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How We Over Rely on BMI

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FROM THE EDITOR

What's Wrong With Overreliance on BMI?

Kratika Mishra and Astrid Floegel-Shetty, MA

I yearn for more than neutrality, acceptance, and tolerance—all of which strike me as meek pleas to simply stop harming us, rather than asking for help in healing that harm or requesting that each of us unearth and examine our existing biases against fat people.
Aubrey Gordon[1]

US adults classified as obese, estimated to compose 42.4% of the US population in a 2017-2018 survey,[2] captivate public discourse because of the sustained scholarship outlining the adverse health outcomes (such as postulated risk of cardiovascular disease, diabetes, and cancer) and the economic consequences (including projected spending on health care) of being obese.[3] A diagnosis of obesity is primarily reliant on body mass index (BMI), which is calculated by dividing an individual's weight in kilograms by the square of their height in meters.[4] BMI serves as a metric for health status; it influences diagnostic workup, differential diagnosis, intervention selection, and outcome measurement.

Current use of BMI as an evaluative and predictive tool is troubling. Originally conceived as a practical index of relative body weight,[5] BMI is now wielded in medicine as a heuristic for disease and health risk, despite studies showing that BMI can be (1) an inaccurate proxy for cardiometabolic markers of health (eg, blood pressure, cholesterol levels)[6] or lifestyle factors (eg, physical activity, eating habits) and (2) imprecise in its prediction of health risks when applied to the diversity of human bodies.[7] Beyond BMI being a poor identification tool, the stratification of care by patients' BMI is ethically troubling because it reinforces narratives justifying anti-fat attitudes and discrimination within systems and individual interactions.[8]

Reliance on BMI as a diagnostic metric also narrows what medicine accepts as "healthy" bodies—those perceived as not fat—with wide-ranging consequences. On one hand, the "weight-normative approach" to medicine, which emphasizes the roles of weight and personal responsibility for health,[9] perpetuates misunderstandings about the phenotypes[10] of and potential resolutions for obesity. Without consideration of individual clinical presentation, bodies with a BMI greater than 30 are automatically labeled as obese, and weight loss is often recommended as *the* treatment option despite its unsustainability and impermanence.[11] On the other hand, health care quality is undermined by the assumption that "normal weight" bodies are the benchmark of health. This assumption manifests in inequitable eligibility criteria for clinical trials that influence the generation of evidence for standards of care,[12,13] iatrogenic harm born of

anti-fat biases during care delivery,[14,15,16,17] and a moral panic[18,19] that, to our collective and individual detriment, pursues oversimplified and imprecise efforts during care administration to promote thinness and eliminate fat bodies that pose a supposed epidemic-level threat.[20,21]

This issue of the *AMA Journal of Ethics* focuses on ethical dimensions of how BMI is clinically deployed. Specifically considered are BMI screening practices for gender-affirming surgeries, pharmaceutical interventions for adolescents classified as obese on the basis of BMI, historical and current uses of BMI in enforcing power inequity, and the exclusion of people with higher BMIs from clinical trials.[12,13] Through exposure to this slate of thoughtful perspectives, we hope that readers of this issue of the *AMA Journal of Ethics* will come away with an enriched understanding of how the overuse of BMI in medical practice detrimentally leads to weight being disproportionately valued in our conception, assessment, and promotion of health.[22]

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CASE AND COMMENTARY: PEER-REVIEWED ARTICLE

Why We Need to Stop Labeling Behaviors Influencing a Person's Weight *Ideal* or *Healthy*

Madeline Ward, PhD

Abstract

This commentary argues that financial incentives for employees who meet body mass index requirements reinforce *healthism,* a false and oppressive ideology. Healthism is the view that personal health is the vehicle of well-being and that health is achieved by taking personal responsibility for habit modification. Healthist views about body shape and body weight enforce oppressive norms and can lead to pernicious harms, especially to members of vulnerable groups. Overall, this article argues that persons and organizations ought not to label behaviors that influence body shape and weight in normative terms, such as "ideal" or "healthy."

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Case

X is a large employer looking to reduce number of employee sick days, optimize productivity, encourage adherence to its wellness program activities, and promote "ideal health behaviors." Employees who engage in such behaviors, document them, and maintain a body mass index (BMI) at or below 25 will be eligible for reduced insurance premiums.

CR is an X employee with a BMI of 29 and learns after a "weigh in" at a wellness day event that this means she is "nearly obese." CR has never considered herself unhealthy, maintains an overall diet that is about 90% plant-based, and participates in many recommended "ideal health behaviors." CR sees the offer for reduced insurance premiums, views those savings as significant, but feels they are out of reach. CR feels demoralized about being asked by her employer to "weigh in," about being described as "nearly obese," and about her health being deemed not good enough for her employers' insurance premium reductions.

Many employees have complained that 25 as the BMI cutoff is discriminatory, encourages body negativity, and expresses views of wellness that are fundamentally racist, sexist, and ableist and that might not be "healthy" at all for many of X's

employees. Others have submitted formal written complaints arguing that protected health information should never be used to financially incentivize any company's vision of employee health and wellness.

Commentary

Should employers offer financial incentives for employees who monitor and report "ideal health behaviors"? Should employers offer financial incentives for employees who meet BMI requirements? In this commentary, I take issue with these practices as described in the case above, arguing that labeling behaviors that influence a person's weight in normative terms contributes to a phenomenon called *healthism*, an ideology that emphasizes one's personal responsibility for one's own health. Engaging in practices that support healthism is morally wrong, because healthism ignores social factors that constrain individuals' choices and reinforces oppressive social hierarchies. Thus, we ought not to label behaviors influencing a person's weight in normative terms. This conclusion extends to companies offering financial incentives for employees who engage in "ideal" personal behaviors that may influence their weight. Additionally, as I will explain below, the use of BMI as a marker of health is fraught and ought to be avoided by company wellness programs.

Healthism is a term coined by sociologist Robert Crawford in his 1980 discussion of a then-emerging homeopathic "health consciousness" and its associated social movements.[1] Crawford defines healthism as "the preoccupation with personal health as a primary—often *the* primary—focus for the definition and achievement of well-being; a goal which is to be attained primarily through the modification of lifestyles, with or without therapeutic help."[1] In other words, healthism is the view that personal health is the vehicle of well-being and that health is achieved through the modification of personal habits. Healthism locates the locus of moral and causal responsibility for health in the individual. For example, healthism would hold that quitting smoking is one's personal responsibility (as is picking up the habit in the first place); one is morally culpable for their smoking habit because one's health is one's own responsibility.

Healthism seems prima facie plausible. One's health seems intricately connected to the choices one makes, and, in a very literal sense, one has control over one's actions. With respect to smoking, one literally places the cigarette to one's lips and lights the cigarette. With respect to something like diet and exercise, one literally controls the food that one puts in one's mouth and the physical activities in which one engages. Healthism expresses what seems obvious: given that one's actions influence one's health, one would seem to be personally responsible for one's health. Therefore, a company's effort to incentivize certain behaviors that influence employees' weight seems to make sense on its face—the company gives employees an incentive to engage in a certain "healthy" behavior, employees respond to the incentive by engaging in that behavior, and that behavior influences employees' health. Some companies are very explicit about the connection between one's health and one's personal responsibility. For example, in 2010, Whole Foods launched an employee discount program wherein employees received greater discounts for meeting certain metrics, including BMI.[2] Eleven years later, Whole Foods founder John Mackey publicly made healthist claims: "71% of Americans are overweight and 42.5% are obese. Clearly, we're making bad choices in the way we eat."[3] Note the use of the normative term *bad* and the inference that Americans being overweight and obese is explained by the bad personal choices individual Americans make with respect to their diets. When companies promote certain behaviors as "ideal" and "healthy," they reinforce similar healthist associations between

certain behaviors and health: one can choose to smoke or not, and if one is unhealthy by virtue of smoking, it's because one made a bad choice. Similarly, one can choose to eat certain foods, restrict others, and exercise a certain amount, so if one is obese, it's because one has made bad choices.

Complicating Healthism

However, this healthist view is more complicated than it first appears. It's true that in a very literal sense, individuals have control over the food they put in their mouths and the activities that their bodies do, much like it's literally true that individuals control whether they light a cigarette or not. But the behaviors that we associate with smaller body shapes and lower body weights—cooking whole foods, eating lots of vegetables, going to the gym—are not equally accessible to all. These behaviors are influenced by social facts about a person. For example, one's social class constrains the choices one can make. For example, author Barbara Ehrenreich describes trying to make ends meet while working in low-wage jobs like waitressing and hotel housekeeping.[4] She discovered that if one can't put up 2 months' rent to secure an apartment, one must rely instead on a weekly rate motel and a hot plate, and one is forced to consume meals like fast food and gas station hot dogs regularly. Having fewer choices can lessen one's agency and make one less morally culpable for one's actions. Consider cases of coercion: we tend to see people who are forced to engage in some behavior and left with little or no choice as less morally culpable for that behavior. People whose health-related behaviors are constrained should be seen the same way.

Even if a worker who earns low wages has an apartment, that worker might face challenges in engaging in the activities we associate with normative body shapes. Suppose a single mother has 2 jobs to make ends meet and provide for her children. When is she going to spend time preparing whole foods or shopping for whole foods? Is she going to be able to find childcare regularly so that she can go to the gym? If she is a single mother working 2 jobs, is she able to afford to shop for whole foods? Is she able to afford a gym membership? The social facts about this mom's life constrain her choices in ways that can influence weight. So, it doesn't seem as straightforward that the mom is morally culpable for "bad" choices because her options are limited.

Cases like the above are more common than one might think: a recent Brookings Institution report found that, across 373 metropolitan areas in America, between 30% and 62% of workers earn low wages.[5] The challenges faced by workers earning low wages are compounded in vulnerable and marginalized groups. Workers earning low wages, although racially diverse, are disproportionately Latino/Hispanic or Black and disproportionately female.[6] Forty percent of workers earning low wages aged 25 to 54 are raising children.[6] Additionally, 12.8% of the US population lives in low-income and low-food-access areas, according to the US Department of Agriculture, and approximately half that group have limited access to a supermarket or grocery store.[7] These food deserts are often inhabited by members of vulnerable groups: neighborhood racial segregation and poverty both independently reduce food store availability.[8] Food deserts are more common in areas with lower levels of income and education and higher unemployment rates.[9] The challenges of poverty, racial discrimination, child-rearing, and obesity often intersect, and these constraints are not accounted for by things like wellness programs that offer financial incentives for engaging in "ideal" health behaviors related to weight. Thus, wellness programs offering financial incentives for engaging in such health behaviors themselves entrench and compound social inequities.

Additionally, when doctors or wellness program directors say or imply that certain things like eating whole foods and exercising regularly will cause one to have an ideal body shape (and therefore improve one's health), doctors and other institutional figures reinforce the idea that one can improve one's metabolic health through behaviors for which one is personally, morally, and causally responsible. While this claim may be literally true with respect to one's causal responsibility, it ignores possible social barriers to making behavioral choices, as discussed above. When an institution has a policy based on healthist views, that policy reinforces healthism's power as an ideology by giving credence to healthism and penalizing employees who might have unseen constraints on the diet and exercise behaviors in which they can engage. Since healthism views people as morally responsible for their health behaviors, the implication that people who are fat fail to discipline themselves appropriately permits their being made targets of stigma and shame.[10,11] If institutions ought not promote policies that reinforce oppressive social hierarchies, it follows that institutions shouldn't promote wellness programs that incentivize engaging in "ideal" health behaviors related to weight.

Beyond BMI

The problems with using BMI as a metric to measure fatness are well documented; BMI fails to account for muscle mass[12]; BMI cutoffs for levels of obesity are arbitrary[13]; and, as a measure of overall health, BMI fails to account for differences in metabolic fitness between people with identical BMIs.[14] Nevertheless, higher BMIs are associated with a higher risk for diseases like hypertension, coronary heart disease, respiratory illness, sleep apnea, and diabetes, among others.[15] Higher BMIs are also associated with higher health care costs.[16,17] If company wellness plans aim to reduce health care costs and the incidence of diseases comorbid with BMI, those plans could focus on behaviors like eating whole foods and exercising without referring to BMI itself. This seems like a reasonable proposal to me, as long as the modified wellness plans don't use normative terms like *ideal*, *good*, or *bad* to label certain behaviors and instead refer to behavior in normatively neutral ways. For example, a plan could encourage fitness as a way to increase metabolic health and make clear, objective claims about the relationship between, say, fitness and heart disease or eating a plant-based diet and reducing one's risk for cancer. These plans should also lower barriers to accessing things like fitness and whole foods in order to avoid reproducing social inequities. Lowering barriers might include more common forms of aid—group fitness classes, free gyms or gym memberships, providing whole foods in the workplace cafeteria—but they might necessarily involve other, uncommon forms of aid like free childcare so that employees have unencumbered time in which they can shop, prepare food, or exercise.

Company wellness programs that label some behaviors in normative terms like *ideal* or *healthy* can reinforce healthist ideology and reproduce social inequities. By avoiding labeling behaviors in normative terms, a company wellness plan can instead offer more objective information about the relationship between, say, diet and exercise and reducing one's risk of disease. By employing nontraditional forms of aid, company wellness plans can also lower socially based barriers to the behaviors associated with reduced risk of disease and increased metabolic health.

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The case to which this commentary is a response was developed by the editorial staff.

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The people and events in this case are fictional. Resemblance to real events or to names of people, living or dead, is entirely coincidental. The viewpoints expressed in this article are those of the author(s) and do not necessarily reflect the views and policies of the AMA.

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CASE AND COMMENTARY: PEER-REVIEWED ARTICLE

Should Pharmaceuticals Be Used as Weight Loss Interventions for Adolescents Classified as Obese by BMI?

Astrid Floegel-Shetty, MA

Abstract

Ethically evaluating prescription of weight loss pharmaceuticals for adolescents classified by body mass index (BMI) as obese requires reconsideration of how medicine's overreliance on BMI as a diagnostic criterion supports a weight normative approach to health. This commentary on a case suggests that weight loss is not a safe, effective, or permanent method of health promotion. The unknown extent of pharmacotherapeutics' risks to adolescents in addition to the controvertible benefits of weight loss ethically preclude their prescription, despite scientific consensus to fight obesity by prescribing weight reduction.

Case

M is a student at Sunnyvale High School. At 16 years old, they are currently enrolled in an intensive health behavior and lifestyle treatment (IHBLT) at the local county hospital. During the pandemic, their body mass index (BMI) increased from 28 to 30, making them a candidate for liraglutide, a glucagon-like peptide 1 (GLP-1) analogue approved by the US Food and Drug Administration (FDA) in 2020 as a weight loss medication in adolescents. As M's primary care physician, Dr B recommends liraglutide as an additional means for preventing M's becoming an obese adult with comorbidities.

Commentary

Responding to the title question requires not only evaluating the risks and benefits of pharmacotherapy (particularly in adolescents), but also closely examining weight loss as a health goal. Present clinical practice is "weight normative"[1] in emphasizing weight and weight loss to define health and well-being. There is no more obvious manifestation of this practice than the continued use of BMI to define health status. BMI is based on the ratio of weight in kilograms to height in meters squared and is currently used as *the* identifying obesity indicator,[2,3] although its value does not reflect significant considerations of the obesity disease state, including peripheral and visceral adiposity, body composition, and metabolic indices.[2,4]

Calling attention to how questionable BMI is as a litmus test for obesity are patients classified as overweight or obese (BMI ≥ 25) whose weight, when evaluated by physical

and metabolic fitness, does not necessarily pose a risk to their health.[5,6] Research on the "obesity paradox"[4,7] and "metabolically healthy obesity"[8,9,10] substantiates the existence of this incongruence between the *expected* and *actual* health or risk status associated with an obesity diagnosis. Additionally, the clinical distress of obesity can exist in bodies that do not match the expected phenotype of obesity (ie, fat), which are described in literature as thin-fat phenotype, normal weight obesity, metabolic obesity, and metabolically unhealthy non-obese.[11]

An obesity diagnosis that is defined by weight categorization (BMI ≥ 30) is problematic not only because the diagnostic accuracy of BMI is debatable, but also because it arguably leaves the impression that if too much weight is the problem, then less of it is the solution. Based on data collected from 2017 to 2020, the Centers for Disease Control and Prevention (CDC) determined the obesity prevalence to be 22.2% in adolescents aged 12 to 19.[12,13] The increasing rate of adolescents classified as obese by BMI is often cited as a public crisis on the national and global level,[14] with calls to address this crisis through interventions aimed at weight loss, including IHBLT programs, pharmacotherapeutics, and surgeries.[15] Yet a 2015 *Lancet* publication found that no country has yet resolved its obesity epidemic despite these purported weight loss solutions.[16]

Updated Pediatric Guidelines

The 2023 publication of the American Academy of Pediatrics (AAP) Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents with Obesity[17] refocused attention on pharmacotherapeutic inducement of weight loss in adolescents, with the recommendation being changed from watchful waiting to offering pharmacotherapeutics to those ages 12 years and older as an adjunct to behavioral and lifestyle obesity treatment.[18]

What should clinicians consider when deciding upon weight loss pharmacotherapy in obesity management? The US Food and Drug Administration (FDA) 2007 "Guidance for the Clinical Evaluation of Weight-Control Drugs" articulates these considerations:

> Lifestyle modification, consisting of changes in patterns of dietary intake, exercise, and other behaviors, is considered the cornerstone of overweight and obesity management. Because all drug and biological therapies impose some risk for adverse events, the use of a weight management product should be contemplated only after a sufficient trial of lifestyle modification has failed and the risks of excess adiposity and the anticipated benefits of weight loss are expected to outweigh the known and unknown risks of treatment with a particular weight-management product.[19]

Crudely summarized, lifestyle modifications must fail before clinicians consider pharmacotherapies as an adjunct. Side effects of pharmacotherapies for weight loss must be less risky than untreated excess adiposity, understood to be a risk factor for or marker of weight-related disease states. BMI stratification is utilized as a proxy for identifying excess adiposity (ie, obesity). Therefore, failure of lifestyle modifications can be understood as lack of BMI shift or, less stringently, weight reduction.

In this case, despite participation in an IHBLT, M experienced an increase in BMI, which means the program failed to inhibit or reverse weight progression. Dr B might anticipate that weight loss via pharmaceutical intervention would reduce excess adiposity and therefore resolve M's current obesity diagnosis while reducing the likelihood of adult obesity with its associated comorbidities—benefits that would outweigh the expected risks of liraglutide. Dr B's introduction of pharmacotherapy would be in line with

pediatric obesity treatment algorithms that recommend tiered comprehensive multidisciplinary interventions,[20,21] including the AAP guidelines.[17] These treatment approaches are rooted in the premise that, for reasons of current health and future risk, weight in excess of certain clinical parameters (ie, BMI ≥ 25) is bad and that weight loss is both achievable and good for health—so much so that it merits induction by biomedical means.

The remainder of this commentary will examine the feasibility as well as the benefits of weight loss cited to justify pharmaceutical interventions, weight loss pharmaceuticals for adolescents, and the implications of weight loss encouragement as a means of achieving health with the goal of promoting greater understanding of the dialogue surrounding adolescent obesity[22] and weight loss pharmacotherapeutics. (In what follows, the phrase "classified as obese" will be used in lieu of "obese adolescents" to call attention to the role of BMI in weight-related disease diagnoses and not as an endorsement of person-first language[23] in medicine's discussion of obesity.)

Use of BMI in Pediatric Populations

Dual energy x-ray absorptiometry scans are relatively accurate measures of adiposity,[17] but they are impractical on a large scale,[24] prompting the use of BMI as a proxy for measuring adiposity in body composition. Studies have shown that BMI has high specificity but relatively low sensitivity for detecting excess adiposity.[25,26] In pediatric obesity studies, BMI z-score (BMIz) is often used as a standardized measurement because BMIz tends to remain the same as a child gains weight while maturing into adulthood.[27] However, in overweight and obese youth, BMIz is a poor predictor of relative body fat and therefore unlikely to be accurate if used to monitor adiposity changes resulting from weight management interventions.[24,28,29]

In pediatric populations, no risk-stratified BMI cutoffs exist akin to adult BMI classifications, which the World Health Organization and National Institutes of Health developed in 1995 and 1998, respectively, based on data relating BMI to mortality risk.[19] For adolescents, overweight and obesity is often defined by the 85th and 95th percentile, respectively, of the BMI-for-age in the sex-specific reference population; race/ethnicity is not taken into consideration.[30] These cutoff points in children, as well as the terminology of overweight and obese, lack "strong evidence for any precise" consensus,[27] perhaps indicating that these are nosological entities[31] borrowed from adult medicine for their familiarity rather than their accuracy. Even if BMI/z could be used to accurately assess and longitudinally monitor adiposity composition in pediatric populations, the inflection point between adiposity being a biological necessity and a threat to health is not clearly defined, particularly in pediatric populations during development.[29]

Realities of Weight Loss

Adolescents classified as obese generally remain so in adulthood, with a 2016 meta-analysis finding that "around 80% of obese adolescents will still be obese in adulthood."[32] The probability of attaining normal weight for people with an obesity classification is low, with one study of adults classified as overweight or obese reporting the annual probability over a maximum 9-year follow-up to be "1 in 210 for men and 1 in 124 for women [with simple obesity], increasing to 1 in 1290 for men and 1 in 677 for women with morbid obesity."[33] Cochrane systematic reviews evaluating diet, physical activity, and surgical and pharmaceutical interventions found low-quality evidence of

their effectiveness for weight management in adolescent or childhood obesity, as well as a lack of safety data, particularly with regard to long-term effects.[34,35,36,37,38]

For pediatric populations, there is no general consensus on what constitutes clinically meaningful weight loss (usually estimated to be 5% to 10%[39,40] of body weight in adults) or how long the weight loss should[29] be sustained in order for an intervention to be considered successful (which is similarly undecided in adults[39]). Only a few studies have tracked long-term weight loss persistence,[39] and even fewer have done so in pediatric populations.[41,42] An oft-quoted 1959 study estimated that 95% of people who lose weight gain it back long term.[43] More recent studies confirm weight regain as being par for the course,[44] including a 2001 meta-analysis of 29 long-term studies, which found that, on average, more than 80% of lost weight was regained within 5 years.[45] Weight loss, if any, tends to be insufficient to move patients into the non-obesity BMI range: IHBLTs reduce BMI an estimated 1% to 3% in children,[17] bariatric surgery reduces BMI approximately 26% to 29% long-term[46] (with a majority of adolescents having reduced bone mass and nutritional deficiencies),[47] and anti-obesity drugs in adults taken for at least 12 months induce a 2.9% to 6.8% weight reduction from baseline.[48] The Look AHEAD study found that, after 8 years of continuous intervention, only 50.3% and 35.7% of the participants in the intensive lifestyle intervention and diabetes support and education groups, respectively, lost at least 5% of their initial weight (the overall initial average BMI was 36).[49]

The putative benefits of weight loss are generally positive by clinical standards,[40] but they tend to be either dependent on weight loss permanence (eg, cardiometabolic improvements[50,51]) or relatively independent of weight loss. Lifestyle interventions can be effective in "improving obesity-related comorbidities (eg, insulin resistance, hypertension, hyperlipidemia, fatty liver disease, and exercise capacity) even in the absence of sustained weight loss."[52] A 2022 cohort study concluded that only 15.6% to 46.8% of the association between weight loss strategies and type 2 diabetes risk could be attributed to weight changes.[53] It could be concluded that perhaps it is the weight loss strategy itself, rather than the weight loss,[54] that begets the desired health outcomes.

Despite the dubious feasibility of attaining and maintaining long-term clinically significant weight loss and the indication that weight loss may not be key to addressing health concerns linked to obesity, some studies persist in recommending weight loss, suggesting that even temporary weight loss is potentially valuable.[55] However, repeated weight loss attempts[56,57,58] with accompanying weight gain, otherwise known as weight cycling, lead to increased risk of disordered eating,[59] higher mortality due to all causes and to cardiovascular disease (CVD),[60] higher comorbidity of CVD and hypertension,[60] worse cardiometabolic and lipid measures,[61] and escalated weight regain.[62,63]

Our understanding of psychological outcomes in weight loss-oriented treatment is limited because existing studies rarely report mental health or well-being outcomes, and those that do show mixed results.[64,65,66,67] Remarkably, merely perceiving failure in weight control (perhaps due to weight regain or not achieving expected weight loss in the first place) is associated with negative psychological outcomes.[68,69] Weight treatments for adolescent are particularly ripe for concerns about disordered eating behaviors (DEBs) and eating disorders (EDs).[70] The onset of EDs is usually during adolescence,[70] with weight stigma and dieting being common precipitating factors.[71,72] Studies have found that roughly 40% of overweight adolescent girls and 20% of

overweight adolescent boys exhibit DEBs.[72,73] Adolescents classified as obese tend to have low self-esteem, negative self-evaluation, and high body dissatisfaction,[74] placing them at higher risk for restrictive eating escalating into a disorder.[75] The AFINOS and AVENA studies found the odds of adolescents classified as overweight developing EDs to be 2.5 to 4.9 times higher, respectively, than their peers categorized as normal weight.[76]

Treatment for DEBs/EDs in adolescents classified as obese or overweight is regularly delayed by the pervasive perception of weight loss as invariably good rather than as a canary signaling clinical danger.[77,78] Less than 6% of people with EDs are medically diagnosed as underweight,[79,80] and the weight history of a significant portion of those presenting for ED treatment (37% to 41%) includes an overweight or obesity classification.[73,81] As of 2022, screening tools for EDs in adolescents with obesity are still not validated,[71,82,83] which undermines implementation of any recommendations (such as those in section IX.B.3. of the AAP guideline)[17] for DEBs/EDs assessments in this targeted population prior to and during implementing weight management strategies like pharmacotherapy.

Pharmaceuticals have been described as the prescription for fat people of what is diagnosed as disordered in thin people[84]—that is, the acceptable biomedicalization of the pathological: skipping meals (anorectics), diet pills (pharmacotherapeutics themselves), laxatives (orlistat), and vomiting (a common glucagon-like peptide 1-related adverse effect).[85,86] Considering the vulnerability to and higher prevalence of DEBs/EDs in adolescents classified as overweight or obese, the explicit valuing of weight loss as a success metric in pharmaceutical obesity management is worrisome in that it aligns with a weight normative approach to health,[1] which has been shown to increase the risk for weight cycling and DEBs/EDs.[87,88,89]

In summary, weight loss is not essential to improving comorbidities and tends to be minimal and impermanent, with repeated attempts being typical. Particularly in adolescents, making weight loss the primary aim of health interventions (including pharmaceuticals) exacerbates the likelihood of destructive outcomes such as DEBs/EDs and weight cycling.

FDA and Weight Loss Pharmaceuticals

The FDA evaluates weight loss pharmacotherapies, or anti-obesity medications, by their *mean* and *categorical* efficacy, as defined in "Guidance for Industry: Developing Products for Weight Management" (originally published in 1996 as "Guidance for the Clinical Evaluation of Weight-Control Drugs").[19] After 1 year of treatment, the difference in the mean weight loss between the active-product and placebo groups must be statistically significant and at least 5% (ie, mean efficacy). Alternatively, after 1 year of treatment, at least 35% of participants in the active-product group should lose at least 5% of their initial weight, the proportion who lose at least 5% of their initial weight "is approximately double the proportion in the placebo-treated group, and the difference between groups is statistically significant" (ie, categorical efficacy). The 5% benchmark was selected because research before 1996 indicated that weight reductions of 5% to 10% improved metrics such as blood pressure, indexes of glycemia, and high-density lipoprotein cholesterol. [90,91]

The FDA itself notes that "pediatric-specific adverse events are unlikely to be detected in development programs that are limited in size and duration" and that "long-term effects of drug treatment in children can include impacts on development, growth, and/or

maturation of organ/system function."[92] Additionally, the FDA evaluation does not include a period of pharmaceutical cessation, hampering our understanding of weight loss permanence and regain associated with treatment timelines.

As of February 2023, there are 4 FDA-approved weight loss drugs for adolescents older than 12 years of age: orlistat,[93] liraglutide,[94] semaglutide,[95] and phentermine/topiramate extended-release capsules.[96] Additionally, phentermine is permitted for individuals older than 16 years of age for 12 weeks or less (see Table).[97,98] In the near future, the FDA is likely to approve the diabetes drug tirzepatide for adolescent weight loss.[99] Practitioners also use other medications off-label, including bupropion/naltrexone, topiramate, lisdexamfetamine, and (most commonly) metformin.[100,101]

Table. US Food and Drug Administration-Approved Weight Loss/Anti-obesity Medications for Adolescents

Name	Class of drug	Year approved for adults	Year approved for adolescents
Phentermine	Anorectic	1959	2015
Orlistat	Lipase inhibitors[a]	1999	2003
Liraglutide	GLP-1 agonist[b]	2014	2020
Phentermine/topiramate ER	Anorectic, anticonvulsant	2012	2022
Semaglutide	GLP-1 agonist[b]	2021	2022

Abbreviations: ER, extended release; GLP, glucagon-like peptide.
[a] Prevents some of the fat in foods eaten from being absorbed in the intestines. The unabsorbed fat is then removed from the body in the stool.
[b] Mimics glucagon-like peptide 1, a gastrointestinal hormone that helps regulate glucose.

The history of weight loss/anti-obesity medications is littered with recalls,[102] including of fenfluramine, dexfenfluramine, sibutramine [103] and, most recently, lorcaserin,[104] due to postmarket phase discovery of risks ranging from primary pulmonary hypertension[91,105] to cardiac valvulopathy[106] to cancer.[104] The more recently approved medications, such as liraglutide and semaglutide, should arguably be safer given the availability of safety information on their active compounds, which have been used for years in other formulations.[107] However, the application of weight loss/anti-obesity pharmacotherapies to adolescents is still relatively new and therefore the risk profile is relatively underdetermined.

Weight Loss Medications for Adolescents

Weight loss medications specifically approved for adolescents are relatively new, with off-label prescriptions being the norm.[108] Currently, pharmaceuticals are intended as an adjunct rather than as monotherapy[17] after lifestyle and behavioral medications, such as IHBLTs, fail to produce weight loss.[19]

IHBLTs are intended to serve as a first-line approach to reduce the frequency of pharmaceutical prescription, thereby avoiding unnecessary exposure to harm.[109] However, numerous studies document that IHBLT and other similar interventions do not result in weight loss for the majority of adult[49,110,111] and adolescent[112,113] participants long-term, with the result that, for most, the lifestyle intervention will be deemed a failure, prompting clinicians to recommend pharmaceutical intervention.[17,19] IHBLT

programs vary in their characteristics[114] while similarly suffering high patient attrition,[112,113,115] possibly because the intense time and resource investment required negatively impact participation.[17] Without uniform quality standards for IHBLTs, it is difficult to determine whether weight loss failure is due to treatment resistance or nonadherence or to poor intervention quality. With IHBLTs tending toward failure and pharmaceuticals being relatively undemanding to implement, weight loss pharmacotherapeutics may rapidly become the dominant treatment modality for adolescent obesity.

In its 2023 practice guidelines, the AAP concedes that evidence on using pharmaceuticals to aid weight/BMI reduction is currently insufficient.[17] There are a relatively small number of completed clinical trials, which tend to collect limited information[116] and be inadequately powered due to small sample sizes.[117] Available data indicate that average weight loss is typically minimal: 1.5% BMI reduction from baseline after 12 months' treatment with orlistat,[118] 4.1% BMI reduction from baseline after 6 months' treatment with phentermine,[52] 4.29% BMI reduction from baseline after treatment with liraglutide for 56 weeks,[55] and 16.1% BMI reduction from baseline after treatment with semaglutide for 68 weeks.[119] Common side effects (eg, nausea, vomiting, gastrointestinal distress)[120] cause a noteworthy number of participant treatment discontinuations during clinical trials: 17.1% for orlistat vs 11.7% for the placebo group,[121] 13.8% for liraglutide vs 6.8% for the placebo group,[55] and 14.8% for semaglutide vs 4.3% for the placebo group.[119]

The history of weight loss medications indicates that adverse drug reactions (including those resulting in a box warning or withdrawal) are not fully understood until the postmarket phase.[122,123,124] Studies assessing FDA approval of new drugs[125,126] find that approval is increasingly based on "fewer, smaller, or less rigorous pivotal trials,"[127] thereby shifting the burden of evidence of adverse effects to the post-approval period.[128] A study of all drugs approved by the FDA between 2001 and 2010 found that more than a third were affected by a postmarket safety event (withdrawals, boxed warnings, safety communications).[124] With regard to weight loss drugs specifically, there is a dearth of long-term studies of the effects of weight loss pharmaceuticals in adolescents,[129] and, as a result, our knowledge of their risks is lacking. Extrapolating potential side effects in adolescents from studies with adults[130] is insufficient because, as the AAP notes, adolescents are undergoing growth and pubertal development, which can "alter the kinetics, end-organ responses, and toxicities" of the pharmaceutical in question.[131] Health care practitioners will need to consider that early adoption of weight loss medications means that significant side effects—particularly long-term or developmental ones—will likely be identified in their patients during postmarket surveillance. This possibility is ethically troubling, given that many adolescents who will initially qualify for pharmaceutical intervention due to BMI belong to minoritized or under-resourced populations,[17] raising concerns about the justness of these adolescents bearing the brunt of side effect discovery during the postmarket phase without more significant investment to discover these issues during the clinical trial phase.

Research on weight regain in adolescents after pharmaceutical discontinuation is scarce, but the emerging evidence is consistent with the pattern found in adults.[51,55] Weight regain and loss of "attendant health benefits"[17,51] after pharmaceutical cessation are mentioned as reasons to switch framing obesity from an acute[121] to a "chronic relapsing progressive disease process"[132] requiring continuous treatment. This push to extend treatment timelines indefinitely should spark concerns not only about

our limited understanding of long-term side effects of weight loss medications in adolescents, but also about the potential impact of out-of-pocket cost on medication adherence.[133] Medication adherence is low in adolescents to begin with, and even lower for those with long-term conditions.[134,135] Many private insurers follow the lead of Medicare, which, outside of Advantage plans, does not cover anti-obesity medications, leaving patients to pay hundreds of dollars a month out of pocket or risk weight regain.[136,137] Inconsistent use could result from these access challenges, inadvertently exposing adolescents to the dangers of weight cycling.

The nonprofit Obesity Action Coalition (OAC) is currently pushing for the passage of the Treat and Reduce Obesity Act of 2021, which would expand Medicare benefits for IHBLT-type programs and expand coverage for FDA-approved chronic weight management medications.[138,139] Top corporate partners of the OAC are Novo Nordisk® (semaglutide) and Eli Lilly (tirzepatide),[140] both of which stand to make a fortune with the prescription of weight loss and anti-obesity pharmaceuticals for obesity diagnosed by what could be considered an indiscriminate standard—BMI.

In summary, the threshold for initial prescription of weight loss medications is low, given how failure is defined for lifestyle modifications. Pharmaceutical interventions induce modest weight loss at best (frequently with side effects) that requires persistent usage to maintain. Long-term side effects of such interventions in adolescents—especially on development—have arguably not been sufficiently established for adequate risk assessment. What few studies there are examining pharmaceutical safety and efficacy in adolescents tend to be small and inadequately powered.

Conclusion

Should pharmaceuticals be used as a weight loss intervention for adolescents classified as obese? There is no disputing that pharmaceuticals are an essential part of clinical practice, but as a result of sparse investigation and overvaluing of weight loss, physicians might be inaccurately assessing the benefits as outweighing the risks in prescribing pharmaceuticals to induce weight loss. There is no general consensus for what constitutes a healthy BMI or clinically significant weight loss in adolescents. What weight loss that does occur is typically transient, not enough to shift BMI categorization, and not necessary to produce desired health outcomes. The pursuit of weight control,[141] a tactic of weight-normative health promotion, is likely to result in—but is not limited to—weight dissatisfaction[142,143,144] and stigma,[145] DEBs/EDs, and weight cycling. All of these consequences are linked to worse health outcomes and further weight gain—the very opposite of the intended effect. The risks of continuous pharmaceutical treatment in adolescents in order to potentially stabilize weight loss are not yet known. The unknown extent of pharmacotherapeutics' risks to adolescents for the controvertible benefits of weight loss ethically precludes their prescription, despite the scientific consensus to fight obesity by prescribing weight reduction.[146]

BMI and weight as defining clinical metrics distort our conception of what is required for health, justifying a dogged commitment to the erasure of fatness as health promotion rather than the interrogation of the biological, social, environmental, and economic factors impacting bodies.[147] Pharmacological interventions might eventually become a key, safe, and effective component of the comprehensive care of patients navigating obesity. However, the justification of risks—particularly for adolescents—will depend on the congruence of the intended outcome with health reconceptualized as more than just anti-fatness. This reconceptualization will require scientific and ethical examination of

the evidence, narratives,[148] and assumptions influencing how medicine understands and deems desirable goals of health.[149] Weight-neutral and weight-inclusive approaches[1,87,88,150,151,152,153] provide insight into actualizing a clinical practice in which weight status—rather than being the definitive standard—is just one factor informing our understanding and pursuit of health.

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The people and events in this case are fictional. Resemblance to real events or to names of people, living or dead, is entirely coincidental. The viewpoints expressed in this article are those of the author(s) and do not necessarily reflect the views and policies of the AMA.

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CASE AND COMMENTARY: PEER-REVIEWED ARTICLE

Should BMI Help Determine Gender-Affirming Surgery Candidacy?

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Abstract

Use of body mass index (BMI) as a health care metric is controversial, especially in candidacy assessments for gender-affirming surgery. When considering experiences of fat trans individuals, it is important to advocate for equitable divisions of responsibility for and recognition of systemic fat phobia. This commentary on a case suggests strategies for increasing equitable access to safe surgery for all body types. If surgeons use BMI thresholds, simultaneous effort must be made to advocate for data collection so that surgical candidacy criteria are evidence-based and equitably applied.

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Case

ZZ is a trans man and a patient of Dr S, a surgeon at a clinic offering gender-affirming services, including hormone therapy, chest surgeries, and genital surgeries. During 5 years of hormone treatment, ZZ's weight increased to a point at which he now has a BMI of 35, which is clinically considered class II obesity.[1] As a result, he does not qualify for most gender-affirming surgeries (GAS) offered by Dr S at the clinic. ZZ is distressed and asks, "What was the point of hormone therapy if all it did was make me so fat I can't get surgery?"

Dr S considers how to respond.

Commentary

Transgender, nonbinary, and other non-cisgender (henceforth referred to as trans) individuals with a body mass index (BMI) of at least 30 (referred to clinically as "obesity"),[1] could be denied access to GAS[2] due to systemic bias and social inequity. High BMI is associated with conditions such as sleep apnea,[3,4,5] type 2 diabetes, gallbladder disease, and certain types of cancers.[6] It is also associated with perioperative issues, including surgical site infection,[7] increased operative time,[8] and greater technical difficulty when operating[9,10] and hence is often a primary factor in GAS candidacy.[9] However, this risk metric can obscure other multifactorial causes[11,12,13] that

contribute to poor surgical outcomes.[7,8,9,14] Moreover, some consider BMI thresholds to be a manifestation of weight stigma,[9,11] or the negative stereotyping of and discrimination against fat individuals.[12,15] (We use the word *fat* here as a neutral descriptor of body size in alignment with fat activists to help destigmatize the word.[16]) Weight stigma, among other biases, can cause clinicians to erroneously attribute a patient's health issues to their body size.[12] As a result of weight stigma, fat patients may be inclined to avoid clinical care.[12]

Equitable treatment requires that we consider the current surgical risks for fat patients, how weight stigma contributes to these risks,[12] and the appropriate uses of BMI in clinical care. It is also important to acknowledge the problematic history of BMI, including the lack of validation for its use in non-cisgender populations of color[11] and the relationship between weight stigma and racism.[17,18] For example, among Black men, experience of major discrimination is associated with obesity.[19]

Here, we discuss weight stigma, inadequate empirical evidence of GAS risks associated with BMI, and how to reduce barriers to GAS for fat trans people like ZZ by addressing structural oppression. In the absence of definitive evidence of a direct causal link between high BMI and poor GAS outcomes, we propose a more holistic approach to surgical candidacy that includes shared decision making, wherein BMI is not used as the sole determinant of GAS access but is considered alongside weight stigma and factors like procedure type and body composition.

Weight Stigma

ZZ's weight and his perception of how it affects his surgery access is mediated by internalized weight stigma. Internalized weight stigma poses concrete risks to patients by negatively influencing eating and exercise behavior,[20] and it is also associated with depression and body shame.[20] Even if ZZ ends up having surgery, he may struggle to find peer support, the benefits of which for surgery and medical care have been described in the existing literature for fat trans people who do not have easy access to GAS.[20,21]

Fat patients may also experience a lower quality of care due to clinician biases.[12] Surgical teams can limit reinforcing these biases in clinical environments by questioning their own anti-fat attitudes, as well as by educating clinicians and staff members on the complexity of weight and weight change.[12] Quality of care can be improved by using motivational interviewing and patient-centered communication[12] and by shifting the focus from weight loss to the benefits of behavior changes, such as increased physical activity.[12]

Known and Anticipated Risks and Benefits

The benefits of GAS, including decreased gender incongruence, improved quality of life, and decreased suicide risk, cannot be understated.[11,21] These data help make the case for proceeding with surgery despite potential risks associated with an elevated BMI.

Existing data on GAS indicate that the risk of complications is contingent on multiple factors, including procedure type, BMI, and body composition. Two studies have reported that gender-affirming mastectomy for patients with a BMI of 30 to 39.9 is relatively safe.[22,23] Data on complication risk specific to genital GAS, however, is lacking[9,11] and, with few exceptions,[24] is not available for those above a BMI of 30 (see Tables 1 and 2).

Table 1. Stratifying Complications in Gender-Affirming Mastectomies, Including for People With a Body Mass Index of at Least 30

			Common complications reported, No. (%)					
Author, y	**Max BMI**	**BMI, N**	**Hematoma**	**Seroma**	**Infection**	**SWD**	**Total**	**Conclusions**
Berry (2012)[25]	NR	All, 100	6 (6.0)	NR	3 (3.0)	NR	11 (11.0)	No conclusions stated regarding BMI.
		≥ 30, 1	NR	NR	NR	NR	NR	
Frederick (2017)[26]	41.3	All, 88	8 (9.1)	NR	0 (0)	0 (0)	29 (33)	Mastectomy weight not associated with hematoma.
		≥ 30, NR	NR	NR	0 (0)	0 (0)	NR	
Donato (2017)[27]	NR	All, 130	18 (13.8)	9 (6.9)	NR	NR	32 (24.6)	No association found between BMI and incidence of hematoma or need for revision.
		≥ 30, 41	7 (5.4)	NR	NR	NR	12 (9.2)	
McEvenue (2017)[28]	NR	All, 679	44 (6.5)	44 (6.5)	25 (3.7)	3 (0.4)	123 (8.1)	There was a statistically significant association between BMI and surgical technique (keyhole vs double incision with free nipple graft).
		≥ 30, NR	NR	NR	NR	NR	NR	
Kääriäinen (2017)[29]	NR	All, 57	14 (24.6)	4 (7.0)	2 (3.5)	NR	19 (33.3)	There was a statistically significant association between BMI and surgical technique (concentric circular incision vs transverse incision).
		≥ 30, NR	NR	NR	NR	NR	NR	
van de Grift (2017)[30]	35	All, 54	16 (29.6)	12 (22.2)	2 (3.7)	7 (13.0)	91 (NR)	No conclusions stated regarding BMI.
		≥ 30, NR	NR	NR	NR	NR	NR	
Knox (2017)[31]	40	All, 101	12 (11.9)	NR	11 (10.9)	21 (20.8)	36 (35.6)	BMI is a predictor variable for procedure type: patients with a BMI > 27 should undergo free nipple graft technique.
		≥ 30, NR	NR	NR	NR	NR	NR	
Gallagher (2019)[32]	57	All, 153	1 (0.7)	0 (0)	7 (4.6)	3 (2)	11 (7.2)	All complications in patients with BMI ≥ 30.
		≥ 30, 83	1 (0.7)	0 (0)	7 (4.6)	3 (2)	11 (7.2)	
Watanabe (2019)[33]	NR	All, 358	15 (4.2)	NR	NR	NR	NR	No significant association between hematoma formation and BMI.
		≥ 30, NR	NR	NR	NR	NR	NR	
Stein (2020)[34]	≥ 40[a]	All, 97	1 (1.0)	2 (2.1)	4 (4.1)	3 (3.1)	18 (18.6)	For patients with BMI < 30 and BMI ≥ 30, complication rates were not significantly different but rates of minor wound dehiscence were significantly different. No patient required operative revision.
		≥ 30, 43	1 (1.0)	2 (2.1)	1 (1.0)	3 (3.1)	14 (14.4)	
Pittelkow (2020)[22]	NR	All, 145	1 (0.7)	0 (0)	7 (4.8)	NR	10 (6.9)	Postoperative infection rates increased significantly between the "normal" and the "morbidly obese" and "super obese" groups but not between the normal and "obese" groups.
		≥ 30, 79	1 (0.7)	0 (0)	6 (4.1)	NR	9 (6.2)	
Rothenberg (2021)[23]	≥ 50[a]	All, 948	44 (4.6)	16 (1.7)	20 (2.1)	NR	89 (9.4)	BMI ≥ 25 did not have significantly higher odds of complications. No association between BMI category and need for revision.
		≥ 30, 295	NR	NR	NR	NR	NR	
Naides (2021)[35]	46.8	All, 72	4 (5.6)	3 (4.2)	1 (1.4)	1 (1.4)	NR	Authors do not recommend a BMI threshold for patients undergoing mastectomy.
		≥ 30, NR	NR	NR	NR	NR	NR	
Rifkin (2022)[36]	NR	All, 486	25 (5.1)	174 (35.8)	6 (1.2)	NR	205 (42.2)	BMI independently predicted surgical site infection.
		≥ 30, NR	NR	NR	NR	NR	NR	

Abbreviations: BMI, body mass index; NR, not reported; SWD, surgical wound dehiscence.
[a] Specific value not reported.

Table 2. Stratifying Complications in Other Gender-Affirming Surgeries, Including for People With a Body Mass Index of at Least 30

Author, y	Max BMI	BMI, N	Common complications reported, No. (%)				
Vaginoplasty			**Vaginal fistula or wound[c]**	**Infection**	**SWD**	**Total**	**Conclusions**
Gaither (2018)[37]	NR	All, 330	6 (1.8)	NR	17 (5.2)	95 (28.8)	BMI did not independently predict wound complications, fistula formation, or vaginal stenosis.
		≥ 30, NR	NR	NR	NR	NR	
Ives (2019)[24]	48.2	All, 101	4 (4)	1 (1)	29 (28.7)	53 (52.5)	BMI did not predict major, minor, or any complications or urethroplasty.
		≥ 30, 27	NR	NR	NR	NR	
Phalloplasty			**Urethral complications**	**Partial or total flap necrosis/loss**	**SWD**	**Total**	**Conclusions**
Ascha (2017)[38]	NR	All, 213	57 (26.8)	10 (4.7)	9 (4.2)	75 (35.2)	Patients with BMI > 30 were advised to undergo RFF phalloplasty due to amount of subdermal fat on thigh.
		≥ 30, NR	NR	NR	NR	NR	
Wirthmann (2018)[39]	44.1[a]	All, 32	19.7 (8.6)[b]	9 (3.9)	39 (17)	NR	BMI > 25 showed a linear increase in complications but was not statistically significant.
		≥ 30, NR	NR	1 (0.4)	NR	NR	
Watanabe (2021)[40]	31	All, 32	19 (59.4)	1 (3.1)	NR	28 (88)	Recommend BMI and radiographic imaging be considered in decision making regarding donor flap choice.
		≥ 30, NR	NR	NR	NR	NR	
Spennato (2022)[41]	37.5	All, 45	Fistula: 39 (86.7) Stricture: 19 (42.2)	12 (26.7)	10 (22.2)	43 (96.0)	No association was found between body weight and postoperative complications.
		≥ 30, NR	NR	NR	NR	NR	
Metoidioplasty			**Urethral complications**	**Infection**	**SWD**	**Total**	**Conclusions**
Bordas (2021)[42]	32.8	All, 813	86 (10.6)	NR	NR	207 (25.5)	All patients, including those with a high BMI, were able to stand to urinate postoperatively.
		≥ 30, NR	NR	NR	NR	NR	

Abbreviations: BMI, body mass index; NR, not reported; RFF, radial forearm flap; SWD, surgical wound dehiscence.
[a] Patient experienced total flap loss and subsequently underwent a second successful RFF phalloplasty.
[b] Including rectovaginal and vesicovaginal fistulas, as well as intraoperative rectal/bladder injury.

In this data's absence we can extrapolate from similar procedures.[9] For example, in robot-assisted laparoscopic radical prostatectomy, BMI correlates with pelvic visceral fat volume, pelvic width, and working space.[43] More pelvic visceral fat can increase operative time and incidence of complications.[43] However, in colorectal surgery, BMI appears to be less accurate at predicting the amount of visceral fat.[44] Overall body composition therefore may be more helpful when estimating surgical risk, as BMI does not account for the effects of body composition on surgical outcomes. Reporting on surgical complications is also not standardized (see Tables 1 and 2).

Complications stratified by BMI provide more specific information on potential risks and outcomes, although only the studies by Stein et al[34] and Gallagher et al[32] analyze the data in this way. For gender-affirming mastectomy, a BMI of 30 or more is associated with hematoma,[22,23,32,34] seroma,[22,34,45] infection,[22,32,34,36] and wound dehiscence.[32,34,36] For phalloplasty, one study found no statistically significant relationship between a BMI of at least 25 and increased complications,[25] although results may vary with type of reconstruction. In another study, one patient with a BMI of 44.1 experienced total flap loss and underwent a second successful phalloplasty, although this patient engaged in heavy smoking,[39] a known risk factor for impaired wound healing independent of BMI.[46] Ascha et al found that patients undergoing radial forearm flap phalloplasty experienced fewer complications and had a higher BMI than patients undergoing anterolateral thigh flap phalloplasty.[38] However, Wirthmann et al showed that there was a trend (though not significant) toward complications for patients with a BMI greater than 25 undergoing radial forearm flap phalloplasty.[39] Watanabe et al suggested that BMI can be useful, in tandem with radiographic imaging, when selecting type of donor flap to use for penile creation in phalloplasty.[33] Similarly, for vaginoplasty, data on complications stratified by BMI are limited,[24] and the existing data are too sparse to lead to definitive conclusions about the use of BMI in assessing surgical candidacy.

Risks for patients with a higher BMI precede the operating table, such as the risks accompanying weight loss attempts to qualify for surgery. Losing weight safely or sustainably is difficult and often not achievable for most patients recommended to pursue weight loss.[47] It can even be harmful for some individuals to attempt any weight changes, especially those with an active or previous eating disorder, which is characteristic of a large portion of trans individuals.[48,49] Additionally, permanent weight loss attempts often result in cycles of weight loss and regain, which are ineffective and have their own health risks.[50]

We must consider the ethics of recommending that patients pursue medical or surgical interventions for weight loss before undergoing GAS without evidence that weight loss will significantly affect surgical outcomes as well as long-term outcomes in cases in which patients lose weight preoperatively and then experience postoperative weight regain. Lastly, some fat individuals regard their body size as part of their identity[16,51] and do not want to attempt any kind of weight change. Recommending weight loss to fat individuals whose trans identities incur significant social criticism can similarly be perceived as a negative judgment and thereby damage the patient-surgeon relationship.

Shared Decision Making

In the absence of ample data, shared decision making supports informed consent. Increased risk of complications is often used to rationalize denying surgery to fat patients, as surgeons operating on individuals who may be at higher risk of complications could be accused of poor judgment or even face litigation if problems

arise intraoperatively.[52,53] Creating a more equitable division of decision-making responsibility between patients and surgeons can mitigate surgeons' fears of performing unsafe surgeries or patients' fears of experiencing poor outcomes. This goal can be achieved by proper informed consent through patient education and by allowing patients to be involved in the final decision.

Fear of litigation does not adequately justify refusal to operate, especially if the complications are manageable through wound care or revision surgeries. Even data on serious complications, like total flap loss, can help set patient expectations and possibly reduce legal action stemming from miscommunication. A paradigm of robust informed consent and collaboration encourages patient autonomy and strengthens patient-surgeon relationships.

Equitable Access to Surgery

Evidence regarding causes of fatness increasingly points toward macro-structural factors,[54] which, alongside structural stigma, contribute to health inequalities.[55,56] In the case of other stigmatized characteristics, such as race, attempts to address stigma aim to remove its effects on the patient rather than remove the characteristic itself. Thus, if it is assumed that people will continue to have diverse body sizes, solutions should be sought that will allow surgeons to safely operate on individuals of all sizes, including fat individuals.

We recognize that, in addition to explicit, intentional BMI thresholds, de facto BMI thresholds for surgery also exist,[9] which include technical difficulties and equipment limitations. We hope these barriers to care can be resolved through innovation and investment in equipment, such as operating tables and longer tools suited for patients at high weights or with more tissue.[57] Bariatric surgery specialists can model learning proper techniques and using equipment for safer operations.[57] Examples from colorectal surgery include alternative incision sites and use of prophylactic mesh when there is more visceral fat.[44] Preoperative radiographic imaging for flap surgeries, such as phalloplasty, can inform procedure decision making and planning.[7,58,59] BMI can also be used to identify cases appropriate for less experienced surgeons.[43]

Access to GAS for fat trans people will not improve if BMI thresholds continue to bar patients from care without critical consideration of their use. BMI lacks the nuance to fully inform surgical candidacy. While still acknowledging the discriminatory origins of BMI, we believe its usefulness remains due to its ubiquity in the existing surgical outcomes literature. In a vacuum where no weight stigma exists, BMI is a helpful metric for data collection and procedural decision making, as well as for innovation of novel solutions in surgery for fat individuals. The problem is that BMI can enable and reinforce weight stigma, and that is what we must avoid. When assessing surgical candidacy, the risks associated with high BMI must be weighed against the benefits of GAS, which can be life-changing and sometimes even lifesaving.

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MEDICAL EDUCATION: PEER-REVIEWED ARTICLE

Teaching How to Avoid Overreliance on BMI in Diagnosing and Caring for Patients With Eating Disorders

Kratika Mishra and Erin Harrop, PhD, LICSW

Abstract

Physicians tend to rely on diagnostic criteria, which can influence patients' access to care by legitimizing need for care, connections to appropriate clinicians, and insurance coverage for indicated interventions. This article considers potential unintended but foreseeable negative consequences, including iatrogenic harm, of using body mass index (BMI) to distinguish typical from atypical anorexia nervosa, despite both illnesses sharing the same behaviors and complications. This article also suggests teaching strategies to help students learn to avoid overreliance on BMI in eating disorders care.

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What Students Should Learn

Medical training and practice largely follow a "weight-normative approach," which emphasizes weight management as an important aspect of health and well-being.[1] This approach hinges on a widely held belief that higher body mass index (BMI) causes poor health. It is important for all health professions students to know that BMI, despite its omnipresence, is controversial. Abundant data suggesting complexity in relationships between BMI and health are often overlooked in clinical care. For example, one study found that when BMI categories were used to measure metabolic health, an estimated 75 million US adults were misclassified as cardio-metabolically healthy or unhealthy.[2] A pedagogical upshot here is that diagnostic practices heavily reliant on BMI would benefit from additional specificity and precision. Especially when BMI cutoffs are used as diagnostic criteria, many clinicians and trainees may miss key health problems of a patient whose body habitus does not fit stereotyped illness presentation.

In this article, we consider potential unintended but foreseeable negative consequences, including iatrogenic harm, of using BMI to distinguish typical anorexia nervosa (AN) from atypical anorexia nervosa (AAN), despite both illnesses sharing the same behaviors and complications. We also suggest teaching strategies to help students learn to avoid overreliance on BMI in eating disorders care.

Bette's Story

"I feel like if I had a smaller body right from the start, I would have gotten help when I was 15, when everybody started noticing I was losing a lot of weight and at 16, when I was vomiting blood" (E. Harrop, unpublished data, 2020).[3] This quotation is from Bette (a pseudonym), a 38-year-old patient with AAN. Bette identifies as a nonbinary, white, pansexual, plus-sized US resident, who was low income as a child.[3] Bette's AAN developed in early adolescence; by age 15, they were eating less than 600 calories a day, purging multiple times daily, and losing weight rapidly, although never becoming "underweight" according to BMI (E. Harrop, unpublished data, 2020). After enduring multiple physical issues from their eating disorder (ED), including 2 pregnancies complicated by poor nutrition intake, a nurse practitioner finally questioned them about their ED, leading to a diagnosis at age 37. Their ED was severe and long-standing, warranting longer-term residential care, but insurance only approved 8 weeks of intensive outpatient care. At the time of this paper, Bette is still actively trying to recover from their decades-long battle with AAN, with suboptimal treatment supports.

Diagnosis and Treatment of EDs

In the case of AN, a hallmark symptom is emaciation with low BMI. Patients with AN in clinical vignettes are classically thin, with restrictive caloric intake, intense fear of weight gain and becoming fat, and disturbance in self-evaluation of body weight or shape. According to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*), the severity of AN is classified mainly by BMI.[4] However, not all patients engaged in severe self-starvation behaviors are emaciated.[5] When patients, such as Bette, present with all of the symptoms of AN except emaciation (and have BMIs >18.5), they may be diagnosed with "other specified feeding and eating disorder" within the category of AAN. Despite their different classifications, AN and AAN have the same acute physiologic sequelae (bradycardia, low systolic blood pressure, low body temperature, and prolonged QTc interval on an electrocardiogram).[6,7] There are few if any significant differences between patients with AN presentations who meet the low BMI criteria and patients who do not,[7] leading some researchers to conclude that BMI is a poor predictor of AN severity[7,8] and others to suggest that the BMI diagnostic criterion be removed from the *DSM-5* to facilitate faster patient identification.[3,9] Notably, one experimental study found that mental health trainees were significantly more likely to identify AN or AAN in a case study with an underweight patient than to identify AAN in identical patients with BMIs in the "normal" or "overweight" ranges,[10] suggesting that patient BMI likely affects the diagnostic impressions and perceptions of clinicians. AAN can go undetected or undiagnosed because physicians are not primed to look for signs of starvation in patients with "normal," "overweight," or "obese" BMIs.

Although studies estimate the prevalence of AAN to be double or triple that of AN,[11] in the United States, fewer patients with AAN than AN are referred to and admitted for ED-specific care.[11] This disparity is consistent with the finding that patients with a BMI category of "overweight" or "obese" have 6 times lower odds of receiving inpatient medical care 1 year after diagnosis, despite experiencing greater percentages of weight loss.[12] The second author (E.H.) found in a small study that, on average, patients with AAN experienced a treatment delay of 11.6 years.[3] This treatment gap is crucial, because early identification and treatment of EDs is the best predictor of full recovery.[13] Moreover, based on our clinical experience, categorization of an ED as AN or AAN affects approval for insurance coverage of intensive (often inpatient) treatment. Even when able to access care, patients have reported that their treatment experiences are often steeped in weight stigma and shaming comments from clinicians, who question their

diagnosis, recommend weight loss, or prescribe restrictive diet plans.[11,14] This overvaluation of BMI in ED treatment impedes referral, treatment, and recovery.[11]

Weight Stigma in Clinical Care

Medical training places significant emphasis on constructing differential diagnoses based on presenting symptoms. In practice, however, it is natural to fall back on heuristic methods and assess for diseases that match the clinical vignettes of one's training (eg, screening for EDs in patients who are thin), but even manifestation of unconscious biases (eg, skipping screening for EDs in patients who are not thin) can reflect weight stigma—not only in one's approach to care but also in one's training.

Additionally, dominant representations in the media and in medical training tools narrowly frame patients with EDs as thin, young, and female, although patients with EDs are demographically diverse.[15] One study based on surveys found that groups previously thought to be least at risk for EDs (eg, males, older individuals) demonstrated increases in the prevalence rates of some ED behaviors between 1998 and 2008.[16] Moreover, people of lower socioeconomic status,[17] people of color, and male-presenting individuals also present with EDs,[18] and adolescents of lower socioeconomic status have been found to have higher rates of disordered eating behaviors than adolescents of high socioeconomic status.[17] Representations of patients with EDs as young, female, cisgender, white, thin, and upper-middle class have the unintended consequence of making those who do not fit this dominant image—particularly due to intersecting marginalized identities—feel less welcome in treatment spaces. Reinforcement of damaging stereotypes can also make it harder for diverse patients to find services that meet their needs.[19]

Once identified as having AAN, patients often encounter weight stigma in clinical interactions. Like most of the general population, health care professionals harbor attitudes indicative of weight stigma,[20] and medical trainees are no different.[21] Clinician assumptions about eating behaviors based on BMI can harm rapport and make it harder for patients to be forthcoming about their disordered behaviors. In a study examining the health care experiences of patients with AAN, the second author (E.H.) identified multiple ways that patients felt weight stigma impacted their care and the course of their EDs.[3] Among the physician behaviors patients viewed as harmful were the following: emphasizing weight or weight gain (particularly when patients were children), discounting or minimizing ED behaviors or symptoms, not believing patient reports of ED diagnoses or history, recommending weight loss or caloric restriction while the patient was in treatment for AAN, encouraging disordered eating behaviors (eg, skipping meals, compulsive exercise), and not referring patients to treatment after EDs were identified.[3]

Weight-Inclusive ED Care

The current recommendation is to treat atypical EDs as similarly as possible to the ED they most closely resemble (AN),[22] but, in the case of AAN, the recommendation for sufficient daily caloric intake can contradict other medical guidelines, such as the recommendation that all patients with high BMIs be counseled to lose weight.[23]

As a field, mental health needs to get better at screening diverse individuals for EDs and providing weight-inclusive care that does not overly rely on BMI. Weight-inclusive approaches to care regard health and well-being as multifaceted; deemphasize weight; and focus on improving health behaviors (eg, nutrition quality and variety, sleep quality, enjoyable movement, meaningful social connections, participation in hobbies) and

health care access and on minimizing weight stigma.[1] While weight-inclusive approaches are important for ED-specific care, these approaches can also benefit other sectors of medicine, particularly sectors in which patients with EDs are likely to present (eg, primary care, emergency care, gastroenterology, internal medicine).

An ideal opportunity to emphasize these approaches is to incorporate more anti-weight stigma training in medical school curricula. Although variable amounts of education on EDs, nutrition, and obesity are included at each school,[24] weight stigma is not uniformly addressed, even as implicit bias training is becoming a more prominent part of health professional education.[25] Given the high rates of weight stigma reported in health care,[26] a weight-inclusive approach is urgently needed in medical training. Additionally, medical training should include vignettes of patients with EDs that deviate from the accepted picture (for example, patients who are older, of higher weight, or persons of color). Strategies for weight-inclusive practices are also needed. Finally, while one-off seminars about weight stigma are useful, comprehensive curricular revisions can be necessary to create lasting changes in clinician attitudes.[27]

While research on weight-inclusive care, especially for EDs, is still in its infancy, researchers have made several recommendations for improving patient care across the weight spectrum (see Table).

Table. Strategies for Weight-Inclusive Health Care for People With Eating Disorders

Strategy	Recommendations
Weighing	• Avoid weighing unless medically necessary (eg, anesthesia, medication dosing, monitoring of water retention, or other specific indications). • If a weight is needed, harm reduction strategies include: - *Asking for consent prior to weighing*. Keep in mind that very few patients receive coaching in saying "no" to clinicians, and refusal requires strong self-advocacy. - *Conducting measurement at end of appointment if needed*. - *Weighing backwards so patient does not learn measurement*. - *Ensuring weight does not appear on a patient's discharge paperwork or online chart if a patient requests to not learn their weight*.
Screening	• Screen universally for eating disorder behaviors (eg, restriction, purging, laxative misuse, compulsive exercise) before making recommendations for diet or weight changes. • Particularly screen with any weight loss. • Frame questions thoughtfully, because being perceived as overweight by a clinician can itself be harmful to health behaviors and outcomes and increase disordered eating.[28]
Encouragement	• Encourage intuitive connection with body (eg, recognizing hunger, fullness, fatigue, pain). • Congratulate positive changes in behaviors (eg, increasing food variety, joining a sports team, spending time with friends, working hard in school) and positive changes in health measures (eg, improvements in blood pressure, cholesterol, mood, HbA1C, hours of sleep, pain levels). • Be cautious about congratulating weight loss, because it can be a result of disordered eating behaviors, and undue focus on weight could undermine positive health behavior change that does not result in weight loss.

Investigation	• Investigate physical symptoms correlated with malnutrition (eg, menstrual irregularity, amenorrhea, bradycardia, dizziness, orthostasis, low body temperature) in all patients, including normal or higher weight patients.
Rapport	• Focus on listening and empathy-evoking interactions between clinicians and patients.
Education	• Increase education on weight stigma and how it impacts patients' experience of medical care and other aspects of their lives. • Weight stigma and fat phobia should be explicitly included in diversity, equity, inclusion initiatives to foster recognition of fatness as a marginalized identity rather than a health problem.

Adapted from Harrop 2020,[3] Talumaa et al 2022.[21]

Additionally, as current ED screeners lack predictive power[29] and are not tailored to people across the weight spectrum, we propose a 2-question screener, based on our own clinical experience, to assess disordered eating and exercise behaviors in patients (regardless of BMI): (1) How do you feel about your body? and (2) Are you doing anything to try to change it (please specify)? We recommend these questions be asked with care, as questions about weight are sensitive and potentially stigmatizing (eg, "I recognize questions about eating habits and weight can be stressful, but it's important for me to understand the pressures you might be facing"). Although testing of this screener is still in development, both authors have found (anecdotally) that this tool results in better identification of EDs in diverse patients; we recommend that screening for EDs occur after standard mental health screeners to allow for better rapport with patients.

Conclusion

Given the high prevalence of disordered eating behaviors, dieting behaviors, and concerns about body image,[27,28] clinicians' diligence and compassion in screening for EDs—even in patients they do not expect to struggle with these behaviors—will facilitate faster diagnosis and treatment. These efforts will validate the struggle with weight, diet, and appearance that many patients face and can even improve their quality of life and decrease the likelihood that they will have to wait years for appropriate care.

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AMA CODE SAYS

AMA *Code of Medical Ethics*' Opinions Related to Clinical Use of BMI

Jake Young, PhD, MPH, MFA

Abstract
Although body-mass index (BMI) is regularly used, it has come under clinical and ethical scrutiny. The AMA *Code of Medical Ethics* offers guidance on the use of diagnostic tools that could be sources of harm to patients.

Imprecision of Body Mass Index

People with overweight or obesity are at increased risk for many serious diseases and health conditions, including type 2 diabetes, heart disease, stroke, and all-cause mortality.[1] However, individuals with overweight or obesity often face bias and discrimination in their daily lives as well as during clinical encounters.[2,3] Adults with a body mass index (BMI) of at least 30 are considered obese,[1] but many issues exist with respect to the interpretation and application of BMI, such as the arbitrary cut points used for identifying health risks; the need to adjust those cut points for race/ethnic and sex subgroups; its inability to measure the mass of fat in different body sites; its questionable accuracy in diagnosing obesity, especially in individuals with intermediate BMI; and general patient distrust of its accuracy in assessing the healthiness of their weight.[4,5,6,7,8]

Physicians' Ethical Responsibilities

While the American Medical Association (AMA) *Code of Medical Ethics* does not directly address the use of BMI, 4 opinions are particularly relevant to considering the use of BMI in clinical encounters. Opinion 1.1.6, "Quality," states that physicians have an obligation "to ensure that the care patients receive is safe, effective, patient centered, timely, efficient, and equitable" and that "physicians should actively engage in efforts to improve the quality of health care" by, among other things, monitoring the use of "quality improvement tools."[9] While this opinion does not bar the use of BMI, it does suggest that physicians have a responsibility to ensure that its use is patient centered and equitable and that its effectiveness as a quality improvement tool should be monitored.

Opinion 8.5, "Disparities in Health Care," dictates that, beyond monitoring quality improvement tools, physicians have a professional obligation to support "the development of quality measures and resources to help reduce disparities."[10] This

obligation has important bearings on the use of BMI as a diagnostic tool, as it has become increasingly clear that the current general cut point of 30 to diagnose obesity should be personalized to account for differences in sex and race/ethnicity.[8] As Stanford et al note in their research aimed at redefining BMI risk thresholds for metabolic disease: "When obesity is defined by a correlation with the presence of metabolic risk factors, the BMI cutoffs to define obesity would change for specific race/ethnicity and sex subgroups instead of [there being] a single BMI threshold."[8]

Opinion 9.3.2, "Physician Responsibilities to Colleagues With Illness, Disability or Impairment," states: "In carrying out their responsibilities to colleagues, patients, and the public, physicians should strive to … eliminat[e] stigma within the profession regarding illness and disability."[11] Because BMI is often treated as measurably objective despite being a cultural construct, and thus can unintentionally dehumanize patients,[4] physicians have a responsibility to minimize and try to eliminate the stigma of obesity that can be exacerbated by the use of BMI as a diagnostic tool. Similarly, Opinion 1.1.3, "Patient Rights," articulates that the patient-physician relationship should be a collaborative and mutually respectful alliance that upholds the patient's right to "courtesy, respect, dignity, and timely, responsive attention to his or her needs."[12] Physicians' awareness of the ways that implicit bias and physician stigma against patients with overweight or obesity can impact patient outcomes is critical to ensuring a respectful and dignified clinical encounter.

Lastly, Opinion 11.2.1, "Professionalism in Health Care Systems," directly addresses ethical considerations of implementing tools for organizing the delivery of care, such as BMI, and states that physicians should ensure that all such tools "are designed in keeping with sound principles and solid scientific evidence," are "based on best available evidence and developed in keeping with ethics guidance," and "are implemented fairly and do not disadvantage identifiable populations of patients or physicians or exacerbate health care disparities."[13] As physicians consider their use of BMI as a diagnostic tool, they should keep in mind how BMI was designed, question whether its use is in keeping with sound scientific evidence, and reflect on whether its implementation is fair and equitable.

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STATE OF THE ART AND SCIENCE: PEER-REVIEWED ARTICLE

How Should We Approach Body Size Diversity in Clinical Trials?

Dania Pagarkar, Erin Harrop, PhD, LICSW, and Lisa Erlanger, MD

Abstract

Regulatory and ethical considerations mandate that minorities affected by health disparities be included in research. Despite concerns about clinical outcomes for patients with obesity, clinical trials have reported few data about participation of and outcomes for such patients. This article examines the lack of body size diversity in clinical research participants and reviews the evidence and ethical arguments for including larger-bodied patients. Drawing on examples of improved gender diversification of trial participants, this article suggests that similar benefits would be likely from inclusion of body diversity.

Diversity in Clinical Trials

Clinical trials have historically overrepresented White male participants and underrepresented children and older adults, women, gender and sexually diverse people, and people of color.[1] Given the higher burden of disease among disadvantaged minorities,[1,2,3] their lack of representative inclusion in trials threatens to exacerbate health disparities.[4] Continued disparities in cardiovascular health demonstrate this phenomenon, as women and people of color continue to be underrepresented in clinical trials and thus benefit less from research advances.[5,6]

The NIH (National Institutes of Health) Revitalization Act of 1993 mandated the inclusion of women and minorities in clinical trials, stating that unless "substantial scientific data" exists supporting no differences in intervention effects between members of traditionally excluded demographic groups and members of demographic groups that would have been included in the trial anyway, the inclusion of the former in the clinical trial is required.[7] Mandated clinical subject diversity is effective, as increased inclusion of women in studies and subgroup analyses by gender have led to advances in our understanding of how drugs and disease states may affect women differently than men.[8,9,10,11,12,13,14] Yet more work is needed.[15] African American and Hispanic populations continue to be underrepresented and benefit less from advancements in research.[16,17] Ethical and scientific imperatives thus demand ongoing efforts to include members of diverse populations in clinical trials.

This article examines data demonstrating that patients with obesity may respond differently to some clinical interventions, thus mandating their representative inclusion in clinical trials. We argue that not only regulatory requirements but also the basic ethical principles of beneficence, nonmaleficence, and distributive justice mandate inclusion of patients with obesity in clinical trials. While we limit the scope of our discussion to clinical trials, we encourage readers to consider these principles' applications to other research programs.

Body Size Diversity

A body mass index (BMI) between 18.5 and 24.9 is categorized as "healthy weight," a BMI between 25.0 and 29.9 is categorized as "overweight," and a BMI of 30 or above is categorized as "obesity."[18] Roughly 74% of the population falls into the overweight and obesity BMI categories (otherwise referred to as higher weight and elevated BMI).[19] It should be noted that BMI has been critiqued as a poor measure of adiposity (the amount of fatty tissue in a body or region[20]) and a poor predictor of individual health,[21] making the term *obesity* inexact both biologically and medically.[21,22] We also recognize that obesity is not the preferred descriptor of many higher-weight individuals, who may use *larger-bodied* or *fat* as descriptors. Nonetheless, here we use the term *obesity* to describe these populations, as BMI is the current standard for measuring body size in medicine, and existing research uses BMI as a variable.

Larger-bodied patients remain underrepresented in clinical trials,[23] despite studies showing differences in intervention effects between people with obesity and people with normal BMI.[24,25] Underrepresentation of people with obesity occurs when researchers exclude participants above a specific BMI, fail to recruit or retain people with obesity, fail to report rates of obesity in study samples, or fail to perform relevant subanalyses. In the remainder of this paper, we discuss vaccine and dosing effects in patients with obesity and the ethical and scientific imperative to include these patients in future clinical trials to better promote health equity.[24,25]

Lessons From Vaccine Research

Studies have demonstrated that some vaccines are less effective for people with obesity than for people with normal BMIs. A 2012 study found that 12 months after administration of the influenza vaccine, patients categorized as obese had significantly decreased influenza antibody titers and $CD8^+$ T-cell activation than patients categorized with normal BMIs.[26] Similar results have been produced for rabies, tetanus, and Hepatitis B vaccines.[27,28,29,30,31] Potential explanations for the reduced effectiveness of vaccines in people with obesity include inappropriately sized needles, inadequate dosing, and altered immune responses,[31,32,33] suggesting the need for more research to optimize vaccine efficacy in larger patients.

With regard to the COVID-19 pandemic and vaccine efforts, research has yet to produce universal data on obesity's impact on vaccine effectiveness[34] and whether obesity is significantly associated with increased morbidity and mortality from COVID-19.[35,36] While a large cohort study conducted in England found higher rates of vaccination among people with obesity than those of healthy weight as well as evidence that vaccines are effective in preventing severe COVID-19 in people with obesity,[37] it also highlights the need for replication research in other populations. However, as of May 2021, of 58 COVID-19 vaccine trials in phases III and IV, only 2 protocols indicated an intention to conduct subgroup analyses of participants with obesity; of 249 COVID-19 vaccine trials

across all 4 trial phases, 29.3% specifically excluded those with BMIs over 30, and half provided no specification of body size.[38]

While government and media messaging targeting obesity may have contributed to more higher-weight people getting vaccinated, as was demonstrated in the English study, researchers have also critiqued COVID-19 messaging focused on obesity as potentially contributing to increased weight stigma.[39] Given significant COVID-19 vaccine hesitancy among those with obesity[40] and that weight bias is attributed to delays in preventive and acute care,[41] it is important to consider the potential impact of weight stigma in public health discourse regarding COVID-19. Townsend et al concluded that "weight *stigma* and its cumulative sequalae are a prevalent and distinct vulnerability that interacts with biologic and structural risks for worse COVID-19 outcomes,"[42] highlighting the need to be attentive to issues of weight stigma when conducting public health outreach targeting higher-weight populations. Research examining the efficacy and reach of vaccination campaigns, effectiveness and dosing of COVID treatments, and the role of weight stigma in larger-bodied patients' COVID outcomes is needed.[42,43,44,45]

Different Pharmacologic Effects

Adipose tissue has different pharmacokinetic properties than lean tissue, and larger-bodied patients have demonstrated differences in activity of key enzymes and physiologic functions, leading researchers to hypothesize that drugs will function differently in patients with obesity. Natural variations in fat-to-lean mass ratios in patients with similar BMIs complicates the ability to predict drug effects. Some studies of highly lipophilic drugs in patients with obesity show differences in tissue blood flow and cardiac function, although the causes of these differences are not well characterized.[46,47]

Altered pharmacokinetics may in part explain data suggesting that standard dosing of some medications is not as effective in patients with obesity. For example, patients with obesity may be underdosed with anesthetics[48,49] and anticoagulants, such as enoxaparin.[50] In addition, studies show that antibiotics are frequently underdosed in patients with obesity due to both a lack of dosing research (in some cases) and physicians' lack of adherence to specified dosing guidelines,[51,52,53,54] suggesting a need for further research on best practices. The emergency contraceptives levonorgestrel and ulipristal acetate have reduced effectiveness in larger-bodied patients for unknown reasons, but higher dosing may not rectify this problem, suggesting additional factors may be at play.[24,55]

Body size also influences response to chemotherapeutic agents. Among patients with higher BMIs, studies have found decreased rates of complete pathologic response to neoadjuvant chemotherapy and reduced clearance of drugs (eg, doxorubicin or cyclophosphamide) compared to those of normal weight, as well as differences in overall survival.[56,57,58,59] A 2018 systematic review of 76 randomized controlled trials of obesity-related cancer types found that only one conducted a subgroup analysis and that this analysis showed less treatment success in patients with obesity.[23] Based on unpublished information, the median proportion of patients with obesity in 22 trials was only 18%.[23] These findings are concerning, given that higher weight is associated with increased incidence of multiple cancers,[60,61,62] possibly due to biological mechanisms.[63] Obesity is also correlated with social determinants of health that contribute to cancer rates, including lower socioeconomic status, residence in historically redlined neighborhoods, decreased access to fresh food, adverse childhood experiences, and

high allostatic load.[64] Additionally, weight stigma leads to reduced access to quality health care and screenings and exerts negative socioeconomic pressure on larger patients.[65,66,67] Inclusive research is needed to separate the impacts of these various factors and the clinical steps necessary to rectify disparities.

To ensure safe and effective care for higher-weight patients, studies should include a representative number of patients at the full range of higher BMIs, examine dosing and effectiveness through subgroup analysis, and explore whether other anthropomorphic measures predict medication response more accurately than BMI.

Including Higher-Weight Bodies

The principles of beneficence, nonmaleficence, and justice underlie the justification for inclusion of patients with higher BMIs in clinical trials.

- *Beneficence*. Given data showing the underrepresentation of larger bodied patients in cancer-related clinical trials, the differing efficacy of chemotherapeutic treatment in larger bodied patients, the association of obesity with cancer, and the increased cost of obesity-related cancers,[68] representative inclusion of larger-bodied patients in clinical trials is essential to maximizing benefit.

- *Nonmaleficence*. Harm could be prevented by conducting research on larger-bodied patients for whom vaccines have been shown to be less effective. Patients with obesity have been shown, in some studies, to have higher risk for COVID-19 morbidity and mortality.[35] Given the lack of conclusive data on COVID-19 outcomes for higher-weight individuals, as well as the concern that weight stigma could increase delays in care, more large-scale research is needed. In an effort to avoid jeopardizing the whole community by having a population that is potentially not adequately vaccinated, we need more population-specific research on delays in care and usage of preventive measures like vaccines. More generally, inadequate dosing of medications can lead to progression of disease and increased health care costs.[69,70,71,72]

- *Justice*. Ethical research demands that we address the historical issue of unduly burdening stigmatized groups with risks of research without full access to its benefits.[70] Given the multiple stigmas faced by patients with obesity,[73] it is fitting that researchers ensure that participants with obesity are not manipulated into participation. Concurrently, the principle of justice also requires that patients with obesity have equal access to the benefits of research participation.

In sum, while greater inclusiveness is important for research rigor (eg, generalizability, statistical power for subgroup analysis), it is ethically mandated as well.

A Path Forward

The Table provides an overview of various considerations for researchers when including higher-weight participants in clinical research. Moving forward, larger-scale legislative measures, such as an amendment to the NIH Revitalization Act to include participants with a full range of BMIs, would provide an enduring incentive for change. In addition, researchers should thoughtfully consider the ethical and methodological implications of including body diversity in study samples and subgroup analyses, even in the absence of legal mandates. While mandating body diversity inclusion may be outside the scope of

most institutional review boards (IRBs), IRBs could provide statements of "best practice" regarding body diversity inclusion to aid researchers in making study design decisions. Aside from study design, community engagement has been proven to be the most effective way to recruit subjects and maintain participation in clinical trials among minority groups.[74] Building rapport and trust, understanding community needs, being transparent about research protocol, including community input in research endeavors, and cultivating ongoing community relationships are all important not only for recruitment and retention but also for more ethical, responsible research. Likewise, addressing issues of access to trial participation, such as geographic availability of trials; introducing public health initiatives to address health literacy; and hiring community members in the research workforce all help to increase research participation as well as to empower minority communities to develop agency regarding their health.[75,76] The responsibility of research institutions also includes robust education of researchers and diversity among research personnel.[76]

Table. Considerations for Including Higher-Weight Participants in Clinical Research

When to include subgroup analysis	Critical questions to ask of published research	Sensitivity to ethical issues
Target disease has different prevalence in larger-bodied patients.	Were there any BMI restrictions for study inclusion? What range of BMIs was included in the study? Was this range representative of population BMIs?	Be attentive to potential issues of weight stigma in the research design or language; consider consulting a weight stigma expert for review of participant materials.
Target disease has different presumed mechanisms in larger-bodied patients.	Was there a subgroup analysis of higher-weight patients?	Develop more specific and biologically relevant measures of adiposity (than BMI).
Target medication depends on volume of distribution, fat mass, or liver/kidney clearance for metabolism and effect.	Did results differ for those with higher BMI? What explanations were explored?	The conclusion should not automatically be drawn that adiposity is the cause of differing results.
Target disease is known to be correlated with allostatic load, which is increased in larger-bodied patients.[64]	Did the study design control for the effects of weight stigma and weight cycling?	Weight loss should not be recommended as a solution for differing outcomes unless weight loss specifically was the intervention studied, it was studied in all participants regardless of BMI, and short- and long-term side effects were tracked as with any other intervention.
Medication is administered intramuscularly.	What was the dropout rate of higher-weight patients? Did dropout rates differ by BMI?	Given the prevalence of dieting among larger-bodied people, assessment of nutritional status will likely be important to fully understand results.
Disease or intervention is believed to be impacted by experiences of weight stigma.	Did the study control for social determinants of health?	Conduct research into barriers to participation for higher-weight patients.

Conclusion

As we have shown, lack of body diversity in medical research creates methodological and inferential challenges (eg, lack of generalizability) and ethical concerns (eg, beneficence, nonmaleficence, justice). Based on data suggesting that higher-weight individuals may respond differently to some clinical interventions, we suggest that body size diversity should be included under the NIH Revitalization Act. Compliance should be overseen by grantors and facilitated through education of researchers and in partnership with communities and IRBs. We urge the biomedical community not only to support such legislative efforts, but also to adopt representative inclusion of patients at the full range of higher BMIs in clinical trials to better promote health equity.

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Five Ways Health Care Can Be Better for Fat People

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Abstract

Discussions about how to better accommodate fat persons' needs in health care settings tend to focus on how to reduce stigma and improve equipment (eg, scanners). While important, such efforts must address underlying ideological foundations of stigma and equipment inadequacy, including thin-centrism, a tendency to pathologize fatness, inadequate representation of fat people in health care organizational leadership, and power differentials between clinicians and health care seekers. This article describes how weight-based exclusion and oppression play out in clinical settings and practice as dysfunctional power sharing and suggests strategies for improving clinical relationships.

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Fat Suffering and Death

Much of the existing work on better accommodating fat people's needs within North American health care settings focuses on reducing stigma[1] and addressing inadequate medical equipment.[2] In some cases, inadequate equipment and surgery-related issues can be a matter of life or death: the computed tomography or magnetic resonance imaging scanner that was not designed to accommodate the bodies of larger members of the population[3]; the surgeon who never learned to operate on fat bodies because their medical school refused the donation of fat cadavers[4]; or the loss of life due to impaired health and well-being from bariatric surgery.[5,6] These deaths are, collectively, uncountable; the result, however, is the loss of precious lives and irreversible trauma to families, friends, and communities.

Other outcomes are not as often deadly but may result in significant damage to physical or psychological health when, for example, clinicians' expressions of weight bias result in "health care seekers"[7] of higher weights ceasing all contact with clinicians,[8] joint replacements in healthy people being denied on the basis of body mass index (BMI),[9,10] or eating disorders being induced or retriggered by the bigoted comments of those entrusted with healing.[11] To every survivor of medical weight bias, the suffering, limitation of activities, economic impoverishment through imposed disability, or other

negative consequences are lived experiences that come on top of the already serious health impacts of broader social and cultural fatphobia.[12 t]

Yet these sequelae of encounters with medical fatphobia cannot be tackled apart from their root causes: the dominance of thin-centric ideology,[13] the pathologization of fatness,[14] a failure to foster the leadership of fat people,[15] and a biomedical health system that continues to elevate the power of physicians over that of health care seekers, fat and otherwise.[16] Ultimately, we cannot understand and effectively address the specifics of the induced suffering of fat people within—or excluded from—biomedical contexts without looking to the power inequalities that ground and support them.

Making Change Real

It is vital that iatrogenic harm be recognized and addressed at every level. There are many strategies and tactics that have been outlined for tackling the problems stemming from systemic medical fatphobia.[17] Moreover, because, as sociologist Sabrina Strings has demonstrated, medical fatphobia is rooted in historical legacies of white supremacy (particularly, in the form of anti-Black racism), classism, and sexism,[18] addressing weight bias must occur in conjunction with a comprehensive commitment to intersectional anti-oppression work that is attentive to the multiple oppressions and painful histories underlying contemporary medico-cultural views of fat people and fat bodies.

Discrimination in health care does not occur apart from the broader contexts of national and regional human rights and antidiscrimination laws. While legislation alone may not always be capable of providing an effective preventative strategy or remedy, the *absence* of such legal protections against weight bias in most jurisdictions provides implicit endorsement of fat phobic speech and behavior and limits how institutions and individuals can be held accountable for their deleterious impacts.[19] Clinicians and scholars in the health sciences have particularly strong and well-regarded voices in the public and political arenas and possess a moral obligation to use their voices to advocate for laws that specifically protect fat health care seekers (and fat colleagues) from discrimination.

At the institutional level—in acute and long-term care settings, ambulatory clinics, medical schools, and regulatory authorities—weight bias *must* be explicitly included in antidiscrimination policies and efforts be made to ensure that fat people are represented among staff and on boards, committees, and other decision-making bodies. Today, as a matter of course, we take marginalized social groups—most often women, people of color, disabled people, and people with diverse gender and sexual identities—into consideration when hiring or forming steering or advisory committees; by the same token, we must do this for people of differing body size. Without fat people at the table in decision-making roles, meaningful change will not happen, as the experiences of other marginalized communities vividly bear out.[20]

At the level of clinical practice, change must span a range of spheres. The inaccessibility of the built environment for fat bodies—from sphygmomanometer cuffs to waiting-room chairs to high-tech diagnostic equipment—must be addressed and corrected, as no amount of change in attitudes will compensate for a health care environment that is made only for thin(ner) bodies. Offering health care by phone or video call has already been revolutionary for many disabled health care seekers and should also be encouraged and supported for fat people.[21]

Equally important is to have health care spaces free from items that have been and continue to be used to pathologize and humiliate fat people, from weight-measurement scales to skin calipers to exam gowns. Many individuals have traumatic personal experiences with these material objects, as such tools also carry embedded histories of the medical "abnormalization" of fatness and the objectification of bodies. Twenty-first century health care must have no tolerance for clinical relics of oppression, especially given the paucity of useful clinical information to be gleaned from weight/BMI measurement and the profound racism it perpetuates.[22] Such items in a clinical setting may telegraph to marginalized health care seekers that their lives and well-being have already been devalued before a word has been uttered, for they concretize harmful biases and deleterious power relations.[23]

But the ways we think, talk, write about, and depict weight-diverse bodies are no less important. Fat activists have been clear in their demands for the elimination of fat-pathologizing language from both research and clinical practice: "*overweight*" and "*obesity*" are terms that "otherize" and do harm to members of the fat community by representing fatness as an abnormal condition.[24] With the former term gesturing to the notion that some weights are over a "correct" or "acceptable" weight and the latter originating with the popular belief that fatness is a "disease" and the result of gluttony,[25] this language encodes oppression and weight bigotry under a façade of clinical objectivity. As such, it needs to follow other harmful, pathologizing language of the past that degrades human diversity in being discarded, and it needs to be replaced with more neutral language (such as *fat* or *larger bodied*).[24] In the clinical encounter, weight should only be referenced when necessary and invited by the health care seeker (such as an expressed concern over the clinical significance of an unusually rapid weight gain or loss). Clinical spaces should include positive, weight-inclusive depictions of human beings and bodies (and not stigmatizing posters of fat people to illustrate metabolic syndrome or the like). Clinicians must be alert to the need—arising from generations of abuse by practitioners—to *actively and explicitly* position their health care environments as weight-neutral, size-diverse, anti-oppressive spaces that guarantee respect for the autonomy and safety of all people, regardless of the body they inhabit.

Power and Domination

Supporting change at all levels requires more than just leadership; it necessitates a genuine worldview change within an organization's culture. Achieving change in worldview can be considerably harder than achieving change in policies and practices, as fatphobia is not only a deeply entrenched cultural ideology but also a key component of dominant biomedical notions of "health" in research and clinical settings.[12,19] Furthermore, both medical and popular conceptions of health go beyond the mere absence of disease, as they are intertwined with cultural values concerning youth, productivity, appearance, and morality, among many other themes.[26] Da'Shaun Harrison, a fat Black disabled scholar and activist, has argued that the contemporary Western conception of health exists in its present form as a tool "to abuse, to dominate, and to subjugate" bodies and persons, particularly those that are fat, Black, or both.[27] Eliminating fatphobia in research and clinical practice, therefore, requires reenvisioning the very notion of health itself, who gets to define it, and what it means to provide "care" for "health."

This dynamic of domination is also evident in health care more broadly. The structure of contemporary biomedicine subjugates vulnerable persons (including, but not only, fat persons) to professional medical power, allowing clinicians to violate other human

beings' bodies, including sexually; to permit or deny adults direct access to testing, diagnosis, and therapeutics; and even to physically or medically restrain certain individuals from exercising their basic freedom from treatment and involuntary confinement. All of these unjust relations of power are deeply interrelated and have been critiqued by feminist, disabled, Mad, and fat activists and scholars over the years; yet, by and large, they remain in place.[28] A health care system that truly values fat human beings must be one in which liberty and freedom of choice are always protected and centered. Fat people's health liberation is intertwined with that of members of other marginalized communities. Anything less than an *intersectional* approach to fat justice in health care is simply a Band-Aid placed over a gaping wound of medical paternalism, oppression, and perpetually reinscribed trauma.[29]

Fattening Health Care

A comprehensive, ethical approach to fat-positive health care can, therefore, be guided by the following ideas:

1. Weight diversity must be acknowledged as a natural feature of humanity and as a manifestation of the genetic variation that has allowed our species to successfully survive into the present. "Excess weight" is a myth. Fat people enrich humanity in a *biological* sense, through genetic and physiological diversity, not only in a sociocultural one.

2. Fat people are to be recognized as a *community* who continue to face systemic oppression, barriers to equitable power and resources, and a denial of definitional autonomy (that is, the freedom to craft one's own self-understanding and to have it acknowledged as valid by others).

3. Fat people are to be represented in leadership and decision-making positions—not as tokens, but as socially and politically aware agents whose contributions to institutional change are supported, valued, and understood to enhance care for *everyone*.

4. All spaces and equipment within a clinical environment should be size- and weight-accessible; this is true for health care seekers of all ages, including pediatric ones.

5. Medical or surgical treatments that intentionally attempt to manipulate body weight should not be offered and should be recognized as manifestations of a biased (and racist) cultural mindset that positions some body sizes as inherently abnormal.

In sum, fat justice in health care cannot exist outside of a comprehensive commitment to reenvisioning health care for all people—and redesigning health care settings as places of dignity, of respect for autonomy, and of healing in its fullest sense.

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How the Use of BMI Fetishizes White Embodiment and Racializes Fat Phobia

Sabrina Strings, PhD

Abstract

This article describes how size-based health and beauty ideals made their way into the medical field through the eugenics movement of the 19th to 20th centuries and were validated using so-called "standard weight" tables. They became even more mainstream with the 20th-century tool to replace standard weight tables: body mass index (BMI). BMI, then, is a continuation of white supremacist embodiment norms, racializing fat phobia under the guise of clinical authority. This article describes the key players in the legacy of size-based mandates, which fall under what I have labeled the "white bannerol of health and beauty." This pseudoscientific bannerol has helped forge oppressive conceptions of fatness as an indicator of ill health and "low" racial quality.

Fat Fright

Today, we treat "obesity" (measured as a body mass index [BMI] ≥ 30) with a surprising seriousness, given its history. Fear of fatness did not begin as a medical concern. In fact, it took off in the mid-18th century. At that time, several race scientists began arguing that being "too fat" was bad specifically because it had been linked to women of color. Renowned scientist Georges-Louis Leclerc, Comte de Buffon, for instance, repeated claims made by other scientists that Chinese people while not all "fat and bulky … consider being so as an ornament to the human figure." Adding that one could find, therefore, many Chinese women with enormously "big bellies." Big bellies were also, according to Buffon, a noticeable deficit among the women of some African tribes.[1]

These ideas crept into medicine through eugenics. Eugenics was a late-19th to mid-20th century movement to promote so-called better breeding by identifying qualities of the human race to be cultivated and defects of the human population to be eradicated through selective breeding. Race and weight were intrinsic to their concerns. In the United States, eugenicists like the zoologist Charles Davenport argued that fatness was a constitutional flaw. The "low" types betrayed this form of embodiment. Chinese and Jewish people, for instance, were thought to be prone to a lamentable "racial obesity."[2]

Davenport and other eugenicists, by combining race science and medical science, were inventing what I call a "white bannerol of health and beauty." This bannerol pseudoscientifically bundles attractiveness and healthfulness. Peoples and physical proportions that had been held in high or low esteem by race theorists and philosophers of beauty were, with the eugenics movement, subject to a new form of medical penalty. These faux-scientific notions about body size, health, and desirability (especially for women) would ultimately make their way into the medical mainstream.

Insuring Against Fatness

Davenport had frontloaded race in his pseudoscientific understanding of the link between weight and health. He'd also embraced the latest science for identifying how much fat was believed to make a person sick. Such notions had arrived by way of the insurance companies.

The insurance industry had long been creating so-called "standard weight" tables. These tables gave the average weight by age and height for thousands of people judged by insurance companies' medical examining boards to be sufficiently healthy to be acceptable life insurance risks.[3] Most of the insured were white, but the insurance industry's primary concern was not in identifying racial differences but in demonstrating a link between weight and health. This was the mechanism used to delimit potential policyholders and, by extension, potential monetary payouts. Yet the insurance industry's ignoring race did not stop Davenport and others from continuing to make racialized assertions about body weight. Davenport was known to use the weight tables to advance his eugenic claims about a racial factor in obesity.[4]

Still, as the 20th century wore on, eugenic claims were becoming less tenable. The devastation of the Holocaust led some postwar scientists to publicly admit that race was not biological.[5] During the 1940s and 1950s, the medical community downplayed the overt role of race in questions of health, even those about obesity.[6] A new emphasis was placed on discipling the bodies of all people based on the insurance industry weight tables, which unfortunately still relied on an implied white standard.

A 1951 paper titled "Obesity and Its Relation to Health and Disease" exemplifies this emphasis.[7] Two of the 4 coauthors were affiliated with the insurance industry. The first author was Donald B. Armstrong, an esteemed physician recognized by the American Public Health Association (APHA) as one of the men who, in the early 20th century, "created the profession of public health."[8] A Charter Fellow of the APHA, Armstrong was also the vice president in charge of the Health and Welfare Program for the Metropolitan Life Insurance Company (MetLife). The second author, Louis I. Dublin, was vice president of and a statistician for MetLife. In their paper, the authors assert that "[o]ne of the subtler" and yet somehow "more serious health hazards of our time is obesity."[7] Presumably, it manages to be both subtle and serious because it lies "in the twilight zone between health and disease."[7] To estimate the number of US adults who were overweight or obese, they relied on "an arbitrary percentage departure from average weight for height" from MetLife's ideal weight tables. These ideal weights were established by MetLife based on analyses of policyholders' weight, morbidity, and mortality. As a "practical measure," the authors define overweight as 10% above ideal weight and obesity, or "pathological overweight," as 20% above the ideal weight. The policyholders were themselves overwhelmingly white, male, and middle class, meaning they were far from representative of all Americans.

There was only one study reviewed in their paper in which gender was mentioned. That study found that increases in body weight led to increases in blood pressure, with the biggest effects being seen among older people and women. Although the etiology of body size is complex, according to Armstrong et al, "simple unadulterated overeating is the basic cause in the majority of cases." They make the additional, baseless allegation that "we are probably safe in saying that overeating accounts for the overweight in at least 95% of the cases."[7]

An eye-popping amount of what is being asserted in this paper has no scientific foundation whatever. The claims were made by people with medical degrees who worked for insurance companies that had the money and power to create medical dicta. Nevertheless, it did index something important in the evolution of weight-tracking as a form of health monitoring: a movement toward standardization that would only intensify the tacit whiteness of medical standards. By the 1970s, this form of white-washed medicine would reach its apex.

New Pseudoscience of Obesity

Ancel Keys was a Berkeley- and Cambridge-trained physiologist. He had worked on questions of how little nutriment humans needed to survive during the war years. By the 1950s, he'd turned to addressing the other end of the spectrum: how much food and fat were too much? In a 1953 review article, "Body Fat in Adult Man," Keys and coauthor Josef Brožek found that though weight was regularly examined in its relationship to health, it was an unsatisfactory gauge of fatness: "[b]ody weight, even when evaluated with reference to the size of the skeleton, is a poor measurement of fatness."[9] Moreover, Keys and Brožek noted that "The practices followed in connection with the use of 'standard weight' tables vary in a most confusing way," as people might be weighed with or without shoes and clothing. For example, to compensate for shoes and clothing, one author "subtracted 10 lb. from the weight and 1 in. from the recorded height of men," and, for women, "the standard corrections were 6 lb. and 1.5 in.," making the women appear on average heavier and shorter than men.[9] Many of the early medico-actuarial tables used in studies of relationships between weight and health were "reproduced sometimes without citing the source or giving credit to Davenport."[9]

Keys was ultimately prompted to look for a solution to the vagaries of the industry-born tables for measuring obesity. He landed on the Quetelet Index—renamed BMI, or kg/m^2—and used it to determine the average build of men in a given country and how both the average and deviations from the average were linked to health conditions. He conducted a study that included working men from America and 5 European countries—Japan, which had been part of his notorious Seven Countries Study, was unceremoniously excluded. Keys found that BMI was not a better predictor of heart disease than other measures of relative weight or skinfold thickness—a commonly used measure of adiposity—for men from half the nations under study.[10]

Strangely, Keys declared the study a success. He claimed that BMI was preferable to other measures of obesity—like percent above average weight at a given height based on insurance industry tables—because it was "easy to calculate" and, unlike insurance tables, did not vary over time.[10] That is, as noted by scholar Nicolas Rasmussen, Keys was eager to endorse "BMI without evidence of its predictive superiority" as it "did nothing at the time to clarify the contribution of obesity to heart disease—long his stated motive."[10]

Keys, like Davenport before him, was interested in the question of fatness for reasons outside of health. Keys allegedly described obesity in the presence of his friends as "disgusting," "a health hazard," and "ethically repugnant."[10] He also claimed that "very fat" people were "clumsy and prone to accidents,"[10] although the evidence to support this claim, too, is lacking. Like Davenport, Keys' concerns about fatness were shot through with white aesthetic priorities. That is, they fell under the white bannerol of health and beauty. And while Keys did not issue specific directives for fat women, much of the literature had long focused on the greater obstacle that fatness posed for women's (read: white women's) health and beauty, following its centuries-old association with "grotesque" women of color—especially African and Chinese women.

Nevertheless, BMI was slow to take off. A series of international conferences to identify and understand overweight and obesity were initiated in 1973 by the National Institutes of Health.[11] BMI finally came to prominence with the National Health and Nutrition Examination Survey (NHANES). In 1985, the NHANES II blended practices from the insurance industry (i.e, by relying on a percentile-based range of "acceptable" weights) with BMI, defining overweight as BMI of greater than or equal to the 85th percentile and obesity as BMI of greater than or equal to the 95th percentile, an approach that didn't exactly honor Keys' vision of uniformity.[12] That same year, the US Department of Agriculture (USDA) combined forces with the US Department of Health, Education, and Welfare (HEW) to develop different BMI standards for "desirable weights" for men and women.[12] Perhaps unsurprisingly, (and again, these studies almost exclusively concerned themselves with white people) the desirable BMI for women was lower than for men, with a BMI of approximately 25 to 26 for men and approximately 24 to 25 for women being deemed "overweight."[12] It wasn't until 1995 that the World Health Organization, the USDA, and the HEW seemingly noticed that questions of "ideal" and "desirable" weights were laced with moral and aesthetic judgments and defined a BMI of between 18.5 and 24.99 as "healthy" for adults of all ages.[6]

It is not possible that these BMI standards were based on a representative sample of people across the earth and over time before they were applied globally. Although uniformity was always Keys' goal, the pretension that these categories were applicable to all if (in some minor way) BMI predicts health risk of white persons was rooted in colorblind racism.

In any event, if the foregoing discussion reveals anything, it's that the scientific method was at best loosely and rarely applied in the creation of weight-based health categories, and at worst skirted. Which is to say, obesity science has always been a (racist) form of pseudoscience that relies on statistical correlations based on a limited portion of humanity. Knowing this fact, whatever could be the rationale for keeping it alive?

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Overreliance on BMI and Delayed Care for Patients With Higher BMI and Disordered Eating

Natasha Ramaswamy and Nathan Ramaswamy

Abstract

Diagnostic utility of weight and body mass index (BMI) is widely overestimated. Although both are clinically relevant, their use as universal measures of health and wellness can result in missed or incomplete diagnoses, which are neglected sources of iatrogenic harm. This article problematizes overreliance on weight and BMI in assessing disordered eating behaviors and suggests how physicians can prevent harmful delays in indicated interventions. This article also canvasses misconceptions about the prevalence and severity of eating disorders in people with higher BMIs and encourages holistic approaches to caring for patients with obesity.

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Eating Disorders in Patients With High BMI

Eating disorders remain a complex and serious category of diseases, with a wide variety of symptoms that affect both men and women across the United States. It is estimated that 6.37% of Americans alive in 2018 to 2019 will develop an eating disorder in their lifetime, and $64.7 billion is spent each year on treatment for the associated physical and mental repercussions.[1] Often, the image brought to mind when one hears the term *eating disorder* is that of the traditionally portrayed young and markedly thin White woman.[2] However, this image does not align with the reality that though some people with eating disorders do fit that mold, eating disorders are not limited to people of a particular gender or size and include those defined clinically as overweight (BMI of 25 to 29.5) or obese (BMI ≥ 30).[3]

Often, people with overweight or obesity are stigmatized as lazy, noncompliant, or lacking the self-control to follow a healthy lifestyle.[4] Current estimates are that 19% to 42% of adults with obesity experience some form of discrimination because of their weight, with higher rates of weight bias among women and people with higher BMIs.[5] Few clinicians are truly immune to the social bias against those perceived to have excess weight.[4] A recent survey of 13 996 adults in the United States, Canada, Australia, and 3 European countries found that 63% to 74% of patients who had

experienced weight stigma reported experiencing weight bias from doctors.[6] A second survey of 4732 first-year medical students found that 74% of respondents exhibited implicit weight bias and 67% exhibited explicit bias.[7] This bias becomes a problematic barrier to care when eating disorders present in patients from traditionally overweight or obese populations. In a cross-sectional study of young adults 18 to 24 years of age, a higher rate of disordered eating behaviors was found in those who were overweight or obese than in those who were underweight or of normal weight (29.3% of women vs 15.8% of women, respectively, and 15.4% of men vs 7.5% of men, respectively).[8] However, those same individuals were half as likely to receive a clinical diagnosis of an eating disorder from a health care practitioner as those who were of normal weight or underweight (2.6% of women vs 4.9% of women, respectively, and 0.3% of men vs 0.6% of men, respectively).[8]

Thus, when patients from these populations are perceived to be losing weight—even rapidly—physicians may be less inclined to ensure that they are partaking in healthy weight loss and to rule out disordered eating behaviors. One study found that eating disorder diagnoses are delayed by an average of 9 months among patients who were once overweight or obese compared with patients who were never overweight.[9,10] Although weight can be an important clinical indicator in certain scenarios, this paper will make the argument that physicians should not exclude diagnoses of eating disorders in patients with higher BMIs in order to prevent harmful delays in treatment. As these disorders significantly affect both men and women, it is important to consider influences on each population.

Men

A survey conducted from 2001 to 2003 estimated that roughly a third of anorexia and bulimia cases are males.[11] While there has been substantial research on the effects of weight bias on women,[12,13,14] there is less data on the effects of weight bias on men. For example, a 2006 study on weight bias comprised a sample of 2449 women—and a matched sample of 111 men and 111 women.[15] One study found that approximately 40% of men had experienced some form of weight bias in a health care setting,[16] with the most common form being verbal mistreatment.[16] Such stigmatization increases risk of depression and reduced self-esteem.[17] In addition, physicians may incorrectly attribute health issues and concerns to weight and BMI and recommend lifestyle changes rather than treatment.[17] This finding is consistent with a frequently endorsed stereotype that patients with overweight are usually undisciplined and therefore unreliable narrators of their own health history.[17]

Although male patients with eating disorders tend to exhibit characteristics similar to female patients, they do have some key differences. In comparison to women, men with binge-eating disorders are more likely to resort to substance abuse, and men are more likely to have muscle dysmorphia (preoccupation with muscle mass).[18] They are also less likely than women to engage in vomiting or laxative abuse and are more likely instead to exercise excessively to compensate for caloric intake.[18] Moreover, the average desired body weight (relative to ideal healthy weight) of men with bulimia was higher than for most women with bulimia.[19] Finally, one study showed that, while the age of onset for eating disorders tended to be the same for males and females, the mean time before treatment was shorter for males (approximately 2.1 years) than for females with anorexia.[19] Considering that recovery from anorexia is poor if left untreated for more than 3 years,[20] this delay could significantly worsen patient outcomes. Thus, physicians dismissing concerns of disordered eating due to weight, BMI, or gender can

lead to significant delays in treatment and a subsequent decline in the overall standard of care for these populations.

Women

As previously mentioned, anorexia nervosa is 2 times more prevalent among women than men,[11] and binge-eating disorders are twice as prevalent among women.[21] One study of women with anorexia nervosa found that atypical patients (those with average BMI of 25.2 at the heaviest) "scored significantly higher in a questionnaire that assessed eating disorder psychopathology, which addressed issues such as avoidance of food and eating, preoccupation with calories and eating in secret, feelings of fatness and discomfort seeing one's body, dissatisfaction with weight and reaction to being weighed."[22] Hence, one of the study authors concluded that "atypical anorexia nervosa is a real illness."[22] From an ethical standpoint, clinicians should remain aware of the substantial iatrogenic harm that can be incurred if they do not consider eating disorders in those with higher BMIs. Additionally, patients in the atypical group "were just as likely as their underweight counterparts to stop menstruating," and "both typical and atypical patients were susceptible to electrolyte imbalances."[22] This finding suggests that patients with higher BMIs affected by eating disorders often have similar severity of symptoms as those with lower BMIs, and thus early diagnosis and treatment would be of similar clinical benefit in both groups.

Conclusion

Patients with higher and lower BMIs are equally susceptible to disordered eating. The large, community-based Project EAT study, which collected data from 1998 to 1999 and from 2003 to 2004, estimated that 40% of adolescent girls and 20% of adolescent boys in its sample of 2516 adolescents who were overweight or obese engaged in disordered eating behaviors,[23] and these prevalences remained stable at a 5-year follow-up in young adulthood.[24] Despite this finding and the fact that patients with obesity have a 2.45 times greater chance of engaging in disordered eating behaviors as patients of normal weight, such patients receive a clinical diagnosis of an eating disorder half as frequently as patients with normal weight or underweight.[8] Considering that patients with higher BMIs present with disease courses for eating disorders comparable with those of lower BMIs,[22] the argument can be made that it is equally critical to catch signs of disordered eating early in these patients so as to initiate intervention and prevent disease progression. While weight and BMI can be useful clinical indicators in many scenarios, it is evident that they are not reliable clinical indicators of the presence of eating disorders, and they should not be used as a sole basis to eliminate eating disorders for differential diagnosis. It is neither ethical nor evidence based therefore to disregard disordered eating behaviors in patients with higher BMIs.

In conclusion, to avoid missing key eating disorders in those with overweight or obesity due to weight bias—and thereby delay treatment—physicians and other medical professionals should regard potential disordered eating behaviors with the same index of suspicion in all patients, regardless of BMI or weight, and adopt a more holistic approach to their management of perceived obesity.

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MEDICINE AND SOCIETY: PEER-REVIEWED ARTICLE

How Body Mass Index Compromises Care of Patients With Disabilities

Alexander E. Jacobs

Abstract

The history of body mass index (BMI) is intertwined with the development of anthropometric statistics used to classify and measure human variation, an intellectual foundation of eugenics. While useful in analyzing population trends in relative body weight, BMI possesses multiple shortcomings when used as an individualized health screening tool. These limitations compromise the just care of people with disabilities, especially patients with achondroplasia and Down syndrome, for whose care BMI use contributes to clinical ostracization.

Introduction

Body mass index (BMI), a metric that divides a person's weight (in kg) by their height (in m^2) to estimate their body fat indirectly, was originally known as the Quetelet Index for its creator, the Belgian mathematician Adolphe Quetelet (1796-1874). Quetelet was instrumental in promoting ideal body types defined by a statistical average.[1] Through his development of BMI, among other measures of physical variation, Quetelet helped create medical-physical norms that could be used to sort humans based on how well their measurements conformed to, or deviated from, arbitrary ideals of what a body should be. This paper argues that, in its current clinical application, BMI enforces physical norms that pose risk of medical harm for patients whose bodies do not conform to average measures. In particular, BMI's use as a clinical cutoff value for medical interventions risks harming certain people with disability (PWD), such as those with achondroplasia and Down syndrome.

An "Average Man"

Quetelet was inspired by early 19th-century scientists who worked on error theory. Error theorists had observed that no single scientific measurement was likely to be accurate, whether due to instrument imprecision, user error, or natural variance.[1] However, while solitary measurements were prone to error, the average of multiple measurements most accurately estimated a quantity. Error theorists also discovered that measurements typically followed a bell curve—what we would now call a normal distribution.[1,2] Quetelet observed that certain human features, such as height and weight, are also normally distributed.[2,3]

In addition to his observation that human traits were often normally distributed, Quetelet believed that the mean value of any measured trait defined an ideal—the value least corrupted by error. For Quetelet, the average value of measurable traits—such as height, intelligence, or number of progeny—was of normative significance, as it described what a person *should* possess. A person who, in theory, adhered to the average in every measurable domain would constitute a human ideal. Quetelet named this idealized figure *l'homme moyen*—"the average man."[4] Reifying a statistical artifact into a moral value, Quetelet explicitly linked the average man to beauty, health, and moral goodness, while associating vice, illness, and ugliness with persons who deviated from the mean.[4]

Quetelet's creation of BMI stemmed from his effort to record as many measurable human traits as possible, from chest circumference to height to number of offspring.[3] Quetelet found that among the primary population he studied—Western European adult males—BMI was a consistent index of relative body weight.[3] He did not acknowledge the value of exceptions—such as one might see with certain disabled persons—outside the average.[3] His concern remained with average bodies—those found at the center of the normal distribution.

Francis Galton, the late 19th-century statistician and eugenicist, further developed Quetelet's work. Unlike error theorists, who viewed deviations from the mean as errors to be mitigated,[1] Galton recognized that, in humans, certain deviations were desirable, such as above-average intelligence.[2] He developed the quartile as a way to divide the normal distribution so that people's qualities and abilities could be compared, ranked, and ultimately reproduced (eg, high intelligence) or extinguished (eg, low intelligence) in the name of racial progress.[2] As Donald MacKenzie writes, "The needs of eugenics in large part determined the content of Galton's statistical theory."[2] If Quetelet's *l'homme moyen* was an ideal from which all humans deviate, Galton's quartile enabled humans to be ranked, valued, and bred for perfection. Modern medicine has inherited Quetelet's and Galton's standards of normality, which remain embedded in purportedly objective measurements like BMI.

Limitations of BMI for Patients With Disabilities

Due to the ease of its calculation, BMI is a clinical measure that is widely used to identify obesity and screen for risk of certain diseases.[5] It is, however, imperfectly suited for these tasks. The use of BMI cutoffs for healthy weight is prone to false positives—such as when muscular individuals are considered overweight—and to false negatives—such as when elderly patients with low muscle mass and higher levels of body fat are considered in the "healthy" BMI range.[5,6] Medical guidelines typically acknowledge that BMI is best used to analyze population trends,[5] yet BMI is the measure by which individuals are most commonly categorized as underweight, healthy, overweight, or obese (and possibly further subcategorized, such as "morbidly obese").[5] While not true quartiles, such categories nevertheless express Galton's project of sorting humans into "deviant" and "normal" groupings.

Because BMI originates from statistical efforts to define average bodies, it is less applicable to bodies that deviate from the average due to the way it is calculated. BMI is a 2-dimensional formula, whereas bodies exist in 3 dimensions. In 3-dimensional objects, volume and mass increase with the cube of height, not the square. Thus, BMI fails to consistently track the relationship between height and mass the further an individual's height deviates from average. As summarized by one commentator, "Because BMI uses the square of the height rather than the cube, anyone who is tall but

normally proportioned will tend to have a high BMI and anyone who is short … will tend to have a low BMI, even if they are relatively obese."[7]

Under the social model of disability, in which PWD are disabled by the environment—that is, by physical structures and social attitudes—rather than intrinsic physical or cognitive attributes, the disabled body is defined by its deviance from a socially sanctioned norm of what a body should be.[4] Originating in Quetelet's attempts to define idealized bodies, BMI imposes a physical norm that perpetuates a disabling medical environment for certain PWD.

Consider patients with achondroplasia, the most common cause of dwarfism, which is associated with increased abdominal adiposity and metabolic dysregulation.[8] Owing to their shorter stature, individuals with achondroplasia will have lower BMIs than would be expected in a taller patient with proportionally comparable body fat levels. Even after accounting for their predisposition to increased abdominal adiposity, BMI would still underestimate relative obesity in people with achondroplasia.[7,8] In such cases, there is potential for the use of BMI to adversely affect medical care. For instance, medical interventions such as bariatric surgery for the treatment of morbid obesity have strict minimum BMI cutoffs.[9] A patient with achondroplasia and obesity would need, in effect, to achieve a higher (and arguably less healthy) body fat level relative to a taller person to access the benefits of bariatric surgery. Similarly, BMI cutoffs are used to trigger interventions for people at risk of diabetes and are included in validated diabetes risk calculators.[10,11] Physicians who adhere rigidly to BMI-based guidelines may fail to offer surgical interventions or diabetes prevention measures to shorter patients for whom such treatments are otherwise warranted.[10] The application of BMI to determine treatment eligibility privileges the "normal" bodies BMI was first used to define.

Or consider patients with Down syndrome, which is associated with elevated blood leptin levels.[12] Elevated leptin is linked to many of the inflammatory processes associated with the morbidity of obesity.[12,13] Yet studies demonstrate that, in patients with hyperleptinemia, BMI underestimates obesity compared to dual-energy absorptiometry, the gold standard for measuring body composition.[6] In clinical practice, leptin levels are not routinely evaluated, even in patients with Down syndrome.[12] Thus a patient may experience the inflammatory effects of hyperleptinemia while having a BMI that falls below the cutoffs that trigger medical interventions aimed at curbing obesity and related metabolic dysfunction. In patients with Down syndrome, BMI's use as a screening tool provides inadequate insight into the unique medical needs associated with hyperleptinemia.

BMI's unreliability as an indirect measure of body fat is heightened the further a body deviates from a Queteletian norm, limiting its generalizability across different body types. These inconsistencies apply beyond PWD. For instance, a 5-ft-tall person would have a lower BMI than a 6-ft-tall person with proportional mass. And ethnic differences in BMI-associated health risks have been well established in the contemporary medical literature.[10] All people deviate from one norm or another—even Quetelet understood *l'homme moyen* was unattainable—and physicians should consider whether overreliance on a statistic developed to define average bodies limits their ability to attend to individual patient needs.

Conclusion

While BMI correlates with many markers of ill health, one can look to those markers directly to answer questions that BMI only glancingly addresses. For PWD, who may inhabit bodies poorly described by BMI or require tailored medical care, the costs of BMI's imprecision are commensurately more burdensome than for people without disability.

A critic may fairly argue that BMI is a convenient, low-cost way of gauging patient health and that a capable physician understands no single number reflects a patient's entire story. Yet a historical and clinical assessment of BMI cannot ignore its role in reproducing a concept of normality with the potential to perpetuate medical harm for PWD. The limitations of BMI in medical practice are not limited to PWD, but the case of PWD foregrounds the subtle ways that destructive values can be smuggled into seemingly objective measures.

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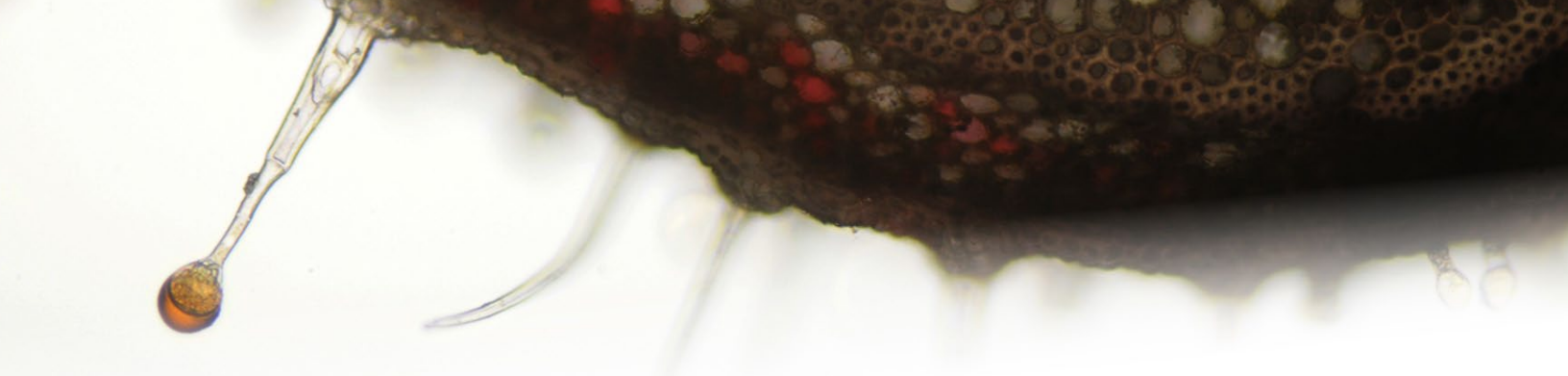

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HISTORY OF MEDICINE: PEER-REVIEWED ARTICLE

Use and Misuse of BMI Categories

Katherine M. Flegal, PhD, MPH

Abstract

Body mass index (BMI) was introduced in the 19th century as a measure of weight relative to height. Before the late 20th century, overweight and obesity were not considered a population-wide health risk, but the advent of new weight loss drugs in the 1990s accelerated the medicalization of BMI. A BMI category labeled *obesity* was adopted in 1997 by a World Health Organization consultation and subsequently by the US government. Language in the National Coverage Determinations Manual stating that "obesity itself cannot be considered an illness" was removed in 2004, allowing reimbursement for weight loss treatments. In 2013, the American Medical Association declared obesity to be a disease. Yet the focus on BMI categories and on weight loss has yielded few health benefits and contributes to weight-related discrimination and other potential harms.

An Important Clinical Problem?

Dramatic statements about the health risks of obesity are common today. The opening lines of a recent article read: "Obesity is the most prevalent chronic disease worldwide, affecting approximately 650 million adults. Excess adiposity and its numerous complications, including cardiovascular disease and type 2 diabetes, impose a considerable economic burden and constitute major contributors to global morbidity and mortality."[1] Such assertions are a recent development. According to the Institute of Medicine, "Prior to the late 20th century, overweight and obesity were not considered a population wide health risk."[2] Body weight was often considered as more of a cosmetic and social issue than an important medical concern.[3] A 1969 study found that patients and physicians did not view body weight and weight loss as salient medical problems and considered deviations from weight standards to be almost meaningless.[4] Prior to 2004, the National Coverage Determinations Manual stated bluntly that "obesity itself cannot be considered an illness,"[5] and treatment for obesity was not covered by Medicare.[5] The costs of weight loss as a treatment for obesity were not allowed as a medical deduction for tax purposes until 2002.[6] Until the 2010s, in most doctor visits, BMI was not calculated.[7]

In the early 1990s, obesity was not well defined in terms of either BMI or percentage body fat. A comprehensive World Health Organization (WHO) report in 1995 authored by an expert panel deliberately avoided using BMI to define obesity.[8] The report explicitly defined grades of "overweight" using BMI cut points of 25, 30, and 40 but described these cut points as largely arbitrary. The panel noted: "There is no agreement about cut-off points for the percentage of body fat that constitutes obesity" and concluded that "there are no clearly established cut-off points for fat mass or fat percentage that can be translated into cut-offs for BMI."[8] Obesity became more medicalized as new weight loss drugs, such as orlistat and dexfenfluramine, began to be developed[9] and the limited medical concern for obesity to be seen by the pharmaceutical industry as a barrier to wider acceptance of the use of weight loss medications.[10] This article argues that the ensuing focus on BMI categories and on weight loss have created a narrative that is advantageous to the billion-dollar weight loss industry but has yielded little in the way of long-term health benefits and can exacerbate weight-related discrimination and stigmatization.

International Obesity Task Force and Pharma

In 1995, the International Obesity Task Force (IOTF) was created, led by Philip James, who was at the time the director of the Rowett Research Institute in Aberdeen, United Kingdom (later merged with the University of Aberdeen and called the Rowett Institute). This self-appointed task force was set up as a charity and funded almost entirely by contributions from the pharmaceutical industry.[11,12] In 2013, a reporter asked James where the funding for the IOTF came from, and James replied: "'Oh, that's very important. The people who funded the IOTF were drugs companies.' And how much was he paid? 'They used to give me cheques for about 200,000 [British pounds] a time. And I think I had a million or more.'"[12]

At its inception, the IOTF had as its explicit purpose to convince the WHO to hold a special consultation solely devoted to obesity.[13] The WHO was initially reluctant. [13] Such a consultation was not part of the WHO planning process and hadn't been agreed to by its executive board.[13] The IOTF provided a substantial grant to the WHO to fund the consultation, which took place in 1997, and IOTF staff authored the draft report for the consultation, which was adopted with almost no changes.[13]

Because of a production backlog, the final report was delayed and not published officially until 2000.[14] The WHO took the unusual step of disseminating an interim publication of the original agreed-upon version of the consultation report in 1998, paid for by the IOTF.[15] According to James: "On discovering that the full WHO report on obesity would take a long time to edit and translate into the six WHO languages, we, in the IOTF, decided to publish the original agreed-upon version of the consultation ourselves and send it immediately to all 200+ ministers of health."[16] The interim publication was for limited distribution only and not issued to the general public,[15] but nonetheless had a broad impact.

How BMI Defines Obesity in the United States

An expert panel was convened in 1995 by the National Heart, Lung, and Blood Institute (NHLBI) and tasked with developing clinical practice guidelines for treatment of overweight and obesity.[17] The chair and 3 other members of the NHLBI panel were members of the IOTF. The interim publication from the 1997 WHO consultation was available to the NHLBI panel and enabled the NHLBI panel members to cite it in their clinical guidelines, which were published in 1998.[17] The NHLBI committee adopted

almost the same BMI categories as the 1997 WHO consultation report, and these BMI categories are the ones most often used today.

As shown in Table 1, the nomenclature for BMI categories in the 1997 WHO consultation[14] and in the 1998 NHLBI guidelines[17] differed from the terminology in the WHO's earlier 1995 report.[8]

Table 1. Categorization of Body Mass Index Cut Points in 3 Reports and Guidelines

BMI	1995 WHO report[8]	1997 WHO consultation[14]	1998 NHLBI clinical guidelines[15]
18.5-24.9	Normal range	Normal range	Normal
25-29.9	Grade I overweight	Pre-obesity	Overweight
30+	Grade II-III overweight	Obesity	Obesity

Abbreviations: BMI, body mass index; NHLBI, National Heart, Lung, and Blood Institute; WHO, World Health Organization.

The 1997 WHO consultation used the same arbitrary BMI cut points as the 1995 report, but without discussion changed the terminology for a BMI of 30 or above from "overweight" to "obesity" (see Table 1). Despite this obvious difference, the 1997 WHO consultation report claimed that its classification was "in agreement" with the 1995 WHO report and asserted that a BMI of 30 or more was already widely accepted as denoting obesity.[15] The NHLBI panel then adopted the same terminology for a BMI of 30 or more. The *New York Times* noted the new term *obesity* for a BMI of 30 or above and described the resulting categories as creating "a booming new market for diet pills for the obese, practically served to the companies on a silver platter by the Government."[18]

The change in terminology from *overweight* to *obese* was medically and socially significant. When the American Medical Association decided in 2013 to classify obesity as a disease,[19] it made no distinction between obesity defined as excess fat harmful to health and obesity defined as a BMI of 30 or above. There is no clearly accepted level of body fat, however, that would represent a diagnosis of obesity.[20] Scientific organizations routinely explain that the degree of body fat that is (or may be) harmful varies by age, sex, fat distribution, and multiple other factors.[21,22] In the absence of any clear definition of obesity in terms of body fat, a BMI of 30 or above is used as a cut point, but no justification has been provided for that number. The definition of "normal" weight as a BMI of 18.5 to 24.9 is also problematic and has no obvious justification.[23] In almost all Organisation for Economic Co-operation and Development countries, over half the population is, on this definition, above normal weight[24] and thus in some way abnormal, pathological, or deviant.[25] Such classifications invite stereotypes.[26]

BMI in a Clinical Setting

As shown in Table 2, there has been a steady increase in BMI assessment in clinical settings, with it being included in over 96% of Medicare visits in 2018.[27] As will be discussed, there is little evidence that this procedure has yielded benefits for patients or improved long-term health outcomes of morbidity or mortality.

Table 2. Adult BMI Assessment Rate

Measure year[a]	Commercial HMO	Commercial PPO	Medicaid HMO	Medicare HMO	Medicare PPO
2009	41.3	15.7	34.6	38.8	24.1
2010	40.7	11.6	42.2	50.4	36.6
2011	55.4	26.3	52.6	68.2	62.2
2012	66.1	35.2	67.5	80.8	75.3
2013	75.7	41.5	75.9	89.6	84.9
2014	75.9	49.4	79.9	92.9	90.0
2015	75.2	56.7	80.8	93.3	89.3
2016	76.6	62.9	80.7	94.2	91.8
2017	80.3	67.1	84.5	95.0	94.6
2018	82.5	71.4	86.6	96.2	96.3
2019	84.9	69.7	88.4	N/A	N/A

Abbreviations: HMO: Health maintenance organization; N/A, not available; PPO, preferred provider organization.
[a] BMI was documented during the measurement year or the year prior to the measurement year for insured adults, ages 18-74, who had an outpatient visit.
Data reproduced with permission from National Committee for Quality Assurance.[27]

US Preventive Services Task Force (USPSTF) recommendations regarding obesity in adults started in 1996 with a recommendation that clinicians periodically measure all patients' weight and height.[28] The USPSTF recommendations then progressed through several iterations to the recommendation in 2018 that clinicians provide access to intensive, multicomponent behavioral interventions for all adults with a BMI of 30 or above.[29,30] The USPSTF thus took a weight-centered approach, not a health-centered approach, in its recommendations.[31] A thread running through all the USPSTF recommendations is the lack of evidence that weight loss will improve morbidity and mortality. The 1996 version stated: "Evidence is limited that screening for obesity and implementing weight-reducing or weight maintenance strategies are effective in decreasing long-term morbidity and mortality."[28] According to the 2012 version, "Inadequate evidence was found about the effectiveness of these interventions on long-term health outcomes (for example, mortality, cardiovascular disease, and hospitalizations)."[32] The 2018 version[29,30] referenced 2 major studies[33,34] showing that participants with prediabetes had a lower risk of developing diabetes after weight loss interventions but stated there was no evidence of other benefits. Long-term follow-ups of the 2 cited studies showed no impact of the interventions on cardiovascular morbidity or mortality.[35,36,37] Women's Preventive Services Initiative 2022 recommendations for counseling interventions to prevent weight gain among midlife women also noted the absence of direct evidence that these interventions improve mortality or morbidity.[38,39]

A 1997 workshop convened by the National Institutes of Health called for a randomized controlled trial of an intensive lifestyle intervention for intentional weight loss—including behavior modification, diet, and exercise—to provide needed guidance on the risks and benefits of weight loss that could inform rational clinical and public health policy.[40] That trial, known as Look AHEAD, found that an intensive lifestyle intervention focusing on weight loss did produce weight loss and reduce waist circumference but did not reduce the rate of cardiovascular events in adults with type 2 diabetes and overweight or

obesity.[41] The trial was discontinued after a maximum of 13.5 years of follow-up on the basis of a futility analysis.[41] A follow-up study found that the lifestyle intervention also did not significantly reduce mortality risk.[42] Two other trials, one involving patients with arthritis and one involving patients with hypertension, found similar results.[43,44]

As these studies demonstrate, recommendations for universal screening and lifestyle interventions generate an intense focus on BMI categories and weight loss without adequate evidence of long-term improvement in morbidity or mortality. Moreover, they ignore several potential sources of harm. A 1998 *New England Journal of Medicine* editorial cautioned: "Until we have better data about the risks of being overweight and the benefits and risks of trying to lose weight, we should remember that the cure for obesity may be worse than the condition."[45] The focus on BMI also ignores the possible adverse health effects caused by weight bias in health care leading to health care avoidance.[46] More generally, the emphasis on weight loss contributes to discrimination and the harms of weight stigma.[47,48] Potential harms may also arise from weight loss medications or from adverse events following bariatric surgery. Several weight loss medications approved by the US Food and Drug Administration have been subsequently withdrawn for causing unexpected harmful side effects.[49,50,51,52] A weight-inclusive approach has been called for to minimize the harms of weight loss promotion.[53] In the United Kingdom, members of Parliament recently called on the government to stop using BMI as a measure of health.[54]

International standardization of BMI categories, largely motivated by the introduction of weight loss drugs and funded by the pharmaceutical industry, has resulted in the creation and overuse of arbitrary BMI categories that don't identify the same level of health risks across individuals or populations. These categories have been used to arrive at misleading population estimates of overweight and obesity that are in effect prevalence estimates of a clinically diagnosed disease based solely on height and weight. People are thus classified as having a disease without ever having been diagnosed by a clinician or been seen by a medical professional.

Beyond BMI Categories

BMI is not a good measure of fat mass, and fat mass itself may not be a good indicator of health.[55] Some studies have found that low muscle mass is more of a health risk than high fat mass.[56,57,58] Bosy-Westphal and Müller suggest that obesity should not even be considered a question of body fat per se but should be addressed in terms of body composition and that the use of both BMI and body fat percentage in assessing obesity-related health risk should be avoided.[59] They call for a new approach focused on fat-free mass instead and point out that, at older ages, a higher BMI may indicate more adequate fat-free mass. Another new paradigm has been suggested according to which overweight and moderate obesity are beneficial for patients with a broad spectrum of chronic diseases.[60] Physical activity and fitness may be more important for health than adiposity is.[61,62,63] It is time to look beyond the arbitrary and questionable BMI categories and evaluate other approaches to promote health and well-being.

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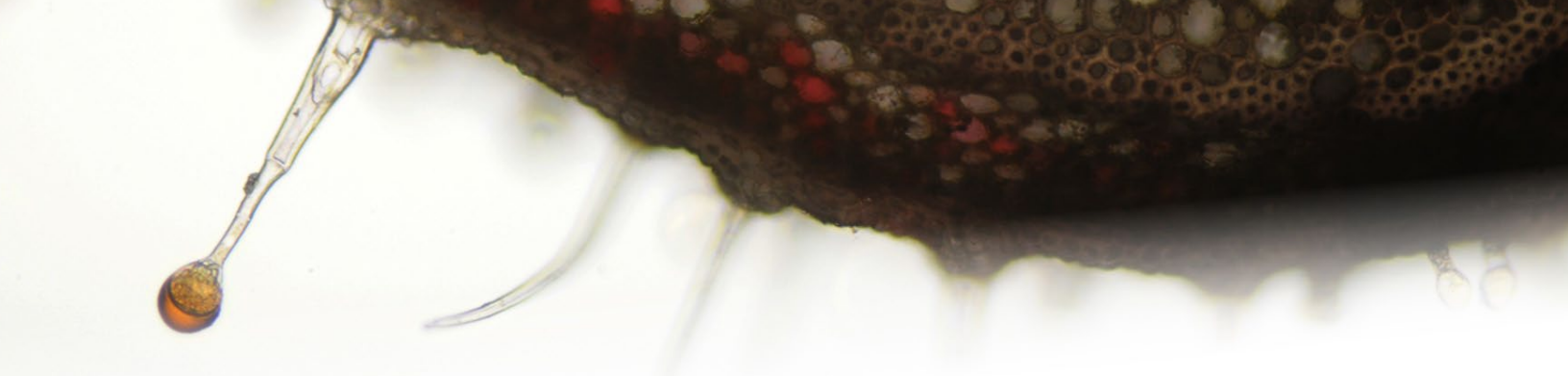

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HISTORY OF MEDICINE

Fat Norms and the AMA

Jorie Braunold, MLIS

Abstract

This article features images from the AMA Archives and brief narration of their importance for how Americans have oriented themselves to body habitus norms. In the early 20th century, the United States, as an industrialized nation with more food than ever, began to grapple with obesity. Questions about how to measure weight were being asked by the mid-20th century, as health professionals needed an indicator of obesity to accompany medicine's attempts to help patients and populations control it as a health risk.

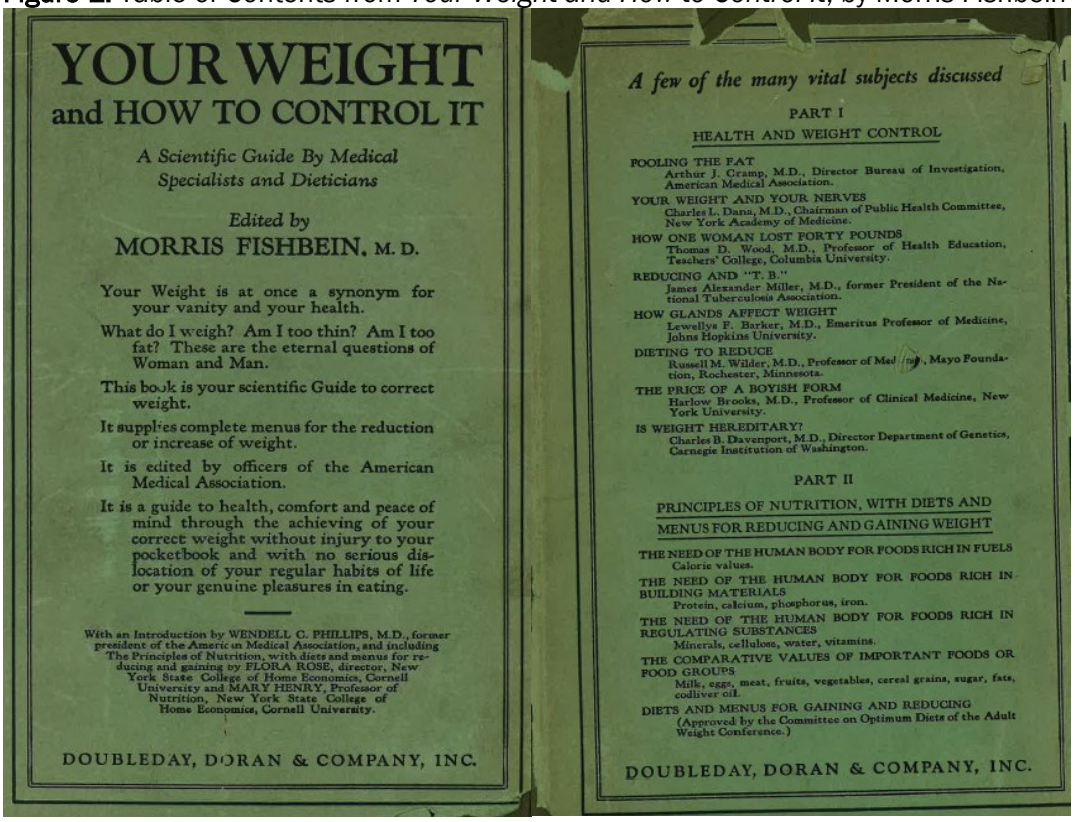
Measuring Weight

Body mass index, known colloquially as BMI, is currently the most familiar indicator of obesity, despite its known flaws.[1,2] But how did it come to be, and how was obesity calculated and talked about before the BMI entered our lexicon? More specifically, how did America's physicians think about it? This article examines the origins and flaws of BMI as an indicator of obesity and how physicians and medical organizations, including the American Medical Association (AMA), addressed weight management as part of health care before the 1970s, with specific attention to visual materials from the AMA archives.

A Brief History of BMI

Based on the work of mid-19th century scientist Adolphe Quetelet, BMI as we know it today (703 x weight (lbs)/[height (in)]^2) was promoted by Ancel Keys in the July 1972 issue of the *Journal of Chronic Diseases*.[3,4] Quetelet had initially designed the formula to study population averages and to identify the "type" or "ideal"[4] (the ideal in this case being the average ratio of weight in kg to height in m^2). Keys was moved to give the formula a second life after studying insurance companies' height-weight tables and noting that they ignored body fat content, although it must be noted that the AMA was integral to the creation of these standards and participated in the first Adult Weight Conference in 1927.[5] A compilation of articles and information on weight loss, edited by Morris Fishbein, then-editor of *Journal of the American Medical Association*, marks the first time the AMA addressed the issue for the public (see Figure 1). The timing was likely in response to the shift from food scarcity to food abundance, and for the first time being overweight was a problem for more than just the very wealthy.[6]

Figure 1. Table of Contents from *Your Weight and How to Control It*, by Morris Fishbein



YOUR WEIGHT
and HOW TO CONTROL IT

A Scientific Guide By Medical Specialists and Dieticians

Edited by
MORRIS FISHBEIN, M. D.

Your Weight is at once a synonym for your vanity and your health.

What do I weigh? Am I too thin? Am I too fat? These are the eternal questions of Woman and Man.

This book is your scientific Guide to correct weight.

It supplies complete menus for the reduction or increase of weight.

It is edited by officers of the American Medical Association.

It is a guide to health, comfort and peace of mind through the achieving of your correct weight without injury to your pocketbook and with no serious dislocation of your regular habits of life or your genuine pleasures in eating.

With an Introduction by WENDELL C. PHILLIPS, M.D., former president of the American Medical Association, and including The Principles of Nutrition, with diets and menus for reducing and gaining by FLORA ROSE, director, New York State College of Home Economics, Cornell University and MARY HENRY, Professor of Nutrition, New York State College of Home Economics, Cornell University.

DOUBLEDAY, DORAN & COMPANY, INC.

A few of the many vital subjects discussed

PART I

HEALTH AND WEIGHT CONTROL

PART II

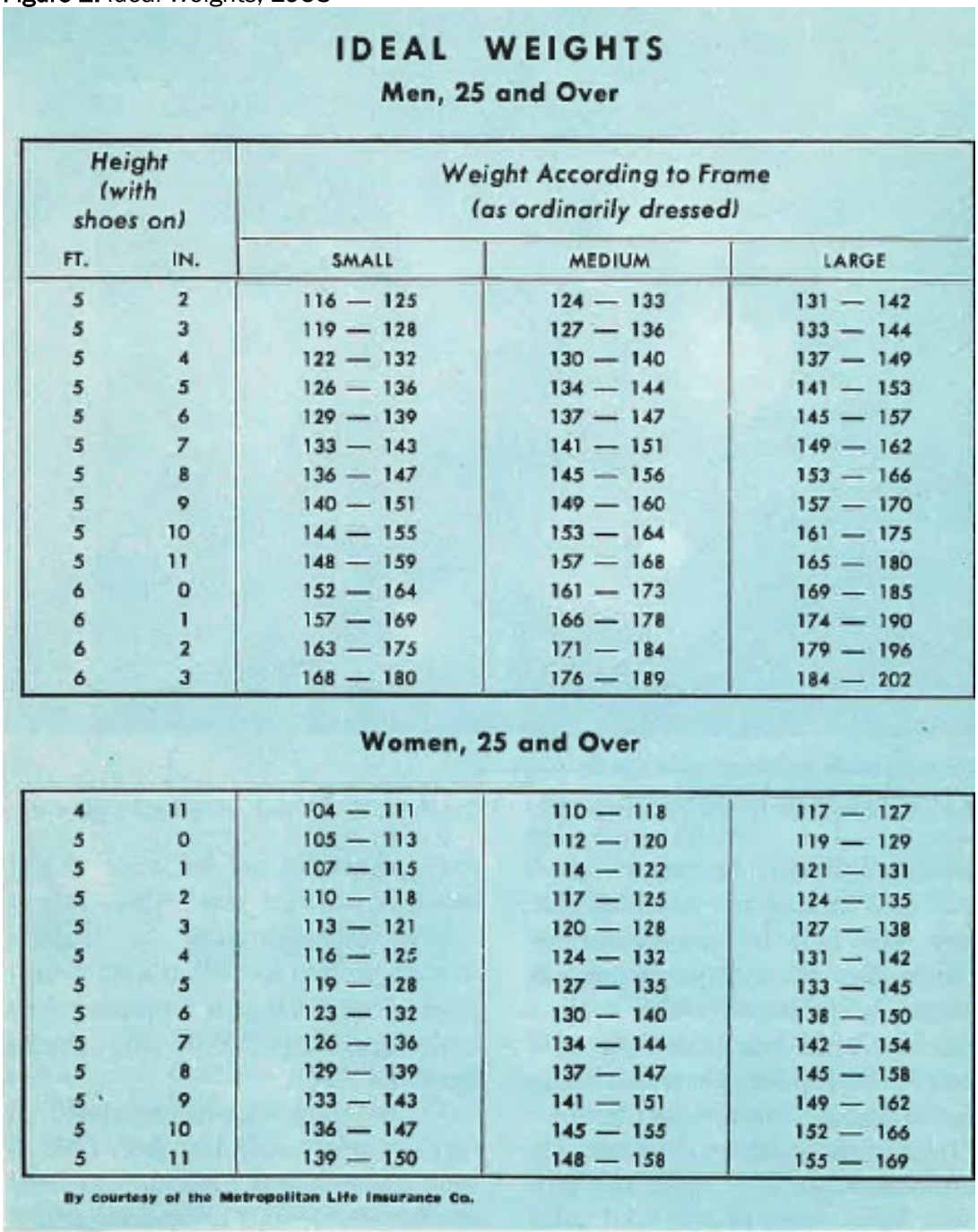
PRINCIPLES OF NUTRITION, WITH DIETS AND MENUS FOR REDUCING AND GAINING WEIGHT

DOUBLEDAY, DORAN & COMPANY, INC.

Reproduced from Fishbein.[5]

Ideal weight charts were created initially by life insurance firms, but, by 1926, the AMA and other health organizations were involved in their creation.[5] The blue chart (Figure 2) is from a 1958 pamphlet titled "How to Lose Weight and Reduce Sensibly." This title suggests that, at mid-century, the AMA's main concern was unhealthy and fad dieting rather than obesity. It is also clear when comparing this chart to the ones printed in Fishbein's book in 1927 (Figure 3) that obesity standards were already inching upwards, as was also shown in studies.[7] While obesity itself was only recently labeled an epidemic[7] and it was not until the 1990s that the extent of the obesity epidemic became clear,[8] Keys himself warned of a coming obesity epidemic in the 1950s due to changes in the lifestyle and food options available to most Americans.[1]

Figure 2. Ideal Weights, 1958



IDEAL WEIGHTS

Men, 25 and Over

Height (with shoes on)		Weight According to Frame (as ordinarily dressed)		
FT.	IN.	SMALL	MEDIUM	LARGE
5	2	116 — 125	124 — 133	131 — 142
5	3	119 — 128	127 — 136	133 — 144
5	4	122 — 132	130 — 140	137 — 149
5	5	126 — 136	134 — 144	141 — 153
5	6	129 — 139	137 — 147	145 — 157
5	7	133 — 143	141 — 151	149 — 162
5	8	136 — 147	145 — 156	153 — 166
5	9	140 — 151	149 — 160	157 — 170
5	10	144 — 155	153 — 164	161 — 175
5	11	148 — 159	157 — 168	165 — 180
6	0	152 — 164	161 — 173	169 — 185
6	1	157 — 169	166 — 178	174 — 190
6	2	163 — 175	171 — 184	179 — 196
6	3	168 — 180	176 — 189	184 — 202

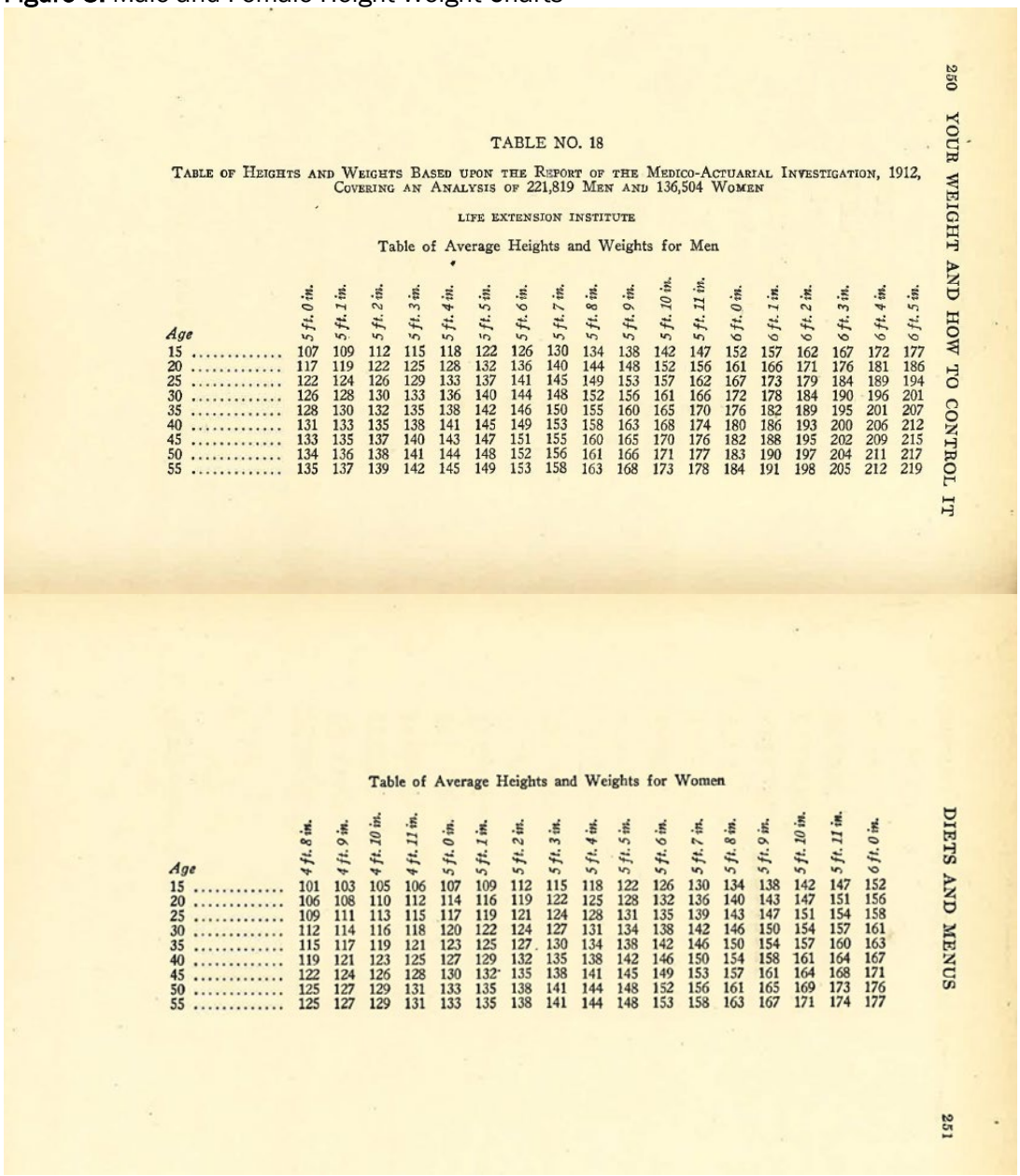
Women, 25 and Over

4	11	104 — 111	110 — 118	117 — 127
5	0	105 — 113	112 — 120	119 — 129
5	1	107 — 115	114 — 122	121 — 131
5	2	110 — 118	117 — 125	124 — 135
5	3	113 — 121	120 — 128	127 — 138
5	4	116 — 125	124 — 132	131 — 142
5	5	119 — 128	127 — 135	133 — 145
5	6	123 — 132	130 — 140	138 — 150
5	7	126 — 136	134 — 144	142 — 154
5	8	129 — 139	137 — 147	145 — 158
5	9	133 — 143	141 — 151	149 — 162
5	10	136 — 147	145 — 155	152 — 166
5	11	139 — 150	148 — 158	155 — 169

By courtesy of the Metropolitan Life Insurance Co.

Courtesy of AMA Archives.

Figure 3. Male and Female Height-Weight Charts



250 YOUR WEIGHT AND HOW TO CONTROL IT

TABLE NO. 18

TABLE OF HEIGHTS AND WEIGHTS BASED UPON THE REPORT OF THE MEDICO-ACTUARIAL INVESTIGATION, 1912, COVERING AN ANALYSIS OF 221,819 MEN AND 136,504 WOMEN

LIFE EXTENSION INSTITUTE

Table of Average Heights and Weights for Men

Age	5 ft. 0 in.	5 ft. 1 in.	5 ft. 2 in.	5 ft. 3 in.	5 ft. 4 in.	5 ft. 5 in.	5 ft. 6 in.	5 ft. 7 in.	5 ft. 8 in.	5 ft. 9 in.	5 ft. 10 in.	5 ft. 11 in.	6 ft. 0 in.	6 ft. 1 in.	6 ft. 2 in.	6 ft. 3 in.	6 ft. 4 in.	6 ft. 5 in.
15	107	109	112	115	118	122	126	130	134	138	142	147	152	157	162	167	172	177
20	117	119	122	125	128	132	136	140	144	148	152	156	161	166	171	176	181	186
25	122	124	126	129	133	137	141	145	149	153	157	162	167	173	179	184	189	194
30	126	128	130	133	136	140	144	148	152	156	161	166	172	178	184	190	196	201
35	128	130	132	135	138	142	146	150	155	160	165	170	176	182	189	195	201	207
40	131	133	135	138	141	145	149	153	158	163	168	174	180	186	193	200	206	212
45	133	135	137	140	143	147	151	155	160	165	170	176	182	188	195	202	209	215
50	134	136	138	141	144	148	152	156	161	166	171	177	183	190	197	204	211	217
55	135	137	139	142	145	149	153	158	163	168	173	178	184	191	198	205	212	219

Table of Average Heights and Weights for Women

Age	4 ft. 8 in.	4 ft. 9 in.	4 ft. 10 in.	4 ft. 11 in.	5 ft. 0 in.	5 ft. 1 in.	5 ft. 2 in.	5 ft. 3 in.	5 ft. 4 in.	5 ft. 5 in.	5 ft. 6 in.	5 ft. 7 in.	5 ft. 8 in.	5 ft. 9 in.	5 ft. 10 in.	5 ft. 11 in.	6 ft. 0 in.
15	101	103	105	106	107	109	112	115	118	122	126	130	134	138	142	147	152
20	106	108	110	112	114	116	119	122	125	128	132	136	140	143	147	151	156
25	109	111	113	115	117	119	121	124	128	131	135	139	143	147	151	154	158
30	112	114	116	118	120	122	124	127	131	134	138	142	146	150	154	157	161
35	115	117	119	121	123	125	127	130	134	138	142	146	150	154	157	160	163
40	119	121	123	125	127	129	132	135	138	142	146	150	154	158	161	164	167
45	122	124	126	128	130	132	135	138	141	145	149	153	157	161	164	168	171
50	125	127	129	131	133	135	138	141	144	148	152	156	161	165	169	173	176
55	125	127	129	131	133	135	138	141	144	148	153	158	163	167	171	174	177

DIETS AND MENUS 251

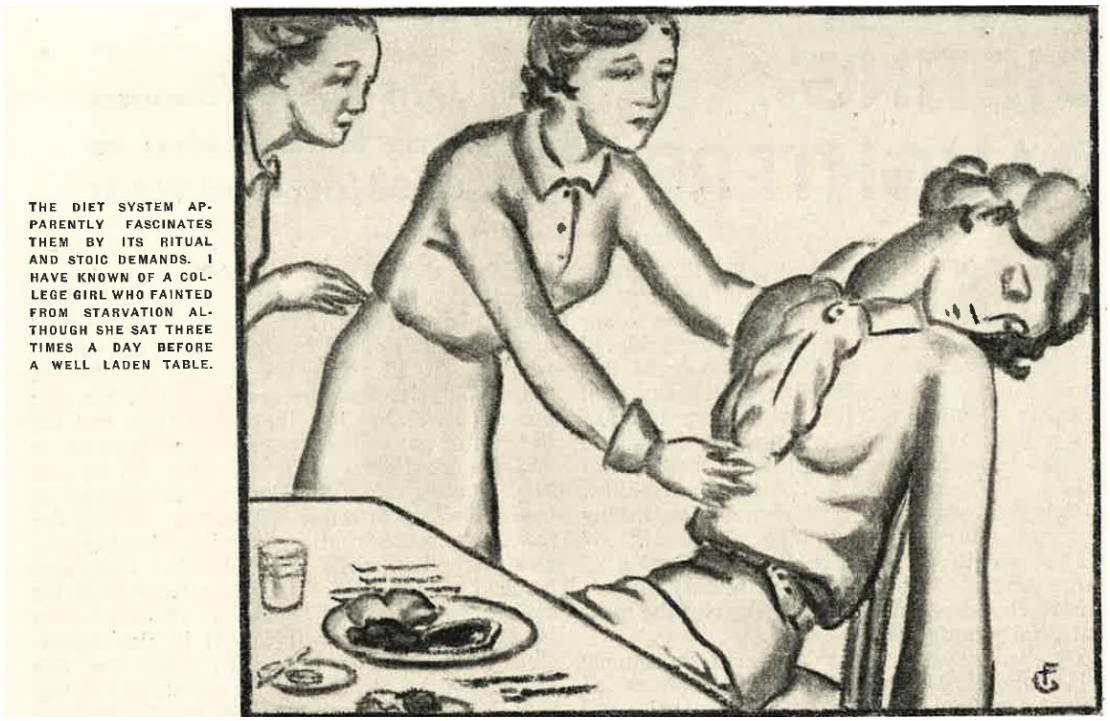
Reproduced from Fishbein.[5]

BMI as a measure of obesity is problematic. Not only does BMI have blind spots with regard to muscle mass and body fat, but it was based exclusively on Quetelet's study of adult males and, in particular, Scottish and French soldiers.[2] Although Keys did attempt to account for cultural and racial differences with his famous Seven Countries Study,[9] BMI is notoriously unreliable as a rough measure of health for women and people of color.[10] Finally, BMI categories are frequently stereotyped, as someone with a "normal" BMI is considered healthier than someone with a BMI that puts them in the obese category. This mode of thinking, however, disregards many things we now know about overall health, including that many people with obesity are metabolically healthy.[11]

The AMA Talks Weight

The AMA's popular magazine, *Hygeia*, shows how, in the early days of the AMA's discussion on achieving a healthy weight, the concern was primarily about young women starving themselves to achieve the ideal "flapper" figure (see Figure 4).

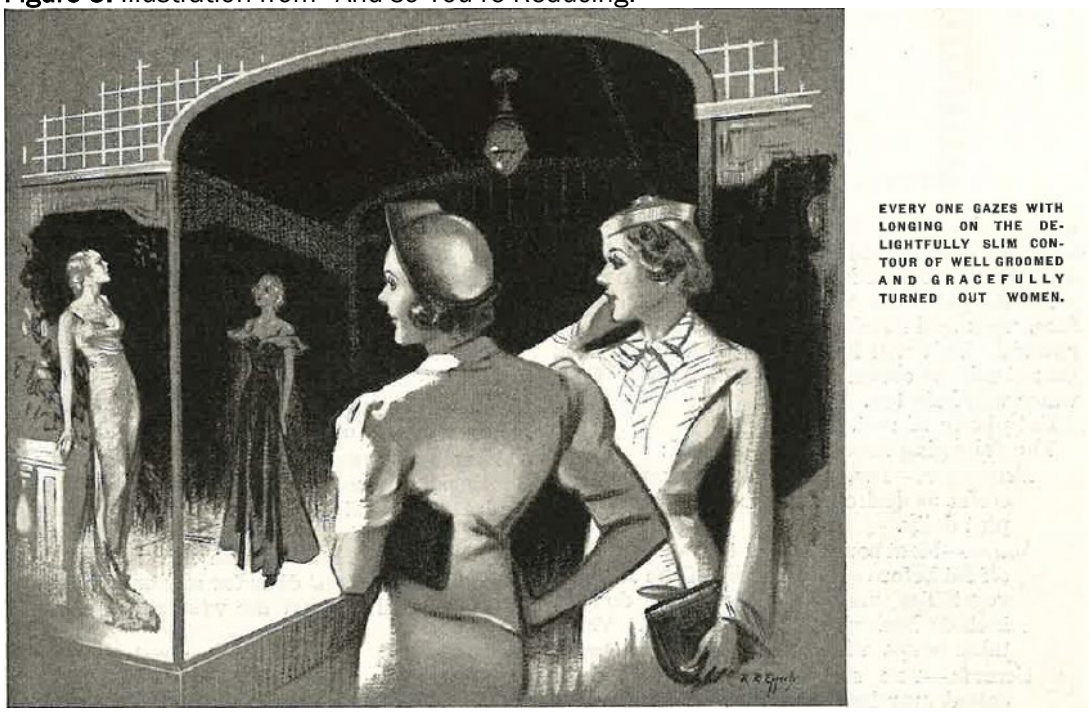
Figure 4. Illustration from "Dieting Daughters"



Reproduced from Foster.[12]

Despite repeatedly reminding readers that weight loss was a matter of good health and providing sensible, safe dieting advice, many of the AMA's publications appealed to women's perceived vanity and promoted the idea that a healthy weight was synonymous with beauty and status, thereby promoting one of the issues (unsafe dieting) it sought to prevent as well as advancing sexist stereotypes (see Figure 5).

Figure 5. Illustration from "And so You're Reducing!"



Reproduced from Geraghty.[13]

While we can see in Figure 4 that dieting to extremes was common in young women and something the AMA sought to put an end to, much of the AMA's dietary advice at mid-century was aimed at mothers looking to help their daughters lose weight (see Figure 6). This messaging can set in motion a generational cycle of unhealthy attitudes toward food and internalized ideas about women as decorative objects.

Figure 6. Nutrition Is a Family Affair

Courtesy of AMA Archives.

Another public service poster from the 1950s highlights the ways that the AMA's messaging around obesity and weight loss targeted women (see Figure 7).

Figure 7. Are You a Candidate for "Creeping Obesity"?

Courtesy of AMA Archives.

Given the unprecedented access to food (including processed food) created by the Second Industrial Revolution, it is perhaps unsurprising that dieting as we know it today began in the early 1900s.[14] We can see this trend reflected in the literature of the 1920s, when the first public materials about weight gain and loss were created in response to both an increasingly heavy population and the surge in popularity of dangerous fad diets.[15]

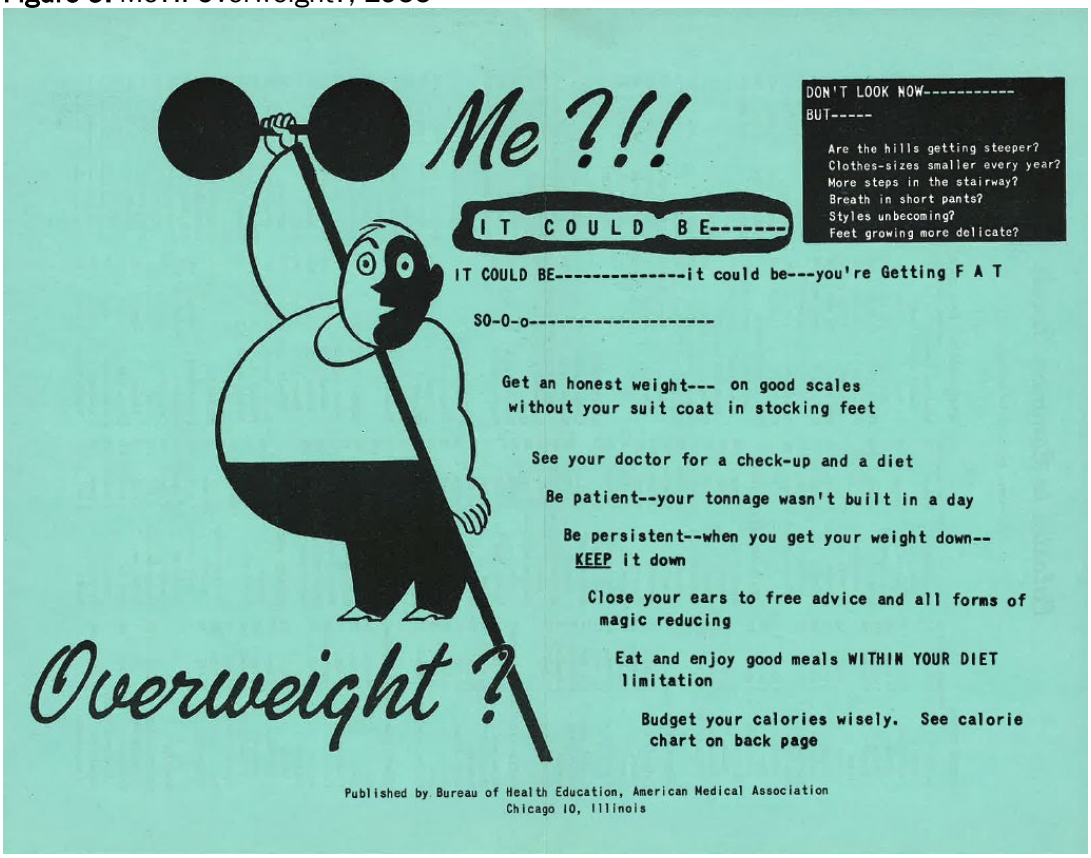
At the time, calorie counting was seen as "rational,"[14] and therefore those who were obese were irrational. This viewpoint is clear in the AMA's framing of weight loss as a matter of simple self-control.[14] The AMA also frequently used language of self-control that appealed to vanity rather than health outcomes, which may have contributed to the social stigma of obesity. Nowhere was this stigma more prevalent than in the ads targeting women, which made clear associations between thinness and desirability, as seen in Figure 5. Rare were images that focused on an overweight man (see Figure 8). Both the language and the image imply that overweight people are gluttonous and simply unwilling to take the hard steps needed to lose weight. Now we know that there are a number of biological, socioeconomic, and genealogical factors at play, but at the time (and still among some people), weight loss was viewed as a matter of willpower.

Figure 8. Illustration from "Can You Take It or Leave It?"

Reproduced from Walters.[16]

The AMA's advice favored sensible diets with slow but steady weight loss over time and speaking to one's doctor before embarking on a weight loss plan (see Figure 9). Looking back, the advice itself was sound, but the language and tone could be insensitive.

Figure 9. Me?!! Overweight?, 1955



Courtesy of AMA Archives.

Conclusion

It is only recently that an understanding of social determinants of health and the ways in which calorie restriction can slow our metabolism[17] has altered the way that medical professionals talk to patients about weight loss. The problem of stigma still exists, though, and the way doctors speak to patients with overweight and obesity can lead to them foregoing medical care at all.[18]

The Metropolitan Life Tables' criteria for defining obesity were widely used in the United States until the early 1990s when BMI came into vogue,[19] so it is perhaps unsurprising that, despite known flaws in the way the medical profession talks about obesity, the practice continues.

In the 1970s, around the time that Keys was promoting Quetelet's formula, obesity rates were going up, and American doctors were apparently getting fed up with patients' supposed inability to stick to a sensible diet. At this time, factors like social determinants of health were unknown, and processed foods were only beginning to affect Americans' health.[8] In making weight loss seem simple and accessible (see Figures 10 and 11), the AMA inadvertently promoted the diet culture that exists in America to this day.

Figure 10. How to Kill Yourself

How to kill yourself.

Eat! Drink! And Be Merry?
And whatever you do, by all means, overdo it.

Eat! It gives you something to do when you're bored or tense. (Sure, your doctor told you how many calories you should take in in a day. But it's been a long day.)

Drink! You don't really need it to unwind. It's just to be sociable.

A second helping of dessert? Lemon meringue pie is mostly egg white. And how about a pizza while you are watching TV after dinner? Of course, it always tastes better with beer.

What was it your doctor said? "People are the only animals who eat themselves to death." But you know it's your glands, not your appetite, that makes *you* plump.

Why Are America's Doctors Telling You This?
Well, for a long time we've been telling you how to stay alive and healthy. (Last year, 70% of the annual budget of the American Medical Association went to health and scientific education.) But many of you go do the opposite.

Now we figure we'll tell you how to kill yourselves. In the fervent hope that once again you'll do the exact opposite. If you do, there's every chance we'll be seeing less of you. Once a year for a checkup. And that's it.

Doing your bit to take care of yourself simply means your doctor can give everyone the best care possible. When *only* his care will do.

For a free booklet on eating and good health, write: American Medical Association, Box H, 535 North Dearborn Street, Chicago, Illinois 60610.

America's Doctors of Medicine
(Our Best Patients Take Care of Themselves)

Courtesy of AMA Archives.

Figure 11. Don't Walk When You Can Ride

Don't walk when you can ride.

Presenting Another Lesson in How To Kill Yourself.

In an earlier lesson, we told you to eat, drink, be merry, and most important, to overdo it.

Now we are going to suggest that, once you've taken in all those calories, do nothing—absolutely nothing—to burn any of them off.

No matter how short the trip, don't walk when you can ride.

And if walking is out, jogging is unthinkable. Even though your doctor told you you're one of those people who could well invest in some exercise—to get your heart muscle pumping and your blood circulating.

True, you have heard it said that most children in America learn to walk by 16 months and stop walking by 16 years. But then, *you're* no child.

And, anyway, exercise is a big, fat bore.

Why Are America's Doctors Telling You This?

Well, for a long time we've been telling you how to stay alive and healthy. (In fact, about 70% of the annual budget of the American Medical Association goes to health education.) But many of you go do the opposite.

Now we figure we'll tell you how to kill yourselves. In the fervent hope that once again you'll do the exact opposite. If you do, there's every chance we'll be seeing less of you. Just for check-ups. And that's it.

Doing your bit to take care of yourself (such as exercising, but only if your doctor says it's OK) means your doctor can give everyone the best care possible. When *only* his care will do.

For a free booklet on the right kind and right amount of exercise for you, write: Box X, American Medical Association, 535 North Dearborn Street, Chicago, Illinois 60610.

America's Doctors of Medicine

(Our Best Patients Take Care of Themselves)

Courtesy of AMA Archives.

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