BRIEF COMMUNICATION

Racial and Ethnic Disparities in Financial Barriers Among Overweight and Obese Adults Eligible for Semaglutide in the United States

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BACKGROUND: Semaglutide holds the promise for weight loss and risk reduction. Less is known about racial and ethnic disparities in financial barriers among the semaglutide-eligible population.

METHODS AND RESULTS: We conducted a cross-sectional analysis of adults aged 18 years or older using data from the National Health and Nutrition Examination Survey 2015 to 2020. We analyzed adults eligible for semaglutide based on Food and Drug Administration labeling and assessed financial barriers and social determinants of health among the eligible population overall and by race and ethnicity. A total of 13711 adults were included in the final analysis. In 2015 to 2020, 51.1% (48.3%–53.2%) of US adults (\approx 43.3 million) met the Food and Drug Administration eligibility criteria for semaglutide. The percentage of adults eligible for semaglutide was highest among Black adults (56.6% [54.2%–59.1%]), followed by Hispanic adults (55.0% [52.8%–57.3%]). Among adults eligible for semaglutide, 11.9% (10.1%–13.6%) were uninsured, 13.3% (12.1%–14.5%) lacked a usual source of care, 33.6% (30.2%–36.9%) had low family income, and 38.9% (36.5%–41.3%) lacked higher education. Compared with White individuals, significantly larger proportions of Black and Hispanic individuals were uninsured, lacked a usual source of care, had low family income, or lacked higher education (*P*<0.001 for all).

CONCLUSIONS: Many Americans who were eligible for semaglutide were likely to be unable to afford the medication. Among the eligible population, a larger proportion of Black and Hispanic adults had financial barriers than other subgroups.

Key Words: antiobesity agents I disparities I health equity I obesity I race and ethnicity

The US Food and Drug Administration (FDA) recently approved high-dose semaglutide at 2.4 mg once a week for chronic weight management in adults with obesity or with overweight and at least 1 weight-related condition.¹ The drug reduces body weight by >20% among a third of the participants over 68 weeks in large clinical trials.² This effect rivals what is typically seen 1 to 3 years after bariatric surgery.³ Despite the promising effect of semaglutide, access and affordability remain a concern for treatment uptake. The drug costs about \$1500 per month.⁴

Prior reports in the US general population have shown that Black and Hispanic adults had poorer access to care, poorer health insurance, and lower family income compared with their White counterparts.⁵ These racial and ethnic disparities may be attributable to a wide array of health determinants, including structural racism, as depicted in the National Institute of Minority Health and Health Disparities Research Framework.⁶ Less is known about racial and ethnic disparities in financial barriers and social determinants of health among individuals eligible for semaglutide.

Using nationally representative survey data in the United States, we assessed the percentage of adults who could be considered eligible for semaglutide based on FDA labeling, overall and by race and ethnicity. We

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also assessed racial and ethnic differences in financial barriers and social determinants of health among semaglutide-eligible adults.

METHODS

Study Design and Population

The data that support the findings of this study are available from the corresponding author upon reasonable request. We included 15685 adults, aged ≥18 years, from the National Health and Nutrition Examination Survey (NHANES) for the years 2015 to 2020. The NHANES is a series of cross-sectional surveys that provide nationally representative estimates on the noninstitutionalized US population.⁷ Since 1999, the NHANES has been conducted in 2-year cycles. For the current analysis, 2 most recent cycles conducted from 2015 to 2016 through 2017 to 2020 were used. during which the mean participant response rate was 56.2% for interviews and 52.8% for physical examinations. Notably, the NHANES program suspended field operations in March 2020 because of the COVID-19 pandemic. As a result, data collected from January 2019 to March 2020 were combined with data from the NHANES 2017 to 2018 cycle to form a nationally representative sample of NHANES January 2017 to March 2020 prepandemic data. We categorized adults into non-Hispanic Asian, non-Hispanic Black, Hispanic, and non-Hispanic White subgroups based on selfreported racial and ethnic information. We excluded adults who identified as Alaskan Native or American Indian or Other race (Other include American Indian or Alaska Native, Native Hawaiian or Pacific Islander, or other race) (n=1856) and pregnant women (n=118).

Data Collection

During the in-home interview, data on demographics, socioeconomic status, and medical history of participants were collected. Demographic and socioeconomic variables included age, sex, education level, family income, insurance status, marital status, employment status, smoking status, alcohol intake, and physical activity. Medication use was also obtained by self-report and during review of participant prescription medication bottles.

During the physical examination, weight and height were measured, and body mass index was calculated as weight in kilograms divided by height in meters squared. Blood pressure was measured by trained staff using a mercury sphygmomanometer after the participant rested quietly in a seated position for at least 5 minutes. Three blood pressure measurements were obtained, and the mean of all measurements was used in analyses. Blood samples were collected at the mobile examination center, stored at -20 °C, and sent to central laboratories for the determination of total cholesterol and hemoglobin A1c using standard methods.

Variable Definitions

Individuals were considered as eligible for semaglutide if they met either of following the FDA label criteria for use of semaglutide for weight reduction: (1) body mass index \geq 30 kg/m²; or (2) body mass index \geq 27 kg/m², with at least 1 weight-related condition (hypertension, type 2 diabetes, or hypercholesteremia). Hypertension was defined as blood pressure \geq 140/90 mmHg or self-reported taking any prescribed medication for high blood pressure. Diabetes was defined as hemoglobin A1c \geq 6.5% or self-reported as taking any prescribed medication for diabetes. Hypercholesteremia was defined as total cholesterol \geq 240 mg/dL or selfreported as taking any prescribed medication for hypercholesterolemia.

Among people eligible for semaglutide, we assessed several financial indicators and social determinants of health, including health insurance status, usual source of care, family income, highest education level, marital status, and employment status. Health insurance status was categorized into 4 mutually exclusive categories: (1) Medicare, which included all adults who reported having Medicare, regardless of whether they reported having another type of health insurance (eg, private health insurance) in addition to Medicare; (2) private health insurance (excluding adults with Medicare); (3) Medicaid/public health insurance (excluding Medicare); and (4) uninsured. Not having a usual source of care was defined as answering "no" to the question, "Is there a place that you usually go when you are sick or you need advice about your health?" Low family income was defined by the income-to-poverty ratio (annual family income divided by the poverty threshold adjusted for family size and inflation) <2. Lack of higher education was defined by the highest education level less than or equivalent to high school. Unemployment/not in labor force was defined as participants either unemployed or not in labor force. Unmarried was defined by marital status being single, divorced, separated, or widowed.

The NHANES also asked participants if they tried to lose weight, and, for those who did, if they took diet pills prescribed by a doctor. Attempt to lose weight was defined as self-reported trying to lose weight during the past 12 months. Currently taking medications for weight loss was defined as self-reported taking diet pills prescribed by a doctor.

Statistical Analysis

We estimated the percentage of US adults eligible for semaglutide, overall and by race and ethnicity. Among

all eligible adults, we reported the percentage of adults who attempted to lose weight or took prescription medications for weight loss in the past 12 months. We also estimated the percentage of adults who had each insurance type, lacked a usual source of care, had low family income, lacked higher education, were unmarried, or were unemployed/not in labor force. We compared racial and ethnic differences in these metrics using χ^2 tests. All analyses used methods appropriate for structured survey data, incorporating strata and weights to produce nationally representative estimates, following the NHANES guidance. We considered 2-sided P<0.05 to be statistically significant. All analyses were performed using R 4.0. This study received an exemption for review from the institutional review board at Yale University.

RESULTS

From 15685 adults enrolled in the NHANES from 2015 to 2020, we excluded 118 women because of pregnancy. Because of small numbers, we also excluded 1856 individuals who identified as Alaskan Native/ American Indian and individuals who identified as non-Hispanic and did not select a primary race. Finally, a total of 13711 adults were included in the final analysis (Figure 1).

In 2015 to 2020, 51.1% (95% CI, 48.3%–53.25%) of US adults (\approx 43.3 million) met the FDA eligibility criteria for semaglutide. The mean age was 50.6 years (SD, 16.8 years), and 50.9% (49.2%–52.7%) were women. Significant differences in percentage of eligible population were observed by race and ethnicity. The percentage of adults eligible for semaglutide were highest among Black adults (56.6% [54.2%–59.1%]), followed by Hispanic adults (55.0% [52.8%–57.3%]), White adults (50.5% [48.1%–52.9%]), and Asian adults (19.8% [16.2%–23.5%]; *P* for racial and ethnic difference <0.001). Compared with White adults, Hispanic and Black adults were younger, included a higher percentage of women, were current smokers and heavy drinkers, and were physically inactive and obese (Table).

Among semaglutide-eligible adults, 56.9% (54.3%– 59.6%) attempted to lose weight in the past 12 months, but only 2.3% (1.8%–2.9%) took prescription medications for weight loss. The percentage of semaglutideeligible adults who attempted to lose weight in the past 12 months were highest among Asian adults (61.5% [53.1%–69.8%]), followed by Black adults (59.8% [57.8%–61.8%]), Hispanic adults (57.1% [53.5%– 60.8%]), and White adults (56.2% [52.7%–59.7%]; *P* for racial and ethnic difference <0.001). However, the percentage of adults who took prescription medications for weight loss was consistently low (<5%) in all racial and ethnic subgroups.

Among adults eligible for semaglutide in 2015 to 2020, 11.9% (10.1%-13.6%) were uninsured, 12.0% (9.8%-14.1%) had Medicare, 19.4% (17.6%-21.2%) had Medicaid/public insurance, and 55.9% (53.2%-58.6%) had private insurance (Figure 2). A total of 13.3% (12.1%-14.5%) of the eligible adults lacked a usual source of care, 33.6% (30.2%-36.9%) had low family income, 38.9% (36.5%-41.3%) lacked higher education, 35.0% (32.7%-37.4%) were unmarried, and 37.0% (34.7%-39.2%) were unemployed or not in the labor force. Significant differences in financial barriers and social determinants of health were observed by race and ethnicity. Among adults eligible for semaglutide, the percentage of adults who were uninsured, lacked a usual source of care, had low family income, or lacked higher education was consistently highest among Hispanic adults (29.3% [26.4%-32.2%], 22.4% [19.5%-25.3%], 57.1% [52.3%-61.9%], and 60.8% [56.9%-64.8%], respectively), followed by Black adults (14.7% [13.0%-16.4%], 11.6% [9.4%-13.8%], 48.8% [44.5%-53.2%], and 40.9% [38.3%-43.5%], respectively), Asian adults (12.1% [3.6%-20.6%], 22.8% [8.7%-36.9%], 29.9% [15.3%-44.5%], and 33.6% [24.4%-42.8%] respectively), and White adults (6.6% [4.5%-8.7%], 11.0% [9.4%-12.5%], 24.7% [22.0%-27.4%], and 33.2% [30.5%-36.0%], respectively; P for racial and ethnic difference <0.001 for all; Figure 2). Notably, Hispanic adults had a 4 times higher proportion than White adults for being uninsured, 2 times higher proportion for lacking a usual source of care, 2 times higher proportion for having low family income, and 2 times higher proportion for lacking higher education. Black individuals had higher proportion of being unmarried than White individuals (53.8% [50.9%-56.7%] versus 31.8% [28.9%-34.7%]; P<0.001). The proportion of people who were unemployed or not in the labor force was not statistically different across racial and ethnic subgroups (P=0.21).

DISCUSSION

In this nationally representative serial cross-sectional study, >50% of US adults were eligible for semaglutide. However, many people who met the treatment criteria were likely to be unable to afford the medication, and among this group, significantly larger proportions of Black and Hispanic Americans had financial barriers than others. There is a critical need for policies to ensure that medical innovations such as semaglutide are affordable by all segments of the population.

Our estimate of population eligible for semaglutide is consistent with prior studies. In a previous study of the NHANES 2015 to 2018, Aggarwal et al found that 53.5% of the US adults were considered eligible for semaglutide based on FDA labeling.⁸ However, we



Figure 1. Flowchart of study sample selection.

further extended the literature by assessing financial barriers and other social determinants of health among the eligible population.

For several decades, the country has made little progress in reducing overweight and obesity. The prevalence of overweight and obesity has tripled since 1960, with more than two-thirds of US adults either overweight or obese in 2018.⁹ This is not because Americans do not recognize the problem; over 50% of overweight and obese adults in this study attempted to lose weight in the prior 12 months. Current strategies generally have moderate effects.¹⁰

Semaglutide, which also reduced cardiovascular risk, holds the promise of a safe and effective strategy for weight loss and risk reduction.² However, this drug is expensive and may increase disparities if its dissemination is restricted to those with deep financial

resources and good insurance coverage. Adults who are uninsured may commonly not be able to afford it for chronic therapy. Coupons for antiobesity medications (AOMs) are not offered to those who are uninsured and generally cannot be used by patients with Medicare. Even if one has insurance, it does not guarantee that one therefore has coverage for AOMs. Health insurance coverage for AOMs is limited, and only 1 in 5 insured adults has coverage for AOMs.¹¹ A recent publication by Gomez and Stanford¹² showed that only 11% of 136 marketplace insurance plans made AOMs available and in only 9 states. Health insurance coverage for AOMs also varied by insurance type. Medicare does not cover AOMs at all. Only a few Medicaid plans in 7 states offered some coverage for AOMs. Even if employer-sponsored and individually purchased health plans offer coverage of AOMs, these

Covariate	Hispanic adults	Asian adults	Black adults	White adults	P value*
Semaalutide-eliaible participants	2090 (55% [52.8%-57.3%])	125 (19.8% [16.2%–23.5%])	2038 (56.6% [54,2%-59.1%])	2498 (50.5% [48.1%-52.9%])	<0.001
Age category, y					<0.001
18–39	626 (42% [38.6%-45.4%])	49 (42% [31.1%-52.9%])	509 (32.7% [29.9%-35.4%])	578 (25.1% [22.6%-27.7%])	
40-59	729 (39.1% [36.7%-41.6%])	40 (29.7% [24.5%-34.9%])	784 (41.4% [39.1%-43.7%])	758 (36.4% [34%-38.9%])	
60-79	682 (17.2% [14.6%–19.8%])	33 (26.1% [13.8%-38.3%])	682 (23.2% [21.1%-25.2%])	849 (32.5% [29.4%–35.7%])	
80+	53 (1.6% [1.1%-2.2%])	3 (2.3% [1.1%-3.5%])	63 (2.8% [2%-3.6%])	313 (5.9% [4.8%–7%])	
Sex					<0.001
Women	1120 (49.5% [47.4%-51.5%])	63 (52.5% [43.1%–61.9%])	1209 (61.9% [60.1%-63.7%])	1208 (49.1% [46.8%–51.5%])	
Men	970 (50.5% [48.5%-52.6%])	62 (47.5% [38.1%-56.9%])	829 (38.1% [36.3%-39.9%])	1290 (50.9% [48.5%–53.2%])	
Education					<0.001
Greater than high school	741 (39.2% [35.2%-43.1%])	81 (66.4% [57.2%-75.6%])	1162 (59.1% [56.5%-61.7%])	1529 (66.8% [64%-69.5%])	
High school diploma or GED	432 (25.9% [23.5%–28.3%])	23 (17.8% [12.8%–22.7%])	547 (27.6% [25.4%-29.7%])	656 (26.2% [24%-28.3%])	
Less than high school	879 (34.9% [30.4%-39.5%])	21 (15.8% [6.3%–25.3%])	298 (13.3% [11.7%-14.9%])	274 (7.1% [5.6%–8.6%])	
Family income					<0.001
High/middle income	717 (42.9% [38.1%-47.7%])	70 (70.1% [55.5%-84.7%])	837 (51.2% [46.8%–55.5%])	1384 (75.3% [72.6%-78%])	
Low income	1081 (57.1% [52.3%–61.9%])	34 (29.9% [15.3%-44.5%])	912 (48.8% [44.5%–53.2%])	904 (24.7% [22%-27.4%])	
Health insurance					<0.001
No insurance	549 (29.3% [26.4%-32.2%])	15 (12.1% [3.6%–20.6%])	284 (14.7% [13%-16.4%])	201 (6.6% [4.5%-8.7%])	
Medicare/public insurance	232 (6.4% [3.6%–9.3%])	25 (19.3% [9.8%–28.7%])	150 (8.8% [6.8%–10.9%])	329 (14% [10.7%–17.2%])	
Medicaid	529 (24% [21.5%–26.5%])	17 (11.6% [6.4%–16.7%])	613 (28.1% [25.6%-30.6%])	558 (16.5% [13.8%-19.2%])	
Private health insurance	720 (38.3% [34.8%-41.9%])	68 (56% [41.1%-70.9%])	868 (45.7% [42.8%–48.6%])	1365 (62.7% [59.4%–66.1%])	
Marital status					<0.001
Married/living with others	1336 (66.3% [63.5%–69.2%])	89 (74.5% [61.2%–87.7%])	897 (46.2% [43.3%–49.1%])	1550 (68.2% [65.3%-71.1%])	
Unmarried (ie, single/divorced/ separated/widowed)	694 (33.7% [30.8%–36.5%])	31 (25.5% [12.3%–38.8%])	1098 (53.8% [50.9%–56.7%])	899 (31.8% [28.9%–34.7%])	
Employment status					0.207
Unemployed/not in labor force	891 (33.5% [30.4%-36.6%])	45 (36.3% [25.9%-46.7%])	851 (35.1% [32.6%-37.5%])	1234 (38.3% [35.2%-41.4%])	
Working	1199 (66.5% [63.4%–69.6%])	80 (63.7% [53.3%-74.1%])	1187 (64.9% [62.5%–67.4%])	1264 (61.7% [58.6%–64.8%])	
Smoking status					<0.001
Current smoker	286 (15.8% [14.1%-17.5%])	15 (12% [5.7%–18.3%])	435 (21.4% [19.1%–23.8%])	484 (17.6% [15.8%–19.4%])	
Former smoker	451 (19.1% [16.8%–21.4%])	20 (15.3% [10.1%–20.5%])	375 (15.9% [13.9%–17.9%])	812 (31.3% [28.6%–34%])	
Never smoker	1352 (65.1% [62.3%-67.9%])	90 (72.7% [67.7%-77.7%])	1224 (62.6% [60.4%–64.9%])	1201 (51.1% [48.1%–54.1%])	
Physical activity					0.007
Recommended	582 (32.1% [29.3%–35%])	33 (27.7% [21.2%–34.3%])	651 (34.8% [32.6%–37%])	697 (33.8% [31.3%–36.4%])	

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Covariate	Hispanic adults	Asian adults	Black adults	White adults	P value*
Insufficient	262 (12.9% [11.3%-14.5%])	27 (20.3% [14.7%–25.9%])	308 (15.1% [13.4%–16.8%])	381 (17.3% [15.6%–19%])	
Inactive	1244 (55% [52.1%-57.8%])	65 (52% [46%-57.9%])	1073 (50.1% [46.9%–53.2%])	1413 (48.9% [46.2%–51.6%])	
Alcohol intake					<0.001
Former drinker	64 (7.4% [5.3%–9.5%])	6 (8.2% [4.3%–12.2%])	65 (13.6% [11%–16.2%])	56 (7.5% [5.5%–9.6%])	
Heavy drinker	228 (37.3% [34%-40.6%])	11 (11.7% [4.5%–18.8%])	96 (23.6% [20.2%–27%])	147 (25.9% [22.5%–29.2%])	
Light drinker	80 (10.8% [8.7%-12.9%])	15 (15.9% [10%–21.8%])	81 (20.2% [16.6%–23.7%])	135 (23% [19.8%–26.2%])	
Moderate drinker	120 (18.6% [15.9%–21.2%])	18 (21.8% [10.9%-32.8%])	97 (20.7% [16.7%-24.7%])	180 (30.9% [27.2%-34.6%])	
Never drinker	216 (25.9% [22.9%-29%])	37 (42.4% [26.3%–58.4%])	100 (21.9% [18.6%–25.3%])	89 (12.7% [8.8%–16.6%])	
BMI category					<0.001
≥30	1679 (83.9% [82%-85.8%])	80 (65.4% [58.1%-72.8%])	1705 (85% [83.2%-86.8%])	1951 (79.3% [76.8%-81.7%])	
25 to <30	411 (16.1% [14.2%–18%])	45 (34.6% [27.2%-41.9%])	333 (15% [13.2%–16.8%])	547 (20.7% [18.3%–23.2%])	
BMI indicates body mass index; GED, gen *P values for differences across racial and	ieral educational Development. ethnic suborouos were calculated bas	sed on the Pearson y^2 test.			

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 plans often require prior authorization to determine an individual's eligibility. Because semaglutide has just been approved by the FDA, we do not know what coverage will be for people who have private or public insurance. Given its high cost, it is expected that many insurers will likely continue to not cover it.

In addition to insurance coverage of AOMs, there may be other additional barriers to the uptake of semaglutide. Social determinants of health, such as socioeconomic status, access to care, education attainment, and cultural and family contextual factors that greatly impact obesity as a disease, could also impact its treatment. Our analysis suggests that among the semaglutide-eligible population, Hispanic and Black adults were more likely to be uninsured, lack access to care, and have low family income or low education attainment compared with White adults, prohibiting them from getting treatment of new antiobesity drugs. Moreover, provider-related factors may also contribute to the racial and ethnic disparities in prescriptions of AOMs. It is possible that a provider's unconscious biases may influence him or her into believing that patients of certain races and ethnicities are less likely to afford, understand, or accept the use of certain classes of medications.¹³ Limited use of AOMs may reflect limited discussions between patients and their providers and poor patient-provider communication.¹⁴ Although the effect of semaglutide has been proven in large clinical trials, translation of evidence to clinical practice is important for increasing the uptake of semaglutide and reduce racial and ethnic disparities in obesity.

This study has important policy and clinical implications. First, our findings underscore the need for expanding the current national efforts to address both medical barriers to care and the broader social determinants of health including systemic racism that contribute to the inequity in use of AOMs. Improving health insurance coverage alone is necessary, but probably not sufficient to eliminate such inequity. As shown in prior studies,⁵ overall affordability of health care has not substantially improved even after the Affordable Care Act was implemented. Second, interventions to reduce racial and ethnic inequities in use of AOMs may need to consider a 2-pronged approach that assists patients in understanding the benefits of medications and addresses clinicians' prescribing behavior. For example, using clinical decision support tools integrated with the electronic health records could help reduce provider unconscious bias, facilitate patient-provider communications, and improve the shared decision-making process of treatment for obesity.15

Limitations include decrease in NHANES response rates over time, but we used sampling weights to limit the impact of nonresponse bias. In addition, the data

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Fable.



Figure 2. Racial and ethnic differences in financial barriers and social determinants of health among semaglutide-eligible adults, 2015 to 2020.

on medication use were self-reported, which may be subject to recall bias. Third, we could not assess physician practice pattern because such data are not available in the NHANES. Even when AOMs are prescribed by the doctors, the high cost of AOMs is a greater issue among those with financial barriers, which disproportionately affects Hispanics and non-Hispanic Black individuals. Finally, we applied the FDA label criteria for use of semaglutide for weight reduction to US adults. In practice, the medication is eligible to patients with a wider range of common comorbidities such as obstructive sleep apnea, nonalcoholic fatty liver disease, and nonalcoholic steatohepatitis. Given that the NHANES does not have information on these comorbidities, our results may underestimate the total number of adults eligible for semaglutide.

In conclusion, many US adults who are eligible for semaglutide are likely to be unable to afford the medication. Among the eligible population, a significantly larger proportion of Black and Hispanic adults have financial barriers than other subgroups.

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