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Abstract

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Understanding nutrient intake in schools: The gap between served and consumed meals

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Given that children's dietary intakes often fail to meet national dietary guidelines, it is particularly relevant to focus on school settings, where children consume approximately 30% of their food/beverage intake [(1)]. However, we do not have current information on what children consume at school - only what they are offered. This study aimed to explore and compare the extent to which lunch served and consumed in primary schools with nurseries fulfils children's nutritional requirements.

This work is part of the FixOurFood project, a research program in school settings across Yorkshire, and followed the guidelines laid down in the Declaration of Helsinki (ethical approval number: HSRGC/2021/466/D). Using pre- and post-meal plate photographs from 1063 children across eight Yorkshire schools, we conducted an energy and nutrient analysis of food served and consumed during school lunch. Nutritional composition of the meals served and consumed was compared to government dietary recommendations [(2)] for children aged 4–10 years (averaged when values differed by age or sex) and adjusted to 30% (estimated proportion for lunch)[(3)]. The percentages of lunches served and consumed in schools meeting the energy and nutritional requirements of children were compared using a paired t-test, and the results were summarised as mean ± SEM.

For most nutrients, we found that the proportion of consumed meals that met dietary requirements was significantly lower than the served meal for: energy (67.7±1.2% vs. 86±1.2%), total (73.2±1.6% vs. 90.3±1.7%), saturated (86.4±2.4% vs. 104.8±2.7%), monounsaturated (69.7±1.7% vs. 84.3±1.8%), and polyunsaturated fats (66±1.5% vs. 85.7±1.7%), carbohydrate (61.5±1.2% vs. 80.4±1.2%), total sugars (182.4±4.6% vs. 229.1±5.1%), protein (187.7±3% vs. 235.4±2.8%), fibre (39.3±1.2% vs. 58.5±1.6%), sodium (78.1±1.6% vs. 96.1±1.7%), calcium (92.3±2.5% vs. 112.2±2.8%), iron (63.1 ±1.3% vs. 79.9±1.4%), and zinc (65.2±1.5% vs. 81.8±1.7%) ($p<0.001$).

This study provides the first data on children's actual school food intake in many years. Our findings show that while food that is offered to children provides a greater opportunity to meet dietary recommendations, children's actual consumption falls short, particularly for essential nutrients. When adjusting lunch to contribute approximately 30% of daily energy and nutrient intake, the consumed meals were insufficient (<66%) in key nutrients such as carbohydrates, fibre, iron, and zinc. Moreover, there was an overconsumption of total sugars and protein, exceeding the recommended levels. These imbalances highlight a significant gap in meeting children's nutritional needs. Therefore, a more comprehensive approach to school meal programs is needed, focussing not only on the nutritional value of the served food but also on the quantity children consume. Suggestions for future studies may include a closer examination of children's consumption habits and the development of strategies to increase consumption rates by offering more appealing, nutrient-dense alternatives. We may also recommend policy changes to balance the energy and sugar content of school meals.

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