



## Graffiti, greenery, and obesity in adults: secondary analysis of European cross sectional survey

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**What is already known on this topic**

Terrorist attacks can have emotional effects on people directly exposed to an attack as well as those in the wider population

In the short term, these effects can be seen in the presence of stress symptoms and changes in behaviour

Identifying correlates of these effects can be helpful in planning responses to future attacks

**What this study adds**

The bombings in London on 7 July 2005 resulted in substantial stress among 31% of London's population and altered travel intentions in 32%

Muslims suffered disproportionately greater levels of stress than respondents from other faiths

Previous experience of terrorism was associated with reduced likelihood of substantial stress, and difficulty contacting others by using the mobile phone network was associated with higher levels of stress

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## Graffiti, greenery, and obesity in adults: secondary analysis of European cross sectional survey

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Obesity levels are high and increasing worldwide. Being overweight is linked with increased death rates and contributes to a wide range of conditions, including ischaemic heart disease, hypertension, stroke, diabetes, certain cancers, and diseases of the gall bladder.<sup>1</sup> The principal cause of obesity is an imbalance between energy intake and energy expenditure. And there is growing recognition that, independently of individual characteristics, place of residence may be associated with health outcomes, including body size<sup>2</sup> and health related behaviours, such as level of physical exercise.<sup>3</sup>

Few studies have explored which features of the local neighbourhood might be related to these outcomes or behaviours, although perceived attractiveness has been found to be related to levels of physical activity.<sup>4</sup> Levels of incivilities, such as litter and graffiti, are associated with poorer health outcomes such as general wellbeing but not, to our knowledge, with levels of physical activity. Few studies use objectively measured indicators of the residential environment or similar research instruments across different settings. Based on our previous work, we hypothesised that areas which are pleasant with lots of greenery and few

incivilities might encourage people to take exercise and thereby influence levels of obesity.

### Participants, methods, and results

To tackle this hypothesis systematically, we drew upon data collected in the LARES study (Large Analysis and Review of European Housing and Health Status), which was done in 2002-3 in eight European countries, varying in their wealth, culture, and history.<sup>5</sup> This survey includes data on adults (n=6919) in Angers (France), Bonn (Germany), Bratislava (Slovakia), Budapest (Hungary), Ferreira do Alentejo (Portugal), Forlì (Italy), Geneva (Switzerland), and Vilnius (Lithuania). The same survey methods and training of the surveyors were applied in all cities. A strength of the study is that it is not generally subject to same source bias—that is, it does not rely solely on self assessed perceptions of both health and environment. Housing and health questionnaires captured self reported data on the health of occupants (including self assessed height

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Effect of litter, graffiti, and greenery on likelihood of being overweight/obese or being frequently physically active

	No*	Adjusted odds ratio (95% CI)†	P value
<b>Overweight/obese‡</b>			
Greenery:			
1 (low)	661	1.00	—
2	1143	0.87 (0.71 to 1.07)	0.195
3	1666	0.74 (0.61 to 0.90)	0.003
4	1250	0.79 (0.64 to 0.97)	0.027
5 (high)	458	0.63 (0.49 to 0.82)	0.001
Litter and graffiti:			
1 (low)	1193	1.00	—
2	1122	0.99 (0.82 to 1.18)	0.880
3	753	1.16 (0.95 to 1.42)	0.150
4	1341	1.34 (1.12 to 1.60)	0.001
5 (high)	675	1.42 (1.15 to 1.96)	0.001
<b>Frequent physical activity</b>			
Greenery:			
1 (low)	655	1.00	—
2	1133	1.70 (1.30 to 2.23)	0.001
3	1647	1.76 (1.36 to 2.27)	0.001
4	1238	1.68 (1.29 to 2.18)	0.001
5 (high)	454	3.32 (2.46 to 4.50)	0.001
Litter and graffiti:			
1 (low)	1180	1.00	—
2	1107	0.79 (0.60 to 0.88)	0.001
3	749	0.66 (0.54 to 0.85)	0.001
4	1331	0.51 (0.44 to 0.67)	0.001
5 (high)	668	0.53 (0.43 to 0.72)	0.001

\*Number of respondents varies because of missing data on some variables.

†Adjusted for sex, age (in single years), socioeconomic status (based on variables deemed to be comparable across the eight countries—highest education qualification of any adult resident, size of dwelling in square metres, number of rooms in dwelling, number and percentage of adults working full time, number of full time equivalent jobs held by resident adults, number of people in the household, whether a single person household, number of people aged at least 60 in the household), and city of residence. Odds ratio showed a linear relation with body mass index and physical activity ( $P < 0.001$  in trend test).

‡Compares normal (body mass index 20–24.99) with overweight/obese ( $\geq 25$ ) and excludes 208 underweight ( $\leq 19.99$ ).

and weight, which we then used to calculate body mass index, and level of physical activity) and the dwelling and surrounding environment via face to face interview. Trained surveyors used an inspection sheet to assess the immediate residential environment, including the amount of graffiti, litter, and dog mess, as well as the level of vegetation and greenery visible on the dwelling and streets immediately surrounding it. We recoded physical activity into two levels (never/seldom and often) and incivilities and greenery into five levels—low to high. The analysis controlled for age, sex, socioeconomic status, and city of residence, and excluded respondents who reported having a physical handicap or constraint. Dietary intake was not measured in this survey.

For respondents whose residential environment contains high levels of greenery, the likelihood of being more physically active is more than three times as high, and the likelihood of being overweight and obese is about 40% less (table). Conversely, for respondents whose residential environment contained high levels of incivilities, the likelihood of being more physically active is about 50% less, and the likelihood of being overweight or obese is about 50% higher.

## Comment

In this study of a range of European cities, we find that objectively assessed features of the residential environ-

## What is known on this topic

Area of residence is increasingly recognised as being associated with levels of obesity and physical activity

## What this study adds

Higher levels of greenery and lower levels of graffiti and litter in residential environments are associated with being physically active and not being overweight or obese; efforts to promote activity and reduce weight should take into account environmental facilitators and barriers

ment are associated with the likelihood of being physically active and not being overweight or obese. Our analysis is limited because it is cross sectional and may be subject to differences in interpretation and reporting between countries—for example, in the reporting of height and weight. In efforts to promote physical activity and reduce weight, however, attention should be paid to environmental facilitators and barriers as well as individual factors.

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## Endpiece

### The triumph of our art?

To know and counteract the cause of diseases before they become effective is evidently the triumph of our art; but it will be long before mankind will be wise enough to accept the aid we could give them in this direction. Ignorance of the laws of health and intemperance of all kinds are too powerful for us . . . there is a belief that disease comes by providence and is cured by drugs; whilst you put up a public house at one end of your street and a provident dispensary at the other, how can you expect your people to be healthy?

William Withey Gull, *A biographical sketch*, 1896

Submitted by Terry Smyth, freelance editor and consultant in education and health, Leavenheath, Suffolk