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RESEARCH ARTICLE

Obesity-Related Health Lifestyles of Late-Middle Age Black Americans: The Jackson Heart Study

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Introduction: This article examines the obesity-related health lifestyle practices of a late-middle age cohort of socioeconomically diverse Black Americans. Black people have the highest prevalence of obesity of any racial group in the U.S. Consequently, the obesity-related health lifestyles of this population is an important topic of investigation, including those in late-middle age for whom there is little data.

Methods: This study employs latent class analysis (LCA) and multinomial logit models to investigate dietary habits, levels of exercise, alcohol use, and smoking. The analysis sample is from the first examination of the Jackson Heart Study (2000–2004) analyzed in 2021 using LCA. The sample consists of 739 Black men and 1,351 women between the ages of 50 and 64 years.

Results: Three classes of lifestyles were found for both genders: healthy diet, unhealthy diet, and unhealthy smokers. For women only, a most healthy lifestyle was added. Major findings are the low levels of physical activity, a clear socioeconomic pattern in healthy lifestyles among Black men and women, and the association of diagnoses of diabetes and cardiovascular disease with healthier lifestyle practices among Black men but not among women.

Conclusions: Obesity-related health lifestyles among late-middle aged Black Americans generally do not converge toward a healthier norm with impending old age. An exception is men who have been diagnosed as having diabetes or heart disease. Otherwise, healthy and unhealthy lifestyle practices remain aligned by social class during this period of the life course.

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INTRODUCTION

Nationally, non-Hispanic Black adults have the highest prevalence of obesity (nearly 50%) of any racial group in the U.S.[1] Black women have the highest prevalence of obesity (nearly 57%) by sex and race.[1] Obesity was also a significant comorbid variable in the high mortality of Black adults from coronavirus disease 2019 (COVID-19).[2–4] Consequently, the obesity-related health lifestyles of Black people are a significant topic of investigation, including those in late-middle age for whom there is a lack of data.[5,6]

Late-middle age is a period in the life course when an individual's weight is usually well established and chronic diseases linked to the cumulative effects of disadvantaged social conditions, stress, and constraints on health-promoting behaviors often surface, regardless of race.[5] Obesity, heart disease, diabetes, high blood pressure, breathing difficulties, and various other afflictions connected to smoking, lack of a nutritious diet, excessive alcohol consumption, and lack of exercise become more

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common during this stage of life.[5,6] Given that Black Americans have the highest mortality rates in the U.S. from chronic diseases,[7–9] it is important to understand the combinations of obesity-related health behaviors that coalesce into health lifestyles for this group.

Past studies have largely focused on comparing individual health behaviors across racial/ethnic groups. Research shows that Black people are not as likely as White people to indulge in heavy episodic drinking[10] but are more likely to have a less healthy diet[11–15] and not exercise.[16–18] Proportionately more Black men smoke than either White men or White women, but Black women smoke less than Black men and White people generally.[19–23]

However, in many studies, Black Americans and members of other racial groups have low representation. Instead, they are embedded, sometimes in small numbers, within much larger and predominantly White samples, serving as token minorities in some analyses.[24] In such instances, general conclusions about Black American health practices are based on relatively small samples. Moreover, a related criticism of past samples of Black Americans is that low-income individuals are frequently overrepresented and that the more affluent are underrepresented, possibly skewing results to be more characteristic of disadvantaged Black people than the Black population as a whole.[25–27] Samples failing to capture the diversity of socioeconomic backgrounds among Black people do not provide the most representative results,[24,25] which this study addresses by analyzing an all-Black sample of varying SES.

The purpose of this study is to examine the obesity-related health lifestyles of a late-middle age cohort of socioeconomically diverse Black Americans. Latent class analysis (LCA) and health lifestyle theory is used to investigate the health lifestyle practices associated with obesity among Black adults in the Jackson Heart Study (JHS). These data were collected from the tricounty (Hinds, Madison, and Rankin) area of Jackson, Mississippi, which is noteworthy because Mississippi has the highest mortality rates for Black people of any state in the U.S. (801.0 deaths per 100,000 in 2017), especially from coronary heart disease (CHD) and Type 2 diabetes.[9,28] Mississippi also has the second-highest prevalence (46.0%) of obesity for non-Hispanic Black people in the nation after West Virginia.[29]

The theoretical perspective guiding this analysis is health lifestyle theory.[30–32] This theory defines *health lifestyles* as collective patterns of health-related behavior based on choices from options available to people according to their life chances. The basic orientation of health lifestyle theory is that the behavioral choices people make that affect their health either positively or negatively—namely smoking, consuming alcohol, eating particular foods, exercising, and the like—cluster into distinct lifestyle configurations characteristic of particular groups and social classes. Although these lifestyle practices are enacted by the individual, they are affected (enabled or constrained) by what is available with respect to the norms, values, and material resources associated with the individual's SES and other variables consistent with the individual's living situation or chances in life. The choices typically align the chooser with others sharing the same or similar social backgrounds.

The practices that result can either impair, maintain, or promote health over time. However, even though these health behaviors have a general binary character (positive or negative), they may not be exclusively one way or the other in differentiating between lifestyles. Instead, health lifestyles often include a mixture of health-promoting and health-harming behaviors that are nevertheless aligned along social gradients, with the most healthy (MH) practices invariably associated with higher SES and the least healthy associated with lower SES.[32–36] Health lifestyle theory is described more fully elsewhere.[30–32]

This study moves beyond past research in 3 ways. First, rather than analyzing individual health behaviors related to obesity, this research investigates the health lifestyles that capture the relatively durable combinations and mutually reinforcing nature of various health behaviors. Second, the focus is on the predictors of health lifestyles among Black men and women rather than across races. Because of the unique life course processes involving stress related to discrimination, systemic inequities, and structural racism as well as experiences with the health-care system among Black people,[37–40] this study seeks to determine whether SES, a key predictor of health lifestyles, has a different result in an all-Black sample from that found in Black-White comparisons. Third, attention is given to late-middle age as an important period of the life course when chronic illnesses begin to emerge.

METHODS

The JHS is a single-site prospective epidemiologic cohort study focusing on the risk factors of CHD among Black men and women. The original sample consisted of 5,306 persons between the ages of 20 and 95 years. Details of the study's design are published elsewhere.[41] Data were collected in 3 examinations—(1) 2000–2004, (2) 2005–2008, and (3) 2009–2013—and the study continues. Overall, the sample is relatively well educated, with 56% having a college degree or higher and 6% having some college compared with 38% with a high-school diploma or less. In addition, more than a quarter of the sample have family incomes of $50,000 or more annually at baseline (2000–2004), with more than 8% earning $75,000 or more, compared with about 31% who have an income <$16,000 per household annually. Consequently, the sample is not overrepresented by low SES individuals but includes a majority of middle-class participants.

Because the focus is on late-middle age, the analysis was restricted to 739 Black men and 1,351 Black women between the

ages of 50 and 64 years at baseline. The mean age of participants in the study sample is around 57 years, with nearly 60% of both sexes having a 4-year college degree. A small number of participants were excluded (n=22, <1%) owing to having unclassifiable occupations. With the exception of income (missing for 15%), covariates were missing for <5% of participants. Multiple imputation was used to address missing data. Stata's suite of mi commands was used to construct 25 complete data sets through multiple imputation with chained equations.[42] Diagnostics of the imputations indicated minimal departures from the distributions of the observed data.[43]

Measures

A total of 5 indicators of obesity-related health lifestyles collected at baseline (2000–2004) were analyzed. These 5 health behaviors have strong relationships with obesity and later-life health outcomes.[30–34] Ideally, measures of health practices collected at Examinations 2 and 3 would also have been utilized, but JHS did not gather this information after the first wave of data collection. The 5 health behaviors examined are:

1. eating the American Heart Association (AHA)-recommended amount (4.5 cups) of fruit/vegetable servings per day, and
2. drinking not more than the AHA-recommended amount of (<36 ounces or 450 kcals) of sugary beverages per week, along with
3. meeting the AHA's Life's Simple 7 metric for ideal physical activity,
4. alcohol consumption, and
5. smoking.

The AHA metric for ideal physical activity is based on the number of minutes per week that participants report engaging in sports/exercise activities. Participants were ranked as having a poor (0 minutes in moderate or vigorous physical activity per week), intermediate (between 0 and 150 minutes in moderate or between 0 and 75 minutes in vigorous physical activity per week), or ideal (>150 minutes in moderate or >75 minutes in vigorous physical activity per week) exercise regimen. Following this metric, poor or intermediate physical activity was coded as failing to meet the criteria, and ideal physical activity was coded as meeting the criteria.

For drinking, a measure was constructed distinguishing between abstainers (0 drinks daily), light-to-moderate drinkers (1–3 drinks daily for men and 1–2 drinks daily for women), and heavy drinkers (>3 drinks daily for men and >2 drinks daily for women). For smoking, a measure was developed differentiating between participants who never smoked, participants who smoked in the past but were not current smokers, and current smokers. For both drinking and smoking, the 3 categories are treated as nominal rather than ordinal in the measurement of health lifestyles.

The analysis draws on 4 measures of SES collected at baseline —education (years of schooling), logged income, occupation, and self-reported subjective social class. Logged income is based on an 11-category measure of household income. The categories were recoded to midpoints, with the top code set to $125,000 and then logged. As for occupation, the vast majority of participants (99%) fell into 1 of 3 occupation categories: (1) management/professional, (2) sales/service, and (3) production/construction. Subjective social status is based on a question that asked participants to rate their standing in their community on a 1-to-10 scale.

Additional correlates include age and whether participants have been told by a physician that they are in a prediabetic stage or have Type 2 diabetes and whether they have a history of CHD. The medical histories are self-reported.

Statistical Analysis

The analysis proceeds in 2 steps. The first step involves identifying health lifestyles on the basis of the 5 indicators of diet, exercise, smoking, and drinking. This step is accomplished with LCA. LCA treats the individual health behaviors as indicators of an underlying categorical latent variable. In this context, the categories of the latent variable represent distinct health lifestyles composed of different combinations of health behaviors. The number of health lifestyles is determined by balancing the latent class model that has the best fit with the data on the basis of several model fit statistics and considerations of parsimony and interpretation. This analysis relies on the Akaike Information Criterion, the Bayesian Information Criterion, and the entropy.[44]

The second step of the analysis involves examining the correlates of the health lifestyles that emerge in the first step. This component of the analysis relies on multinomial logit models predicting membership in a specific health lifestyle. Participants were assigned to the health lifestyle for which they had the highest estimated probability of membership (some studies indicate that a 3-step approach may be subject to attenuation bias.[45,46] However, simulation studies suggest that the bias is minimal for LCA models with high entropy, as in the current analysis.[47,48]).

All analyses are stratified by gender because women are generally found to have healthier lifestyles than men.[32–34,37] All analyses were conducted in Stata 16, using 25 imputed data sets and reporting the average parameter estimates across all the complete data sets along with corrected SEs.

RESULTS

Table 1 provides the descriptive statistics for all the analysis variables. It shows that late-middle aged Black men generally engage in worse health behaviors than Black women because a higher proportion of men who smoke currently or in the past are heavy or moderate drinkers, and a lower proportion meet the recommended fruit/vegetable intake than women. However, a somewhat higher proportion of men than women meet the recommended guidelines for exercise.

The model fit statistics for latent class models allow from 2 to 5 health lifestyles (Table 2). For men, the minimum Akaike Information Criterion is the model allowing for 3 health lifestyles, and the minimum Bayesian Information Criterion is the model allowing for 2 health lifestyles. For women, there is a similar pattern with models allowing for 4 and 2 health lifestyles, respectively. The models allowing for 3 health lifestyles for men and 4 health lifestyles for women were selected as offering the best fit with the data and a parsimonious, interpretable set of health lifestyles. In addition, for both men and women, the entropies are high (0.82) and

Table 1. Means or Proportions for Indicators of Health Lifestyles, Sociodemographic Measures, and Medical History by Sex

Variables	Overall (*n*=2,090)	Men (*n*=739)	Women (*n*=1,351)	*p*-value for Difference
Health lifestyle indicators				
Smoke: never	0.64	0.50	0.71	**<0.001**
Smoke: past	0.21	0.30	0.16	**<0.001**
Smoke: current	0.15	0.19	0.12	**<0.001**
Drink: none	0.59	0.42	0.68	**<0.001**
Drink: moderate	0.38	0.53	0.30	**<0.001**
Drink: heavy	0.03	0.05	0.02	**<0.001**
Exercise: yes	0.18	0.21	0.16	**0.007**
Fruit/vegetable: yes	0.72	0.63	0.77	**<0.001**
Sugary beverage: yes	0.46	0.45	0.46	0.744
Sociodemographic measures				
Age	57.80	57.60	57.91	0.143
Education: ≥16 years of schooling	0.58	0.59	0.58	0.906
Log income	10.44	10.67	10.31	**<0.001**
Occupation: management/professional	0.38	0.32	0.41	**<0.001**
Occupation: service/sales	0.40	0.27	0.47	**<0.001**
Occupation: construction/production	0.22	0.41	0.12	**<0.001**
Subjective social status	7.86	7.89	7.85	0.629
Diabetes: no	0.36	0.36	0.36	0.661
Diabetes: pre	0.37	0.40	0.35	**0.034**
Diabetes: yes	0.26	0.24	0.27	0.156
History of CHD: yes	0.12	0.18	0.09	**<0.001**

Note: Boldface indicates statistical significance ($p<0.05$).
Sugary beverages, fruit/vegetables, and exercise were coded such that yes indicates that participants met healthy guidelines. *p*-values for differences between sexes are based on 2-tailed test for differences in means or proportions as appropriate.
CHD, coronary heart disease.

indicate that the model performs well in classifying respondents into 1 of the health lifestyles.

Figures 1 and 2 illustrate the conditional item response probabilities for the health lifestyle indicators estimated for each lifestyle among men and women, respectively. This information depicts the general characteristics of each health lifestyle class that allow labels to be developed. For the men, 3 labels capture the salient characteristics of each lifestyle: (1) HD, (2) unhealthy diet (UHD), and (3) unhealthy smokers (UHSs). For women, there is a similar set of labels with the addition of a (4) MH lifestyle. The modal lifestyle of HD or HD for men and women (characteristic of a majority, some 55% of men and 77% of women) in this sample have a relatively healthy profile—low rates of smoking and heavy drinking coupled with reasonably positive dietary practices, although low rates of exercise.

Table 2. Model Fit Statistics for Latent Class Models

Variables	AIC	BIC	Entropy
Men (*n*=739)			
2-class	5,268	5,337	0.40
3-class	5,259	5,356	0.82
4-class	5,263	5,397	0.49
5-class	5,259	5,415	0.48
Women (*n*=1,351)			
2-class	8,159	8,237	0.81
3-class	8,147	8,262	0.69
4-class	8,130	8,287	0.82
5-class	8,130	8,297	0.68

AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion.

The UHD lifestyle for both men and women is characterized by relatively poor diets because it has the lowest probabilities of healthy fruit/vegetable consumption (pr<0.01 for both men and women) and the highest consumption of sugary beverages (pr=0.35 for men and pr=0.16 for women). However, this lifestyle has negligible probabilities of current smoking and heavy drinking.

The chief distinguishing feature of the UHSs or UHS lifestyle for both men and women is the very high probability of current smoking (pr=0.86 for men and pr=0.85 for women) and the highest but still low probability of heavy drinking (pr=0.13 for men and pr=0.12 for women) than the other lifestyles. This lifestyle also

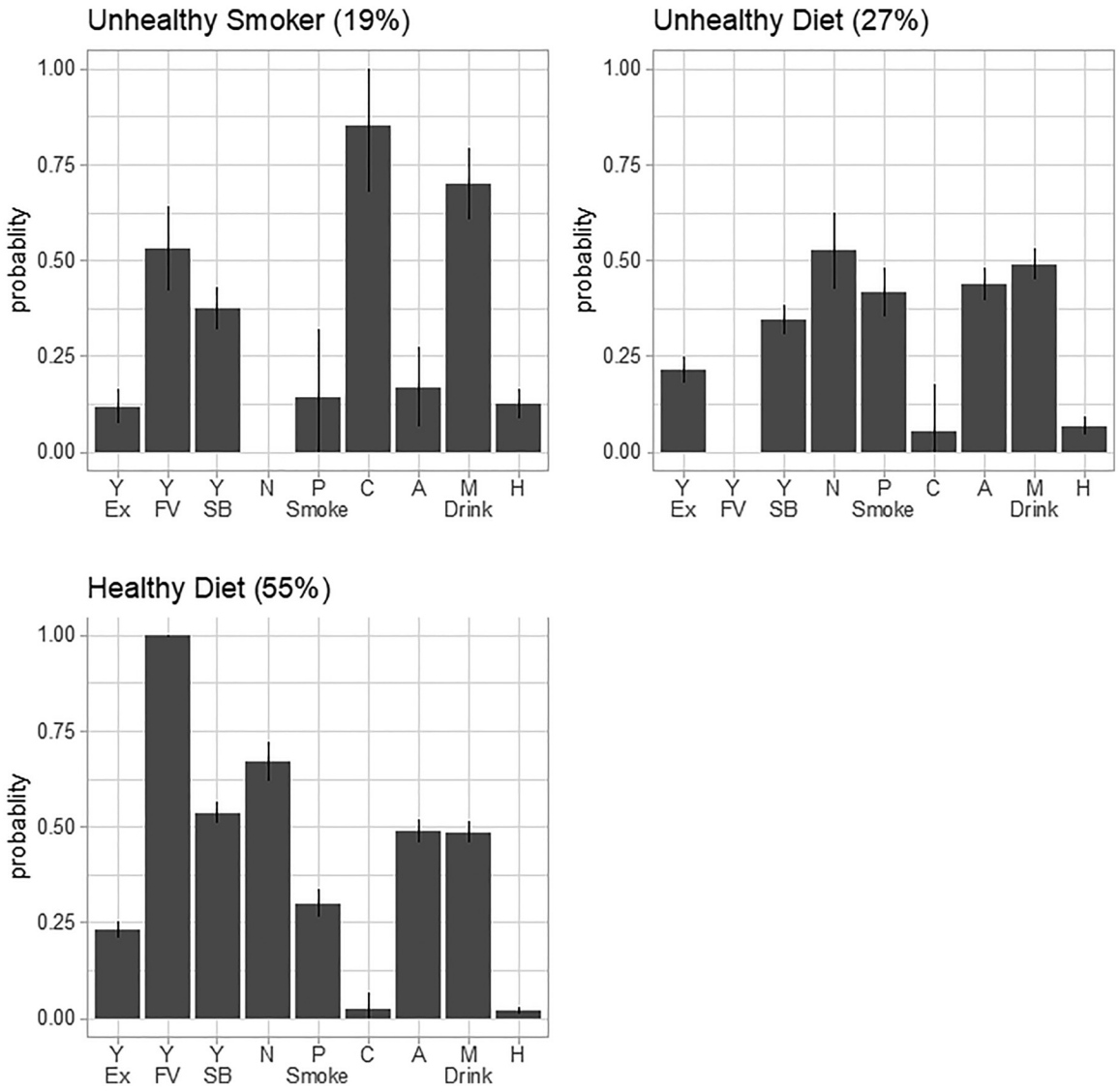

Figure 1. Illustration of item response probabilities and prevalence for each of the latent classes for men.

Note: For each of these indicators, Y=met healthy guidelines. For smoking, N=never smoked, P=smoked in the past, and C=current smoker. For drinking, A=abstains, M=light-to-moderate drinking, and H=heavy drinking. See discussion in text for details about coding for each of these indicators.

Ex, exercise; FV, fruit and vegetable; SB, sugary beverage.

comes with low probabilities of exercise (pr=0.12 for men and pr=0.02 for women) but moderate probabilities of healthy fruit/vegetable consumption (pr=0.53 for men and pr=0.38 for women) and sugary beverages (pr=0.61 for men and pr=0.35 for women).

Finally, it is notable that a broadly healthy lifestyle emerged among a small percentage of women (only 2%) and not at all among men. This MH lifestyle or MH among women has a high probability of exercise (pr=0.94) and healthy fruit/vegetable consumption (pr=0.84) along with limited consumption of sugary beverages (pr=0.93). This lifestyle is also characterized by high rates of moderate drinking (pr=0.89). None of the health lifestyle configurations are exceedingly healthy, but the MH lifestyle for a few women stands out as the healthiest by far.

Table 3 reports the estimates of average marginal effects (AMEs) from multinomial logit models predicting membership in each health lifestyle (Appendix Table 1, available online, provides the descriptive statistics by health lifestyle). Beginning with men, subjective social status is found to be unrelated to health lifestyle membership, but objective measures of SES were associated with such memberships. In particular, income is

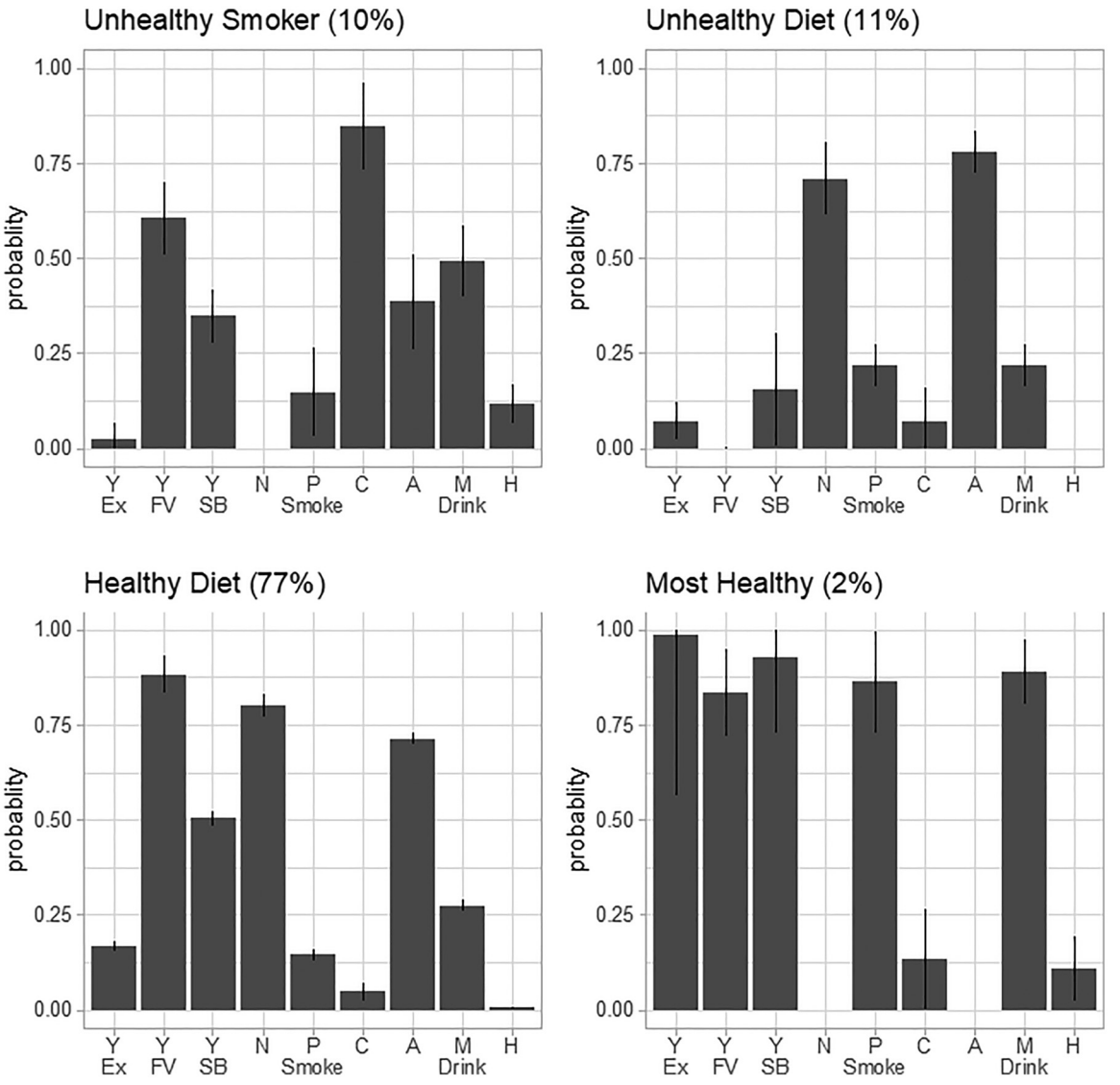

Figure 2. Illustration of item response probabilities and prevalence for each of the latent classes for women.

Note: For each of these indicators, Y=met healthy guidelines. For smoking, N=never smoked, P=smoked in the past, and C=current smoker. For drinking, A=abstains, M=light-to-moderate drinking, and H=heavy drinking. See discussion in text for details about coding for each of these indicators.

Ex, exercise; FV, fruit and vegetable; SB, sugary beverage.

associated with a higher probability of being a member of the HD lifestyle (AME=0.07) and a lower probability of being a member of the UHS lifestyle (AME= −0.04). Similarly, working in production/construction jobs is associated with a lower probability of being a member of the HD lifestyle (AME= −0.10). This pattern is consistent with the association of lower SES with less healthy lifestyles. With respect to medical histories, being prediabetic is associated with a lower probability of the UHS lifestyle (AME= −0.07), being diabetic is associated with a higher probability of the HD lifestyle (AME=0.10), and a history of CHD is associated with a lower probability of the UHD lifestyle (AME= −0.11).

Turning to women, age has a positive association with the HD lifestyle (AME=0.01). However, there is a different pattern of associations involving SES from that observed among men. The results favor higher SES individuals because education rather than income is associated with a higher probability of the MH lifestyle (AME=0.03), and working in construction/production is associated with a lower probability of the HD lifestyle (AME= −0.12). In contrast to men, women reported as prediabetic are associated with a higher probability of the UHD lifestyle (AME=0.04), which might explain why they are prediabetic. In comparison, women with CHD are associated with a lower probability of the HD

Table 3. Average Marginal Effects From Multinomial Logistic Regressions Predicting Health Lifestyles

	Men (*n*=739)			Women (*n*=1,351)			
Variables	**UHS 19%**	**UHD 27%**	**HD 55%**	**UHS 10%**	**UHD 11%**	**HD 77%**	**MH 2%**
Age	−0.006 (0.003)	−0.002 (0.004)	−0.008 (0.004)	**−0.004** (0.002)	−0.003 (0.002)	**0.006** (0.003)	0.001 (0.001)
≥16 years schooling	0.007 (0.034)	−0.028 (0.040)	0.021 (0.045)	0.001 (0.020)	0.020 (0.022)	−0.009 (0.030)	**0.030** (0.015)
Log income	**−0.044** (0.019)	−0.026 (0.024)	**0.070** (0.027)	**−0.035** (0.010)	0.003 (0.011)	0.025 (0.015)	0.008 (0.006)
Service/sales	0.047 (0.036)	−0.051 (0.044)	0.004 (0.049)	**0.041** (0.019)	−0.021 (0.021)	−0.017 (0.028)	−0.003 (0.008)
Construction/production	**0.090** (0.038)	0.010 (0.047)	**−0.100** (0.051)	0.044 (0.030)	0.068 (0.038)	**−0.122** (0.046)	0.009 (0.020)
Subjective social status	−0.012 (0.008)	0.003 (0.009)	0.008 (0.010)	0.001 (0.004)	−0.001 (0.004)	0.001 (0.006)	−0.001 (0.002)
Diabetes: pre	**−0.074** (0.034)	−0.007 (0.038)	0.081 (0.042)	0.004 (0.020)	**0.043** (0.021)	−0.042 (0.021)	−0.004 (0.009)
Diabetes: yes	−0.065 (0.038)	−0.036 (0.043)	**0.101** (0.049)	−0.016 (0.020)	−0.001 (0.021)	0.029 (0.028)	−0.013 (0.008)
CHD: yes	0.054 (0.036)	**−0.108** (0.048)	0.054 (0.050)	**0.085** (0.022)	0.015 (0.028)	**−0.106** (0.036)	0.007 (0.013)

Notes: Boldface indicates statistical significance ($p<0.05$).
Unstandardized estimates of average marginal effects with SEs are reported in parentheses. Estimates are based on 25 multiple imputation data sets.
CHD, coronary heart disease; HD, healthy diet; MH, most healthy; UHD, unhealthy diet; UHS, unhealthy smoker.

lifestyle (AME= −0.11) and a higher probability of the UHS lifestyle (AME=0.09). Here again, less healthy lifestyle practices (low likelihood of an HD and high likelihood of smoking) are linked to diagnoses of CHD.

DISCUSSION

Higher SES Black individuals were found to have healthier lifestyle practices than those lower on the socioeconomic scale. For the entire sample, levels of exercise were low, but the highest scores for exercise nevertheless accrued to those of higher SES. Late-middle age college-educated Black women as well as Black men with professional and managerial jobs and higher incomes were most likely to engage in the healthiest practices involving obesity. Overall, the findings show that the health lifestyles of Black adults in late-middle age are aligned by SES consistent with health lifestyle theory.

Gender was also relevant in that late-middle age Black women were more likely to have healthier lifestyle practices than Black men. They drank and smoked less and had healthier food habits than men. For both genders, obesity-related health lifestyle practices are generally mixed (both good and bad) in late-middle age, thereby indicating that they have not coalesced toward a healthier norm at this time of life. Most past research on health lifestyles has focused on earlier stages of the life course and assumed that health lifestyles formed in adolescence and young adulthood persist later in life.[33–36] The finding of a general lack of healthier lifestyles in late-middle age in this sample of Black Americans suggests the possibility of less healthy lifestyles at earlier ages, which could in part reflect lifelong exposures to stress and discrimination.

However, the analysis revealed opposite associations between diagnoses of chronic conditions and health lifestyle practices for men and women. Among men, the associations are consistent with the probability that men change their health behaviors toward healthier lifestyles after a diagnosis of diabetes or CHD. In contrast, among women, there is no evidence of this. These patterns may reflect different levels of severity or different timings of diagnoses (earlier for men than for women) in late-middle age. Nevertheless, the diagnoses of diabetes and heart disease among women were not associated with healthier lifestyles in the same way observed among men. Additional research is needed to determine whether the association among men represents a causal effect and the mechanisms that could underlie the gender differences.

Limitations

This study has a few limitations. First, LCA is inductive with respect to identifying health lifestyles. Consequently, one would not necessarily expect to observe these same health lifestyles in all-Black populations. Rather, we view

this study as joining others using LCA to identify health lifestyles in different populations that will ultimately form the basis for generalized deductive analyses. Second, the measures of diet were limited to sugary drinks and fruit/vegetable consumption. More dietary measures would have been preferable. Third, the study design is cross-sectional, which limited the ability to draw causal inferences. Fourth, this study was conducted in a single metropolitan area in the southeastern U.S., possibly limiting its generalizability to other Black populations.

CONCLUSIONS

Despite these limitations, there are notable strengths. First, the JHS includes a large proportion of well-educated, middle-class Blacks who have often been underrepresented in large surveys. This provided an opportunity to assess the lifestyles of a more sizable and broader range of SES among Blacks than seen in most studies. Second, a novel but increasingly prevalent statistical measure (LCA) was used to examine the association of SES with obesity-related lifestyle behaviors in an all-Black sample. Third, as suggested by health lifestyle theory, SES appears to operate within this sample of Blacks much the same as other studies show that it does among Whites in patterning health lifestyles. Fourth, major findings are the low levels of physical activity, a clear socioeconomic pattern in health lifestyles among Black men and women, and the association of diagnoses of Type 2 diabetes and CHD with healthier lifestyle practices among Black men but not among women. These findings lay the groundwork for future research on late-middle age health lifestyles that include Black Americans.

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SUPPLEMENTAL MATERIAL

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SUPPLEMENT NOTE

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REFERENCES

1. Fryar CD, Carroll MD, Afful J. Prevalence of overweight, obesity, and severe obesity among adults aged 20 and over: United States, 1960–1962 through 2017–2018. Atlanta, GA: National Center for Health Statistics, Centers for Disease Control and Prevention. https://www.cdc.gov/nchs/data/hestat/obesity-adult-17-18/overweight-obesity-adults-H.pdf. Published December 2020. Accessed March 4, 2022.
2. Poteat T, Millett GA, Nelson LE, Beyrer C. Understanding COVID-19 risks and vulnerabilities among black communities in America: the lethal force of syndemics. *Ann Epidemiol.* 2020;47:1–3. https://doi.org/10.1016/j.annepidem.2020.05.004.
3. Yancy CW. COVID-19 and African Americans. *JAMA.* 2020;323(19):1891–1892. https://doi.org/10.1001/jama.2020.6548.
4. Asare S, Sandio A, Opara IN, et al. Higher obesity trends among African Americans are associated with increased mortality in infected COVID-19 patients within the city of Detroit. *SN Compr Clin Med.* 2020;2(8):1045–1047. https://doi.org/10.1007/s42399-020-00385-y.
5. Cockerham WC, Wolfe JD, Bauldry S. Health lifestyles in late-middle age. *Res Aging.* 2020;42(1):34–46. https://doi.org/10.1177/0164027519884760.
6. King DE, Mainous AG 3rd, Geesey ME. Turning back the clock: adopting a healthy lifestyle in middle age. *Am J Med.* 2007;120(7):598–603. https://doi.org/10.1016/j.amjmed.2006.09.020.
7. Sudano JJ, Baker DW. Explaining U.S. racial/ethnic disparities in health declines and mortality in late-middle age: the roles of socioeconomic status, health behaviors, and health insurance. *Soc Sci Med.* 2006;62(4):909–922. https://doi.org/10.1016/j.socscimed.2005.06.041.
8. Woolf SH, Chapman DA, Buchanich JM, Bobby KJ, Zimmerman EB, Blackburn SM. Changes in midlife death rates across racial and ethnic groups in the United States: systematic analysis of vital statistics. *BMJ.* 2018;362:k3096. https://doi.org/10.1136/bmj.k3096.
9. National Center for Health Statistics. Health, United States. Hyattsville, MD: National Center for Health Statistics, 2018 https://www.cdc.gov/nchs/data/hus/hus18.pdf. Published 2019. Accessed March 4, 2022.
10. Zapolski TCB, Pedersen SL, McCarthy DM, Smith GT. Less drinking, yet more problems: understanding African American drinking and related problems. *Psychol Bull.* 2014;140(1):188–223. https://doi.org/10.1037/a0032113.

11. August KJ, Sorkin DH. Racial/ethnic disparities in exercise and dietary behaviors of middle-aged and older adults. *J Gen Intern Med.* 2011;26(3):245–250. https://doi.org/10.1007/s11606-010-1514-7.
12. Bahr PR. Race and nutrition: an investigation of black–white differences in health-related nutritional behaviours. *Sociol Health Illn*. 29 (6), 2007, 831–856. https://doi.org/10.1111/j.1467-9566.2007.01049.x.
13. Cockerham WC, Bauldry S, Hamby BW, Shikany JM, Bae S. A comparison of black and white racial differences in health lifestyles and cardiovascular disease. *Am J Prev Med.* 2017;52(suppl 1):S56–S62 1. https://doi.org/10.1016/j.amepre.2016.09.019.
14. Hattery AJ, Smith E. Health, nutrition, access to healthy food and well-being among African Americans. In: Lemelle AJ, Reed W, Taylor S, eds. Handbook of African American: Health Social and Behavioral Interventions. New York, NY: Springer, 2011:47–59.
15. Wang Y, Chen X. How much of racial/ethnic disparities in dietary intakes, exercise, and weight status can be explained by nutrition- and health-related psychosocial factors and socioeconomic status among U.S. adults? *J Am Diet Assoc.* 2011;111(12):1904–1911. https://doi.org/10.1016/j.jada.2011.09.036.
16. Cogbill SA, Sanders Thompson VL, Deshpande AD. Selected sociocultural correlates of physical activity among African-American adults. *Ethn Health.* 2011;16(6):625–641. https://doi.org/10.1080/13557858.2011.603040.
17. Grzywacz JG, Marks NF. Social inequalities and exercise during adulthood: toward an ecological perspective. *J Health Soc Behav.* 2001;42 (2):202–220. https://doi.org/10.2307/3090178.
18. Saint Onge JM, Krueger PM. Education and racial-ethnic differences in types of exercise in the United States. *J Health Soc Behav.* 2011;52 (2):197–211. https://doi.org/10.1177/0022146510394862.
19. Evans-Polce RJ, Vasilenko SA, Lanza ST. Changes in gender and racial/ethnic disparities in rates of cigarette use, regular heavy episodic drinking, and marijuana use: ages 14 to 32. *Addict Behav.* 2015;41:218–222. https://doi.org/10.1016/j.addbeh.2014.10.029.
20. Keyes KM, Vo T, Wall MM, et al. Racial/ethnic differences in use of alcohol, tobacco, and marijuana: is there a cross-over from adolescence to adulthood? *Soc Sci Med.* 2015;124:132–141. https://doi.org/10.1016/j.socscimed.2014.11.035.
21. Ho JY, Elo IT. The contribution of smoking to black–white differences in U.S. mortality. *Demography.* 2013;50(2):545–568. https://doi.org/10.1007/s13524-012-0159-z.
22. Pampel FC. Racial convergence in cigarette use from adolescence to the mid-thirties. *J Health Soc Behav.* 2008;49(4):484–498.
23. Gittelsohn J, Roche KM, Alexander CS, Tassler P. The social context of smoking among African-American and white adolescents in Baltimore City. *Ethn Health.* 2001;6(3–4):211–225. https://doi.org/10.1080/13557850120078134.
24. Turner RJ, Brown TN, Hale WB. Race, socioeconomic position, and physical health: a descriptive analysis. *J Health Soc Behav.* 2017;58 (1):23–36. https://doi.org/10.1177/0022146516687008.
25. Monk EP Jr.. The cost of color: skin color, discrimination, and health among African-Americans. *AJS.* 2015;121(2):396–444. https://doi.org/10.1086/682162.
26. Williams DR, Sternthal M. Understanding racial-ethnic disparities in health: sociological contributions. *J Health Soc Behav.* 2010;51(suppl): S15–S27. https://doi.org/10.1177/0022146510383838.
27. Hill S. *Inequality and African-American Health.* Bristol, United Kingdom: Policy Press, 2016.
28. HHS, NIH. The Jackson Heart Study Data Book. Washington, DC: HHS, NIH. https://www.nhlbi.nih.gov/sites/default/files/publications/08-5848.pdf. Published September 2008. Accessed March 4, 2022.
29. Adult obesity prevalence maps. Centers for Disease Control and Prevention. https://www.cdc.gov/obesity/data/prevalence-maps.html. Updated September 27, 2021. Accessed March 7, 2022.
30. Cockerham WC. Health lifestyle theory and the convergence of agency and structure. *J Health Soc Behav.* 2005;46(1):51–67. https://doi.org/10.1177/002214650504600105.
31. Cockerham WC. *Social Causes of Health and Disease.* 3rd ed. Cambridge, United Kingdom: Polity, 2021.
32. Cockerham WC. *Sociological Theories of Health and Illness.* New York, NY: Routledge, 2021.
33. Burdette AM, Needham BL, Taylor MG, Hill TD. Health lifestyles in adolescence and self-rated health into adulthood. *J Health Soc Behav.* 2017;58(4):520–536. https://doi.org/10.1177/0022146517735313.
34. Lawrence E, Mollborn S, Goode J, Pampel F. Health lifestyles and the transition to adulthood. *Socius: Sociological Research for a Dynamic World.* 2020;6:1–17. https://doi.org/10.1177/2378023120942070.
35. Lee C, Tsenkova VK, Boylan JM, Ryff CD. Gender differences in the pathways from childhood disadvantage to metabolic syndrome in adulthood: an examination of health lifestyles [published correction appears in SSM Popul Health. 2020;12:100710] *SSM Popul Health.* 2018;4:216–224. https://doi.org/10.1016/j.ssmph.2018.01.003.
36. van den Broek T. Early-life circumstances, health behavior profiles, and later-life health in Great Britain. *J Aging Health.* 2021;33(5–6):317–330. https://doi.org/10.1177/0898264320981233.
37. Farmer MM, Ferraro KF. Are racial disparities in health conditional on socioeconomic status? *Soc Sci Med.* 2005;60(1):191–204. https://doi.org/10.1016/j.socscimed.2004.04.026.
38. Brown TH, Richardson LJ, Hargrove TW, Thomas CS. Using multiple-hierarchy stratification and life course approaches to understand health inequalities: the intersecting consequences of race, gender, SES, and age. *J Health Soc Behav.* 2016;57(2):200–222. https://doi.org/10.1177/0022146516645165.
39. Whitfield KE, Allaire JC, Belue R, Edwards CL. Are comparisons the answer to understanding behavioral aspects of aging in racial and ethnic groups? *J Gerontol B Psychol Sci Soc Sci.* 2008;63(5):P301–P308. https://doi.org/10.1093/geronb/63.5.p301.
40. Whitfield KE, Baker-Thomas T. Individual differences in aging minorities. *Int J Aging Hum Dev.* 1999;48(1):73–79. https://doi.org/10.2190/YGAQ-0D95-M0V4-820M.
41. Taylor HA Jr.. The Jackson Heart Study: an overview. *Ethn Dis.* 2005;15(suppl 6):S6. 4–3.
42. Lanza ST, Tan X, Bray BC. Latent class analysis with distal outcomes: a flexible model-based approach. *Struct Equ Modeling.* 2013;20(1): 1–26. https://doi.org/10.1080/10705511.2013.742377.
43. Eddings W, Marchenko Y. Diagnostics for multiple imputation in Stata. *Stata J.* 2012;12(3):353–367. https://doi.org/10.1177/1536867X1201200301.
44. Collins LM, Lanza ST. *Latent Class and Latent Transition Analysis: With Applications in the Social, Behavioral, and Health Sciences.* Hoboken, NJ: Wiley, 2010.
45. Vermunt JK. Latent class modeling with covariates: two improved three-step approaches. *Polit Anal.* 2010;18(4):450–469. https://doi.org/10.1093/pan/mpq025.
46. Asparouhov T, Muthén B. Auxiliary variables in mixture modeling: three-step approaches using Mplus. *Struct Equ Model.* 2014;21 (3):329–341. https://doi.org/10.1080/10705511.2014.915181.
47. Bakk Z, Tekle FB, Vermunt JK. Estimating the association between latent class membership and external variables using bias-adjusted three-step approaches. *Sociol Methodol.* 2013;43(1):272–311. https://doi.org/10.1177/0081175012470644.
48. Bakk Z, Vermunt JK. Robustness of stepwise latent class modeling with continuous distal outcomes. *Struct Equ Model.* 2016;23(1):20–31. https://doi.org/10.1080/10705511.2014.955104.