Case-study of data visualization for communication of complex research findings

Veronica Tuffrey, October 2020

Background information for visualizations

DATA SOURCE -The visualizations used in this study are based on data from a government-funded survey, the National Diet and Nutrition Survey (NDNS) which is intended to assess the dietary habits and nutritional status of the general adult and child population in the UK. Since 2008 the NDNS has been conducted annually as part of a rolling programme[1]. Nine years' data are available up to 2016/17, and can be downloaded from the UK data service website[2]. Around 500 adults and 500 children take part each year. The sample represents the UK general population aged ≥1.5 years living in private households. For this secondary data analysis, only the data collected from adults aged ≥19 years were used.

DATA COLLECTION AND ANALYSIS - The survey uses two-stage sampling. Recruitment in Wales and Northern Ireland is boosted to get representative country-specific data. The fieldwork includes several components, and for the secondary data analysis the researcher only used data from the 4-day diet diaries, and the interviews. She chose to analyse a small number of dietary variables for which there is strong evidence of associations with health-related outcomes, either as protective or risk factors, and examined variation in these variables with respect to age (4 categories), sex, ethnicity (2 categories), three socio-economic variables (occupation, income and educational attainment - 4 categories each), survey year (9) and region (12). For a sub-set of the dietary variables, the researcher used non-parametric correlation, linear regression and logistic regression to explore their temporal and geographical variation, and also their association with the socio-economic variables (the other independent variables were included as covariates in the models).

SELECTED FINDINGS -

Time-trends: Using regression modelling, the four dietary variables examined had statistically significant associations with survey year ($p < 0.001$) across the UK as a whole. The consumption of sodium and red meat, and the proportion of the population consuming alcohol decreased. The proportion of the adult population with folate intake lower than the recommended levels increased. *Chart 1 displays the median values for each year for each geographical region.*

Socio-economic and regional variation: Regression modelling showed the regions with lowest fruit and vegetable intakes were Northern Ireland and the North-East, and the regions with highest intakes were London and the South-West. Non-parametric correlation analysis showed the region with strongest association between fruit and vegetable intake and occupation category was Scotland, while the region with weakest association was East of England. *Chart 2 displays the median total daily consumption of fruit and vegetables by occupation category for each geographical region.*

Associations between dietary, socio-economic and socio-demographic variables: Using regression modelling -

- daily intake of fruit and vegetables had a stronger positive association with education and occupation than with income when statistically adjusted for age-group, sex and ethnicity. On average, total fruit and vegetable intake was lower in the younger and white ethnicity adults compared to the older and non-white ethnicity groups.
- daily intake of red meat had a negative association with education and occupation and no association with income when statistically adjusted for age-group, sex and ethnicity. On average, total red and processed meat intake was lower in women and adults of non-white ethnicity compared to men and adults of white ethnicity.

Chart 3 displays regression coefficients from this modelling. The dietary variables had been transformed to correct for skew, and then standardised to enable comparisons between variables. Error bars show 95% confidence intervals around the values for each category in comparison with the reference categories (highest SES, male, ≥65y, and white ethnicity). Coefficient values greater than zero indicate positive associations.

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[1] Details about the NDNS included in this document were obtained from: NATCEN SOCIAL RESEARCH 2019. National Diet and Nutrition Survey Years 1-9, 2008/09-2016/17. 15th Edition. SN: 6533. UK Data Service, MRC Elsie Widdowson Laboratory.

[2] https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=6533