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Title: Sociodemographic variation in a novel behavioural risk factor index for cancer

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Background: Modifiable behavioural and environmental risk factors are estimated to cause 43% of cancers in the UK. Behavioural risk factors often cluster within individuals; particularly those from socioeconomically deprived backgrounds, exacerbating cancer risk. Previous studies of behavioural risk have typically summed the number of exposures. We propose a novel behavioural risk factor index which accounts for the relative contribution of each behaviour to cancer incidence by creating a weighted composite risk score.

Methods: A population-representative sample of English adults (n=2027; aged 18-70 years) participated in computer-assisted face-to-face surveys. Data were used to determine adherence to UK cancer prevention guidelines for tobacco smoking, body weight, alcohol, fruit and vegetable intake, and physical activity. Two indices were compared. First, the number of behavioural risk factors was summed (summary index). Second, a unique behavioural risk factor index was created by weighting the scores for individual behaviours according to their relative contribution to cancer incidence (weighted index). Knowledge of cancer risk factors was assessed using a subscale from the Cancer Awareness Measure. We also collected data on age, sex, ethnicity, marital status, education, social grade, self-rated health and cancer experience.

Results: In unadjusted analyses, male sex, older age, single relationship status, White ethnicity, lower education, lower social grade, poorer self-rated health and lower knowledge of cancer risk factors predicted higher scores on the weighted index (all p's <.05). These associations remained in adjusted regression models. For the summary index, sex, age, ethnicity, education, social grade, self-rated health and risk factor knowledge were also associated with higher scores (all p's <.05). However, age, sex, education and social grade were no longer statistically significant predictors after adjusting for self-rated health and cancer risk factor knowledge in multivariate regression analyses.

Conclusions: Independent of knowledge, there was greater demographic variation in behavioural risk when the severity of risk conferred by each type of behaviour was taken into account. We had not anticipated an association with White ethnicity, which deserves further study. A more nuanced understanding of demographic variation in behavioural risk profiles could inform population initiatives driven to reduce cancer incidence.