

## Cartas científicas

**Assessment of actual food portions sizes in a sample of adolescents from Cochabamba (Bolivia)**

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Recent studies in Bolivia described increasing levels of overweight in women of childbearing age, adolescents<sup>1</sup> and university students,<sup>2</sup> while under nutrition remained highly prevalent in some regions.<sup>3</sup> Such epidemiological picture can be partially due to socio-economic disparities in food availability at household level.<sup>4</sup>

In 2004, a semi-quantitative food-frequency-questionnaire (SFFQ) was developed for estimating food intake of Bolivian school attending adolescents and compared with a three-days record.<sup>5</sup> Since some overestimations were identified, probably due to the use of adult portion sizes, a further calibration of the instrument by measuring actual adolescents' portion sizes was necessary. Hence, this study's purpose was to assess and report on the actual portion sizes, in weight (g) and household utensil as measurement units, of foods consumed by a sample of Bolivian adolescents.

The study lasted for 21 days during which the food intake of six participants from each age and gender (population: 12-18 yrs; half girls) was measured daily. In total 126 adolescents from Cochabamba's "Rivera De Guzman" primary and "Gonzalo Sanchez de Lozada" secondary schools were asked to participate, but only 88 returned complete and useful forms: 46 boys (mean age 13.9, SD 1.68) and 42 girls (mean age 14.6, SD 1.85). The age difference between genders was not significant ( $P > 0.05$ ). The majority of participants (62.5%) fell in the lower ages (12 to 14 yr). Gender was almost evenly distributed in the sample (48% girls). Informed written consent was obtained from each participant/guardian after the purpose, significance and the pro-

cedure of the study were fully explained. Each participant received detailed instructions on how to accurately weigh the food and beverages consumed in grams using an electronic digital scale (Tristar KW-2430 and Tristar KW-2431) and how to record the weights measured in the diary. The Ethical Committee of Universidad Técnica Privada Cosmos-Cochabamba approved the research protocol. Data analyses were performed with *SPSS v. 17* software and a P-value below 0.05 was considered as statistically significant.

Participants weighed the amount of food served using the common portion as defined in the dietary weighed record sheet. The total food served weight; the number of portions served and the household utensil used to estimate the portion were recorded. Any leftover of food after eating was weighed and recorded. Leftovers were subtracted from total weight of food served to obtain the actual quantity of food eaten. Portion size was calculated by dividing the actual quantity of food eaten by the total number of portions served. Table I shows the actual food portion sizes (using household utensils) of food items that are commonly consumed by adolescents in the city of Cochabamba by gender.

Some of the mean portion sizes differ substantially ( $P < 0.05$ ) between boys and girls. Boys reported bigger portion sizes for chicken, papaya, apple, watermelon, carrot, spinach, and ice cream. Girls reported bigger portion sizes than boys for fried pies, cheese, yoghurt, pineapple and tomatoes. These variations were probably due to different cooking methods applied, e.g. spinach salad vs. cooked spinach. Such variability supports our view of using average values for estimation of food intake based on the SFFQ.

This study succeeded to assess and report actual portion sizes consumed by adolescents from the Bolivian city of Cochabamba. It provides the most recent reference and recommendation of portion sizes to be used in the estimation of food intake based on questionnaires or recalls. The overestimation reported by previously published studies on Bolivian adolescents was refined and corrected.

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**Table I**  
Actual mean portion sizes (g) of food items commonly consumed by adolescents in the Bolivian city of Cochabamba by gender\*

Food item	Portion	Male		Female		Total		Food item	Portion	Male		Female		Total	
		Mean	SD	Mean	SD	Mean	SD			Mean	SD	Mean	SD	Mean	SD
Bread	1 Unit	46	4	36	5	40	5	Watermelon	1 Slice	114	0	27	0	70	16
Rice	1 Big spoon	69	6	57	4	63	5	Pineapple	1 Slice	60	0	76	0	60	32
Oat	1 Spoon	12	7	9	7	11	7	Fruit juice	1 Cup	127	29	85	15	106	31
Maize	1 Big spoon	15	0	15	0	15	0	Tomatoes	1 Slice	11	2	8	2	10	7
Wheat	1 Spoon	11	0	11	0	11	0	Lettuce	1 Spoon	8	6	3	2	6	5
Chimnoa	1 Spoon	18	0	18	0	18	0	Salad	1 Big spoon	13	0	20	5	15	4
Pasta	1 Big spoon	76	40	52	8	64	30	Soup	1 Big spoon	65	16	35	13	50	10
Cookies	1 Unit	16	1	10	3	13	4	Onion	1 Slice	18	5	13	5	15	5
Cakes	1 Unit	62	23	62	23	62	22	Carrot	1 Big spoon	37	33	18	15	27	27
Oven pies	1 Unit	75	0	57	0	66	3	Spinach	1 Big spoon	40	0	4	3	22	19
Fried pies	1 Unit	84	0	120	0	102	6	Avocado	1 Slice	136	0	136	0	136	0
Beef	1 Piece	75	9	72	8	75	8	Peas	1 Big spoon	35	37	35	37	35	36
Pork	1 Piece	126	0	100	0	112	7	Broad beans	1 Big spoon	39	15	19	5	29	15
Chicken	1 Piece	108	18	66	11	88	18	French beans	1 Big spoon	28	0	40	0	34	6
Ham	1 Slice	20	0	20	0	20	0	Lentils	1 Big spoon	30	0	30	0	30	0
Sausages	1 Unit	30	0	30	0	30	0	Other vegetables	1 Big spoon	95	15	60	10	80	15
Bacon	1 Piece	10	0	15	0	15	1	Ketchup	1 Spoon	15	4	15	5	15	3
Liver	1 Piece	40	0	30	0	35	5	Mayonnaise	1 Spoon	6	11	17	8	15	11
Organ meats	1 Piece	30	0	20	0	25	5	Mustard	1 Spoon	18	9	14	7	15	0
Tuna	1 Big spoon	20	0	25	0	23	3	Potato	1 Unit	50	10	76	26	65	24
Sardine	1 Big spoon	66	37	40	0	50	34	Dry potato	1 Unit	74	8	48	24	60	1
Pejerrey	1 Big spoon	15	0	23	0	19	4	Lisa	1 Big spoon	35	0	35	0	35	0
Other fish	1 Big spoon	67	0	45	36	56	27	Sweet potato	1 Unit	48	0	48	0	48	0
Milk	1 Cup	132	28	116	14	124	11	Casava	1 Piece	58	12	32	0	46	8
Cheese	1 Slice	9	4	27	14	20	14	Oca tuber	1 Unit	24	0	16	0	20	2
Yoghurt	1 Cup	149	16	211	131	180	91	Sugar	1 Tea Spoon	23	13	15	25	19	20
Butter	1 Spoon	8	0	5	2	5	4	Honey	1 Spoon	15	0	15	0	15	0
Eggs	1 Unit	60	1	26	1	55	1	Marmalade	1 Spoon	5	0	5	0	5	0
Banana	1 Unit	72	4	92	7	80	6	Milk marmalade	1 Spoon	5	0	5	0	5	4
Plantain	1 Slice	36	0	20	0	28	2	Ice cream	1 Spoon	33	17	14	10	24	16
Citrus fruits	1 Unit	117	0	105	0	111	2	Soft drinks	1 Glass	102	2	101	9	102	6
Papaya	1 Slice	129	0	48	0	87	14	Water	1 Cup	250	0	250	0	250	0
Apple	1 Unit	156	12	129	12	123	17								

\*Descriptive Statistics - Statistical Package for Social Sciences (SPSS) - Version 17.

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