

US Children's Diets and Restaurant Foods: The Importance of Portion Sizes

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Introduction

Larger portion sizes along with increased meals away from home may play a role in the increased prevalence of pediatric overweight and obesity. The Childhood Obesity Task Force Report requests restaurants to re-evaluate portion sizes, improve menu choices, and make healthy options the default choice. As part of a larger effort to include nutrient profiles of restaurant foods in the USDA National Nutrient Database for Standard Reference (SR), portion information was collected by USDA's Nutrient Data Laboratory for use in studies of dietary patterns of children. Food composition databases are based on 100 grams where foods may not appear variable; however, when accounting for portion size, nutrient levels are notably different. Samples of high consumption children's menu items (macaroni and cheese and chicken tenders) at four popular national family-style restaurant chains were identified, obtained for analysis and serving size information collected.

Methods

Sampling: In December 2008, sample units of chicken tenders and macaroni and cheese from the children's menu were collected from four popular nationwide family-style restaurant chains in 12 statistically selected locations in the 48 conterminous states. The family-style restaurant chains were identified using a multistage, stratified sampling plan developed for the National Food and Nutrient Analysis Program (NFNAP)¹.

Analyses: The sample units were randomly grouped into 6 subgroups of 2 each and composited according to previously developed protocols for NFNAP. Values for proximates, vitamins, minerals and fatty acids were determined by USDA-approved commercial laboratories using validated AOAC methodology. Serving size weights on individual sample units were determined prior to compositing.

Quality Control: Analytical quality assurance was monitored through the use of appropriate standard reference materials (SRM) and in-house control materials.

Statistics: Mean, standard deviation, Kruskal-Wallis test ($p < 0.05$) using SAS.

Figure 1a. Variable Mean Portion Sizes of Children's Macaroni and Cheese

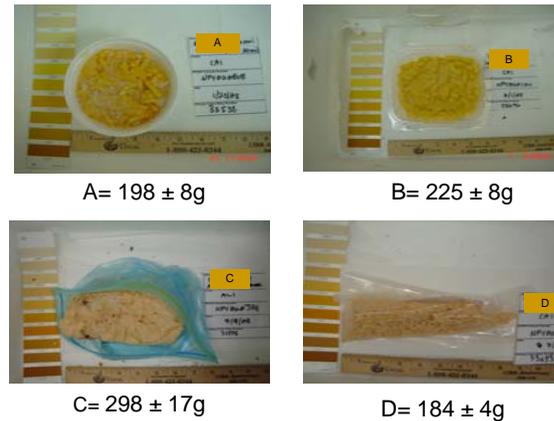


Figure 2a. Serving Sizes of Macaroni and Cheese by Restaurant



Table 1a. Mean and SD of Nutrient Values by Portion Sizes in Children's Macaroni and Cheese

	Energy (kcal)	Total Fat (g)*	Saturated Fat (g)*	Sodium (mg)*
Restaurant A	327	12.5 ± 2.3	4.87 ± 1.50	753 ± 37
Restaurant B	290	10.1 ± 0.3	3.55 ± 0.19	939 ± 17
Restaurant C	516	27.9 ± 4.8	11.9 ± 1.23	1069 ± 60
Restaurant D	270	7.9 ± 0.7	2.41 ± 0.5	584 ± 66

* Indicates significantly different ($p < 0.05$)

Figure 1b. Variable Mean Portion Sizes of Children's Chicken Tenders

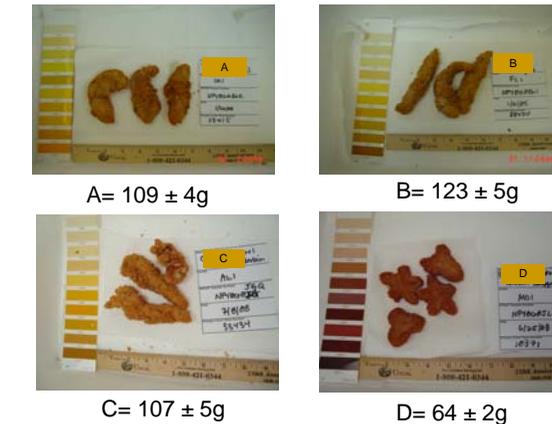


Figure 2b. Serving Sizes of Chicken Tenders by Restaurant

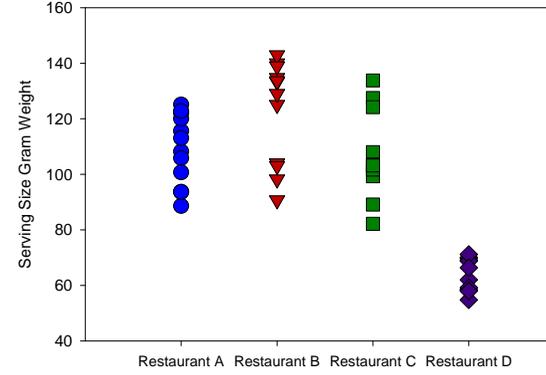


Table 1b. Mean and SD of Nutrient Values by Portion Sizes in Children's Chicken Tenders

	Energy (kcal)	Total Fat (g)*	Saturated Fat (g)	Sodium (mg)*
Restaurant A	289	15.3 ± 2.4	2.76 ± 0.37	605 ± 72
Restaurant B	320	17.1 ± 1.3	3.27 ± 0.29	645 ± 72
Restaurant C	304	16.1 ± 0.9	2.93 ± 0.27	732 ± 220
Restaurant D	202	14.3 ± 0.66	3.15 ± 0.15	420 ± 6

* Indicates significantly different ($p < 0.05$)

Results

Macaroni and Cheese

- Portion sizes varied by restaurant (Fig. 1a).
 - Mean serving size (Fig. 1a); range (Fig. 2a.)
 - Restaurant A: 198 ± 8g (n=12); range 177 - 247g.
 - Restaurant B: 225 ± 8g (n=12); range 200 - 250g.
 - Restaurant C: 298 ± 17g (n=10); range 227 - 395g.
 - Restaurant D: 184 ± 4g (n=12); range 160 - 211g.
- Portion size differences caused large variations in nutrient levels per portion (Table 1a).
 - Mean ranges of nutrients:
 - Energy (kcal) 270 - 516
 - Total Fat (g) 7.86 - 27.9
 - Saturated Fat (g) 2.41 - 11.9
 - Sodium (mg) 584 - 1069

Chicken Tenders

- Mean serving size (Fig. 1b); range (Fig. 2b)
 - Restaurant A: 109 ± 4g (n=12); range 89 - 125g.
 - Restaurant B: 123 ± 5g (n=12); range 91 - 143g.
 - Restaurant C: 107 ± 5g (n=10); range 82 - 134g.
 - Restaurant D: 64 ± 2g (n=12); range 55 - 71g.
- Portion sizes were less variable than the macaroni and cheese and consisted of 3 chicken tenders per serving from all restaurants, except restaurant D which served chicken nuggets (4/serving) (Fig. 1b and 2b).
 - Mean ranges of nutrients (Table 1b):
 - Energy (kcal) 202 - 320
 - Total Fat (g) 14.3 - 17.1
 - Saturated Fat (g) 2.76 - 3.27
 - Sodium (mg) 420 - 732
- Total fat, saturated fat and sodium were significantly different among restaurants except for saturated fat in chicken tenders.
- Actual serving sizes did not agree with restaurant Web site values when available, emphasizing individual restaurant variability in serving sizes.

Conclusion

These observations show the variability in nutrient intake depending on portion size served at different restaurants of high-consumption children's menu restaurant foods. These foods are being re-sampled to continuously update the current, accurate baseline data on restaurant food for the USDA National Nutrient Database and will be included in SR25².

References

- Perry CR, Pehrsson PR, and Holden J. A Revised Sampling Plan for Obtaining Food Products for Nutrient Analysis for the USDA National Nutrient Database. 2003. Proceedings of the American Statistical Association, Section on Survey Research Methods [CD-ROM], Alexandria, VA: American Statistical Association, San Francisco, CA.
- Nutrient Data Laboratory (NDL), Agricultural Research Service, US Department of Agriculture. 2012. USDA National Nutrient Database for Standard Reference, Release No.25. NDL Web site: http://www.ars.usda.gov/nutrient_data.