

Review Article

Socio-economic factors in obesity: a case of slim chance in a fat world?

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The global obesity pandemic has been well-documented and widely discussed by the public, the media, health officials, the food industry and academic researchers. While the problem is widely recognised, the potential solutions are far less clear. There is only limited evidence to guide decisions as to how best to manage obesity in individuals and in populations. While widely viewed as a clinical and public health problem in developed countries, it is now clear that many developing countries also have to grapple with this problem or face the crippling healthcare costs resulting from obesity-related morbidity. There is also abundant evidence that obesity is socio-economically distributed. In developed countries persons of lower socio-economic position are more likely to be affected, while in developing countries, it is often those of higher socio-economic position who are overweight or obese. The aim of this paper is to briefly review the evidence that links socio-economic position and obesity, to discuss what is known about underlying mechanisms, and to consider the role of social, physical, policy and cultural environments in explaining the relationships between socio-economic position and obesity. We introduce the concept of 'resilience' as a potential theoretical construct to guide research efforts aimed at understanding how some socio-economically disadvantaged individuals manage to avoid obesity. We conclude by considering an agenda to guide future research and programs focused on understanding and reducing obesity among those of low socio-economic position.

Key Words: socio-economic factors, obesity, environment, social environment, resilience.

Introduction

Population obesity as a socio-economically patterned phenomenon

There is a substantial body of evidence that demonstrates that obesity is associated with socio-economic position (SEP). That literature was first reviewed by Sobal and Stunkard in 1989.¹ In their now classic paper, they examined 144 mostly cross-sectional studies and concluded that, in developed countries, SEP was consistently inversely associated with obesity among women. Among men and children, however, the associations between SEP and obesity were less consistent. For example, of 66 studies including data from men, 52% found an inverse relationship between SEP and obesity, but 30% found the opposite – a direct relationship – and 17% found no association. In developing societies, Sobal and Stunkard's¹ review showed that SEP was strongly directly associated with obesity among men, women and children.

In a more recent review, Ball and Crawford² examined the evidence regarding the associations between SEP and weight change. That review identified 34 papers published between 1980 and 2002 that reported on longitudinal studies conducted in developed countries. Based on the more rigorous of these studies, the authors concluded that occupation was inversely associated with weight gain. For example, in a sample of almost 8,000 adults participating in the Whitehall study, participants in the lowest occupational category (clerical) had 1.64 (men) or 2.16

(women) times the odds of long-term major BMI increases (>3 BMI points) compared with those in the highest occupational category (administrators).³ The review also showed that the association between education and weight gain was less consistent, and that income was inconsistently associated with weight gain. While some previous evidence suggested that obesity may actually be an antecedent to low SEP,^{4,5} results of Ball and Crawford's² review of longitudinal studies suggests that SEP precedes weight gain and risk for obesity, rather than the reverse. Too few studies from developing countries were identified to be included in that review, and similarly the remainder of the present paper focuses on developed countries, from where the majority of research evidence is derived.

Socio-economic position and nutrition and physical activity behaviours

There seems little doubt that the epidemic of obesity that we are witnessing worldwide is attributable to excess energy consumption and inadequate energy expenditure.

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In other words, at a population level, changes in both eating patterns and in physical activity habits are important in terms of obesity aetiology.⁶ However, beyond a recognition that excess weight gain results from energy imbalance, the specific behavioural drivers of the obesity epidemic are not well understood. A limited number of behavioural factors have been identified as important in relation to obesity risk in adults, including fast food consumption, skipping breakfast, low intakes of fruits and vegetables, consumption of meat, and television viewing.⁷⁻¹¹ While the search for specific behavioural drivers of obesity continues, it is likely that these comprise both eating and physical activity-related behaviours.

There is good evidence that the socio-economic distribution of eating patterns and of leisure-time physical activity are consistent with those found for obesity. Studies show that persons from low socio-economic backgrounds are less likely than those from high socio-economic backgrounds to participate in organised sport and leisure-time physical activity.¹²⁻¹⁴ For example, data from the third US National Health and Nutrition Examination Survey showed that the prevalence of physical inactivity was much lower (25%) among those with high levels of education (16 years or greater) than those with low education levels (less than 12 years).¹⁵ Similarly, there is also evidence that individuals from lower socio-economic backgrounds consume nutritionally poorer diets (in terms of current dietary recommendations) than do those from higher socio-economic backgrounds.¹⁵⁻¹⁸ For example, these studies demonstrate that individuals of lower SEP eat comparatively fewer fruits and vegetables, but more foods that are lower in fibre, low in micronutrient density, and high in fat.

While variations across socio-economic groups in eating and physical activity are well-documented, much less is known about why these behaviours are socio-economically patterned. A better understanding of this is important in identifying the specific behavioural determinants that should be the target of intervention programs aimed at reducing risk of obesity among socio-economically disadvantaged groups.

Pathways between socio-economic position and obesity risk behaviours

The finding that different indicators of SEP (e.g., occupation, education and income) are differentially associated with weight gain² begins to tell us something about the mechanisms at work that might explain the associations between SEP and obesity. As we have previously argued, it may be that a person's occupational status structures their lifestyle, and therefore their opportunities to consume a healthy diet and to engage in physical activity.¹⁹ For example, persons in low status occupations are likely to have less flexible working conditions, and therefore fewer opportunities to be physically active during their working day than are persons in higher status occupations. Education may well be an indicator of an individual's capacity to access and assimilate health information, and to put it into practice. Therefore, a person with lower levels of education would be less likely to have sound nutrition knowledge than a well-educated person. Income, on the other hand, may be a marker for

material wealth, with persons on low incomes less able to pay for exercise classes or to purchase sporting equipment. However, in terms of explaining the pathways between SEP and obesity, occupation, education and income are at best only crude indicators.

In terms of understanding the pathways that might explain SEP-obesity relationships, there exists relatively little empirical research that has examined the degree to which the determinants of obesity-risk behaviours vary by SEP, and whether SEP differentials in these determinants explain SEP variations in diet and physical activity behaviours, or in obesity risk. There is evidence that better nutrition knowledge is related to healthier dietary intakes,^{20,21} and that higher SEP is associated with greater nutrition knowledge,²¹⁻²³ and it is therefore plausible that knowledge mediates the relationship between SEP and dietary intake. There is also evidence that body weight dissatisfaction and weight control practices,²⁴ physical activity enjoyment and self-efficacy,²⁵ values and beliefs about diet and health,^{26,27} and cooking skills²⁸ vary according to SEP. While less evidence exists, it is also plausible that socio-economic variations in factors such as stress or depression levels; food taste preferences; access to and uptake of new knowledge/information (e.g., through media); or discretionary time or energy levels also contribute to increased obesity risk among socio-economically disadvantaged groups via their influence on obesity-related behaviours.

The preceding sections have provided an overview of links between SEP, weight-related behaviours and obesity. Consistent with the emphasis of existing literature in this field, this paper has focused primarily on inter personal factors (e.g., values, knowledge, skills). However, current theoretical models of physical activity and eating behaviours (e.g., social ecological models²⁹), as well as increasing empirical evidence, suggests that broader environmental factors may also play a critical role in influencing obesity risk, and some evidence suggests that persons of low SEP may be exposed to environments that predispose them to risk of obesity. An overview of this literature is provided below.

Environmental contributors to the obesity epidemic

Increasingly urgent calls for action to address the obesity epidemic have focused on the need to modify what has been termed a 'toxic' or 'obesogenic' environment.³⁰⁻³² Such approaches are premised on the belief that avoiding obesity in today's fast-paced, high-tech, convenience-oriented environment is very difficult – a case of a slim chance in a fat world, particularly for those of lower SEP. However, while the environment is increasingly implicated as a potent source of influence on obesity levels, to date empirical evidence linking specific environmental exposures with obesity risk is not strong. Research studies are limited in number; have assessed only a small range of potentially important environmental factors; and have produced inconsistent results.³³⁻⁴¹

While we certainly do not argue that the environment is unimportant, there is a critical need for more sophisticated conceptual thinking and empirical testing of environmental determinants of obesity and its determinant behaviours, eating and physical activity. The lack of

strong associations observed in existing studies may be in part due to the tendency to rely on readily-available measures of obvious physical infrastructure (for instance, the simple existence of recreational facilities or food outlets, rather than their accessibility via road networks or public transport, operating hours, quality, range or price of produce/service) as indicators of the environment. In addition, very little attention has been paid to social aspects of the environment that might impact obesity, or what we term 'socio-environmental determinants', which might operate within families, social groups, institutions (such as schools or workplaces) or communities. Potential socio-environmental determinants of obesity include social circumstances, including economic and material wealth, but also social norms regarding body weight, physical activity and eating; levels of social support for obesity-protective behaviours; 'social capital'; safety (including both risk of crime and road/traffic safety); and social and cultural customs, values, or expectations for what is important (eg relating to the role of food or the acceptability of vigorous exercise).

Such socio-environmental constructs are likely to vary greatly across socio-economic groups. For example, persons of low SEP have reported lower levels of social support for healthy behaviours.^{21,25,27,42} However, the available evidence provides few insights into the relative importance of socio-environmental exposures in the obesity epidemic, and in explaining the increased risk of obesity amongst those of low socio-economic position. There has also been virtually no research that has attempted to systematically intervene and influence these socio-environmental constructs in an attempt to impact obesity risk. A better understanding of the contribution of modifiable socio-environmental constructs may provide key insights to inform obesity prevention efforts, particularly amongst groups experiencing socio-economic disadvantage.

Resilience to obesity

Efforts to elucidate the aetiology of obesity have focused much attention on identifying determinants of obesity or unhealthy weight gain. However, as discussed earlier, the *specific* behavioural, social and environmental drivers leading to the energy imbalance that causes obesity remain poorly understood. An alternative research strategy that may be useful for guiding interventions to prevent weight gain involves the identification and description of predictors of weight maintenance.^{7,43,44} Contrary to popular belief, not everybody is gaining weight.⁴⁵ The ability to maintain a steady weight is most likely the product of the interaction of genetic predisposition and modifiable personal, behavioural and environmental factors. The identification of those modifiable characteristics of "weight maintainers" (ie people who have successfully maintained a stable weight over time) may assist in the development of strategies aimed at preventing weight gain in others. We believe that this is a particularly promising approach when attempting to understand the elements necessary for obesity prevention in population groups identified as high-risk, such as those of low socio-economic position. That is, what insights can be gleaned from investigating how some individuals of low socio-

economic position, despite the odds, remain 'resilient' to weight gain and obesity?

The term 'resilience' has been defined as a "dynamic process encompassing positive adaptation within the context of significant adversity".⁴⁶ The term first emerged from a prospective investigation of the developmental outcomes across the life course of children born into poverty,⁴⁷ a proportion of whom defied the odds by developing into well-adjusted, competent adults. Research on resilience subsequently expanded to include not only poverty but socio-economic disadvantage.⁴⁸⁻⁵⁰ To our knowledge, however, the concept of resilience has not been previously applied to the study of obesity. We argue that the application of this construct represents a promising avenue for innovative research into obesity prevention among those of low socio-economic position. For instance, strong theoretical parallels exist between resilience theories and conceptual paradigms used to study obesity risk. For example, evolving research into resilience delineated three sets of factors implicated in the development of resilience: attributes of individuals themselves; aspects of the family environment; and aspects of the broader (particularly social) environment.⁴⁶ Such a framework resonates with the social ecological models currently being applied to the study of obesity-related behaviours, physical activity and eating.²⁹

When applied to obesity, the term resilience may be used to describe those who manage to maintain a healthy weight, despite exposure to circumstances that commonly contribute to risk of weight gain and obesity. While by no means comprehensive or unequivocal,^{51,52} accumulating evidence suggests that persons of low SEP are disproportionately exposed to a number of obesity-promoting circumstances. For instance, in addition to the intra-personal risk factors (such as lower nutrition knowledge or physical activity self-efficacy) summarized earlier, residents of socio-economically disadvantaged neighbourhoods have been found to have greater access to fast food outlets⁵³ but poorer access to supermarkets,^{54,55} free-for-use physical activity resources,⁵⁶ and several of the socio-environmental supports described above.^{21,25,27,42} Clearly a range of 'adverse factors' that might increase the risk of obesity appear to be at work, making weight gain prevention difficult for those facing socio-economic disadvantage. In contrast to the large number of studies examining determinants of obesity, however, very few studies have concurrently examined the intrapersonal, socio- and physical environmental factors associated with resilience to weight gain and obesity.^{7,43,44}

Conclusions and agenda for future action

The increasing prevalence of obesity, particularly among those experiencing socio-economic disadvantage, highlights the need for more innovative and effective approaches to understanding and intervening to prevent obesity. Currently, the mechanisms underlying the increased risk of obesity faced by those of low socio-economic position are not well-elucidated, but are likely to reflect a combination of personal characteristics and adverse socio- and physical environmental factors. We believe that the application of the construct of 'resilience' represents an innovative approach to enhancing under-

standing of the personal and contextual factors protective against obesity among those of low socio-economic position, hence providing critically-needed insights into how and in whom significant weight gain might be prevented.

Proposed research agenda

Further research into socio-economic factors and obesity should:

- i) Empirically test specific, hypothesized theory-driven pathways linking various socio-economic components (income; education; occupation; neighbourhood deprivation) with obesity.
- ii) Focus on understanding resilience to obesity among those of low socio-economic position – identify the intra-personal, socio-environmental and physical environmental factors that confer protection against obesity risk among socio-economically disadvantaged women and children.
- iii) Capitalize on advances in analytical techniques such as multi-level statistical modelling, which enables the examination of the relative influences of intrapersonal and contextual environmental factors simultaneously.
- iv) Include more intervention studies in which socio-cultural context is modified or accounted for.

In terms of an agenda for public health action on obesity, we recommend the following:

- i) Recognition in obesity prevention efforts that socio-economically disadvantaged populations are at increased risk of weight gain and obesity, and hence warrant particular focus in any action plans/programs.
- ii) Acknowledging that current evidence is not comprehensive, as much as possible use evidence-based programs to address the disproportionate obesity prevalence in low SEP groups (e.g. targeting those specific behaviours and their determinants known to predict obesity).
- iii) It is essential to evaluate any actions undertaken in an effort to combat the obesity epidemic, particularly amongst those of low SEP, in order to consolidate and grow the currently limited evidence base.

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Original Article

Socio-economic factors in obesity: a case of slim chance in a fat world?

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肥胖的社會經濟因素：一個肥胖的世界變瘦的渺小機會

全球的肥胖疫情已經被大眾、媒體、衛生官員、食品工業及學術研究者廣泛且充分的討論。當肥胖問題被廣為認定的同時，其可能解決之道卻仍是遙遙無期。只有少數有限的證據指出如何決定最佳的方式以控制個人及族群的肥胖問題。目前在已開發的國家，肥胖被視為一個臨床及公共衛生的問題。然而在許多開發中國家，肥胖也是一個必須去處理的難題，或是去面對因為肥胖所致的死亡而嚴重受創的健康照護成本。同時有許多的證據指出肥胖分佈在不同社會經濟階層。在已開發國家，社經地位較低者似乎比較容易受到影響，而在發展中國家社經地位較高者，較容易過重或是肥胖。這篇文章的目的主要是簡短的：證社經地位與肥胖相關的證據，討論已知的根本機制，並且思考社會、生理、政策與文化環境對於解釋社經地位與肥胖間的角色。我們提出「韌性」這個觀念當作可能的理論架構，引導研究以瞭解社經地位弱勢者如何能避免肥胖。我們總結，應該以一個議程來指導未來的研究及計畫，使其集中於瞭解並減少低社經弱勢者肥胖的問題。

關鍵詞：社會經濟因素、肥胖、環境、社會環境、韌性