

Abstract

This study shows that the odds ratio between high Na intake and high BP is 7.71(CI 2.12,28.0).It also shows that UPF has no statistically significant correlation with high BP within a multivariable logistic regression model.

In univariable regression UPF shows a negative gradient with BP, and a stronger negative gradient with age balancing the relationship between age and BP. This suggests interaction between UPF, Na and Age.

Reduction of sodium intake may be effective at reducing the overall risk.

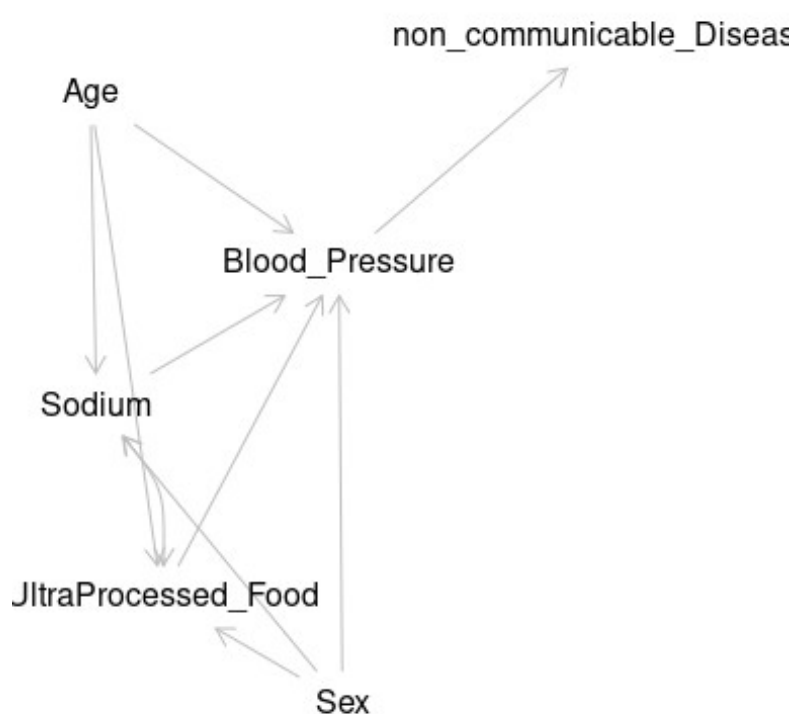
This is a secondary data study the national dietary and nutrition survey (1) which looked at BP and the effects of UPF and Na. BP is an important clinical and public health measurement, and is a proxy measure for CVD.

Policy should aim to reduce intake of Na and UPF and increase percentage intake of unprocessed foods. The accompanying literature review discusses aspects of policy and their effectiveness.

Introduction

There is evidence of an association between blood pressure (BP) and intake of Ultra-processed Foods (UPF) (2) and BP and Salt intake (3) from studies of different types in multiple countries. This study looked at this association in the data set of the National dietary and nutrition survey ((1)). The study gives data from 2008 to 2019. There have been changes in the intake of UPF, of salt and BP over that time. This study described those changes. As part of this description, I identify how BP is affected by these key dietary factors. I identify the role salt intake plays in the effect of ultraprocessed food on BP.

It seems that there are relationships between UPF, Na and BP and an onward relationship to non-communicable disease. There is an underlying importance of age and sex. This study explored this complex web pulling out strands within it, (**fig-diag1?**) shows a possible arrangement of this.



The relationships explored in the analysis

Public Health Impact

Public Health aims to reduce the burden of ill health across the population. BP is an indicator of the health of the population, in that it is a risk factor for a number of non-communicable diseases (NCD) (3).

Dietary approaches to improving public health are able to deliver proportionate and universal interventions to populations to reduce the incidence of NCD. When delivered up stream at the policy level they are effective and efficient and minimise cost.

Dietary approaches can also be used by individuals. This approach risks the development of a culture of blame of individuals. The commercial and social determinants of health play out a significant role in research, and delivery of public health improvements around food (4).

Epistemology

The epistemological approach of this study is positivist. I use a quantitative approach in a mechanistic and deterministic model. However, I am aware that this model is an incomplete description of the whole of reality. I am aware that the paradigm encourages experimental isolation. This attempts to isolate the study from the world through control of explanatory variables.

Real world application to dietary change requires understanding interaction with social and economic factors. Critical realist and social constructionist studies are needed to complement the information from this study. The commercial and social determinants of health are models which have a great deal of impact on the reality of dietary effects on BP and on the availability of UPF and on their nutritional constituents.

Positionality

In a positivist paradigm the observer is external to the experiment. Acknowledging that there are constructivist aspects to this study allows that the observer is closer to the model. My positionality is therefore of interest to interpretation of the model, and also to understand reasons for decisions about the approach to the data. I share with Jafar (5) an intention to lead in describing my positionality in this quantitative study.

From a biomedical background, I bring an attachment to positivist ideals. However, as a practising physician I am aware of the interaction of any number of social factors on the health of participants as Evans and Trotter (6) discuss. These impact on food 'choices', which might be determined by social expectations as much as by income, or geography. They also impact on 'hard' clinical measurements such as BP. This can also be affected by position and room temperature as well as by the relationship between the observer and the participant.

This work is primarily to complete requirements for an MPH degree which means that it is influenced by factors around health equity and classic epidemiology as taught on the course. It is produced in collaboration with a research group with a long established reputation in food research in public health, which may steer the results in a conservative direction.

In relying on NDNS I am aware that the reasons for ongoing funding for this study relate to its being established by the government department responsible for food policy in collaboration with that for health. These influences affect the development of the study and therefore the data collected and available.

Positivist 'grand isolation' may reduce the influence of these 'external' factors, but they remain as influences.

To proceed, I need to be aware of the limitations of the positivist approach. I need to make pragmatic selections to bring some degree of validity to the resulting dataset.

University Research Governance and Ethical Review

The ethics process for the University of Liverpool was followed and a certificate of compliance is attached at appendix 2.

The storage of the data is in keeping with the research governance agreements of the University and the Data set owners.

Research Question

What proportion of the association between blood pressure (SBP) and UPF intake can be explained by the changes in salt intake in England between 2008 and 2019?

The question can be split into parts,

What was intake of UPF between 2008 and 2019? What was intake of salt between 2008 and 2019? What was BP between 2008 and 2019?

Did each of these change over that time and how? Did the changes in any one affect any other? What are the sizes of the changes? Which element was most important in these changes?

All of these questions look for numbers as answers.

Answering the question starts with collecting a sample of participants. Measurements are taken, and then collated. The collected numbers are then compared in different ways to answer each part of the question.

Key Objectives

- 1 Literature Review of UPF and BP, with Na
- 2 Descriptive analysis of subjects from NDNS with amalgamation of data across the rolling programme.
- 3 Analysis for correlation between UPF and BP using regression models incorporating Na in different ways.
- 4 Discussion of implications of results in relation to limitations of study and data as well as suggestions for further research
- 5 Publication of findings in peer reviewed journal/ direct delivery to policy makers.