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## Association of daily nitrate consumption with blood pressure and other risk factors for cardiovascular diseases in a representative UK population

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### Abstract

Dietary inorganic nitrate has been shown to lower blood pressure (BP) and improve endothelial function<sup>(1)</sup>. The main sources of dietary nitrate are vegetables (root and green leafy varieties) as well as drinking water but data available on dietary analysis software on nitrate levels in vegetables and vegetable-based foods is very limited. To date, very few studies have investigated the relationship between the level of consumption of dietary nitrate on BP and other cardiovascular disease (CVD) risk factors in a representative UK population. The aim of the study was to address this knowledge gap using data from the National Diet and Nutrition Survey (NDNS) years 1–8, a cross-sectional study conducted in 3339 men and women aged 19–64 y between 2008/09–2011/12. A comprehensive database was first developed to evaluate the nitrate and nitrite levels in vegetables, cured meats and composite dishes to more accurately estimate the dietary nitrate intakes of the NDNS participants. The population was then classified into quartiles of daily nitrate intake, with quartile 1 (Q1: 26–106 mg/d) and quartile 4 (Q4: 183–559 mg/d) representing diets with the lowest and highest intakes, respectively. ANCOVA analysis was performed to determine the relationship between the level of daily nitrate intake with available data on biomarkers of CVD risk (including BP (systolic, diastolic and pulse pressure), lipid profile, (total, high-density lipoprotein and low-density lipoprotein (LDL-C) cholesterol), C-reactive protein, anthropometric measures (body mass index and waist to hip ratio) and glycaemic control (glucose and glycated haemoglobin). There were significant differences in systolic ( $P$ -trend = 0.008) and diastolic ( $P$ -trend = 0.025) BP across increasing quartiles of dietary nitrate intake, with BP significantly lower in Q3 than all other quartiles. Pulse pressure (calculated as systolic–diastolic BP) was also found to be significantly different across quartiles ( $P$ -trend = 0.001), with diets of participants in Q3 and Q4 being associated with significantly lower pulse pressures than those in Q1 ( $P$ -Q1 vs. Q3 = 0.005,  $P$ -Q1 vs. Q4 = 0.007). All of the other CVD risk markers were not different between quartile groups. Our preliminary results suggest that the level of dietary nitrate intake may be significantly associated with BP, a key independent CVD risk factor. There is an urgent need to more accurately estimate the dietary nitrate intake in the UK population and to determine whether the source of dietary nitrate (vegetables vs cured meats) impacts on the significant relationship with BP.

### Conflict of Interest

There is no conflict of interest

### Reference

1. Hobbs DA, George TW, Lovegrove JA (2013) *Nutr Res Rev* 26, 210–222.