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EFFECTS OF INCOME, EDUCATION AND OCCUPATION STATUS ON DIET AND RISK OF OBESITY

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Key Findings

- Socioeconomic indicators (income, education and occupation status) are known to influence diet and diet influences risk of obesity.
- Our research confirms this, after allowing for a two way relationship between diet and obesity i.e. diet can influence obesity and obesity can influence diet.
- The comparative effect of having better educational qualifications on healthy eating is larger than the effect of higher income.
- Policies to tackle obesity should consider improving general education which may enhance use of knowledge and information about healthier diet and health benefits.

What problem was this research addressing?

Overweight and obesity are major contributors to the burden of chronic diseases, including coronary heart disease, hypertension, stroke, type 2 diabetes, certain types of cancer, and disability.[1] The estimated direct cost of overweight and obesity to the National Health Services increased from around £3.2 billion during 2003/2004[2] to £5.1 billion during 2006/2007[3]

Food based policies aimed at addressing the risk of obesity require an understanding of the link between socioeconomic indicators and the diet-obesity relationship. Such an understanding is central to education on healthy eating and disease prevention.

In separate bodies of research, relationships have been shown between socioeconomic indicators (income, education and occupation) and both diet and obesity. In another group of studies, these indicators have also featured as socioeconomic determinants of obesity. The direction of the relationship between diet and obesity remains unclear from these separate analyses. That is, whilst diet may be a determinant of obesity, those at risk of obesity may change their diet. The direction of relationship is important for deriving effective policy interventions to reduce obesity.

What this research adds

The present study[4] contributes to a better understanding of the interrelationship between diet, risk of obesity, and socioeconomic indicators. We apply a modelling framework that allows both diet and obesity (measured by body mass index, BMI) to be jointly determined by the same socioeconomic indicators.

Methods

The model estimated is based on the health production approach.[5,6] Here individuals or households use their resources to optimise their health (BMI), subject to certain constraints. Demographic characteristics (e.g. age, gender) and socioeconomic circumstances (e.g. income, education, and occupational status) will affect their ability to produce health; dietary intake is also an input into health production. We model a system of health and diet equations, with all equations having the same set of demographic and socioeconomic indicators as explanatory factors. We also allowed diet and health to determine each other by including diet in the BMI equation and BMI in the diet equation.[4]

Data used were from the 2000/2001 UK National Diet and Nutrition Survey (NDNS). The NDNS is a nationally representative survey of 1,724 individuals aged 19-64 living in private households in the UK. The NDNS survey provides cross-sectional information on: 112 food items consumed by the individual in the previous week; physical and anthropometric measurements obtained during nurse visits; and socioeconomic characteristics. Diet information was used to create eight common food groups: cereals and cereal products; milk and milk products; fat spreads; meat and meat products; fish and fish products; fruit and vegetables; and sugars, preserves and savoury foods. Socioeconomic variables included educational qualifications, occupation-based social status, and annual household income. During the model estimation we alternated between these three variables, as they might be affecting each other if they were used together in the same estimation.

A nine-equation model was estimated, comprising a BMI (health) equation and an equation for consumption of each of the eight food groups (measured in kilograms). The Table below shows selected results and the box highlights some key findings for those socioeconomic factors where BMI was significant. Full results are available in Olajide and Ludbrook.[4]

Research Highlights

- The effect of income on BMI was only significant for the highest income group.
- Income was associated with lower consumption of less healthy foods (fat spreads) and higher consumption of healthier foods (fish, fruit and vegetables).
- The middle income group were more likely to consume less healthy items (meat and meat products, and sugars, preserves and savoury foods) than those in the low income group.
- Education had a significant effect on BMI for all but the lowest level of qualifications.
- Education was associated with a healthier diet: fish and fish products, fruit and vegetables for all groups and cereal and cereal products in the most educated group.
- Better education was not associated with avoiding unhealthy food groups other than reduced meat intake, where the benefit may depend on the type of meat product.
- BMI is lowest for skilled workers, followed by the managerial / professional class and this is associated with a higher consumption of fish and fish products and fruit and vegetables.

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Policy relevance of the research findings

Both income and education were positively associated with healthier foods (e.g. fish/fish products, and fruit and vegetables), and these were associated with lower BMI, but the effect on the consumption of less healthy foods was not clear.

Individuals can change their diet behaviour towards healthier options when their socioeconomic circumstances improve, but different indicators have different effects. Looking at consumption of fruit and vegetables in the Table below, having a degree/vocational level education is associated with an increase in consumption of almost 1.5 kg (1500 g) per week compared with having no education whereas the highest income group has a 74 g per week increase compared to the lowest income group. In terms of daily portions (where 1 portion equals 80 g), the gap between the highest and no education groups is almost 3 portions a day compared with just under one portion a *week* when comparing the highest and lowest income groups.

Whilst both education and income improve dietary behaviour, their impact on healthy eating differs. The standard economic response to higher income is to increase consumption of all foods. However, we also observe substitution effects away from 'inferior' goods. Cereal products may be seen in this category (cheap and filling), with less being consumed as income rises, despite potential health benefits. The protective effect of higher educational attainment may be mediated by better use of knowledge and information about healthy eating and associated health benefits. Policies to reduce obesity should target education and not just income.

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Table: Selected results from a system of 8 diet and 1 health (BMI) equations from Olajide and Ludbrook (2012)

Variables	Cereals[a]	Milk	Eggs	Fat	Meat	Fish spreads	FruVeg	Sugars and savoury	BMI
No education.[b]									
Low education: School leaving certificate, 'O' grade, GCSE, etc.	0.037	-0.0542	-0.0082	0.00068	-0.034	**0.059****	**0.397*****	**0.807*****	0.121
Low mid education: SVQ, 'A' level, ONC, OND, C&G, etc.	0.0709	0.226	-0.0043	0.0046	**-0.117****	**0.132*****	**0.879*****	**0.690****	**-0.245***
Upper mid education: HNC, HND, etc.	0.080	0.118	-0.021	-0.0086	0.124	**0.104*****	**0.750*****	**0.537***	**-0.192*****
Degree /vocational equivalent	**0.491*****	**0.390****	-0.019	0.0058	**-0.323****	**0.112*****	**1.497*****	0.367	**-0.974****
Low income: Household income < £14,000 p.a.									
Mid-level income: Household income £14,000 - £30,000 p.a.	-0.0028	0.048	0.0073	0.0024	**0.187***	0.0066	-0.108	**0.596****	-0.0051
Upper level income: income £30,000 and above p.a.	-0.045	-0.223	0.017	**-0.020****	0.095	**0.058****	**0.074****	0.456	**-0.845****
Unskilled									
Skilled	0.091	0.126	0.0082	-0.0078	-0.095	**0.057****	**0.410*****	-0.0141	**-0.537***
Managerial/professional	-0.0104	-0.172	0.028	**-0.024*****	-0.025	**0.052***	**0.357****	-0.440	**-0.480****
R^2 [c]	0.155	0.048	0.034	0.094	0.064	0.090	0.191	0.097	0.059
N	**1,724**	**1,724**	**1,724**	**1,724**	**1,724**	**1,724**	**1,724**	**1,724**	**1,724**

Notes: The figures are the coefficients; those in bold and shaded are statistically significant at 1% (*** p<0.01), 5% (** p<0.05) and (* p<0.1);
[a] The name of each food group is shortened to preserve space. e.g. 'Cereals' refers to 'Cereal and cereal products', as described in the methods;
[b] Variables in italics are the reference groups; [c] The R2 shows the goodness-of-fit for each equation. Independence of equations was rejected (Chi2(36) = 428.381, P = < 0.0001.

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