

# SUPPLY AND NUTRITIONAL COMPOSITION OF SALADS IN THE FOOD COURTS OF SHOPPING CENTERS OF METROPOLITAN LIMA, 2014

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## ABSTRACT

**Objectives.** To assess supply and nutritional composition of the salads offered as an entrée main course in the food courts of the shopping centers in Lima, Peru. **Materials and methods.** The menus of all food franchises present in the food courts of the eleven shopping centers of Lima were reviewed. The nutritional composition of salads offered as an entrée were calculated for calories, protein content, carbohydrates, fats, cholesterol, fiber and sodium, and the adequacy of intake for a dinner (30% of a diet of 2000 kcal). **Results.** Salads as entrées accounted for 4.7% of the supply, and only 7 out of 17 franchises offered at least one salad. The average cost of the salads was higher than the other dishes (\$5.3 vs \$4.7;  $p < 0.001$ ). The average calorie content was 329 kcal and 2.7 g fiber; in relation to a dinner, we found a high percentage of adequacy for protein (172.9%), cholesterol (121.0%), and low adequacy for calories (54.8%), carbohydrates (23.1%) and fiber (36.4%). **Conclusions.** The salads that are offered in food courts in the shopping centers of Lima are scarce and more expensive, have little fiber content and are high in cholesterol. Strategies should be reviewed to improve the accessibility of quality salads offered in areas where only fast food is offered.

**Key words:** Cholesterol, dietary; Dietary fiber; Fast foods; Nutritive value; Vegetables (source: MeSH NLM).

## INTRODUCTION

Obesity is a global public health problem with a growing trend and affects between 36.9% and 38.0% of adult males and females worldwide, respectively<sup>(1)</sup>. Peru is not an exception, and the prevalence of people who are overweight and obese has tripled during the last 20 years<sup>(2,3)</sup>; it is also estimated that among Peruvian adults over 20 years old, 16.8% have metabolic syndrome, 13.3% have hypertension, 2.8% have diabetes mellitus, and 19.6% have hypercholesterolemia<sup>(4,5)</sup>. This obesity epidemic has been linked to the change in eating habits, sedentary lifestyle, technological advances, the lack

of time to cook at home, and the growing popularity of fast-food establishments that target the population with advertisements and promotions<sup>(6)</sup>. Obesity and overweight are not problems exclusive to developed countries because poorer populations are more susceptible to obesity, purely due to access to cheaper foods with higher caloric content<sup>(7)</sup> that are available in fast-food restaurants.

The expansion of shopping centers in urban areas has enabled many fast-food franchises to reach more people and thus to influence the health of the population because there is a link between the presence of these establishments

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and prevalence of obesity <sup>(8,9)</sup>. Fast food is consumed in high quantities due to its strong flavor, palatability, and wide availability and affordability. As its name implies, fast food is quick and easy to prepare and consume. In addition to offering low prices, such establishments have long service hours and thus greater availability to potential diners <sup>(10)</sup>. On the whole, fast food has nutritional characteristics that mean that its frequent consumption is not advisable. Some of these characteristics are high energy density due to the high quantity of fat (saturated fats and cholesterol) and carbohydrates; among the products offered by these restaurant chains, salads have the lowest caloric content <sup>(11)</sup>.

Shopping centers are a part of the new urban environment <sup>(9)</sup>; they have food courts that offer different types of fast food, a situation that is not unfamiliar to consolidated cities such as the Lima Metropolitan Area. Due to the limited range of foods considered healthy and the difficulty with identifying which of them are, when people go to shopping centers, they assume that salads would be the healthiest option. In addition, people in Lima eat more processed food—which is rich in saturated fats and simple sugars—as part of their daily diet <sup>(12)</sup>; they see fruit and vegetables as bland and boring <sup>(13,14)</sup> and therefore consume few of these foods <sup>(3)</sup>; processed foods receive a lot of publicity <sup>(3)</sup>; and there is a lack of nutritional labeling on products offered in restaurants in general and in franchises <sup>(15)</sup>. Nutritional education is limited in our country, causing a lack of knowledge in the population regarding the health effects and consequences of leading an unhealthy lifestyle.

For these reasons, the aim of this study was to analyze the range and nutritional composition of salads as a main dish (not a side dish) in food courts located at shopping centers in the Lima Metropolitan Area. Our study may help those who seek professional advice to make more informed decisions after gaining a clearer picture of the variety and nutritional quality of food offered at these establishments.

## MATERIALS AND METHODS

A cross-sectional study was conducted between July and August 2014. It was exempt from review by the Ethics Committee of the Universidad Peruana de Ciencias Aplicadas (UPC), and the study protocol was approved by the School of Nutrition and Dietetics of that university.

We included all shopping centers in the Lima Metropolitan Area that had a food court available at the time of the

study as well as all fast-food franchises (where food is paid for before being consumed) that were within these food courts. We conducted a census of shopping centers, franchises, and foods offered there. Each food court was visited and all dishes on the menu of each franchise were identified. Information was collected on the name, type of food, franchises, and cost of each dish in soles, converted into US dollars at the exchange rate on that date (\$1 to S/.2.80).

Any salad offered as a main course and not as a side dish was analyzed in this study. The term “main course” refers to dishes that are a complete option for lunch or dinner. In this case, they had to include a portion of a protein-rich food. Only salads were taken into consideration because they had previously been identified as the healthiest dishes at fast-food franchises <sup>(11)</sup>.

After that, two portions of every salad on the menu were bought; the same was done at different branches of the same franchise, and we registered the average obtained in the digital database. On the day of each purchase, each ingredient was separated and weighed using the direct weight method with a calibrated Krea brand digital scale for food, with a 10 kg capacity and sensitivity 1 g. The direct weight method involved separating all ingredients and weighing each one separately (each ingredient was weighed twice to minimize errors). The results of measuring the ingredients were entered into a Microsoft Excel spreadsheet to calculate the total amount of calories, proteins, carbohydrates, fats, cholesterol, sodium, and fiber by means of the digital version of the Peruvian food composition table <sup>(16)</sup> as well as the one from the United States Department of Agriculture (USDA) <sup>(17)</sup>. The percentage of requirements met was calculated on the basis of a normal adult diet of 2000 kcal and assuming that a lunch represents 40% of the daily intake and dinner 30% <sup>(18)</sup>.

The data were exported into an Excel database by double entry and exported to the STATA software v. 11.0 for statistical analysis. Categorical variables were described using absolute and relative frequencies, and the numerical variables by averages, standard deviation, and the range (maximum and minimum). The differences in the cost of the salads were evaluated in comparison with nonsalad items using the Mann-Whitney *U* test after checking for non-normality by the Shapiro Wilk test, assuming that  $p < 0.05$  denotes statistical significance.

**Table 1.** The variety of salads offered as a main course in food courts at shopping centers (CC) in the Lima Metropolitan Area according to franchise, dishes available, and costs (2014)

	Franchises		Dishes			Costs*		p value
	Total	Salad is offered	Total	Salad	(%)	Nonsalad dishes (%)	Salads (%)	
CC 1	11	2	229	7	(3.1)	14.8 (5.2)	15.5 (0.4)	0.710
CC 2	9	3	284	9	(3.2)	16.2 (5.6)	16.0 (0.9)	0.927
CC 3	7	3	170	9	(5.3)	12.9 (4.0)	16.0 (0.9)	0.020
CC 4	7	3	148	10	(6.8)	13.7 (5.0)	15.7 (0.4)	0.197
CC 5	6	2	111	4	(3.6)	14.6 (4.8)	16.2 (1.5)	0.510
CC 6	8	3	165	13	(7.9)	13.9 (4.1)	11.3 (4.8)	0.031
CC 7	8	2	174	6	(3.4)	16.8 (5.5)	14.5 (0.5)	0.320
CC 8	5	3	108	12	(11.1)	12.0 (3.1)	15.1 (0.8)	0.001
CC 9	9	3	284	9	(3.2)	16.2 (5.6)	16.0 (0.9)	0.927
CC 10	14	3	272	10	(3.7)	13.3 (3.9)	15.1 (0.9)	0.146
CC 11	4	2	87	6	(6.9)	16.9 (6.3)	14.5 (0.5)	0.344
<b>Total</b>	<b>27</b>	<b>7</b>	<b>2032</b>	<b>95</b>	<b>4.7</b>	<b>14.8 (5.2)</b>	<b>14.9 (2.4)</b>	<b>0.686</b>

\*Costs in *nuevos soles* (exchange rate S/.2.80 equals 1 USD), expressed as mean (standard deviation)

## RESULTS

A total of 11 shopping centers that had food courts in the Lima Metropolitan Area were assessed; these involved 27 different franchises. Only 7 of the 27 franchises offered at least one type of salad as a main course. We found that between two and three franchises in each food court had salads on the menu. Of the total number of dishes offered in the shopping centers, only 4.7% were salads; this figure varied among the shopping centers between 3.1% and 11.1% (Table 1).

The price of salads compared to other dishes was analyzed by shopping center and by franchise. There were no differences in the price of salads when we compared shopping centers, with all franchises included (Table 1). In contrast, when only those franchises offering salad(s) were evaluated, we found that the price of salads was higher (S/.14.8) than the price of nonsalad dishes (S/.13.6,  $p < 0.001$ , Table 2).

It is worth highlighting that, for Franchise 7, these salads were offered as a main course, but due to their size, it was doubtful that they would be consumed as such. For this reason, their consumption was assumed to be linked to other dishes, increasing the amount of money spent.

Nineteen types of salad that were offered as a main course were analyzed. Analysis of composition of the salads showed that, on average, salads contained  $329.0 \pm 124.5$  kcal (mean  $\pm$  SD), not counting the dressing. Macronutrients were as follows:  $25.9 \pm 8.9$  g of protein,  $20.8 \pm 10.3$  g of carbohydrates, and  $16.8 \pm 9.9$  g of fat. Regarding the lunchtime requirement (40% of the total daily intake) and dinnertime requirement (30% of the total daily intake), the average salad constituted 41.1% of kilocalories for lunch and 54.8% for dinner, 129.7% of protein for lunch and 172.9% for dinner, 17.3% of carbohydrates for lunch and 23.1% for dinner, and 64.5% of fats for lunch and 86% for dinner (Table 3).

**Table 2.** Differences in prices between salads offered as a main course and other main-course dishes available at franchises at shopping centers in Lima, 2014

	Price in US dollars		Price in soles		p value
	Nonsalad dishes (%)	Salads (%)	Nonsalad dishes (%)	Salads (%)	
Franchise 1	4.3 (1.2)	5.3 (0.0)	11.9 (3.3)	14.9 (0.0)	<0.001
Franchise 2	6.0 (2.8)	5.7 (0.0)	16.9 (7.8)	16 (0.0)	0.846
Franchise 3	3.7 (1.0)	4.9 (0.2)	10.3 (2.7)	13.8 (0.5)	0.004
Franchise 4	5.0 (1.5)	6.2 (0.2)	13.9 (4.3)	17.4 (0.5)	0.023
Franchise 5	6.6 (1.8)	5.1 (0.2)	18.6 (5.2)	14.3 (0.5)	0.021
Franchise 6	4.4 (1.0)	5.7 (0.0)	12.3 (2.8)	15.6 (0.0)	<0.001
Franchise 7	4.8 (1.1)	2.3 (0.3)	13.5 (3.1)	6.3 (0.7)	<0.001
<b>Total</b>	<b>4.7 (1.5)</b>	<b>5.3 (0.9)</b>	<b>13.6 (4.2)</b>	<b>14.8 (0.3)</b>	<b>&lt;0.001</b>

**Table 3.** Total nutritional value and data on the appropriate level for lunch (40%) and dinner (30%) for salads offered as a main course at shopping centers in Lima, 2014

	Amount*			Appropriate intake (%)**								
				Lunch***			Dinner***			Daily**		
	Average	(SD)	range	Average	(SD)	range	Average	(SD)	rango	Average	(SD)	range
Kcal	329	(124.5)	119.3-555.9	41.1	(15.6)	14.9-69.5	54.8	(20.8)	19.9 - 92.7	16.5	(6.2)	6.0–27.8
Proteins(g)	25.9	(8.9)	11.7-41.3	129.7	(44.8)	58.5-206.6	172.9	(59.7)	78.0 - 275.5	51.9	(17.9)	23.4–82.6
Carbohydrates (g)	20.8	(10.3)	6.0-37.5	17.3	(8.6)	5.0-31.3	23.1	(11.4)	6.7 - 41.7	6.9	(2.0)	2.0–12.5
Fat (g)	16.8	(9.9)	0.3-37.4	64.5	(38.0)	1.0-143.9	86.0	(50.7)	1.3 - 191.8	25.8	(15.2)	0.4-57.5
Cholesterol (mg)	108.9	(51.4)	54.9-266.8	90.8	(42.8)	45.7-222.3	121.0	(57.1)	61.0 - 296.4	36.3	(17.1)	18.3–88.9
Sodium (mEq)	321.9	(315.9)	52.2-1223.5	35.0	(34.3)	5.7-133.0	46.6	(45.8)	7.6 - 177.3	14.0	(13.7)	2.3–53.2
Fiber(g)	2.7	(1.6)	1.2-8.6	27.3	(16.2)	11.7-85.5	36.4	(21.7)	15.6 - 114.0	10.9	(6.5)	4.5–34.2

\* EGiven in units (grams or milliequivalents [mEq] as applicable)

\*\* Percentage depending on the international recommended daily allowance (RDA) for an adult diet of 2000 kcal

\*\*\*Where lunch represents 40%, and dinner 30%, of the recommended daily intake (18)

SD: standard deviation

Among the ingredients of the salads, the following were documented: animal protein (chicken, tuna, turkey, egg, prawn, octopus, or hamburger); carbohydrates (croutons, potatoes, sweet potatoes, local corn, and/or American corn); fruit and vegetables (tomato, lettuce, avocado, white onion, red onion, snow peas, mushrooms, pepper, cucumber, carrots, artichoke, and/or pineapple); dairy (parmesan, edam, and/or cheddar cheese); and miscellaneous foods (raisins, chips, peach juice, olives, fried sweet potato, and/or nuts).

It is striking that the average salad offered as a main course in food courts covers more than the appropriate cholesterol intake for dinner (121%) and is close to the upper boundary of the range for lunch (90.8%). Only 27.3% of the appropriate amount of fiber is covered for lunch and just a third (36.4%) for dinner. These findings imply that if a person opts for a salad offered at any of these franchises, whether for lunch or dinner, they will consume only 10.9% of the recommended daily allowance of fiber (Table 3).

## DISCUSSION

Our results proved that the variety of salads is limited, both by franchise and by shopping center. One of the factors that can be attributed to the limited assortment of salads is the eating habits of the Lima population, which are based primarily on carbohydrates and fats such as white flour, rice, noodles, and vegetable oils<sup>(12)</sup>. This situation contributes to the low demand on the part of the

consumers. The low demand is not only due to the habits of consumers but also to the perceptions regarding fruit and vegetables. These foods are seen as boring, associated with weight-loss programs, and bland<sup>(13)</sup>.

After the data collection in this study, a new shopping center opened in Lima that hosts two franchises in the food court, stating that they offer healthy food. This finding shows that the population of Lima is starting to become more conscious of their eating habits. This event suggests that the situation in food courts may reverse in the future, and a greater variety and number of healthy options may become available. A study on a university cafeteria in Lima showed that improving the visibility of healthy food (placing food near a cash register), adding nutritional information, and reducing the price are effective strategies to encourage the consumption of these foods<sup>(19)</sup>.

Of the franchises evaluated (9% of all franchises), only one included nutritional information in the description of their dishes and salads offered. This is unexpected because there are studies showing that when nutritional information on various dishes at a restaurant is available, customers are more likely to choose dishes with a smaller caloric content, especially if they are on any kind of diet<sup>(20,21,22)</sup>. Girz *et al.* found that when salads have nutritional labels, and they show that the salads contain few calories, people following diets prefer these dishes over other options. In contrast, if the nutritional label shows that a dish has high calorie content, then customers prefer to eat a different type of dish<sup>(20)</sup>. Under

this premise, a wider selection of salads with nutritional information should encourage their consumption.

This notion has caused regulatory organizations such as the US Food and Drug Administration (FDA) to establish new compulsory regulations regarding nutritional labeling of food sold in vending machines as well as for dishes on menus in franchises for more than 20 establishments, whether or not they specialize in fast food<sup>(15)</sup>. This initiative seeks to make the population more aware of the nutritional value of products they consume outside their home. This approach also enables the consumer to choose food on the basis of informed decisions.

We found that the prices of the majority of salads on offer were higher than those of other dishes on the menu. This situation could be due to the low demand for salads (for the aforementioned reasons); therefore, offering a wide variety of salads could cause losses for the franchise because of the short shelf-life of vegetables and other ingredients of salads. A study conducted by French showed that reductions in the prices of healthy food could be an effective strategy for increasing the consumption of this type of food, and therefore the sales. That study also suggests that this price reduction is a public health strategy that could be implemented by policy initiatives and with cooperation of the industry<sup>(22)</sup>. Powell *et al.* found that when the cost of fruit and vegetables is higher, the body mass index (BMI) in children is also higher, whereas when the cost of fast food is higher, their BMI is lower<sup>(23)</sup>. On the other hand, a study by Terry-McElrath *et al.* showed that when there is greater access to sweets and snacks rich in fat, consumption of fruit and vegetables among high school students is lower. These results can be extrapolated to the context of this study, meaning that potential consumers are likely to choose dishes rich in fat instead of salads in food courts of shopping centers. Nonetheless, that article does state that at the time of purchase, availability is not as significant in relation to this situation<sup>(24)</sup>. A good example is the price because if the price is increased, even though the product is available, just like the cheaper dish, a less expensive option is likely to be chosen. In addition, other studies have shown that levying a tax on fast food and provision of subsidies for healthier foods (fruit and vegetables) improve body weight of the consumers<sup>(20,23,25,26)</sup>.

There is definite rejection of fresh vegetables outside the home because these foods carry a greater risk of foodborne illnesses and the related health problems. There are studies suggesting that, on average, consumers perceive a moderate risk level when consuming raw vegetables in salads at restaurants, supermarkets, and fast-food establishments<sup>(27,28)</sup>. For

this reason, it is important for fast-food establishments to maintain appropriate hygiene and practices to address these problems, both in the establishment and among the staff, in order to instill greater confidence in potential salad consumers.

Finally, another noteworthy result is the low quantity of fiber and high level of cholesterol in the salads evaluated here, contrary to expectations. This is because the ratio of vegetables and animal protein in the salads is not appropriate: that is to say, a low proportion of vegetables and large amounts of animal protein and full-fat dairy products. A study at a university in the Lima Metropolitan Area revealed that the menu offered to the students does not cover even 50% of the fiber requirements for lunch; this phenomenon is considered undernourishment<sup>(29)</sup>. The article published by Ramel also shows that two similar products, where one is prepared from ingredients of higher nutritional value, have different effects on the body: one is more beneficial than the other while having the same palatability<sup>(30)</sup>. This observation suggests that quality of ingredients should be improved as should the proportions in which these are used, in order to improve their nutritional value (to increase the amounts of fiber, reduce cholesterol, and prioritize the consumption of essential fatty acids and micronutrients).

The main limitation of this study is the inability to analyze the composition of the dressings accompanying the salads evaluated. Weighing each type of salad twice could also be considered a limitation. Nevertheless, because franchises were evaluated and because one of their typical characteristics is standardization of processes, we assumed that it was appropriate to evaluate the sample only twice; we found minimal variation between the results. It would be worthwhile to conduct studies that analyze these dressings as well. Our study also shows the need to regulate the caloric labeling on food offered in the franchises evaluated, and to encourage greater availability of salads at prices similar to other products offered in food courts at shopping centers.

Another limitation is the lack of cooperation among franchises. This situation prevented evaluation of the amount of micronutrients in some of the protein preparations because the information was not sufficient for a successful analysis. This was also the reason why other dishes that could have been labeled as healthy were not evaluated. These dishes (food with a garnish or heated food, such as casseroles and stews) involve more complicated preparation: each individual ingredient cannot be identified in the final cooked version, and it is therefore impossible to analyze them using the direct ingredient-weighing method.

In conclusion, the findings of this study show that there is a limited variety of salads both at fast-food franchises and in food courts at shopping centers in the Lima Metropolitan Area. This situation, along with the fact that these salads, on the whole, are offered at a higher price than other dishes, contributes to the current trend of preference for calorie-dense foods instead of healthier alternatives.

On the other hand, the salads analyzed here have high cholesterol content and contain small amounts of fiber, thus misleading the consumers, who believe that they are eating a healthy dish. In order to resolve the problems found during this study, we propose that all dishes offered by a franchise have nutritional labels, and high-quality ingredients should be used in appropriate quantities.

This approach, in addition to the public health strategy that encourages each establishment to offer salad

options or food with low caloric density, could be the first step toward improvement of the nutritional value of salads offered as a main course and toward a greater variety of salads offered. Franchises that already offer salads can be encouraged to reduce the sodium and cholesterol content to make these dishes more attractive to consumers seeking healthy eating options.

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