

Public Administration and the Obesity Epidemic: Does Citizens' Physical Activity Participation Make a Difference Across Local Populations?

Ian Hodgkinson

Loughborough Business School, Loughborough University, UK.

Paul Hughes

Management School, Lancaster University, UK.

Vitor Leone

School of Accounting, Finance and Economics, De Montfort University, UK.

Abstract

The rising level of obesity across the globe is a wicked problem facing contemporary public administrations. Increasing citizens' physical activity participation has been championed as a means to manage against rising obesity levels. In the UK the responsibility for which lies largely with local authorities. However, if citizens' participation in physical activity across a local authority population increases, is this associated with lower levels of overweight and obesity in that same population? Drawing on secondary data, an exploratory panel study of 317 English local authorities during 2012-15 were analyzed using multiple linear regression analysis to examine whether citizens' sport participation does reduce the prevalence of obesity. The findings reveal how when physical activity levels are lower across a local authority area, the prevalence of obesity among these local authority populations is greater. Therefore, by increasing physical activity among their populations, local authorities can better 'manage obesity'.

Keywords: Obesity, Physical activity, Local government, Managing obesity, England.

Introduction

The prevalence of obesity worldwide has nearly tripled since 1975 with overweight and obesity linked to more deaths worldwide than underweight, according to the World Health organization (WHO) (2019). How to mitigate against rising levels of obesity among the citizenry has become a wicked issue facing contemporary public administrations, especially in light of the fact that “no country is on track to meet global targets to stop the increase in obesity” (WHO 2023: 3).

In 2016, the WHO reported that more than 1.9 billion adults were overweight and of these adults over 650 million were obese (WHO 2021). Obesity is a condition where weight gain has reached a level at which it poses a serious threat to health and has overtaken malnutrition as a key contributor to ill health worldwide (Swinburn et al. 2011). The prevalence of obesity affects the citizenry at large, in England 63.8% of adults aged 18 years and over were estimated to be overweight or living with obesity in 2021 to 2022 (Office for Health Improvement and Disparities, HM Government 2023), while more than 2 in 3 adults are classified as ‘overweight’ or ‘obese’ in the US adult population (National Institute of Diabetes and Digestive and Kidney Diseases 2017).

As well as increasing mortality, obesity is a risk factor for a range of chronic diseases, including type-2 diabetes, coronary heart disease, colon cancer, osteoarthritis, and social and psychological consequences such as stigmatization, alienation and social exclusion; collectively creating a substantial drain on public health resources with obesity and conditions associated with inactivity previously claimed to incur a cost to the nation £7.4bn each year (Sporting Future 2015). Yet, obesity is largely preventable, and one recommendation is to simply increase individuals’ physical activity level (WHO 2021). Participation in physical activity and the role of sport therein has, therefore, become a critical

issue for contemporary public administrations and the citizenry at large across developed economies, but does citizens' participation in sport reduce obesity levels?

If governments are to act urgently to decrease the prevalence of obesity (Roberto et al. 2015), there is a need to better understand whether the drive to increase participation through government investment in sport and leisure services is a means to manage obesity. Local authorities are charged by central government with increasing levels of physical activity at the local (authority) level, within a broader context of rising obesity levels, which is a key performance priority espoused in public policy discourse (HM Government 2015). As a demonstration of the significance of this priority area, local authorities in the UK represent the largest public sector investor in sport and physical activity, committing over £1bn per year to such services (HM Government 2015).

Given this context, the study employs an exploratory model to test the effects of physical activity levels among local authority populations and the corresponding levels of overweight and obesity among these populations over time (2012-15) using national panel data. This represents a key contribution to the public health agenda and is consistent with the need to transition from the view of overweight and obesity as an individual's responsibility to recognising this to be a societal responsibility (WHO 2023). Indeed, the WHO (2023) are clear that the solution to the obesity epidemic is "political will, a plan of action and the resources and commitment to deliver" (WHO 2023: 3). At the societal level, then, empirical evidence is needed to establish whether citizens' physical activity participation levels are linked, or not, to the prevalence of overweight and obesity across local populations. Such an evidence base can in turn help direct local governments' investment decisions and is especially important when considering the budgetary cuts to public sport and leisure services over many years.

Overweight and Obesity Across Local Populations: A Public Priority

The need for local government to drive physical activity and reduce obesity among their populations through cross-sector delivery is heavily emphasised in public sport policy (HM Government 2015). The specific performance agenda here is driven by increasing inactivity of local authority populations and, by consequence, the need to address rising rates of obesity. This legislative emphasis is evidenced in the UK by the publication of the ‘Sporting Future: A New Strategy for an Active Nation’ document in 2015. Obesity is a condition where weight gain has reached a level at which it poses a serious threat to health worldwide (Swinburn, Sacks, Hall, McPherson, Finegood, Moodie, and Gortmaker. 2011). Such is the magnitude of the issue, overweight and obesity contribute to a higher mortality figure than deaths from underweight/malnutrition worldwide (WHO 2021).

A major health concern attributable to weight gain is the likelihood of developing Type-2 diabetes, and approximately 90% of those classified as Type-2 diabetic are obese or overweight (Public Health England 2014). In regard to participation levels, the Audit Commission (2006) identified significant differences between socio-economic groups and specifically found that those in the highest social group participated twice as much as those in the lowest. More recently, NHS Digital report that obesity prevalence was lowest among adults living in the least deprived areas and highest in the most deprived areas (2022).

To quantify the economic impact of overweight and obesity, the UK government claim that obesity costs the NHS £6 billion annually and is expected to rise to over £9.7 billion by 2050 (Department for Health and Social Care, HM Government 2022). When accounting for wider health consequences attributed to overweight and obesity, it is reported by the Tony Blair Institute for Global Change (2023) that “the economic cost of obesity in the UK, in 2020, put the annual figure at £58 billion, equivalent to about 3 per cent of GDP.

Updated estimates in 2021 indicate that the cost of obesity and overweight spiralled to £98 billion”.

Increasing national physical activity levels is, therefore, a critical public priority but has rarely featured in the public administration and management literature (cf. Houlihan and Green, 2009). This is despite the unifying vision for all agents and actors involved across the service domain being ‘to engage those who do sport less than the population as a whole’ (HM Government 2015: 20). As O’Brien (2013) observes, local authority sport and leisure services remain characterised by a focus on increasing participation as a central performance goal. Like core services such as education, local authority sport and leisure service provision has formal performance targets (Houlihan and Green 2009; O’Brien 2013); specifically, targets for increases in physical activity engagement by 2025 (HM Government 2015). However, public funding for local authority sport and leisure services is at a crisis point exacerbated by the COVID-19 pandemic (Local Government Association 2023).

Exploratory Model

In addressing the research question, we test whether increased physical activity among local authority populations reduces levels of overweight and obesity reported among these populations. This would be expected since sedentary behaviour is a long-standing driver of rising obesity levels (Hill, Wyatt, and Peters 2012; James, Leach, Kalamara, and Shayeghi 2001). Increasing inactivity more broadly is a consequence of reduction in occupational physical activity; greater use of the car; decline of walking due to perceived personal safety; increase in energy-saving devices in public spaces; reduction in physical education and sport in schools; substitution of physically active leisure with sedentary pastimes such as watching television and playing computer games (Foster and Hildson 2004).

Methods

Multiple Regression Analysis

The unit of analysis is local authorities in England that operate either as unitary authorities (one-tier system), or as county and district councils (two tier system). Unitary authorities and district councils are responsible for the provision of sport and leisure opportunities. The data is examined across 2012-2015 for 317 unitary authorities and district councils in England. To build the model secondary data were gathered from two sources.

First, data on physical activity levels among local authorities, local authority income from sport and leisure services and local authority spend on sport and leisure facilities was sourced from Public Sector Audit Appointments Limited. This is an independent company that collates data supplied by local authorities about the costs, performance and activity of local authorities, which is used to produce Value for Money Profiles and is published on an annual basis for public consumption.

Second, data on the prevalence of overweight and obesity among local authorities was sourced from the Public Health Outcomes Framework. The data is collected in the Active People Survey and allows local authorities to monitor trends in excess weight prevalence among their adult population. Commissioned by Sport England, the Active People Survey is a large telephonic survey of adults in England.

Measures

Local authorities' physical activity level

As the unit of analysis is the local authority, physical activity level is measured as the percentage of adults (aged 16 and over) within each local authority participating in at least 30 minutes of physical activity of at least moderate intensity on at least 12 days out of the last 4 weeks or equivalent to 30 minutes on 3 or more days a week. Certain activities are excluded

such as recreational walking or infrequent recreational cycling; however, more intense/strenuous walking activities such as power walking, hill trekking, cliff walking and gorge walking and cycling if done at least once a week at moderate intensity and for at least 30 minutes is included.

Local authorities' overweight and obesity level

Excess weight including obesity is measured by body mass index (BMI). BMI is a simple index of weight-for-height that is commonly used in classifying overweight and obesity in adult populations and individuals. It is defined as the weight in kilograms divided by the square of the height in metres. The WHO defines overweight as a BMI equal to or more than 25, and obese as a BMI equal to or more than 30 (WHO, 2021). The prevalence of excess weight is expressed as a percentage of adults that are classified overweight/obese for each local authority. The data cover the period from mid-January 2012 to mid-January 2015 and is collected through the Active People Survey. Though commissioned by Sport England, the data holds verification from Public Health England, through the assurance of validity of the data by adjusting self-report height and weight measures to reduce the impact of inaccurate reporting. The adjusted data is used in this study.

Control variables

The exploratory model controls for financial investment in sport and leisure facilities, which is a known driver of increasing participation (HM Government 2015). Local authority's investment is measured as the total expenditure (£000s) on sports and recreation facilities including golf courses. Here gross domestic product deflators to allow for real term comparisons over time have been applied. Local authority service income is also controlled for on the premise that the pursuit of income may run in conflict with the policy objective to

increase physical activity. Income is measured as the total income over total spend on sport and leisure. It is the total income from community centres and public halls, foreshore, sports development and community recreation, sports and recreation facilities including golf courses and open spaces divided by their total spend on the same.

There are a variety of management types used by local authorities in their delivery of sport and leisure services in England: in-house by the local authority (public), by a third sector trust (nonprofit), or by a private operator (private). Thus, secondary objective data on the management types employed by local authorities' in their service portfolio is used as a control of publicness (Hodgkinson, Hughes, Hughes, and Glennon 2017) and the measure is calculated as the ratio public ownership/(public+nonprofit+private), a further two additional ownership ratios are controlled for in recognition that not every local authority will comprise all three management types in their collective service portfolio: public/(nonprofit+public) and public/(public+private),

Data analysis

The analysis was conducted by applying an ordinary least squares linear multiple regression. Since the obesity construct is based on an average of excess weight among the 317 local authorities between the time period 2012 and 2015, the explanatory and control variables were averaged also. The basic model including the control variables is represented by the following equation:

$$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \varepsilon_i \quad (1)$$

Where

Y_i = Percentage of the population by local authority considered obese by BMI measures;

X_{ki} = Are the following explanatory and control variables: Percentage of adults aged 16 and over participating in physical activity (adultper); income from culture and sport sales, fees,

and charges as a percentage of culture and sport income (incomeper); spend on sports development and community recreation (per head) (ssdcprh); spend on sports and recreation facilities (£000s) (ssrf); spend on sports and recreation facilities including golf courses (per head) (ssrfgcph); collective organisational publicness (PUBLICN) and ownership ratios 1 and 2, as before. We estimated 3 models model 1 containing all variables, model 2 the ownership ratios were omitted, and model 3 the ownership ratios were kept but the other control variables removed.

Table 1. Multiple linear regression results

Variables	Model 1	Model 2	Model 3
Constant	0.692948***	0.690776***	0.695304***
ADULTPER	-0.115897	-0.126035*	-0.121746*
<i>Controls</i>			
INCOMEPER	0.070423	0.092632	
SSDCRPH	0.000468	0.000470	
SSRF	-0.00000146***	-1.42E-06**	
SSRFGCPH	-7.5E-06	3.65E-05	
PUBLICN	-0.02555		-0.024501
RATIO1	0.00284		0.002764
RATIO2	0.022962		0.023615
<i>Model Statistics</i>			
R-Squared	0.0376	0.03216	0.01665
Breusch Pagan Godfrey Heteroskedasticity Test			
F-Statistic	1.07027(0.33837)	1.448347(0.2067)	1.212614(0.3053)
VIF (Mean)	4.471233	1.018285	6.676288
Sample Size	317	317	317

Notes: ***, **, * represents 1%, 5% and 10% significance levels; p-values are in brackets; Dependent variable: "Obesity".

The results suggest that increased physical activity among local authority populations reduces excess weight among the same populations, as corroborated by the negative relationship and 10% significance level on ADULTPER in models 1, 2, and 3.

Multicollinearity might be an issue here, however, the controls for management type mix (PUBLICN) and the additional management type ratios (RATIOS 1 and 2) are not significant (Models 1 and 3). In model 2, the VIF factor resulted in a mean value of 1.02 ruling out the likelihood of multicollinearity. In addition, a test for heteroskedasticity is applied based on a variance function¹ and suggests heteroskedasticity is not an issue (see Table 1).

Discussion

The magnitude of the wicked problem is significant, with the current annual global costs of obesity projected to be US\$ 990 billion (WHO 2023). UK public policy has charged local government with increasing physical activity and reducing levels of excess weight and obesity among their populations, through their sport and leisure services; but, is there a clear relationship between increased physical activity participation and reduced levels of overweight and obesity at the level of the local authority population?

Regular physical activity holds many health benefits for all age groups. Increased physical activity has benefits for cardiovascular risk factors, insulin resistance and depression and limits the loss of lean tissue and contributes to bone health (Avenell, Sattar and Lean 2006); as well as specific benefits for older people, which include improved fitness and quality of life, prevention of osteoporosis, and a reduction in the risk of falling (Crombie et al. 2004). Notwithstanding these key benefits, physical activity is considered critical to weight loss and, thus, is a means to de-escalate the global epidemic of overweight and obesity, termed “globesity” by the WHO. Though the relationship between physical activity and an individual’s overweight and obesity risk is well documented, with the WHO (2023) identifying regular activity as a preventable measure, we are less clear on if this extrapolates

¹ The variance function is relevant when heteroskedasticity is a possibility, for details see Hill, Griffiths, Lim, and Lim (2015)

across populations. This lack of understanding is in part due to the reluctance to recognise overweight and obesity as a societal rather than an individual responsibility, as aptly described in the WHO (2023: 3) acceleration plan to stop obesity:

“Tackling obesity must be recognized first as a societal rather than an individual responsibility with the solutions to be found through the creation of supportive environments and communities that embed healthy diets and regular physical activity as the most accessible, available and affordable behaviours of daily life”.

Examining whether increased physical activity levels reduce excess weight among local authority populations over time, the findings reveal that the greater the level of physical activity among local authorities the lower the level of excess weight among their populations. Furthermore, based on the control findings, when local authorities spend more on their facilities the positive relationship between physical activity and reduced obesity levels among local authorities’ populations strengthens.

Increasing physical activity levels and reducing obesity across local authority populations are related performance outcomes that form a public priority in policy discourse. This is due to the hugely draining effect that physical inactivity and overweight and obesity is having on the cost of healthcare in the UK. UK public policy continues to emphasise the importance of increasing physical activity levels across local authorities to overcome rising obesity rates and the findings support such a policy focus. However, there appears to be somewhat of a disconnect between the policy rhetoric and the delivery of sport and leisure services in practice. As a discretionary public service, sport and leisure has suffered as a consequence of reducing local government budgets, with investment often being directed to core services. Thus, while on the one hand public policy appears to recognise and value the importance and relevance of physical activity across the citizenry for addressing significant health issues, on the other hand, there appears to be a growing underinvestment in facilitating opportunities for the citizenry to participate in physical activity

The significance of the budgetary cuts to sport and leisure cannot be underestimated and is highlighted in a recent article by The Guardian, which outlines net spending on sport and leisure facilities fell to 0.7p per person in 2022-23, after taking inflation and population growth into account, representing a drop of 44% from 1.3p in 2010; during this timeframe, 400 swimming pools have been ‘lost’ in England (Goodier, Aguilar García and Partington 2024). While sport and leisure facilities are the cornerstone of public sector provision of physical activity opportunities, other provisions have also witnessed a significant decrease in funding, with spending on sports development and community recreation cut by 59% per person and by 33% on parks and open spaces per person since 2010 (Goodier et al. 2024).

With the spiralling costs associated with the increase in the prevalence of overweight and obesity, coupled with the sheer magnitude of the cuts to public sector investment in sport and leisure provision, the UK management of the overweight and obesity epidemic is at a critical juncture. It appears that the WHO’s called-for shift in responsibility for tackling obesity, from the individual to public administrations, is not materialising. This is despite the empirical evidence clearly showing that increased physical activity levels across local authority populations is statistically linked to lower levels of overweight and obesity in those same populations.

Study Limitations

The findings need to be considered relative to the study’s limitations, however. First, the study relies on secondary data of the self-reported height and weight of citizens (i.e. the excess weight construct); though adjustments endorsed by Public Health England and Sport England respectively have been applied to the data to ensure validity. Second, the excess weight construct is a single measure and is not reported year on year, unlike ownership and participation. This is the only secondary data available for examining excess weight of each

local authority population, thus, the average level of physical activity for each local authority is calculated over the same time-period to ensure standardisation of measures. Though this is deemed an appropriate approach to take, it is acknowledged as a limitation. Third, this study does not examine the drivers of participation, only the relationship between physical activity participation and the level of excess weight at the local authority level. Nevertheless, by increasing physical activity among their populations, local authorities can better ‘manage obesity’.

References

- Audit Commission. 2006. *Public sports and recreation services: making them fit for the future*. Local Government National Report, UK.
- Avenell, A., N. Sattar, and M. Lean. 2006. “Management: Part 1 – Behaviour change, diet, and activity.” *British Medical Journal* 333: 740-742
- Crombie, I. K., L. Irvine, B. Williams, A. R. McGinnis, P. W. Slane, E. M. Alder, and M. T. McMurdo. 2004. “Why older people do not participate in leisure time physical activity: a survey of activity levels, beliefs, and deterrents.” *Age and Ageing* 33 (3): 287-292
- Department for Health and Social Care, HM Government. 2022. New obesity treatments and technology to save the NHS billions. [WWW document]. URL <https://www.gov.uk/government/news/new-obesity-treatments-and-technology-to-save-the-nhs-billions> (accessed on 8 January 2024).
- Foster, C., and M. Hillsdon. 2004. “Changing the environment to promote health-enhancing physical activity.” *Journal of Sports Sciences* 22 (8): 755-769.
- Goodier, M., C. Aguilar García, and R. Partington. 2024. “How a decade of austerity has squeezed council budgets in England. [WWW document]. URL

<https://www.theguardian.com/uk-news/2024/jan/29/how-a-decade-of-austerity-has-squeezed-council-budgets-in-england#:~:text=After%20taking%20inflation%20and%20population,400%20swimming%20pools%20since%202010>. (accessed on 30 January 2024).

Hill, R. C., W. E. Griffiths, and C. Guay. 2012. *Principles of Econometrics*, 4th Ed., Wiley.

Hill, J. O., H. R. Wyatt, and J. C. Peters. 2012. "Energy balance and obesity." *Circulation* 126 (1): 126-132.

HM Government. 2015. *Sporting Future: A New Strategy for an Active Nation*. Cabinet Office, London.

Hodgkinson, I. R., P. Hughes, M. Hughes, and R. Glennon. 2017. "Does ownership matter for service delivery value? An examination of citizens' service satisfaction." *Public Management Review* 19 (8): 1206-1220.

Houlihan, B., and M. Green. 2009. "Modernization and sport: the reform of Sport England and UK Sport." *Public Administration* 87 (3): 678-698.

James, P. T., R. Leach, E. Kalamara, and M. Shayeghi. 2001. "The worldwide obesity epidemic." *Obesity Research* 9 (11): 228S-233S.

Local Government Association. 2023. *Urgent support for public sport and leisure services*. [WWW document]. URL <https://www.local.gov.uk/topics/culture-tourism-leisure-and-sport/urgent-support-public-sport-and-leisure-services> (accessed on 26 January 2024).

National Institute of Diabetes and Digestive and Kidney Diseases. 2017. *Health Statistics: Overweight and Obesity*. National Institutes of Health, US Department of Health and Human Services.

- NHS Digital. 2022. Health Survey for England, 2021 part 1. [WWW document] URL <https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2021/overweight-and-obesity-in-adults> (accessed on 29 January 2024)
- Office for Health Improvement and Disparities. 2023. *Obesity Profile: short statistical commentary May 2023*. [WWW document]. URL <https://www.gov.uk/government/statistics/obesity-profile-update-may-2023/obesity-profile-short-statistical-commentary-may-2023> (accessed on 1 February 2024).
- O'Brien, D. 2013. "Drowning the deadweight in the rhetoric of economism: what sport policy, free swimming, and EMA tell us about public services after the crash." *Public Administration* 91 (1): 69-82.
- Public Health England. 2016. *Adult obesity and type 2 diabetes*. [WWW document]. URL https://assets.publishing.service.gov.uk/media/5a7f069140f0b6230268d059/Adult_obesity_and_type_2_diabetes_.pdf accessed on 20 January 2024).
- Swinburn, B. A., G. Sacks, K. D. Hall, K. McPherson, D. T. Finegood, M. L. Moodie, and S. L. Gortmaker. 2011. "The global obesity pandemic: shaped by global drivers and local environments." *The Lancet* 378 (9793): 804-814.
- Tony Blair Institute for Global Change. 2023. *Unhealthy Numbers: The Rising Cost of Obesity in the UK*. [WWW document]. URL <https://www.institute.global/insights/public-services/unhealthy-numbers-the-rising-cost-of-obesity-in-the-uk> (accessed on 15 January 2024).
- World Health Organization. 2021. *Obesity and Overweight*. [WWW document]. URL <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight> (accessed on 29 January 2024).

World Health Organization. 2023. *WHO acceleration plan to stop obesity*. [WWW] URL
[https://iris.who.int/bitstream/handle/10665/370281/9789240075634-](https://iris.who.int/bitstream/handle/10665/370281/9789240075634-eng.pdf?sequence=1)
[eng.pdf?sequence=1](https://iris.who.int/bitstream/handle/10665/370281/9789240075634-eng.pdf?sequence=1) (accessed on 30 January 2024).