Socioeconomic Inequality and Lifestyle Mediation in Obesity: Evidence from Adults in Los Angeles, 2019–2023

Chenhao Dong [1, *]

[1] Department of Applied and Computational Mathematics, University of Southern California, Los Angeles, CA 90089, United States
*Corresponding author: chenhd@usc.edu

Abstract:

The rates of overweight and obesity in the past few decades have increased throughout the world, subjecting increasingly larger populations to high cholesterol, blood pressure, and cardiovascular disease. Some populations have a higher level of burden than others. This essay is interested in how socioeconomic status (SES) and daily lifestyle choices might work together as BMI variation determinants in different populations in the Los Angeles area. With data from large health surveys, the California Health Interview Survey (CHIS), this study will take adults aged 18-65 in Los Angeles as its research target and consider their BMI, occupation, smoking/drinking habits, social status, income, and level of education. This study examined Los Angeles adult data and determined a strong SES–obesity gradient. Among lifestyle variables, frequency of fast-food intake had the closest to a clear dose–response. Binge drinking, current smoking status, and heavy device use had modest contrasts. Altogether, the results are compatible with partial mediation, whereby structural disadvantage augments convenience-ingredient dependence on convenience-dense foods that are energy-dense to illuminate SES gaps in corpulence. These results suggest combined remedies: structural policies that enhance economic and food environments along with behavioral assists that lessen fast-food-based dependence, particularly among lower-SES communities.

Keywords: Obesity; Socioeconomic Status; Body Mass Index; Social Determinants.

1. Introduction

The global rise in body mass index (BMI) has become a pressing public health challenge over the past four decades. According to the World Health Organization (WHO), in 2022, 1 in 8 people in the world was living with obesity; 2.5 billion adults were overweight; and 43% of adults aged 18 years and

over were overweight [1]. This upward trend has contributed to a simultaneous increase in obesity-related chronic conditions such as diabetes, cardiovascular disease, high blood pressure, and certain cancers, including liver, colon, and kidney cancers. Beyond individual health risks, the systematic difference in BMI across social groups has emerged as a key dimension of health disparities, reflecting broader social and economic inequalities.

A large body of research suggests that BMI distribution is shaped by both lifestyle behaviors and socioeconomic status, while it also shows that the relationship is complicated. Autret, Guillaume, and colleagues provide a comprehensive review in the Journal of the Endocrine Society on SES and obesity. The paper shows consistent associations across obesity, income, education, and occupation. The authors argued that structural determinants such as food affordability and the built environment are important factors when considering interventions on obesity [2]. Hoebel, Finger, and Lampert analyze German national health survey data and report that obesity prevalence has increased mainly among middle- and low-SES groups. The paper highlights the deepening social disparities in BMI [3]. Pourfarzi conducted a decomposition analysis on 20000 Iranian adults in the Iranian ArNCD cohort. The paper shows that BMI is disproportionately concentrated among higher SES groups. The difference in income and wealth largely explained most of the inequality, while gender and education level played partial roles [4]. White found that SES gradients in BMI emerge in early childhood and persist into adolescence based on the data of seven birth cohorts across six high-income countries [5]. Morfenstern argued that people from low-SES backgrounds are at higher risk for obesity and overweight because of higher television viewing levels [6].

Collectively, these studies demonstrate that BMI inequality is driven by both socioeconomic and lifestyle factors, that SES and BMI gradients are present globally, and that they emerge early and often widen over time. These studies support the need for integrated approaches that combine structural policies and individual interventions to reduce disparities in BMI.

Although previous studies have consistently shown that SES is a strong predictor of BMI. They showed that in different areas of the world, the SES-BMI gradient varied a lot. In high-income countries, lower SES is typically associated with higher BMI, while in middle-income countries, higher SES groups carry a greater burden of overweight and obesity [4]. This geographic variability suggests that the drivers of BMI are highly context dependent. Thus, this paper is dedicated to focusing on the issues in the Los Angeles area. Most prior research has considered SES or lifestyle behavior in isolation. Single-behavior interven-

tions fail to eliminate BMI disparities because, e.g., they fail to consider the affordability of meals, availability of time, and safety of neighborhoods, as Autret note. Hoebel also illustrates that obesity disparities are growing over time, though they fail to distinguish income, education, work, and environmental contributions from one another. This study addresses these gaps by combining SES indicators, lifestyle factors, and neighborhood characteristics into one framework. This approach clarifies which factors drive BMI inequality in different contexts and helps identify leverage points for more targeted, equitable interventions.

2. Methods

2.1 Data Sources

This cross-sectional examination utilizes pooled public tabulations from the California Health Interview Survey (CHIS) of Los Angeles County from 2019 to 2023. CHIS is a statewide survey of California residents that is done through complex probability sampling and weighting. This study limited the analytic population to 18–65-year-old adults. As per WHO plausibility recommendations, records that contained implausible BMI measures have been dropped. Since the analysis depends upon pool-altered outputs of AskCHIS of LA County, the geographic region is set as fixed at the county level.

2.2 Variable Definitions

The dependent variable in this study is body mass index (BMI, kg/m²), treated both as a continuous variable and categorised according to World Health Organisation standards as underweight (<18.5), normal weight (18.5–24.9), overweight (25.0–29.9), and obese (≥30). The core independent variables comprised socioeconomic status (SES) indicators: poverty level as a percentage of Federal Poverty Level (FPL) bands (e.g., 0–99%, 100–199%, 200–299%, ≥300%...), educational attainment (e.g., ≤HS, some college/AA, BA+, or Phd…). Health insurance status (e.g., currently insured/not insured), annual household income (e.g., $5000 or less, $5001 through $10000, $10001 through $15000…), business/company size (e.g., fewer than 10 employees, 10-50 employees, 51-100 employees…), housing status (e.g., renting in a multi-unit building, homeowner in a single-unit building…), and ability to afford enough food. Lifestyle mediating variables encompass dietary quality (fast food eaten frequency in the past week, sugar-sweetened beverage intake), smoking status (not current, current), alcohol consumption (binge drinking in the past month), and computer/mobile device

usage (frequency). Covariates include age, gender, marital status, and self-reported chronic conditions (e.g., diabetes, hypertension).

2.3 Statistical Analysis

This study presents BMI distributions and prevalence of obesity across SES groups in terms of AskCHIS point estimates and 95% confidence intervals. To portray a visual representation of the SES gradient, this study graphs obesity in percent with CIs by FPL band and education level, and a stacked graph of the proportion of Normal/Overweight/Obese by FPL band. For lifestyle, we contrast the lifestyle smoking/drinking/phone usage status and obesity in percent.

For model-based inference from an expanded variant by utilizing CHIS microdata, this study would estimate linear/ordinal models of BMI/BMI-category on SES and then incorporate lifestyle variables to test attenuation (partial mediation) through survey-weighted methods (e.g., survey/srvyr in R). A test of statistical significance would be done at $p < 0.05$.

3. Results

3.1 Socioeconomic status (SES)

Among the core SES indicators, prevalence of obesity in Los Angeles presents a strong, monotonic social gradient. The steepest and most internally homogeneous gradients are those of poverty level (%FPL) and of schooling (educational attainment). Those having the least schooling (e.g., Grades 9–11 or ≤HS) have the highest prevalence of obesity, and those having Ph.D. degrees or graduate degrees have the lowest. This finding agrees with multi-country and worldwide syntheses that characterize strong inverse associations between schooling and obesity—plausibly by virtue of health literacy, work–life sorting (e.g., jobs enabling good physical activity or healthier work environments), and healthier work–life environments [3–5]. This is also consistent with the broader mechanistic explanation; wherein higher education renders healthier options more conspicuous and easier to access [6].

A comparable stepwise trend is evident across %FPL bands and annual household income: the 0–99% FPL category has the greatest obesity prevalence, trending down through 100–199%, 200–299%, to its weakest levels at ≥300% FPL; income levels reproduce the same-order ranking. These results confirm cross-national evidence that socioeconomic deprivation is strongly connected to higher prevalence of obesity [2–5]. Direction is consistent with the energy density/food pricing mechanism—energy-dense, ultra-processed foods are less expensive and more accessible, whereas nutrient-dense foods have a higher monetary and time cost, which is especially prominent among low-income families (Fig. 1 and 2) [6].
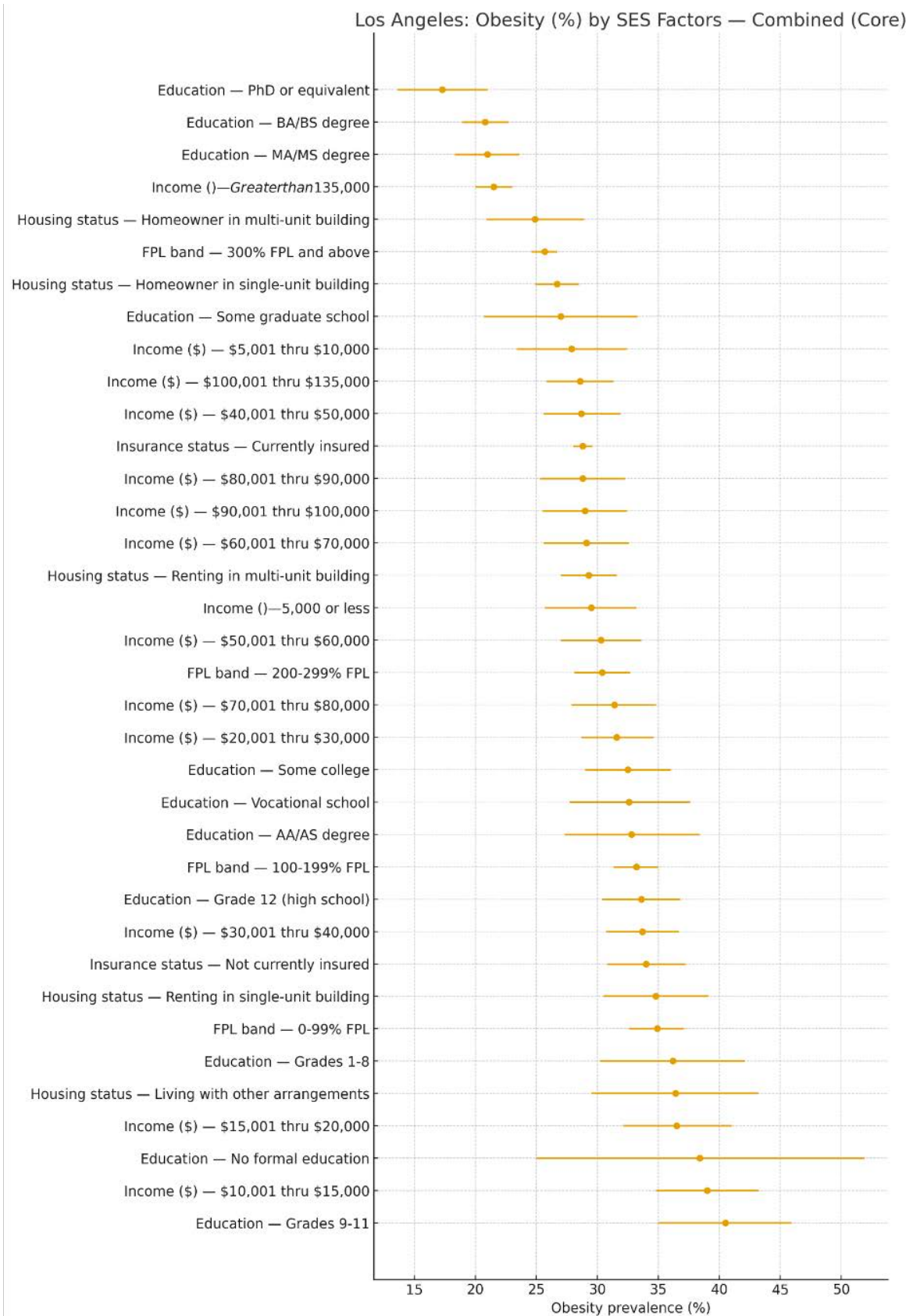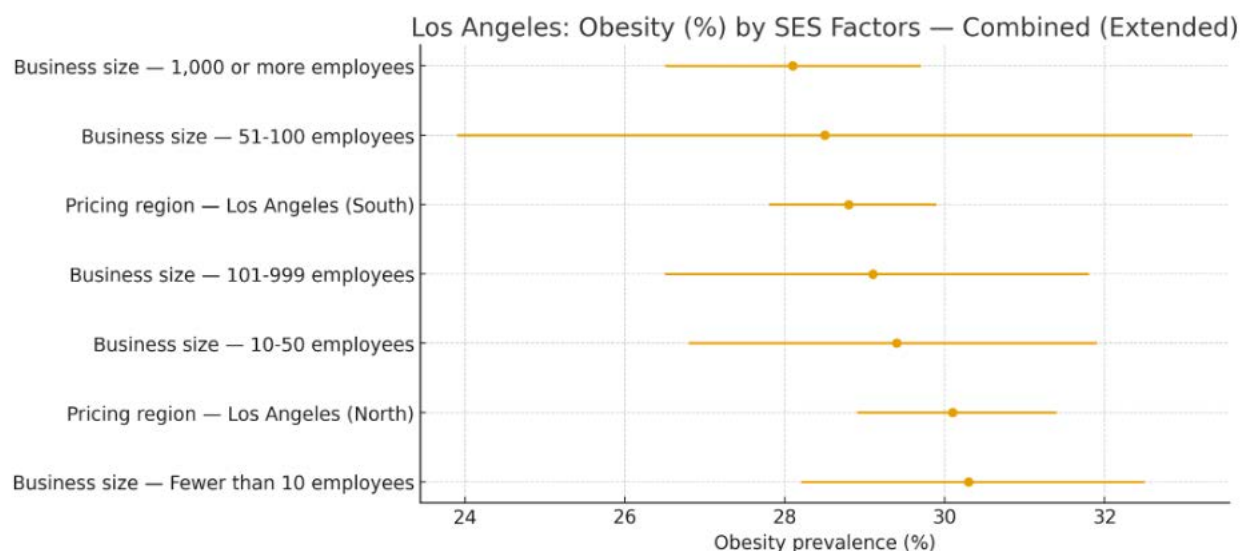
Fig. 1 Obesity prevalence in Los Angeles by socioeconomic factors [6]

Fig. 2 Obesity prevalence in Los Angeles stratified by business size and pricing region [6]

Other material and access proxies confirm the gradient. Food-insecure adults have a higher prevalence of obesity compared to those who are food-secure, and uninsured adults have a higher prevalence compared to those who are insured; renters (particularly those living in units of a single building) are heavier than homeowners [7, 8]. These relations are compatible with those from some recent U.S. work that shows stepwise relations of adiposity to deteriorative food insecurity [9] and with systematic reviews relating material hardship to lower diet quality and limited opportunities to be active physically [5–6]. The baseline SES panel presents a consistent multi-dimensional gradient: education, income/%FPL, food security, insurance status, and housing tenure all go in the same direction, and have meaningfully large absolute differences that are of policy significance.

By comparison, the extended SES measures—company/business size and Covered California pricing area—have smaller absolute prevalence spreads in obesity. These variables are more distal measures of household and individual resources than those of education, %FPL, or food security, so attenuated between-group distinctions are no surprise. This attenuation is a repeat of previous work demonstrating that area-structure or employer-structure alone serves as a less-than-ideal indicator of SES–health gradients unless complemented by more expansive measures of built environment or individual resources [3,7]. As interpreted along the side of the core panel, the longer measures bring refinement but no change to the chief conclusion: the largest and most policy-apparent SES distinctions in LA are revealed by education, %FPL/income, food security, insurance coverage, and tenure (Fig. 3).

Fig. 3 Obesity prevalence in Los Angeles stratified by lifestyle factors [6]

3.2 Lifestyle Factors

The lifestyle indicator shows three important patterns. First, the frequency of fast food shows the most prominent monotone relationship with the prevalence of obesity. Those adults who do not have a fast-food meal in a week have a lower prevalence that is significantly increasing through 1–4+ fast-food meals weekly. This dose-response gradient is consistent with evidence that diets higher in ultra-processed, energy-dense foods are associated with higher adiposity, and that cost/time limitations drive lower-income families to convenience foods [5–6]. It also complements longitudinal evidence that BMI drifts upwards following exposures to fast-food outlets that have subsequently increased—but that decreases in exposure do not necessarily lead to rapid weight loss—even indicating habit retention and possible asymmetry in reactions [8].

Secondly, binge drinking and current smoking demonstrate modest disparities. For alcohol, this is consistent with a 127-study meta-analysis: cross-sectional associations with overweight/abdominal obesity tend to emerge mainly in heavier intake, whereas cohort estimates mean to zero—thus population disparities might be small in most environments [9, 10]. For smoking, small variations are also possible. While lighter on average in some cases among regular users, association with prevalence of obesity is situationally dependent and susceptible to distortion by selection/conditioning in cross-sectional photographs; methodological work admonishes that smoking is naively

modelled to bias estimates [11]. Third, heavier mobile/computer social-media use is correlated to somewhat higher prevalence among lighter users, as would be expected by time-displacing activity sedentary time spent on tap, yet again, magnitude is undeniably a poor second to that of an important fast-food gradient—again to be consistent with wide-ranging reviews favouring diet drivers of an important SES–obesity gap [5].

Taken as a whole, SES and lifestyle factors suggest that structural socioeconomic factors are by far the largest correlates of obesity in Los Angeles areas, and particular behaviors—most significantly, fast-food dependence—likely play a part in those structural gaps as mediators. Largest gaps in strength are found in education and %FPL/income, followed tightly by food insecurity/ insecurity-avoidance and insurance and tenure; these findings are consistent with cross-national and international syntheses that report ongoing SES gradients in obesity [2–5] and a mechanistic explanation that spotlights the price of food and time cost [6]. Lifestyle panel informs which of these behaviors most credibly transmit the SES signal: fast-food frequency tracks BMI prevalence significantly more tightly than binge drinking or smoking, and its graded relationship is compatible with built environment evidence that finds outlet exposure predicts subsequent BMI augmentation [8]. Environmental mediators sometimes mitigate SES gaps (e.g., walkability/green space), yet results are inconsistent at scale and confirm that core disadvantages of SES leave a strong imprint on the risk of obesity [7].

4. Summary

This study evaluated how lifestyle behaviors and socioeconomic status (SES) influence obesity prevalence among adults in Los Angeles.

The main result is that SES is significantly and negatively correlated with obesity in LA areas: less schooling, lower %FPL/income, food insecurity, uninsured status, and renting all correlate with higher prevalence of obesity, whereas longer proxies (firm size, price region) have smaller dispersion. Among behavioral variables, frequency of fast-food use has by far the most evident, graded association with obesity; margins of binge drinking, smoking status, and heavy device usage are moderate in comparison. Collectively, the findings confirm a mediation model in which structural disadvantages give rise to dependence on energy-dense convenience foods that help to explain SES–obesity disparities; this is consistent with previous evidence on the price of foods, the time cost of foods, and exposure to the built environment. Substantiation tests and triangulation from literature imply that addressing economic security and food outlets, next to behavioral change, is most likely to narrow disparities.

These results make structural policy levers (income and food-security assistance, insurance and renter protections, and healthier retail-zone placemaking) and diet-oriented counseling to lessen fast-food intakencentral. Combine multi-omics and biomarker panels, enhance interpretability of models (causal mediation, fairness audits), and conduct clinical/community validation to substantiate mechanisms and inform justifiable intervention design.

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