Adolescent Body Image

Spatial Analysis of an Eating Disorder Risk Factor Among 15 Year-Old Girls in London

Introduction

Eating disorders (EDs) are serious, often life threatening conditions that affect the physical health and wellbeing of a growing number of individuals in the UK. This broad range of psychiatric illnesses includes anorexia nervosa, bulimia nervosa, binge eating disorder, and eating disorder not otherwise specified (American Psychiatric Association, 2013). While EDs impact both females and males, this analysis examines data for females only.

Incidence of EDs among young women, especially EDNOS, has increased in the UK since 2000 (NCCMH, 2015). Additionally, less than half of individuals with diagnosable EDs seek treatment, and treatment and diagnosis rates among ethnic minorities may be even lower than the general population due to cultural stigma and impediments to care (Solmi et al., 2015).

To address this growing public health concern, additional recurrent funding of £30 million per year was made available for treatment of eating disorders through the NHS Autumn Statement 2014 (NCCMH, 2015). However, this initiative only addresses concerns of those formally diagnosed with an ED. Academic research indicates that school- or community-based ED intervention programs, such as the UK program *Media Smart*, may be more effective at reducing overall onset of EDs and decreasing system costs associated with ED treatment (Wilsch et al., 2014).

Shape and weight concern are widely considered the strongest risk factor for EDs (Wilsch et al., 2014). While overall incidence of EDs in London has been studied, prevalence these ED risk factors is not well known. In addition, previous studies of EDs in London youth populations have not examined potential geospatial trends or correlation between risk factors and socio-demographic indicators.

This coursework addresses this knowledge gap through analysis of the results of the *What About Youth Survey 2014*, administered to 120,115 15-year-olds across England and aggregated to borough level in London. In particular, we address spatial patterns in female participant responses to the question, "Do you think your body is…?" and correlation with ethnicity at the borough level. (Participants selected answers from much too thin, too thin, about the right size, too fat, or much too fat). In addition to the *What About Youth Survey* data used, borough level demographic, economic, and social data was downloaded as part of the London Boroughs Profiles and Atlas. All data was obtained via the London Data Store under the UK Government License.

Results

To assess if questionnaire responses reflected objective body weights or subjective self-perception, a correlation analysis was performed between obesity rates and rates of youth describing themselves as "too fat" or "much too fat". A significant *negative* correlation was found between girls that viewed themselves as fat and childhood obesity rates ($r = -0.52$, $p = 0.0021$). In general, in areas where fewer children were obese, 15 year-old girls were *more* likely to perceive themselves as fat. (In contrast, no significant correlation was found between boys that described themselves as too fat and childhood obesity rates, $r = -0.24$, $p = 0.18$.)

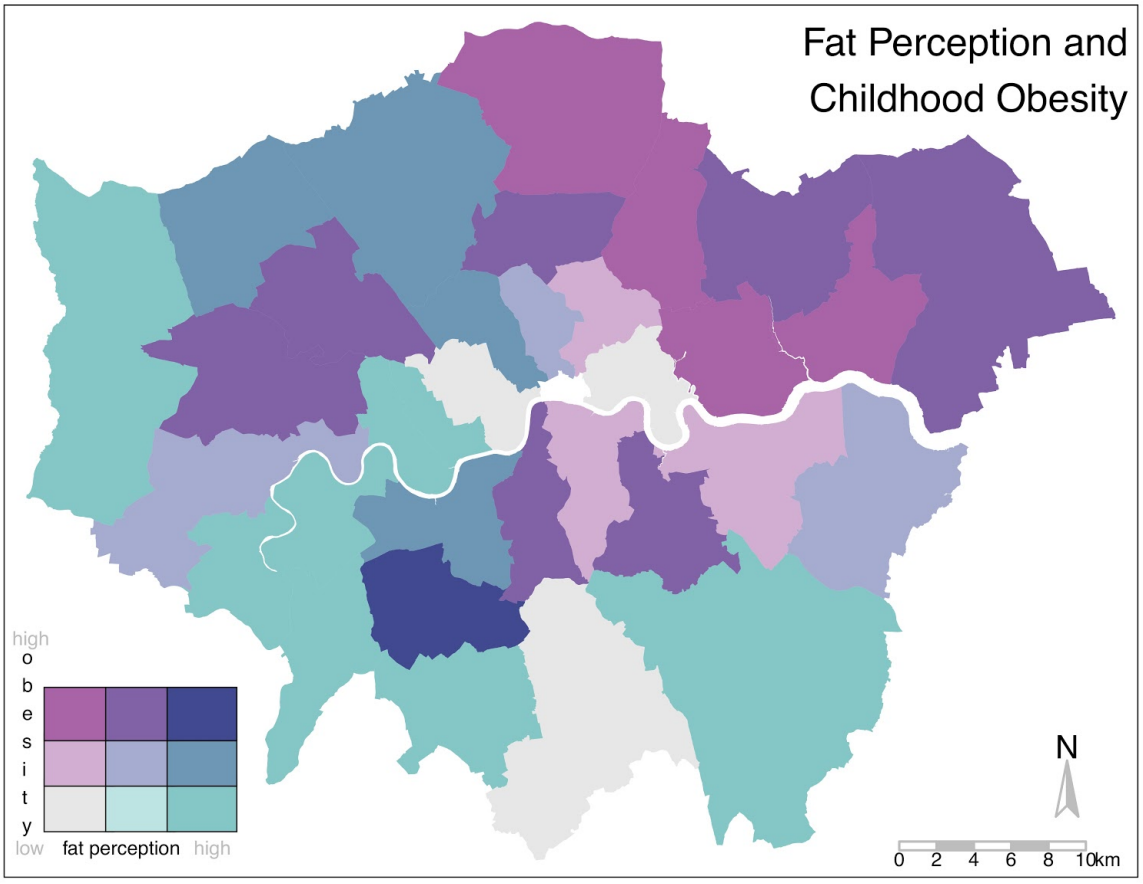

Figure 1: Bivariate choropleth map showing fat perception and childhood obesity.[1]

The map above shows both obesity and fat perception grouped into tertiles, where the darkest blue color indicates counties with high childhood obesity rates and high fat perception rates. Only one borough, Merton, meets this requirement.

In contrast, there are four boroughs in the bottom tertile of fat perception and the top of obesity rates (Barking and Dagenham, Enfield, Newham, and Waltham Forest) and seven with the

[1] Inspiration for the bivariate choropleth map and color scheme drawn from http://www.joshuastevens.net/cartography/make-a-bivariate-choropleth-map/.

lowest obesity rates and the highest fat perception (Bromley, Hammersmith and Fulham, Hillingdon, Kensington and Chelsea, Kingston upon Thames, Richmond upon Thames, and Sutton). This speaks to the strong negative correlation between childhood obesity and fat perception.

In addition to a correlation analysis between a number of variables and fat perception, a correlation analysis between thin perception and a number of demographic variables was performed. In particular, there was a statistically significant positive correlation between areas where a high 15-year-old girls perceived themselves as "too thin" or "much too thin" and areas with large Black, Asian, and Minority Ethnic populations, designated "BAME" within the demographic data used ($r = 0.64$, $p = 8.3 \times 10^{-5}$).

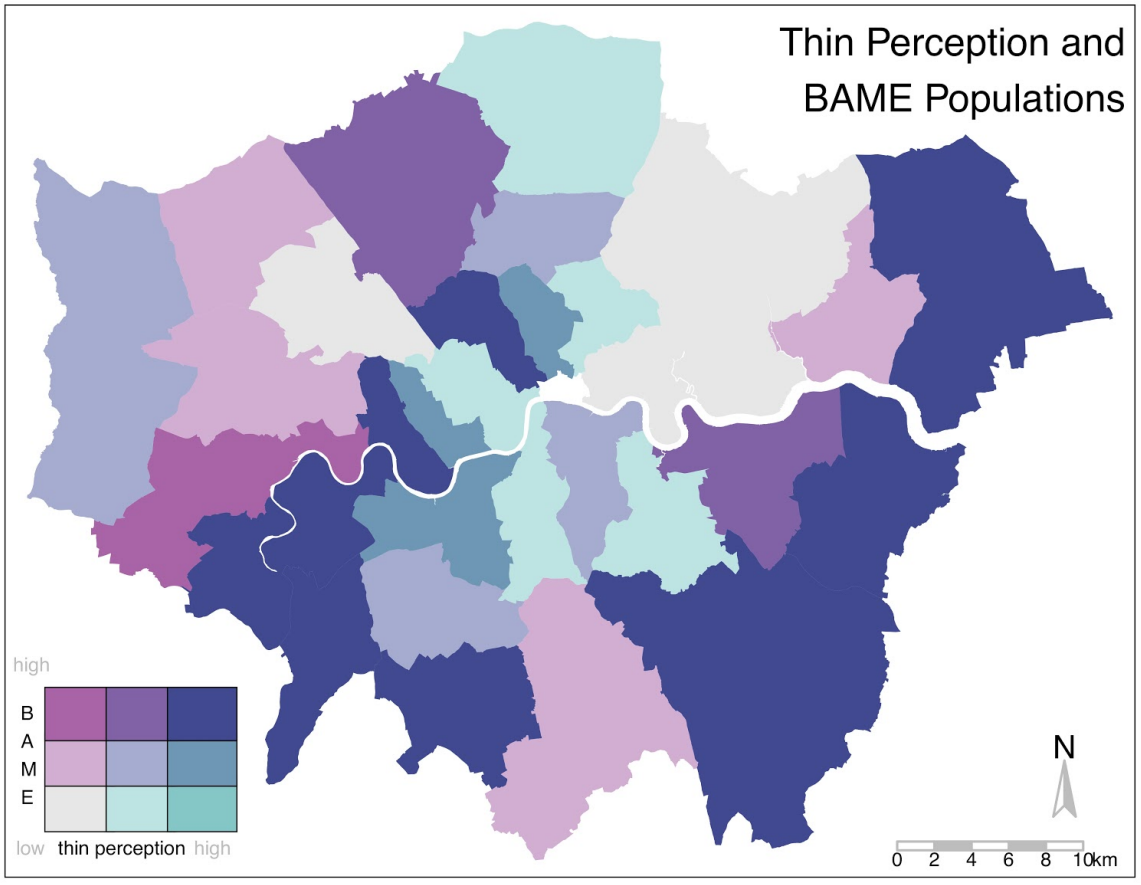

Figure 2: Bivariate choropleth map showing thin perception and BAME populations.

The above figure shows a number of areas in dark blue, representing boroughs in the top tertile of both thin perception and BAME population. In total, eight boroughs fall within this category: Bexley, Bromley, Camden, Hammersmith and Fulham, Havering, Kingston upon Thames, Richmond upon Thames, and Sutton. Only one borough (Hounslow) has a large BAME population and low thin perception, while no boroughs have high thin perception and a low proportion of BAME population.

Figure 3 shows the absolute value of the residuals for both linear models to demonstrate areas that are not well explained by these correlations (note that the scales differ between the maps). As expected, areas with the highest residuals differ between models (Kensington and Chelsea at left, Lambeth at right). Could income be a factor in understanding why Kensington and Chelsea has such a high residual? Could low poverty be a factor in explaining Lambeth's deviation from this linear model? Further work to examine these results, in particular additional potential spatial autocorrelation and socio-demographic variables, would support development of an improved model.

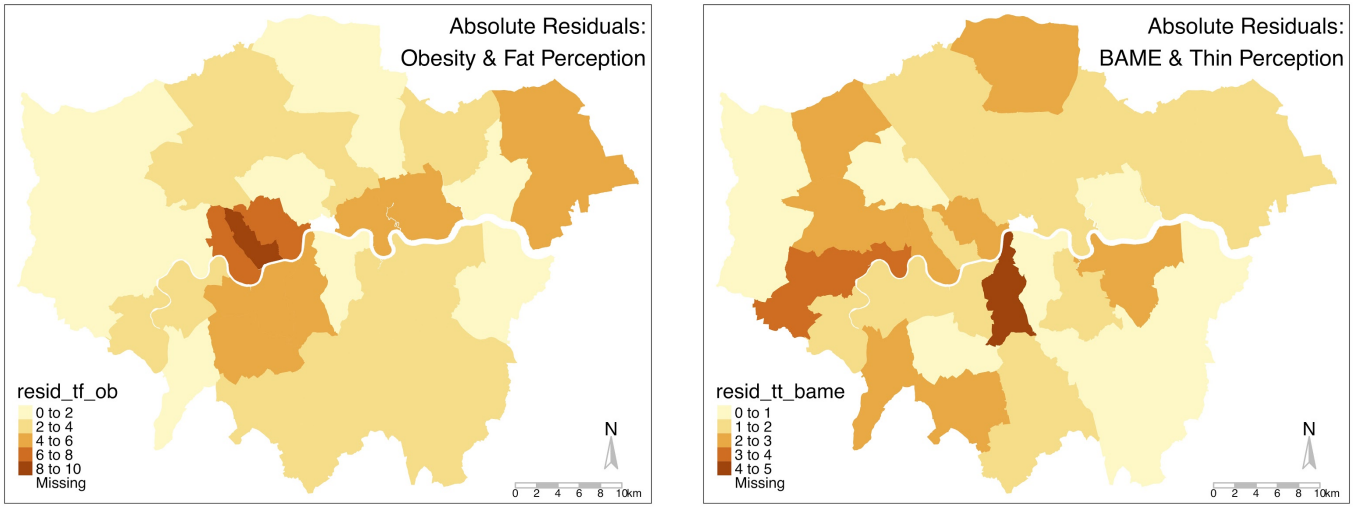

Figure 3: Absolute value of residuals for the linear model between childhood obesity and fat perception and the linear model between %BAME and thin perception.

Discussion

Individuals' perception of their own bodies is driven by a myriad of factors, including genetic predisposition, body image role models, and media consumption (NCCMH, 2015). It is therefore no surprise that participant responses to the question "Do you think your body is…" may not necessarily align with body size indicators such as obesity. Analysis of the *What About Youth Survey 2014* dataset indicated a significant negative correlation, as demonstrated in Figure 1.

An additional factor, cultural beauty ideals, may add context the interesting result demonstrated in Figure 2. While the "thin ideal" is a prevalent beauty standard among White and Asian women, Overstreet et al. have demonstrated that Black women prefer a curvier beauty standard with larger buttocks (2010). They note that discrepancy from beauty standards is related to higher body dissatisfaction. Is it possible that girls in communities with curvier ideals are more likely to view themselves as too thin if they are far from that ideal, rather than too fat? To investigate this question, future analysis should look at the correlation between thin perception and the proportion of Black members of the population.

This work admits a number of serious limitations. No effort to control for potential correlation between poverty and BAME was made, and it is possible that perceptions of thinness could be

correlated with increased want instead of ethnicity. Additionally, the borough-level dataset was far too broad to draw any meaningful conclusions. While analysis of patient level data would provide more insight and avoid the ecological fallacy, borough level data may nevertheless provide a sufficient starting point for preliminary analysis without compromising patient privacy.

Ultimately, spatial analysis could be used to support decisions on how to allocate the annual £30 million NHS ED funding among boroughs as well as identify which communities might benefit from increased and tailored interventions.

References

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