RESEARCH
Research Paper

Breakfast in Latin America: Evaluation of Nutrient and Food Group Intake Toward a Nutrient-Based Recommendation

Irina Kovalskys, MD, PhD; Mauro Fisberg, MD, PhD; Agatha Nogueira Previdelli, MSc, PhD, RD*; Jaqueline Lopes Pereira, MSc, PhD, RD*; Ioná Zalcman Zimberg, MSc, PhD, RD*; Viviana Guajardo, MSc; Regina Fisberg, MSc, PhD, RD*; Gerson Ferrari, MSc, PhD; Georgina Gómez, MSc, PhD, RD*; Attilio Rigotti, MD, PhD; Lilia Y. Cortés Sanabria, MSc, PhD, RD*; Martha C. Yépez García, MSc, PhD, RD*; Marianella Herrera-Cuenca, MSc, PhD, MD; María Reyna Liria Domínguez, MSc, PhD, RD*; the ELANS Study Group

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*Certified in Brazil, Costa Rica, Colombia, Ecuador, or Peru.

ABSTRACT

Background Little is known about breakfast habits of the Latin American (LA) population to support nutritional recommendations for a balanced breakfast in this region.

Objective To evaluate the nutritional composition of breakfast in the LA population and to propose recommendations for a balanced breakfast.

Design This multicenter cross-sectional study evaluated food and nutrient intake of nationally representative samples of urban populations of 8 LA countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Peru, and Venezuela) in 2014-2015.

Participants/setting The sample comprised 8714 participants from the Latin American Study of Nutrition and Health, aged 15 to 65 years, randomly recruited according to geographical location, sex, age, and socioeconomic level.

Main outcome measures Two 24-hour recalls were used to examine dietary intake. Breakfast consumers were stratified by tertiles of Nutrient-Rich Foods Index 9.3 (NRF9.3) to assess the overall diet quality of individuals. Nutrient intake at breakfast of those in the upper tertile of NRF9.3 pooled for the 8 countries was used as a reference for the development of recommendations for LA adolescents and adults.

Statistical analyses Comparison of food and nutrient intake of breakfast across NRF9.3 tertiles were analyzed using the Kruskal-Wallis rank sum test.

Results Overall breakfast was an important contributor to protein, carbohydrate, and B vitamin intakes but also to added sugar and total and saturated fat intakes relative to daily intakes. Individuals in the upper NRF9.3 tertile had higher intake of key micronutrients such as calcium and potassium at breakfast compared with other tertiles. White breads/rolls/tortillas were the most consumed food group (60%), followed by butter/margarine (40%) and coffee/tea without milk (34%-50%).

Conclusions Breakfast contributed to the daily intake of B vitamins, protein, and carbohydrates but also added sugar and total and saturated fat intakes for all countries. The proposed recommendations support the nutrient density of existing highest-quality breakfast in the LA population while addressing concerns about nutrients to be encouraged or reduced.
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EATING HABITS, INCLUDING NUMBER AND QUALITY of daily meals, have shown to be an important contributor to people's health.[1] More than any other meal, the nutritional composition of breakfast has received special attention in the literature in the last years.[2] Although energy contribution of this meal might be smaller in comparison with other main meals, findings from cross-sectional and interventional studies have reported that eating breakfast may be a predictor of healthy eating behavior.[3-6] Regular breakfast consumption has been associated with higher consumption of fruits, vegetables, milk, and grains and fewer total calories from snacks and beverages compared with breakfast skipping,[3] and consequently, it has been associated with higher intake of micronutrients and higher odds of meeting nutritional recommendations.[6]

Despite its potential importance, there are no established food group or nutrient criteria for an ideal composition of breakfast, that could be applicable broadly across Latin America (LA). The Dietary Guidelines for the Brazilian and

Argentinian populations[7,8] do not recommend amounts of foods or nutrients specifically for breakfast; however, they give examples of quality breakfast according to each country's habits and recommend the consumption of natural or minimally processed foods, such as fruits, coffee, and milk, and culinary preparations based on grains or tubers, such as cassava. The International Breakfast Research Initiative (IBRI) developed quantitative breakfast recommendations for achieving a balanced breakfast, that is, a nutritionally adequate breakfast, considering the existing distinctive and cultural eating habits of the population.[9] Data from nationally representative dietary intake databases from 6 Western European and North American countries were analyzed taking both reported breakfast and daily nutrient intakes into account. These recommendations were developed using a new approach based on nutrient intakes of breakfasts that were associated with the highest overall daily dietary quality and allowed for local adaptation.

A previous study in LA reported that the majority of participants were regular breakfast consumers (who consumed breakfast on both 24-hour dietary recalls [24HRs]) and that breakfast skipping was more frequent among adolescents.[10] The study found that in most countries breakfast was a meal with a higher content of carbohydrates, added sugars, saturated fat, and calcium and lower content of protein and fats relative to the entire day. A more detailed evaluation of the nutritional composition of breakfast could contribute to the development of data-driven nutrient recommendations for this meal in LA, considering both daily nutrient and breakfast intakes. Thus, the objective of this study was to evaluate nutrient and food group intakes at breakfast in LA and to propose nutrient-based recommendations for a balanced breakfast for adolescents and adults according to breakfast intake of the population with the highest daily diet quality.

RESEARCH SNAPSHOT

Research Question: What is the nutritional composition of breakfast in Latin American (LA) populations and what recommendations can be proposed for a balanced breakfast in this group?

Key Findings: This multicenter cross-sectional study of the nutritional intake of 8 LA countries shows that breakfast is a nutrient-rich eating occasion relative to daily energy intake. Although breakfast is an important contributor to B vitamins, protein, and carbohydrate intakes, it is also a source of added sugar and total and saturated fat. Breakfast intake of those individuals with the best daily diet quality, along with the current international dietary guidelines, were used to develop nutrient-based recommendations for a balanced breakfast for the first time in LA.

PARTICIPANTS AND METHODS

Study Sample

This study was based on the data derived from the Latin American Study of Nutrition and Health (ELANS), a multicenter cross-sectional survey originally designed to collect information on food and nutrient intake, nutritional status, and physical activity levels of nationally representative samples of urban populations of 8 LA countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Peru, and Venezuela). The complete methodology of the study has been described in detail elsewhere.[11]

In brief, sample participants aged 15 to 65 years old were randomly recruited by multistage sampling method stratified by geographical location (only urban areas), sex, age, and socioeconomic level (SEL). Participants were evaluated on 2 household visits on nonconsecutive days (with an interval of up to 8 days between them) over 1 year (from September 2014 to August 2015). The following exclusion criteria were applied: (a) pregnant and lactating women; (b) persons with physical or mental disabilities; (c) unsigned consent form; (d) individuals living in nonfamily residential environments; and (e) individuals who could not read. The total eligible sample from the ELANS was composed of 9218 subjects; however, this study final sample consisted of 8714 individuals, as described in detail in the "Dietary Assessment" section.

The overarching ELANS protocol was approved by the Western Institutional Review Board (#20140605) and is registered at Clinical Trials (#NCT02226627). Each site-specific protocol was also approved by the ethical review boards of the participating institutions. All study sites adhered to a common study protocol for interviewer training, implementation of fieldwork, data collection and management, and quality control procedures. All participants gave their informed consent/assent before participation in the survey.

Sociodemographic Data

Questionnaires administered by trained interviewers at the participants' households were used to collect information about demographics (such as sex and age) and SEL. Participants were categorized into 2 age groups: adolescents (15-19 years, n = 1140) and adults (20-65 years, n = 7574). SEL questionnaires used a country-dependent format based on the national indexes used in each country. SEL data were divided into 3 strata (low, medium, and high) based on the national indexes used in each country.[11]

Dietary Assessment

Dietary data were obtained using 2 nonconsecutive 24HRs collected at 2 household visits. The Multiple Pass Method[12] approach was used to provide detailed information of all food and beverages, including water and alcoholic beverages, and preparations/recipes consumed over the 24 hours before the interview in household measures. Data collected were analyzed through the Nutrition Data System for Research software, versions 2013[13] (for Argentina, Chile, Costa Rica, Ecuador, and Venezuela) and 2014[14] (for Brazil, Colombia, and Peru) (NDS-R, Minnesota University). Before entering data on the NSDS-R software, professional nutritionists in each country followed a standardization procedure for matching the nutritional equivalency of local foods to foods available in the US Department of Agriculture food composition table in the NDS-R database. The complete procedure for standardization of the food composition database has been described in detail elsewhere.[15]

Breakfast was defined by self-report and included consumption of any food or beverage at a meal occasion named by the respondent as breakfast. The total ELANS sample was considered for the current study, therefore 18,436 24HRs (ie, 9218 individuals × two 24HRs = 18,436) were assessed. The

following exclusion criteria were then applied: breakfast skippers (n = 504), who did not consume breakfast intentionally or not intentionally on both days; breakfasts with less than 50 kcal[16] (731 24HRs); breakfasts derived exclusively from alcoholic beverages (six 24HRs); and inconsistent data (one 24HR, typing error). The final sample comprised 8714 breakfast consumers (individuals who had breakfast in one or both 24HRs, for a total of 15,961 24HRs). The complete methodology of the final sample was described elsewhere.[10] For the purpose of the present study, only data of breakfast consumers were used in the analysis.

Measures of Diet Quality

The Nutrient-Rich Foods Index 9.3 (NRF9.3),[17] a validated nutrient profiling method used previously in the IBRI studies,[18] was applied to assess the overall diet quality score of the breakfast consumers of each LA country. Because breakfast has been shown to significantly contribute to the daily micronutrient intake, the NRF9.3 was chosen, due to the positive influence of micronutrients to the scoring system.[9,10] The NRF9.3 variation used for the IBRI studies[18] is based on the sum of daily intakes of 9 "nutrients to encourage" (protein; fiber; vitamins A, C, and D; calcium; iron; magnesium; and potassium) expressed as percentages of Daily Reference Values (DRVs) normalized to an intake of 2000 kcal, minus the sum of the percentage of the maximum recommended values for 3 "nutrients to limit" (added sugar, saturated fat, and sodium). Vitamin E was replaced by vitamin D in the list of the 9 "nutrients to encourage." The NRF9.3 algorithm is represented below:

$$\text{NRF9.3} = \left(\sum_{i=1}^{9} \frac{\text{Intake}_i/\text{Energy} \times 2000}{\text{DRV}_i} - \sum_{j=1}^{3} \frac{\text{Intake}_j/\text{Energy} \times 2000}{\text{MRV}_j} - 1 \right) \times 100$$

where Intake_i or Intake_j is the intake of each nutrient i to encourage or j to limit, Energy represents daily energy intake, DRV_i is the DRV for nutrients i, and MRV_j is the maximum reference value for nutrients j.[17]

Percentage DRVs for "nutrients to encourage" were capped at 100; that is, in this case the nutrient scores (subscores) were truncated at 1, so that high intake of 1 nutrient could not compensate for the dietary inadequacy of another.[17] As for "nutrients to limit," if the Intake_i was less than 1, then 0 was assigned to the score of that nutrient. In all other cases, 1 was subtracted from the score. The maximum possible total score was 900, where intakes/2000 kcal for all 9 nutrients to encourage was above DRV, and intakes of all 3 nutrients to limit were below DRV.[17]

The DRVs were based on the dietary reference intakes published by the Institute of Medicine,[19,20] Food and Agriculture Organization,[21] World Health Organization,[22-24] European Union Regulation,[25] and other IBRI studies.[26-31] The DRVs used to calculate the NRF9.3 were as follows: (1) "nutrients to encourage": protein 50 g, vitamin A 900 mg, vitamin C 90 mg, calcium 1300 mg, iron 18 mg, magnesium 420 mg, potassium 4700 mg, fiber 25 g, and vitamin D 5 μg; and (2) "nutrients to limit": sodium 2300 mg, saturated fat 10% of the Total Energy Intake (TEI), and added sugar 10%TEI. DRVs for "nutrients to limit" were based on maximum recommended values.

The NRF9.3 tertiles were calculated separately for each country and then compiled as a single database to allow for comparisons across countries. NRF9.3 was stratified by tertiles for each age group across all countries: adolescents (n = 1140) and adults (n = 7574). The lower tertile (T1) was indicative of the lowest level of overall daily diet quality, and the upper tertile (T3) represented the highest overall daily diet quality. The nutrient intakes at breakfast for those at the upper tertile were used as reference for the development of recommendations for the LA region, focusing on setting attainable quantitative recommendations that could improve total daily diet quality.[9]

Principles for the Development of Nutrient Recommendation for Breakfast

The average nutrient intakes of breakfast in the population with the highest-quality diets were compared with recommended daily intakes from the Institute of Medicine,[19,20] Food and Agriculture Organization,[21] and World Health Organization.[22-24] By using 5 key guiding principles adapted from IBRI[9] and based on the comparison between the intakes observed and the daily recommendations, nutrient recommendations were proposed for the breakfast of the LA population, as follows.

Principle 1. The first principle is based on the contribution of breakfast to daily energy intake, according to age group. As a result, a value closer to the midpoint of the observed range of energy intakes is proposed as a benchmark for setting the percentage of energy (%) and nutrient recommendations, based on a 2000 kcal diet.

Principle 2. For nutrients in which there is evidence that the median daily population intake is higher than DRV among most countries (data not shown), the target was set to the lower range of the median national values found in the upper NRF9.3 tertile.

Principle 3. For nutrients where (1) the median population intakes are close to optimal relative to the reference values, and (2) breakfast contributes significantly to daily intakes (more than the percentage found in the principle 1), the target is set to the average intakes range from individuals in the upper NRF9.3 tertile.

Principle 4. Where the median population intakes are generally less than the reference values and there is wide variation in breakfast contribution across countries, the target will be based on the value of the country with the highest percentage of contribution. If this value exceeds the energy intake of breakfast, then the same percentage of energy, proposed on the principle 1, will be considered.

Principle 5. For macronutrients to limit, the proposal is to adopt the World Health Organization guideline values expressed as percentage of breakfast energy intake.

The main difference from IBRI[9] principles is that the present analyses were based on median values, instead of mean values, since the distribution of most variables was asymmetric. Also, the fourth principle was based on intakes from

the country with the highest percentage of contribution, instead of the Codex.

Food Grouping

An adapted version of the What We Eat in America Food Classification System[32] was used to classify the foods and beverages consumed by the study population. Nine of the 15 main groups of the What We Eat in America Food Classification System were evaluated in this study: milk and dairy, protein foods, grains, snacks and sweets, fruit, vegetables, nonalcoholic beverages, fats and oils, and sugars. From these 9 main groups, 27 food subgroups most frequently consumed by the total population (eg, whole grain bread, rolls, and tortillas; white bread, rolls, and tortillas; plain and flavored whole milk; plain and flavored nonfat, low-fat, or reduced-fat milk; butter and margarine; cheese) were included to calculate the percentage contribution of food groups to key nutrient intakes at breakfast. The same 27 food subgroups were compared across diet quality tertiles in adolescents and adults.

Statistical Analysis

The Kolmogorov-Smirnov test was applied to check the distribution of the data. Descriptive statistics were primarily reported as means and SD and/or in percentages. Associations between NRF9.3 tertiles and demographic characteristics (sex, age, SEL, and country) were tested using χ^2 tests by each age group (adolescents or adults). Comparison of LA breakfast energy, macro- and micronutrients, and food groups intakes (grams) across tertiles of the daily NRF9.3 were carried out by the nonparametric post hoc multiple comparisons of Kruskal-Wallis rank sum test for each age group. Nutrient-based recommendations for a balanced breakfast were developed using pooled data of 8 LA countries. All analyses were performed with SPSS version 22 software.[33] The statistical significance level was set at $P < .05$.

RESULTS

Table 1 shows descriptive characteristics of the ELANS breakfast consumers according to NRF9.3 tertile, age group, sex, and SEL. Sex, age, and SEL were significantly different between tertiles of daily diet quality in adults ($P < .05$), although only sex was significantly different between NRF9.3 tertiles in adolescents ($P < .001$). Among adolescents, those with higher daily diet quality were more likely to be girls. Among adults, those with higher daily diet quality were more likely to be women, older (50-65 years old), and high SEL. No significant differences were found in NRF9.3 between countries, which confirms that tertiles were evenly distributed among each country.

Nutrient Intakes at Breakfast by Daily Diet Quality

Breakfast provided overall about 498 kcal in adolescents and 436 kcal in adults (Table 2, available at www.jandonline.org). The intake of most nutrients varied across NRF9.3 tertiles in the expected direction (ie, nutrients to encourage were higher—vitamins A and D, calcium, and potassium for adolescents and fiber, calcium, and potassium for adults) and nutrients to limit were lower (added sugar, saturated fat, and sodium for both groups) in those of tertile 3 compared with tertile 1. Energy content, carbohydrate, and total and saturated fat were higher in tertile 1 compared with tertile 3 for both age groups, and protein, thiamine, riboflavin, niacin, and iron were higher in tertile 1 compared with tertile 3 in the adults group.

Tables 3 and 4 show the nutritional intake of NRF9.3 tertile 3 at breakfast and the contribution of these intakes to the daily requirement values among adolescents and adults by country, respectively. Overall, breakfast was an important contributor (>20% DRV) to the intakes of protein and vitamin B complex (except B_6) and low contributor (<10% DRV) to the intakes of vitamin C and potassium. Breakfast was also an important contributor to the intake of carbohydrate, added sugar, total fat, and saturated fat as those nutrients' intakes were very similar to the daily recommendations.

Individuals in the highest NRF9.3 tertile (higher daily diet quality) had a median energy intake at breakfast of 410 kcal for adolescents (25% TEI) and 325 kcal for adults (20% TEI). The higher energy intake resulted in a higher contribution of breakfast to the intake of most nutrients in adolescents compared with adults.

When comparing the mean NRF9.3 score among countries, Colombia had the highest score in the upper tertile, and therefore was the country with the highest breakfast quality (Tables 3 and 4). This is mainly because Colombia had the highest intakes of most nutrients to encourage (6 of 9 in the adolescents and 7 of 9 in the adults) compared with the other countries. Also, this country's breakfast overcontributed (relative to energy) to the intake of protein and saturated fat and contributed to approximately half of the recommended daily intake of riboflavin, vitamin B_{12}, and vitamin D. On the other hand, Argentina had the lowest upper tertile NRF9.3 score, and consequently the lowest breakfast quality among the ELANS cohort. This is probably related to the lowest intake of most nutrients to encourage (7 out of 9 in adolescents and adults) and highest proportion of added sugar in relation to the daily referencea nutrient to limiteven though this country had the lowest intake of saturated fat and sodium (the other 2 nutrients to limit) in the adult group. It is also worth noticing the very low intake of vitamin D and zinc reported in the Brazilian breakfast for both age groups.

Food Group Intakes at Breakfast by Daily Diet Quality

The mean intake of food groups consumed per tertile of daily diet quality and age group at breakfast are shown on Table 5 (available at www.jandonline.org). Many food groups varied across tertiles in the expected direction (ie, higher intakes of reduced-fat milk and coffee/tea with milk [for both age groups] and fruits [only for adults]) and lower intakes of non–whole grains, crackers, butter/margarine in adolescents and adults and sweet bakery products, soft drink, coffee/tea without milk, sugar/honey, meats, and white rice only in adults of tertile 3 compared with other tertiles of NRF9.3, which resulted in a distinct contribution of nutrients by these food groups (data not shown).

Tables 6 and 7 show the frequency and mean intakes of food groups at breakfast analyzed only for the upper tertile of NRF9.3 among adolescents and adults. The 10 most frequently eaten food groups at breakfast by the upper tertile were white bread, rolls, and tortillas (60%); butter and margarine (40%); coffee and tea without milk (34% adolescents and 50% adults); whole milk (28% adolescents and 18%

Table 1. Descriptive characteristics of the 8714 breakfast consumers according to mean daily diet quality[a] determined by NRF9.3[b] tertiles, from the 2014-2015 ELANS[c] study

	NRF9.3 Tertiles[d] Adolescents (15-19 y; n = 1140)					NRF9.3 Tertiles[d] Adults (20-65 y; n = 7574)				
Characteristics	**Total**	**T1**	**T2**	**T3**	***P* value[e]**	**Total**	**T1**	**T2**	**T3**	***P* value[e]**
		←——— *n (%)* ———→					←——— *n (%)* ———→			
Sex										
Male	638	241 (38)	227 (36)	170 (27)	<.001	3533	1577 (45)	1207 (34)	749 (21)	<.001
Female	502	142 (28)	152 (30)	208 (41)		4041	950 (24)	1318 (33)	1773 (44)	
Age group (y)										
15-19	1140	383 (34)	379 (33)	378 (33)						
20-34						3290	1542 (47)	1122 (34)	626 (19)	<.001
35-49						2484	726 (29)	909 (37)	849 (34)	
50-65						1800	259 (14)	494 (27)	1047 (58)	
Socioeconomic level										
High	106	37 (35)	37 (35)	32 (30)	.462	738	205 (28)	254 (34)	279 (38)	.006
Medium	436	141 (32)	136 (31)	159 (36)		2912	966 (33)	971 (33)	975 (33)	
Low	598	205 (34)	206 (34)	187 (31)		3924	1356 (35)	1300 (33)	1268 (32)	
Country										
Argentina	126	42 (33)	42 (33)	42 (33)	.999	1005	335 (33)	335 (33)	335 (33)	.999
Brazil	204	68 (33)	68 (33)	68 (33)		1595	532 (33)	532 (33)	531 (33)	
Chile	112	38 (34)	37 (33)	37 (33)		728	243 (33)	243 (33)	242 (33)	
Peru	163	55 (34)	54 (33)	54 (33)		936	312 (33)	312 (33)	312 (33)	
Colombia	145	49 (34)	48 (33)	48 (33)		1051	351 (33)	350 (33)	350 (33)	
Costa Rica	116	39 (34)	39 (34)	38 (33)		657	219 (33)	219 (33)	219 (33)	
Ecuador	126	42 (33)	42 (33)	42 (33)		658	220 (33)	219 (33)	219 (33)	
Venezuela	148	50 (34)	49 (33)	49 (33)		944	315 (33)	315 (33)	314 (33)	

[a]Mean daily diet quality was calculated from the average of 2 nonconsecutive 24-hour dietary recalls (24HRs), for individuals who had breakfast in both 24HRs, and one 24HR, for individuals with breakfast in only one 24HR.
[b]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[c]ELANS = Latin American Study of Nutrition and Health.
[d]NRF9.3 score was calculated separately to divide the study participants into tertiles per country. NRF9.3 tertile score ranges for each age group were adolescents: tertile 1, 163-603; tertile 2, 345-649; tertile 3, 412-824; and adults: tertile 1, −36-647; tertile 2, 393-699; tertile 3, 479-856.
[e]Pearson χ^2 test; statistically significant difference indicated by $P < .05$.

adults); cheese (28% adolescents and 31% adults); eggs (26%); cooked cereal and flour (20%); vegetables (21% adolescents and 18% adults); fruits (20%); and coffee and tea with milk (18% adolescents and 27% adults).

Tables 6 and 7 also demonstrate the variety of foods consumed at breakfast between countries. Among adolescents, the upper tertile breakfast eaters in Venezuela distinguish themselves from other countries by the high frequency of consumption of butter/margarine, cheese, cooked cereals/flour (for both age groups), and vegetables, and all types of meat (for adolescents). In Colombia, breakfast is distinguished by the higher frequency of intake of all types of milk and eggs. In Costa Rica, there is a higher frequency of intake of white rice, beans/peas/legumes, and vegetables (for both age groups). Other distinguishing food groups included the higher frequency of intake of 100% juice (for both age groups), sugar/honey (for adolescents), and fruits (for adults) in Ecuador; the higher frequency of intake of smoothies/grain drinks (for both age groups), white bread/rolls/tortillas, and red meats/poultry/seafood (for adults) in Peru; the higher frequency of intake of coffee/tea with milk (for both age groups), white bread/rolls/tortillas (for adolescents), and butter/margarine (for adults) in Brazil; the higher frequency of intake of coffee/tea without milk (for both age groups) in Argentina; the higher frequency of intake of yogurt (for both age groups) and fruits (for adolescents) in Chile.

Nutrient Recommendation for Breakfast

Based on the analyses of NRF9.3 tertile 3 and the identification of food choices and nutrient intakes that were associated with highest quality diets, a proposed nutrient

Table 3. Nutritional intakes at breakfast by country among the 378 adolescents of the upper NFR 9.3[a] tertile who participated in the 2014-2015 ELANS[b] study[c]

Nutrients	ELANS (n = 378)	Argentina (n = 42)	Brazil (n = 68)	Chile (n = 37)	Colombia (n = 48)	Costa Rica (n = 38)	Ecuador (n = 42)	Peru (n = 54)	Venezuela (n = 49)	DRV[d]
	← *median (% DRV)* →									
Energy (kcal)	410 (–)	284 (–)	383 (–)	349 (–)	502 (–)	366 (–)	439 (–)	413 (–)	452 (–)	
Protein (g)	13.4 (26.8)	9.1 (18.2)	12.4 (24.9)	13 (26)	19.1 (38.2)	9.7 (19.4)	15.5 (31)	13.9 (27.7)	15.2 (30.5)	50 g
Carbohydrate (g)[e]	56.9 (55.3)	49.6 (65.6)	52.1 (54.2)	46.4 (53.2)	63.4 (53.3)	56.2 (58.4)	62.7 (55.5)	64 (62.4)	57.5 (47.9)	55%-75% TEI[f]
Added sugar (g)[e]	11.7 (10)	14.6 (20.7)	7.2 (7.9)	4.8 (5.4)	10.8 (7.9)	10.3 (10.8)	15.5 (12.6)	11.6 (11.8)	15 (10.3)	<10% TEI
Total fat (g)[e]	12.1 (28)	6.1 (19.7)	12.9 (31)	10.5 (30.2)	18.5 (29.2)	10.7 (26.5)	14.3 (30.4)	9.2 (22.3)	18.2 (36.1)	<30% TEI
Saturated fat (g)[e]	4.7 (10.5)	3.1 (8.7)	5.4 (10.6)	4.9 (13.8)	7.2 (12)	3.1 (8.3)	6.5 (12.8)	2.7 (6.4)	5.9 (10.5)	<10% TEI
Fiber (g)	2.9 (11.6)	1.6 (6.5)	2.3 (9.2)	2.4 (9.5)	3.5 (13.9)	3.6 (14.3)	2.9 (11.4)	3.4 (13.6)	3.6 (14.2)	25 g
Vitamin A (mg)	125.8 (14)	65.6 (7.3)	83.9 (9.3)	132.6 (14.7)	175.8 (19.5)	132.5 (14.7)	153.1 (17)	137.5 (15.3)	120.2 (13.4)	900 mg
Thiamin (mg)	0.4 (33.4)	0.3 (27.1)	0.3 (28)	0.3 (28.4)	0.5 (43.1)	0.4 (31.3)	0.4 (31.6)	0.4 (29.7)	0.6 (51.7)	1.2 mg
Riboflavin (mg)	0.5 (41.6)	0.4 (34)	0.5 (40.1)	0.5 (41.8)	0.8 (65.3)	0.4 (33)	0.5 (42.1)	0.4 (33.3)	0.5 (44.9)	1.2 mg
Niacin (mg)	3.7 (24.4)	2.8 (18.8)	2.9 (19.5)	3.1 (20.9)	5 (33.3)	3.3 (22.1)	4.3 (28.9)	3.6 (24.2)	5 (33.6)	15 mg
Vitamin B_6 (mg)	0.2 (16.9)	0.1 (8.7)	0.1 (11.4)	0.2 (15.5)	0.3 (25.5)	0.2 (14.8)	0.3 (21.8)	0.2 (14.9)	0.3 (24.8)	1.3 mg
Vitamin B_{12} (μg)	0.8 (31.8)	0.6 (25.8)	0.7 (28.8)	1.1 (44.1)	1.4 (59.5)	0.7 (27.4)	1.2 (50.8)	0.3 (11.7)	0.8 (31.6)	2.4 μg
Vitamin C (mg)	4.2 (4.7)	0.7 (0.7)	1.9 (2.1)	2.5 (2.8)	5.6 (6.3)	5.4 (6)	10.8 (12)	7.1 (7.9)	5.6 (6.2)	90 mg
Vitamin D (μg)	1 (19.6)	0.6 (11.2)	0.1 (1.9)	2.1 (41.6)	2.7 (53.8)	0.6 (12.1)	2.4 (47)	0.6 (12.7)	0.6 (12.5)	5 μg
Calcium (mg)	215.5 (16.6)	155.5 (12)	206.3 (15.9)	254.4 (19.6)	338.7 (26.1)	85.5 (6.6)	343.3 (26.4)	116.7 (9)	231.1 (17.8)	1300 mg
Iron (mg)	2.8 (15.5)	2.3 (12.7)	2.4 (13.2)	2.5 (13.9)	3.6 (20.3)	2.8 (15.7)	2.7 (14.9)	3.3 (18.1)	3.1 (17.3)	18 mg
Potassium (mg)	427.3 (9.1)	233.9 (5)	371.9 (7.9)	427 (9.1)	695.1 (14.8)	429.1 (9.1)	503.9 (10.7)	373.2 (7.9)	419.1 (8.9)	4700 mg
Magnesium (mg)	49.7 (11.8)	29.3 (7)	38.4 (9.1)	43.3 (10.3)	71.8 (17.1)	44.1 (10.5)	57.6 (13.7)	55.1 (13.1)	62.3 (14.8)	420 mg
Zinc (mg)	1.8 (16.2)	1.9 (17.2)	1.4 (12.7)	1.5 (13.7)	2.4 (21.9)	1.5 (13.6)	1.9 (17.1)	1.7 (15.4)	2.2 (20.3)	11 mg
Sodium (mg)	469.6 (20.4)	368.3 (16)	504.5 (21.9)	450.6 (19.6)	450.6 (19.6)	427.7 (18.6)	584.3 (25.4)	295.9 (12.9)	796.1 (34.6)	2300 mg
Mean NRF9.3 score	574.4	441.2	523.7	595.4	681.6	554.9	578.5	651.5	565.9	

[a]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[b]ELANS = Latin American Study of Nutrition and Health.
[c]Nutrient intakes and NRF9.3 score were calculated from the average of 2 nonconsecutive 24-hour dietary recalls (24HRs), for individuals who had breakfast in both 24HRs, and one 24HR, for individuals with breakfast in only one 24HR.
[d]DRV = Daily Reference Value.
[e]Expressed as percentage of breakfast energy. The other nutrients are expressed as percent of DRV.
[f]TEI = total energy intake.

Table 4. Nutritional intakes at breakfast by country among the 2522 adults of the upper tertile of the NFR 9.3[a] who participated in the 2014-2015 ELANS[b] study[c]

Nutrients	ELANS (n = 2522)	Argentina (n = 335)	Brazil (n = 531)	Chile (n = 242)	Colombia (n = 312)	Costa Rica (n = 350)	Ecuador (n = 219)	Peru (n = 219)	Venezuela (n = 314)	DRV[d]
	← *median (% DRV)* →									
Energy (kcal)	325 (–)	207 (–)	298 (–)	293 (–)	425 (–)	280 (–)	410 (–)	355 (–)	395 (–)	
Protein (g)	11.3 (22.6)	6.9 (13.8)	9.4 (18.7)	10.6 (21.1)	16.5 (33.1)	9.5 (19.1)	14.7 (29.4)	13 (26)	13.8 (27.7)	50 g
Carbohydrate (g)[e]	47.9 (55.3)	42.3 (65.4)	43.5 (55.4)	43.2 (57.3)	56 (51)	41.7 (55.1)	54.9 (51.8)	55.9 (57.1)	50 (49.6)	55%-75% TEI[f]
Added sugar (g)[e]	8.2 (9.5)	6.7 (11.3)	6.6 (8.5)	3.9 (5)	8.7 (8.4)	6.8 (9.8)	10.6 (10)	10.7 (11.2)	10.6 (10.1)	<10% TEI
Total fat (g)[e]	10.1 (28.1)	4.4 (19.1)	9.3 (29.3)	8.1 (25.5)	14.5 (31)	9.5 (28.1)	14.3 (32.1)	10.3 (25.1)	14 (33.4)	<30% TEI
Saturated fat (g)[e]	3.6 (9.9)	1.6 (6.6)	3.4 (10.2)	3.5 (10.4)	5.9 (12.3)	2.7 (8.4)	5 (10.7)	3.1 (7.6)	4.8 (11.5)	<10% TEI
Fiber (g)	2.7 (10.7)	1.3 (5.4)	2.2 (8.7)	2.2 (8.9)	3.2 (12.9)	3.7 (14.7)	3.1 (12.5)	3.5 (13.9)	3.3 (13.3)	25 g
Vitamin A (mg)	98.7 (11)	32.4 (3.6)	85.7 (9.5)	85.6 (9.5)	151.9 (16.9)	122.4 (13.6)	122 (13.6)	117.5 (13.1)	102.9 (11.4)	900 mg
Thiamin (mg)	0.3 (28.4)	0.3 (25.7)	0.3 (22.9)	0.3 (25.5)	0.5 (38.2)	0.3 (27.3)	0.3 (26.4)	0.3 (27.2)	0.6 (46.8)	1.2 mg
Riboflavin (mg)	0.4 (34.5)	0.3 (24.7)	0.4 (31.8)	0.3 (29)	0.7 (55.5)	0.5 (38.4)	0.4 (34.7)	0.3 (27.9)	0.5 (42)	1.2 mg
Niacin (mg)	3.2 (21.2)	1.9 (12.8)	2.7 (17.8)	3 (20.1)	4.3 (28.4)	2.9 (19.6)	3.6 (23.9)	3.3 (21.9)	4.8 (31.8)	15 mg
Vitamin B_6 (mg)	0.2 (13.3)	0.1 (9.6)	0.1 (8.8)	0.1 (11.3)	0.2 (18.3)	0.2 (11.6)	0.3 (20.1)	0.2 (13.8)	0.3 (20.3)	1.3 mg
Vitamin B_{12} (μg)	0.5 (22.4)	0.1 (6.1)	0.5 (19)	0.5 (21.6)	1.1 (45.1)	0.5 (20.1)	0.9 (37.8)	0.3 (13.1)	0.7 (30.7)	2.4 μg
Vitamin C (mg)	1.6 (1.8)	0.8 (0.9)	0.3 (0.3)	1.5 (1.7)	0.4 (0.5)	3.3 (3.7)	11.3 (12.6)	8.4 (9.3)	0.9 (1)	90 mg
Vitamin D (μg)	0.6 (11.8)	0.2 (4.4)	0.1 (1.1)	0.6 (12.4)	2.2 (44.6)	0.6 (11.9)	1.7 (34.5)	0.7 (13.3)	0.6 (13)	5 μg
Calcium (mg)	167.4 (12.9)	84.6 (6.5)	138.2 (10.6)	155.1 (11.9)	314.3 (24.2)	89.5 (6.9)	265.1 (20.4)	120 (9.2)	209 (16.1)	1300 mg
Iron (mg)	2.4 (13.5)	1.8 (10.1)	1.9 (10.5)	2.4 (13.4)	3.1 (17.2)	2.4 (13.5)	2.4 (13.6)	3 (16.9)	3.1 (17.1)	18 mg
Potassium (mg)	352.7 (7.5)	209.2 (4.5)	314.2 (6.7)	292.2 (6.2)	553.9 (11.8)	366.6 (7.8)	538.3 (11.5)	385.5 (8.2)	331.8 (7.1)	4700 mg
Magnesium (mg)	44.9 (10.7)	26.6 (6.3)	33.2 (7.9)	34.4 (8.2)	66.9 (15.9)	44 (10.5)	56 (13.3)	53.1 (12.6)	64.9 (15.5)	420 mg
Zinc (mg)	1.5 (14)	3.6 (32.5)	1 (9.1)	1.3 (11.9)	2 (18)	1.2 (11)	1.7 (15.1)	1.6 (14.2)	1.9 (17.1)	11 mg
Sodium (mg)	409.3 (17.8)	247.1 (10.7)	399.4 (17.4)	407.5 (17.7)	427.2 (18.6)	417.1 (18.1)	581.1 (25.3)	299.7 (13)	707.4 (30.8)	2300 mg
Mean NRF9.3 score [a]	627.1	539.2	579.5	634.6	729.7	640.3	618.5	688.7	613.4	

[a]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[b]ELANS = Latin American Study of Nutrition and Health.
[c]Nutrient intakes and NRF9.3 score were calculated from the average of 2 nonconsecutive 24-hour dietary recalls (24HRs), for individuals who had breakfast in both 24HRs, and one 24HR, for individuals with breakfast in only one 24HR.
[d]DRV = Daily Reference Value.
[e]Expressed as percentage of breakfast energy.
[f]TEI = total energy intake.

Table 6. Frequency and mean food group intake at breakfast (grams) among 378 adolescents of the upper NFR 9.3[a] tertile[b] who participated in the 2014-2015 ELANS[c] study

	ELANS (n = 378)		Argentina (n = 42)		Brazil (n = 68)		Chile (n = 37)		Colombia (n = 48)		Costa Rica (n = 38)		Ecuador (n = 42)		Peru (n = 54)		Venezuela (n = 49)	
Food group	%[d]	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD
Breads, rolls, tortillasnon—whole grain	61	70 ± 50	52	70 ± 41	81	76 ± 65	57	68 ± 21	58	77 ± 43	66	48 ± 20	60	73 ± 45	78	67 ± 60	20	85 ± 51
Butter and/or margarine	39	10 ± 8	14	9 ± 13	53	14 ± 9	49	7 ± 3	58	6 ± 3	29	8 ± 5	31	14 ± 12	13	8 ± 12	59	8 ± 5
Coffee and tea (without milk)	34	239 ± 163	57	304 ± 164	22	201 ± 137	8	201 ± 173	42	81 ± 72	37	303 ± 93	40	246 ± 19	24	346 ± 123	41	236 ± 247
Milk, plain or flavored, whole	28	261 ± 115	21	207 ± 130	26	273 ± 147	19	216 ± 23	65	273 ± 123	5	282 ± 14	38	268 ± 34	28	246 ± 96	16	296 ± 175
Cheese	28	42 ± 32	10	70 ± 56	18	39 ± 27	24	29 ± 13	25	38 ± 28	8	42 ± 30	43	48 ± 31	26	28 ± 15	69	48 ± 38
Eggs and omelets	27	58 ± 37	7	48 ± 67	7	34 ± 38	16	64 ± 59	67	71 ± 34	24	57 ± 29	33	52 ± 27	28	54 ± 31	35	50 ± 42
Cooked cereals (oatmeal and grits) and flour	21	44 ± 29	5	17 ± 18	12	77 ± 43	19	23 ± 16	33	34 ± 24	0	0	7	27 ± 10	4	42 ± 20	82	48 ± 25
Vegetables, excluding potatoes	21	65 ± 94	2	280 ± 0	4	242 ± 273	8	44 ± 14	21	98 ± 130	34	49 ± 81	24	52 ± 67	33	43 ± 33	41	51 ± 58
Fruits	20	169 ± 132	5	124 ± 28	18	150 ± 61	35	86 ± 66	33	248 ± 151	11	303 ± 219	31	217 ± 148	19	84 ± 56	8	122 ± 87
Coffee and tea (with milk)	18	303 ± 217	17	302 ± 19	40	267 ± 95	16	95 ± 135	10	564 ± 620	16	440 ± 277	7	257 ± 3	4	253 ± 81	22	334 ± 93
Milk, plain or flavored, nonfat/low fat or reduced fat	17	119 ± 129	12	105 ± 101	1	260 ± 0	35	250 ± 86	38	75 ± 119	34	152 ± 151	12	21 ± 9	0	0	20	27 ± 13
100% juice	16	276 ± 126	2	252 ± 0	13	372 ± 121	0	0	21	264 ± 75	11	214 ± 110	31	309 ± 130	20	290 ± 143	22	178 ± 94
Cured meats/poultry	14	37 ± 29	5	28 ± 11	15	33 ± 29	5	24 ± 13	17	42 ± 25	16	46 ± 46	7	27 ± 5	13	44 ± 43	29	34 ± 24
Red meat, poultry and seafood	13	81 ± 73	2	351 ± 0	7	92 ± 78	8	60 ± 40	15	102 ± 60	3	2 ± 0	10	101 ± 56	26	60 ± 57	29	72 ± 68
Rice, white	12	146 ± 75	0	0	3	47 ± 19	0	0	15	96 ± 37	32	156 ± 57	12	150 ± 58	28	197 ± 78	8	62 ± 25
Smoothies and grain drinks (licuado and horchata)	11	409 ± 214	2	712 ± 0	3	916 ± 93	0	0	0	0	0	0	31	461 ± 243	46	331 ± 123	2	353 ± 0
Fruit drinks	10	293 ± 227	10	540 ± 335	6	175 ± 195	16	213 ± 104	8	133 ± 110	21	232 ± 172	5	237 ± 112	2	126 ± 0	18	446 ± 231
Beans, peas, legumes	8	82 ± 62	0	0	4	89 ± 111	0	0	4	47 ± 5	39	96 ± 42	5	104 ± 107	11	69 ± 89	6	43 ± 28
Sugars and honey	7	10 ± 11	5	3 ± 0	7	8 ± 7	3	2 ± 0	6	20 ± 23	5	23 ± 22	12	12 ± 11	7	7 ± 4	8	6 ± 3
Sweet bakery products	7	42 ± 22	17	50 ± 29	3	55 ± 33	16	44 ± 19	10	38 ± 23	5	29 ± 11	2	24 ± 0	0	0	4	28 ± 11
Yogurt	6	203 ± 71	12	251 ± 65	7	197 ± 98	27	172 ± 55	2	207 ± 0	0	0	5	272 ± 55	2	162 ± 0	0	0
Crackers	6	49 ± 65	17	68 ± 103	15	48 ± 54	0	0	8	26 ± 5	5	30 ± 9	0	0	0	0	2	56 ± 0
Ready-to-eat cereals	6	57 ± 45	10	34 ± 14	0	0	8	83 ± 103	6	73 ± 25	18	67 ± 47	10	43 ± 15	2	22 ± 0	2	55 ± 0

(*continued on next page*)

Table 6. Frequency and mean food group intake at breakfast (grams) among 378 adolescents of the upper NFR 9.3[a] tertile[b] who participated in the 2014-2015 ELANS[c] study (*continued*)

Food group	ELANS (n = 378)		Argentina (n = 42)		Brazil (n = 68)		Chile (n = 37)		Colombia (n = 48)		Costa Rica (n = 38)		Ecuador (n = 42)		Peru (n = 54)		Venezuela (n = 49)	
	%[d]	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD
Breads, rolls, tortillaswhole grain	6	56 ± 51	2	28 ± 0	1	50 ± 0	11	68 ± 10	6	36 ± 24	8	32 ± 11	7	117 ± 133	15	47 ± 25	0	0
White potatoes	6	110 ± 87	2	40 ± 0	1	100 ± 0	0	0	4	176 ± 157	0	0	0	0	30	108 ± 88	4	102 ± 66
Jams, syrups, toppings	6	32 ± 55	5	15 ± 4	4	27 ± 24	11	18 ± 9	8	23 ± 14	11	69 ± 129	0	0	9	33 ± 29	0	0
Regular soft drinks	2	280 ± 64	2	249 ± 0	0	0	3	260 ± 0	2	355 ± 0	0	0	2	312 ± 0	2	161 ± 0	4	311 ± 0

[a]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[b]Mean food group intake and NFR9.3 tertile (for entire day) were calculated from the average of 2 nonconsecutive 24-hour dietary recalls (24HRs), for individuals who had breakfast in both 24HRs, and one 24HR, for individuals with breakfast in only one 24HR.
[c]ELANS = Latin American Study of Nutrition and Health.
[d]Percentage represents the frequency of food group intakes at breakfast per tertile.

recommendation for a balanced breakfast in LA based on 5 guiding principles separated for adolescents and adults was summarized in Table 8.

Principle 1 was based on the contribution of breakfast to daily energy intake. Among adolescents, the contribution ranged from 18% to 28% and among adults it ranged from 14% to 28%, depending on the country. As a result, a value closer to the midpoint of the range was proposed as a benchmark for setting a percentage of energy (%) and nutrient recommendations: for adolescents 25% and for adults 20% of daily energy. Based on a 2000 kcal diet, the recommend range of energy intake (kcal) at breakfast for the adolescents ranged from 400 to 600 kcal (18%-28% of 2000 kcal) and for the adults from 300 to 600 kcal (14%-28% of 2000 kcal).

Principle 2 was applied to protein, niacin, and vitamins B_6 and B_{12}, in which the median daily intake was higher than DRV. For adolescents, the target of protein and niacin was >20% and for vitamins B_6 and B_{12} was >10%. For adults, the target was >15% of protein, >15% of niacin, >10% of vitamin B_6, and >5% of vitamin B_{12}.

Principle 3 was applied to carbohydrates, thiamin, and riboflavin, in which the median population intakes were close to the reference values (DRV and Acceptable Macronutrient Distribution Range),[34] and breakfast contributed significantly to daily intakes of these nutrients (>25% for adolescents and >20% for adults). The target was then set to the average intakes range from individuals in the upper NRF9.3 tertile; therefore, >35% for thiamin and >40% for riboflavin among adolescents and >30% and 35% for adults. As for carbohydrates, the Acceptable Macronutrient Distribution Range recommendation of 45% to 65% of TEI was used.

Principle 4 was applied to calcium; fiber; vitamins A, C, and D; iron; potassium; magnesium; and zinc, since the ELANS population median intake was below the DRV and there was wide variation in breakfast contribution across countries in both age groups. The proposed target for each of these nutrients was determined by taking the highest percentage of intake observed in a LA country. In the case of vitamin D, calcium, and sodium, as higher percentage of intake in the range exceeded the mean energy contribution of breakfast (for example, vitamin D in adolescents ranged from 2% to 54% and mean energy intake was 25%), the mean energy contribution was used as target instead of the higher intake in the range. As sodium consumption should not be encouraged, the same principle was applied as a maximum threshold rather than the minimum requirement (<25% for adolescents and < 20% to adults).

Principle 5 was applied to added sugar, total fat, and saturated fat, in which the consumption should be limited. As a result, the proposal was to limit to 10% breakfast energy for sugars and saturated fat, and up to 30% for total fats.[21,24]

DISCUSSION

This study confirms the importance of breakfast on overall diet quality in both adolescents and adults. Among those with higher daily diet quality, breakfast was consistently shown to be a nutrient-rich eating occasion relative to its contribution to daily energy and a positive contributor of B vitamins, protein, and carbohydrates intakes, although it was a negative contributor of added sugar and total and saturated fat intakes for all countries. By observing the nutritional

Table 7. Frequency and mean food group intake at breakfast (grams) among 2522 adults of the upper NFR 9.3[a] tertile[b] who participated in the 2014-2015 ELANS[c] study

	ELANS (n = 2522)		Argentina (n = 335)		Brazil (n = 531)		Chile (n = 242)		Colombia (n = 312)		Costa Rica (n = 350)		Ecuador (n = 219)		Peru (n = 219)		Venezuela (n = 314)	
Food groups	%[d]	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD	%	mean ± SD
Breads, rolls, tortillasnon−whole grain	60	62 ± 34	41	56 ± 33	73	59 ± 25	72	70 ± 28	59	76 ± 51	60	51 ± 34	65	56 ± 33	76	55 ± 27	33	76 ± 36
Butter and/or margarine	40	10 ± 13	10	10 ± 6	58	13 ± 8	47	8 ± 5	52	7 ± 7	42	6 ± 5	33	11 ± 12	16	13 ± 50	52	9 ± 7
Coffee and tea (without milk)	50	269 ± 299	75	508 ± 447	43	162 ± 159	4	218 ± 154	57	115 ± 364	70	289 ± 119	58	224 ± 67	35	300 ± 83	54	243 ± 149
Milk, plain or flavored, whole	18	238 ± 152	8	146 ± 137	15	213 ± 163	8	260 ± 86	58	266 ± 155	2	36 ± 1	22	226 ± 101	16	265 ± 164	10	189 ± 141
Cheese	31	37 ± 25	9	37 ± 30	21	38 ± 29	26	40 ± 21	31	33 ± 21	28	27 ± 25	48	40 ± 24	24	28 ± 21	68	42 ± 26
Eggs and omelets	26	57 ± 35	7	43 ± 63	8	53 ± 62	14	57 ± 32	57	68 ± 34	41	54 ± 21	33	40 ± 21	32	58 ± 27	30	53 ± 30
Cooked cereals (oatmeal and grits) and flour	20	47 ± 50	1	66 ± 31	11	67 ± 49	11	32 ± 47	36	27 ± 12	7	42 ± 23	2	33 ± 19	6	201 ± 146	77	43 ± 22
Vegetables, excluding potatoes	18	62 ± 74	1	41 ± 13	4	48 ± 46	5	83 ± 48	22	102 ± 109	47	38 ± 65	31	77 ± 75	26	56 ± 57	25	50 ± 47
Fruits	20	176 ± 153	7	180 ± 155	23	161 ± 131	33	156 ± 174	18	252 ± 205	20	142 ± 125	34	228 ± 147	21	124 ± 86	8	161 ± 135
Coffee and tea (with milk)	27	252 ± 137	24	310 ± 117	51	227 ± 98	24	57 ± 98	22	241 ± 144	26	352 ± 136	16	257 ± 41	7	324 ± 149	26	344 ± 135
Milk, plain or flavored, nonfat/low fat or reduced fat	16	111 ± 138	12	146 ± 112	4	204 ± 232	28	234 ± 142	34	45 ± 74	25	90 ± 118	14	119 ± 118	2	368 ± 140	18	37 ± 76
100% juice	11	282 ± 190	4	204 ± 145	8	336 ± 234	2	148 ± 134	10	251 ± 110	5	290 ± 178	27	288 ± 171	25	329 ± 220	12	190 ± 119
Cured meats/poultry	13	28 ± 19	2	23 ± 10	9	25 ± 17	17	28 ± 14	12	34 ± 31	18	22 ± 16	9	33 ± 18	11	31 ± 19	28	29 ± 18
Red meat, poultry, and seafood	10	66 ± 50	1	49 ± 41	4	42 ± 31	2	40 ± 17	9	70 ± 50	11	39 ± 30	22	84 ± 54	25	70 ± 52	16	67 ± 54
Rice, white	9	121 ± 81	0	0	1	60 ± 17	0	0	12	101 ± 45	40	96 ± 59	16	124 ± 67	14	197 ± 106	2	75 ± 80
Smoothies and grain drinks (licuado and horchata)	9	357 ± 167	1	641 ± 459	2	291 ± 126	0	0	3	278 ± 174	2	347 ± 208	22	377 ± 162	44	354 ± 147	3	326 ± 193
Fruit drinks	5	244 ± 176	4	245 ± 153	5	206 ± 234	5	255 ± 290	3	172 ± 117	10	221 ± 142	1	238 ± 1	2	262 ± 82	9	324 ± 98
Beans, peas, legumes	6	70 ± 72	1	8 ± 11	1	25 ± 21	0	0	3	69 ± 60	42	76 ± 70	8	90 ± 121	6	26 ± 27	5	89 ± 47
Sugars and honey	8	10 ± 10	8	7 ± 6	6	15 ± 14	6	17 ± 15	13	7 ± 4	6	10 ± 10	9	5 ± 5	8	11 ± 10	6	13 ± 14
Sweet bakery products	4	49 ± 38	12	53 ± 42	4	55 ± 39	3	37 ± 39	3	29 ± 19	9	41 ± 30	1	40 ± 36	2	77 ± 14	0	140 ± 0
Yogurt	3	191 ± 86	1	182 ± 44	2	227 ± 114	11	154 ± 57	2	246 ± 133	0	0	4	241 ± 80	3	176 ± 82	0	249 ± 0
Crackers	11	29 ± 18	35	28 ± 14	12	29 ± 25	6	21 ± 8	8	33 ± 18	12	30 ± 11	5	39 ± 19	5	31 ± 22	3	26 ± 2
Ready-to-eat cereals	3	51 ± 47	4	34 ± 20	2	32 ± 30	6	38 ± 24	5	87 ± 72	5	40 ± 29	1	123 ± 25	2	15 ± 11	3	62 ± 44
Breads, rolls, tortillaswhole grain	10	64 ± 59	7	87 ± 50	7	46 ± 26	10	70 ± 32	11	91 ± 115	22	59 ± 42	14	62 ± 61	14	52 ± 24	2	48 ± 6
White potatoes	5	130 ± 122	1	112 ± 163	2	198 ± 222	0	0	11	135 ± 104	1	13 ± 13	7	85 ± 69	17	113 ± 97	3	251 ± 168
Jams, syrups, toppings	7	19 ± 13	21	18 ± 10	1	28 ± 18	19	20 ± 11	7	19 ± 13	5	10 ± 12	1	8 ± 4	2	33 ± 26	1	19 ± 15
Soft drinks	1	306 ± 122	1	330 ± 162	1	260 ± 60	0	0	0	332 ± 0	0	250 ± 0	2	213 ± 65	4	331 ± 131	2	338 ± 132

[a]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[b]Mean food group intake and NFR9.3 tertile (for entire day) were calculated from the average of 2 nonconsecutive 24-hour dietary recalls (24HRs), for individuals who had breakfast in both 24HRs, and one 24HR, for individuals with breakfast in only one 24HR.
[c]ELANS = Latin American Study of Nutrition and Health.
[d]Percentage represents the frequency of food group intakes at breakfast per tertile.

profile of the individuals with the best daily diet quality, along with the current international dietary guidelines, nutrient-based recommendations for a balanced breakfast were developed for the first time in LA. Also, by exploring the food groups most commonly consumed in the region and specifically for each country, inferences could be made about the food groups that should be encouraged or reduced by this population, respecting their cultural habits.

Diets that scored in the upper NRF9.3 tertile were associated with a better level of intake at breakfast of some key micronutrients such as vitamins A and D and calcium, although some variability was observed among age groups and countries. Previous studies have also shown higher micronutrient intakes and improved overall dietary adequacy in breakfast consumers.[35-37] Interestingly, energy content of breakfast was significantly higher in the bottom NRF9.3 tertile for both age groups, which could be explained by the higher intake of carbohydrate, protein (only in adults), and total and saturated fat of the individuals in this tertile. The differences observed in nutrient intakes are likely explained by the differences in food choice across the tertiles. In the bottom NRF9.3 tertile, for example, there was a higher amount and frequency of consumption of foods such as refined bread and butter/margarine for both age groups and all types of meat, rice, sweet bakery products, soft drinks, and sugar/honey in adults. On the other hand, the highest NRF9.3 tertile had a higher overall amount and frequency of consumption of healthy food groups such as low-fat milk (for both age groups) and fruits (only in adults). These findings are in line with the findings from IBRI participating countries[26-31] except for dairy groups (eg, yogurt, cheese), juices, and eggs, which did not differ across NRF9.3 tertiles in the present study.

It is noteworthy that the most frequently consumed foods at breakfast are not completely in agreement with the recommended breakfast composition outlined in the national guidelines available in LA.[7,8] White bread/rolls/tortillas was the most consumed food group by approximately 60% of all consumers of both age groups. On the other hand, the absolute level of intake of whole-grain products was low (<10% of consumers of both age groups). These observations might explain the low fiber intake and suggest that an increase in fiber content could be recommended to this population, including for those individuals with a better diet quality. Notably, fresh fruits were consumed at breakfast by only 15% of consumers of both age groups. Besides the low fiber consumption, these findings might also explain the low vitamin C intake, which clearly represents an opportunity for needed improvement. Considered together, the poor food choices at breakfast are likely contributing to the suboptimal intake of some nutrients at this meal (eg, high contribution of added sugar and saturated fat, and low contribution to vitamin C and fiber intakes), which could be improved by the higher consumption of fruits, vegetables, whole grains, and low-fat dairy and lower consumption of non–whole grains and animal and sugary products.

Age differences in breakfast micronutrient intakes were observed between adolescents and adults of the highest NRF9.3 tertile. Adolescents within the highest tertile had significantly higher intakes of vitamins A, B_{12}, D and calcium and potassium compared with the lowest tertile, whereas adults within the highest tertile had significantly higher intakes of calcium and potassium compared with the lowest tertile. Both age groups had lower intake of sodium in the highest tertile compared with the lowest tertile. Probably due to the high intake of carbohydrates and proteins, adults of the lowest tertile had higher intakes of niacin, iron, and sodium compared with the highest tertile. These findings underline the importance of breakfast as a micronutrient-rich meal, especially in adolescents, and reinforce the importance of maintaining healthful eating habits that continue when entering adulthood.[38]

Differences in breakfast nutritional quality and food composition were observed among participating countries. The highest score in the upper tertile reported in Colombia is likely to be driven by the best combination of nutrients to encourage and nutrients to limit (especially added sugar). This higher nutrient density could be explained by the large variety of food groups consumed in the Colombian breakfast (eg, refined bread, cereal, and flour; butter and/or margarine; coffee/tea; milk; cheese; egg; vegetables). Argentina, on the other hand, had the lowest upper tertile score, with breakfast typically low in micronutrients and rich in added sugar, which could be explained by a low diversity of food groups typically eaten in breakfast (eg, refined bread and grains and coffee/tea without milk). These findings are potentially influenced by the different average energy intake between countries (notably Argentina), but once more underline that the cultural diversity might have contributed to different breakfast composition and diet quality among LA countries. Furthermore, the wide range of intake observed for nutrients at breakfast, such as vitamin D, could be related not only to cultural habits, but also to differences in food fortification policies among the 8 countries.

The nutrient recommendations for breakfast were based on the existing LA breakfast intakes, considering the nutritional profiles of ELANS tertile 3 and conforming with the current DRVs. Therefore, they are realistic and feasible, aiming to maintain nutrient density while improving intakes for nutrients of public health concern (eg, added sugars, saturated fats, fiber, and vitamin D). This information could be applied in each country to support food choice recommendations based in quantitative data. For example, in Brazil, encouraging fruit intake at breakfast (which is a culturally acceptable intervention) could improve the fiber and vitamin C content of this meal; likewise, introducing a serving of protein and reducing the sugar intake in Argentina's breakfast would improve the quality of this meal. Despite considering the intake of each country as a unit, the proposed recommendations are close to the mean intake observed in the overall ELANS sample. In addition, the recommendations were divided by age group and expressed in percentage so it could be tailored to DRVs.

The main strengths of the present study include the use of a large multicenter representative sample of 8 LA countries, with simultaneous application of dietary recall over 2 individual nonconsecutive days across countries following a standardized methodology. This feature of the ELANS study enables the development of nutrient recommendations adapted to the current patterns of breakfast in the evaluated countries. The approach proposed by the IBRI project, based on optimal nutrients intake rather than food groups, was appropriate for the LA region, considering that breakfast possess distinct dietary patterns among LA countries, besides being different from

Table 8. Proposed nutrient recommendations for breakfast based on the average nutrient intake of adolescents and adults of the upper NFR9.3[a] tertile who participated in the 2014-2015 ELANS[b] study

	Adolescents (1-19 y)			Adults (20-65 y)			
		ELANS[c]			ELANS[c]		
Nutrient	Recommended	%kcal or DRV	Range	Recommended	%kcal or DRV	Range	DRV
Principle 1 (value closer to the midpoint of the range)							
Energy (kcal)[d]	400-600			300-600			
Energy (% TEI)[e]	25		18-28	20		14-28	
Principle 2 (lower range of the median intake of T3)							
Protein (% DRV)[f]	>20	27	18-31	>15	23	14-33	50 g
Niacin (% DRV)	>20	24	19-34	>15	21	13-32	15 mg
Vitamin B_6 (% DRV)	>10	17	9-26	>10	13	9-20	1.3 mg
Vitamin B_{12} (% DRV)	>10	32	12-51	>5	22	6-45	2.4 μg
Principle 3 (average intake range of T3)							
Thiamin (% DRV)	>35	33	27-52	>30	28	23-47	1.2 mg
Riboflavin (% DRV)	>40	42	42	>35	35	25-42	1.2 mg
Total carbohydrates (% kcal breakfast)[g]	45-65	55	52-66	45-65	55	51-65	45%-65% TEI
Principle 4 (value of the country with the higher percentage of contribution)							
Fiber (% DRV)	>14	12	7-14	>15	11	5-15	25 g
Vitamin A (% DRV)	>20	14	7-20	>17	11	4-17	900 mg
Vitamin C (% DRV)	>12	5	1-12	>13	2	0-13	90 mg
Vitamin D (% DRV)	>25	20	2-54	>20	12	1-45	5 μg
Calcium (% DRV)	>25	17	9-26	>20	13	7-20	1300 mg
Iron (% DRV)	>20	16	13-20	>17	13	10-17	18 mg
Potassium (% DRV)	>15	9	5-15	>12	8	4-12	4700 mg
Magnesium (% DRV)	>17	12	7-17	>16	11	6-16	420 mg
Zinc (% DRV)	>22	16	13-22	>18	14	9-18	11 mg
Sodium (% DRV)	<25	20	13-35	<20	18	11-31	2300 mg
Principle 5 (WHO[h] guideline values expressed as percentage of breakfast energy intake)							
Added sugar (% kcal breakfast)	<10	10	5-21	<10	10	5-11	<10% TEI
Total fat (% kcal breakfast)	20-30	28	2-36	20-30	28	19-33	<30% TEI
Saturated fat (% kcal breakfast)	<10	11	6-14	<10	10	7-12	<10% TEI

[a]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[b]ELANS = Latin American Study of Nutrition and Health.
[c]ELANS sample size was composed of 378 adolescents and 2522 adults of the upper NFR9.3 tertile.
[d]Based on a 2000 kcal diet
[e]TEI = total energy intake
[f]DRV = Daily Reference Values.
[g]% kcal breakfast = percentage of breakfast calories.
[h]WHO = World Health Organization.

European and North American countries studied in this project. Indeed, compared with IBRI recommendations, lower recommended values were observed in the current study specially for the nutrients of principles 2 and 4 and in the adults group. Finally, it should be noted that the present protocol based on highest daily diet quality could be used in future quantitative assessments of changes of dietary habits or to evaluate and follow up on nutritional interventions, which could be used for between- or within-countries comparisons.

The ELANS study group is aware that with the cross-sectional design of the project, causal and temporal inference is not possible. Also, as ELANS data represented the

dietary intake of the urban population of 8 countries of LA, caution should be used to extrapolate these findings to rural population or other countries of the region. Although dietary data from the rural population was absent, it should be highlighted that the majority of the LA population lives in the urban setting (64%-92% of the population).[39] Although the recommendations for a balanced breakfast were based on the midpoint of the range of intake of the highest NRF9.3 tertile, the average energy contribution of breakfast is used as reference to set guidelines for other nutrients (eg, principles 1 and 5). Therefore, countries where daily nutrient intakes are lower than the reference of the current study should approach the recommendations cautiously. It is important to note that data analyses were based on the two 24HR, which may be susceptible to some limitations, such as memory-related errors, underreporting of energy intake, and examiner effects.[40] Although it is a reliable instrument to assess nutrient intakes of populations,[41] it is possible that some subjects could have been incorrectly identified as "breakfast skippers" and therefore excluded from the final sample.

The results of the present study pave the way for future research of each LA country involved in the ELANS to explore food habits at breakfast and consequently tailor the nutritional recommendations for a balanced breakfast at a country level, investigating their specific strengths and windows of opportunity and allowing the adaptation for tangible targets according to local and feasible habits. These nutrient recommendations for balanced breakfast will be of value for health professionals, policy makers, educators, food manufacturers, food retailers, and researchers to assist consumers to optimize food choices at breakfast.

CONCLUSION

The current study showed that NRF9.3 provided a harmonized approach to identify high-quality breakfasts within each country. Individuals with higher daily diet quality (upper NRF9.3 tertile) had a higher intake at breakfast of nutrients to encourage (vitamins A and D, calcium, and potassium for adolescents and fiber, calcium, and potassium for adults) and lower intake of nutrients to limit (added sugar, saturated fat, and sodium for both age groups) compared with those with lower diet quality. These findings allowed the development of nutrient-based recommendations for a balanced breakfast for the first time in LA, which may contribute to a better nutrient intake and help LA breakfast consumers make healthier choices at this meal.

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AUTHOR INFORMATION

I. Kovalskys is an associate professor, Facultad de Ciencias Médicas, Pontificia Universidad Católica, Buenos Aires, Argentina. M. Fisberg is a coordinator, Excellence Center for Nutrition and Feeding Difficulties (CENDA-PENSI Institute), Jose Luiz Egydio Setubal Foundation, and an associate professor, Departamento de Pediatria, Universidade Federal de São Paulo, both in São Paulo, Brazil. A. N. Previdelli, is a professor, Faculdade de Ciências Biológicas e da Saúde, Universidade São Judas Tadeu, São Paulo, Brazil. J. L. Pereira is a postdoctoral fellow, Faculdade de Saúde Pública, Departmento de Nutrição, Universidade de São Paulo, São Paulo, Brazil. I. Z. Zimberg is a researcher, Departamento de Psicobiologia, Universidade Federal de São Paulo, São Paulo, Brazil. V. Guajardo is a professor, Facultad de Ciencias Médicas, Pontifica Universidad Católica, Buenos Aires, Argentina. R. Fisberg is an associate professor, Faculdade de Saúde Pública, Departmento de Nutrição, Universidade de São Paulo, São Paulo, Brazil. G. Ferrari is an associate professor, Laboratorio de Ciencias de la Actividad Física, el Deporte y la Salud, Facultad de Ciencias Medicas, Universidad de Santiago de Chile, USACH, Santiago, Chile and a researcher, Laboratorio de Rendimiento Humano, Grupo de Estudio en Educacion, Actividad Fisica y Salud (GEEAFyS), Universidad Catolica del Maule, Talca, Chile. G. Gómez is an associate professor, Departamento de Bioquímica, Escuela de Medicina, Universidad de Costa Rica, San José, Costa Rica. A. Rigotti is an associate professor, Centro de Nutrición Molecular y Enfermedades Crónicas, Departamento de Nutrición, Diabetes y Metabolismo, Escuela de Medicina, Pontificia Universidad Católica, Santiago, Chile. L. Y. Cortés Sanabria is an associate professor, Departamento de Nutrición y Bioquímica, Pontificia Universidad Javeriana, Bogotá, Colombia. M. C. Yépez García is an associate professor, Colégio de Ciencias de la Salud, Universidad San Francisco de Quito, Quito, Ecuador. M. Herrera-Cuenca is an associate professor, Centro de Estudios del Desarrollo, Universidad Central de Venezuela (CENDES-UCV)/Fundación Bengoa, Caracas, Venezuela. M. R. Liria Domínguez is an adjunct researcher, Instituto de Investigación Nutricional, La Molina, Lima, Peru.

Address correspondence to: Irina Kovalskys, MD, PhD, Facultad de Ciencias Médicas, Pontificia Universidad Católica, Av Alicia Moreau de Justo 1300, Buenos Aires C1107AAZ, Argentina. E-mail: ikovalskys@gmail.com

STATEMENT OF POTENTIAL CONFLICT OF INTEREST

M. Fisberg has received fees and consultancy payments from biotechnology, pharmaceutical, and food and beverage companies. M. Fisberg has also received fees and payments for consulting and financing research studies without any restrictions from government sources and nonprofit entities. The rest of the authors also have no conflicts of interest to declare. None of the entities mentioned had or have any role in the design or preparation of this manuscript.

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AUTHOR CONTRIBUTIONS

All authors were involved in the conception and design of the overall research plan. M. Fisberg, I. Kovalskys, G. Gómez, A. Rigotti, L. Y. Cortés Sanabria, M. Herrera-Cuenca, M. C. Yépez García, and M. R. Liria Domínguez designed and conducted the study and collected the data; M. Fisberg and I. Kovalskys had primary responsibility for the final content of the manuscript; I. Z. Zimberg and J. L. Pereira wrote the paper; A. N. Previdelli and J. L. Pereira analyzed data; V. Guajardo and G. Ferrari assisted with the interpretation of results and provided critical review of the manuscript. All authors read and approved the final manuscript.

Table 2. Mean energy and nutrient intake at breakfast of the 8714 breakfast consumers (1140 adolescents and 7574 adults) by NFR 9.3[a] tertile[b], from the 2014-2015 ELANS[c] study

	Adolescents (15-19 y; n = 1140)					Adults (20-65 y; n = 7574)				
	Overall	T1	T2	T3	*P* value[d]	Overall	T1	T2	T3	*P* value[d]
	← mean ± (SD) →					← mean ± SD →				
NRF9.3 score	518.5 ± 95	454.3 ± 84.6	518.2 ± 74.9	583.7 ± 77.1	<.001[e]	558.2 ± 98.4	481.7 ± 86.1	557.5 ± 71	635.6 ± 68.9	<.001[e]
Energy (kcal)	498 ± 286	545 ± 297	497 ± 305	452 ± 246	<.001[f]	436 ± 252	506 ± 294	436 ± 230	366 ± 205	<.001[e]
Protein (g)	16 ± 10.8	16 ± 10.6	16.4 ± 11.5	15.7 ± 10.3	.679	14.6 ± 10.6	16 ± 12.4	14.6 ± 9.9	13.2 ± 8.9	<.001[e]
Carbohydrate (g)	71.8 ± 40.6	78.5 ± 40.9	70.4 ± 41.5	66.4 ± 38.4	<.001[f]	63.7 ± 35.4	73.8 ± 41.2	63 ± 31.6	54.2 ± 29.6	<.001[g]
Added sugar (g)	18.6 ± 16.5	25 ± 20.8	17.1 ± 12.4	13.5 ± 12.5	<.001[e]	15.8 ± 15.2	22.4 ± 19.2	14.9 ± 12.4	9.9 ± 9.6	<.001[e]
Total fat (g)	17.4 ± 14.8	19.6 ± 16.6	17.7 ± 15.6	15 ± 11.2	<.001[g]	15 ± 12.6	17.7 ± 15.1	15.1 ± 11.8	12.2 ± 9.7	<.001[e]
Saturated fat (g)	6.5 ± 6	7.1 ± 7.1	6.6 ± 6.2	5.7 ± 4.4	.015[h]	5.4 ± 5	6.2 ± 5.9	5.5 ± 4.8	4.5 ± 3.9	<.001[e]
Fiber (g)	3.5 ± 2.8	3.3 ± 2.5	3.6 ± 3	3.7 ± 2.9	.284	3.4 ± 2.9	3.4 ± 2.8	3.4 ± 2.9	3.5 ± 3	<.001[e]
Vitamin A (mg)	163 ± 344.7	134.8 ± 139.7	171.9 ± 354.7	182.7 ± 460.3	.021[h]	142 ± 269.5	130 ± 155.5	139.2 ± 195.5	156.9 ± 394.2	.668
Thiamin (mg)	0.5 ± 0.4	0.5 ± 0.3	0.5 ± 0.4	0.5 ± 0.3	.196	0.5 ± 0.3	0.5 ± 0.3	0.5 ± 0.3	0.4 ± 0.3	.025[g]
Riboflavin (mg)	0.6 ± 0.4	0.5 ± 0.3	0.5 ± 0.4	0.6 ± 0.4	.333	0.5 ± 0.3	0.5 ± 0.3	0.5 ± 0.3	0.5 ± 0.3	<.001[e]
Niacin (mg)	4.8 ± 3.7	5 ± 3.7	4.9 ± 3.9	4.6 ± 3.6	.085	4.4 ± 3.2	4.9 ± 3.6	4.4 ± 3	3.9 ± 3	.005[g]
Vitamin B_6 (mg)	0.3 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	.166	0.3 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	<.001[e]
Vitamin B_{12} (μg)	1 ± 2.5	0.8 ± 1	1 ± 2.6	1.2 ± 3.4	.008[h]	0.8 ± 1.9	0.8 ± 1.2	0.8 ± 1.4	0.9 ± 2.7	.053
Vitamin C (mg)	19.3 ± 50.8	19.2 ± 62.7	16.3 ± 38.7	22.4 ± 48	.026[i]	17.8 ± 61.5	17.7 ± 67.9	17.8 ± 67.7	18 ± 46.3	.361
Vitamin D (μg)	1.3 ± 1.6	1.1 ± 1.4	1.2 ± 1.5	1.5 ± 1.8	.011[h]	1.1 ± 1.7	1 ± 1.7	1.2 ± 1.9	1.2 ± 1.7	.800
Calcium (mg)	231.2 ± 202.7	204.7 ± 180.8	233 ± 220.5	256.3 ± 202.3	.001[h]	197.4 ± 187.5	184.2 ± 186.7	196.7 ± 180.8	211.1 ± 194	<.001[f]
Iron (mg)	3.7 ± 2.9	3.8 ± 3	3.6 ± 2.7	3.5 ± 2.8	.147	3.2 ± 2.4	3.5 ± 2.3	3.2 ± 2.3	2.9 ± 2.6	<.001[e]
Potassium (mg)	471.8 ± 362.1	430.3 ± 311.5	467.3 ± 380.2	518.3 ± 386	.002[g]	436.9 ± 355.7	437.4 ± 367.4	424.6 ± 329.8	448.5 ± 368.3	<.001[e]
Magnesium (mg)	55.9 ± 37.1	52.7 ± 32.8	55.2 ± 38.4	59.9 ± 39.6	.051	53.1 ± 37.9	52.7 ± 37.5	52.3 ± 36.8	54.3 ± 39.4	.087
Zinc (mg)	2.2 ± 1.8	2.2 ± 1.8	2.2 ± 2	2.2 ± 1.7	.732	2.4 ± 3.7	2.6 ± 2.8	2.3 ± 2.3	2.3 ± 5.2	.217
Sodium (mg)	656.1 ± 1005.6	750.9 ± 1611.5	641.3 ± 479.8	574.8 ± 421.1	.016[h]	578.7 ± 584.7	658 ± 607.3	580.9 ± 429.9	496.8 ± 677.9	<.001[g]

[a]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[b]Mean energy and nutrient intakes at breakfast and the NFR9.3 tertile (for entire day) were calculated from the average of 2 nonconsecutive 24-hour dietary recalls (24HRs), for individuals who had breakfast in both 24HRs, and one 24HR, for individuals with breakfast in only one 24HR.
[c]ELANS = Latin American Study of Nutrition and Health.
[d]Kruskal Wallis test; statistically significant difference indicated by $P < .05$.
[e]T1 ≠ T2, T1 ≠ T3, and T2 ≠ T3.
[f]T1 ≠ T2 and T1 ≠ T3.
[g]T1 ≠ T3 and T2 ≠ T3.
[h]T1 ≠ T3.
[i]T2 ≠ T3.

Table 5. Frequency and mean food group intake at breakfast (grams) of the 8714 breakfast consumers (1140 adolescents and 7574 adults) by NFR 9.3[a] tertile[b], from the 2014-2015 ELANS[c] study

	Adolescents 15-19 y (n = 1140)					Adults 20-65 y (n = 7574)				
	Total	T1	T2	T3	*P* value[d]	Total	T1	T2	T3	*P* value[d]
	←mean (%)→					←mean (%)→				
Milk, plain or flavored, whole	252.87 (23.2)	254.7 (19.3)	240.9 (22.2)	261.1 (28.0)	.57	228.05 (16.7)	212.3 (14.0)	229.9 (17.9)	238.4 (18.2)	.09
Cheese	43.82 (30.8)	43.9 (29.3)	44.9 (35.1)	42.4 (28.0)	.78	39.09 (29.6)	41.4 (27.6)	39 (30.8)	37.1 (30.5)	.3
Yogurt	215.72 (4.7)	231.1 (3.9)	220.8 (3.7)	203.1 (6.4)	.94	200.05 (2.8)	209.5 (2.7)	199.5 (3.1)	191.2 (2.6)	.85
Red meat, poultry, and Seafood	70.19 (15.6)	63.6 (18.8)	69.5 (15.0)	80.7 (13.0)	.43	72.39 (14.8)	76.5 (19.0)	71.6 (15.0)	66.0 (10.4)	.02[e]
Eggs and omelets	55.01 (27.5)	52.6 (28.5)	54.5 (27.2)	58.1 (26.7)	.58	57.39 (28.0)	58.0 (28.9)	57.1 (29.3)	57.1 (25.9)	.84
Cured meats/poultry	39.50 (18.8)	40.4 (22.2)	40.4 (20.3)	36.6 (13.8)	.35	36.81 (16.7)	42.6 (19.9)	36.4 (17.6)	28.3 (12.6)	<.001[f]
Beans, peas, legumes	77.82 (6.4)	69.0 (5.0)	79.0 (6.1)	82.4 (8.2)	.86	71.90 (6.6)	71.1 (6.9)	74.9 (6.3)	69.9 (6.5)	.72
Breads, rolls, tortillas—non—whole grain	73.68 (62.5)	75.6 (61.6)	74.9 (65.7)	70.3 (60.3)	.04[e]	70.14 (62.3)	78.1 (61.8)	70.3 (64.8)	61.8 (60.2)	<.001[g]
Ready-to-eat cereals	55.96 (4.2)	66.6 (2.6)	46.8 (4.0)	57.3 (6.1)	.35	50.00 (2.4)	50.8 (1.4)	48.5 (2.4)	50.7 (3.2)	.93
Cooked cereals (oatmeal and grits) and flour	49.30 (17.9)	52.9 (17.0)	52.1 (16.1)	44.1 (20.6)	.11	46.94 (18.2)	46.2 (17.1)	47.6 (17.7)	47 (19.7)	.021[h]
Crackers	48.89 (7.0)	59.5 (8.1)	35.7 (6.6)	49 (6.4)	.005[i]	35.10 (9.8)	41.7 (8.9)	35.9 (9.3)	29.2 (11.2)	<.001[i]
Sweet bakery products	69.65 (7.6)	89.1 (9.9)	67.7 (6.3)	42.0 (6.6)	.08	61.39 (5.7)	68.3 (7.4)	61.4 (5.3)	49.3 (4.2)	.001[e]
Fruits	155.57 (15.3)	131.5 (10.7)	155.7 (15.6)	168.8 (19.6)	.32	156.11 (15.4)	132.7 (12.0)	148.5 (14.6)	176.2 (19.7)	<.001[f]
Vegetables, excluding potatoes	62.44 (20.1)	65.6 (19.3)	57.0 (20.3)	64.8 (20.6)	.62	61.55 (20.4)	65.7 (22.6)	56.6 (20.9)	62.1 (17.6)	.16
White potatoes	119.35 (4.4)	157.3 (2.9)	106.9 (4.5)	110.0 (5.8)	.97	125.49 (5.3)	140.4 (5.6)	105 (5.1)	129.6 (5.1)	.2
100% juice	265.27 (15.8)	259.1 (18.3)	261.7 (13.5)	275.6 (15.6)	.52	266.81 (13.6)	253.9 (16.0)	269.2 (13.5)	282.3 (11.2)	.52
Regular soft drinks	350.68 (6.8)	381.2 (13.1)	299.1 (5.3)	280.0 (1.9)	.15	371.84 (4.5)	403.5 (9.0)	308.3 (3.0)	305.8 (1.4)	<.001[i]
Coffee and tea (without milk)	247.17 (36.5)	258.5 (38.4)	242.4 (37.7)	239.4 (33.3)	.3	284.50 (50.2)	307.3 (50.2)	276.7 (50.8)	269.4 (49.6)	<.001[g]
Butter and/or margarine	12.47 (43.1)	14.0 (47.8)	13.4 (42.2)	9.5 (39.2)	.002[e]	11.91 (45.0)	14.0 (47.5)	11.5 (47.1)	9.8 (40.3)	<.001[g]
Sugars and honey	13.35 (10.0)	14.5 (13.6)	14.0 (9.5)	10.2 (6.9)	.2	14.36 (9.2)	18.6 (10.9)	12.8 (9.0)	10.2 (7.7)	<.001[i]
Milk, plain or flavored, nonfat/low fat or reduced fat	95.54 (14.5)	58.8 (13.3)	102.6 (12.9)	119.0 (17.2)	.01[e]	76.40 (13.7)	46.4 (12.0)	62.8 (13.5)	111.1 (15.7)	<.001[f]
Rice, white	171.94 (11.0)	203.4 (10.7)	168.3 (10.3)	146.4 (11.9)	.32	155.11 (10.3)	186.1 (12.0)	147.3 (10.2)	120.9 (8.6)	<.001[g]
Breads, rolls, tortillaswhole grain	52.15 (3.1)	32.3 (0.8)	49.7 (2.4)	55.7 (6.1)	.38	68.68 (5.8)	78.2 (2.3)	73.1 (5.0)	64.3 (10.0)	.1
Fruit drinks	262.65 (10.3)	253.6 (10.7)	241.8 (10.0)	293.2 (10.1)	.48	261.06 (6.4)	270.6 (7.8)	261.4 (6.8)	244.2 (4.6)	.44

(*continued on next page*)

Table 5. Frequency and mean food group intake at breakfast (grams) of the 8714 breakfast consumers (1140 adolescents and 7574 adults) by NFR 9.3[a] tertile[b], from the 2014-2015 ELANS[c] study (*continued*)

	Adolescents 15-19 y (n = 1140)					Adults 20-65 y (n = 7574)				
	Total	T1	T2	T3	*P* value[d]	Total	T1	T2	T3	*P* value[d]
Coffee and tea (with milk)	240.87 (18.6)	211 (17.8)	213.2 (20.3)	302.9 (17.7)	.01[f]	230.51 (25.5)	208.7 (22.9)	227.1 (26.6)	252.4 (27.0)	<.001[f]
Jams, syrups, toppings	33.32 (6.5)	43.6 (7.6)	21.2 (6.1)	32.5 (5.8)	.31	25.47 (6.6)	29.4 (6.2)	27.9 (6.9)	19.2 (6.6)	.05
Smoothies and grain drinks (licuado and horchata)	384.92 (9.0)	374.6 (7.3)	363.6 (8.7)	408.6 (11.1)	.81	361.51 (7.5)	370.3 (6.3)	359.6 (7.3)	356.8 (8.8)	.6

[a]NRF9.3 = Nutrient-Rich Foods Index 9.3.
[b]Mean food group intake and NFR9.3 tertile (for entire day) were calculated from the average of 2 nonconsecutive 24-hour dietary recalls (24HRs), for individuals who had breakfast in both 24HRs, and one 24HR, for individuals with breakfast in only one 24HR.
[c]ELANS = Latin American Study of Nutrition and Health.
[d]Kruskal Wallis test; statistically significant difference indicated by $P < .05$.
[e]T1 ≠ T3.
[f]T1 ≠ T3 and T2 ≠ T3.
[g]T1 ≠ T2, T1 ≠ T3, and T2 ≠ T3.
[h]T2 ≠ T3.
[i]T1 ≠ T2 and T1 ≠ T3.