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National Food, Nutrition, and Physical Activity Survey of the Portuguese General Population, IAN-AF 2015-2016

Summary of Results

2018

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1.
Food Consumption

The IAN-AF 2015-2016 reported the consumption of 2479 food items, including foods, beverages and 1696 food recipes. Each food item was grouped into categories (described in the Appendix 1) and the analysis proceeded according to the food groups with a higher consumption in Portugal.

The food consumption data was collected through a two 24-hours recall (two diaries in children), adjusted for the within-person variability of dietary intake and consumption frequency (for less frequent food items), considering only the conversion of raw and cooked foods to edible portions. In some analyses, the quantification of raw foods was used in order to be comparable with other studies.

The food groups “Soups”, “Sweets, cakes and biscuits” and “Salty snacks and pizzas” result from aggregated methodology that comprises the respective food items and recipes while the other food groups result from a disaggregation of food items and recipes.

This chapter presents some of the main results regarding the consumption of food and beverages. Methodological notes can be found in the Appendix 1.

1.1 Food Consumption

Table 1.1 and figure 1.1 compile information related with the food consumption at national level and stratified by age group.

The mean consumption of "Fruit, vegetables and pulses" by the Portuguese population is 312 g/day and it corresponds to about 153 g/day of vegetables, 131g/day of fresh fruit and 18 g/day of pulses. The elderly consume significantly more of these foods, particularly fresh fruit. On the contrary, inadequate consumption of fruit, vegetables and pulses is more prevalent among children and adolescents, with the latter consuming significantly less fresh fruit and vegetables (97 g/day and 133 g/day, respectively).

The mean consumption of soups by the Portuguese population is about 154 g/day. Children and the elderly have a higher consumption of soups (247 g/day, 199 g/day respectively), while adults have the lowest (132 g/day).

The Portuguese population consumes about 254 g/day of dairy products, mainly milk (167 g/day). Children and adolescents are the individuals with the highest level of consumption, followed by the elderly. Adults consume significantly less milk than the other age groups.

As for yoghurt and other fermented milks, children are the main consumers (mean of 87 g/day) while the elderly have the lowest intake.

Relatively to the "Cereals, cereal products and starchy tubers" food group, adolescents stand out as the age group with the highest consumption (323 g/day). However, the elderly have the highest consumption of bread, toast, potatoes and other tubers.

The consumption of breakfast cereals and cereal bars is higher in children and adolescents, with the latter consuming more than twice of the mean consumption at the national level (20 g/day vs. 9 g/day, respectively).

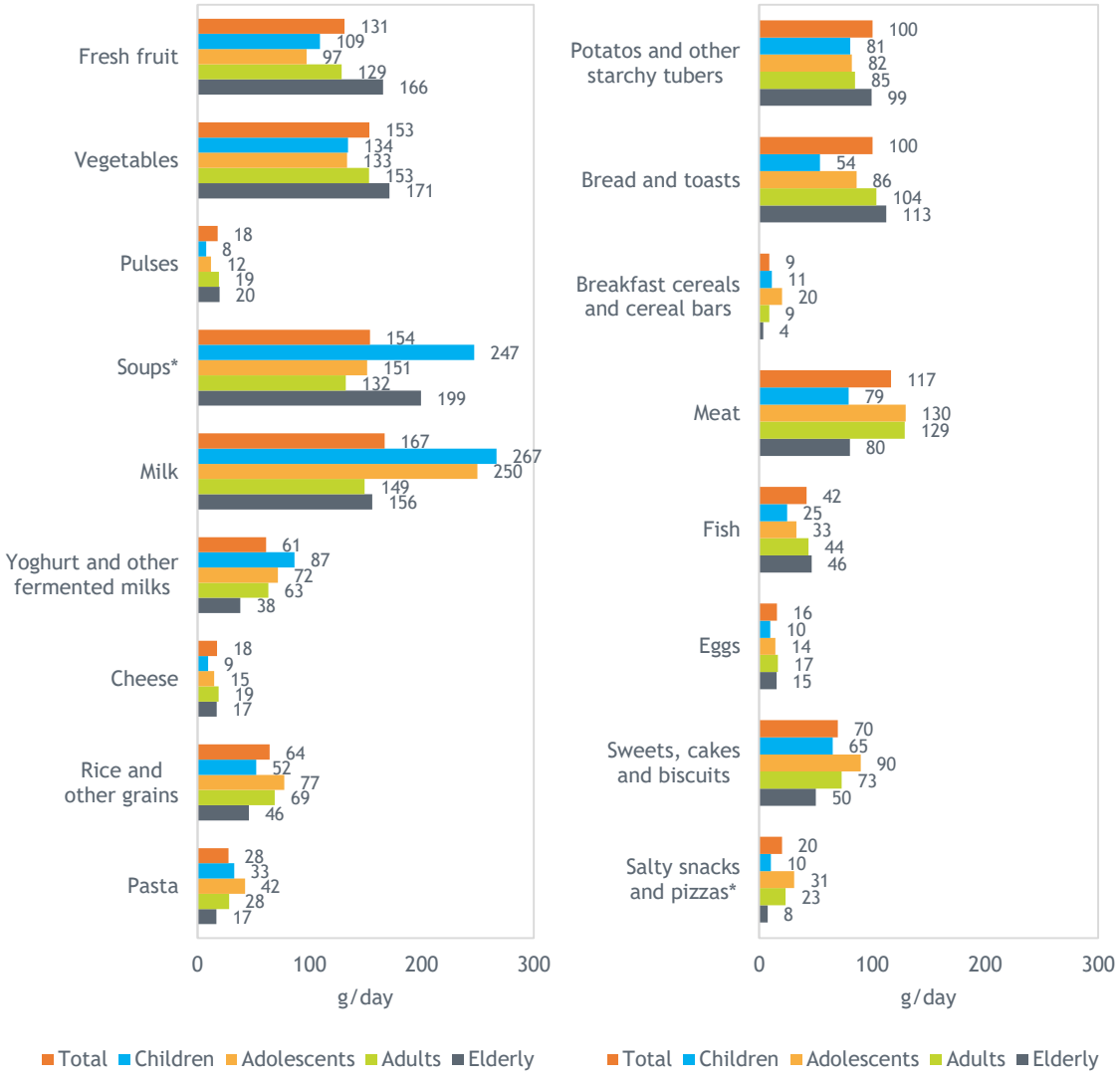
Table 1.1. Usual intake of some food groups in edible grams per day, at national level and among consumers, weighted for the Portuguese population distribution.

	Total		% Days of consumption	Among consumers	
	Mean g/day	Median (P25-P75) g/day		Mean g/day	Median (P25-P75) g/day
Fruit, vegetables and legumes	312.1	294.9 (207.7-397.8)	>95%	312.1	294.9 (207.7-397.8)
Soups*	153.9	132.9 (60.1-223.7)	46.4%	320.9	307.0 (239.1-307.0)
Dairy	253.5	219.8 (129.7-340.2)	>95%	253.5	219.8 (129.7-340.2)
Cereals, cereal products and starchy tubers	306.1	293.3 (220.3-378.0)	>95%	306.1	293.3 (220.3-378.0)
Meat, fish and eggs	174.3	163.2 (116.0-220.7)	>95%	174.3	163.2 (116.0-220.7)
Fats and oils	20.6	19.1 (13.4-26.2)	>95%	20.6	19.1 (13.4-26.2)
Sweets, cakes and biscuits*	69.7	54.3 (30.6-91.1)	93.1%	83.7	67.0 (18.1-67.0)
Salty snacks and pizzas*	20.2	13.0 (4.1-28.8)	10.4%	135.7	129.2 (99.0-165.4)

P25-P75: percentile 25-75; * The food group “Soups” (any kind), “Sweets, cakes and biscuits” and “Salty snacks and pizzas” include recipes and isolated food items.

In all age groups, meat is consumed in a greater quantity than fish. However, the elderly have a slightly similar intake rates of these foods, whereas adolescents have the greatest disparity among meat and fish consumption (130 g/day vs. 33 g/day). Overall, eggs have a small contribution in the Portuguese diet.

It is important to highlight the high percentage of "Sweets, cakes and biscuits" consumption (93.1%) by adolescents (90 g/day).



* The food groups “Soups”, “Sweets, cakes and biscuits” and “Salty snacks and pizzas” include recipes, apart the isolated food items.

Figure 1.1. Mean consumption of food group and subgroup, expressed in edible grams per day, at national level and by age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Relatively to the group of "Fats and oils", olive oil stands out as the subgroup with the highest consumption, followed by butter and vegetable oil (figure 1.2). Comparatively to adults, adolescents have greater vegetable oil consumption than the elderly, olive oil is less consumed by children and adolescents and butter is less consumed by the elderly.

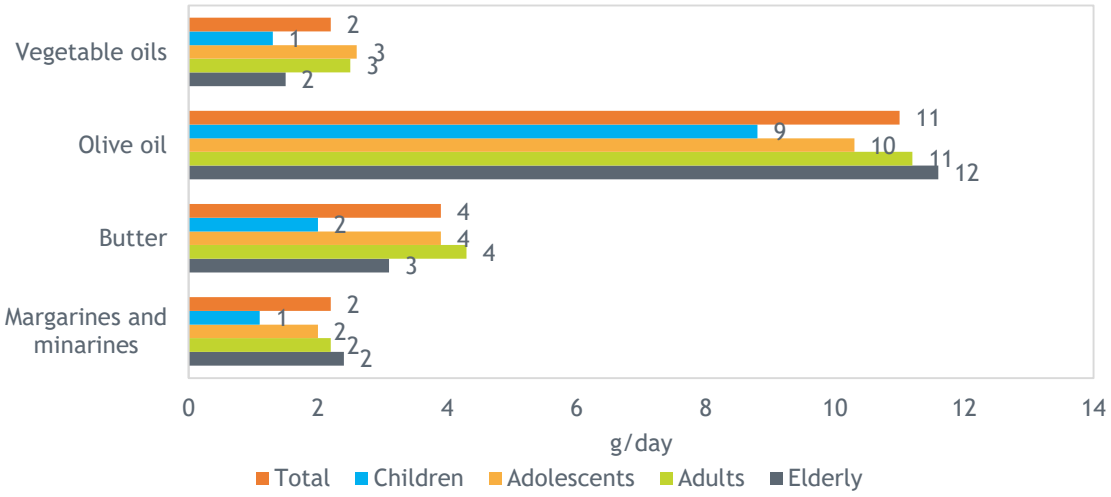
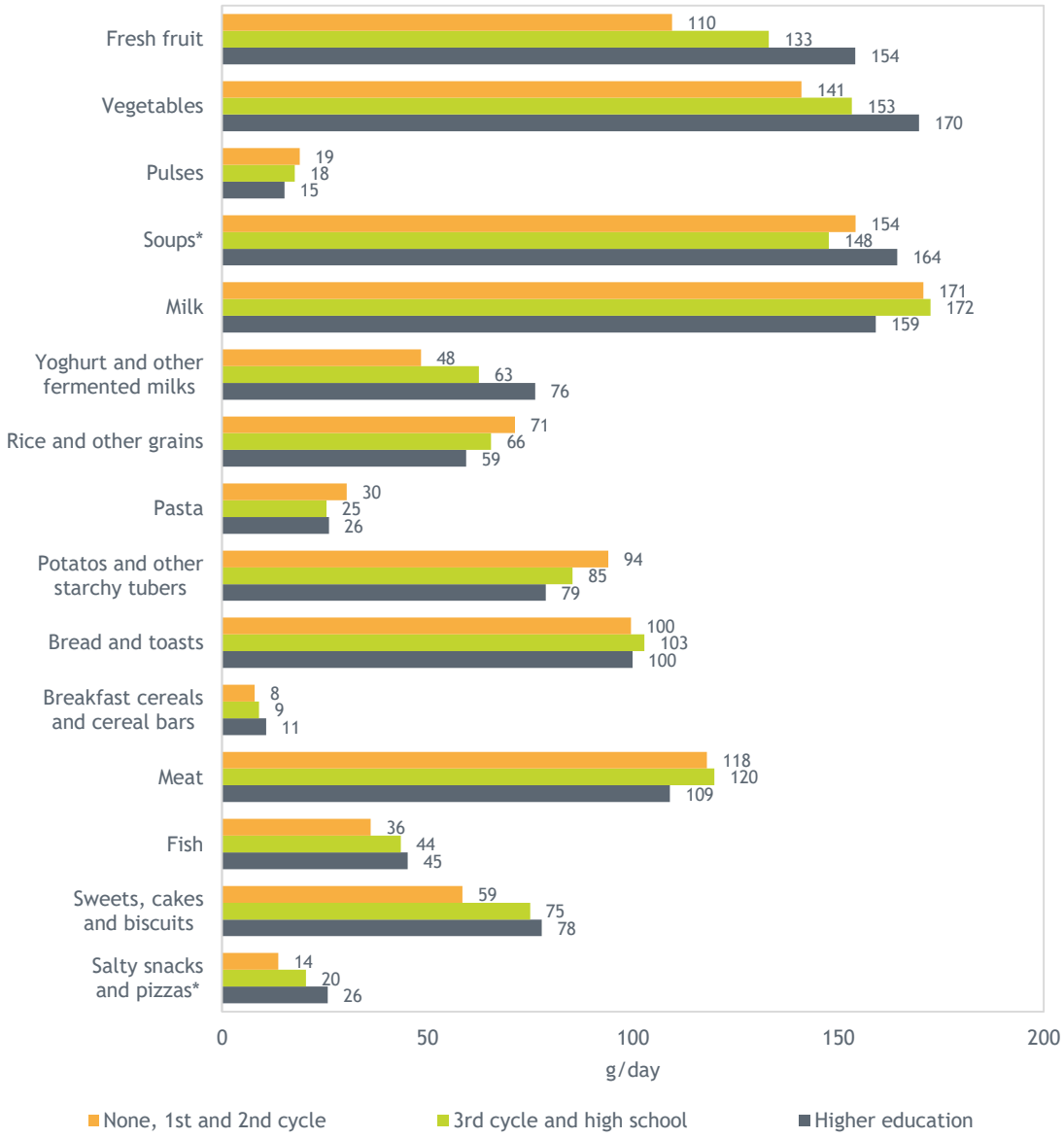


Figure 1.2. Mean consumption of "Fats and oils" subgroups, expressed in edible grams per day, at national level and by age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Our findings suggest that more educated individuals consume significantly more vegetables, yoghurt and fermented milk, food items from the groups "Sweets, cakes and biscuits", "Salty snacks and pizzas" and less food items from the group "Cereals, cereal products and starchy tubers" than the less educated individuals (Figure 1.3).



* The food groups “Soups”, “Sweets, cakes and biscuits” and “Salty snacks and pizzas” include recipes, apart the isolated food items.

Figure 1.3. Mean consumption of food group and subgroup expressed in edible grams per day, at national level and by educational level (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Considering the analyses by geographic region, the group "Dairy" is mostly consumed in the Azores region, which has a mean consumption of 308 g/day as well as higher percentiles of the consumption distribution. In the other regions, the results for the mean consumption of food items in the group "Dairy" are as follows: North: 262 g/day; Centre: 253 g/day; Lisbon MA: 242

g/day; Alentejo: 268 g/day; Algarve: 247 g/day; Madeira: 224 g/day. These data indicate that, at a subgroup level, milk is mostly consumed in Azores (227 g/day).

The distribution of the consumption of bread and toast subgroup ("Cereals, cereal products and starchy tubers" group) is different across regions. This subgroup has the lowest consumption in Madeira and Azores (79.7 g/day and 94.8 g/day, respectively) and in Lisbon MA (95.0 g/day). Alentejo is the region with a higher consumption of this food subgroup (136.5 g/day).

1.1.1. Adherence to Food Recommendations

Portuguese Food Wheel Guide

Figure 1.4 compares the food consumption at the national level and its accordance to the Portuguese Food Wheel Guide, considering only the consumption of the food groups presented in this guide.

The results indicate that the "Meat, fish and eggs" food group consumption is 12% higher relatively to the recommendations, as well as the consumption of “Dairy” (6% higher) and “Cereals, cereal products and starchy tubers” (1% higher). On the other hand, the consumption of "Fruit" (-7%), "Legumes" (-2%) and "Cereals, derivatives and tubers" (-1%) is above the recommendations. The consumption of "Oils and Fats" by the Portuguese population corresponds to the recommendations set by the guide.

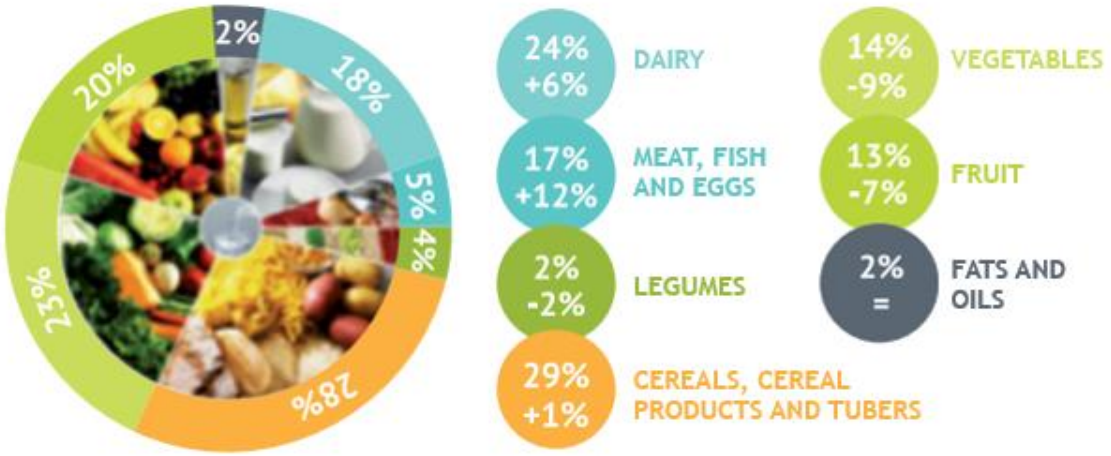


Figure 1.4. Comparison between the Portuguese Food Wheel Guide recommendations and the estimated food consumption for the Portuguese population (IAN-AF 2015-2016).

Considering the total amount of food and beverages consumed by the Portuguese population (i.e. not included in the Food Wheel, like sweets, snacks, alcoholic beverages, but not including water), the percentage of consumption of each food group of the Portuguese population is as follows: 20% of “Cereals, cereal products and starchy tubers”, 17% of “Dairy”,12% of “Meat, fish and eggs”, 10% of “Vegetables”, 9% of “Fruit”, 1% of “Pulses” and 1% of “Oils and fats”. Overall, the foods and beverages not represented in the Portuguese Food Wheel Guide represent 29% of the national consumption, with “Non-alcoholic beverages” (except water) contributing with 16%, “Alcoholic beverages” with 7%, “Sweets, cakes and biscuits” with 4% and “Salty snacks and pizzas” with 1%.

Fruit and vegetables

The consumption of fruit and vegetables is one of the most used indicators in the world to assess diet quality. The World Health Organization recommends the consumption of at least 400 g/day of these foods (equivalent to 5 or more portions per day) (1).

Considering exclusively the edible portion of "Fruit, vegetables and legumes", the mean daily intake is 312 g/day. Disparities among age groups are highlighted, such as a lower consumption of vegetables by children and fruit by adolescents.

Considering the consumption of purchased fruit and vegetables (this methodology is frequently applied to other populations), the prevalence of individuals who do not adhere to the recommended daily intake of at least 400 g/day is 56% (figure 1.5). The inadequacy of fruit and vegetables consumption is higher in adolescents (78%), children (72%) and lower in the elderly (40%). Figure 1.6 shows the prevalence of fruit and vegetables consumption <400 g/day, considering the edible portions. According to this approach, the prevalence of inadequacy is even higher.

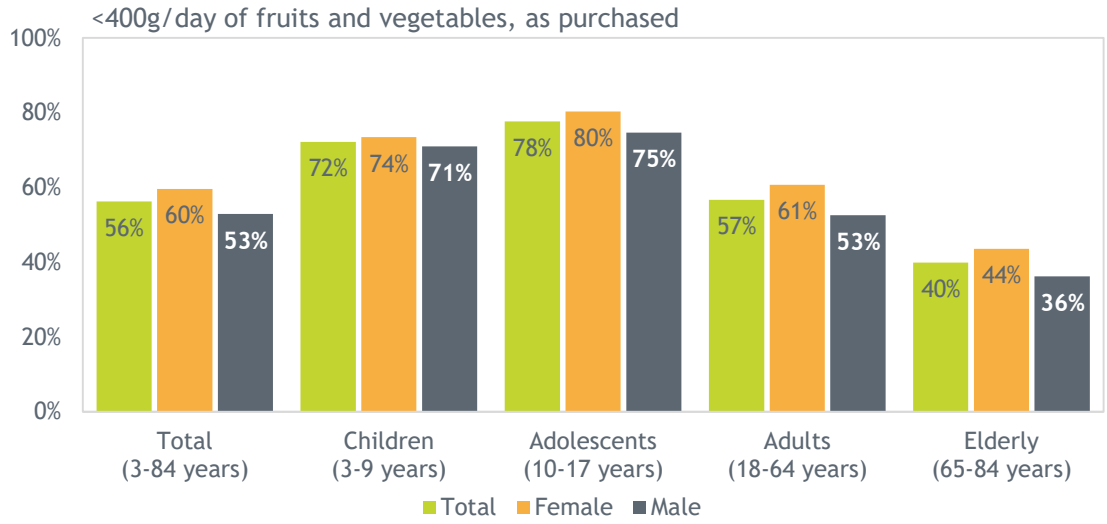


Figure 1.5. Prevalence of inadequate consumption of fruit and vegetables (<400 g/day, non-edible), at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

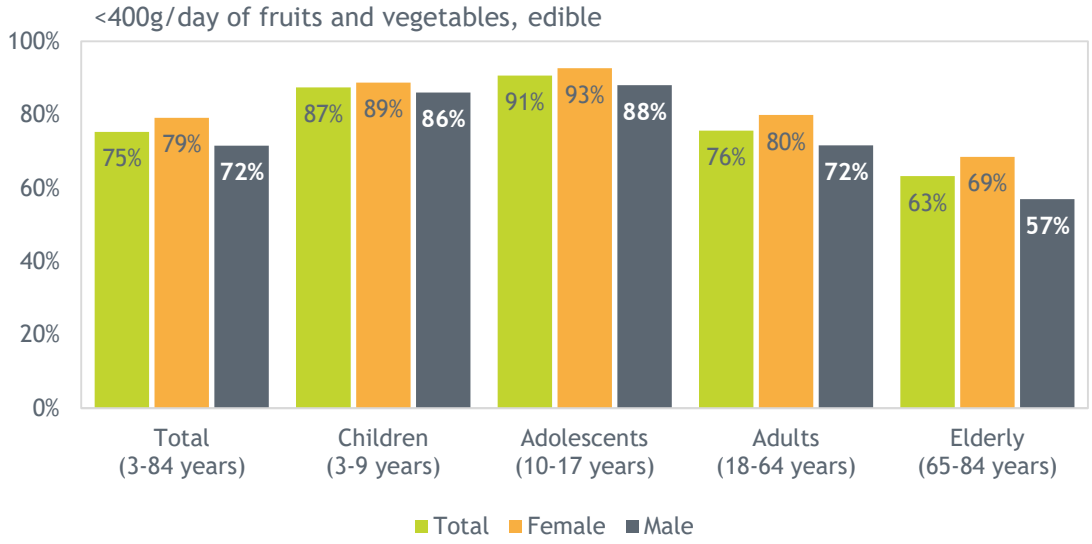


Figure 1.6. Prevalence of inadequate consumption of fruit and vegetables (<400 g/day, edible), at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

At a regional level (NUTS II) (Figure 1.7), the disparities in the prevalence of inadequate fruit and vegetables consumption, have a higher magnitude in Madeira and Azores (70%).

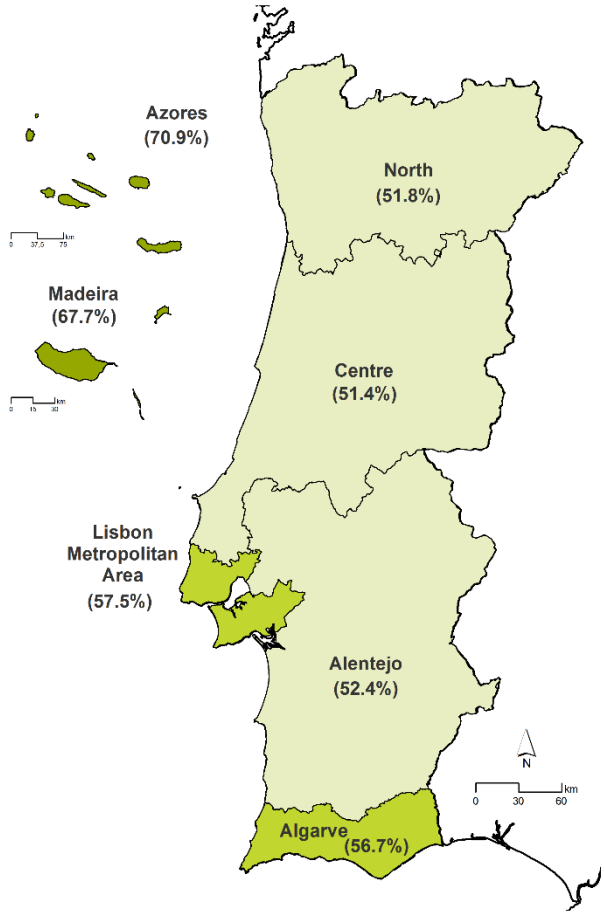


Figure 1.7. Spatial distribution of the prevalence of inadequate consumption of fruit and vegetables (<400 g/day, non-edible), by region NUTS II, weighted for the Portuguese population distribution.

Red meat and processed meats

The International Agency for Research on Cancer (IARC) classified processed meats as carcinogenic to humans (group 1) in 2015 (2).

A daily consumption of 50 g of processed meats was associated with an 18% increased risk of colon cancer, while a daily consumption of 100 g of red meat was associated with a 17% risk increase.

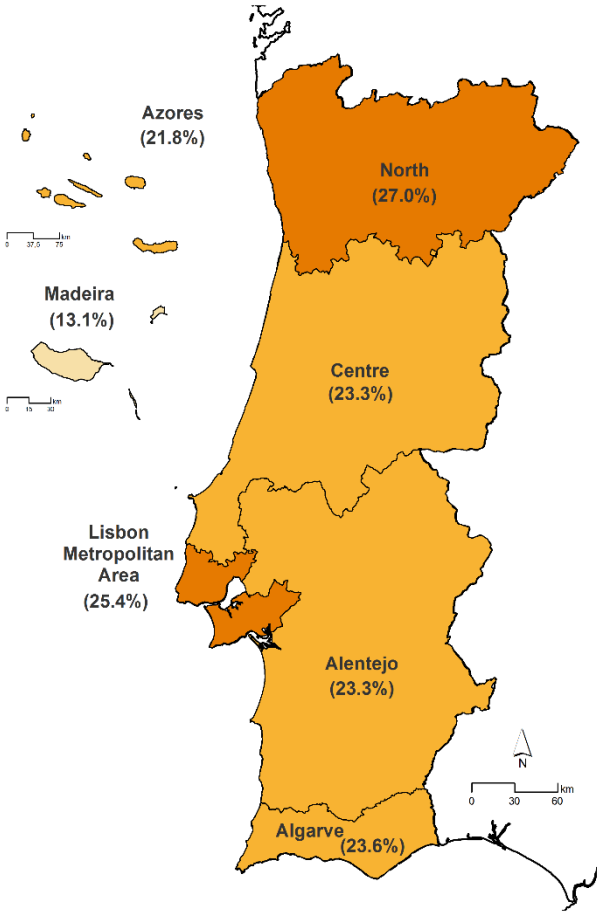
Table 1.2 describes the prevalence of daily consumption that exceeds the cut-off points associated with an increased health risk. The daily consumption of processed meat greater than 50 g is done by 6.3% of the population (5.7% in children, 11.6% in adolescents, 7.1% in adults and 1.0% in the elderly), while the consumption of more than 100 g of red meat is observed in 22.5% of the population (16.3% in children, 32.3% in adolescents, 25.5% in adults and 9.0% in the elderly).

Table 1.2. Prevalence of inadequate consumption of processed meat and red meat* (>50g/day and >100g/day, respectively), at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

	Total (3-84 years)	Children (3-9 years)	Adolescents (10-17 years)	Adults (18-64 years)	Elderly (65-84 years)
>50 g/day of processed meat (charcuterie)					
Total	6.3%	5.7%	11.6%	7.1%	1.0%
Female	2.1%	3.0%	5.8%	2.2%	0.1%
Male	11.9%	6.3%	16.8%	14.0%	2.2%
>100 g/day of red meat*					
Total	22.5%	16.3%	32.3%	25.5%	9.0%
Female	8.4%	9.0%	17.7%	9.2%	1.8%
Male	40.2%	19.1%	44.5%	46.7%	18.2%

* Red meat- all types of red meat, processed meat and offals.

At a regional level (figure 1.8), the prevalence of a daily consumption greater than 100g of red meat is higher in the North (27.0%) and MA Lisbon (26.4%). The prevalence of a daily consumption higher than 50g of processed meat is higher in Azores (10.0%).



* Red meat- all types of red meat, processed meat and offals.

Figure 1.8. Spatial distribution of the prevalence of inadequate consumption of red meat* (>100g/day, edible), by region NUTS II, weighted for the Portuguese population distribution.

1.2 Consumption of Non-alcoholic Beverages

The consumption of non-alcoholic beverages, for the total population and by age group is described in table 1.3 and figures 1.9 and 1.10.

The Portuguese population drinks, on average, less than 1 litre per day of water, considering only the drinking water (excluding the water intrinsic to food or used for cooking purposes). Adults are the age group with the highest consumption of water, corresponding to a mean of 956 mL/day. Adolescents and the elderly have similar consumption to adults. Children are the ones who drink less water, in average less than 500 mL/day (432 mL/day).

Table 1.3. Usual intake of some non-alcoholic beverages per day, at national level and among consumers, weighted for the Portuguese population distribution.

	Total		% Days of consumption	Among Consumers	
	Mean g/day	Median (P25-P75) g/day		Mean g/day	Median (P25-P75) g/day
Water*	869.8	784.3 (493.3- 1151.6)	>95%	869.8	784.3 (493.3- 1151.6)
Tea and infusions	77.0	8.7 (0.1-92.7)	2.8%	377.9	336.4 (211.5-499.3)
Coffee	54.9	37.0 (8.7-78.5)	94.4%	73.8	28.9 (7.8-56.1)
Natural and 100% fruit juices	22.3	4.5 (0.8-18.4)	7.5%	158.0	75.1 (30.1-178.1)
Nectars	20.0	1.1 (0.0-17.7)	0.5%	249.2	236.3 (178.1-306.2)
Soft drinks	88.4	33.2 (2.0-135.0)	11.5%	325.3	303.8 (221.4-405.4)

P25-P75: percentile 25-75;
*Water- the estimative includes all the drinking water (excludes the water intrinsic to food or used for cooking purposes)

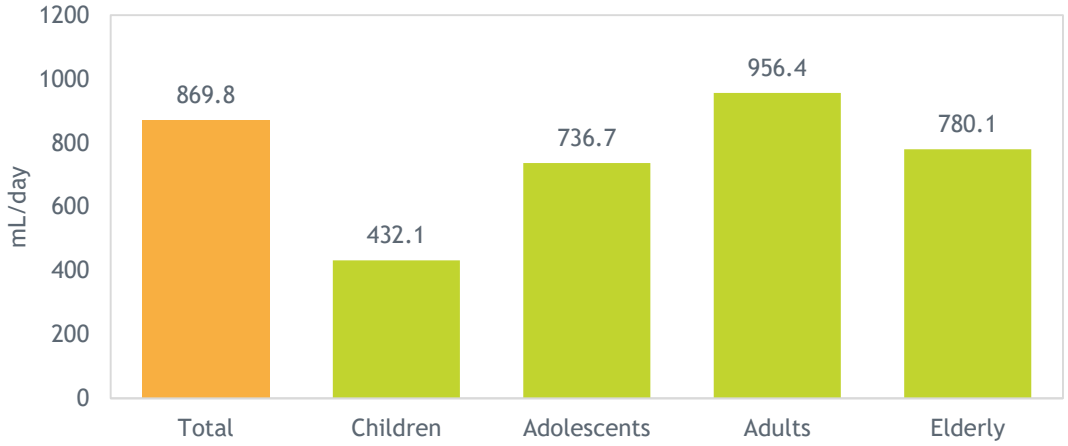


Figure 1.9. Water consumption (millilitres per day), at national level and by age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The Chapter 2 describes the total water intake, including the water intrinsic to food. For that matter, the mean daily consumption of water by the population corresponds to 2.1 litres (2.3 L in adults; 2.0 L in adolescents and elderly and 1.5 L in children).

Soft drinks are the second most consumed beverages in Portugal (88 g/day), frequently consumed by adolescents. Soft drinks and nectars intake is especially high (161 g/day and 38 g/day, respectively) when compared with other age groups (figure 1.9).

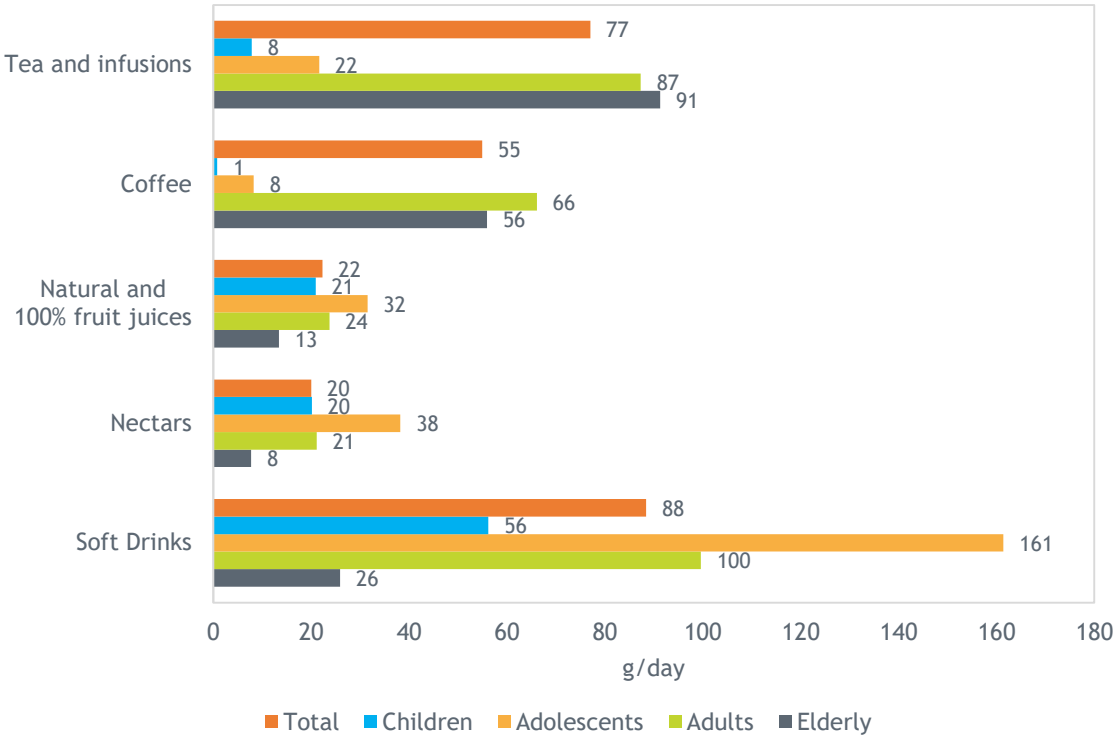


Figure 1.10. Consumption of some types of beverages, expressed in grams per day, at national level and by age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The prevalence of daily consumption of soft drinks and nectars (≥220 g/day, at least one serving) in Portugal is 18%. Adolescents are the age group with the highest prevalence (42%; 34% in girls and 51% in boys). Overall, the results reveal that men consume more soft drinks and fruit nectars on a daily basis (at least one serving) when compared with women (26% and 11%, respectively) (figure 1.11).

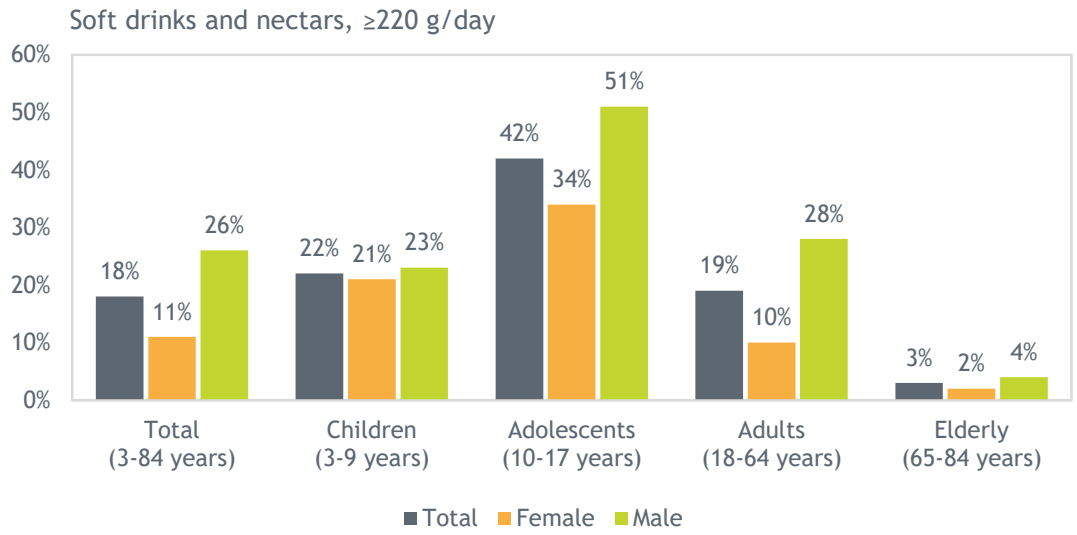


Figure 1.11. Prevalence of daily consumption of soft drinks and nectars (≥220 g/day, at least one serving), at national level, weighted for the Portuguese population distribution.

The contribution of soft drinks to this percentage is 14% (34% in adolescents) (figure 1.12). Approximately 25% of the adolescents who consume soft drinks consume at least two servings per day.

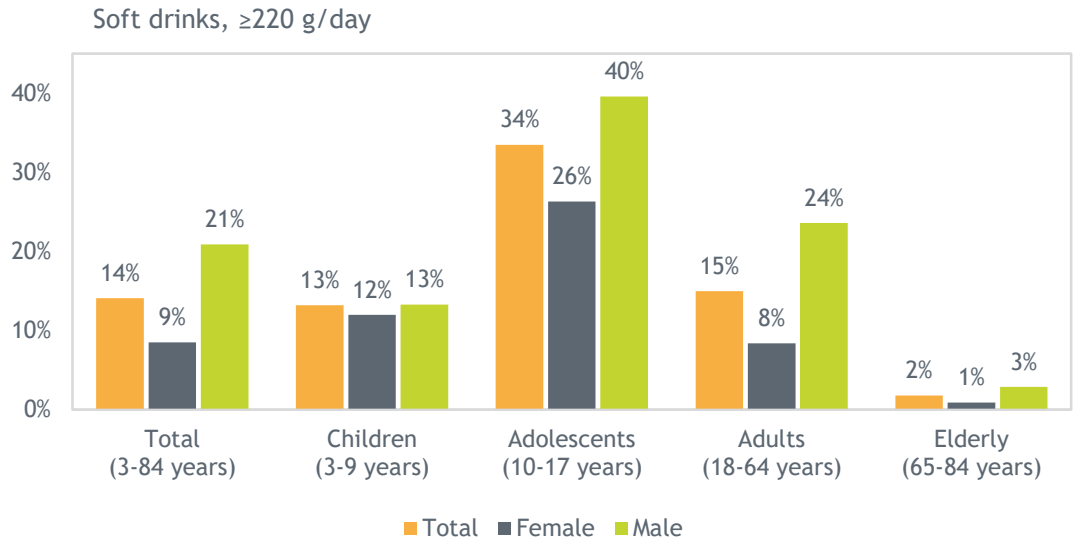


Figure 1.12. Prevalence of daily consumption of soft drinks (≥220 g/day, at least one serving), at national level, weighted for the Portuguese population distribution.

The consumption of some sub-groups of non-alcoholic beverages by educational level is shown in figure 1.13. Individuals with a higher educational level consume significantly less soft drinks and nectars, more fresh fruit juices and more 100% fruit juices than less educated individuals.

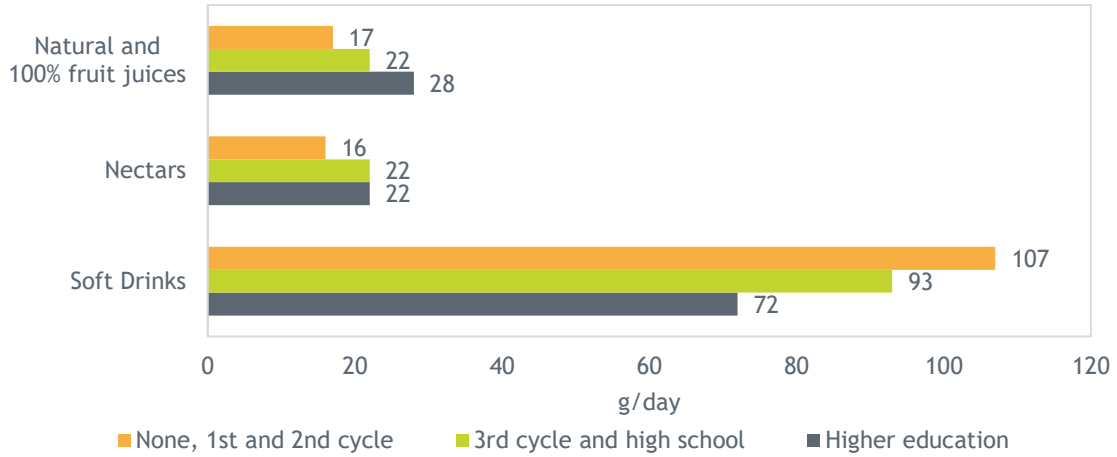


Figure 1.13. Consumption of some types of beverages, expressed in grams per day, at national level and by educational level (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The analysis on the consumption of non-alcoholic beverages by region suggests that Azores has the highest consumption of soft drinks (131 g/day) as well as a higher frequency of consumption (27.1%) when compared to other regions.

1.3 Consumption of Alcoholic Beverages

The consumption of alcoholic beverages has a bimodal distribution, due to great disparities among men and women consumption. Consequently, the results are stratified by age group and sex (figure 1.14).

The frequency of alcoholic beverages consumption in men increases with age and is especially higher in the elderly (85%), adults (73%) and lower among adolescents (46%). Women's frequency of consumption of alcoholic beverages is analogous across all age groups yet slightly lower in older women (37% vs. 43% in adolescents and 45% in adults).

Among consumers, female and male adolescents have similar consumption of alcoholic beverages and differences between sexes are significant in adults and elderly. The mean consumption of the elderly is the highest, both for men (322 g/day) and women (61 g/day).

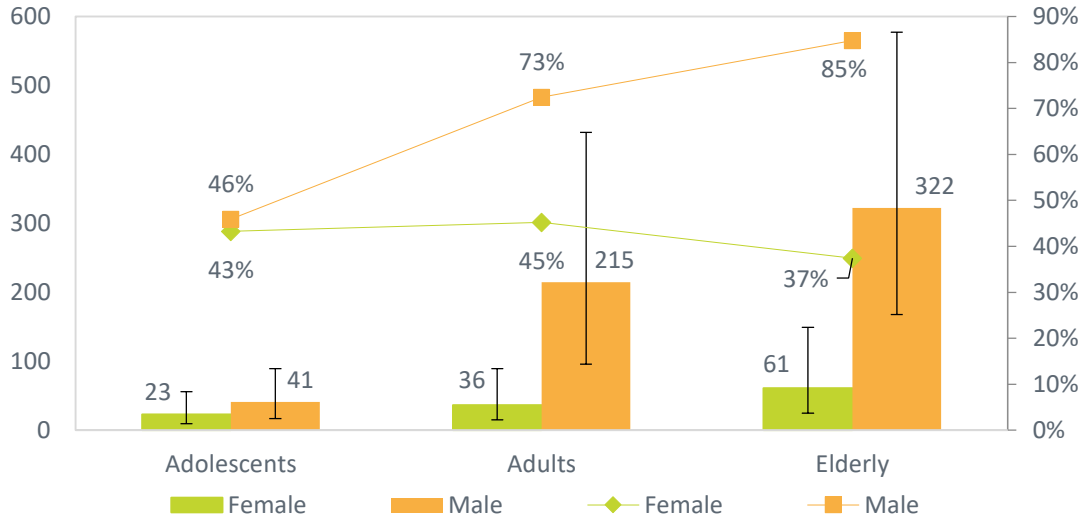


Figure 1.14. Median consumption of some types of beverages expressed in grams per day (main axis) and the consumption frequency (secondary axis), by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

In general, wine is the most consumed alcoholic beverage for both men and women, across all age groups. However, when consumed, beer is the alcoholic beverage consumed in higher quantity. (figure 1.15).

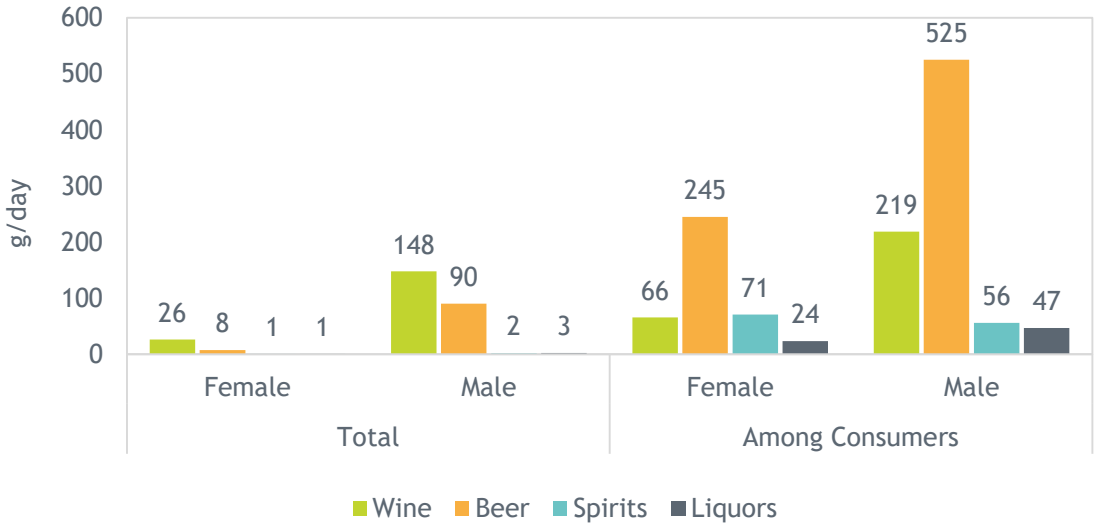


Figure 1.15. Total mean consumption of wine and consumption only among consumers, expressed in grams per day, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The consumption of alcoholic beverages by educational level has different trends according to sex. Even though, men consume more alcoholic beverages and more frequently, independently of the educational level; as the educational level increases men tend to consume less quantity of alcoholic beverages and consume it less frequently, while women tend to consume more quantity and with higher frequency (figure 1.16).

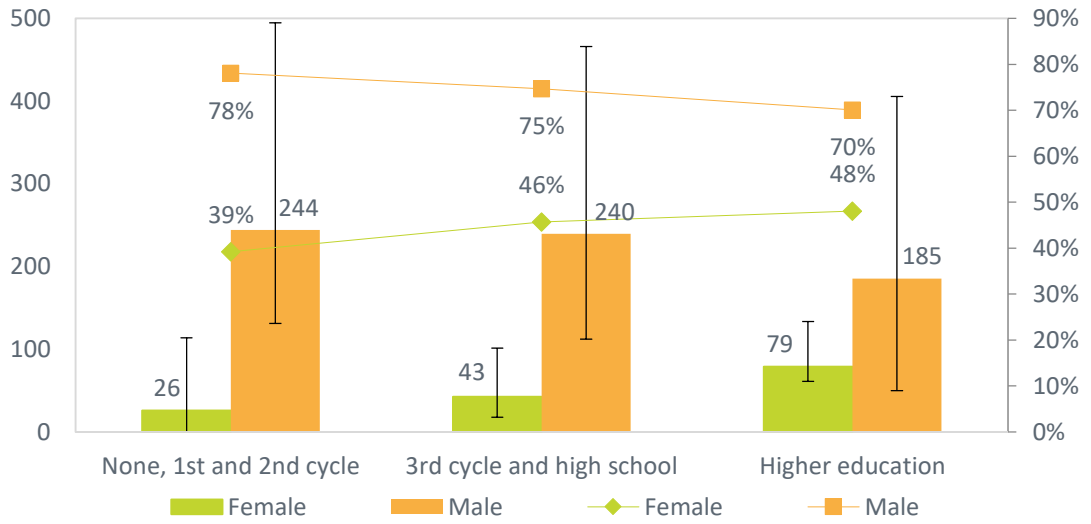


Figure 1.16. Median consumption of some types of beverages expressed in grams per day (main axis) and the consumption frequency (secondary axis), by sex and educational level (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Alentejo is the region with the highest alcoholic beverages consumption among men (181 g/day), followed by the Centre region (170 /day). At a subgroup level, the analysis reveals that the consumption of wine is slightly higher in the North (89 g/day) and Centre (88 g/day).

Based on the information collected from the Food Propensity Questionnaire (FPQ), the proportion of the population aged 15 year-old or more with a consumption of alcoholic beverages over the last 12 months prior to the interview, by sex and age group, is shown in figure 1.17. About 25% of the individuals consumed alcoholic beverages on a daily basis and 20.9% reported a null consumption in the last 12 months. The frequency of daily consumption is higher in the elderly (41.7%) and adults (22.3%), and null in adolescents. Regarding adolescents, 63.8% of girls and 55.7% of boys reported have never consumed it in the last 12 months before the interview.

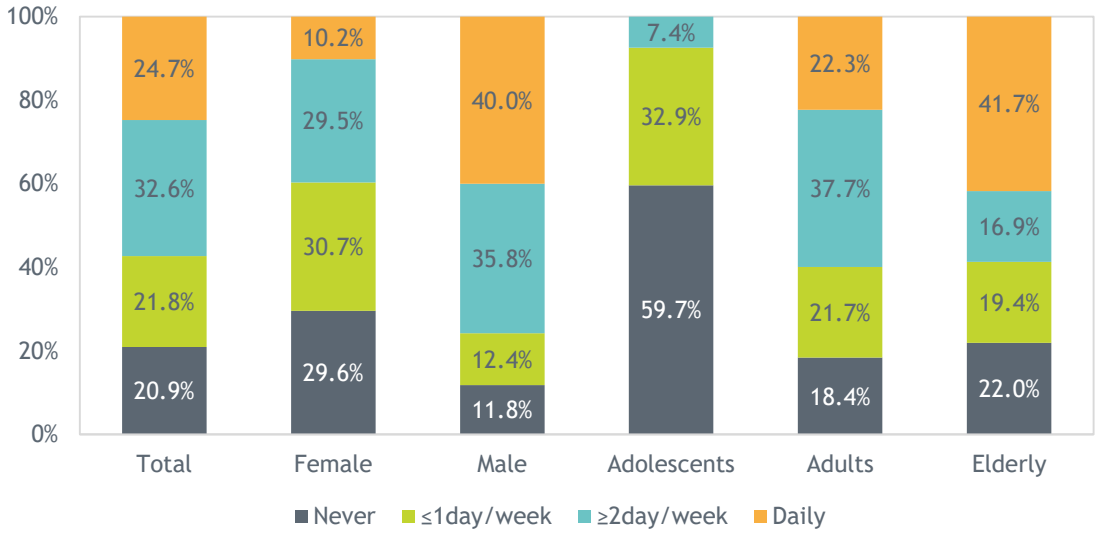


Figure 1.17. Consumption of alcoholic beverages, based on the Food Propensity Questionnaire, for individuals aged above 14 year olds, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Chapter 2 describes and quantifies the estimates of alcohol intake obtained from the 24-hours dietary recall. Considering the alcohol intake by individuals aged 15 year-old or more and its contribution to the total energy intake, men present higher contribution than women (5.9% vs.2.0%), especially in the elderly age group (9.9% vs. 3.2%). Adults present smaller contributes than the elderly (5.2% in men and 2.0% in women).

For individuals aged 15 year-old or more, an elevated alcohol consumption (12-36 g/day for women and 24-60 g/day for men) was estimated in 5.6% of women and 18.5% of men. A very high alcohol consumption level (>36 g/day for women and >60 g/day for men) was estimated in 2.9% of women and 7.3% of men.

SUMMARY OF MAIN RESULTS

- In comparison with the Portuguese Food Wheel guide recommendation, the Portuguese population is consuming proportionally more 12% of "meat, fish and eggs" and 6% of "dairy products", but less "vegetables" (-9%), fruit (-7%) and legumes (-2%).
- More than half of the Portuguese population (56%) does not meet the World Health Organization recommendation to consume more than 400g/day of fruit and vegetables (equivalent to 5 or more servings per day). The inadequacy is higher in children and adolescents, of whom 72% and 78% do not meet the recommendations. Azores (70.9%) and Madeira (67.7%) are the regions with the highest inadequacies, followed by the North (51.8%) and Centre (51.4%).
- The daily consumption of processed meat higher than 50g is observed in 6.3% of the population (5.7% in children, 11.6% in adolescents, 7.1% in adults and 1.0% in the elderly) and a consumption higher than 100g of red meat is observed in 22.5% (16.3% in children, 32.3% in adolescents, 25.5% in adults and 9.0% in the elderly).
- The daily consumption of soft drinks or nectars (≥220 /day) is 18%, and this prevalence is higher in adolescents (42% in total, 34% in girls and 51% in boys). The contribution of soft drinks to this percentage is 14% (34% in adolescents). Among adolescents who consume soft drinks, 25% drinks approximately two servings of soft drinks per day.
- The mean consumption of alcoholic beverages is higher in men (249 g/day) than in women (44 g/day), and higher among the elderly men (350 g/day) compared to adult men (234 g/day). The average consumption among consumers is 340 g/day in men and 100 g/day in women. Still 5% of the elderly men drinks more than 1 litre (1142g) of alcoholic beverages per day, and in the adults the consumption is 981 g. Wine is the most consumed drink, but considering the consumption only among consumers, beer has a higher mean intake.
- Among the population aged 15 years or older, 8.5% of women and 25.8% of men consume alcohol at levels considered high or excessive (>12 g/day in women and >24 g/day in men).

2.
Nutrients Intake

This chapter presents data on nutrient intake of the Portuguese population, by sex, age group and region, as well as the prevalence of macro and micronutrient intake inadequacy and the foods that are the main contributors of that intake. Methodological notes on the estimation of nutritional intake and on the assessment of inadequacy prevalence can be found in Appendix 1.

2.1. Energy and Macronutrients

Tables 2.1 to 2.3 and figures 2.1 to 2.3 present the estimated intake of total energy and macronutrients of the Portuguese population, as well as their description by sex, age group, region and educational level, after adjusting for the within-person variability of dietary intake, estimated by the two dietary reporting days.

For all population, the average energy intake is 1910 kcal/day (1635 kcal/day in women and 2228 kcal/day in men) (table 2.1). Average contributions to the daily total energy intake (TEI) were 19.9% from protein, 46.6% from carbohydrates and 31.4% from fat, also accounting for the contribution of alcohol to the TEI. The contribution of carbohydrates is higher in children and adolescents (51.2% and 49.1%, respectively) and the contribution of fat is higher in adolescents (32.4%) but lower in the elderly (29.4%) (figure 2.1).

In the population aged 15 year-old or over, the analysis of the foods that contribute to the total energy intake, by age and sex (figure 2.2), shows that the average contribution of alcohol to daily energy intake is higher in men than in women, and is particularly high in the elderly (9.9%) and adults (5.2%).

Table 2.1. Daily intake of the total energy and macronutrients, for the all population and by sex (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	Total		Women		Men	
	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)
Energy (kcal)	1910	1855 (1516-2245)	1635	1606 (1349-1891)	2228	2186 (1812-2601)
Protein (%TEI)	19.9	19.7 (17.7-21.8)	19.9	19.7 (17.8-21.9)	18.0	17.7 (15.8-19.9)
Carbohydrate (%TEI)	46.6	46.7 (42.3-51.0)	48.0	48.1 (43.9-52.1)	45.1	45.1 (40.6-49.7)
Sugars (%TEI) [(a)]	18.5	18.0 (14.6-21.8)	19.9	19.5 (16.3-23.0)	17.1	16.4 (13.0-20.3)
Free sugars (%TEI)[(b)]	7.5	6.6 (4.1-9.9)	7.8	7.1 (4.7-10.2)	6.8	6.0 (3.6-9.1)
Fibre (g)	17.8	17.2 (13.7-21.2)	16.3	15.9 (12.9-19.2)	19.4	18.9 (15.0-23.2)
Total fat (%TEI)	31.4	31.3 (27.9-34.9)	31.9	31.8 (28.3-35.3)	30.0	29.9 (26.5-33.3)
Saturated fatty acids (%TEI)	10.6	10.2 (8.5-12.3)	10.7	10.4 (8.6-12.4)	10.1	9.7 (8.0-11.7)
Monounsaturated fatty acids (%TEI)	12.7	12.5 (10.7-14.4)	12.7	12.6 (10.8-14.5)	12.5	12.3 (10.6-14.2)
Polyunsaturated fatty acids (%TEI)	5.2	5.0 (4.3-5.9)	5.3	5.2 (4.4-6.1)	4.8	4.6 (3.9-5.4)
Trans fatty acids (%TEI)	0.4	0.4 (0.3-0.5)	0.4	0.4 (0.3-0.5)	0.4	0.3 (0.3-0.5)

P25-P75: percentile 25-75; TEI: daily total energy intake
(a) Sugars: total of monosaccharides and disaccharides
(b) Free sugars: sugars added to foods by industry, catering or consumers, besides sugars naturally present in honey, syrups and fruit juices
(c) The alcohol estimation was performed in individuals aged 15 years-old or older

The mean national intake of sugars (mono and disaccharides) is 84 g/day (median 80 g/day: P25-P75 = 62-103), contributing, on average, to 18.5% of the TEI. This contribution is higher in children (24.9%) and adolescents (20.2%). Regarding the consumption of free sugars (sugars added to foods by industry, catering or consumers, besides sugars naturally present in honey, syrups and fruit juices), the national average intake corresponds to 35 g/day (median 30 g/day: P25-P75 = 17-47), contributing, on average, to 7.5% of the TEI. This contribution is higher in the adolescents' group with 10.5% and in the age group of children with 9.6%.

The intake of fibre is significantly higher in men than in women, also showing a significant increase with age.

At national level, the saturated fatty acids contribute with 10.6% for the TEI, monounsaturated fatty acids with 12.7% for the TEI, while polyunsaturated fatty acids contribute with 5.2%. When compared to adults, children and adolescents present a greater percentage contribution of saturated fatty acids to the TEI (12.1% and 12.0%, respectively), with mean intakes of 21.9 g/day and 27.5 g/day, respectively. On the other hand, the elderly is the age group with the lowest percentage of contribution of saturated fatty acids to the energy intake (9.1%).

Table 2.2. Daily intake of total energy, macronutrients and fibre, by age group (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	Children (<10 years)		Adolescents (10-17 years)		Adults (18-64 years)		Elderly (65-84 years)	
	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)
Energy (kcal)	1646	1614 (1243-2012)	2043	1781 (1517-2072)	1962	1904 (1568-2292)	1760	1706 (1401-2060)
Protein (%TEI)	18.6	18.4 (16.5-20.5)	19.8	19.6 (17.7-21.7)	20.2	19.9 (18.1-22.1)	19.5	19.3 (17.4-21.4)
Carbohydrates (%TEI)	51.2	51.3 (47.2-55.3)	49.1	49.2 (45.0-53.3)	45.7	45.9 (41.5-50.1)	46.7	46.8 (42.5-51.0)
Sugars (%TEI) [a]	24.9	24.2 (19.4-28.6)	20.2	19.8 (16.3-23.6)	17.9	17.5 (14.3-21.1)	17.6	17.2 (14.0-20.7)
Free sugars (%TEI)[b]	9.6	8.8 (5.9-12.5)	10.5	9.8 (6.8-13.5)	7.5	6.7 (4.4-9.8)	5.0	4.3 (2.6-6.6)
Fibre (g)	14.1	13.6 (10.4-17.3)	16.8	16.3 (13.0-20.0)	18.1	17.5 (14.1-21.5)	18.5	17.9 (14.4-21.9)
Total fat (%TEI)	31.5	31.4 (28.0-34.9)	32.4	32.2 (28.8-35.7)	31.8	31.7 (28.3-35.2)	29.4	29.3 (26.0-32.7)
Saturated fatty acids (%TEI)	12.1	11.7 (9.8-13.9)	12.0	11.6 (9.8-13.8)	10.7	10.3 (8.6-12.3)	9.1	8.8 (7.4-10.4)
Monounsaturated fatty acids (%TEI)	12.3	12.1 (10.5-14.0)	12.7	12.5 (10.7-14.4)	12.9	12.7 (10.9-14.6)	12	11.8 (10.2-13.7)
Polyunsaturated fatty acids (%TEI)	4.8	4.7 (4.0-5.5)	5.1	4.9 (4.2-5.8)	5.3	5.2 (4.4-6.1)	4.9	4.8 (4.1-5.6)
Trans fatty acids (%TEI)	0.5	0.5 (0.3-0.6)	0.5	0.5 (0.4-0.6)	0.4	0.4 (0.3-0.5)	0.3	0.3 (0.2-0.4)

P25-P75: percentile 25-75; TEI: daily total energy intake
(a) Sugars: total of monosaccharides and disaccharides.
(b) Free sugars: sugars added to foods by industry, catering or consumers, besides sugars naturally present in honey, syrups and fruit juices

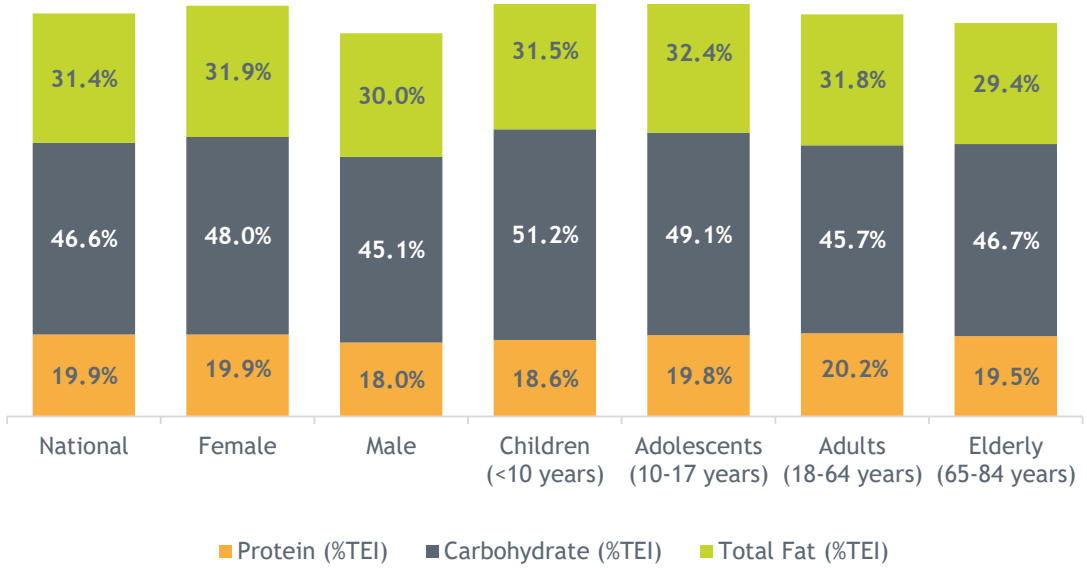


Figure 2.1. Percentual contribution of macronutrients for the total energy intake (including energy from alcohol), at national level, by sex and by age group (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

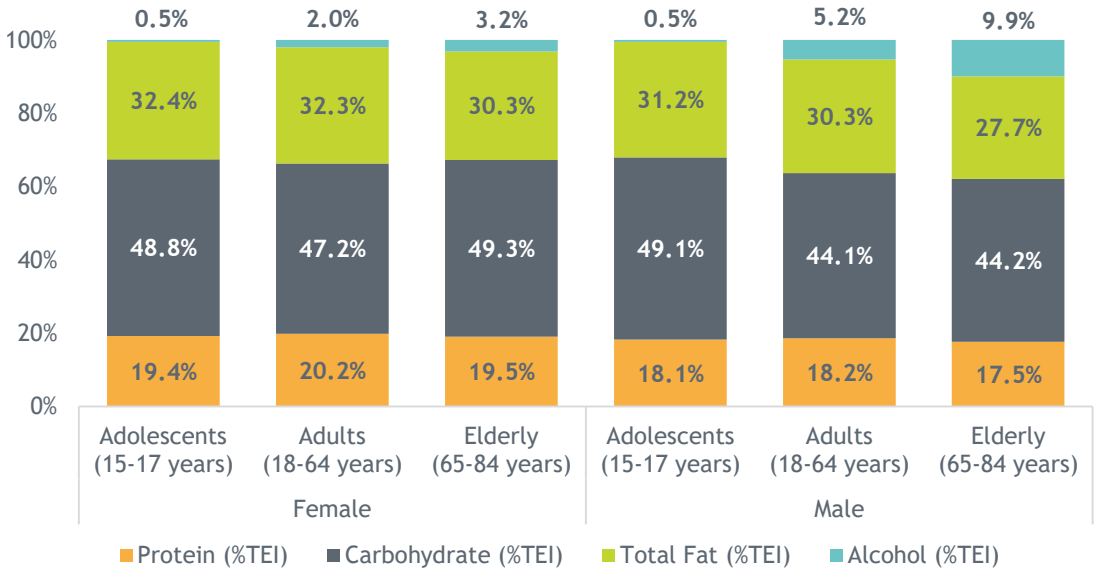


Figure 2.2. Percentual contribution of macronutrients and alcohol for the total energy intake in individuals aged 15 years-old or more, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

At the regional level (figure 2.3), it is possible to observe significant differences in energy intake, with Alentejo being the region with the lowest average energy intake (1895 kcal/day), and Madeira and Azores with the highest energy intakes (1915 and 1913 kcal/day, respectively). The distribution of macronutrients also presents some differences by region; the Autonomous Region of Madeira is the region with the highest percentage contribution of carbohydrates to the total energy intake (50.3%), the lowest contribution of fat (27.9%) and the lowest protein contribution (27.9%). The Central region has the largest contribution of fat (32.2%) and the lowest contribution of carbohydrates (44.8%) for the total energy intake.

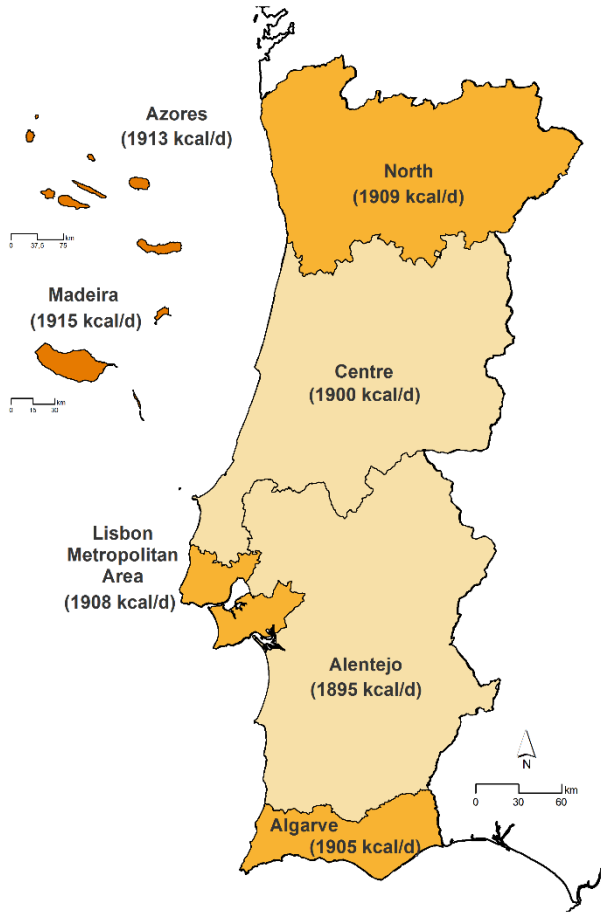


Figure 2.3. Spatial distribution (by NUTS II region) of the mean energy intake (kcal / day) (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

Table 2.3 presents the nutritional intake according to the educational level. Overall, energy intake is higher among the more educated. In this group, there is also a higher intake of protein and carbohydrates and a lower intake of saturated and *trans* fatty acids. For the group with higher education, a higher intake of fibre and lower free sugars were observed, compared to the less educated ones.

Table 2.3. Daily intake of total energy and macronutrients by educational level (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	None, 1st and 2nd cycle		3rd cycle and high school		Higher education	
	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)
Energy (kcal)	1846	1786 (1430-2197)	1938	1883 (1536-2281)	1899	1864 (1567-2195)
Protein (%TEI)	19.4	19.3 (17.6-21.1)	17.9	17.7 (15.8-19.8)	17.9	17.8 (15.9-19.8)
Carbohydrates (%TEI)	47.1	47.1 (42.0-52.2)	45.8	45.9 (41.8-49.9)	45.9	46.1 (42.1-49.9)
Sugars (%TEI) [(a)]	18.1	17.2 (13.5-21.7)	18.9	18.4 (15.1-22.1)	19.1	18.6 (15.6-22.0)
Free sugars (%TEI)[(b)]	7.9	6.7 (3.9-10.7)	7.8	7.0 (4.4-10.3)	7.0	6.3 (4.0-9.3)
Fibre (g)	16.6	16.0 (12.6-19.9)	17.3	16.9 (13.6-20.7)	18.8	18.3 (14.7-22.3)
Total fat (%TEI)	29.7	29.6 (26.3-32.9)	30.1	30.0 (26.9-33.1)	30.2	30.2 (27.0-33.4)
Saturated fatty acids (%TEI)	9.4	9.2 (7.8-10.8)	9.8	9.7 (8.3-11.2)	9.8	97 (8.3-11.2)
Monounsaturated fatty acids (%TEI)	11.7	11.6 (10.0-13.2)	12.2	12.0 (10.5-13.6)	12.2	12.1 (10.5-13.7)
Polyunsaturated fatty acids (%TEI)	4.8	4.6 (3.9-5.4)	4.7	4.6 (3.9-5.4)	5.0	4.8 (4.0-5.8)
Trans fatty acids (%TEI)	0.3	0.3 (0.2-0.4)	0.4	0.4 (0.3-0.5)	0.4	0.4 (0.3-0.5)

P25-P75: percentile 25-75; TEI: daily total energy intake
(a) Sugars: total of monosaccharides and disaccharides.
(b) Free sugars: sugars added to foods by industry, catering or consumers, besides sugars naturally present in honey, syrups and fruit juices

The guidelines proposed by EFSA for the European population were used to calculate the inadequacy of macronutrient intake (17). The inadequacy of macronutrient intake of the Portuguese population is presented in figure 2.4, by sex, and additionally by age group in table 2.4.

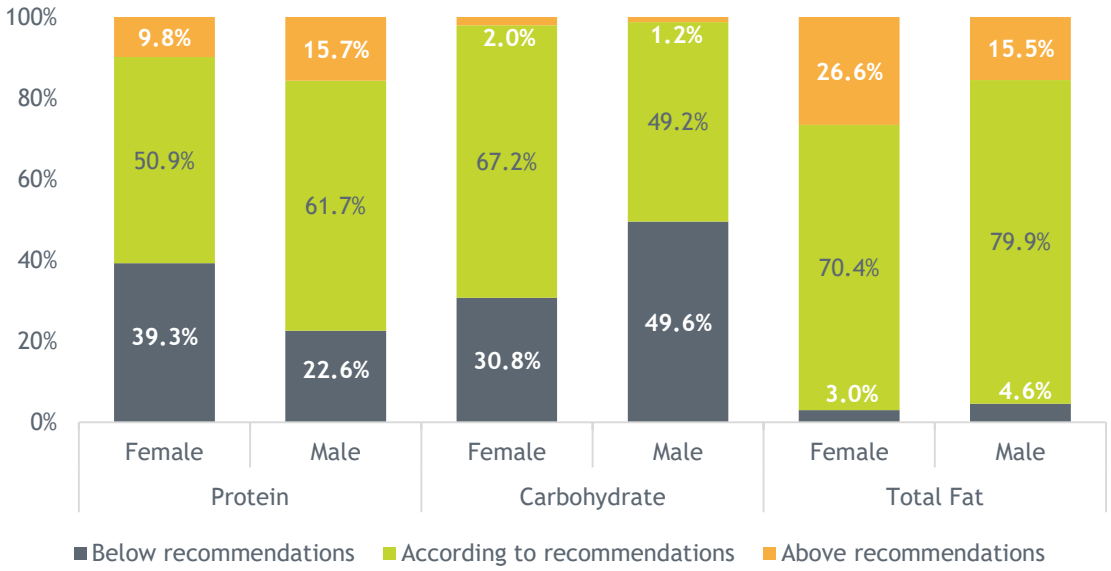


Figure 2.4. Prevalence of (in)adequacy of macronutrient intake, by sex (IAN-AF 205-2016), weighted for the distribution of the Portuguese population.

More than half of the population (57.1%) has a daily intake of protein between 1 and 2 g/kg of body weight; around 10% of women and 15.7% of men exceed the intake of 2 g/kg of body weight. An intake below 1 g/kg of body weight occurs in 39.3% of women and 22.6% of men. Taking into consideration age, the elderly have a high prevalence of low protein intake (48.6%) and, on the contrast, about 83% of the children exceed the 2g of protein per kg of weight.

The prevalence of protein intake inadequacy by deficit, taking into account the mean needs by age and sex established by the EFSA, is higher in elderly women (13.8%), adult women (6.5%) and elderly men (5.1%).

Table 2.4. Prevalence of inadequate intake of macronutrients, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	Total	Women	Men	Children (<10 years)	Adolescents (10-17 years)	Adults (18-64 years)	Elderly (65-84 years)
Protein							
< 1 g/kg weight	30.2%	39.3%	22.6%	0.2%	3.8%	31.7%	48.6%
> 2 g/kg weight	12.7%	9.8%	15.7%	83.2%	35.2%	5.3%	1.5%
Carbohydrates							
< 45 % TEI	40.1%	30.8%	49.6%	15.7%	24.9%	44.7%	38.7%
> 60 % TEI	1.6%	2%	1.2%	6.9%	3.5%	1%	1.4%
Free sugars							
> 10 % TEI	24.3%	26.3%	20.1%	40.7%	48.7%	24.1%	7.4%
Total fat							
< 20 % TEI	3.4%	3%	4.6%	34.2%	0.5%	0.7%	2.4%
> 35 % TEI	23.6%	26.6%	15.5%	16.8%	29.6%	26.3%	13.3%
Saturated FA							
> 10 % TEI	52.9%	55.5%	45.4%	73.0%	71.9%	54.4%	30.7%
Trans FA							
> 1 % TEI	0.4%	0.4%	0.4%	1.6%	1.4%	0.2%	0%

TEI – Total energy intake; FA - Fatty Acids

The overall prevalence of inadequate intake of carbohydrates is 41.7% (40.1% by deficit), being higher in men and in adults. Around one quarter (24.3%) of all population has a consumption of free sugars higher than 10% of the TEI; adolescents (48.7%) and children (40.7%) have the highest intakes.

Only 3.4% of the Portuguese population have an intake of fat below recommendations, although in children the prevalence of inadequacy by deficit is of 34%. The intake of fat above the recommendations occurs in 23.6% of the entire population. Around half of the Portuguese population (53%) exceeds the intake of 10% of TEI from saturated fatty acids. The highest intake is observed in children (73%) and adolescents (72%). Also, children and adolescents present the highest prevalence of inadequacy for trans fatty acids, although it is relatively low (1.6% and 1.4%, respectively). The prevalence of inadequacy of trans fatty acids (> 1% of TEI) for the entire population is only 0.4%.

2.2. Alcohol and Water

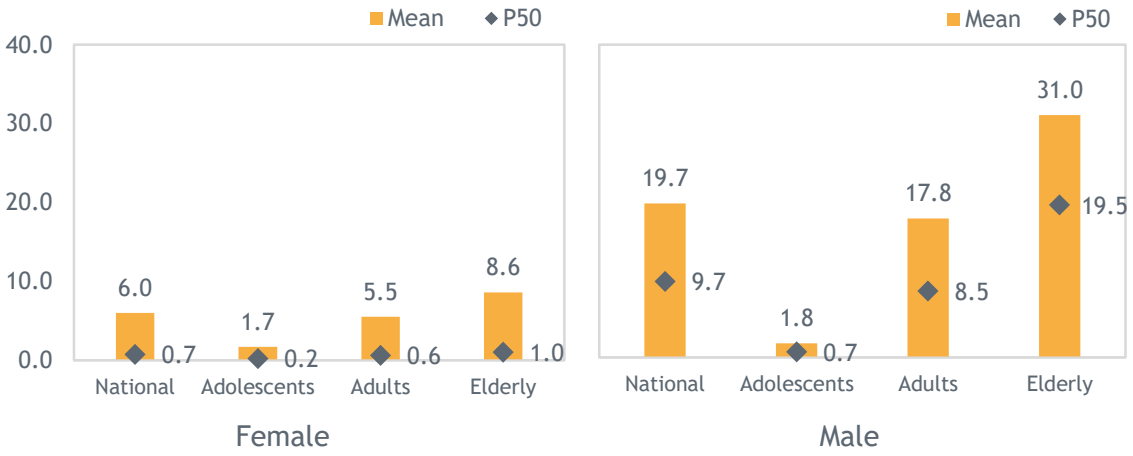
The mean intake of alcohol in the population aged 15 year-old or above is 6.0 g/day in women (2.2% of TEI) and 19.7 g/day in men (5.9% of TEI) (Table 2.5).

The alcohol intake increases with age as shown in Figures 2.5 and 2.6 and this difference is higher in men in comparison with women. It is also observed that in both sexes, the elderly is the age group with the highest consumption of alcohol, with a mean intake above the national estimate.

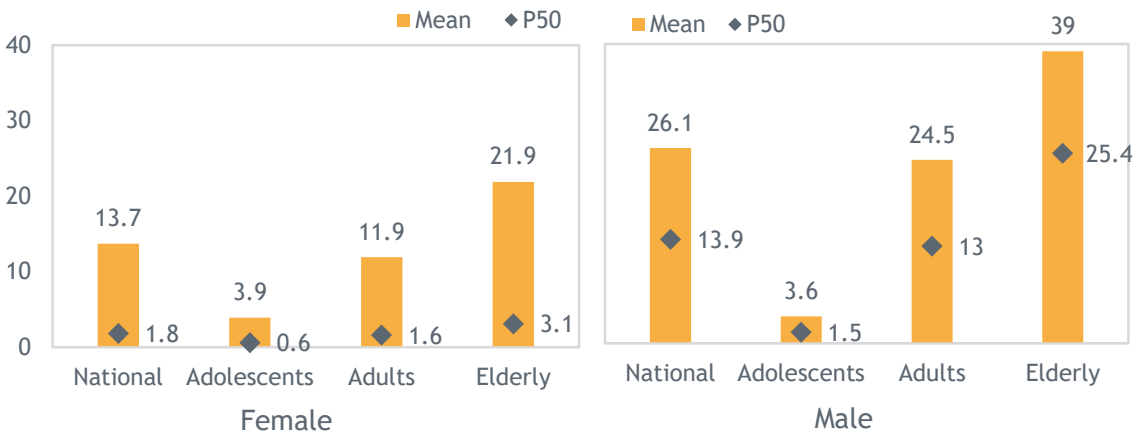
Table 2.5. Daily intake of alcohol and water, at national level and by sex (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	Total		Women		Men	
	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)
Alcohol (g/day) [(a)]	-	-	6.0	0.7 (0.2-2.8)	19.7	9.7 (3.0-24.8)
Alcohol (%TEI)[(a)]	-	-	2.2	0.3 (0.1-1.2)	5.9	2.9 (0.9-7.5)
Water (l)	2.1	2.1 (1.7-2.5)	2.0	2.0 (1.6-2.3)	2.3	2.3 (1.9-2.7)

P25-P75: percentile 25-75; TEI: daily total energy intake
(a) The alcohol estimation was performed in individuals aged 15 years-old or older and stratified by sex, due to the bimodal distribution.



P50: percentile 50
Figure 2.5. Mean daily intake of alcohol, in grams per day, in individuals aged 15 year-old or over, by sex and age group (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population



P50: percentile 50

Figure 2.6 Mean daily intake of alcohol, in grams per day, in individuals aged 15 years-old and over who consumes alcohol, by sex and age group (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

The mean contribution of alcohol to the TEI in the elderly men is 9.9% and in the elderly women is 3.2% (table 2.6). The contribution of alcohol to the TEI differs by educational level and by regions in both sexes. The Algarve region is the region with the highest contribution of alcohol to the TEI among women, but the lowest among men. Among men, it is the North region that has the highest contribution of alcohol.

The mean intake of total water was 2.1 L/day (accounting for water consumed and water from food), being lower in women (2.0 L/day) and higher in men (2.3 L/day). Children is the age group that consumes less water, and there are no significant differences between adolescents, adults and the elderly regarding the intake of water. This intake is also similar by educational level and by geographical region (table 2.6).

Table 2.6. Daily intake of alcohol and water, according to the age group, educational level and region, by sex (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	Alcohol (% TEI) Women*		Alcohol (% TEI) Men*		Water (Litres) Women		Water (Litres) Men	
	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)
Age group								
Children	-	-	-	-	1.5	1.4 (1.1-1.8)	1.6	1.5 (1.2-1.9)
Adolescents	0.5	0.1 (0.0-0.3)	0.5	0.2 (0.1-0.5)	1.9	1.8 (1.5-2.2)	2.1	2.1 (1.7-2.5)
Adults	2.0	0.3 (0.1-1.0)	5.2	2.5 (0.8-6.4)	2.1	2.0 (1.7-2.4)	2.5	2.4 (2.0-2.9)
Elderly	3.2	0.5 (0.1-1.8)	9.9	6.5 (3.0-12.8)	2.0	1.9 (1.6-2.3)	2.1	2.1 (1.7-2.5)
Educational level								
None, 1st and 2nd cycle	2.5	0.1 (0.0-0.6)	5.5	3.2 (0.8-7.7)	1.8	1.8 (1.4-2.2)	2.2	2.2 (1.8-2.6)
3rd cycle and high school	2.0	0.3 (0.1-1.2)	6.4	3.2 (1.0-7.9)	2.0	2.0 (1.7-2.4)	2.3	2.3 (1.8-2.7)
Higher education	3.8	0.9 (0.3-2.8)	6.1	2.0 (0.6-6.3)	2.1	2.0 (1.7-2.4)	2.3	2.3 (1.9-2.7)
Region								
North	2.8	0.4 (0.1-1.5)	7.4	3.0 (0.8-8.8)	2.0	2.0 (1.6-2.4)	2.3	2.3 (1.9-2.7)
Centre	1.0	0.2 (0.1-0.6)	6.4	3.1 (0.9-8.3)	2.0	2.0 (1.6-2.3)	2.3	2.3 (1.9-2.7)
MA Lisbon	3.4	0.6 (0.1-2.0)	6.5	3.0 (0.9-7.9)	2.0	2.0 (1.6-2.3)	2.3	2.3 (1.8-2.7)
Alentejo	1.6	0.3 (0.1-0.9)	5.8	3.1 (1.1-7.5)	2.0	2.0 (1.6-2.3)	2.3	2.3 (1.9-2.7)
Algarve	3.6	0.3 (0.1-0.9)	4.7	2.8 (1.1-6.2)	2.0	2.0 (1.6-2.3)	2.3	2.3 (1.9-2.7)
Madeira	2.4	0.9 (0.3-2.3)	4.9	2.4 (0.9-5.8)	2.0	2.0 (1.6-2.3)	2.3	2.3 (1.9-2.7)
Azores	2.4	0.2 (0.0-1.0)	5.6	3.1 (1.2-7.2)	2.0	1.9 (1.6-2.3)	2.3	2.3 (1.8-2.7)

P25-P75: percentile 25-75; TEI: daily total energy intake; MA: Metropolitan Area
(a) Sugars: total of monosaccharides and disaccharides.
(b) Free sugars: sugars added to foods by industry, catering or consumers, besides sugars naturally present in honey, syrups and fruit juices
* For individuals aged 15 years-old and over

In the population aged 15 year-old or older, the proportion of individuals with high intake of alcohol (between 12 to 36 g/day in women and 24 and 60 g/day in men) is 5.6% in women and 18.5% in men. The excessive consumption of alcohol (> 36 g/day in women and >60 g/day in men) is 2.9% in women and 7.3% in men, reaching 13.6% among the elderly men (table 2.7). Among men, 22.9% of adults and 42.4% of the elderly have an intake of alcohol considered high or excessive.

Table 2.7 – Prevalence of inadequacy of alcohol and water, at national level and by sex and age group (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	Nacional		Adolescents (10-17 years)		Adults (18-64 years)		Elderly (65-84 years)	
	Women	Men	Women	Men	Women	Men	Women	Men
Alcohol								
Categories of consumption*								
Moderate	91.5	74.2	96.6	99.6	92.5	77.1	87.4	57.6
High	5.6	18.5	2.5	0.4	5.0	16.8	7.9	28.8
Excessive	2.9	7.3	0.9	0.0	2.5	6.1	4.7	13.6
Water								
AI (L)	-	-	1.9-2.0	2.1-2.5	2.0	2.5	2.0	2.5
< AI	-	-	ns	ns	low	ns	ns	ns

AI: Adequate Intake, according to EFSA.
*Consumption of alcohol for individuals aged above 14 years of age.
Consumption categories: moderate consumption, <12g/day for women and <24g/day for men; high consumption, between 12 and 36g/day for women, between 24 and 60g/day for men; excessive consumption, >36g/day for women, >60g/day for men.

2.3. Micronutrients

Tables 2.8 and 2.9 present the micronutrient intake of the Portuguese population, for the entire population, and by sex and age group, after adjusting for the within-person variability of dietary intake. The intake of all micronutrients includes also the intake from nutritional supplementation (if it was performed by the individual).

Table 2.8. Daily intake of micronutrients (IAN-AF 2015-2016), adjusted for the within-person variability of dietary intake, at national level and by sex, weighted for the distribution of the Portuguese population.

	Nacional		Women		Men	
	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)
Vitamin A (µg ER)	788	706 (505-979)	775	694 (496-962)	803	720 (515-997)
Carotenes (mg)	2.6	2.4 (1.6-3.4)	2.6	2.4 (1.7-3.3)	2.7	2.4 (1.6-3.5)
Vitamin D (µg)	6.7	3.8 (2.1-7.0)	7.4	3.5 (1.8-6.9)	5.2	3.6 (2.3-5.8)
Tocopherol (mg)	9.6	8.7 (6.4-11.8)	9.1	8.2 (6.0-11.2)	10.1	9.3 (7.0-12.4)
Thiamine (mg)	1.3	1.3 (1.0-1.6)	1.2	1.1 (0.9-1.4)	1.5	1.4 (1.1-1.8)
Riboflavin (mg)	1.6	1.5 (1.2-2.0)	1.5	1.4 (1.1-1.9)	1.8	1.6 (1.3-2.1)
Niacin (mg EN)	35.8	34.3 (27.3-42.6)	31.0	29.8 (24.2-36.5)	40.5	39.4 (31.6-48.2)
Vitamin B6 (mg)	2.0	1.8 (1.4-2.4)	1.8	1.6 (1.2-2.1)	2.2	2.1 (1.6-2.7)
Vitamin B12 (mg)	4.5	3.9 (2.6-5.8)	4.0	3.3 (2.2-5.1)	5.1	4.5 (3.1-6.5)
Vitamin C (mg)	109	94 (61-139)	107	91 (59-136)	112	97 (64-143)
Folates (µg)	228	211 (162-275)	216	198 (150-262)	241	227 (178-289)
Potassium (mg)	3055	2985 (2463-3570)	2694	2655 (2237-3109)	3458	3399 (2844-4010)
Calcium (mg)	774	736 (572-933)	729	691 (538-878)	822	787 (616-989)
Phosphorus (mg)	1230	1198 (975-1451)	1080	1057 (878-1258)	1399	1375 (1131-1642)
Magnesium (mg)	280	269 (218-330)	249	240 (196-292)	313	306 (252-367)
Iron (mg)	11.8	11.0 (8.5-14.2)	10.3	9.6 (7.5-12.4)	13.3	12.6 (10.0-15.9)
Zinc (mg)	10.3	9.7 (7.7-12.3)	9.0	8.6 (6.8-10.7)	11.6	11.2 (9.0-13.8)
Sodium (mg)	2962	2872 (2280-3549)	2547	2492 (2042-2995)	3431	3358 (2698-4091)

P25-P75: percentile 25-75; TEI: daily total energy intake

Table 2.9. Daily intake of micronutrients (IAN-AF 2015-2016), adjusted for the within-person variability of dietary intake, by age group, weighted for the Portuguese population distribution.

	Children (<10 years)		Adolescents (10-17 years)		Adults (18-64 years)		Elderly (65-84 years)	
	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)	Mean	Median (P25-P75)
Vitamin A (µg ER)	828	736 (523-1028)	756	678 (485-939)	782	701 (502-971)	812	729 (523-1009)
Carotenes (mg)	2.6	2.4 (1.6-3.3)	2.4	2.2 (1.5-3.1)	2.6	2.4 (1.6-3.3)	2.9	2.7 (1.8-3.7)
Vitamin D (µg)	22.0	4.9 (2.5-9.9)	5.6	3.8 (2.1-6.9)	5.6	3.7 (2.0-6.8)	5.5	3.7 (2.0-6.8)
Tocopherol (mg)	8.7	7.8 (5.7-10.6)	10.1	9.1 (6.8-12.3)	9.9	9.0 (6.7-12.1)	8.7	7.8 (5.8-10.6)
Thiamine (mg)	1.3	1.2 (0.9-1.5)	1.4	1.3 (1.0-1.7)	1.4	1.3 (1.0-1.7)	1.2	1.1 (0.9-1.5)
Riboflavin (mg)	1.8	1.7 (1.2-2.2)	1.9	1.7 (1.3-2.3)	1.6	1.5 (1.2-2.0)	1.5	1.4 (1.1-1.8)
Niacin (mg EN)	27.7	26.5 (19.8-34.1)	37.0	35.4 (28.6-43.7)	37.4	35.8 (28.8-44.2)	32.4	31.0 (24.9-38.3)
Vitamin B6 (mg)	1.7	1.5 (1.1-2.1)	2.1	1.9 (1.5-2.5)	2.0	1.9 (1.5-2.5)	1.9	1.7 (1.3-2.2)
Vitamin B12 (mg)	3.6	3.0 (1.9-4.7)	4.8	4.1 (2.8-6.1)	4.7	4.1 (2.7-6.0)	4.0	3.4 (2.3-5.1)
Vitamin C (mg)	97	83 (54-125)	99	85 (55-126)	109	94 (62-140)	116	100 (66-148)
Folates (µg)	179	165 (126-217)	217	202 (155-261)	236	219 (169-284)	222	207 (159-268)
Potassium (mg)	2558	2496 (1991-3057)	2992	2920 (2418-3487)	3130	3057 (2539-3642)	2999	2927 (2424-3496)
Calcium (mg)	847	810 (626-1028)	859	820 (644-1030)	770	733 (572-927)	719	684 (533-867)
Phosphorus (mg)	1077	1058 (817-1316)	1319	1286 (1062-1541)	1269	1236 (1015-1487)	1103	1072 (874-1298)
Magnesium (mg)	213	206 (159-259)	271	260 (213-318)	291	279 (228-340)	269	258 (211-315)
Iron (mg)	9.3	8.7 (6.6-11.3)	11.4	10.6 (8.3-13.7)	12.2	11.4 (8.9-14.7)	11.5	10.7 (8.3-13.8)
Zinc (mg)	8.5	8.1 (6.1-10.4)	11.1	10.5 (8.4-13.1)	10.7	10.2 (8.1-12.7)	8.9	8.5 (6.8-10.6)
Sodium (mg)	2151	2089 (1518-2712)	2891	2794 (2240-3436)	3107	3007 (2424-3681)	2778	2682 (2143-3309)

P25-P75: percentile 25-75; TEI: daily total energy intake

In general, for all micronutrients, the mean intakes are slightly higher in men. Considering the age group, a higher daily intake of vitamin D in children (22.0 µg/day) is observed, although considering the median value the intake of this vitamin (4.9 µg/day) is similar to the remaining age groups. The mean intake of sodium is 2962 mg/day, equivalent to 7.4 g of salt, being higher in men compared to women (3431 vs. 2547 mg/day).

At regional level, similar micronutrient intake estimates are found across regions. The exception is Madeira, which presents, for almost all micronutrients, mean values of intake slightly lower than the other regions.

Regarding the inadequacy of micronutrient intake, those with the highest proportion of the population below the average requirements (AR) at the national level are calcium and folates (table 2.10). The elderly are the ones with the highest percentages below the AR (60.2% for calcium and 69.0% for folates). The intake of vitamins A, B6, C and riboflavin, present a prevalence of inadequacy (taking into consideration the average requirements) between 14% and 40%, being the prevalence higher for vitamin C, in both sexes and for riboflavin in women. For iron, the inadequacy is also higher in women, reaching 16.5%.

Table 2.10. Prevalence of inadequacy in the intake of micronutrients (IAN-AF 2015-2016), weighted for the distribution of the Portuguese population.

	Women	Men
Vitamin A <AR [a]	22.7%	29.2%
Vitamin B6 <AR [a]	26.0%	14.0%
Vitamin C <AR [a]	38.1%	39.6%
Folates <AR [a]	66.2%	54.2%
Riboflavin <AR [a]	39.4%	24.3%
Calcium <AR [a]	60.6%	47.0%
Iron <AR [a]	16.5%	3.3%
Sodium > UL [b]	63.2%	88.9%

(a) Percentage obtained by comparison with the Average Requirement (AR), as recommended by the European Food Safety Authority (EFSA) (18), which estimates the level of nutrient intake enough to meet the physiological or metabolic needs of 50% of the population.

(b) Percentage obtained by comparison with the Tolerable Upper Intake Level (UL) recommended by the North American Dietary Reference Intakes (19), due to the absence of a reference value recommended by EFSA.

In the case of vitamin B12, children, adolescents and adults have median intakes higher than the adequate intake (AI), so it can be concluded that these age groups have a low prevalence of inadequacy of vitamin B12. Contrasting, the elderly have a median intake lower than the values indicated as adequate, and therefore it is not possible to make statements about the inadequacy of this age group. Similarly, in relation to potassium, children, adolescents and adult men present a low prevalence of inadequacy; however, it is not possible to make inferences regarding the (in)adequacy of this mineral in elderly and adult women. The median intake of Vitamin D is lower than the value indicated as adequate in each age group, and it is not possible to draw conclusions about the respective prevalence of inadequacy.

The prevalence of inadequacy of sodium intake is high in the Portuguese population; 76.4% of the population (63.2 of women and 88.9% of men) exceed the maximum tolerated value (UL). This prevalence is higher among adults (79.7%) and adolescents (74.7%).

2.4. Contribution of Food Groups to Nutritional Intake

In this section are described the foods that contribute the most to the total energy intake and also to some of the macro and micronutrients that are the most highlighted in dietary recommendations.

The food groups that most contribute to the total energy intake are the “Cereals, cereal products and starchy tubers” (35.3%) and “Meat, fish and eggs” (13.9%). Analysis of the following levels (in sub-groups) has shown a greater contribution to the total energy from the bread and rusks (14.2%) and rice (10.7%) (figure 2.7).

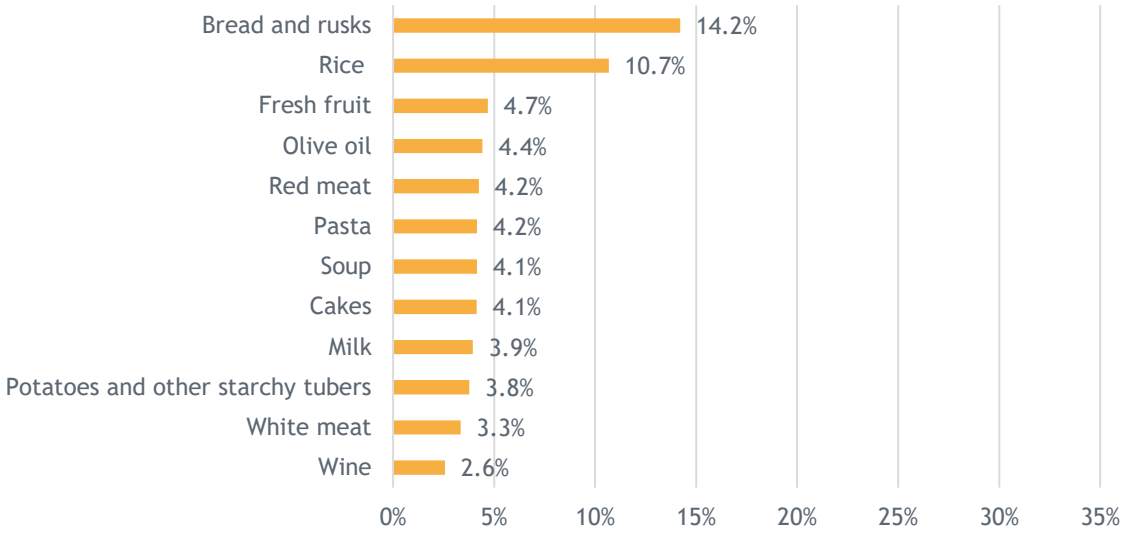


Figure 2.7. Contribution of food subgroups to the daily total energy intake (%).

The main contributors to the intake of saturated fatty acids are "Meat, fish and eggs" (24.1%) and "Dairy" (22.5%). The subgroups that most contribute to the intake of saturated fatty acids are cheese (9.2%), red meat (9.0%), olive oil (8.6%), milk (7.5%) and cakes (including pastries and homemade cakes) (7.3%) (figure 2.8).

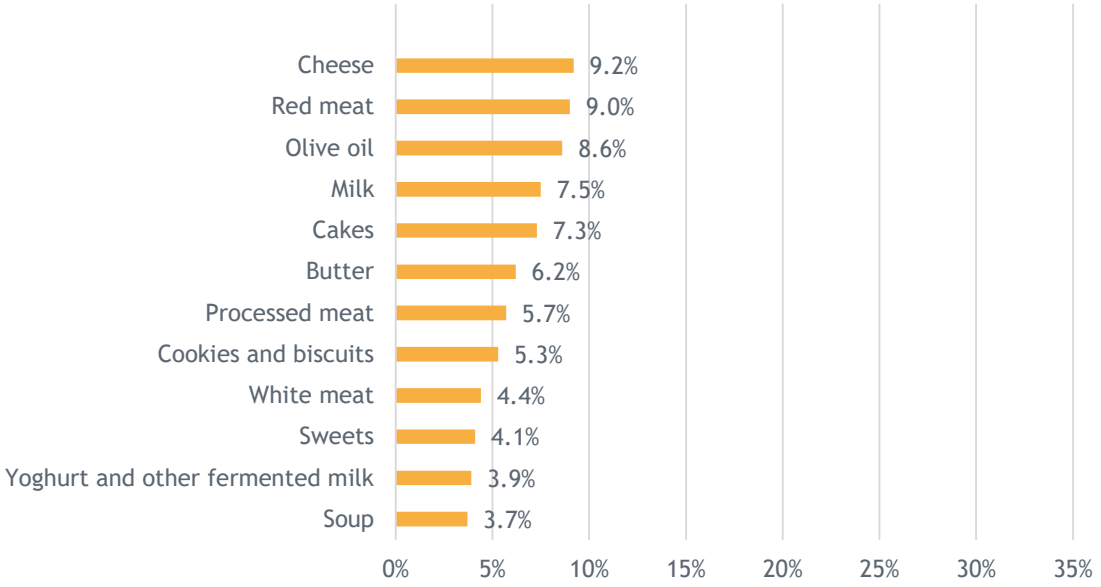


Figure 2.8. Contribution of food subgroups to the daily intake of saturated fatty acids (%).

Regarding the consumption of free sugars, the analysis of the contribution of food groups and subgroups showed that table sugar/addition is the largest contributor (21.4%), followed by sweet (16.7%) and soft drinks (11.9%) (Figure 2.9).

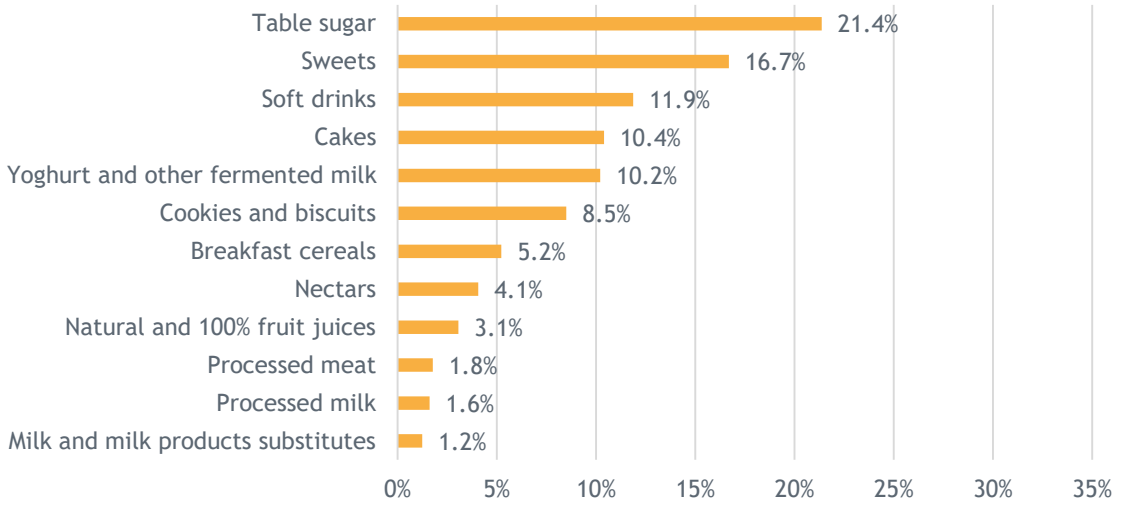


Figure 2.9. Contribution of food subgroups to the daily intake of free sugars (%).

The major contributor for sodium intake is the table salt (29.2%), followed by the subgroup of bread and rusks (18.5%), soup (8, 2%) and processed meats (6.9%) (figure 2.10).

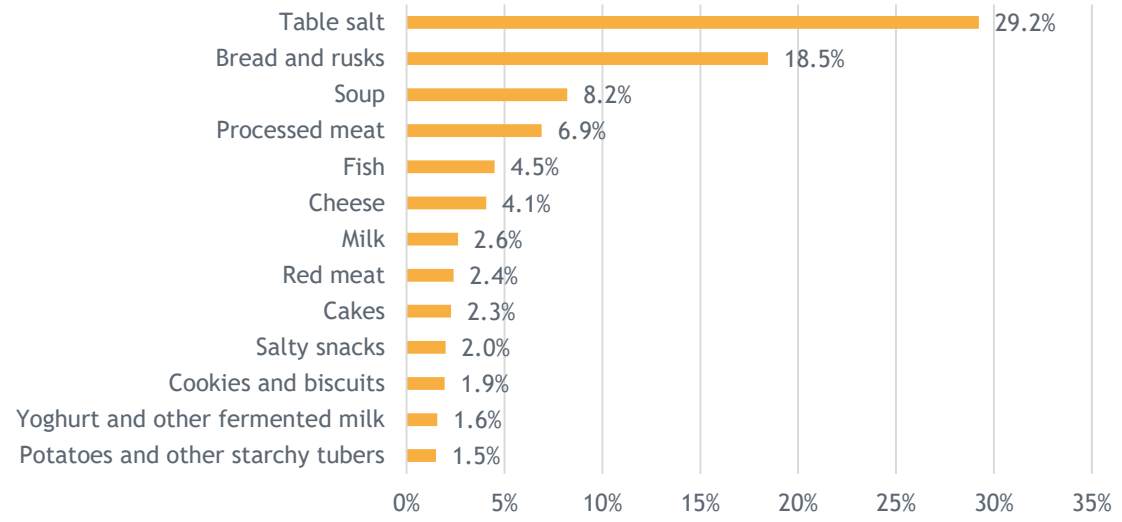


Figure 2.10. Contribution of food subgroups to the daily intake of sodium (%).

The “Dairy” group contribute the most for the calcium intake (44.0%), with the particular contribution of milk (20.5%), cheese (11, 9%) and “Yoghurts and other fermented milk” (9.3%). In addition to dairy products, water (8.9%), bread and rusks (7.1%), soups (5.2) and fresh vegetables (5.0%) are also important contributors to calcium intake in the Portuguese population.

For the folates intakes, the food groups that contribute the most are “Cereals, cereal products and starchy tubers” (35.8%), “Fruit, vegetables and pulses” (24.9%), “Soups” (11.8%) and “Meat, fish and eggs” (9.7%). In the analysis of subgroups, bread and rusks are the largest contributors (13.5%), followed by fresh vegetables (12.0%) and soups (11.8%).

More information about contribution of food groups to nutritional intake is available at the IAN-AF Web Platform https://ian-af.up.pt/en/consulta-de-dados.

SUMMARY OF MAIN RESULTS

- The total energy intake, for the national average, is 1910 kcal / day (1635 kcal / day in women and 2228 kcal / day in men).
- At the national level, the average contributions to the daily energy intake are 19.9% of protein, 46.6% of carbohydrates and 31.4% of fat. The contribution of fat is higher in adolescents and adults.
- It was found that 83.2% of children and 35.2% of adolescents had a daily protein intake of more than 2g / kg / weight; The prevalence of inadequate carbohydrate intake is higher in adults and in the elderly, with 44.7% and 48.6% presenting lower values than the recommended (<45% VET); Approximately 24% of the population consumes fat above the recommended level (> 35% VET). This prevalence is higher in adolescents (29.6%) and adults (26.3%).
- Overall, energy intake is higher for the individuals with higher education. For the same group is also highlighted a higher consumption of protein and carbohydrates and a lower intake of saturated and trans fatty acids. For the group with higher education, a higher intake of fibre and lower free sugars were observed, compared to the less educated ones.
- The contribution of free sugars represents more than 10% of the total energy intake in 24.3% of the national population. This prevalence is higher in adolescents (48.7%) and children (40.7%). The food groups that contribute most to free sugar intake are “table sugar” (21.4%), sweets (16.7%) and soft drinks (11.9%).
- In the population aged 15 or more years, the average contribution of alcohol to the daily energy total is higher in men than in women, both in adults (5.2% vs. 2.0%) and the elderly (9.9% vs. 3.2%), being higher in the elderly. Approximately 8% of women and 26% of men consume alcohol at levels considered high or excessive (> 12 g / day in women and> 24 g / day in men).

- The micronutrients with a larger proportion of the population below the average needs are calcium and folates, with higher percentages in women and in the elderly. The food groups that contribute most to calcium intake are plain milk (20.5%), cheese (11.9%) and yoghurts (9.3%) and the major contributors to folate intake are bread and rusks (13.5%), vegetables (12.0%) and soup (11.8%).
- The average sodium intake is 2962 mg per day (equivalent to 7.4 g of salt), higher in males. In the Portuguese population, 63.2% of women and 88.9% of men have a sodium intake above the tolerable upper intake level (UL). In addition to table salt (29.2%), the food groups that represent the biggest contributions to sodium intake are bread and rusks (18.5%), soup (8.2%) and processed meat (6.9%)

3.
Eating Behaviours

3.1. Dietary Supplements

The intake of food/nutritional supplements in the last 12 months (for children aged over 3 years-old, the intake from the previous month was considered) was reported by 26.6% of the Portuguese population. Adults, the elderly and females were found to had highest intakes (figure 3.1).

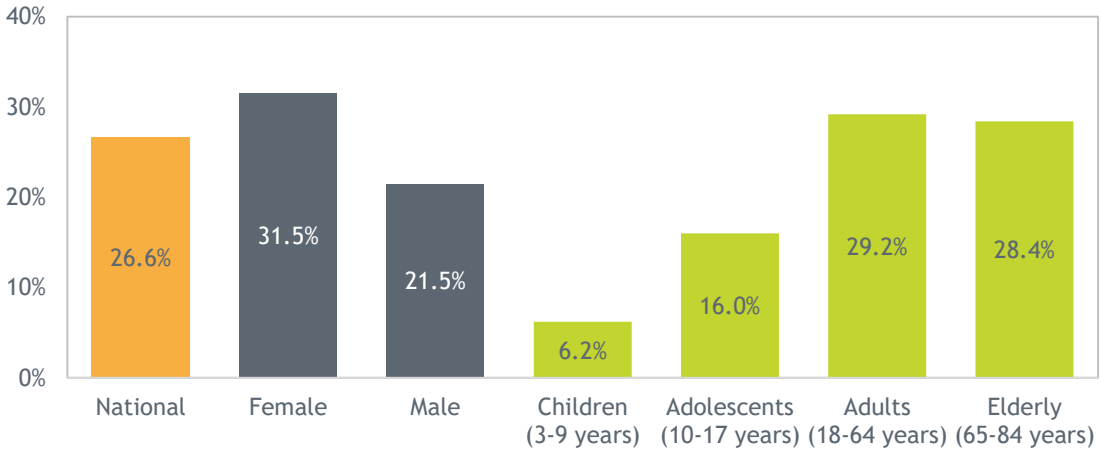


Figure 3.1. Prevalence of food/nutritional supplements use in the previous 12 months (previous month for children) at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Among the elderly who reported to use supplements, minerals are the type of supplements most used (59.9%), being calcium the micronutrient more used by this age group. Among children who used supplements with ages between 3 and 9 years-old, the most used type of supplement was multivitamins (40.2%), with vitamin D being the most consumed (table 3.1). In children under 3 years-old, 81.7% had already taken some type of supplements, being vitamin D the most used supplement (95.2%), followed by iron (11.4%), multivitamins (10.1%), vitamin C (6.0%) and fluoride (1.3%) supplements.

Table 3.1. Prevalence of different types of food/nutritional supplements intake, by individuals who used it, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Type of supplement	Total	Females	Males	Children (3-9 years)	Adolescents (10-17 years)	Adults (18-64 years)	Elderly (65-84 years)
Vitamin	20.8%	23.9%	16.2%	32.9%	22.6%	21.3%	17.2%
Mineral	36.3%	41.5%	28.5%	7.2%	12.8%	33.1%	59.9%
Multivitamin	36.2%	34.8%	38.3%	40.2%	43.3%	37.8%	26.7%
Others	22.5%	17.3%	30.6%	0.0%	16.4%	24.6%	15.5%

About 41.4% of pregnant women reported taking folic acid supplements before getting pregnant and 93.6% reported taking it during the first trimester of pregnancy (table 3.2).

Table 3.2. Prevalence of folic acid supplementation before pregnancy and during the first trimester of pregnancy (IAN-AF 2015-2016).

	Pregnant woman
Folic acid supplementation before pregnancy	41.4%
Folic acid supplementation during the 1st trimester	93.6%

The pharmacy was the place of choice to purchase food/nutritional supplements, followed by teleshopping and online shopping.

3.2. Breastfeeding and Weaning

The descriptive analysis regarding breastfeeding, artificial feeding and weaning practices was based on a sample of 904 children, aged 3-35 months. The IAN-AF 2015-2016 estimates that 48% of the Portuguese children in this age group are female and more than 80% live in the North, Centre and Lisbon MA. Almost 50% of Portuguese children aged 3-35 months, have parents with a higher education and only 3.7% have parents with lower educational level, specifically, 1st and 2nd cycle. Moreover, the maternal mean age of these children is 33 years-old (standard deviation = 5.0), while the paternal mean age is 35 years old (standard deviation = 5.5).

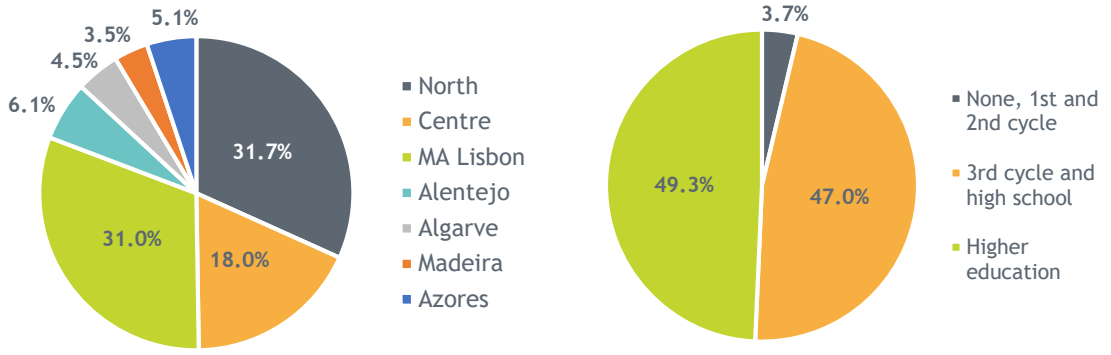


Figure 3.2. Living area (NUTS II) and parental educational level of children aged 3-36 months, weighted for the Portuguese population distribution.

The percentage of children who have never been exclusively breastfed is 8.9%. About 46% of children were exclusively breastfed for less than 4 months and only 21.6% for 6 or more months.

Approximately 30% of children were not exclusively breastfed for a total period of less than 4 months and only 35.1% were breastfed for 12 or more months (table 3.3).

Almost 80% of the children had infant formula and 63.8% had growing-up milk before 36 months. About 6.5% of children aged less than 12 months were prematurely introduced with cow's milk. Most children started their weaning between 4 and 5 months, with soup as the first food introduced in the highest proportion (66.3%), followed by baby porridge (25.8%) (table 3.3).

Table 3.3. Prevalence of breastfeeding, artificial feeding and weaning characteristics.

	Children (<36 months)	
	Prevalence	95% CI
Exclusive breastfeeding duration (in months) (*)		
Null	8.9%	(6.1%-11.6%)
<4 months	45.9%	(41.3%-50.1%)
<5 months	50.3%	(43.5%-56.3%)
<6 months	78.4%	(75.3%-81.1%)
≥ 6 months	21.6%	(18.9%-24.7%)
Total breastfeeding duration (in months) (*)		
Null	5.9%	(3.3%-8.4%)
<4 months	30.2%	(25.4%-34.6%)
<5 months	34.3%	(29.0%-39.1%)
<6 months	39.3%	(33.6%-44.5%)
<12 months	64.9%	(58.5%-70.3%)
≥ 12 months	35.1%	(29.7%-41.5%)
Consumption of Infant formula (*)	78.4%	(73.9%-82.1%)
Consumption of growing-up milk (*)	63.8%	(54.8%-71.0%)
Premature cow´s milk introduction (before 12 months) (*)	6.5%	(4.0%-8.9%)
Age at weaning (*)		
<4 months	3.3%	(1.7%-4.8%)
<5 months	38.3%	(34.6%-41.8%)
<6 months	63.2%	(59.4%-66.7%)
≥ 6 months	36.8%	(33.3%-40.6%)
First solid foods introduced to children(**)		
Porridge	25.8%	(21.1%-30.5%)
Soup	66.3%	(61.0%-71.5%)
Fruit	6.5%	(4.0%-9.0%)
Others	1.4%	(0.0%-2.8%)

* Results estimated through survival analysis, using the Nelson-Aaler method.
** Estimated prevalence for children who have already started weaning.

3.3. Consumption of Organic Food

At national level, certified organic products are consumed by 11.6% of individuals more than 18 years of age, more frequently consumed by adults (13.0%) and less frequently by the elderly (5.8%) (table 3.4). Organic vegetables and fruits are the most consumed on a daily basis (table 3.5).

Table 3.4. Prevalence of individuals who consume certified organic products, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

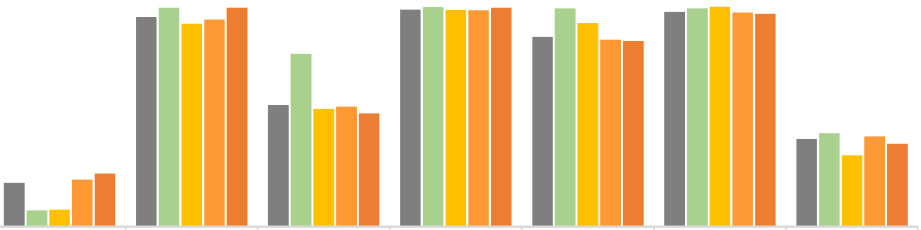
	National (≥18 years)	Women	Men	Adults (18-64 years)	Elderly (65-84 years)
Certified organic products	11.6%	13.1%	10.1%	13.0%	5.8%

Table 3.5. Consumption frequency of certified organic products (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

	Never/rarely	1-3times/month	once/week	2-6 times/week	Everyday
Organic fruit	38.6%	18.6%	12.8%	15.3%	14.7%
Organic berries	77.2%	7.4%	8.8%	4.9%	1.7%
Organic vegetables	19.5%	18.2%	18.3%	27.3%	16.7%
Organic potatoes	64.1%	8.3%	8.6%	14.7%	4.3%
Organic meat	83.6%	5.8%	2.3%	8.2%	0.2%
Organic eggs	67.2%	8.6%	16.1%	6.6%	1.5%
Organic milk	95.4%	0.9%	0.3%	2.5%	0.9%
Organic cheese	89.3%	3.7%	3.3%	2.7%	0.9%
Organic coffee	98.2%	0.5%	-	0.8%	0.6%

3.4. Meal Patterns

When analysing the meal consumption pattern, the national prevalence of breakfast consumption is 94.7% and it is similar across all age groups (figure 3.3). Not everyone has lunch and dinner on a daily basis and the analysis of snacks consumption frequency revealed that, mid-afternoon snacks are more frequent (85.8%). Children have more mid-morning snacks.



	Before breakfast	Breakfast	During morning	Lunch	During afternoon	Dinner	During evening
Total	19.8%	94.7%	55.0%	98.1%	85.8%	97.0%	39.6%
Children	7.4%	98.9%	78.1%	99.2%	98.6%	98.6%	42.3%
Adolescents	7.7%	91.6%	53.2%	97.9%	91.9%	99.4%	32.3%
Adults	21.2%	93.6%	54.2%	97.8%	84.5%	96.8%	40.8%
Elderly	23.9%	98.8%	51.2%	98.9%	83.8%	96.2%	37.5%

Figure 3.3. Prevalence of meal consumption at national level and by age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Breakfast time is frequently at 8 a.m., lunch is at 13 p.m. and dinner at 20 p.m.. Mid-afternoon snacks occur at different timings.

3.5. Special Diets

At the national level, only 6.8% of the individuals reported following a special diet (7.2% females and 6.2% males). The elderly reported the highest frequency of following a special diet (12.7%).

Among those who reported following special diets, the most frequent are: sodium restriction (22.1%), fat and/or cholesterol restriction (14.0%), diet for diabetics (12.3%), lactose restriction (9.1%) and caloric restriction (own initiative) (8.6%).

SUMMARY OF MAIN RESULTS

- The use of dietary/nutritional supplements in the last 12 months was reported by 26.6% of the Portuguese population and is higher in females and in the elderly. The micronutrient most used is calcium by the elderly and vitamin D by the children.
- Only 41.4% of pregnant women reported folic acid supplementation before pregnancy.
- Approximately 30% of children under 3 years old were breastfed for less than 4 months, only 35.1% did so for 12 months or more.
- The early introduction of cow's milk, i.e. before 12 months, is performed by 6.5% of the children. The majority of the children started weaning between 4 and 5 months, with the vegetable soup being the first food introduced in most cases (66.3%).
- Certified organic farming products are consumed by 11.6% of the national adult population. Organic vegetables and fruits are the most consumed daily.
- Breakfast is eaten by 94.7 % of the Portuguese population and not all the population has lunch and dinner daily. Among mid-meals, the most frequent one is the mid-afternoon meal (85.8%).
- Breakfast time is frequently at 8 a.m., lunch is at 13 p.m. and dinner at 20 p.m.. Mid-afternoon snacks occur at different timings.
- Overall, only 6.8% of the individuals report having a special diet; the most frequent is Sodium restriction (22.1%).

4.
Food Insecurity

In IAN-AF 2015-2016, Food Insecurity was assessed through the application of the Portuguese adaptation of the questionnaire developed by Cornell/Radimer (1990). This questionnaire provides estimates of food insecurity for households with and without children under the age of 18 years old, by collecting information on four underlying dimensions and experience of food insecurity, based on the previous 12 months prior to the interview: availability, access, utilization, and stability/resilience. Hence, food insecurity is associated not only with conditions of structural poverty, but also with transitional conditions - but not less serious - of scarce resources, in particular financial resources. The questionnaire was applied to adult and elderly individuals.

In Portugal, 10.1% of the families experienced food insecurity, i.e. they had difficulty to provide enough food for the whole family due to a lack of financial resources. Moreover, 2.6% of the families reported experiencing severe food insecurity, referring to have changed their usual eating habits and have reduced the amount of food consumed, in many cases feeding on low quantity of food or even "feeling hungry but not eating due to not having enough money to buy food" (figure 4.1).

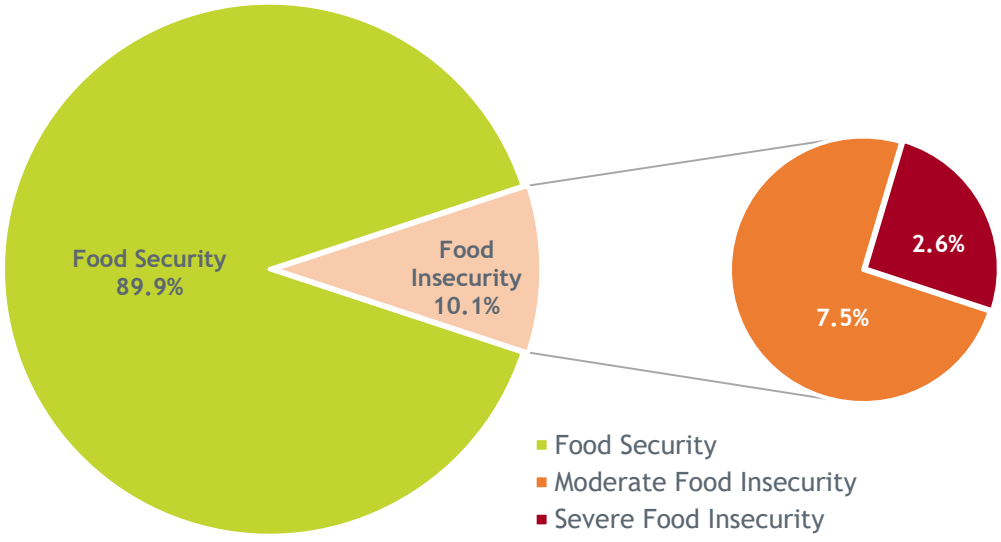


Figure 4.1. Prevalence of classes of Food Insecurity at national level, weighted for the Portuguese population distribution.

The prevalence of food insecurity is higher in families with children and adolescents (11.4%), although not so severe, revealing the inability of children and adolescents in these families to have a healthy, adequate and varied dietary pattern.

The prevalence of food insecurity, moderate and severe, varies significantly between regions (figure 4.2), reaching more families in Azores (13.4%) and Madeira (13.2%) and less in Centre (8.5%) and Algarve (5.8%). However, Alentejo is the region with the highest prevalence of severe food insecurity (4.2%).

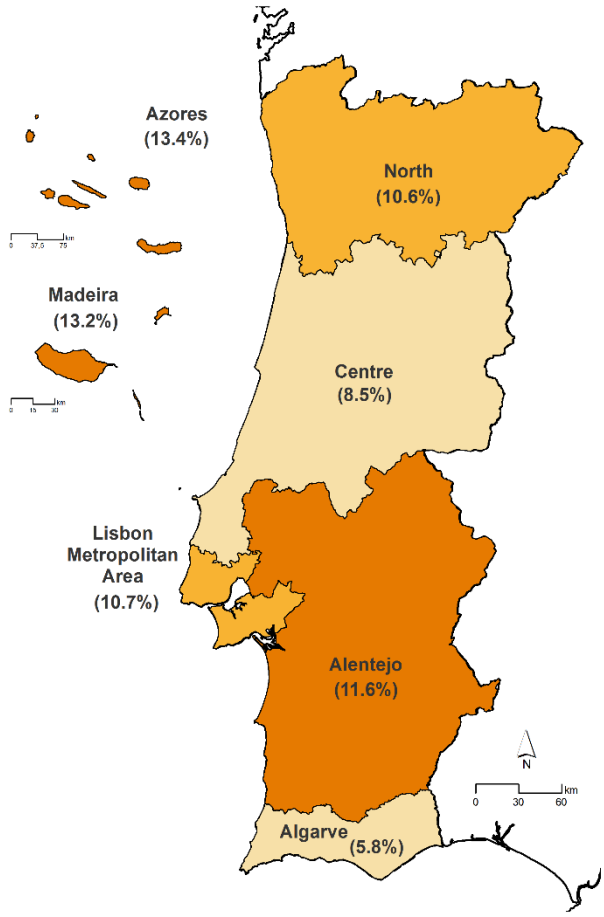


Figure 4.2. Spatial distribution of the prevalence of Food Insecurity (moderate and severe) by region NUTS II, weighted for the Portuguese population distribution.

Families with incomes below or near the national minimum wage and households with low educational levels present not only higher prevalence of food insecurity than the other households, and also higher prevalence of severe food insecurity (figures 4.3 and 4.4).

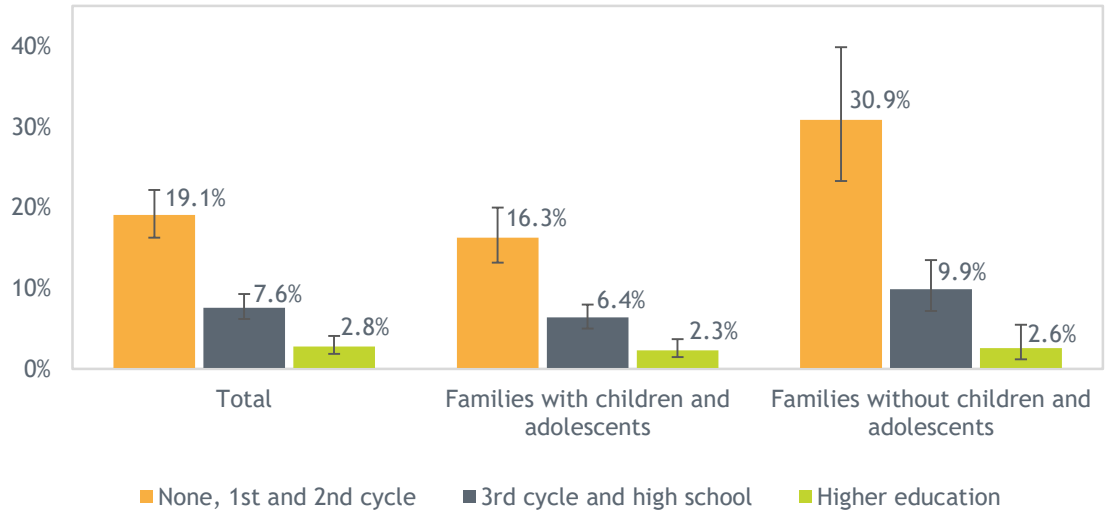


Figure 4.3. Prevalence of Food Insecurity (moderate and severe), by type of household and educational level (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

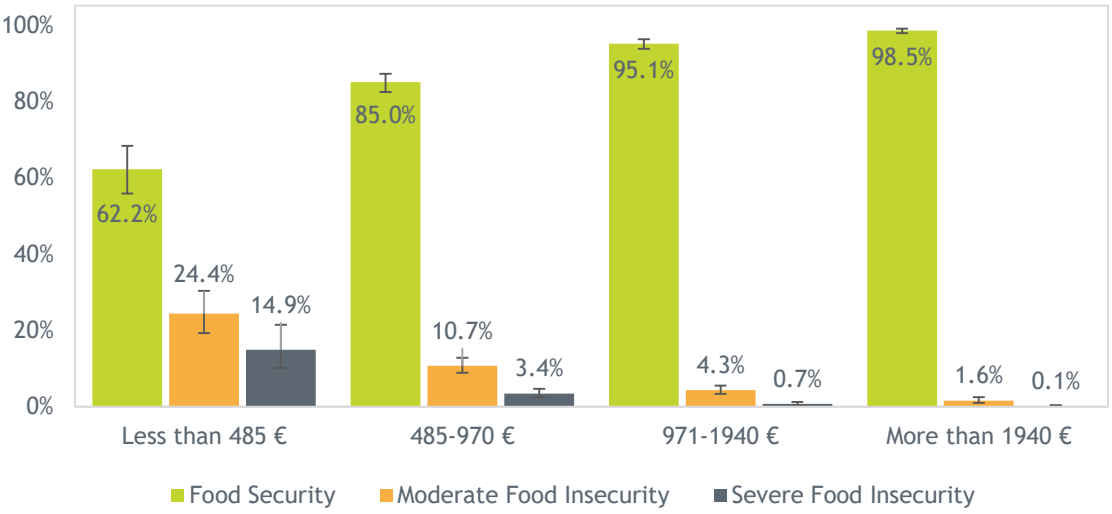


Figure 4.4. Prevalence classes of Food Insecurity categories, by household income levels (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The category of severe food insecurity identifies situations in households where food consumption of one or more members has been reduced by lack of resources. Families classified with severe food insecurity reported the following conditions (figure 4.5):

- 97.2% reported fear that food would end before they had money to buy more;
- 100% reported to had run out of food without having money to buy more;
- 94.2% reported not being able to buy food to have complete healthy meals;
- 92.3% reported that an adult household member ate less or did not eat because there was not enough money;
- 97.8% reported that the previous situation occurred frequently (in 3 or more months of the year);
- 95.3% reported having eaten less than wanted because there was not enough money;
- 64.0% reported being hungry but not having eaten because they did not have enough money;
- 48.8% reported losing weight because they did not have enough money to eat;
- 6.0% reported that an adult household member spent a whole day without eating because there was not enough money to eat;
- 100% reported that the previous situation occurred frequently (in 3 or more months of the year).

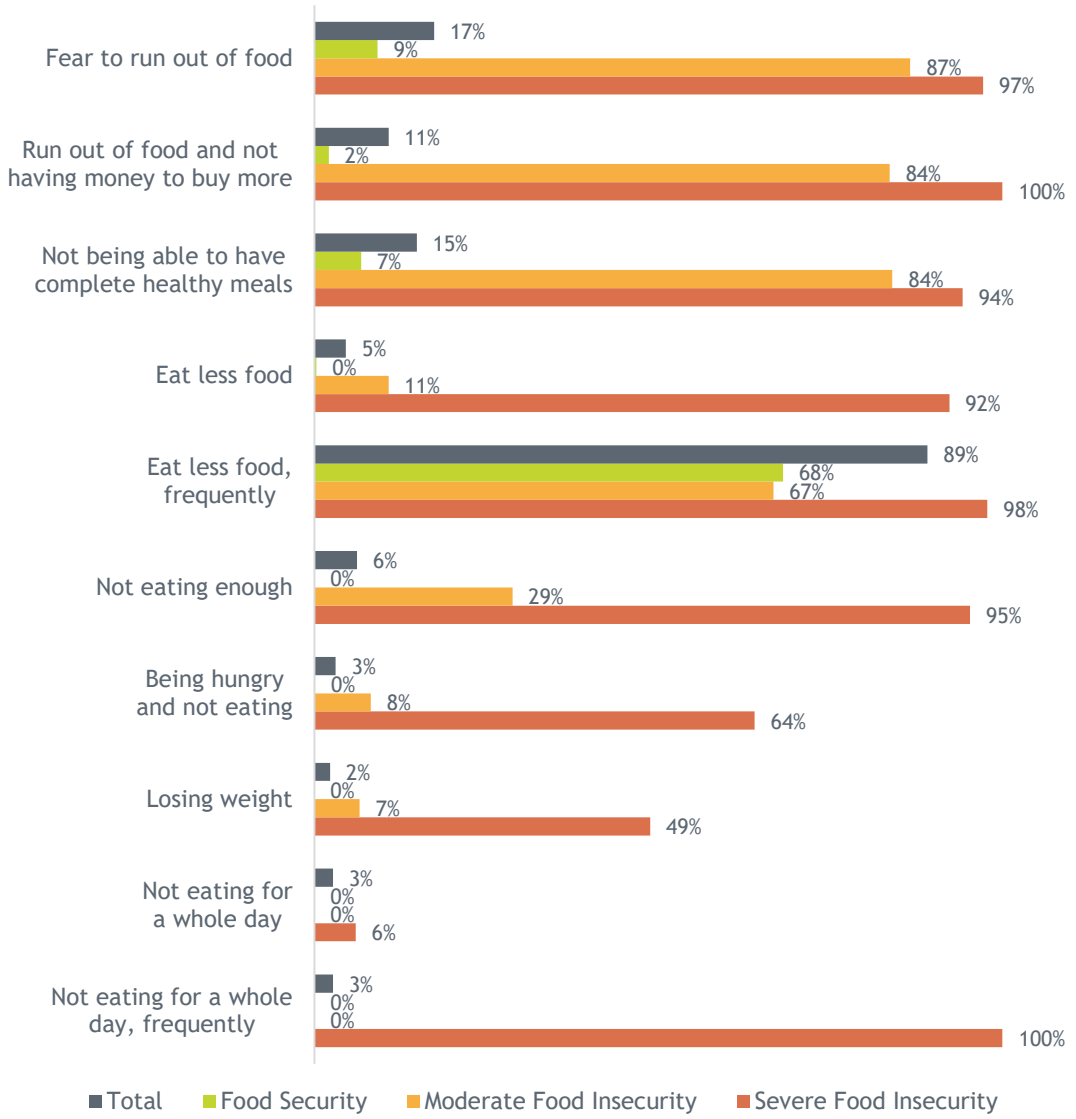


Figure 4.5. Prevalence of reporting food insecurity indicators, at national level and by categories of Food Insecurity, weighted for the Portuguese population distribution.

SUMMARY OF MAIN RESULTS

- In 2015-2016, 10.1% of the Portuguese families experienced food insecurity, meaning that during this period they had difficulty to provide enough food for the whole family due to lack of financial resources. Most of these families have individuals under 18 years of age.
- One out of four of these families reported experiencing moderate to severe food insecurity during this period.
- There are regional disparities in the sex and age standardized prevalence of food insecurity, higher in the Islands and with more severe situations in Alentejo.
- Seventeen percent of families reported fears that food would end before they had the money to buy more (97.2 percent in moderate to severe food insecurity) and eleven percent reported that food purchased had run out and they had no money to buy more (100% in moderate to severe food insecurity).
- Fifteen percent of families reported not being able to buy food to make whole and healthy meals (94.2% in moderate to severe food insecurity).
- The data collected, and the preliminary results now presented, will allow us to produce detailed and accurate knowledge about food insecurity in Portugal, nutrition status and health.

5.
Adherence to the Mediterranean Dietary Pattern

The adherence to the Mediterranean Dietary Pattern (MDP) was estimated for the Portuguese population based on the definition of the Mediterranean Diet Score (3-5), which includes nine key components: ratio of monounsaturated/saturated fatty acids, fruits and nuts, vegetables, legumes, cereals and derivatives, fish, dairy products (milk, cheese and yogurt), red meats and meat products (charcuterie) and alcohol. As originally described, for the first six items, considered closest to the Mediterranean diet, individuals with consumption above the sex-specific median were scored with one point and those with consumptions equal to or below the median were scored with zero points; for dairy products, and meats and meat products, the score was reversed. For alcohol, moderate consumptions (10 to <50 g/day in men and 5 to <25 g/day in women) were scored with one point, while a consumption below or above these values were scored with zero. The final score ranges from 0 to 9. Adherence was assessed for the population aged at least 18 year-old, and three levels of adherence to the MDP were defined with the following cut-off points: “low” if the final score is less than or equal to 3 points, “moderate” if the score was equal to 4 or 5 points, and “high” if the score was equal to or greater than 6 points (3, 5).

Two different methodologies were used in order to estimate the prevalence of adherence to the MDP at national level, by sex and age group. In both methodologies, the method was based on the mean value of two 24-hours dietary recall, but in 1) the cut-off values were directly applied to the mean value, while in 2) there was a previous adjustment for the within-person variability of dietary intake. The latter methodology was used to calculate the prevalence of adherence to the MAP at national level, by sex and by age group, in order to keep the results consistent with the results presented in the previous chapters (figure 5.1.). However, for comparison and consistency with the majority of results published in the literature, the former methodology was also used (figure.5.2).

Figures 5.1 and 5.2 present the prevalence of adherence to the MDP obtained by the two methods. The application of the two methods resulted in completely different results, being the adherence to the MAP lower when considering the adjustment for the within-person variability of dietary intake. However, the same trends are observed independently of the method, with men presenting higher adherence than women and the elderly presenting higher adherence than adults. In order to keep the results comparable with previous studies, the estimates obtained with methodology 1) are generically presented.

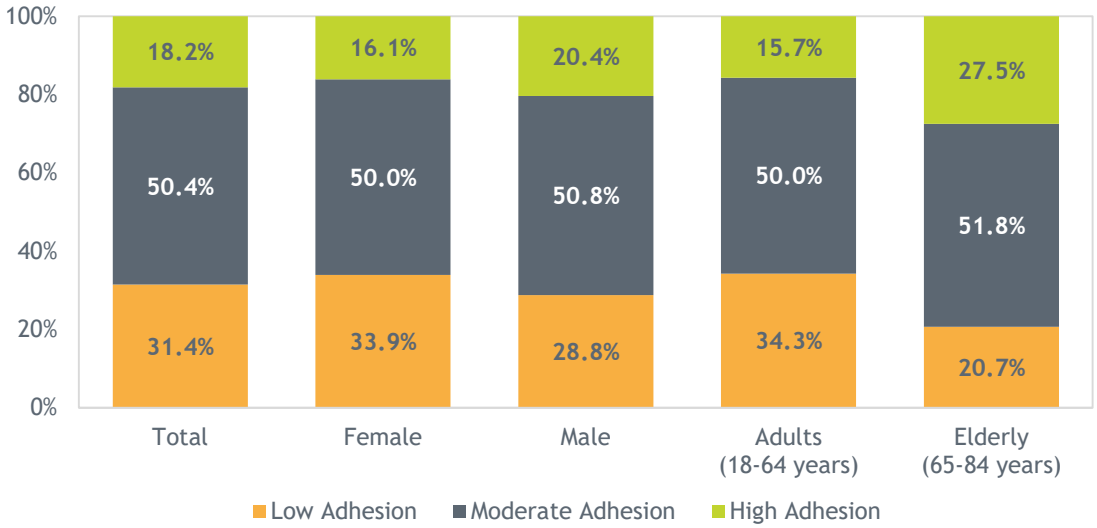


Figure 5.1. Prevalence of adherence to the Mediterranean Dietary Pattern in the adult population, without adjustment for the within-person variability of dietary intake (methodology 1), at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

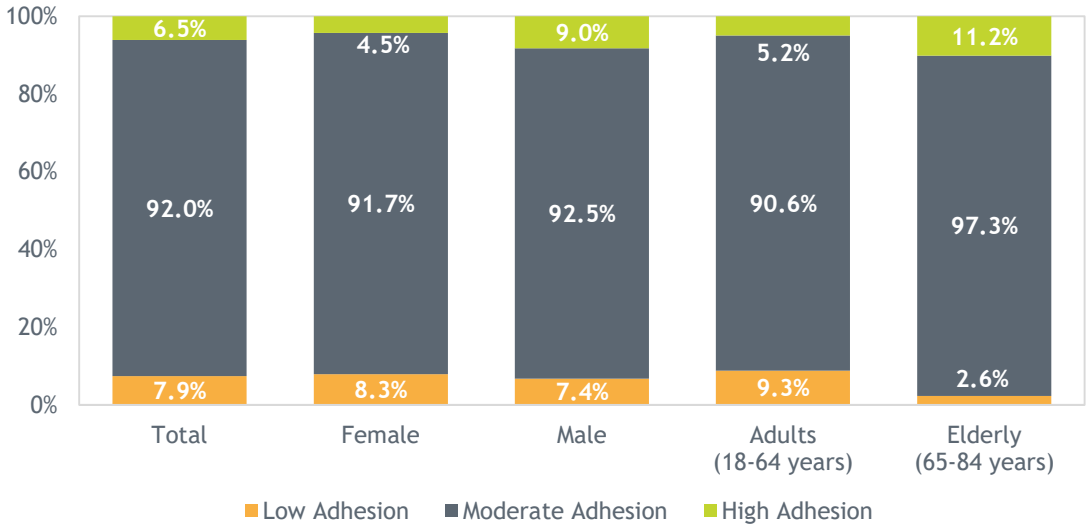


Figure 5.2. Prevalence of adherence to the Mediterranean Dietary Pattern in the adult population, adjusted for the within-person variability of dietary intake (methodology 2), at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

In general, 31% of the individuals have low adherence to the MDP, with 50% of the population showing a moderate adherence. The prevalence of high adherence to the MDP at national level is 18% (95% CI: 17.3-19.1), higher in male than in female (male: 20%, 95%CI: 18.9-21.8; female: 16%, 95%CI: 15.1-17.2) as well as in the elderly when compared to adults (elderly: 28%, 95%CI: 24.9-30.2; adults: 16%, 95%CI: 14.8-16.7) (figure 5.1).

Figure 5.3 presents the prevalence of high adherence to the MDP by region NUTS II. The Metropolitan Area of Lisbon (12%, 95%CI: 10.7-14.1), Madeira (15%, 95%CI: 13.8-15.9) and Azores (7%, 95%CI: 6.6-7.8) are those with lower prevalence of high adherence to the MDP.

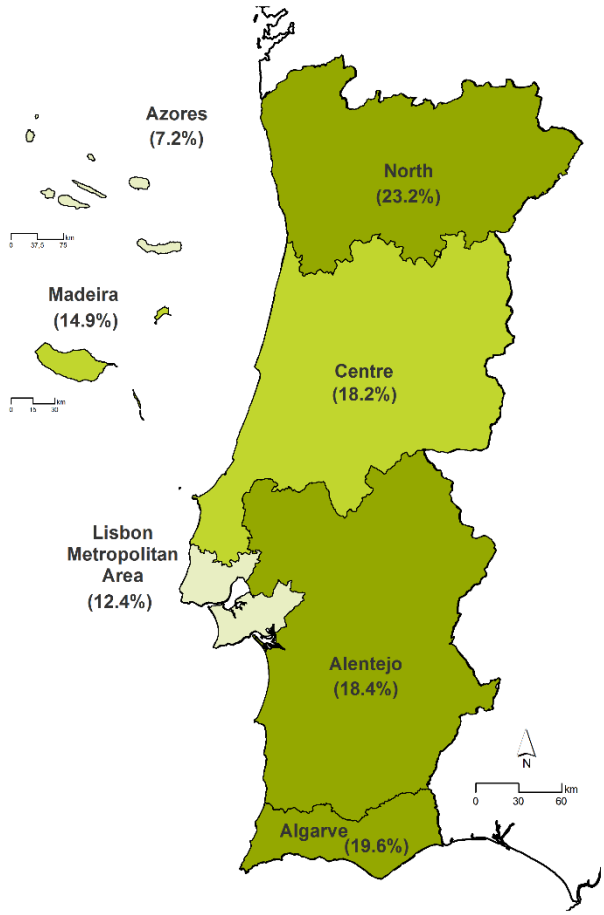


Figure 5.3. Spatial distribution (by NUTS II region) of the prevalence of high adherence to the Mediterranean Dietary Pattern in the adult population, by region (NUTS II), weighted for the Portuguese population distribution.

The adherence to the MDP was also analysed according to food (in)security of the household. Individuals with severe food insecurity present lower prevalence of high adherence to the MDP (13%, 95% CI: 6.7-18.6) than those reporting food security (18%, 95% CI: 17.4 -19.3). The same happens when stratifying by age group; the most marked difference is observed among the elderly (figure 5.4).

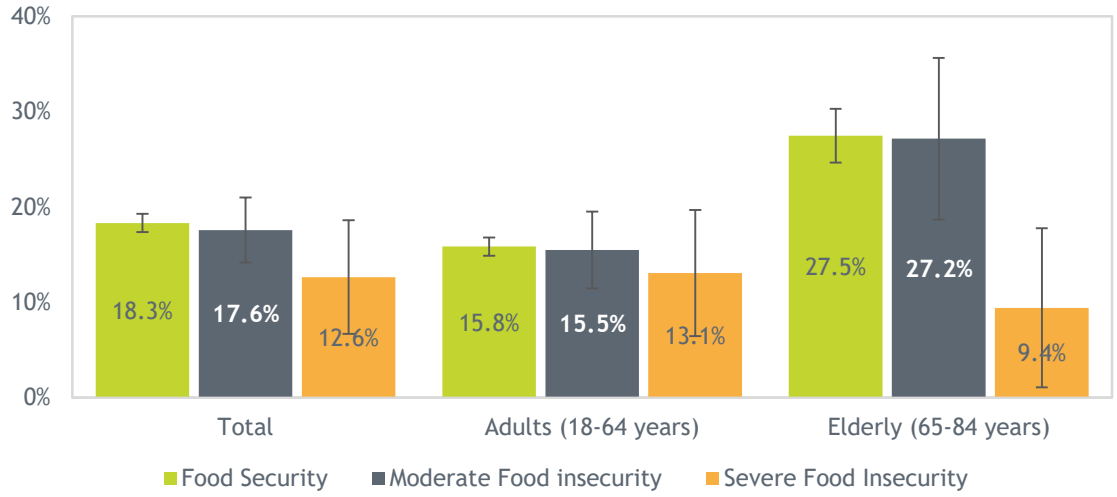


Figure 5.4. Prevalence of high adherence to the Mediterranean Dietary Pattern in the adult population, by level of food (in)security and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The prevalence of high adherence to the MDP is slightly higher in active individuals than in sedentary (20%, 95% CI: 18.0-22.2 vs. 16%, 95% CI: 15.0-17.4), which is observed in both adults and elderly groups (figure 5.5).

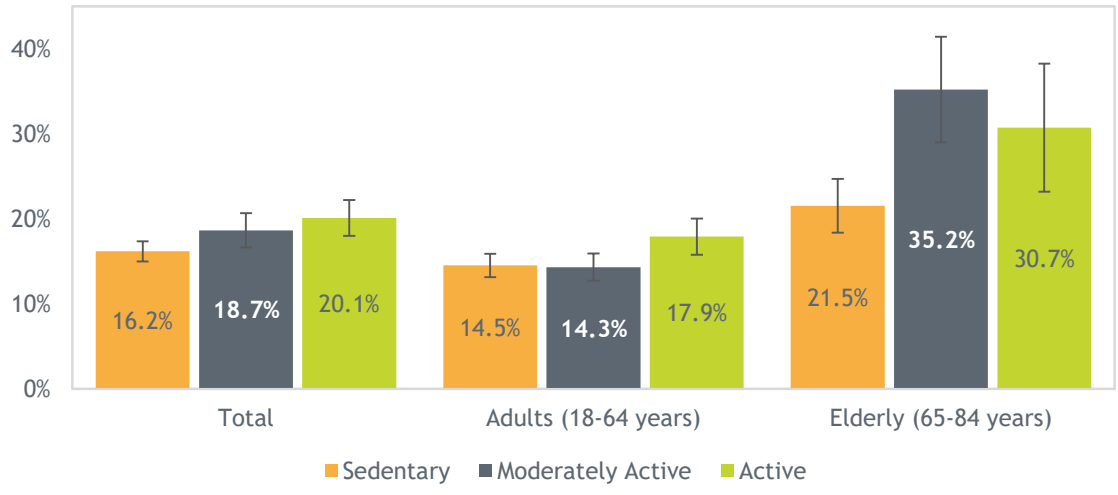


Figure 5.5. Prevalence of high adherence to the Mediterranean Dietary Pattern in the adult population, by physical activity level (IPAQ) and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Although the highest prevalence of high adherence to the MDP was observed in individuals who self-reported their health status as "very poor" (28%, IC95%: 21.6-34.0 overall; 19%, IC95%: 10.0-28.8 in adults; and 36%, IC95%: 27.2-44.8 in the elderly), there are no significant differences on the prevalence of high adherence to the MAP between different levels of self-perception of health status (figure 5.6).

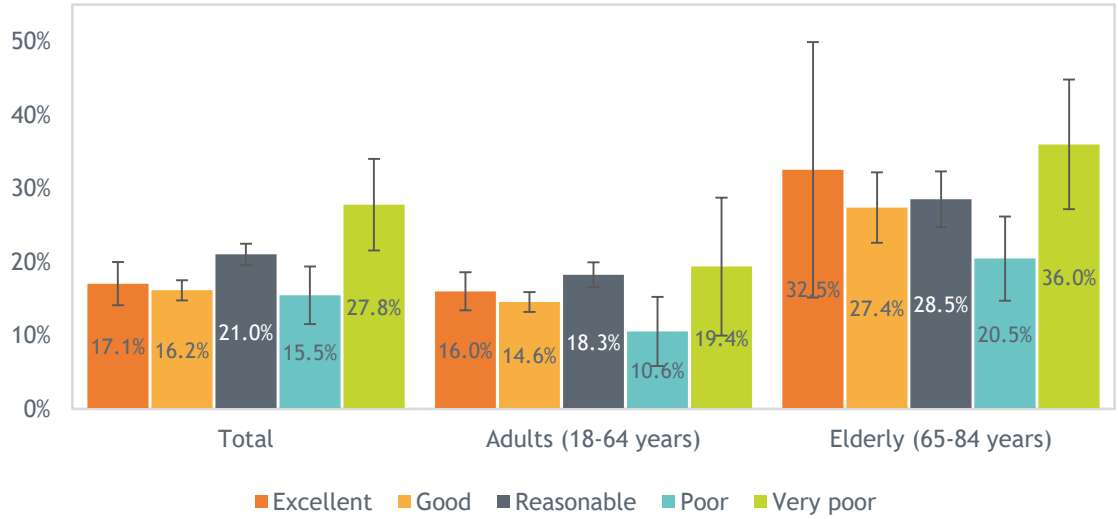


Figure 5.6. Prevalence of high adherence to the Mediterranean Dietary Pattern in the adult population, by self-reported health status and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

SUMMARY OF MAIN RESULTS

- The adherence to the Mediterranean dietary pattern is high in only 18% of the Portuguese population, higher in males (20% vs. 16%), higher in the elderly comparing to adults (28% vs. 16%).
- The weighted prevalence and the age and sex standardized prevalence is lower in Lisbon metropolitan area, Madeira and Azores.
- High adherence to the Mediterranean dietary pattern is lower in individuals with food insecure.
- High adherence to the Mediterranean Dietary Pattern is lower in individuals with lower levels of physical activity.
- The obtained values do not allow to identify a trend in the high adherence to the Mediterranean dietary pattern in the different levels of self-perception of health status.

6. Physical Activity

6.1. Levels of Physical Activity

Three levels of physical activity were defined based on the short version of the International Physical Activity Questionnaire (IPAQ) (6), a questionnaire that considers all the daily life domains and three types of activity – walking, moderate activities and vigorous activities – applied for people aged between 15 and 84 years of age. The highest level, "Active", is applied to people who report spending 30 minutes/day in vigorous activities or one hour/day in moderate activities. The middle level, "Moderately Active", is applied to people who practice around 30 minutes/day of moderate activities and the lowest level, "Sedentary", to people who do not fulfil previous criteria.

Around 43% of Portuguese above 14 years old are sedentary, and only 27% are active. (figure 6.1). Based on the IPAQ classification and interpretation, it is considered that only those who are classified as active highly probably fulfil the present recommendations of physical activity defined by the World Health Organization (WHO) (7). Thus, in this document, we use the active category to define the prevalence of physical activity in Portugal. Similarly, we will also use the sedentary category.

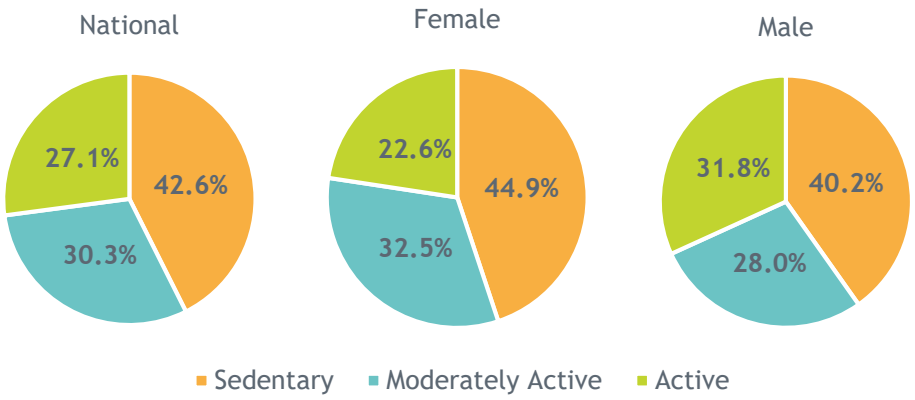


Figure 6.1. Prevalence of physical activity levels "Active", "Moderately Active" and "Sedentary" in people aged between 15 and 84 years of age, at national level and by sex, weighted for the Portuguese population distribution.

In general, in the Portuguese population aged between 15 and 84 years old, the prevalence of physical activity decreases with age, being teenagers and young adults (15 to 21 years of age) the age group which has the highest prevalence of physical activity (36%), followed by adults with 27% and elderly with 22%. Also, men are more active than women (32% vs 23%). This difference is particularly evident in the age group of teenagers and young adults, where 49% of men are classified as active whereas women are only 20% (figure 6.2.)

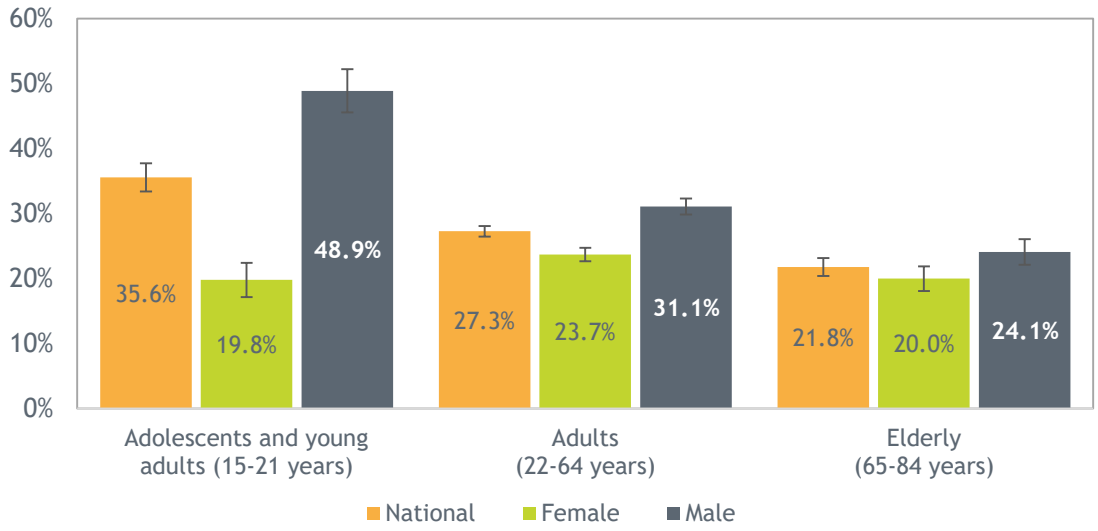


Figure 6.2. Prevalence of physical activity levels "Active" in teenagers and young adults, adults and elderly, weighted for the Portuguese population distribution.

Analysing by region (NUTS II), we conclude that the south region of the country (Alentejo, MA Lisbon and Algarve) presents lower prevalence of physical activity, below the national prevalence. On the other hand, North, Centre and the Islands, Madeira and Azores, are those with higher prevalence of physical activity. Alentejo is the only region where more than half of the population is considered sedentary.

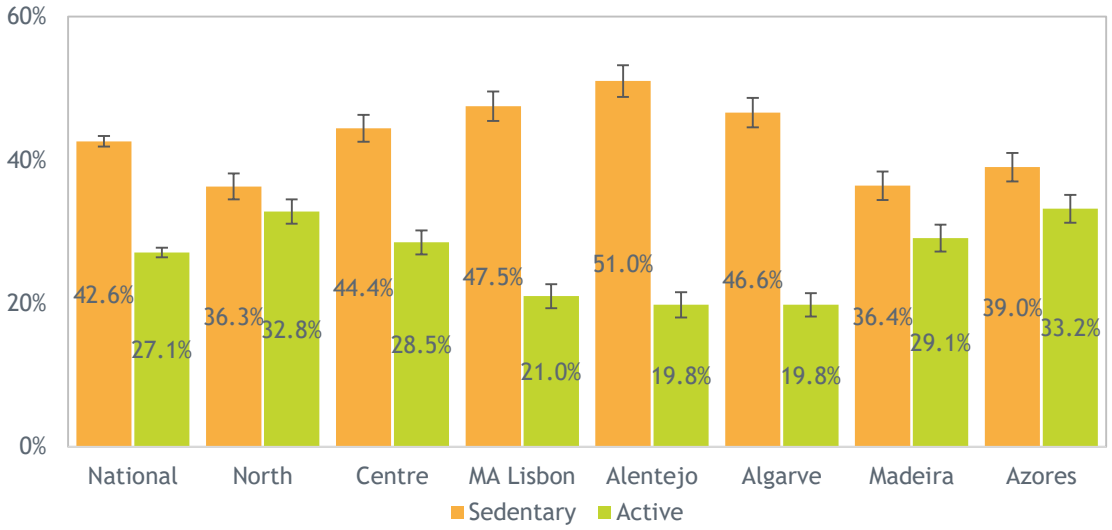


Figure 6.3. Prevalence of physical activity levels "Active" and "Sedentary" by region NUTS II (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The prevalence of children and adolescents (6 to 14 years old) that fulfil WHO recommendations of 60 minutes/day of moderate/vigorous physical activity (≥3METS/hour) was obtained through physical activities diaries. In general, 57.5% of children and adolescents fulfil the recommendations, with children having higher prevalence of physical activity than adolescents (68.3% vs 57.1%). Even though differences between sex are not statistically different (p-value>0.05), boys usually present higher prevalence in both age groups.

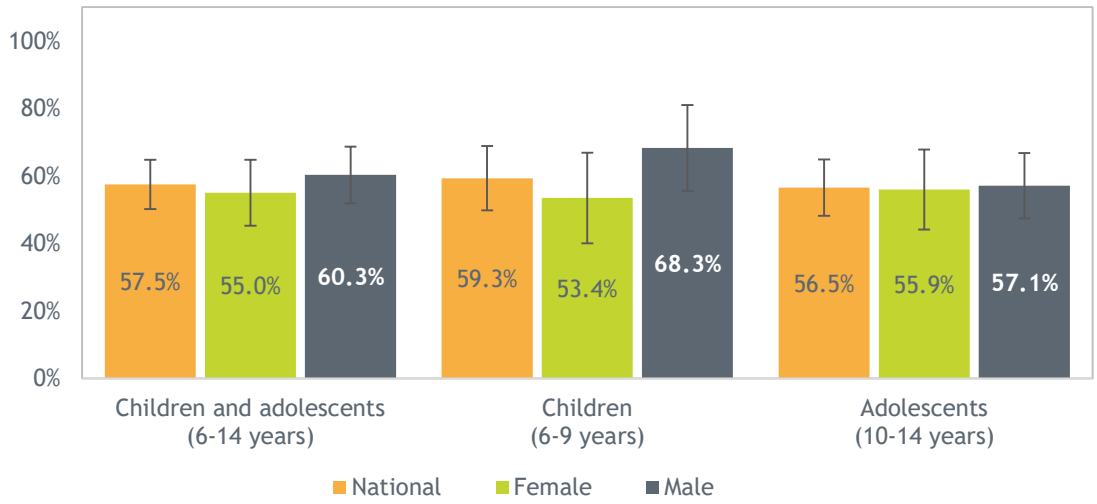


Figure 6.4. The prevalence of 60 minutes/day of moderate/vigorous physical activity (≥3METS/hour), at national level, by sex and age groups (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

When analysing by region (NUTS II), the highest adherence to recommendations is observed in Azores, where 77.4% of children and adolescents have at least 60 minutes/day of moderate/vigorous activities, followed by Alentejo with 70.1%. On the contrary, North is the region with lowest prevalence of adherence to WHO recommendations, with only 49.1%.

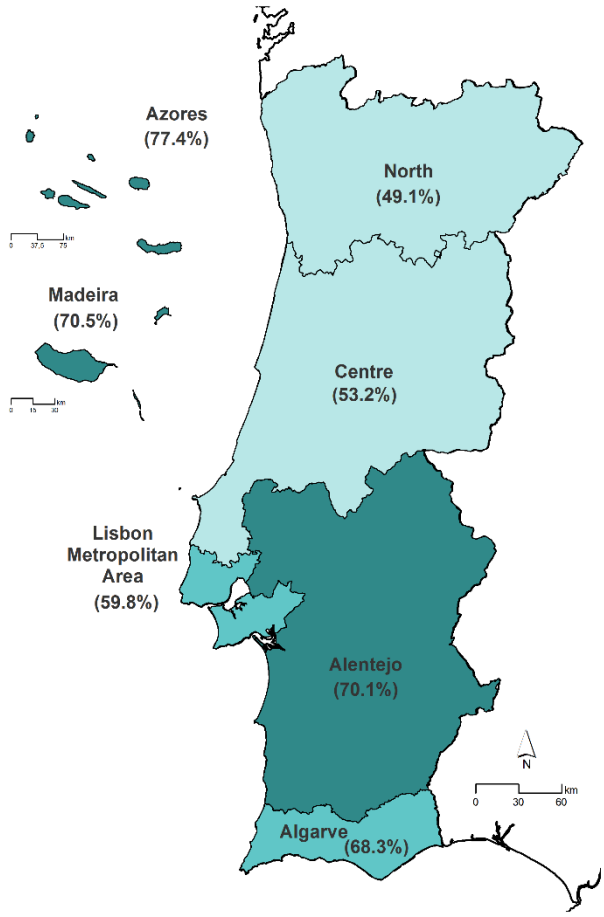


Figure 6.5 Spatial distribution (by NUTS II region) of prevalence of 60 minutes/day of moderate/vigorous physical activity (≥3METS/hour), weighted for the Portuguese population distribution.

6.2. Active Outdoor Play

Regarding age and sex, the prevalence of children that spend more than 60 minutes/day in active outdoor play is higher during weekend than week days (78.9% vs. 72.2%). The age group where this prevalence is lowest is in children aged between 10 and 14 years old, being statistically smaller than children between 6 and 9 years old, in both weekend and week days (week: 64.8% vs. 84.1%; weekend: 69.4% vs. 94.3%).

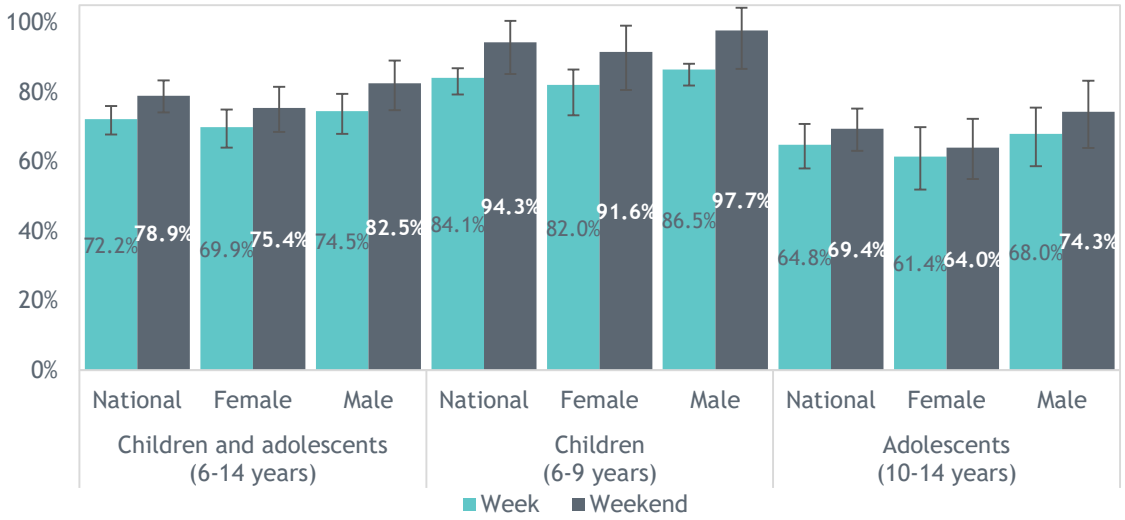


Figure 6.6. Prevalence of active outdoor play, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

MA Lisbon and Alentejo are the regions with the highest prevalence of active outdoor play, presenting very high values in both weekend and week days. On the other hand, the lowest prevalence is observed in North, during the week, where only 58.3% of children and adolescents spend more than 60 minutes/day in active outdoor play. Moreover, contrary to the national tendency, MA Lisbon presents higher prevalence of active outdoor play during weekends than week days.

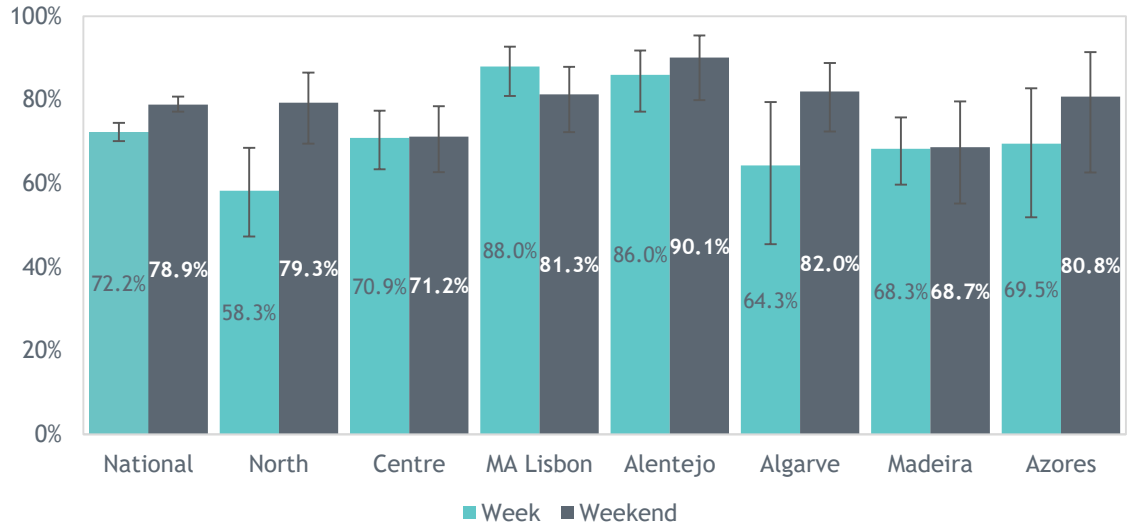


Figure 6.7. Prevalence of active outdoor play by region (NUTS II), weighted for the Portuguese population distribution.

As for parents' education, even though there are no statistically significant differences between classes, children and adolescents whose parents have a higher education present slightly higher prevalence of active outdoor play at weekend (81.9%), and children whose parents are less educated present slightly higher prevalence at week days (74.6%).

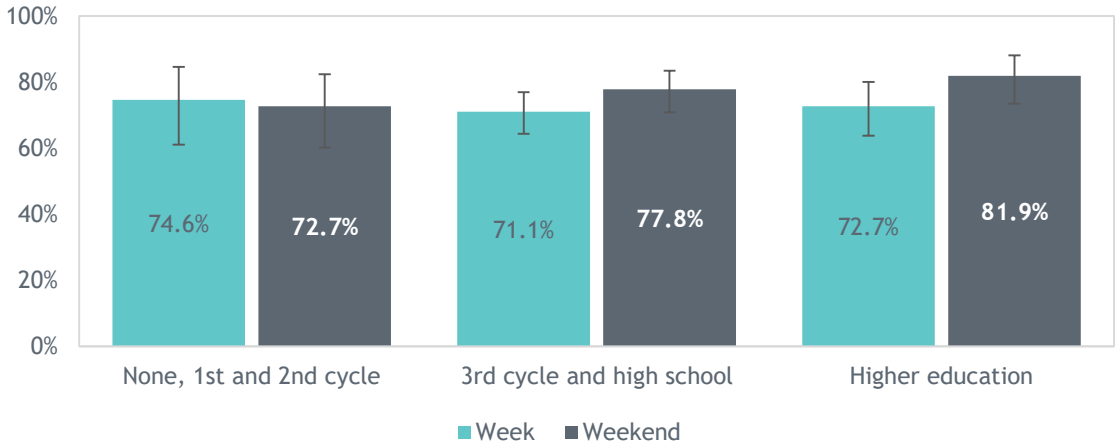


Figure 6.8. Prevalence of active outdoor play by parents' education (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

6.3. Practice of Structured Physical Activity

For the entire sample, the IAN-AF includes a question about "regular" practice of structured physical activity, as sports and/or leisure. The national prevalence of regular practice of this type of activity (including walking for leisure) is 41.8%, higher in men than in women (44.7% vs. 39.0%) (figure 6.9). Children reported to be the most active age group, with prevalence of regular practice of structured physical activity of 61.0%, and elderly the most inactive, with a prevalence of only 33.1%.

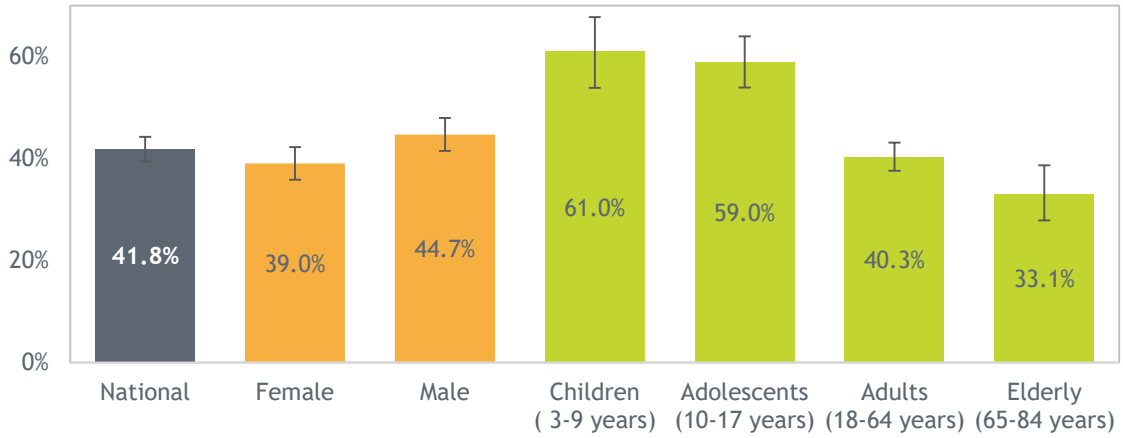


Figure 6.9. Prevalence of regular practice of structured physical activity, as sports and/or leisure, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The prevalence of regular practice of structured physical activity varies significantly by region, with North presenting the highest value (44.8%) and Madeira the lowest (33.1%).

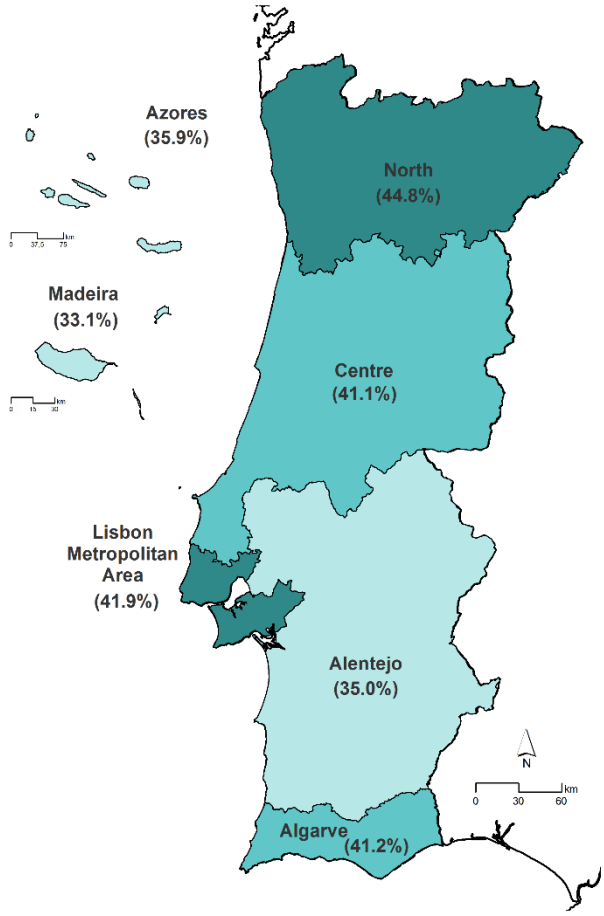


Figure 6.10. Spatial distribution (by NUTS II region) of prevalence of regular practice of structured physical activity, as sports and/or leisure, weighted for the Portuguese population distribution.

The prevalence of regular practice of structured physical activity is significantly different by educational level, with higher educated people presenting a prevalence almost two times higher than those with the lowest educational level. This difference is even more noticeable in males (figure 6.11).

For those who reported to regularly practice physical activity, 47% reported to exercise only once or twice a week (figure 6.12). This percentage is higher in adults (51%) and lower in the elderly (28%). There are no significant differences by sex regarding frequency of this type of physical activity.

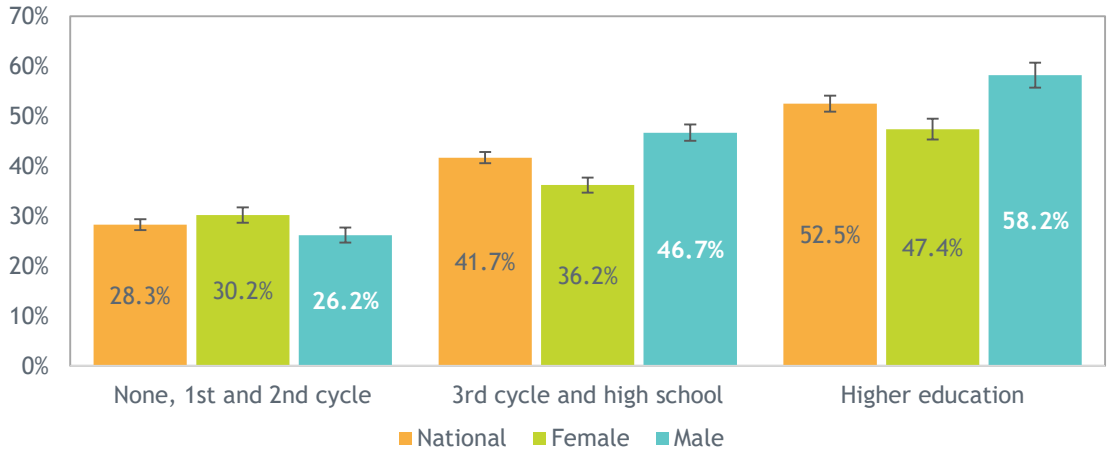


Figure 6.11. Prevalence of regular practice of structured physical activity, as sports and/or leisure, by educational level (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

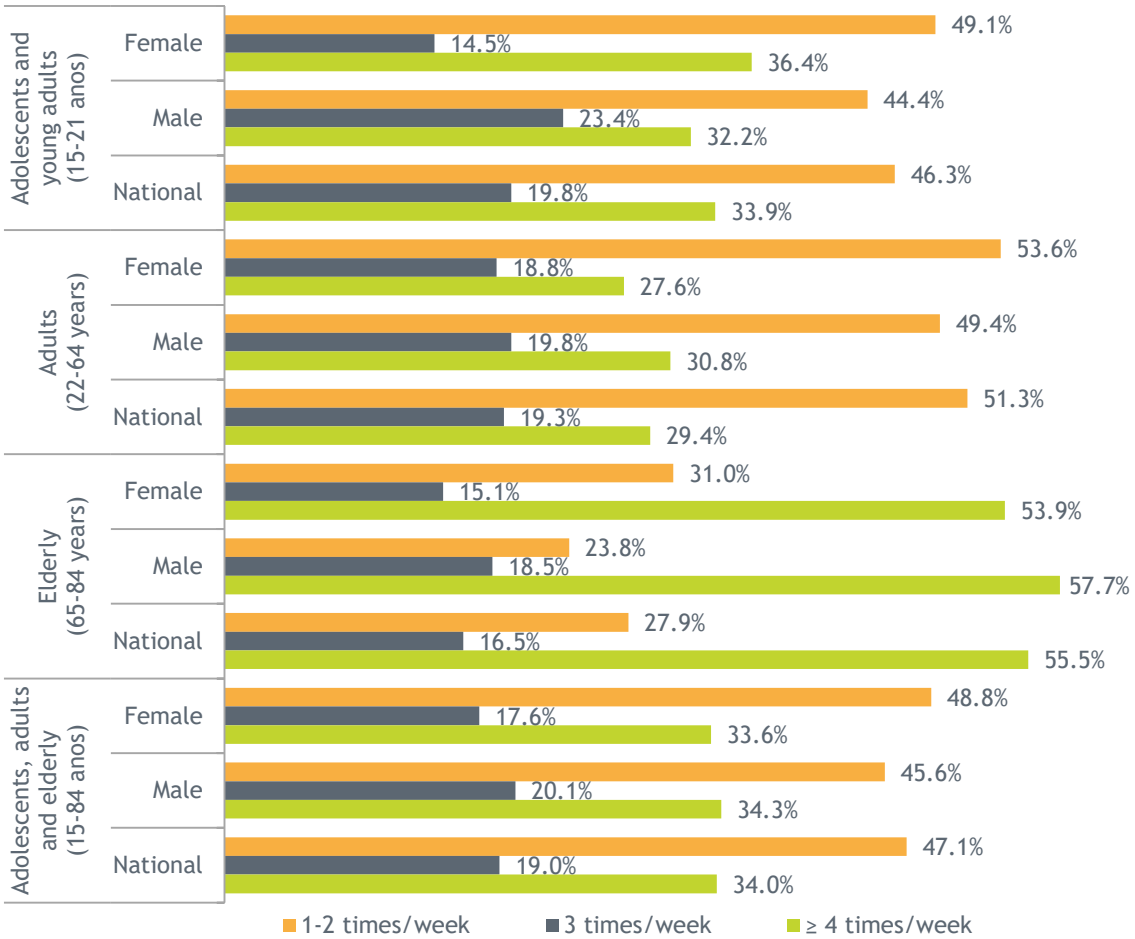


Figure 6.12. Weekly frequency of regular practice of structured physical activity, as sports and/or leisure, weighted for the Portuguese population distribution.

More than half of the children (59.6%) aged between 3 and 14 years regularly practice physical activity, with similar prevalence between girls (59.4%) and boys (59.8%) (figure 6.13). In females, there is a decreasing tendency of regular practice of structured physical activity as the age increases, which is not clear in boys. The highest prevalence occurs in girls between the ages of 3 and 5 years (71%), while the lowest percentage occurs in boys of the same age group (52.2%).

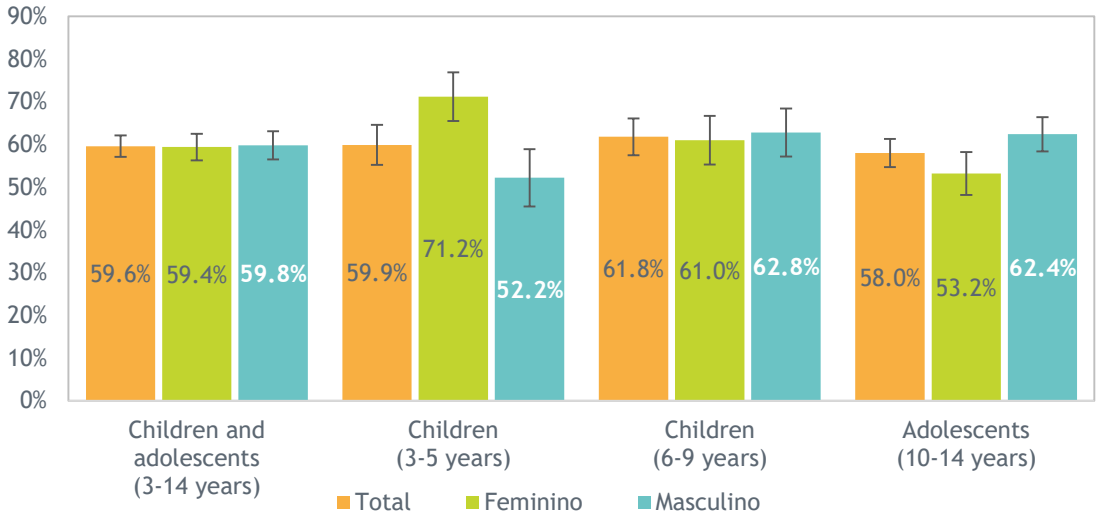


Figure 6.13. Prevalence of regular practice of structured physical activity, as sports and/or leisure, in children and adolescents between 3 and 14 years of age, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

In all regions, the prevalence of regular practice of structured physical activity of children and adolescents aged between 3 and 14 years is more than 50%. The highest value is in Algarve, where the prevalence is 73.9%. On the other hand, Azores presents the lowest prevalence, with only 52.2% regularly practice physical activity. The differences between regions are statistically significant (figure 6.14).

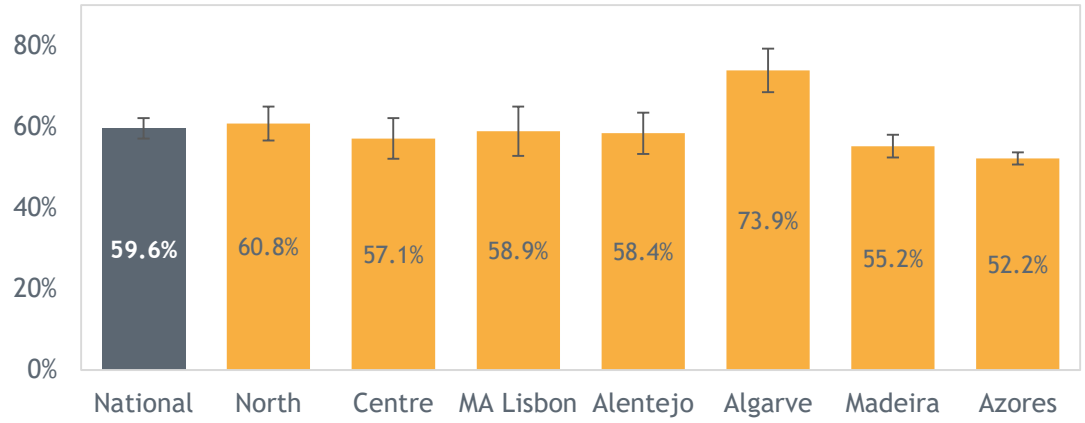


Figure 6.14. Prevalence of regular practice of structured physical activity, as sports and/or leisure, in children and adolescents between 3 and 14 years of age, by region (NUTS II), weighted for the Portuguese population distribution.

There is a clear and significant increase in the prevalence of regular practice of structured physical activity as parents' education increases. Children with higher educated parents have higher prevalence of participation (80.1%), while the prevalence is less than 50% in the children whose parents have the lowest level of education.

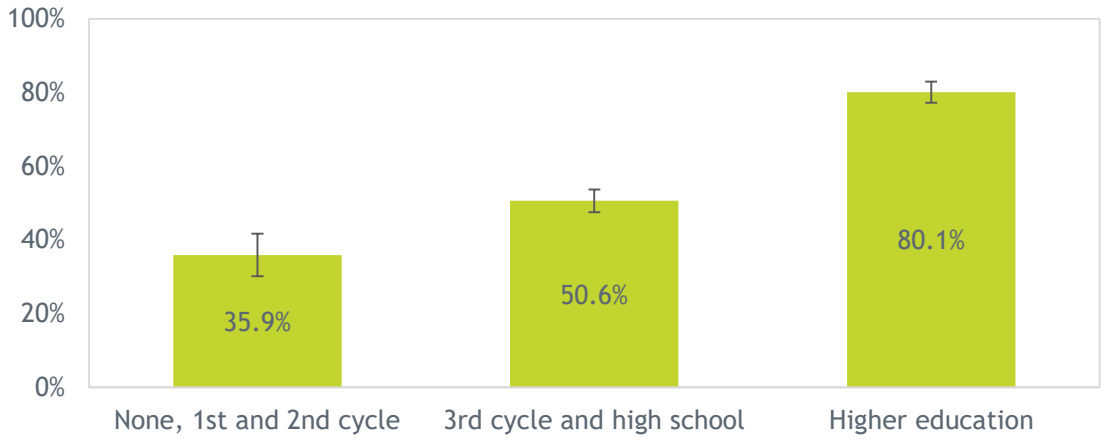


Figure 6.15. Prevalence of regular practice of structured physical activity, as sports and/or leisure, in children and adolescents between 3 and 14 years of age, by parents' education (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Children who regularly practice physical activity perform, on average, 2.6 (standard deviation = 0.12) weekly sessions. Of the children who regularly practice physical activity, 54.6% do it once or twice a week, 22.6% 3 times a week and 21.0% do it 4 or more times a week. However, the frequency increases as the age increases, and at adolescence more than 60% of those who regularly practice structured physical activity do it 3 or more times a week. Also, children with less educated parents present lower frequency of regular practice of structured physical activity.

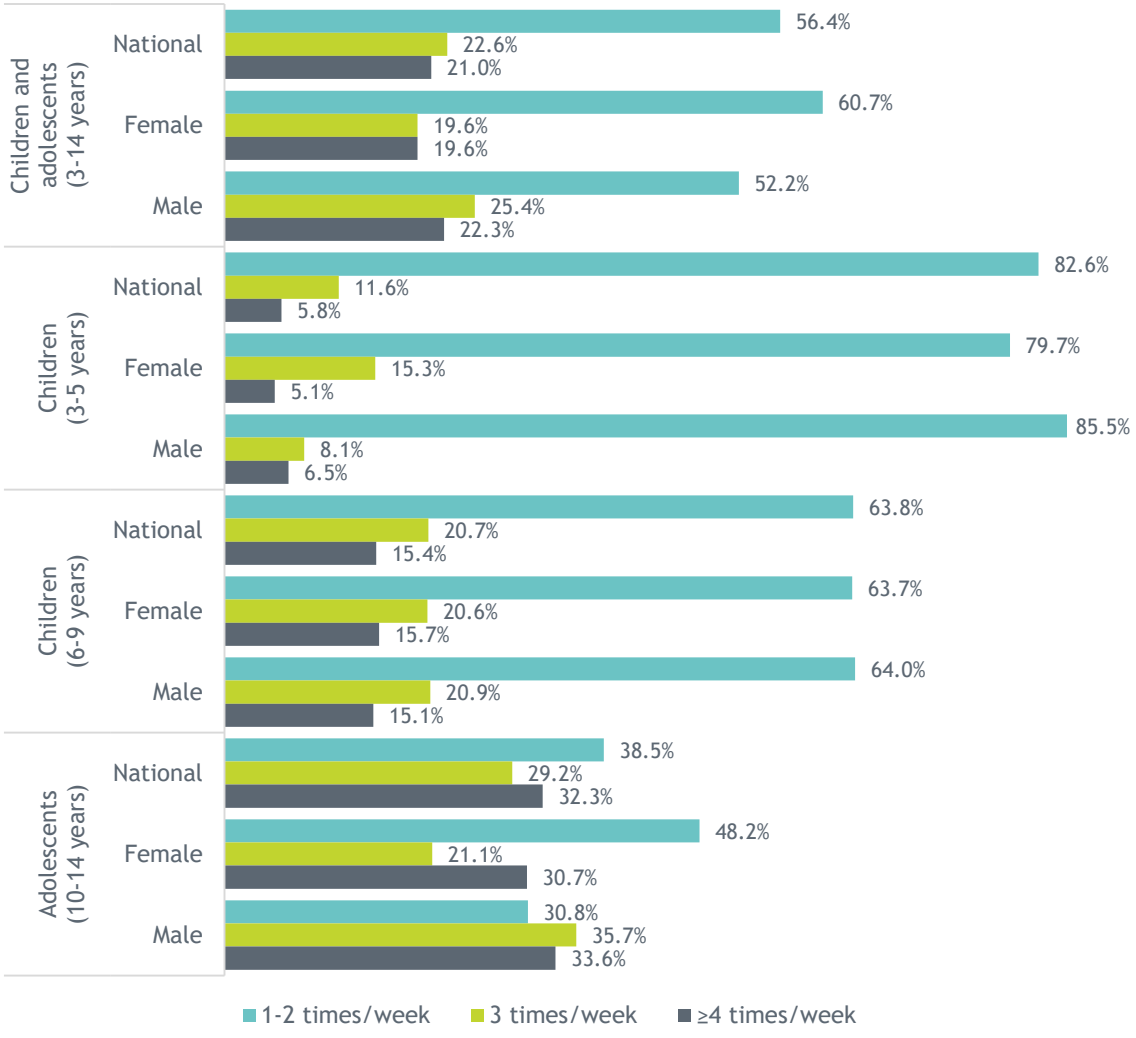


Figure 6.16. Weekly frequency of regular practice of structured physical activity, as sports and/or leisure, in children and adolescents between 3 and 14 years of age, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

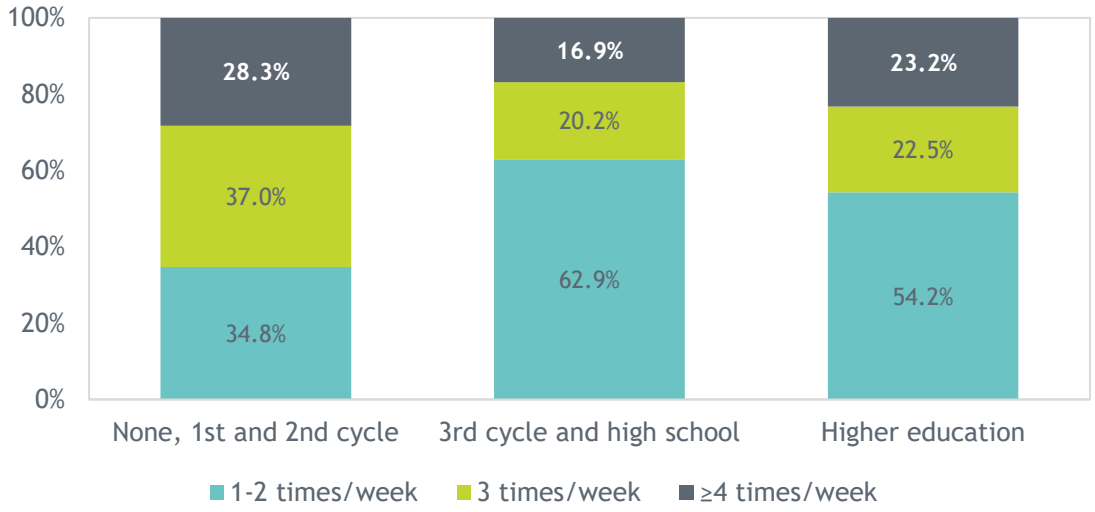


Figure 6.17. Weekly frequency of regular practice of structured physical activity, as sports and/or leisure, in children and adolescents between 3 and 14 years of age, by parents' education (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Regions of Madeira, Azores and Alentejo (28.9%, 28.9% and 28.6%, respectively) have the highest percentage of children who regularly practice physical activity 4 or more times a week. On the other hand, MA Lisbon and North (13.3% and 14.7%, respectively) are the regions with the lowest percentage (table 6.1)

Table 6.1 Weekly frequency of regular practice of structured physical activity, as sports and/or leisure, in children and adolescents between 3 and 14 years of age, by region (NUTS II), weighted for the Portuguese population distribution.

	≤2 times/week	3 times/week	≥4 times/week
National	56.4%	22.6%	21.0%
North	70.6%	14.7%	14.7%
Centre	55.7%	24.7%	19.6%
AM Lisbon	63.8%	22.9%	13.3%
Alentejo	50.0%	21.4%	28.6%
Algarve	57.9%	25.0%	17.1%
RA Madeira	47.0%	24.1%	28.9%
RA Azores	44.7%	26.4%	28.9%

6.4. Types of Physical Activity

Among those who regularly practice structured physical activity, the most frequent activities vary between age groups and sex. Swimming is the most frequent activity among children, being indicated by 45.8% of girls and 58.7% of boys who regularly practice structured physical activity. In this age group, activities in the area of dance and expression are also very frequent among girls (37.3%) as well as football among boys (26.7%). In adolescents, swimming is the second most frequent structured physical activity in both female and male adolescents (female: 15.5%, male: 18.5%), with activities in the area of dance and expression being the most frequent among females (29.5%) and football the most frequent among males (39.8%). Adult men present great diversity of activities practiced, including running (29.9%), playing football (22.3%), gym activities (19.9%), walking (17.7%) and cycling (17.5%). Walking is the most frequent structured physical activity reported by female adults (33.5%), female elderly (65.3%) and male elderly (60.6%).

6.5. Sedentary Choices

The Activity Choice Index (8) includes issues related to day-to-day activities where people must opt between a more active or sedentary decision. Based on this questionnaire, we concluded that about a third of Portuguese over 14 years old never or rarely use the stairs when they can opt for the elevator or escalators. This percentage reaches 52% in the elderly, being young men those who use the active option the most. When analysing by region, North, Madeira and Azores are the regions where there is higher predisposition for people to use the stairs rather than opt for the elevator/ escalator.

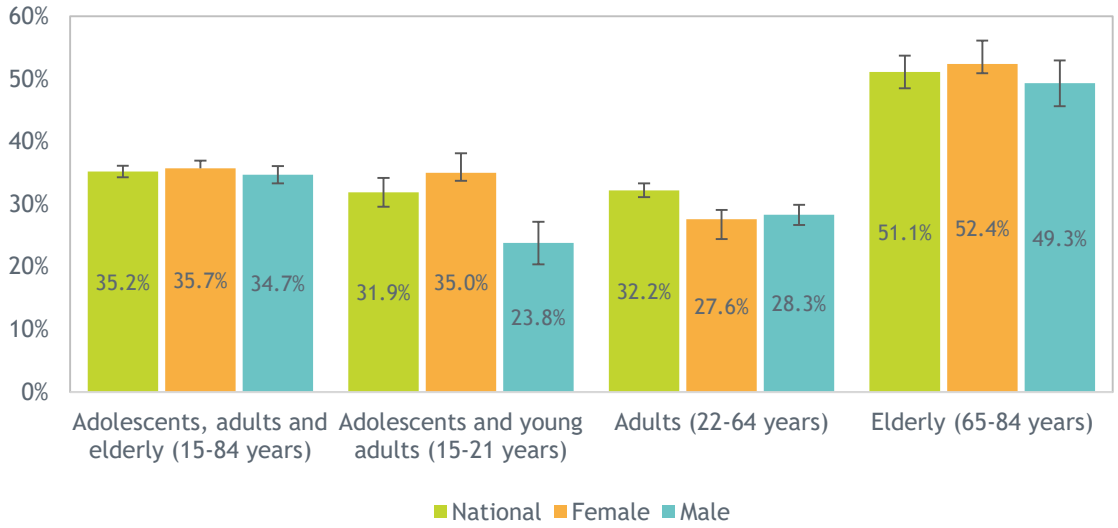


Figure 6.18. Prevalence of "never"/ "rarely" for using the stairs rather than the elevator or escalator, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

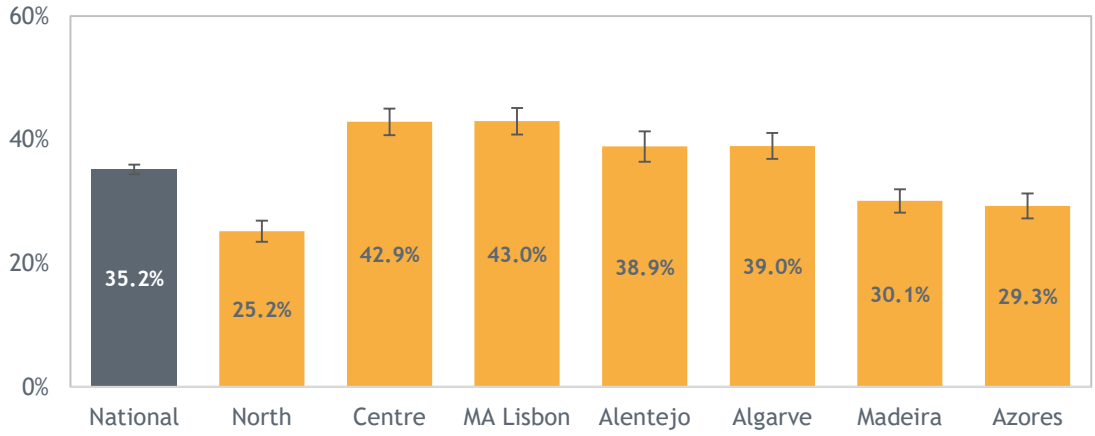


Figure 6.19. Prevalence of "never"/ "rarely" for using the stairs rather than the elevator or escalator, at national level and by regions (NUTS II), weighted for the Portuguese population distribution.

About 35% of Portuguese over 14 years old never or rarely take active breaks (e.g. walking, standing, or jogging) during the time they are seated. This value slightly lower in adults (23%). Algarve stands out as the region where people more often take active breaks, and Madeira as the one where this behaviour happens less frequently.

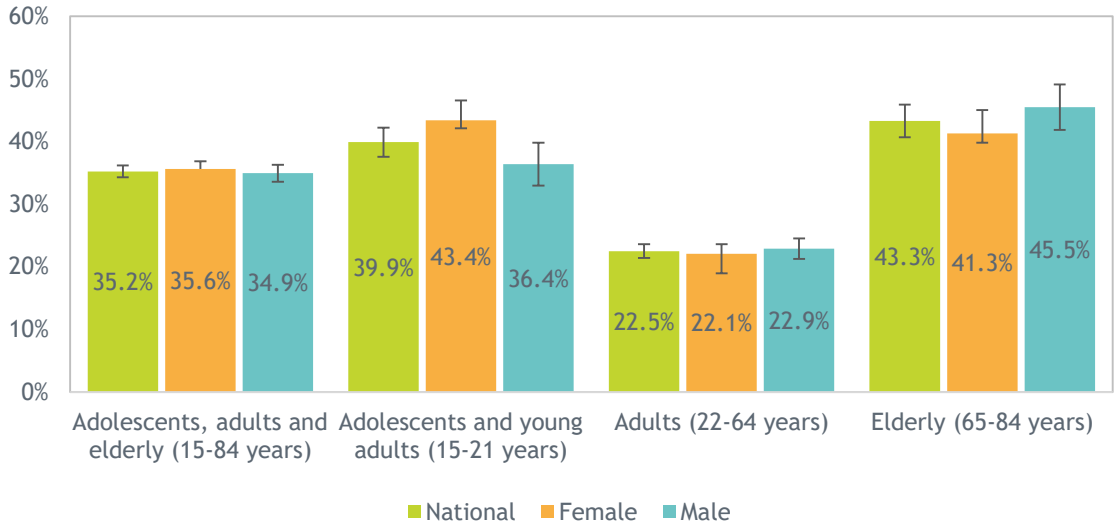


Figure 6.20. Prevalence of "never"/ "rarely" for taking active breaks, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

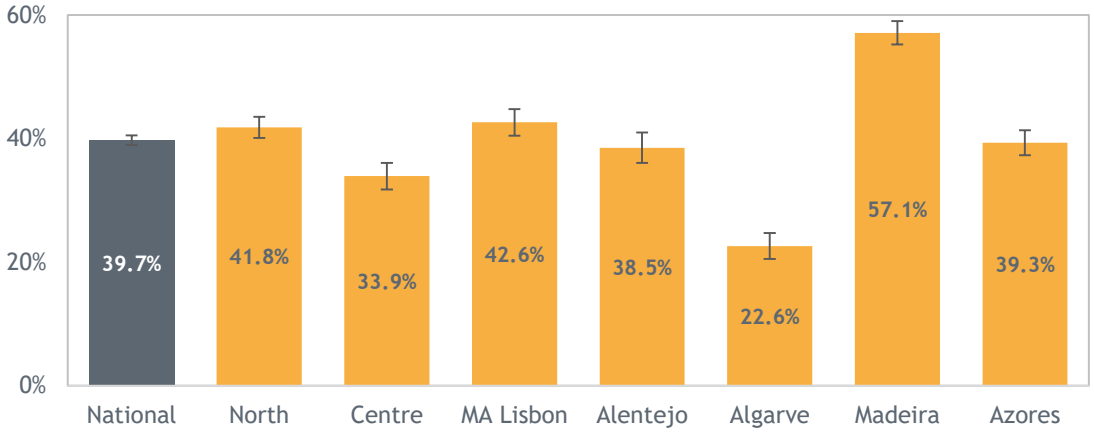


Figure 6.21. Prevalence of "never"/ "rarely" for taking active breaks, at national level and by regions (NUTS II), weighted for the Portuguese population distribution.

Once again reporting to the physical activity diaries, children and adolescents from 6 to 14 years of spend, in average 9 hours and 6 minutes in sedentary behaviours (excluding sleep time), daily. The mean time spent on these behaviours increases significantly with age, being 8 hours and 6 minutes in the younger group and 9 hours and 42 minutes in adolescents aged between the 10 and 14 years old.

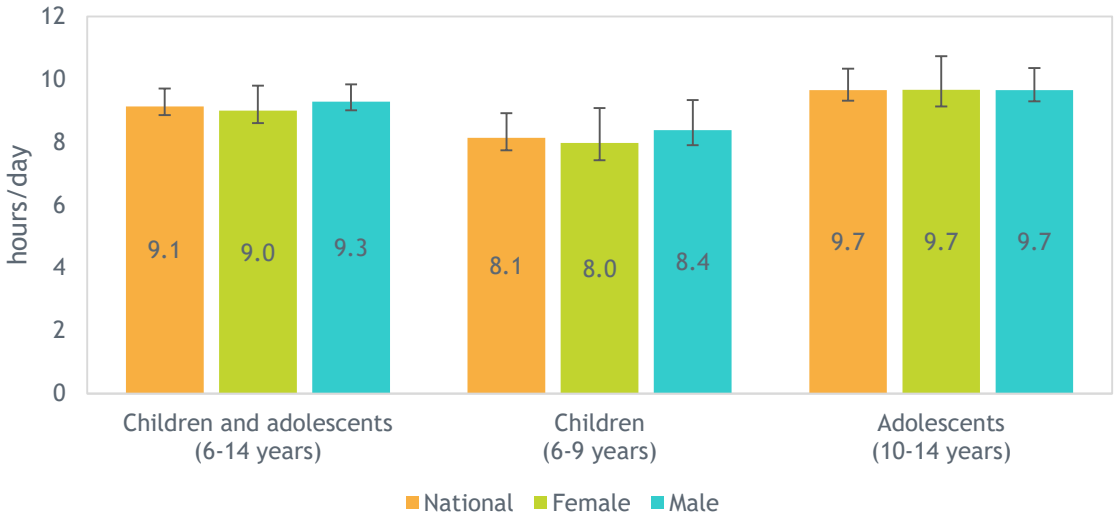


Figure 6.22 Average daily time, in hours, spent in sedentary behaviours, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

North and AM Lisbon present the highest sedentary time values in Portugal and Algarve stands out as the region with the least time spent in sedentary behaviour, even though not statistically significant.

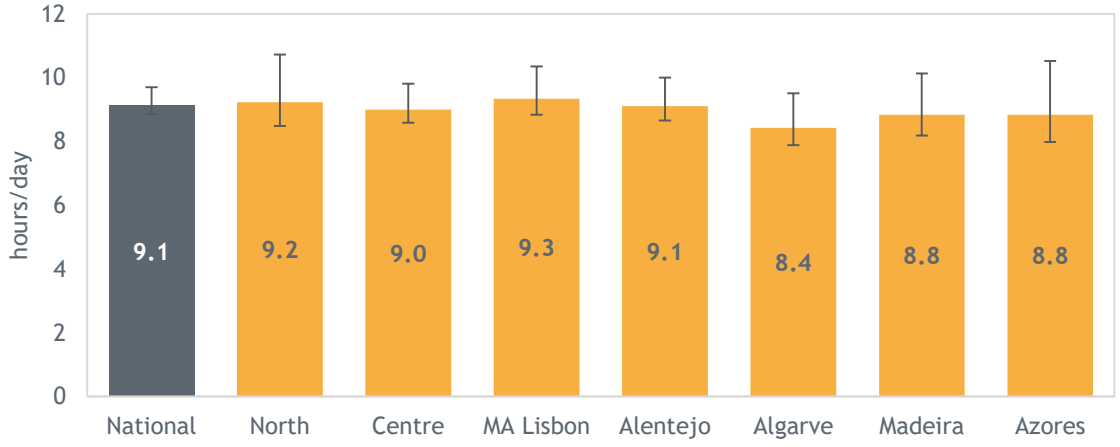


Figure 6.23 Average daily time, in hours, spent in sedentary behaviours, by region (NUTS II), weighted for the Portuguese population distribution.

6.6. TV Viewing Time

During the week, 36.5% of children and adolescents watch television for periods of time equal to or greater than 2 hours/day. This prevalence increases significantly at weekends (71.3%). Between the ages of 3 and 5, at week days, girls present higher prevalence of watching TV for at least two hours/day during (46.6%) when compared to boys (38.63%). In the other age groups, as well as during the weekend, boys are those who present the highest prevalence of this sedentary behaviour. Despite these differences, they were only significant ($p < 0.05$) in the 6 to 9 age group on weekdays (male: 42.4%, female: 28.1%).

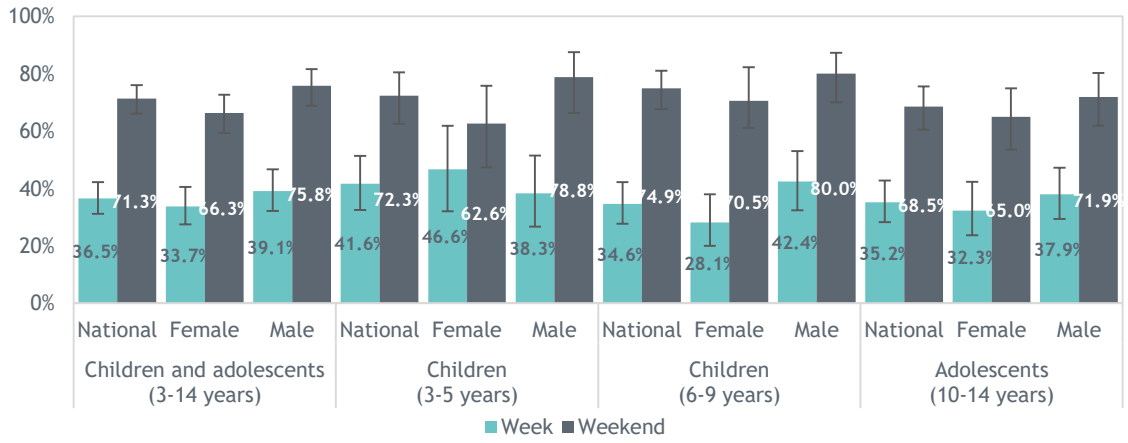


Figure 6.24. Prevalence of watching 2 or more hours/day of television, during weekdays and weekends, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The prevalence of children and adolescents who watch, in average, two or more hours/day of television during the weekend is higher than 65% in all regions of Portugal. The highest prevalence of this behaviour occurs in Alentejo (78.7%), Algarve (78.0%) and Centre (78.6%). As for weekdays, Madeira and Azores present the highest prevalence (43.5% and 49.4%, respectively), and North the lowest prevalence (30.1%).

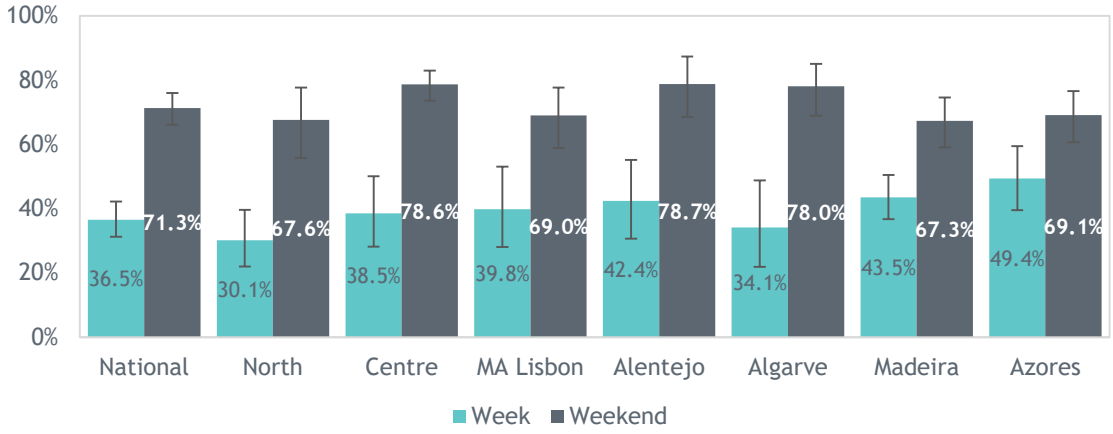


Figure 6.25. Prevalence of watching 2 or more hours/day of television, during weekdays and weekends, by region (NUTS II), weighted for the Portuguese population distribution.

The prevalence of children and adolescents who watch, in average, two or more hours/day of television tends to decrease as parents' education increases, regardless of being during weekdays or weekend. Thus, children whose parents have lower levels of education have the highest prevalence (44.5% on weekdays and 77.4% on weekend days). The prevalence of children and adolescents who watch two or more hours/day of television in weekdays is particularly low in children whose parents have a higher education (27.5%).

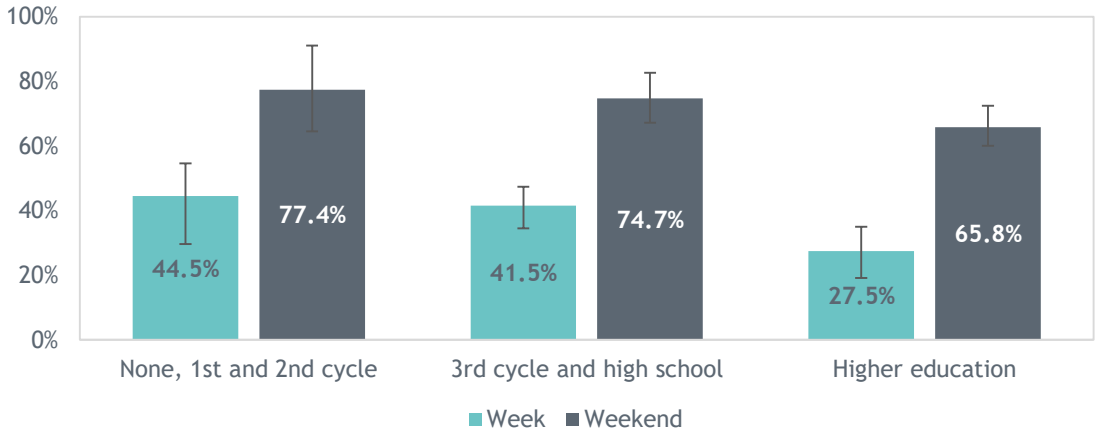


Figure 6.26. Prevalence of watching 2 or more hours/day of television, during weekdays and weekends, by parents' education (NUTS II), weighted for the Portuguese population distribution.

SUMMARY OF MAIN RESULTS

- Only 36% of young people (15 to 21 years old), 27% of adults and 22% of elderly people (65 to 84 years old) are physically active, complying with current WHO recommendations on physical activity for health.
- In the 15 to 21 age group, the percentage of physically active male youth (49%) is substantially higher than that of females (20%).
- Considering physical activity in all domains, 43% of the Portuguese population over 14 years old do not meet any international criteria for physical activity, and can be classified as "sedentary". The regions of Lisbon, Alentejo and Algarve are the most sedentary.
- In children and adolescents under 15 years of age, about 60% accumulate, on average, more than 60 minutes of moderate-to-vigorous physical activity per day. This value is higher in children up to 9 years of age (68%) and lower in adolescents between 10 and 14 years of age (57%).
- Children and adolescents under 15 spend on average about 9 hours in sedentary behaviours, and it increases substantially with age.
- Children and adolescents from Azores (77%) and Alentejo (70%) report the highest compliance with WHO recommendations on physical activity for health. In contrast, the North (49%) is the region with the lowest compliance with the recommendations.
- The prevalence of children between 6 and 14 years old that, on average, engage in active play for at least 60 minutes per day is high both on weekdays (72%) and on weekend days (79%). There is, however, a significant decrease in participation in these activities with age, particularly in girls.
- The national prevalence of adults (22-64 years) reporting a "regular" participation in sports and/or leisure-time physical activity is 40%; there is a high gradient by educational level: 53% in individuals with higher education and 28% in those with the 1st and 2nd cycle of basic education. More than half indicate performing only 1-2 sessions of physical activity per week.

- More than half of the children (60%), between the ages of 3 and 14 years old, report a regular participation in structured sports, being the percentage of participation similar among girls (59%) and boys (60%).
- The regular participation in sports and/or leisure-time physical activity is lower in Madeira (33%) and higher in the North (45%).
- About one-third of the adults (32%), "never or rarely" uses the stairs instead of elevators or escalators. In the elderly, this value increases to 51%.
- On weekdays, the prevalence of children and adolescents who watch television for periods of time equal to or greater than 2 hours is significantly lower (37%) than that found on weekend days (71%).

7.
Anthropometric Evaluation

Of the 6553 individuals who came to the first interview, 6235 were measured in length/height and weight. From those, pregnant women from the general population (n = 59), an individual with dwarfism, and eight in critical conditions, including oedema and probes, were excluded from the analysis.

Obesity and pre-obesity were evaluated through the body mass index (BMI), calculated from the weight and length/height objectively measured. The cut-off points used for BMI categorization were those recommended by the World Health Organization (9-12).

The prevalence of obesity at the national level, weighted for the Portuguese population distribution is 22.3% (95% CI: 20.5-24.0), higher in females (24.3% vs. 20.1%), and much higher in the elderly (39.2%, 95% CI: 34.2-44.2) (figure 7.1). The prevalence of pre-obesity at national level is 34.8% (95% CI: 32.9-36.7) and of eutrophy/thinness is 43.0% (95% CI: 40.7-45.2) (figure 7.2). These two categories were not analysed separately because of the very low prevalence of thinness at national level (1%).

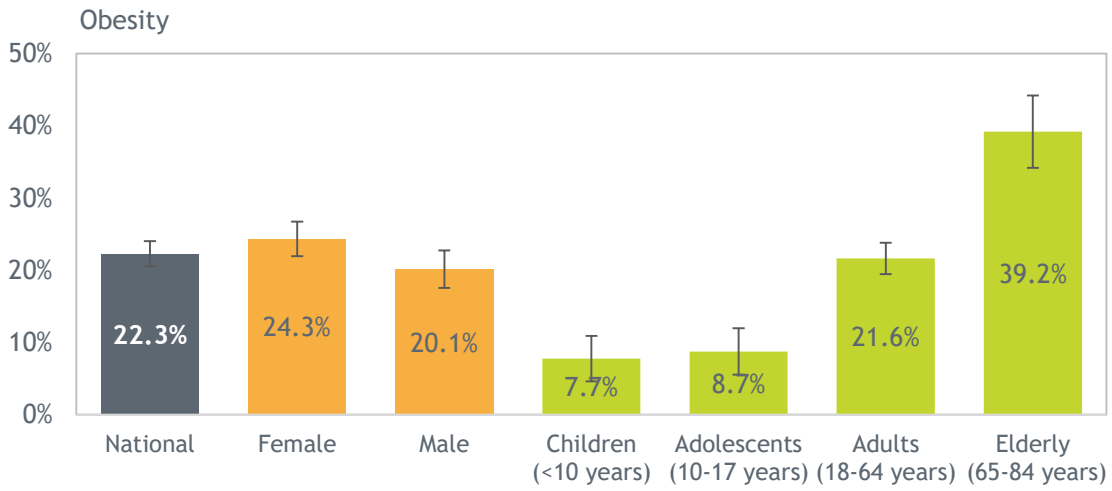


Figure 7.1. Prevalence of obesity, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

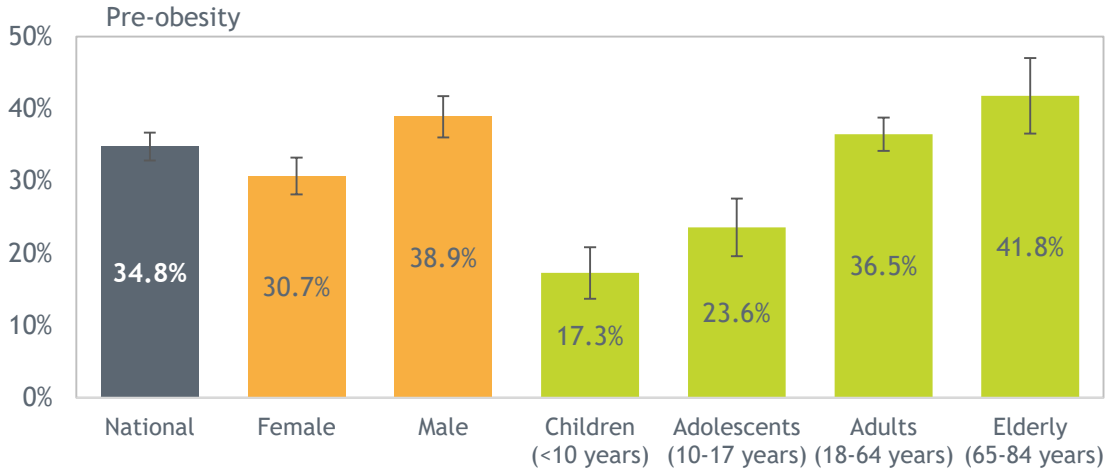
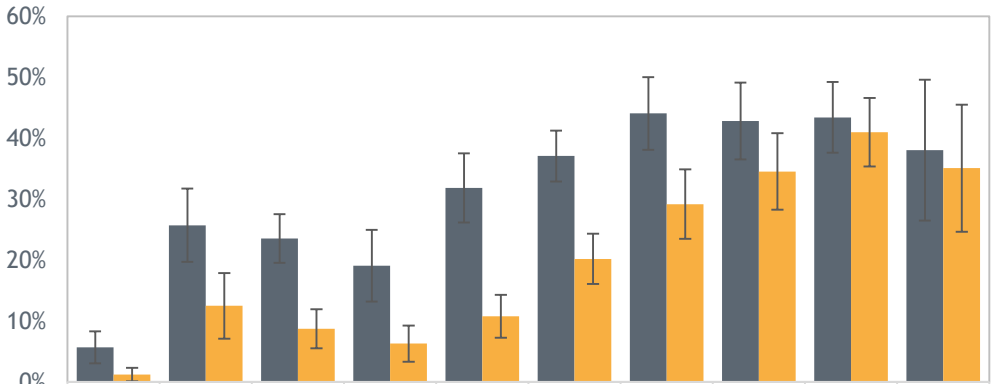


Figure 7.2 Prevalence of pre-obesity, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Figure 7.3 shows an increasing trend of pre-obesity and obesity with age, more evident for obesity than for pre-obesity.



	0-4 years	5-9 years	10-17 years	18-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75-84 years
Pre-obesity	5.7%	25.7%	23.6%	19.1%	31.8%	37.1%	44.1%	42.8%	43.4%	38.0%
Obesity	1.2%	12.5%	8.7%	6.3%	10.8%	20.2%	29.2%	34.5%	41.0%	35.1%

Figure 7.3. Prevalence of obesity and pre-obesity across age groups, weighted for the Portuguese population distribution

The prevalence of overweight (pre-obesity and obesity categories together) is higher in less educated individuals. This tendency is observed not only at national level but also when analysing only children/adolescents (based on parental education) or adults/elderly. The

disparities between educational levels are higher for obesity than for pre-obesity (figures 7.4 and 7.5).

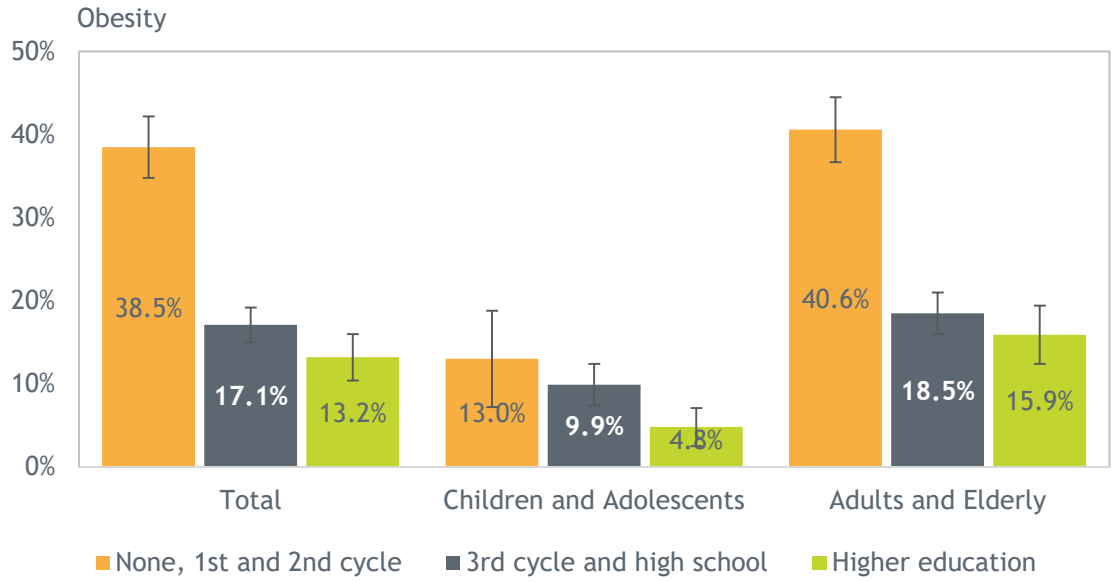


Figure 7.4. Prevalence of obesity, by educational level (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

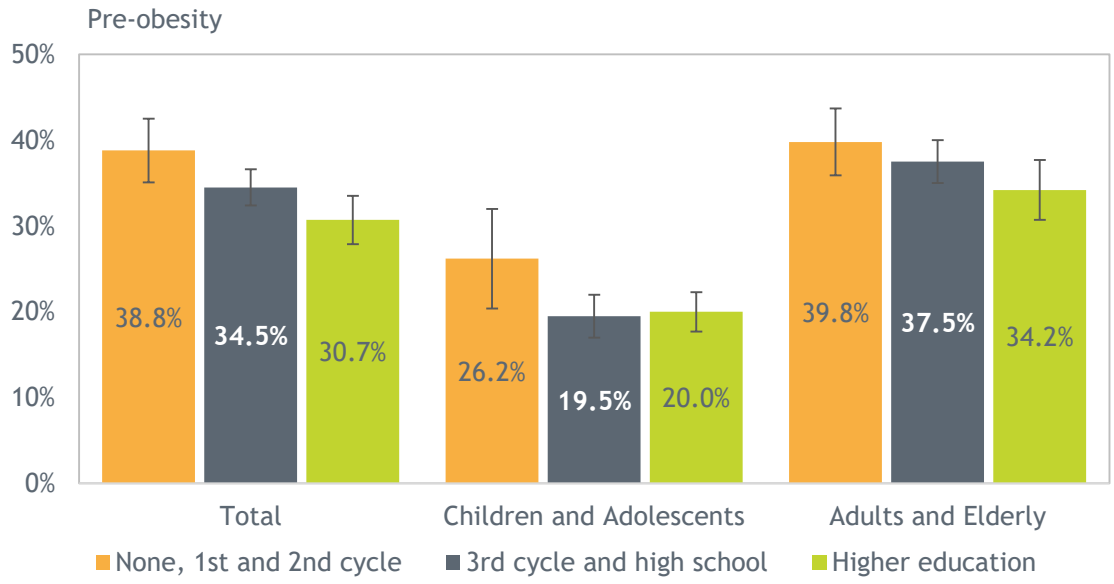


Figure 7.5. Prevalence of pre-obesity, by educational level (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

Figure 7.6 presents the weighted prevalence of pre-obesity and obesity by region (NUTS II). The prevalence of obesity ranged from 19.2% (95% CI: 16.6-21.8) in Algarve to 30.4% (95% CI: 28.0-32.8) in Azores.

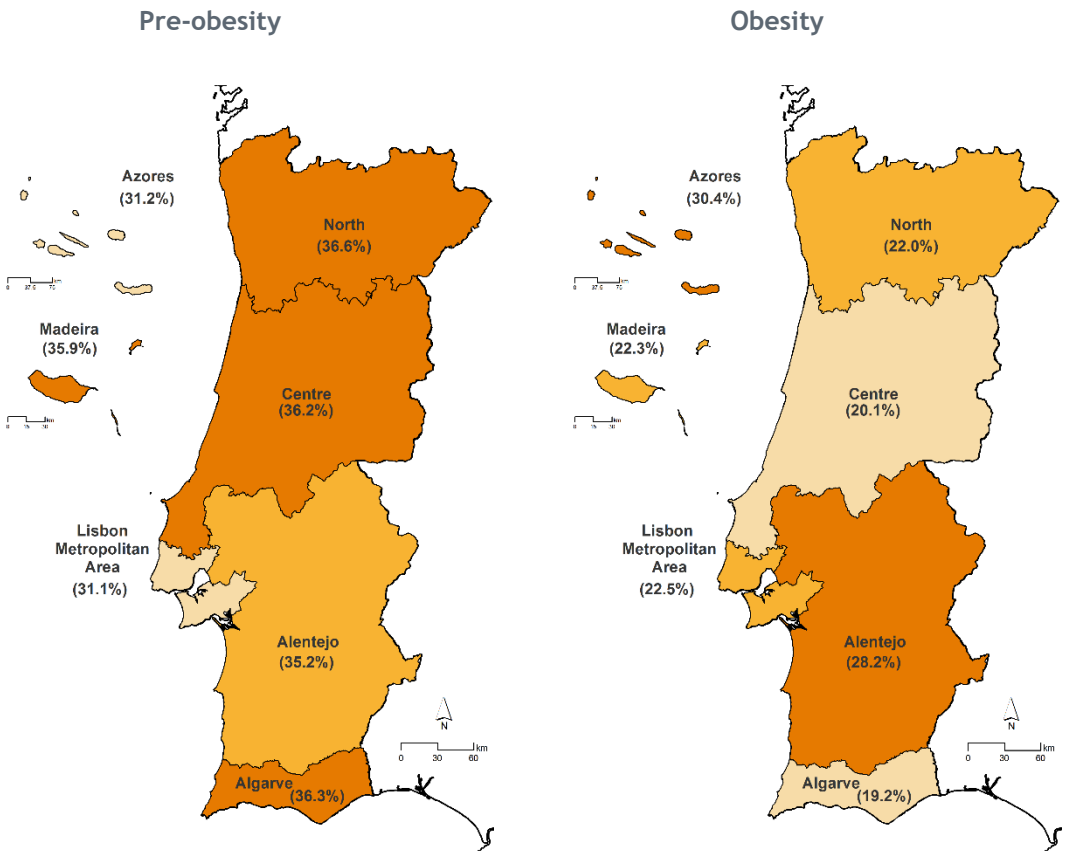


Figure 7.6. Spatial distribution (by NUTS II region) of the prevalence of pre-obesity and obesity, weighted for the Portuguese population distribution.

Abdominal obesity was defined, for the adult population, based on the cut-off points recommended by the WHO (13) for waist circumference and waist-hip ratio (waist circumference: >88 cm in women, >102 cm in men; waist-hip ratio: ≥0.85 in women, ≥0.90 in men).

The prevalence of substantially increased risk of metabolic complications based on waist circumference, in the adult population, is 34.2% (95% CI: 31.8-36.6), higher in females (41.6% vs. 26.7%) and higher in individuals older than 64 years of age (62.4%) (figure 7.7).

The prevalence of substantially increased risk of metabolic complications increased risk based on waist-hip ratio, in the adult population, is 50.5% (95% CI: 47.9-53.1), higher in males (62.0% vs. 39.2%), and much higher in in individuals older than 64 years of age (80.2%) (figure 7.8).

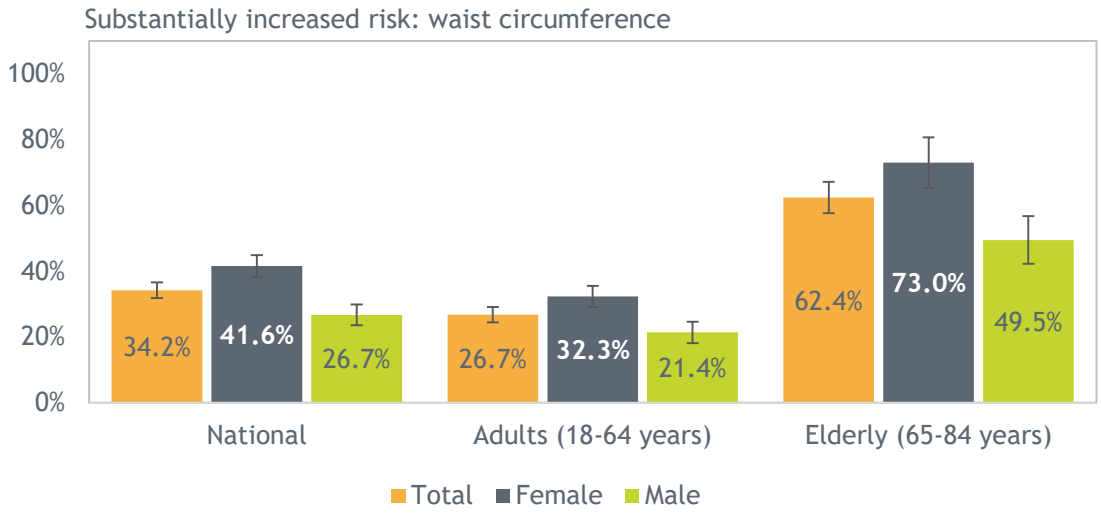


Figure 7.7. Prevalence of increased risk based on waist circumference, in the adult population, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

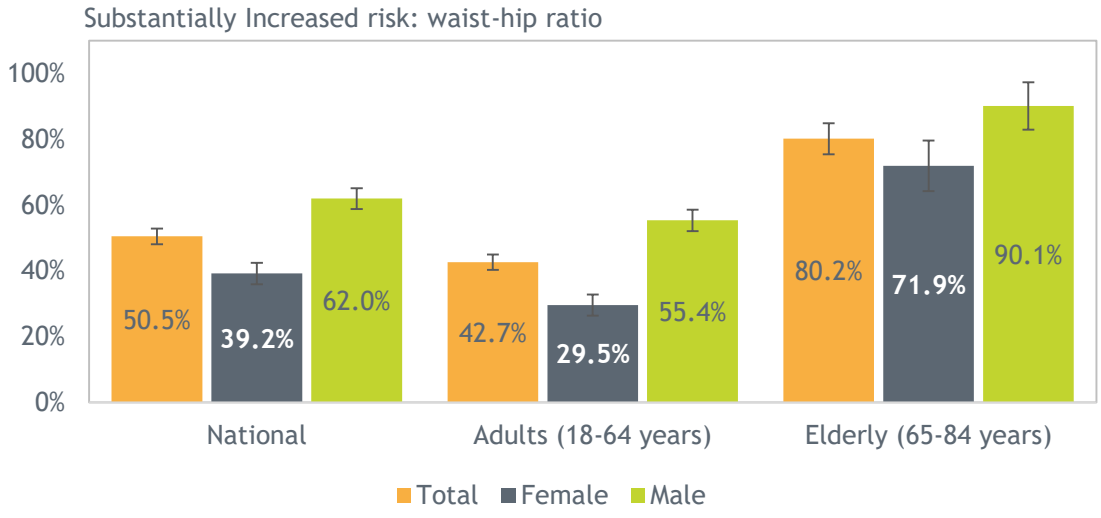


Figure 7.8. Prevalence of substantially increased risk of metabolic complications based on waist-hip ratio, in the adult population, at national level, by sex and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The prevalence of abdominal obesity is always higher in the less educated individuals, although in the elderly the disparities by level of education are smaller (figures 7.9 and 7.10).

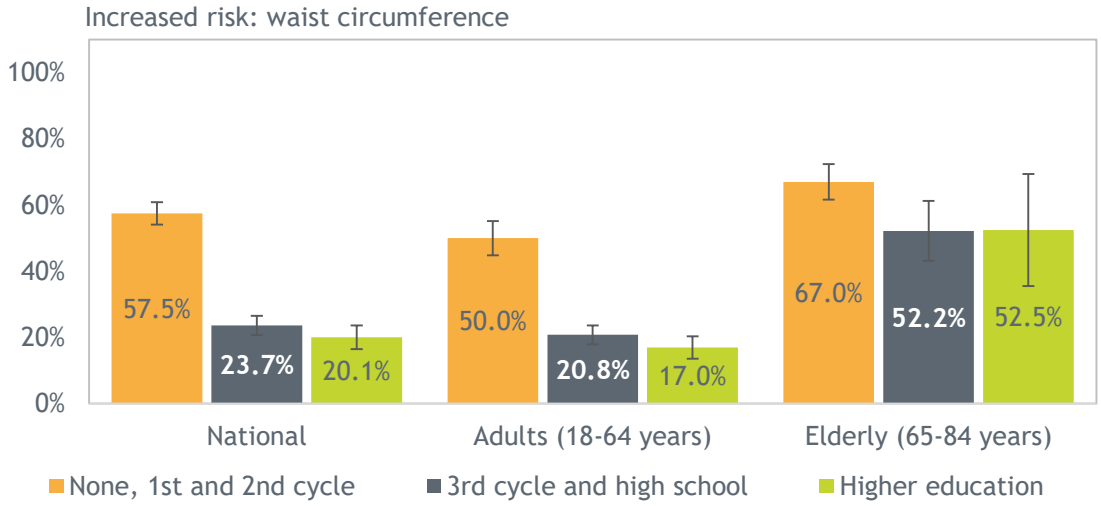


Figure 7.9. Prevalence of substantially increased risk of metabolic complications based on waist circumference, in the adult population, at national level, by educational level and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

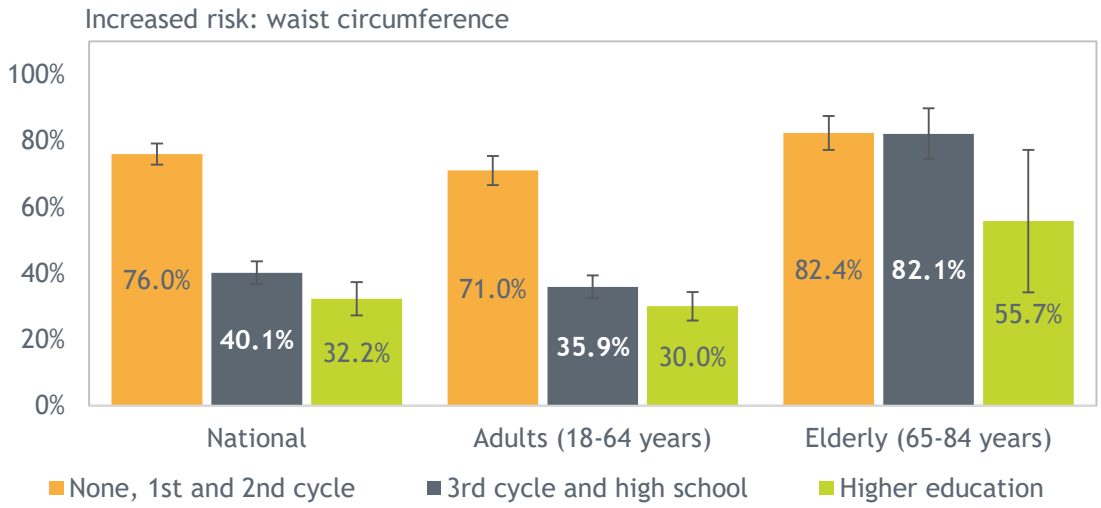


Figure 7.10. Prevalence of substantially increased risk of metabolic complications based on waist-hip ratio, in the adult population, at national level, by educational level and age group (IAN-AF 2015-2016), weighted for the Portuguese population distribution.

The standardized prevalence for sex and age of substantially increased risk of metabolic complications increased risk based on waist-hip ratio are higher in Azores (61.7%) and in Centre region (59.8%), and lower in Lisbon MA (45.5%) and in the North (47. 9%) (figure 7.11).

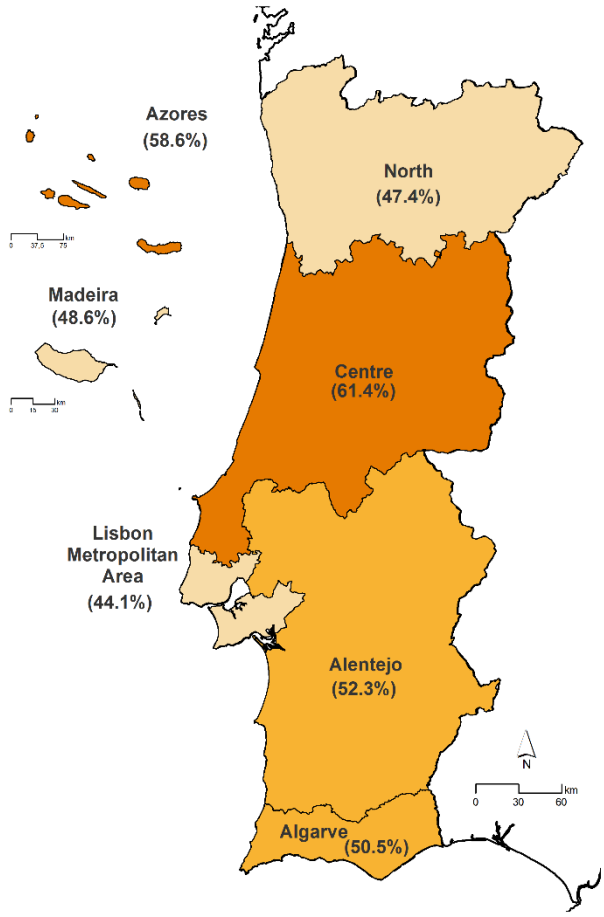


Figure 7.11. Spatial distribution (by NUTS II region) of prevalence of substantially increased risk of metabolic complications based on waist-hip ratio, in the adult population, at national level and by region (NUTS II), weighted for the Portuguese population distribution.

SUMMARY OF MAIN RESULTS

- The national prevalence of obesity is 22.3%, higher in females (24.3% vs. 20.1%) and much higher in the elderly (39.2%). The prevalence of pre-obesity at national level is 34.8%, and the prevalence of normal weight/thinness is 43.0%.
- There are regional disparities in the sex and age standardized prevalence of obesity, higher in Azores (32.8%) and Alentejo (27.6%), and lower in the Centre (19.0%) and North (21.5%) of the country, close to the national prevalence (22.0%).
- The national prevalence of substantially increased risk of abdominal obesity (waist-hip ratio) in adults is 50.5%, higher in males (62.0% vs. 39.2%) and much higher in the elderly (80.2%). The values for substantially increased risk of waist circumference in the adult population are 34.2%, at the national level, higher in females (41.6% vs. 26.7%) and much higher in individuals aged 65 years or over (62.4%).
- The prevalence of abdominal obesity, standardized for sex and age, is higher in Azores (61.7%) and in the Centre region (59.8%), and lower in the Lisbon Metropolitan Area (45.5%) and in the North (47.9%).
- The prevalence of obesity, pre-obesity and abdominal obesity is always higher in the less educated individuals, although in the elderly the disparities due to the educational level are lower

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Appendix 1
Methodological notes and Food Groups

List of Acronyms

AI - *Adequate Intake*;

AR - *Average Requirement*;

UL – *Tolerable Upper Intake Level* (*Dietary Reference Intakes*. USA, 2005)

RI - *Reference Intake ranges for macronutrientes;*

DRV – *Dietary Reference Values* (EFSA Journal 2010; 8: 1458)

TEI – Total Energy Intake.

Methodological notes

Collection, processing and presentation of food consumption data

All fieldwork procedures and the methodology for evaluating food consumption at national level, by sex, age group or region (NUT II) are described in detail elsewhere (1, 2), available at www.ian-af.up.pt. These methodological notes highlight the procedures performed in the information analysis phase.

From the collection of food consumption information that considered isolated or aggregate food items in recipes, all data was disaggregated and food items were organized into food groups. As an example, if it was reported a recipe of "Beef stew with potatoes and peas", this was disaggregated: the meat was allocated to the group "Meat, fish and eggs" (subgroup "Meat"), potatoes to the group of “Cereals, cereal products and starchy tubers” (subgroup "Potatoes and other tubers), olive oil to the group" Fats and oils "(subgroup "Olive oil"), peas to the group "Fruit, vegetables and legumes" (subgroup "Legumes") and so on for all constituent ingredients.

Exceptionally, the total consumption of the groups: "Soups", "Sweets, cakes and biscuits" and "Salty snacks and pizzas" was estimated by considering the food items in an aggregated form, adding the consumption of recipes to the consumption of isolated food items. For example, the group "Sweets, cakes and biscuits" includes, in addition to sweets, biscuits and commercial pastries, homemade recipes of this type of products.

Groups and subgroups of foods and beverages considered are presented below.

Food consumption data can be determined according to three different methodological approaches: a) it can be presented as acquired, that is, incorporating the non-edible parts and without any kind of preparation/cooking method; b) as reported, that is, as presented on the plate at the beginning of a meal, already cooked (if there is an associated cooking method) and already prepared, and may still contain non-edible parts (e.g. bones); c) and as consumed, that is, cooked (if applicable) and considering only edible components. In this report, all the estimated data are reported in grams as they are consumed. In specific situations, the other methods mentioned were used to compare data with other studies.

All the food groups and subgroups consumption are presented for the total population and stratified by sex, age group and geographical region. However, the group "Alcoholic beverages" and its subgroups is an exception, because men and women present considerable differences in consumption of this beverages, resulting in a bimodal distribution of consumption in the Portuguese population. For this reason, for this group and subgroups, all data are estimated separately by sex, and it is not possible to present results for the total.

Nutritional estimation

The conversion of foods to nutrients was performed at the food item level, and considered foods and recipes. When foods were reported independently (outside of a recipe), the nutritional composition was obtained directly from the food composition table. When recipes were reported, the calculation of the nutritional composition was estimated using the EuroFIR methodology, i.e. the estimation was based on the raw amount of food items and then yield factors associated to the respective confection process were applied to estimate eventual losses of water, obtaining the final weight of the ingredients as consumed. In addition, nutrient retention factors were also applied in order to estimate nutrient losses/gains, resulting from the various cooking methods used in the recipes.

Free Sugars

Free sugars are monosaccharides and disaccharides added to foods by industry, restaurants or the consumer, plus sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates, according to the definition proposed by the World Health Organization.

To estimate added sugars content, the systematic method proposed by Louie et al. (3) was adopted. Hence, added sugars content of each food item was assigned according to the following 10-step method: (step 1) to foods with 0g of total sugars, 0g of added sugars was assigned (n=625); (step 2) to foods unprocessed or minimally processed with no added sugar, 0g of added sugars was assigned (n=949); (step 3) to foods that contained minimal amounts of naturally occurring sugars, 100% of total sugars was assigned as added sugar (n=347); (step 4) calculated formula based on a standard recipe used in the food composition database, where added sugar contents of all ingredients were available from the previous steps (n=352); (step 5) calculated formula based on comparison with values from the unsweetened variety (n= 65); (step 10) assigned 50% of total sugars as added sugars, if estimation of added sugars was impossible from the previous steps (n=118). The step 6 and 9 were not considered. Honey, syrups, fruit juices and fruit juice concentrates were defined as 100% free sugars.

Alcohol

All results referring to alcohol were estimated for individuals above the age of 14 years old and stratified by sex.

Inadequate Intake

The estimation of inadequate intake of nutrients was based on the distribution results and its comparison with DRV such as AR, AI, UL e %TEI. If the DRV was of type AI, the inadequacy was classified qualitatively: "low" if the median value of the intake was higher than the AI value, and "ns" if the median value of the intake was lower, for which no statement can be make (“no statement”). If AR or UL values for nutrients were available, the percentage of individuals not meeting or exceeding the reference value was calculated. In the case of AR, the determination of the prevalence of inadequacy was based on the "AR cut-point" method, in which the prevalence is estimated based on the population proportion above or below the reference value, based on the following assumptions:

1. The nutritional intake and the nutritional needs of a population are independent for all parameters under study;
2. The population needs distribution is symmetrical, but not necessarily normal. Micronutrient iron is an exception, for which the distribution, in the case of women, is asymmetric;
3. The variance of the recommendations distribution is small when compared to the variance of the nutritional intake distribution, i.e. it is assumed that there is a greater variation in the individual nutrient intake than in the recommendations for the population.

Food groups

Groups and subgroups		Food items included
Fruit, vegetables and legumes		
Vegetables	Fresh vegetables	Fresh vegetables, including onions, carrots, broccoli, spinach, etc.
	Processed vegetables	Frozen and canned vegetables, pickles and pates.
Nuts and oilseeds	Nuts	Nuts, including almonds, peanuts, walnuts and cashew.
	Oilseeds	Oilseeds, including flaxseed, chia seeds, pumpkin seeds and pine nuts.
	Processed nuts	Caramelized nuts, peanut butter, almond paste and tahini.
Fresh fruit	Fresh fruit	Fresh fruits, including apples, bananas, oranges, grapes, etc.
	Fruit jars	Commercial fruit jars intended for infant feeding.
Processed fruit	Canned fruit	Canned fruit in sugar syrup.
	Dehydrated fruit	Dried and dehydrated fruit.
Legumes		Dry and fresh legumes, including beans, chick-peas peas and lentils.
Soups		
Soups		Vegetable, meat, fish and chicken soups.
Dairy		
Milk	Plain milk	Cow's milk, goat's milk, sheep's milk. Whole milk, semi-skimmed milk, skim milk, lactose-free milk and easily digestible milk.

Groups and subgroups		Food items included
	Processed milk	Milk shakes, chocolate and flavoured milk.
	Powder, condensed and evaporated milk	Includes powder milk (whole, semi-skimmed, skim), condensed milk and evaporated milk.
Milk cream		Includes pasteurized and UHT cream, whipped cream and flavoured cooking cream.
Yoghurt and other fermented milk		Yoghurts and fermented milks (solid and liquid; fat and lean), kefir.
Cheese		Includes goat, cow and sheep cheeses; fresh or cured; Cream cheese; Cottage cheese and products with protected designation of origin (PDO).
Cereals, cereal products and starchy tubers		
Pasta		Fresh and dry pasta; stuffed pasta, whole grain pasta and gluten-free pasta.
Rice and other grains	Rice	Common, whole and wild rice.
	Other grains	Miscellaneous grains including corn, buckwheat, quinoa, bulgur and oats.
Potatoes and other starchy tubers		Potatoes, sweet potatoes, yam and cassava roots.
Bread and rusks		All kinds of bread of different cereals, including loaf bread, toasts, cornbread, bread crumbs, and breadsticks.
Flour, bread dough and pastry dough		Flours, starches, flakes, semolina, doughs for bread and pizza, crumbled pastry, puffed pastry and sanded pastry.
Infant cereals		Milk and non-milk flours intended for infant consumption.
Breakfast cereals and cereal bars	Breakfast cereals	Processed and sweetened cereals, muesli, granola, bran.
	Cereal bars	Sweetened cereal bars, plain, with fruit or chocolate.

Groups and subgroups		Food items included
Meat, fish and eggs		
Meat	White meat	Includes chicken, turkey, rabbit, hare, pigeon, quail, duck.
	Red meat	Includes beef, veal, lamb, mutton, lamb, pork, wild boar, horse, goat.
	Offal	Offal of several species, including chicken, pork, cow, veal, sheep.
	Processed meat	Includes ham, chorizo, sausages, bacon.
Fish and seafood	Fish	Includes fresh fish and fresh fish roe, dried fish including cod and smoked salmon, and canned fish.
	Crustaceans, molluscs and derivatives	Octopus, squid, shrimp, clams, mussels, oysters, including canned varieties.
	Processed fish and seafood	Includes fish sticks, pates, surimi and fish pastes.
Eggs		Includes chicken eggs, quail eggs, egg powder, liquid egg and egg white.
Fats and oils		
Vegetable oils		Peanut oil, palm oil, soy oil, corn oil, sunflower oil and oils of mixed vegetable origins.
Olive oil		Olive oil.
Butter		Salted and non-salted butter and lactose-free butter.
Margarines and minarines		Vegetable creams, minarines, margarines and industrial fats.
Other fats		Fish oil, lard and tallow.

Groups and subgroups		Food items included
Sweets, cakes and biscuits		
Sweets	Table sugar	Includes white sugar, brown sugar, demerara sugar, vanilla flavoured sugar.
	Honey, molasses and syrup	Honey, molasses and syrup.
	Jellies, jams and candied fruits	Jellies, fruit jams, marmalade, guava paste, candied fruits.
	Candy, gums and chewing gum	Candy, gums and chewing gum
	Chocolates and chocolate snacks	Chocolates and chocolate snacks
	Ice cream	Ice creams with milk, cream and fruit sorbets.
	Sweet desserts	Milky desserts, chocolate mousse, fruit mousses, egg desserts and gelatine.
Cakes		Cakes, pies, croissants and other pastries with or without cream, including homemade recipes
Cookies and biscuits		Includes Marie biscuits, water and salt crackers, chocolate cookies, filled biscuits, whole biscuits and others.
Artificial sweeteners		
Artificial sweeteners		Aspartame, saccharin, sucralose, stevia and sodium cyclamate.
Salty snacks and pizzas		
Snacks and chips		Bread snacks, potato chips, salted popcorn and packaged fried snacks.
Savory pies and finger foods		Patties, croquettes, codfish cakes, pies, puffed pastries and pizzas.

Groups and subgroups	Food items included
Meat substitutes	
Meat substitutes	Vegetable burger, vegetable sausage, tofu, seitan, vegetarian pate.
Milk and milk products substitutes	
Milk and milk products substitutes	Soya drink, coconut drink, oat drink, rice drink, soy yogurt, vegetable yogurt, soy dessert, non-dairy creams.
Table salt	
Table salt	Salt, table salt, iodized salt and salt flower.
Other foods	
Other foods	Yeasts and gelatines, aromas, herbs and spices, condiments, sauces and mayonnaise, soups and powdered soups.
Non-alcoholic beverages	
Water	Natural mineral water, aerated mineral water, flavoured water.
Tea and infusions	Black tea, green tea and herbal and fruits infusions.
Coffee	Coffee, decaffeinated, blended coffee, chicory, and coffee substitutes
Natural and 100% fruit juices	Natural fruit and vegetable juices; 100% fruit and vegetable juices.
Nectars	Fruit and/or vegetables nectars and light nectars.
Soft drinks	Carbonated and non-carbonated soft drinks, lemonade, tonic water, energy drinks and juice concentrates.

Groups and subgroups	Food items included
Other non-alcoholic beverages	Isotonic drinks, non-alcoholic beer and non-alcoholic cocktails.
Alcoholic beverages	
Wine	Red and white wines, ripe or green.
Liquors	Port wine, Muscat wine, liqueurs and Martini.
Beer	Beer (white, black and red), with alcohol.
Spirits	Whiskey, brandy, cognac, tequila, rum.
Other alcoholic beverages	Cider, sangria, beer panaché, and other cockatils.

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