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What is the cost of Ultra-Processed Food (UPF) in the UK?

Introduction

Global consumption of ultra-processed foods and drinks (thereafter UPFs) has soared in recent decades, due to an increased market penetration and shifts in lifestyles and dietary behaviours (1,2). These UPFs are typically high in fat, salt and sugar, particularly free sugar, and low in micronutrients but also high in emulsifiers and artificial flavourings increasingly implicated as harmful substances (3,4). The association between high intake of UPFs and disease is increasingly evident (5) even if the mechanisms are not fully understood to an extent. A 2024 meta-analysis found direct associations between greater UPFs exposure and substantially higher risks of serious diseases. These included around 50% higher stroke and heart disease death rates (equivalent odds ratio 1.50, 95% confidence interval 1.37 to 1.63), Type 2 diabetes cases (odds ratio 1.40, 1.23 to 1.59), and common mental disorders (1.53, 1.43 to 1.63) (5).

However, the potential financial impact is poorly understood. We therefore conducted economic analyses of the cost of UPFs consumption in the UK, for these three important disease areas.

Methods

We estimated the Population Attributable Fraction (PAF) (6) of UPFs intakes for cardiovascular disease deaths, Type 2 diabetes incidence and the prevalence of combined common mental disorders (defined as depression, dysthymia, bipolar and anxiety), as categorised in the Lane et al. meta-analysis (2024).

We used odds ratios (ORs) to quantify each PAF (it was not possible to use relative risks for practical reasons, as detailed in the Statistical Footnote).

Most of the studies included in the Lane meta-analysis used the highest quartile of UPFs intakes as the high exposure. We therefore used the same definition to estimate the number of people exposed to high levels of UPFs in the UK.

We assumed that a) prevalence = incidence * survival, and that b) UPFs did not affect the duration of disease.

We searched for recent UK estimates of costs for diseases where there was high confidence of an effect of UPF on outcomes.

We inflated cost estimates to 2024 prices using the Treasury GDP Deflator (7).

Preliminary Results

We estimated that UPFs recently contributed to approximately 11% of cardiovascular deaths, 9% of patients developing Type 2 diabetes, and 12% of the combined common mental disorder outcomes in the UK.

The current annual cost of cardiovascular disease in the UK is estimated as £10bn in healthcare costs, plus £26 billion in indirect costs, making £36bn in total (8). Removing high UPFs intakes might reduce this burden by some £4bn.

The annual cost of diabetes in the UK is estimated as £16bn in healthcare costs, and £20bn in indirect costs, making a total of £36bn in 2024 prices (9,10). Removing high UPFs intakes might reduce this burden by approximately £3bn.

The annual cost of common mental disorders (defined as depression, dysthymia, bipolar and anxiety) in the UK is estimated as around £129bn in 2024 prices (11). Removing high UPFs intakes might reduce this burden by approximately £15bn.

Overall, reducing UPF intake would create benefits of around £22bn per year for these three disease groups (cardiovascular, type 2 diabetes, and common mental health).

Discussion

Our initial analysis suggests that ultra-processed foods and drinks make a substantial health and economic contribution to the UK burden of chronic disease.

This is the first economic analysis to quantify the potential costs of UPFs in the UK, using increasingly strong emerging evidence to focus on major disease areas.

Furthermore, this is likely to be a conservative estimate for four reasons.

Firstly, including impacts on other large disease burdens, such as cancer and gastrointestinal disease, could substantially increase these estimates. Future analyses will therefore need to include these and other major disease burdens.

Secondly, our initial analysis is much needed but remains preliminary and likely underestimates the true global costs. Although we have used the best available current evidence risks, we will need better quality evidence in future. That would then enable us to use relative risks rather odds ratios, and thus enable us to estimate PAFs more accurately.

Thirdly, in the next phase of this study, we propose to use the dose-response relations between UPF exposure and each adverse health outcome. That will allow us to overcome the current variability in the definitions of "high" UPFs exposure.

Fourthly, it is very possible that some disease risk has increased in recent years because of a) higher UPF consumption, b) increased calorie consumption and c) reduced physical activity.

Our Future Work

We plan to continue and improve this work on the cost of UPF as detailed above. Furthermore, many of these estimations are currently based on simple cross-sectional assumptions. Data from prospective cohorts would be better. We will therefore build on this initial work by considering the time of exposure to UPF of different cohorts and the relationship with disease risk.

We are also currently building a project to calculate the costs of UPFs in smaller geographic areas within the UK, such as in regions and individual local authorities. We will use our previously validated IMPACTNCD model (12) to evaluate the health benefits and cost-effectiveness of local and national policy measures to reduce UPFs consumption.

Conclusions

Poor diet and obesity account for a large part of the UK burden of chronic disease and death. Our initial analysis suggests that ultra-processed foods and drinks currently make a substantial contribution, but one which is eminently preventable. Fiscal measures such as putting VAT on cakes and biscuits could help, while also generating revenue to subsidise healthier options. Increasing the availability of cheap, ready-to-eat, minimally processed foods like prepared fruit and vegetables could then also form part of the solution.

Conflict of Interest

We declare no competing interests.

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Statistical footnote

We used odds ratios (OR) to quantify each PAF as risk ratios (RR) were not available in the meta-analysis we used. Although formulas exist to convert OR into RR, we could not do that for this study, because the OR values provided by the meta-analysis were adjusted for covariates. Those adjustments implied multiple shared baseline risk (13), which were not presented in the meta-analysis by Lane et al.