

Compliance with the Dietary Guidelines in Chilean adolescents: a cross-sectional study of the Chilean National Health Survey 2016-2017

Cumplimiento de las Guías Alimentarias en adolescentes chilenos: un estudio transversal de la Encuesta Nacional de Salud 2016-2017

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What do we know about the subject matter of this study?

Several studies conducted in other countries have identified that there is low adherence to the healthy lifestyle recommendations of the Food-Based Dietary Guidelines (FBDG) in the general population.

What does this study contribute to what is already known?

This study evidences the lifestyles in the Chilean adolescent population, with nationally representative data, recognizing a low adherence to FBDG, and therefore, healthy eating actions should be encouraged at this stage of life.

Abstract

In Chile, compliance with the Food-Based Dietary Guidelines (GABA) ensures an adequate and balanced diet. **Objective:** To determine compliance with five GABA recommendations and their associations with anthropometric, lifestyle, and metabolic variables, in adolescents aged between 15 and 19 years who participated in the Chilean National Health Survey 2016-2017. **Subjects and Method:** Cross-sectional study including 355 adolescents. Participants were divided into four groups (fulfilled 0, 1, 2, or ≥ 3 recommendations) using five messages from the GABA (consumption of legumes, fish, dairy products, water, and fruits and vegetables). Associations between GABA and outcome variables (weight, body mass index, waist circumference, physical activity, sleep, and metabolic variables) were investigated using linear regression analyses adjusted by sociodemographic confounders. **Results:** 5.6% of the adolescents met three or more GABA recommendations. Of the recommendations measured, the consumption of water (85%) and legumes (78.7%) presented greater compliance, showing differences between women and men regarding the consumption of legumes (58.6% vs. 86.4%), water (69.6% vs. 91%), and dairy products (92.9% vs. 39.1%). Adolescents with higher compliance with GABA had a better concentration of lower glycemia ($p = 0.025$). There were no other significant associations between lifestyle and anthropometric measurements. **Conclusions:** Adolescents who participated in this study presented difficulties in adhering to GABA recommendations, thus compromising the maintenance of healthy lifestyles.

Keywords:

Adolescents;
Healthy Lifestyle;
Diet;
Food and Nutrition

Introduction

According to demographic data provided by the Pan American Health Organization for the Americas, in 2018, 23% of the Latin American population was aged between 10 and 24 years, which dropped to 21% for Chile in the same period¹. According to the profile of this population, recognized by the World Health Organization as aged between 10 to 19 years, adolescents are considered a human group prone to present risk behaviors, among others, unsafe sexual behavior, smoking, alcohol, and drug use, low levels of physical activity, and unhealthy eating, which can impact not only their current quality of life but also in their adult life^{2,3}.

One of the major health complications that people present at this stage of life is the presence of malnutrition by excess, which reaches 47.8% in adolescents in the first level of high school according to the 2020 Nutritional Map in Chile^{4,5}, which would be conditioned by the educational level of the mother, environmental variables, or the practice of sports⁶. In adolescents, especially girls between 14 and 17 years of age, a preference for energy-dense foods is observed, in addition to selecting their food based on sensory aspects and price, without recognizing the effects they have on their body weight^{7,8}.

In Chile, in order to improve dietary balance and sufficiency, the "Food Guide for Adolescents between 11 and 18 years of age" was established, which presents a healthy eating plan according to the type, quantity, and portions of food necessary for this stage of life⁹. Likewise, the Food-Based Dietary Guidelines

(FBDG), an educational tool for the Chilean population in general, provides 11 recommendations for maintaining a healthy weight and an optimal state of health, which can be used by the health team, teachers, or other professionals in contact with different communities¹⁰.

Although there are previous studies that present evidence of compliance with the FBDG in adolescents^{11,12}, these are not representative of the national reality. The objective of this study was to determine compliance with five FBDG recommendations, and their association with anthropometric, lifestyle, and metabolic variables in Chilean adolescents, aged 15-19 years who participated in the 2016-2017 National Health Survey (ENS).

Subjects and Method

Study design

Cross-sectional population-based study. The selected sample comprised participants between 15 and 19 years of age from the 2016-2017 ENS, applied from August to March 2016 to 2017. The survey is a prevalence study, conducted nationwide in private households, constituting a probabilistic, stratified, and multistage sample of people over 15 years of age with national and regional representativeness. For the development of this research, the information was collected from the database released to the general public by the Ministry of Health of Chile (MINSAL)¹³.

For this study, the research team considered the 355 adolescents aged 15 to 19 years participating in the

2016-2017 ENS which, after applying the recommended expansion factors, represented 1,422,592 adolescents in the country. The protocol for participation in the 2016-2017 ENS was approved by the Ethics Committee of the School of Medicine of the *Pontificia Universidad Católica de Chile*, which included for minors an informed assent and consent by the adolescent's legal guardian¹⁴.

Groups according to FBDG compliance

The FBDG is an educational instrument with 11 recommendations for the Chilean population, aimed at maintaining a healthy weight and an optimal health status¹⁰. Five FBDG recommendations registered in module XII (diet) of Form 1 of the 2016-2017 ENS were considered: consumption of 5 servings of fruits and vegetables per day, 3 servings of dairy per day, 6 glasses or more of water per day, legumes 2 times per week, and consumption of fish 2 times per week¹⁴.

For this research, 4 groups were created according to the degree of compliance with the healthy recommendations of the FBDG: group 1: does not comply with any recommendation; group 2: complies with 1 recommendation; group 3: complies with 2 recommendations; and group 4: complies with 3 or more recommendations, establishing the latter as the reference group, as previously reported¹⁵.

Anthropometric, metabolic, and lifestyle measurements

Body weight was measured using a digital scale (OMRON HN 289) and height was measured using a metal tape measure, set-square, and adhesive tape to affix to a wall or door. Waist circumference for age (WC/A; cm/years) was measured with an inextensible tape measure according to protocols established by the 2016-2017 ENS¹⁴. Body Mass Index for age (BMI/A; kg/m²/years) and WC/A values were classified according to the recommendations of the growth standards for the nutritional evaluation of children and adolescents of the MINSAL, considering years as reference points that the nutritional classification indicated by these standards on their pages 9 and 11 together with the cut-off points established by age and sex on their pages 44-46 and 82-84, for girls and boys, respectively¹⁶. Lipid profile, glycemia, and blood pressure were measured according to the standards of the 2016-2017 ENS¹⁴.

By applying questionnaires validated in the 2016-2017 ENS (Modules IV and XIII of Form 1), the following physical activity data were collected: used transportation, the performance of vigorous (intense) or moderate (medium) activities, sedentary time, and hours of sleep (< 7 hours/day; 7-9 hours/day; > 9 hours/day), as previously reported^{14,15}.

Other measured variables

Sex, geographic area of residence (urban/rural), economic level of the family in Chilean pesos (CLP, classified as low < \$250,000; medium \$250,000 to \$450,000; high > \$450,000), perception of their health (bad, regular, or good), and smoking (never, ex-smoker, regular or occasional smoker). This information was obtained from Modules III and XIV of Form 1 of the 2016-2017 ENS and was incorporated to favor the characterization of the sample¹⁴.

Statistical analysis

The adolescent characterization data are presented as means for continuous variables or as proportions for categorical variables, with their respective confidence intervals (95%CI) subdivided according to compliance with the FBDG recommendations. The prevalence of compliance with FBDG recommendations is presented by sex and total population in percentages.

To determine the association between the output variables (body weight, adiposity measured through WC/A and BMI/A, physical activity, hours of sleep, sedentary time, glycemia, lipid profile, and blood pressure) and FBDG compliance by category, linear regression analyses were performed. The results are presented as β coefficient with their respective 95% CIs. Additionally, Poisson regression with robust standard errors was performed to evaluate the association between FBDG compliance and the categorical variables obesity-for-age and central obesity-for-age. These results are presented as prevalence ratios with their respective 95% CIs. All analyses were adjusted by age, sex, and area of residence (rural/urban).

The STATA MP v16 software and the "svyset" command for complex samples were used for all analyses. All results were estimated using expanded samples according to the expansion factors suggested by the 2016-2017 ENS.

Results

Table 1 shows the results of the general characteristics of the adolescents who participated in this study according to compliance with 3 or more, 2, 1, and non-compliance with FBDG recommendations considered in this study. Of the population studied, 51.7% did not comply with the recommendations measured and 5.6% complied with three or more of the recommendations. Among the adolescents who did not comply with the recommendations, 56.4% were female, resided in urban areas (91.8%), belonged to families with low-income levels (34.7%), and presented good health (71.7%). Of the adolescents who met 3 or more FBDG recommendations, 5.9% presented obesity ac-

cording to BMI/A and none showed central obesity. In addition, 62% reported sleeping between 7-9 hours, not smoking (100%), and having a lower salt intake than the other groups (7.2 g/day). It is also important to note that adolescents with adherence to 2 FBDG recommendations had a higher proportion of obesity (BMI/A) (23.9% v/s 16.5%) and central obesity (17.1% v/s 11.3%) than those who did not adhere to any recommendation.

Table 2 shows the proportion of consumption of legumes, fish, dairy products, water, fruits, and vegetables according to adherence to the FBDG recommendations measured in this study. Globally, water (85.0%) and legumes (78.7%) showed a higher consumption in those adolescents who maintained compliance with 3 or more of the FBDG recommendations measured. In contrast, fish (39.5%) and dairy products (54.2%) showed less adherence to their consumption. On the other hand, there were sex differences in adherence to the FBDG recommendations; males who adhered to a higher number of FBDG recommendations had a higher consumption of legumes (86.4%) and water (91.0%), while females stood out in the consumption of dairy (92.9%) and water (69.6%).

Table 3 shows the association between compliance with FBDG recommendations, anthropometric, metabolic, and lifestyle variables studied, considering as the reference group adolescents who complied with 3 or more recommendations. Only one trend stands out between glycemia (mg/dL) and compliance with the FBDG recommendations ($P = 0.025$), a situation that was not observed in the other variables measured (body weight, BMI/A, WC/A, physical activity, hours of sleep, sedentary time, lipid profile, and blood pressure).

Finally, when the association between obesity by nutritional status according to BMI/A, central obesity, and compliance with the FBDGs was analyzed, it was noted that, in relation to the reference group (compliance with 3 or more recommendations), the other groups presented a greater probability of obesity or central obesity; however, these associations were not significant (Figure 1). These associations were not analyzed by sex because of the low number of participants in the different groups when divided by this variable.

Discussion

This study provided information on lifestyles and the degree of compliance with the current FBDG recommendations, referring to the consumption of water, legumes, dairy products, fruits, and vegetables. It was noted that only 5.6% of adolescents between 15 and 19 years of age in Chile complied with 3 or more FBDG recommendations, while 51.7% did not comply with any of them.

Like the results of this study, the lack of adherence to the FBDG is observed in international research^{17,18}. In Chile, there is evidence that confirms that, regardless of the life stage in which the person is, there is a lack of compliance with the recommendations of the FBDG^{19,20}. In Chilean adolescents aged between 14 and 17 years in the Ñuble Region, the consumption of protein foods was compared with the FBDG, observing that only 40% of the participants complied with the indications of these Guidelines regarding protein foods²¹.

The results of this research are consistent with those at the international level. Among others, Banfield et al. developed a study based on the results of the National Diet and Health Survey and the evaluation of adherence to the 2010 U.S. Dietary Guidelines in children aged 4 to 18 years²². The authors determined that, while diet quality and adherence to Dietary Guidelines recommendations were poor in all age groups, adolescents aged 14-18 years had lower consumption of healthy foods²³. These conclusions are also observed in research conducted in Argentina, with students between 14 and 19 years of age, where the FBDG were used as a reference to investigate food consumption²⁴. Among its conclusions, and maintaining the global trend, there was a lack of compliance with the FBDG, especially due to the lack of fruit and vegetable consumption²⁵.

This trend of non-adherence to the consumption of healthy foods recommended by the FBDG has been observed in other studies. For example, in a study conducted in Greece on children and adolescents with malnutrition by excess, in which food consumption was measured according to the guidelines provided by the FBDG in force in the country, it was found that children consumed 2.1 servings of dairy products, 0.8 of vegetables, and 1.5 of fruits per day, which corresponded to 73.2%, 45.3%, and 75%, respectively, of the average recommended consumption²⁶. On the other hand, fish consumption corresponded to 0.9 servings per week and legumes corresponded to 1.7 servings per week (39.5% and 52.7% of the recommended by the local guidelines, respectively)²⁶. Although our methodological strategy does not compare with the Greek research, it can be recognized that foods such as dairy products, legumes, fish, fruits, and vegetables tend not to be consumed adequately and as recommended by the FBDG for adolescents. Besides that, studies conducted in Canada²⁷ and Brazil²⁸ identify, as our study, sex differences in compliance with recommendations on the consumption of foods such as legumes or dairy products.

The lack of knowledge and, in particular, the monitoring of FBDG is not only an attitude of adolescents, it is also replicated in other life stages²⁹; however, in this

Table 1. Characterization of Chilean adolescents in compliance with GABA recommendations. ENS 2016-2017

	Does not comply with any recommendation	Complies with 1 recommendation	Complies with 2 recommendations	Complies 3 or more recommendations
Sociodemographic				
Total (%)	51.7 [44.0; 59.3]	29.7 [23.1; 37.3]	13.0 [8.5; 19.3]	5.6 [3.2; 9.7]
Age (years)	16.9 [16.6; 17.1]	16.8 [16.4; 17.3]	16.9 [16.1; 17.6]	16.9 [16.1; 17.8]
Women (%)	56.4 [45.7; 66.4]	55.9 [41.8; 69.2]	27.2 [13.3; 47.6]	28.1 [9.64; 58.9]
Geographical area (%)				
Urban	91.8 [85.8; 95.3]	87.7 [78.6; 93.2]	77.0 [50.6; 91.7]	80.9 [49.1; 94.9]
Family income level (%)				
Low	34.7 [24.7; 46.2]	37.0 [24.4; 51.7]	26.2 [11.9; 48.3]	12.2 [2.73; 40.8]
Medium	32.6 [22.4; 44.6]	30.0 [17.8; 45.8]	50.7 [27.7; 73.4]	19.0 [5.13; 50.5]
High	32.7 [23.1; 44.1]	33.0 [19.8; 50]	23.1 [6.48; 46.3]	68.8 [38.0; 88.9]
Anthropometric				
Body weight (kg)	66.1 [63.2; 69.0]	68.0 [63.7; 72.2]	72.1 [64.6; 79.6]	66.5 [59.2; 73.9]
Body height (m)	1.63 [1.61; 1.65]	1.64 [1.62-1.67]	1.69 [1.65; 1.73]	1.69 [1.63; 1.74]
BMI/Age (kg/m ²)	24.9 [23.9; 25.8]	24.9 [23.7; 26.1]	25.1 [23.1; 27.0]	23.5 [20.9; 26.1]
BMI/Age (%)				
Low weight	3.3 [1.0; 10.6]	2.8 [0.5; 14.0]	5.7 [1.4; 20.6]	8.3 [1.1; 42.1]
Normal	50.0 [39.7; 60.4]	48.3 [34.5; 62.4]	34.9 [17.9; 56.9]	41.9 [18.0; 70.3]
Overweight	30.2 [21.1; 41.1]	31.3 [19.5; 46.1]	35.5 [17.9; 58.0]	43.8 [19.6; 71.4]
Obesity	16.5 [10.6; 24.7]	17.6 [9.8; 29.6]	23.9 [9.2; 49.2]	5.9 [0.8; 33.1]
Waist circumference/Age (%)				
Normal	72.3 [62.5; 80.3]	71.6 [57.0; 82.8]	63.5 [39.5; 82.3]	70.3[41.6; 88.7]
Risk of abdominal obesity	16.4 [10.3; 25.2]	20.0 [10.7; 34.3]	19.4 [6.9; 43.6]	29.7 [11.3; 58.4]
Abdominal obesity	11.3 [6.6; 18.8]	8.4 [3.3; 19.8]	17.1 [4.8; 45.9]	0
Lifestyles				
Physical inactivity (%)	22.3 [14.6; 32.5]	27.3 [16.1; 42.5]	14.2 [5.9; 30.4]	0
Hours of sleep (h/day)	8.2 [8.0; 8.4]	8.1 [7.6; 8.5]	8.3 [7.9; 8.5]	8.2 [7.5; 8.8]
Hours of sleep (%)				
≤ 6 h/day	5.0 [2.3; 10.4]	15.7 [7.1; 31.2]	1.9 [0.3; 9.9]	0
7-9 h/day	51.7 [41.3; 61.9]	41.4 [28.4; 55.7]	57.3 [35.1; 76.9]	62.0 [33.1; 84.3]
≥ 9 h/day	43.3 [33.4; 53.8]	42.9 [29.4; 57.5]	40.8[21.5; 63.4]	38.0 [15.7; 66.9]
Health Perception (%)				
Poor	2.1 [0.7; 6.1]	0.6 [0.1; 4.3]	0	0
Regular	26.2 [17.5; 37.2]	14.5 [6.8; 28.3]	9.3 [2.1; 32.7]	12.6 [2.8; 41.9]
Good	71.7 [60.7; 80.6]	84.8 [71.2; 92.7]	90.7[67.3; 97.9]	87.4 [58.1; 97.2]
Smoking (%)				
Never	69.6 [59.6; 78.0]	64.0 [49.5; 76.3]	54.7 [32.7; 75.0]	88.4 [61.0; 97.4]
Former smoker	9.6 [5.0; 17.8]	6.9 [3.0; 15.0]	10.4 [3.0; 30.1]	11.6 [2.6; 39.0]
Regular smoker	9.8 [5.6; 16.7]	14.1 [5.8; 30.5]	16.2 [4.6; 43.8]	0
Occasional smoker	11.0 [6.0; 19.2]	15.0 [7.6; 27.5]	18.8 [6.0; 45.7]	0
Salt intake (g/day)	8.1 [7.6; 8.6]	8.1 [7.6; 8.6]	9.8 [8.1; 11.5]	7.2 [6.2; 8.2]

Data presented as mean for continuous variables and as percentage for categorical variables with their respective 95% CI. Body mass index values for age (BMI/E; kg/m²) and CP/E were classified according to the recommendations of the growth patterns for nutritional evaluation of children and adolescents of the Ministry of Health of Chile (MINSAL), considering as reference points the values recognised for 15-19 years¹⁵.

Table 2. Total percentage of adolescents and by sex who met the recommendations by total level of GABA compliance measured in the ENS 2016-2017

Compliance	0 recommendation	1 recommendation	2 recommendations	3 or more recommendations
Legumes twice a week (%)				
Total	0	20.7	64.0	78.7
Women	0	22.2	61.9	58.6
Men	0	18.8	64.8	86.4
Fish twice a week (%)				
Total	0	5.4	21.1	39.5
Women	0	3.9	35.2	37.5
Men	0	7.4	15.8	40.2
Dairy three times a day (%)				
Total	0	17.9	8.6	54.2
Women	0	13.7	7.3	92.9
Men	0	23.0	9.1	39.1
Water six or more glasses a day (%)				
Total	0	41.6	51.3	85.0
Women	0	37.5	48.9	69.6
Men	0	46.8	52.2	91.0
Fruits and vegetables five times a day (%)				
Total	0	14.5	55.1	58.3
Women	0	22.7	46.8	62.5
Men	0	4.0	58.2	56.7

Source: own elaboration. Results presented in percentages (%).

group of people and this period of life, it is relevant and essential to accompany the formation or strengthening of lifestyles with healthy recommendations since this stage of life is essential in the formation of beliefs, knowledge, and practices on health, due to the repercussions that these behaviors can generate in later stages^{30,31}.

The FBDG intertwine in their recommendations not only indications for a healthy diet but also incorporate healthy lifestyles, such as maintaining body weight within normal ranges or performing physical activity³², centered on a sustainable social and cultural context that allows maintaining healthy lifestyles that prevent the onset of chronic noncommunicable diseases^{33,34}.

In their educational role, the FBDG facilitate the learning of healthy lifestyles for adolescents and are a necessary tool for professionals in different areas³⁵ and for families since the place where they are born is where healthy lifestyle behaviors are consolidated and where the efforts of social, health, and education teams must focus their efforts because guardians or caregivers do not always understand the preferences of their children regarding nutritional information

and lifestyles³⁶. Systematic reviews present among their conclusions that healthy dietary patterns, such as eating as a family, increase in adolescents the consumption of foods such as fruits, vegetables, and legumes, a situation that is not replicated with their peers, who promote the consumption of energy-dense foods^{37,38}.

Regarding the anthropometric data, the results found that body weight, height, BMI/A, and WC/A are close to those observed in a study conducted on a population of adolescent schoolchildren in Talca, Chile³⁹. The high values of adiposity and inadequate lifestyles in Chilean adolescents should be seen as an alarm for health teams, due to the close relationship between these values and cardiovascular risks and the complications that these diseases may cause during life⁴⁰. In addition, and in relation to the control of metabolic variables included in this research, there was only a significant trend in the follow-up of a greater number of FBDG recommendations with normal glycemia values for adolescents. This result is consistent with those found in a study conducted in Canada⁴¹, however, results found in other studies

Table 3. Association between anthropometric background, lifestyles, metabolic control, lipid profile and blood pressure control according to GABA recommendations

Variables	Compliance with 3 or more recommendations	Complies with 2 recommendations	Complies with 1 recommendation	Does not comply with any recommendation	P-trend
	Ref.	β (IC95%)	β (IC95%)	β (IC95%)	
Weight (Kg)	1.00	5.3 [-4.8; 15.5]	4.9 [-4.2; 14.0]	3.4 [-5.3; 12.1]	0.985
BMI/Age (Kg/m ²)	1.00	1.6 [-1.5; 4.7]	1.7 [-1.1; 4.4]	1.6 [-1.1; 4.3]	0.465
Waist perimeter/Age (cm)	1.00	4.4 [-2.8; 11.6]	2.4 [-3.3; 8.1]	3.1 [-2.6; 8.8]	0.733
Physical activity (MET/min/day)	1.00	102.0 [-428.9; 632.8]	90.2 [-396.8; 577.2]	-61.3 [-544.4; 421.8]	0.446
Transport physical activity (min/day)	1.00	32.4 [-59.2; 124.0]	-3.1 [-46.8; 40.5]	-14.7 [-60.1; 30.8]	0.245
Vigorous physical activity (min/day)	1.00	-6.6 [-55.0; 41.8]	29.6 [-4.2; 63.4]	16.4 [-20.7; 53.5]	0.410
Moderate physical activity (min/day)	1.00	61.4 [23.5; 99.4]	63.0 [17.4; 108.8]	43.5 [3.2; 83.8]	0.591
Hours of sleep (h/day)	1.00	-0.1 [-85.3; 0.7]	-0.1 [-1.0; 0.7]	-0.0 [-0.82; 0.7]	0.875
Sitting time (h/day)	1.00	1.3 [-1.4; 4.1]	0.5 [-1.6; 2.6]	0.6 [-1.5; 2.7]	0.908
Glycemia (mg/dL)	1.00	2.7 [-0.9; 6.3]	1.3 [-0.9; 6.3]	4.7 [0.9; 8.6]	0.025
HDL-cholesterol (mg/dL)	1.00	-13.2 [-21.1; -5.2]	-7.5 [-15.4; 0.3]	-6.6 [-14.5; 1.3]	0.665
LDL-cholesterol (mg/dL)	1.00	-1.0 [-22.4; 20.4]	4.1 [-15.7; 23.9]	7.2 [-11.5; 25.8]	0.256
Total cholesterol (mg/dL)	1.00	-3.3 [-29.7; 23.0]	3.6 [-21.3; 28.6]	9.5 [-13.6; 32.7]	0.128
Triglycerides (mg/dL)	1.00	54.4 [20.4; 88.4]	36.4 [12.2; 60.6]	45.5 [19.5; 71.6]	0.272
DBP (mmHg)	1.00	0.8 [-3.4; 5.0]	0.4 [-3.6; 4.2]	-0.7 [-4.5; 3.0]	0.314
SBP (mmHg)	1.00	-0.09 [-5.0; 4.8]	1.5 [-5.0; 5.7]	1.2 [-2.5; 4.9]	0.540

Data presented as β coefficient with their respective 95% CI. All analyses were adjusted by sex, age and area of residence. BMI: body mass index; SBP: systolic blood pressure; DBP: diastolic blood pressure, as a reference group, adolescents who complied with 3 or more recommendations.

recognize an association between adherence to the FBDG in adolescents with blood pressure control, the performance of physical activity, or healthy lifestyles and smoking and alcohol consumption^{42,43}. It is also important to recognize that our results, although not significant, identified a tendency to present malnutrition by excess, central obesity, and lack of compliance with FBDG recommendations, which was observed in previous studies^{44,45}.

Previous studies carried out by researchers on this same topic, focused on the general population and on elderly people who participated in the 2016-2017 ENS, presented similar results. The above reinforces the lack of adherence to FBDG recommendations at the population level^{46,47}. This reality invites the understanding of a biopsychosocial view of nutrition, delving into the social, cultural, and economic determinants, in addition to the emotions involved in the act of eating and the particularities of the territories, which will ultimately contribute to the well-being of the entire population.

Our results identified that adolescents who follow 2 FBDG recommendations have higher weights in obesity (BMI/A) and central obesity (WC). This situation could be understood from the fact that the adolescent stage is key for the adherence to healthy lifestyles, but the results are not observed in the short term, and that these participants, if they maintain a healthy lifestyle, should show values closer to normal over time.

Strengths and limitations

One of the strengths of the study is its data collection based on standardized protocols and the representativeness given by using the results from the 2016-2017 ENS in a group of people who are not generally considered in population-based studies such as adolescents in Chile. However, the results presented are descriptive, so a cause-effect relationship cannot be established. In addition, it was only used as a data collection tool for the FBDG compliance of five recommendations, which limits the results obtained in the study and the analysis of the eating behavior of the participating minors.

The development of future representative research should be considered to establish causal relationships between adherence to the FBDG and the risk of malnutrition by excess, as well as associations with metabolic variables and healthy lifestyles, which would allow for promoting healthier lifestyles in children and adolescents. In addition, other studies could consider the follow-up of these participants and measure associations or correlations between each of the FBDG recommendations and metabolic variables, such as compliance with recommendations on the consumption of fish or

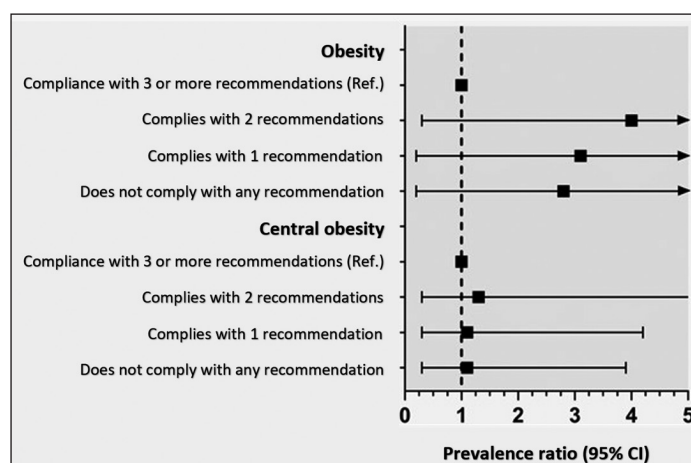


Figure 1. Prevalence of obesity and abdominal obesity according to GABA compliance.

legumes with triglyceride or glycemia values. Finally, the application of the ENS could consider increasing the number of adolescent participants since this would allow us to recognize the lifestyles and health conditions of this group at this stage of their life trajectory, directing public-private actions in favor of a better quality of life.

Conclusions

The adolescents participating in this study reported difficulties in adhering to the FBDG recommendations. Also, of the variables studied, only a relationship was identified between adherence to 3 or more recommendations and glycemia levels.

Adolescence is a key stage for the acquisition of healthy lifestyles, but how can we motivate adolescents to understand and adhere to FBDG recommendations? Although socioeconomic determinants that influence health should be considered, perhaps it is necessary to rethink how health education is provided, favoring the use of sources of information close to the adolescents themselves, and incorporating more effective school programs that provide the tools to improve lifestyles from a health perspective.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data

Rights to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

Financial Disclosure

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