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Investigating the impact of replacing refined grain foods with whole-grain foods on fibre intake in the UK

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Whole-grain (WG) foods are a key component of a healthy diet linked to a reduced risk of chronic diseases such as CVD, Type 2 diabetes and cancers of the gastrointestinal tract⁽¹⁾. The beneficial effect of WG is associated, in part, with their dietary fibre (DF) content. In many countries higher intake of WG foods is advocated, primarily as a means of increasing DF intake. DF intake is universally low and so we wanted to explore whether higher WG intake would help populations achieve targets for DF intake. We used data from the UK National Diet and Nutrition Survey Rolling Programme, years 2008–2014 to explore the impact of substituting refined grain cereal foods with equivalent foods made from WG on DF intake in the UK population.

Substitution modelling was implemented on estimated 4-day food diary records from 4738 adult (>19y) and 4636 child (1.5–18y) participants. *Model 1* replaced refined grain bread with WG bread; *Model 2* replaced white pasta with WG pasta; *Model 3* replaced white rice with WG rice; *Model 4* replaced refined grain ready-to-eat breakfast cereals (RTEC) with WG RTEC; and *Model 5* considered the four Models combined. All substitution foods had to comply with the Healthgrain Forum WG Food Definition of >30 % WG and contain more WG than refined grain⁽²⁾. Because the UK NDNS reports DF as non-starch polysaccharide, this value was corrected using a factor of x1.33 to convert to AOAC DF. Paired t-tests were used to assess the differences between mean nutrient intakes before and after replacements.

The greatest number of substitutions were for bread products in *Model 1* involving 86 % of adults and 92 % of children. Less adults than children were involved in *Model 2* for pasta substitutions (27 % v 44 %) and *Model 4* for RTEC substitutions (24 % v 43 %). Similar numbers were involved in substitutions of rice in *Model 3* (26 % v 28 %). 94 % of adults and 98 % of children were involved in all four substitutions in *Model 5*. Baseline DF intake was 18.3 g/d for adults and 14.6 g/d for children. After all four substitutions in *Model 5* this rose to 21.7 g/d and 18.0 g/d, respectively. WG intake rose from 23.9 g/d to 74.4 g/d in adults and from 17.3 g/d to 63.3 g/d in children. Only 4.5 % of adults and children >16y met the UK recommendation of 30 g DF/d at baseline, and this rose to 10.2 % after substitution of all refined foods for WG foods in *Model 5*. For children aged 2–5y, 14 % met the 15 g/d target at baseline and 33.6 % in *Model 5*; for children aged 5–11y 10.5 % met the 20 g/d target at baseline and 28.3 % in *Model 5*; and for children aged 11–16y 4.7 % met the target at baseline and 15.5 % in *Model 5*.

Replacing refined grain foods with WG foods has the potential to improve dietary quality. Although fibre intake would increase significantly, it would still fall short of UK recommendations for all age groups. Thus, public health messages should focus on consuming WG alongside other high-fibre foods.

1. Seal CJ & Brownlee IA (2015) *Proc Nutr Soc.* **74**, 313–319.
2. Ross AB, van der Kamp J-W, King R, *et al.* (2017) *Adv Nutr* **8**, 525–531.