous score was based on usual frequencies of consumption of a limited number of food items in each food group, in this paper we present descriptive analyses of adherence levels to a Mediterranean-like dietary pattern based on food quantities assessed using a computer-based 24 h dietary recall and including a higher number of food items.

SUBJECTS AND METHODS

Study subjects

A population-based cohort of 16 228 children (response proportion 53.4%) aged 2–9 years was examined in a baseline survey in eight European countries ranging from North to South and from East to West (Sweden, Germany, Hungary, Italy, Cyprus, Spain, Belgium and Estonia) from autumn 2007 to spring 2008. The sample of the present analysis was taken from the baseline survey (T_0) of the IDEFICS study, which includes the largest European children's cohort established to date.[30]

All 2–9-year-old children who resided in the defined regions and attended the selected primary schools (grades 1 and 2) or pre-schools were eligible for participation and were approached via schools or pre-schools. In addition to the signed informed consent given by parents, each child was asked to give verbal assent immediately before examination. Participants were free to opt out of specific modules (for instance, blood collection).[30]

Questionnaires

The parents completed a self-administered questionnaire to assess behavioural and sociodemographic factors. Parental education, employment status, dependence on social welfare and migration background of parents were recorded. Educational attainment was defined according to the International Standard Classification of Education,[31] whereas family income was categorised using country-specific categories based on the average net equivalence income.

The survey also included a Children's eating habits questionnaire to describe food frequencies and dietary habits over the last month, completed by the parents of 14 972 children (49.1% girls). This was complemented by a computer-based 24 h dietary recall, namely, Self-Administered Children and Infant Nutrition Assessment (SACINA), which produced the data used in the present study. SACINA was recently validated with doubly-labelled water, showing to be a valid instrument to assess energy intake at group level.[32] The SACINA was based on the previous designed and validated YANA-C (Young Adolescents' Nutrition Assessment on Computer) developed for Flemish adolescents and further adapted to European adolescents in the Healthy Lifestyle in Europe by Nutrition in Adolescence (HELENA) study.[33] The SACINA software was developed to assess children's absolute nutrient and energy intake, the contribution from food and drinks to total energy and nutrient intake, as well as portion sizes and food groups, during the previous 24 h. It was structured according to six meal occasions: breakfast, mid-morning snack, lunch, afternoon snack, evening meal and evening snack. Choice of portion size was assisted by the display of photographs of selected food items, many of which were country-specific. The parents or other proxies completed the 24 h dietary recall under the supervision of fieldwork personnel in about 20–30 min. Except for Cyprus, where school ends before lunch, school and pre-school meals were additionally assessed by means of direct observation. Teachers and school kitchen staff were interviewed by trained survey personnel and data were collected using special documentation sheets, including portion sizes. School and pre-school meal data were merged with parentally reported data to enhance completeness of dietary intakes. The assessment procedure in Hungary differed slightly from the other study centres. Here all dietary information was recorded on documentation sheets and entered into the SACINA program afterwards. The coded food items were linked to country-specific food composition tables.

A total of 14 863 recall interviews have been done. Of these, 11 669 were first recalls (about 78% of the whole IDEFICS cohort). Exclusion criteria included incomplete interviews ($n = 1913$; for example, when the proxy did not know about at least one main meal or in case of no school or pre-school meal information) as well as recalls characterised by implausible intakes (for example, $>85\%$ energy from fat) or by under-reporting or over-reporting ($n = 1816$), the latter two identified according to Goldberg cut-offs adapted to children as reported in a previous publication.[34] The final data set after exclusions included 7940 first recalls (6738 on work days and 1202 on weekends) as well as 2219 second recalls (1443 on work days). However, due to missing values in the variables related to the parental socioeconomic and migration status, the above numbers varied in some analyses. Data from second recalls were not used in the main analysis, but only in a supplementary analysis, due to the limited number. Also, the procedures for the estimation of usual intakes were not stable when being applied to single (non-daily) consumed food items, that is, the models did not converge. We also decided not to use the mean of both recalls (where available) to avoid differing numbers of recalls between the children.

Food groups and MDS

On the basis of the SACINA data, daily intakes (g per day) of all food items were calculated and six food groups were created: (1) vegetables and legumes; (2) fruit and nuts; (3) cereal grains and potatoes; (4) fish products; (5) meat products; (6) dairy products (see Appendix for details about the foods included in each food group); and (7) a ratio of unsaturated (that is, the sum of mono- and polyunsaturated fats: monounsaturated fatty acids +polyunsaturated fatty acids) to saturated fats. The decision to include both types of unsaturated fats was based on the fact that polyunsaturated fatty acids, and not only monounsaturated fatty acids, are the principal unsaturated fats in non-Mediterranean diets.[35] Food intakes from soups were divided by two to consider the contribution of water to the food weight. Intakes were standardised to an intake level of 1000 kcal and medians were calculated by the children's sex and age categorised as pre-school (<6-year olds) and school age ($\geqslant 6$-year olds). One point was given for individual intakes lying above the food group median for vegetables and legumes, fruit and nuts as well as for cereal grains and potatoes. For the unsaturated to saturated fat ratio, one point was given when children were above the median. For meat and dairy products, one point was given when the child's intake was below the median. Finally for fish, which was consumed by only 8.7% of the children on the single recall day, one point was assigned to consumers. The sum of these points gave a seven-point MDS, and high adherence to a Mediterranean-like dietary pattern was considered when the score was >3 as in previous analyses based on the FFQ data.[29]

Statistical analyses

Prevalence of high adherence to a Mediterranean-like dietary pattern (defined as MDS >3) was calculated both for the whole sample and stratified by participating centre, sex, age group and by parental migration status, as previously described. Due to the limited number of recalls collected during weekend days (that is, Saturday and Sunday, 15.8% of all recalls), the prevalence of high adherence during these days was not reported, stratified by sex, age or parental migration status. In addition, the proportion of boys, pre-school age children, as well as the prevalence of highly educated and higher-income parents and of children having at least one migrant parent were calculated both among children with high (MDS >3) and low (MDS $\leqslant 3$) adherence. The prevalence of high adherence from the second dietary recall was also calculated for the overall sample, as well as stratified by sex and age and based on work days. In addition, a version of the MDS excluding foods consumed at school or pre-school was calculated. A second alternative version of the MDS was obtained by

excluding potatoes from the score calculations and the prevalence of high adherence was calculated, stratified by sex and age group.

All statistical analyses were carried out using the SAS statistical software version 9.2 (SAS Institute, Cary, NC, USA).

RESULTS

Table 1 describes the prevalence of high adherence to a Mediterranean-like dietary pattern (that is, MDS > 3) stratified by participating centre, sex, age group (age < or ⩾6 years) and by having at least one migrant parent or both native parents. During work days, in both age groups and sexes, the Italians (together with Spanish school-age boys) showed the highest prevalence of high-adherent children, whereas the lowest adherence levels (<30%) were observed in Estonian (pre-school age), German and Cypriot (school age) boys, as well as in German (pre-school age), Spanish (school age) and Cypriot girls. With the exception of Estonia, children having at least one migrant parent had higher levels of adherence. Figure 1 summarises the prevalences of high adherence (MDS > 3) by age group and country, showing that the highest adherence levels were found in Italian pre-school children.

Different food groups contributed to high adherence levels in each country as can be shown by the prevalence of children whose intakes were above (high consumers) or below (low consumers) the age- and sex-specific median intake for each food group. For instance, although among Italian children we found a low prevalence of high consumers of vegetables and legumes (36.2%), Sweden was characterised by a very low prevalence of high consumers of both dairy (24.6%) and meat (30.9%) products. An increased prevalence of children above the median for the unsaturated:saturated fat ratio in Italy (72.6%) and Cyprus (58.7%) was observed, whereas a high prevalence of high consumers of cereal grains and potatoes characterised both the Swedish (81.7%) and the Estonian (63.1%) sample. Finally, the highest prevalence of fish consumers was detected in Spain (25.8% of consumers).

In general, the adherence during weekend days was higher compared with work days, with the exception of Italy and Spain where the prevalence of high adherence during weekends was about 10% (Spain) or 20% (Italy) lower than that during work days. In Estonia and Hungary, the number of recalls during weekends was too limited to make a comparison with work days.

The comparison with a second recall was possible only for a limited number of centres, since after the application of the exclusion criteria, <30 recalls were available for Estonia, Belgium and Cyprus. For the remaining countries, the results were mainly consistent with the results based on the first recall, with Italy scoring the highest (55% of high-adherent children overall), followed by the Swedish (47% of high-adherent children) and by the Hungarian, German and Spanish children (<35% of high-adherent children; results not shown in the tables).

With the aim of understanding better how school and pre-school meals could influence the adherence to a Mediterranean-like dietary pattern, the MDS was recalculated excluding food items provided at school. In Cyprus, Belgium, Germany and among school-age Italian children, only <5% of food items were consumed at school, so no specific comments about the influence of school and pre-school meals can be made. In summary, in Swedish pre-school children, the adherence levels increased after excluding meals provided by the pre-school, whereas the opposite tendency was observed in school-age children when excluding school and pre-school meals. A decreased adherence after excluding school/pre-school meals was observed in Hungary, Spain and among Italian pre-school children (results not shown in the tables).

A further classification of high-adherent (MDS > 3) and low-adherent (MDS ⩽ 3) children based on sex, age and socioeconomic status showed that both high- and low-adherent children had homogeneous characteristics, with very few exceptions (Table 2).

Finally, since in this analysis potatoes were counted with grains, as opposed to considering them as vegetables, we ran a sensitivity

Table 1. Percentages of high adherence to a Mediterranean-like diet by day of the week, sex, age and parental migrant status

	Northern Europe		*Central Europe*			*Mediterranean Europe*		
	Sweden	*Estonia*	*Hungary*	*Belgium*	*Germany*	*Italy*	*Spain*	*Cyprus*
				Work days (Monday–Friday)				
Number of recalls	910	640	961	287	1 265	1 385	411	879
Boys								
Pre-school	37.4	29.8	31.5	34.3	27.8	55.9	32.3	33.9
School	36.8	30.0	37.7	35.1	29.6	42.5	42.6	28.0
All boys	37.1	29.9	35.3	34.6	28.8	48.6	36.7	30.4
Girls								
Pre-school	36.1	36.0	30.8	35.1	29.1	55.0	37.1	29.5
School	39.8	35.6	35.4	38.6	30.7	46.7	26.0	28.4
All girls	38.1	35.7	33.4	36.6	30.0	50.1	31.6	28.8
Migrant status[a]								
Native parents	35.7	33.1	34.2	34.6	28.7	48.2	33.7	28.3
At least one migrant parent	46.7	23.3	36.2	43.8	31.2	54.5	36.4	30.0
All children	37.6	33.0	34.3	35.5	29.4	49.3	34.3	29.6
				Weekend days (Saturday and Sunday)				
Number of recalls	235	10	32	50	263	367	144	101
All children	47.2	40.0	28.1	30.0	39.5	27	24.3	31.7

Number of recalls during work days and weekend days, as well as percentages of children characterised by a Mediterranean diet score >3 during work days among pre-school (<6-year olds) or school age (⩾6-year olds) children, stratified by country. Because of the smaller number of recalls, no stratification by sex and age was done for weekend days. [a]The parental migration status was missing for some children. The number of missing values was ⩽15 in most of the countries, except for Germany ($n = 32$) and Cyprus ($n = 112$) where a high number of missing values was present.

analysis by excluding them. The results we obtained confirmed what previously observed when including potatoes in the calculations. For instance, in pre-school Italian boys and girls the prevalence of high adherence was >50% and the Spanish school-aged girls scored the lowest as in the main analysis.

DISCUSSION

In this paper, we described the adherence to a Mediterranean-like dietary pattern in 2–9-year-old boys and girls from eight European countries. As previously reported in a paper based on FFQ data,[29] this study confirmed that a Mediterranean-like dietary pattern is not necessarily a feature of the Mediterranean countries and that children from Southern Europe countries can even have lower adherence proportions than their peers living in other geographical areas. This finding raises the question whether we should continue calling this pattern 'Mediterranean-like', also considering that the adherence is evaluated based on a score calculated considering intakes at the group level (vegetables, meat products and so on) and the actual food items feeding into each group could vary from country to country (for example, rye and salmon are more common in Nordic countries than in Southern Europe). As a confirmation of this, what in North Europe has been defined as a Nordic healthy diet (or 'New Nordic diet') was actually inspired by those principles the Mediterranean pattern has been based on.[36]

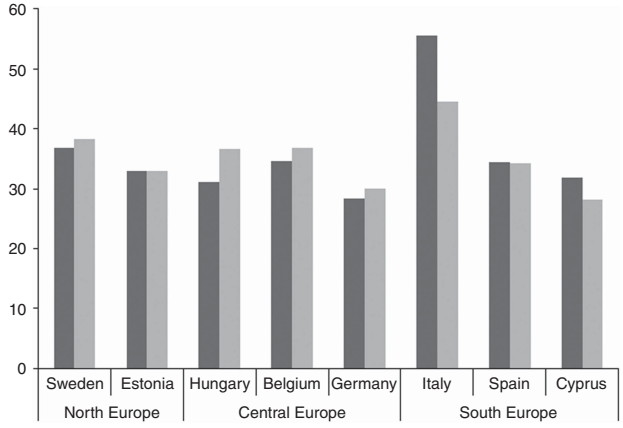

Figure 1. Prevalence of high adherence to a Mediterranean-like dietary pattern (MDS > 3) among pre-school (dark grey) and school children (light grey), stratified by country.

Most of our analyses were based on weekday data but we were also able to make a comparison with weekend days, which showed that the Italians had the highest MDS levels during work days, whereas the Swedish scored the highest during weekend days. However, the possibility of making further speculations on this result was limited by the very small number of recalls done during weekends in some of the countries.

In this study, with the exception of Italy, the proportion of highly educated parents was increased (generally slightly) among high-adherent children, with the biggest difference observed for the Spanish children. The proportion of higher-income parents was increased among high-adherent children in some countries and lower in others. In all the centres, except Estonian children, having at least one migrant parent showed higher adherence levels than those who had both native parents. However, the latter observation can have a different interpretation according to the specific country of residence, as in North Europe a migrant parent might come from a Mediterranean country for instance.

Many variations of the MDS have been adopted in epidemiological studies,[37] therefore the harmonisation of dietary data is mandatory for better comparison of health outcomes.[38–40] Accordingly, we have previously published a paper based on a version of the MDS adapted to the food frequency data used in the IDEFICS study to assess children's usual diets[29] in relation to their weight status. In the present paper, we used data collected in the same study using another methodology, 24 h recall data, which could provide more detailed food and nutrient data but which is less useful than the FFQ for considering associations with health-related outcomes such as body weight. The results obtained from the analysis of the present data highlighted some differences in the ranking of the country-level adherence to a Mediterranean-like dietary pattern. More specifically, Italy has replaced Sweden as the participating centre characterised by the highest adherence levels, but only during work days, whereas the children from Cyprus did not show the lowest adherence levels. However, it has to be pointed out that the present analysis was based on a single day, whereas the FFQ was designed to collect data referring to a broader timespan and only food intakes under parental control, thus excluding school and pre-school meals, which were instead included in SACINA. From a methodological point of view, SACINA is characterised by two major differences compared with the FFQ, that is, the inclusion of meals consumed at school or pre-school and the possibility to calculate the MDS based on food quantities instead of frequencies as well as to include a ratio between unsaturated and saturated fats. Food items consumed at school (or pre-school) contributed to either

Table 2. Distribution of gender, age and socioeconomic status among high- and low-adherent children.

	n	*Northern Europe*		*Central Europe*			*Mediterranean Europe*		
		Sweden	*Estonia*	*Hungary*	*Belgium*	*Germany*	*Italy*	*Spain*	*Cyprus*
Number of low-adherent children (MDS ⩽ 3) (%)		568	429	631	185	893	702	270	619
Boys	4 297	52.2	49.7	49.1	55.4	51.0	52.5	50.6	49.6
Pre-school children	4 297	45.9	35.8	43.1	61.3	43.1	37.7	53.2	37.5
Children with high-education parents	4 154	68.8	12.6	47.9	47.6	19.1	19.7	52.4	53.6
Children with high-income parents	3 821	27.6	40.5	27.7	18.6	5.0	1.3	28.5	9.2
Number of high-adherent children (MDS > 3) (%)		342	211	330	102	372	683	141	260
Boys	2 441	51.5	43.2	50.5	52.5	50.3	52.1	57.8	51.6
Pre-school children	2 441	44.4	35.2	36.5	58.4	40.3	48.8	54.9	41.5
Children with high-education parents	2 365	70.8	14.6	49.2	50.5	21.9	18.9	61.4	54.3
Children with high-income parents	2 129	23.0	45.5	26.3	18.3	6.7	1.7	24.6	9.6

Abbreviation: MDS, Mediterranean diet score. Number of high- and low-adherent children, as well as percentages of boys, pre-school children (<6-year old), high-education and high-income parents among the children characterised by high (>3) or low (⩽3) levels of the MDS during work days.

higher (Italian pre-school children, Spanish and Hungarian children) or lower adherence levels (Swedish school children).

Several recent cross-sectional studies have assessed the adherence to a Mediterranean-like dietary pattern in children or young adolescents by diet scores. Although many of these used the KIDMED score and were based on food frequencies,[28] we decided to use a modified version of the MDS[39,40] readapted to the IDEFICS 24 h dietary recall.[29] The reasons of this choice were twofold: first, this score will give us the possibility to compare the present results with those from future follow-ups when the IDEFICS children will have become adults and the KIDMED will not be applicable. Second, the KIDMED index includes in its scoring criteria some dietary characteristics, which are not specifically associated to the Mediterranean habits, such as having cereals and dairy products for breakfast or having breakfast.[28] Many of the above-mentioned studies on the Mediterranean diet in children described the cross-sectional association with health outcomes such as asthma[41] or overweight.[42] Most were set up in a Mediterranean country such as Greece,[42–44] Cyprus,[45,46] Spain[47,48] and Turkey.[49] A few studies were based on children living in a non-Mediterranean country like UK[22] and Mexico.[26] Moreover, to our knowledge, only the International Study on Allergies and Asthma in Childhood (ISAAC) assessed the adherence of children from different countries, analysing dietary data of children from 29 centres in 20 countries.[23] However, it is difficult to compare our results with this study as they did not calculate the MDS in all countries due to missing data in some of the questionnaires (for instance, the German and Swedish ones) and also because some countries included in our study (that is, Cyprus, Hungary or Belgium) were not part of the ISAAC study. Moreover, the MDS is based on population-specific medians (or consumers/non-consumers as in the case of fish) and not based on specific thresholds, which limits the comparability with other analyses. Therefore, although conclusions based on a single-day analysis should be drawn carefully, we think that it is important to notice that our results confirm what we had previously shown based on FFQ data, that is, that countries outside the Mediterranean basin (for example, Sweden) can have higher adherence levels to a Mediterranean-like dietary pattern than in Southern European countries (for example, Cyprus). High intakes of each food group included in the calculation of the MDS were not a characteristic of any specific geographic area. Therefore, the way each food group contributed to high adherence levels also differed across participating centres.

Strengths of the study include its high number of participants, the fact that we collected data from eight different countries and the possibility to study the distribution of high adherence according to sex, age and socioeconomic features (that is, parental education and income, presence of at least one migrant parent in the family). However, this study is not without limitations. The latter includes the fact that the analyses were based mostly on work days, due to the low number of recalls at weekends and based only on a single-day recall. A single recall may not necessarily reflect habitual intakes such that misclassifications may have occurred especially in case of non-daily-consumed food groups like fish. In Hungary, a further source of error was introduced as the dietary information was recorded on documentation sheets before entering data into the SACINA software, therefore limiting the comparability with the other countries. Finally, due to the clustered study design, the survey cannot be considered representative of the national population and thus we do not know whether the habits of the participants in this study reflect those of the majority of European children. However, the IDEFICS sampling was population-based and the study was not designed to generate a representative sample for the given countries. Rather, it was important to select one intervention and control region that were comparable with regard to infrastructural, sociodemographic and socioeconomic characteristics.[30] The participation proportion of 53.4% may appear to be low and we have no systematic information on non-participants, but, thanks to the community-oriented and setting-based study design, the IDEFICS study approached the whole population for participation.

In conclusion, adherence proportions among European children were found to be homogeneous, with the highest adherence proportions among the Italian pre-school children. The exclusion of potatoes from the group of starchy foods, as they are more typical of central-northern European traditions, did not practically change the main results. Both the demographic and socioeconomic characteristics of high-adherent children slightly differed between countries.

CONFLICT OF INTEREST

YA received doctoral grant support from an EU FP7 project. LL has received grant support from VR, FORTE and FORMAS (research councils in Sweden). The remaining authors declare no conflict of interest.

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AUTHOR CONTRIBUTIONS

GT performed the analyses and wrote the paper. LAM, TM, TV, DM, PR, AS, YA, VK, MT, CB, AH provided comments on the manuscript and on the analyses. IP supported the statistical analyses and their interpretation and provided comments on the manuscript. LL coordinated the research, supported the analyses and gave comments on the manuscript.

DISCLAIMER

The information in this document reflects the author's view and is provided as it is.

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APPENDIX

List of foods included in each MDS component.

Foods available in the SACINA database that are typical of a Mediterranean-like dietary pattern

1. Vegetables and legumes
- Tomato and other vegetable-based sauces
- Pulses (excluding fresh peas, sweet corn and broad bean)
- Vegetables/vegetable salad excluding potatoes
- Root vegetables
- Vegetable juices
- Vegetarian burgers, tempeh and tofu
- Vegetable milk (soymilk, rice milk and so on)
- Vegetable soups

2. Fruit and nuts
- Nuts, seeds and olives
- Fruit
- Fruit and vegetable juices—fresh made—squeezed

3. Cereal grains and potatoes
- Bread and rolls
- Breakfast cereals
- Flour—instant-creamed cereals
- Pasta
- Rice and other cereals
- Cereal soups
- Potatoes (excluding fried potatoes and chips)

4. Fish products
- Foods based on fish products
- Fish, crustaceans and molluscs
- Fish products

Foods available in the SACINA database that are atypical of a Mediterranean-like dietary pattern

1. Meat products
- Sauces (savoury)—meat, ragout and gravy
- Meat
- Game
- Offals
- Processed meat—salami and processed poultry products
- Meat soups

2. Dairy products
- Butter–cream–cheese-based sauces
- Milk and similar
- Cheese (excluding 'fromage blanc' (quark))
- Other milk products—NS