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Relationships of food groups to bone health in females

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Background – Increased dietary protein has been implicated in increasing calcium loss and bone demineralisation. In contrast, a low dietary intake of protein has been found to increase fracture risk. The effect of the food sources of nutrients on bone health in free-living individuals is unclear.

Objective – To determine the association of food group intake with bone health measures in women.

Design – A cross-sectional study was conducted in 341 younger women (YW, aged 18-40 y) and 283 older women (OW, aged 41-68 y) involved participating in twin and sister studies of bone health. Food intake was estimated from one four-day food record. Measurements of total body bone mineral content (TBMC), hip and lumbar spine areal bone mineral density (BMD) were performed using dual energy X-ray absorptiometry (DEXA). Generalised linear modelling identified associations between predictor and outcome variables, adjusting for within twin/sister clustering, age, body weight and height, energy intake, lifetime cigarette smoking and physical activity level.

Outcomes – In YW, lean red meat ($\beta = 0.0002$ (se 0.0001)), white meat ($\beta = 0.0002$ (0.0001)), seeds and nuts ($\beta = 0.0014$ (0.0006)), were all positively associated with hip BMD, and fat-trimmed meat with spine BMD ($\beta = 0.0003$ (0.0002)). In OW, white meat ($\beta = 0.0002$ (0.0001)), sugars ($\beta = 0.0003$ (0.0001)), were positively associated with higher hip BMD, and non-fat trimmed meat with TBMC ($\beta = 1.503$ (0.725)). Egg intake ($\beta = -0.0004$ (0.0002)), however was related to lower hip BMD in OW.

Conclusion – In general, consumption of foods high in protein were associated with higher bone density. There were no detrimental effects observed on bone health with consumption of meat, including red meat, and some evidence that consumption of meat was related to higher bone density in women.

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The effect of dietary fibre source on the glycaemic regulation of extruded breakfast cereals

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Background – Extruded breakfast cereals are regarded as high glycaemic index food items. Previous research has shown that dietary fibre can reduce the rate of the glycaemic response of an individual. The extrusion process has the effect of significantly altering the physiological attributes of ingredients, however there exists a potential to utilise dietary fibres in reducing the glycaemic impact of extruded food products.

Objective – To quantify effects of differing dietary fibre inclusions into an extruded breakfast cereal product and determine the physico-chemical and nutritional properties of the extruded food products.

Design – A range of insoluble and soluble dietary fibres (guar, inulin, swede, resistant starch and wheat bran) were included into a wheat flour base preparation (at different concentrations 5, 7.5, 15% w/w). Extruded breakfast cereals were made from the base preparations. Expansion ratio, cereal texture and chemical composition were determined. In vitro starch digestibility was measured to determine the effect of dietary fibre and extrusion processing on readily, slowly digestible starch fractions.

Outcomes – Measurements of rapidly and slowly digestible for the dietary fibre enriched breakfast cereals were significantly reduced (of up to 30 %) compared to the standard breakfast cereal control (without fibre addition). Texture and expansion ratio of the breakfast cereals were not significantly affected by the inclusion of dietary fibre, illustrating that selected fibres may be included in commercial food samples to reduce the potential glycaemic response of these materials.

Conclusions – Early work demonstrates that the utilisation of dietary fibre in extruded breakfast cereals can significantly reduce the potential glycaemic response due to the ingestion of such food products. It is therefore possible to manufacture reduced glycaemic index extruded breakfast cereals.