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Experimental evaluation of strategies to reduce plate waste in primary schools
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Introduction:

Food waste has been an issue of concern at schools due to its nutritional, economic, environmental and social impact. Plate waste may be an indication that unappealing food is being served and that nutritional value of food is being wasted. Different strategies have been developed and implemented to reduce plate waste at school canteens: nutritional education; tailoring portion sizes to appetite and adjusting them to children nutritional needs; improving quality and appearance of foods served; recess scheduling before lunch; stimulating teachers to reduce children's food waste at school canteen.

The aim of the present study was to determine the effect of two different interventions at short and medium-term in reducing plate waste during lunch at Portuguese primary schools.

Methods:

The study involved fourth-grade children attending to three public primary schools from the municipality of Porto, which were chosen according to preliminary plate waste data: being the three out of 21 schools previously evaluated (ref) presenting the highest average plate waste. Throughout the municipality, the same menus are put forward for all the public schools at the same time.

At one school (A), nutritional education sessions designed for children and complemented with a "No Plate Waste Day".   Additionally, children with no wasted food were rewarded with a golden star sticker.

At another school (B), teachers were presented with a debate session about the causes and consequences of food waste and the importance of their presence during meals to promote plate waste reduction during school lunch. At this session, teachers were requested, whenever possible, to be present during school lunch and to play an active role encouraging children to eat their lunch. The third school (C) was taken as control, were no intervention occurred.

The effect of those interventions was evaluated through measuring of plate waste of soup and main dish, for all fourth-grade children, aged 9 to 10 years old. For each child, weighing of individual meals and leftovers was performed in three non-consecutive weeks, between February and May 2013: at baseline (T0), one week before the intervention; at post-test (T1), one week after intervention; and, finally, three months after intervention (T2). Plate waste was recorded for a total of 14 days, over 8 different menus. For this report, only menus served at T0, T1 and T2 were considered. Individual plate waste (%) was calculated as the ratio between food discarded and food served to the children. Variation of plate waste at short and medium-term was computed and comparison between interventions was also performed.

Results:

A total of 161 children, with mean age of 9.3±0.5 years old, was evaluated. Overall food waste at baseline was 34.9±30.2% % for soup and 50.6±26.1%% for main course, with differences between schools.

At school A, a decrease in soup waste was observed after intervention. Furthermore, the effect was greater at short-term (-11.8±13.6%) than at medium-term (-1.7±21.1%). Plate waste of main course strongly decreased at post-test (-33.9±25.4%), however it did not yield at medium-term (0.2±10.8%).

Intervention focusing in teachers had no marked effect in reducing plate waste at post-test. It was observed that, at T1, soup waste decreased -6.1±9.4% and main dish waste increased 3.7±18.0%. At medium-term, the effect of this intervention decreased slightly (-0.6±9.4%, for soup, and 0.2±10.8%, for main course).

 Regarding soup, when comparing the variation of food waste between schools, there was no significant medium-term effect. For both interventions there was a significant difference (p<0.05) towards the variation observed at the control school. Concerning main course, there was a significant decrease of food waste at school A, when compared to schools B and C. Nevertheless, at medium-term, both schools under intervention presented a significant difference (p<0.05) on food waste decrease, when compared to the control school.

Discussion:

In general, nutritional education sessions designed for children were more effective at short than at medium-term. In contrast, intervention focusing teachers showed better results three months after intervention than at post-test.

Moreover, both strategies had an effective result at medium-term plate waste reduction. Nutritional education designed for children should be done frequently, aiming at the adoption of behaviour towards reduced plate waste. Additionally, teachers should be encouraged to have their lunch with their students since they have an important role in modelling food habits at a longer term.