Social Medicine & Population Health

RF31 EFFECT OF TOBACCO AND ALCOHOL CONSUMPTION ON POVERTY IN THE UK

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Background Tobacco and alcohol use are major risk factors for premature mortality, and treating illnesses associated with tobacco and alcohol consumption comes at a heavy financial cost. Tobacco and alcohol use also place a financial burden on household budgets. There is limited research, however, that explores the effect of tobacco and alcohol consumption on poverty, particularly in high-income countries. Our study aimed to investigate the financial impact of tobacco and alcohol consumption in low-income households in the UK.

Methods We used data from the Living Costs and Food Survey (LCF), an annual cross-sectional survey which collects information on the cost of living and spending patterns of households in the UK. We used data on weekly household income and expenditure on tobacco and alcohol from the 2016–17 LCF to determine the proportion of households spending on tobacco and alcohol and the proportion of poor households in the UK spending on these products. We defined households as living in poverty if their equivalised (i.e. adjusted to account for household size) net disposable household income before housing costs (BHC) fell below 60% of the median equivalised net household income (relative poverty). We also combined the LCF data with national population estimates to calculate the number of households, adults and children that would be classified as living in poverty if alcohol and tobacco expenditure were subtracted from household incomes.

Results The proportion of UK households spending on alcohol falls with decreasing affluence, from 83% of families in the highest income decile to 47% in the lowest decile. The proportion of households consuming tobacco increases with financial deprivation, from 8% to 24%. Of the approximately 5.1 million UK households that live in relative poverty, 26% of these households purchase tobacco and 14% purchase alcohol, spending a median of £12.50 and £9.55 per week respectively on these products. An additional 320,000 households comprising 590,000 adults and 175,000 children live on incomes below the poverty threshold after subtracting expenditure on alcohol; and 230,000 households, comprising 400,000 adults and 180,000 children, after subtracting spending on tobacco from household incomes.

Conclusion Tobacco and alcohol consumption place an additional financial burden on low-income households, which is likely to exacerbate the adverse effects of poverty. This type of study is associated with ethical as well as practical challenges, and further research is needed to understand the substantial burden of smoking on poor households and the implications for policymakers.

RF32

THE ASSOCIATION BETWEEN GESTATIONAL WEIGHT GAIN AND BIRTHWEIGHT IS PARTLY SELF-FULFILLING AND SHOULD BE INTERPRETED WITH CAUTION

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Background The practice of routinely weighing pregnant women to monitor their ‘weight gain’ is controversial. In the United States, the National Academy of Medicine (NAM) advises regular weighing and recommends ‘optimum’ gain targets according to pre-pregnancy body mass index (BMI). In the United Kingdom, the National Institute for Health and Care Excellence (NICE) advises against routinely checking women’s weight as pregnancy progresses.

This quite radical difference hinges on the believed causal effect of ‘gestational weight gain’ (GWG) on adverse pregnancy outcomes, such as macrosomia (birthweight ≥ 4 kg). However, estimating this is very difficult because some association is expected between GWG and birthweight, by definition, because the *total* maternal weight ‘gain’ implicitly includes the offspring’s weight. This study sought to highlight this problem and explore the size of this ‘tautological association’ in simulated data.

Methods Data were simulated using DAGitty R 0.2–2 to reflect three causal scenarios: 1) Birthweight caused by maternal height alone, 2) Birthweight caused by maternal height and maternal pre-pregnancy weight 3) Birthweight caused by maternal height, maternal pre-pregnancy weight, and maternal net end-of-pregnancy weight (i.e. ‘gain’).

GWG was constructed from [maternal net end-of-pregnancy weight + birthweight]–[maternal pre-pregnancy weight]. The odds ratios (ORs) for macrosomia by GWG were estimated by logistic regression, with and without conditioning on maternal pre-pregnancy BMI, constructed from [maternal pre-pregnancy weight]/[maternal height]². Simulation parameters were informed by full and partial correlations observed in the Danish National Birth Cohort.

Results Large associations were observed between GWG and macrosomia in all three scenarios, even though weight ‘gain’ only caused birthweight in the third scenario. The crude OR (95% credible interval) of macrosomia for GWG ‘above’ NAM guidelines compared with ‘recommended’ GWG were 1.26 (1.17–1.36), 1.34 (1.24–1.45) and 1.52 (1.41–1.65) respectively for scenarios 1 (birthweight caused by height only), 2 (height and pre-pregnancy weight), and 3 (height, pre-pregnancy weight, and end-of-pregnancy weight). Adjustment for pre-pregnancy BMI only modestly changed these associations, with ORs of 1.27 (1.18–1.37), 1.28 (1.19–1.39), and 1.42 (1.32–1.54) respectively.

Conclusion The apparent causal effect of maternal net weight 'gain' on birthweight (and hence macrosomia) is difficult to identify because the total maternal weight gain observed includes that of the offspring. A tautological association is therefore observed even when maternal weight has no causal effect on birthweight. Existing evidence regarding the 'effect' of GWG on birthweight should therefore be viewed with caution and should not be used to inform guidelines on 'ideal' gains in weight.

RF33

EVALUATION OF PUBLIC HEALTH INTERVENTIONS USING A COMPLEX SYSTEMS LENS: A CRITICAL REVIEW

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Background There has been a growth in interest in applying systems thinking to public health research: including greater consideration of the complex and changing nature of real-world environments within which public health interventions take place. In this paper we present the results from a critical review that asked the question: how can a systems approach be applied in the context of public health evaluation?

Methods A critical review of the literature was conducted to identify contrasting examples of systems approaches for in-depth comparison and analysis. To inform our protocol and identify relevant studies we held consultations with international researchers with relevant expertise (n=32). We tracked citations from previous reviews and searched Scopus, Medline and Web of Science from 01/01/14 to 06/08/17. We used search terms relating to systems and complexity, evaluation, public health and its social determinants. Our inclusion criteria were as follows: studies must (i) self-identify as taking a systems or complexity-informed approach; and (ii) evaluate one or more interventions or changes in a public health relevant field. Study selection, appraisal, data extraction and analysis were conducted independently by at least two reviewers with regular meetings to discuss contrasting viewpoints.

Results Forty-four studies were finally included. Public health topics varied: the most common concerned obesity, transport, education, and tobacco. Evaluations were classified by the systems approach taken; in total 6 approaches were identified: qualitative research (n=13), concept mapping (n=3), network analysis (n=4), system dynamics modelling (n=15), agent-based modelling (n=8), and 'systems friendly' approaches (n=5). These different approaches were used to address different research questions but there was also cross-over between methodological approach and purpose. Some studies lacked clear empirical conclusions for informing future practice.

Discussion Though sometimes portrayed as a novel development in public health research, there are already numerous examples of different public health 'systems evaluations'. There is no single or dominant 'systems approach' to public health evaluation. Nor is there a consistent pattern whereby different approaches address research questions specific to that approach. Rather than advocate for a single approach to systems evaluation, we believe continued innovation in this field is most helpful at this time. To improve utility, some systems

evaluations would benefit from improvements in the reporting of empirical findings.

RF34

SOCIOECONOMIC DIFFERENCES IN CARDIOVASCULAR DISEASE RISK FACTOR PREVALENCE IN PEOPLE WITH TYPE 2 DIABETES IN SCOTLAND: A CROSS-SECTIONAL STUDY

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Background Health inequalities exist in outcomes of diabetes in different socioeconomic groups and these are particularly marked for cardiovascular disease. This study explores the association between socioeconomic status (SES) and prevalence of cardiovascular risk factors (smoking, body mass index (BMI), glycated haemoglobin (HbA_{1c}), blood pressure and cholesterol) in people with type 2 diabetes in contemporary Scottish data.

Methods We performed a cross-sectional study of people with type 2 diabetes in Scotland who were alive on 30/6/16 identified from the population-based diabetes register. SES was defined using quintiles of the area-based Scottish Index of Multiple Deprivation (SIMD). Cardiovascular risk factors were defined as: current smoker, obesity (BMI ≥ 30 kg/m²), HbA_{1c} ≥ 58 mmol/mol, systolic blood pressure ≥ 140 mmHg, and cholesterol ≥ 5 mmol/l. Logistic regression models adjusted for age, sex, health board, history of cardiovascular disease, ethnicity and duration of diabetes were used to identify odds ratios (OR) (95% confidence intervals) for the most compared to the least deprived SIMD quintile for each risk factor.

Results There were 264,664 people with type 2 diabetes in the study population: mean (SD) age was 66.7 (12.8) years, 56.1% were male, 23.6% were in the most deprived quintile and 15.1% in the least deprived quintile. Less than 5% had missing data on key variables.

Crude prevalence of risk factors in the most/least deprived quintiles were 24.4/8.8% for smoking, 61.9/49.4% for obesity, 43.7/39.7% for above-target HbA_{1c}, 30.5/31.3% for above-target systolic blood pressure and 24.4/24.5% for above-target cholesterol.

Adjusted prevalence of current smoking (OR 3.25 (95% CI 3.09–3.42)), obesity (OR 1.59 (1.54–1.65)) and above-target HbA_{1c} (OR 1.13 (1.09–1.17)) were higher in the most compared to the least deprived quintile. Adjusted prevalence of above-target systolic blood pressure was similar (OR 1.00 (0.97–1.04)), and of above-target cholesterol was lower in the most compared to the least deprived quintile (OR 0.85 (0.82–0.88)). Inequalities in current smoking were larger in females (OR 3.66 (3.37–3.96)) compared to males (OR 3.00 (2.81–3.19)). No other risk factors showed interactions between sex and SES.

Conclusion Socioeconomic deprivation is associated with significantly higher prevalence of smoking, obesity, and above-target HbA_{1c} among people with type 2 diabetes in Scotland. Inequalities in smoking status by SES among people with type 2 diabetes appear to have widened over time. Effective approaches to reducing these inequalities at both population