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Postprandial glycaemic response to white and wholemeal bread consumption between normal weight and overweight/obese healthy adults

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The impact of postprandial glucose response has been implicated in the development of chronic metabolic diseases, and obesity is an important risk factor(1). Few studies investigated the effect of body weight on postprandial glycaemic response. This study aimed to investigate the difference in postprandial glycaemic response to commonly consumed white and wholemeal bread in the UK(2) between normal weight and overweight/obese adults, and to investigate the difference in postprandial glycaemic response between white and wholemeal bread consumption in adults. Wholemeal bread contains higher dietary fibre than white bread, therefore is regarded as a healthier choice(3).

Twenty healthy adults were each given two slides of white or wholemeal bread alongside 150 ml of pure orange juice and 10 g butter on separate visits at random order after fasting for 12 hours. The white bread meal contains 369.5 kcal, 60 g carbohydrates, 17.8 g sugar and 3.6 g fibre, while the wholemeal bread meal contains 355.5 kcal, 48 g carbohydrates, 17.4 g sugar, and 5.6 g fibre. The blood glucose concentration was measured before taking meals, 30 min, 60 min, 90 min and 120 min postprandially by finger pricks using Biosen Blood Glucose/Lactate Analyser (EKF Diagnostics, Cardiff). Participants consumed the meal within 10 minutes and kept sedentary with only water consumption allowed during the study period. The participant information of age, sex, ethnicity, body weight and height, and fat composition measured by Tanita MC-980MA PLUS (Tanita Company, Tokyo) were collected on the first visit. The difference in the area under the curve and the peak value of the postprandial glycaemic response were analysed between different groups using the independent t-test or between different meals using paired t-test.

There was no significant difference in the area under the curve of postprandial glucose response between normal weight (n = 10) and overweight/obese (n = 10), between females (n = 12) and males (n = 8) or between white Caucasians (n = 13) and non-white (n = 7) participants, regardless of white or wholemeal bread consumption. However, the peak value was significantly higher in non-white than white participants (6.11 nmol/L *vs* 5.15 nmol/L, $P = 0.015$) after white bread consumption, while males showed a significantly higher peak value than females after the wholemeal bread consumption (6.22 nmol/L vs 4.78 nmol/L, $P = 0.021$). There was no significant difference in the area under the curve or peak values between white and wholemeal bread consumption.

The results indicated that body weight did not play significant role in postprandial glycaemic response to white or wholemeal bread consumption, and the dietary fibre content in the wholemeal bread used in the current study may not high enough to deliver the health benefit of postprandial glycaemic response. Further research is needed to include a larger sample size with power calculation to investigate the postprandial glycaemic response between sexes and different ethnicities.

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