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Reckoning with the past: a qualitative analysis of medical students describing their formative experiences with weight bias

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Abstract

Introduction Most healthcare providers exhibit weight bias (i.e., negative assumptions, beliefs, or discriminatory acts toward someone based on their weight/body size) in their interactions with patients with obesity. Such bias can be exacerbated in medical training and may lead to reduced healthcare utilization and worsened patient outcomes. This study explored reflections of pre-clinical medical students on formative experiences they perceived to be related to their newly identified implicit weight bias.

Method Seven hundred and sixteen second-year medical students completed the Weight Implicit Association Test (IAT) between April 2019-April 2022 and were instructed to write a reflective response based on their results. Of this sample, 212 students described experiences from childhood in their reflections, and these participant quotes were pulled for analysis. Inductive coding techniques were used to identify themes that were generated from medical students' reflections on formative experiences using the software program Dedoose Version 8.3.35.

Results The identified themes highlighted medical students' own struggles with weight management and body dissatisfaction in childhood, a fear of having obesity, the prioritization of a "healthy" (i.e., thin) body and the stigmatization of larger bodies, and the influence of culture of origin on thin-ideal internalization. Results recognize the manifold experiences that these medical students have before entering their formalized medical training.

Discussion Despite the proven negative impact on patient care caused by clinician weight bias there is a paucity of medical training programs that address weight bias. This research highlights the need for a more intentional educational curriculum to counteract the deeply rooted implicit weight bias existent in some future healthcare providers.

Plain English summary

Weight bias is common in healthcare settings and can lead to patients' reduced healthcare utilization and worsened health outcomes. Weight bias is developed at a young age and influences how people think about and treat themselves and others, including in healthcare settings. In this article, we examine how medical students perceive their formative experiences as influencing their development of weight bias. We explore how

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these insights might inform the design of medical curricula that can mitigate weight bias and improve patient experiences and health outcomes.

Approximately 42% of adults have obesity in the United States, with projected estimates reaching as high as 50% by the year 2030 [1, 2]. Worldwide obesity affects 1 in 8 people, including 16% of adults—more than double the rate in 1990—and 20% of adolescents, a figure that has more than quadrupled since then [3]. Obesity is a complex, multifactorial disease influenced by biological, environmental, psychological, and socioeconomic factors [4]. Bias toward individuals with obesity is pervasive, both in the public and among healthcare professionals [5, 6]. This bias, defined as negative attitudes or beliefs about others due to their body size, negatively affects many outcomes of an individual's health, including psychological and physical health [7, 8]. Bias can be either implicit, which refers to unconscious attitudes that affect a person's decisions outside of their awareness, or explicit, which refers to consciously held attitudes and behaviors conducted with intent [9]. Weight bias refers to negative attitudes and beliefs toward individuals with obesity, such as attributing their condition to traits like lack of discipline [10]. This bias is pervasive, particularly in healthcare, where it can lead to unsolicited comments about a patient's weight and an excessive focus on weight issues, even when unrelated to the patient's primary concern [11].

Though obesity is associated with multiple health risks (e.g., hypertension, diabetes, coronary heart disease), studies have found lower rates of healthcare utilization in patients with higher weight resulting from expected weight bias [12]. Reasons for avoidance of healthcare by patients with obesity include patronizing behavior from providers, providers' perceived lack of training in obesity, and providers' attribution of all health issues to weight [12]. This avoidance of healthcare leads to delayed diagnosis of not only obesity-related conditions but other important assessments, including breast and gynecological cancer screenings [13].

Developmental research suggests that biases begin to form early in childhood [14, 15]. According to Bronfenbrenner's Ecological Model of Human Development [16], children learn about the world through a complex interaction between their immediate surroundings (e.g., family, friends), connections among various elements of their environment (e.g., interactions between parents and teachers), and wider societal factors (e.g., cultural beliefs, social norms). Children collect information from their surrounding world, including their families, communities, and the media; and use this information to construct beliefs about various social categories of significance (e.g., gender, race, body size) [15, 17]. Children as young as three demonstrate implicit weight bias, which refers to unconscious forms of weight bias that occur automatically [18]. Mass media, family, and peers have been identified as key drivers of this bias [19–21]. Mass media, including cartoons and programs geared toward children, frequently portrays individuals with obesity in stigmatizing ways [22]. Similarly, parents transmit stereotypical attitudes about individuals with obesity beginning in early childhood onward [19, 23]. Weight-based teasing and bullying are common among children in schools [24], further perpetuating weight bias. Research shows that children can internalize the weight bias they are exposed to and this influences how they feel about their own bodies beyond childhood, with nearly half of preadolescents reporting a wish to be thinner [18, 25, 26]. Thus, children develop weight bias at a young age and this bias continues to influence how they think about and treat themselves and others later in life, including in professional and healthcare settings.

Given pervasive weight bias, medical students are unlikely to present into their training as neutral, unbiased learners. Students bring various attitudes and experiences into their training that influence their work with patients and biases toward them. Research indicates that merely recognizing implicit bias is insufficient to drive behavioral change; rather, it is through deliberate reflection and purposeful action that learners can deliver intentional and equitable patient care [27]. Importantly, biases can be shifted (at least in the short term) through educational strategies such as engagement with others' perspectives, opportunities for self-reflection, and increased opportunities for contact with minoritized groups [28–30], although structural and institutional changes are necessary to maintain improvements over time [31, 32]. Thus, understanding medical students' formative experiences is important; both in identifying how these experiences lead to the development of weight bias and in designing effective curricula to reduce weight bias in future physicians. Reflection is an important educational strategy in beginning the process of mitigating bias [33]. Our previous qualitative work implicated childhood experiences as being particularly influential in the development of weight bias [34]. Therefore, our specific research aim was to examine how medical students' perceive their formative experiences, including childhood, as influencing their development of weight bias and to explore how these insights may inform the design of medical curricula to mitigate such biases.

Methods

Participants and procedures

Data were collected from 716 second-year medical students at the George Washington University School of Medicine and Health Science across four cohorts between April of 2019–2022. Participants were instructed to complete the Harvard Implicit Association Test (IAT) for Weight [35], a measure of unconscious attitudes about body size that provides test takers with immediate results designed primarily to raise awareness about participant potential implicit biases. Participants were also instructed to write a mandatory reflection. The exact prompt they received was: "Write a personal reflection (< 500 words) on your reaction to the exercise you just completed (i.e., Implicit Association Test-Weight) and describe your current attitude towards those who are overweight or have obesity." After completion of the IAT assignment, participants were immediately provided results from the Harvard IAT website along with a comparison graph of others who have completed the test in years past showing test takers typically have a strong preference for thinner body sizes. Participants are also able to explore the website to better understand test validity and origins. Narrative responses and IAT results were not linked to personally identifying information and, prior to collecting responses, students were informed that their responses would be deidentified. For the purposes of this study, we focused on analyzing qualitative statements and IAT results were not a data point of interest. In addition, students were required to complete a small group (8–10 participants/group) experience within one week of completion of the IAT in order to reflect on experiences and crystalize learning. All procedures were approved by the Institutional Review Board of the George Washington University Office of Human Research.

Participants were only included in this study if their reflection response included a mention of their formative, or childhood experiences (defined as prior to undergraduate education). From the original sample of 716 students, 212 (29.6%) mentioned formative experiences in their reflection and were included in this study. The average age of the original sample was 26 years old. Participants in the original sample self-reported their race as Asian (29.8%), Black (9.0%), and White (46%). Approximately 10% reporting being Hispanic. The majority were women (56.6%).

Data analysis

A thematic analysis approach [36, 37] was used to examine the data in Dedoose Version 8.3.35 (SocioCultural Research Consultants LLC, Los Angeles, California). Three members of the team (KG, TY, KE) reviewed every statement from the original sample of 716 participants to identify those that mentioned a "formative experience" such as parents, childhood friends, schooling, or other influences during childhood. Every statement was reviewed by at least two members of the team, to ensure all statements that described a formative experience were included.

Once all reflections that included formative experiences were identified, four members of the research team (EC, KG, TY, and KE) read through this dataset of 212 reflections to become familiar with participant statements. Next, the research team met to generate a list of initial codes, or basic categories used to group related content across participant statements, that were applied to participant data in Dedoose to identify potential patterns in participant statements. The coded data were then examined to identify themes of broader meaning. The process was inductive, such that themes were constructed specifically from the coded data, based on the research team's analysis of how the codes related to one another across the dataset. The research team met to refine these themes to ensure they were distinct from each other and had adequate supporting data. Each interview was coded by at least two team members and any discrepancies were addressed through a collective review involving all four team members involved in data analysis.

Positionality

Prior to data analysis, the members of the research team met to consider ways in which their professional training and personal experiences might influence their perspectives and interpretation of participant statements. Four of the authors are physicians (KE, KG, TY, LD) and two of the authors are psychologists (EC, AD). Two of the authors (KE, LD) hold leadership positions within a medical school and shared their interpretations of the data based on their extensive experiences in training medical students and treating patients with obesity. Two of the authors (KG, TY) were medical residents at the time of data analysis who reflected on the data from their position as post-graduate trainees. EC and AD are PhD-trained psychologists working in academic (EC) and medical center (AD) settings who bring knowledge in the areas of disordered eating and body image concerns. EC and KE received specific training in qualitative research as part of a training grant award.

Results

Four themes and corresponding subthemes were generated from the data. Figure 1 presents a graphic depiction of our results. We provide descriptions and representative quotes for each theme below.

Theme 1: I know what it's like

Medical students' descriptions of having a larger body size or struggling with weight during their own

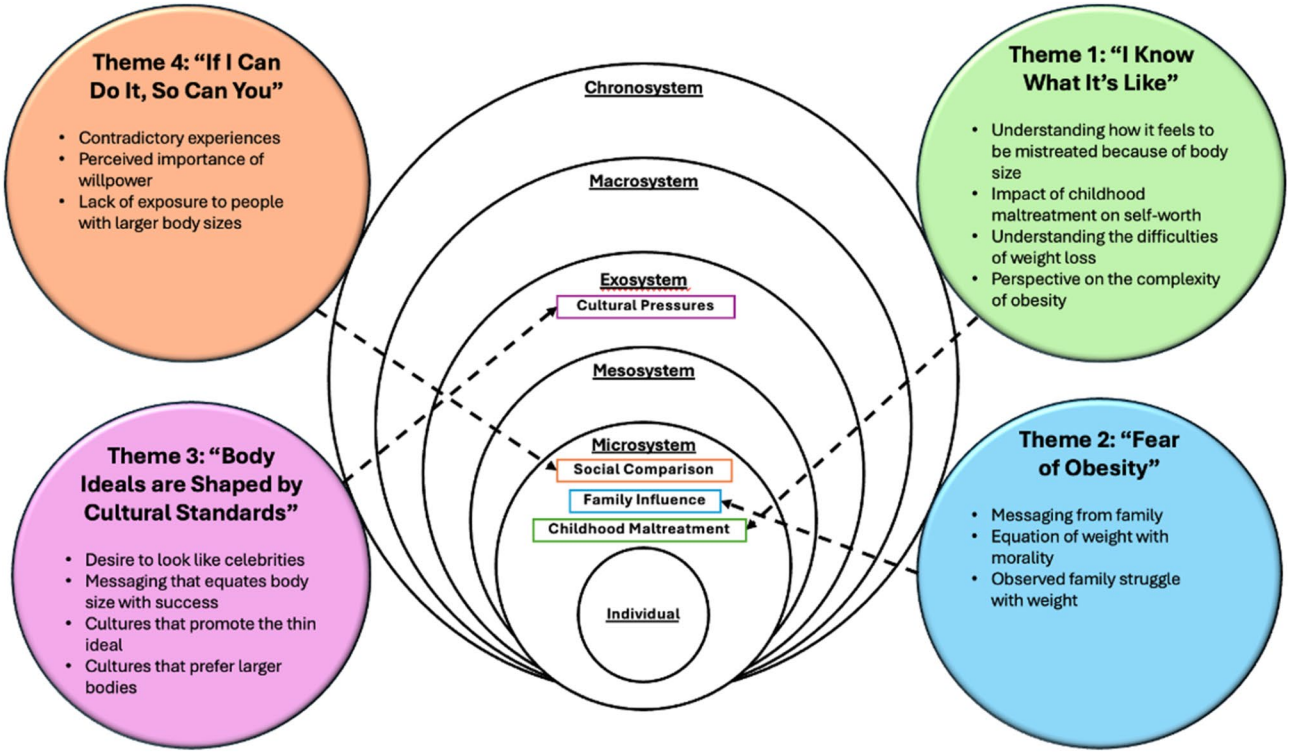

Fig. 1 Themes and subthemes generated from the data. Themes from early formative experiences mapped onto the Bronfenbrenner's Ecological Systems Model. Theme 1: "I Know What It's Like" — Childhood Maltreatment in the Microsystem, Theme 2: "Fear of Obesity" Family Influence in the Microsystem, Theme 3: "Body Ideals are Shaped by Cultural Standards" — Cultural Pressures in the Exosystem, and Theme 4: "If I Can Do It, So Can You" — Social Comparison in the Microsystem

childhood were common in the data, with these experiences informing students' empathy for patients today. Examples of medical trainee's responses can be found in Table 1. Participants discussed knowing what it is like to be mistreated because of body size ("I was bullied until I developed an eating disorder" P207) and described experiencing mistreatment from classmates, friends, family members, and childhood medical providers. Participants frequently mentioned being "harassed," "teased," "bullied," "put down," "pressured," and ostracized because of their body size. These memories were described vividly years later and were described as having a profound impact on participants' lives. Participants described how these experiences affected their sense of self-worth for years to come (and for some even in the present day), making participants believe they were "undeserving of love," "unhealthy," and "not valuable" due to their body size. Participants expressed a desire to not contribute to further mistreatment of patients with obesity in medical settings ("I aim to use my awareness…to avoid this at all costs" P153). These personal experiences also informed participants' understanding of the difficulties of changing one's lifestyle or managing weight, with one participant describing it as a "constant struggle" (P64). Participants described the need for enormous effort, courage, frustration, and expense in their attempts to reduce their body size, with some relying on commercialized weight management programs, gym memberships, sports teams, or rigid diets. Because of these noted challenges in their formative years, participants developed a better understanding of the complexity of weight management and obesity etiology, leading them to take a more nuanced view in their work with patients beyond personal responsibility. Participants discussed the genetic, metabolic, and biological components of obesity, along with the role of environmental and societal factors in the development of obesity, that would inform their treatment planning with patients. Participants reported that these personal experiences gave them a greater sense of empathy and understanding in their work with patients that would improve their clinical care.

Theme 2: fear of having obesity

Some participants described learning in their formative years that having a larger body size symbolized a moral failing of oneself. Examples of medical participant's responses can be found in Table 2. Participants discussed formative experiences that led them to associate larger body sizes with words that have negative connotations ("laziness", "undisciplined", "invisible", "shameful"). Many

Table 1 Illustrative medical trainee quotes for theme 1: "I know what it's like"

Understanding of how it feels to be mistreated because of body size	As a child, I was overweight, and I was bullied because of it for years in school. This experience has always made me have a lot of sympathy for others who are overweight because I assume they have had similar experiences and I have some sense of how it feels to be treated badly because of your body. (P170)
	I still struggle with my weight to this day because of how I was pressured to be thin for so many years. It ruined my relationship with food and how I perceived myself. When I see a fat person, I see myself, I understand their struggle, and I completely empathize with their situation. (P207)
	My perspective on weight is one that encompasses the experience of having gained weight throughout childhood and early life, slowly becoming morbidly obese (BMI > 35) after college, and then having lost about 100lbs to reach my current weight (BMI = ~ 22). As someone who has lived on both sides of the coin, I can say that the differences in how people treated me, and how I treated myself, are striking pre-and-post weight loss. (P104)
Impact of childhood maltreatment on self-worth	My entire life, my parents, extended family, and random family friends I did not even know would tell me I was not thin enough or that I'd gained weight, etc. Back then, I was not even overweight but their words hurt, and they made me resent my body. Since then, I have always associated being anything other than thin with negativity, and these negative connotations that I associate with being fat have only become stronger over the years as I struggle with the side effects of having hypothyroidism and have gained a lot of weight in the past five years. (P11)
	My results showed that I had a slight automatic preference for thin people over fat people. I don't find this a surprising result given the amount of self-loathing I had toward my own body as an overweight child and how our society treats fat people. Throughout my childhood, it was constantly reinforced to me that being fat was not only "gross" but meant I was undeserving of love. (P165)
	Growing up…I did suffer from self esteem issues because of my weight, and [this] has made me self conscious even into my twenties…I definitely struggle with controlling my weight and even more so my own personal body image. (P87)
Understanding of the difficulties of weight loss.	I sympathize with people who are overweight or struggle with obesity because I realize there are so many factors that go into it. So many other things can be going on in life that one day you wake up and realize, I have gained a lot of weight. And it takes a lot of effort to lose that weight. (P146)
	I have struggled with a metabolic disorder since I was a teenager… athletic activities masked an underlying metabolic imbalance that came out when I left for college and didn't have time to do the 5–6 h a day of athletics I was used to. I have always watched my diet and it was very frustrating to me when as a freshman, I struggled with my weight despite not changing anything I was eating. (P77)
	In the setting of a gym, I am extremely proud of those who are overweight or obese, because I know how much courage it takes to be surrounded by people in healthier shape. (P119)
Perspective on the complexity of obesity	For these reasons I always believed that weight has a very strong genetic and metabolic component–that you can control your weight to some extent, but there are a lot of things that may be easier for some people to do (i.e. gain or lose weight) that may be very difficult for others. (P75)
	I was very overweight as a child and I find my weight a constant struggle. I try to maintain as healthy of a lifestyle as I can, but I acknowledge that genetics definitely play a role in weight. (P64)
	Throughout my life, I have always struggled with my weight and after losing 100 pounds, I still continue to face challenges related to weight and body image. Although I was able to lose a lot of weight through Weight Watchers and exercise, I recognize that many people who struggle with their weight are not as fortunate as I am and cannot afford the expenses of healthy food, weight loss programs, or gym memberships. (P47)

of these learned associations were due to the influence of trusted adults surrounding them (parents, extended family, athletic coaches). A number of participants described growing up in households that prioritized eating "healthy" and exercising daily, with the caveat being if they did not do these things and gained weight, it would be a poor reflection of themselves ("I needed to be active and healthy, and if not, bad things would happen to me" P108). Participants reflected on how these negative associations currently impact their views on obesity as well as their relationship with their own bodies. Discussions included persistent fears of gaining weight, poor body image, and the ongoing belief that weight is purely a result of self-control. Many expressed the need and desire to make a "conscious effort" to treat all patients the same regardless of their weight. Participants acknowledged that being aware of their weight-related biases is not enough and that it will require continuous effort and reflection to ensure it does not impact their patient care.

Theme 3: body ideals are shaped by cultural standards

Participants also commonly expressed how US culture and media influenced their views on weight in their formative years ("Most of us in Western society were brought up to idealize thinness" P14). Examples of participants' responses can be found in Table 3. Participants described how the major conduit for these cultural ideals was media, including television, movies, advertisements, magazines, and social media. While ingesting these forms of media at a young age participants noted what they observed, "seeing thin bodies celebrated on TV, movies, and magazines" (P23). Participants discussed how this led them to idolize the bodies of celebrities with a handful of participants admitting to researching the BMIs of celebrities ("I found myself looking up famous actresses' BMIs and then comparing it to my own" P149). In addition to seeing the idealization of thinness, they also noted the denigration of larger body sizes ("Television and movies tell us that thin people are active, smart, and wealthy while fat people are lazy, dumb, and poor" P14). An extension of this message from the media was the promotion of diets and exercise as a means to achieve this "desirable" body type. Participants described how advertisements on television and in magazines touted promises of transformative weight loss through "ab exercises" or enticing article titles, like "How [celebrity X] lost the baby weight." (P185). Participants described how their consumption of these ideals through multiple forms of media in their formative years led them to develop an anti-obesity bias, going on to say how it has been "ingrained" and "burned" into their brains. Upon reflection, participants noted the need to actively fight against these ingrained and historical cultural biases when treating patients, "there is no doubt that I have bias towards obese patients that I will have to actively counteract in order to provide the best possible care as a physician" (P26).

Of note, a number of participants discussed how growing up outside of Western culture also impacted their views on body weight. In comparison to the thin idealization prevalent in American media, some respondents described being raised in cultures that valued larger bodies and deemed larger bodies to be more desirable. This dichotomy of the preferred body type between American culture and the individual's culture of origin led to some participants experiencing criticism from family members growing up. Many of these comments centered around the critique that the individual was too thin, ("Has your mother been feeding you enough?" P37). However, one respondent discussed how even within a culture where being "plump" was viewed as more desirable, individuals with excess weight still received negative comments about their body "[I] would be told that my body was attractive… but would also be laughed at for being overweight" (P71).

Other participants described growing up external to Western culture within cultures that also promoted a thin body as the idealized body. This influence would come in the form of comments from family members telling others that they were not "thin enough" (P11, South Asia) or labeling others with words such as "chubby" (P10, Philippines). Others expressed how their preference for thinness might stem from the fact that in their particular culture, lower body weights were simply more common. A participant who identified as Korean stated it was "rare" to find a person with obesity in Korea (P5). They went on to describe how, "most of the girls are actually thinner than I am, and I am considered a little underweight according to the BMI calculator." Another participant who identified as Indian described how in her culture the weight that is considered acceptable for a woman is much narrower than in American culture. She reflected on how growing up in a culture "that does not tolerate overweight as much as underweight" still influences her views on obesity to this day (P12). Participants' formative cultural experiences around weight left an indelible mark on their perceptions of themselves and others and the language they used to describe weight.

Theme 4: if I can do it, so can you

Many participants described experiences of their own weight loss growing up and attributed it to the efforts they put forward in participating in athletics, working out, and maintaining a healthy diet. Examples of participants' responses can be found in Table 4. These participants highlighted their perceived ease in controlling their weight ("I am a firm believer that mindset can control most things, and that this is true with regard to

Table 2 Illustrative medical trainee quotes for theme 2: "fear of having obesity"

Messaging from family	"I have a heavy bias against those who are overweight. This did not come as a surprise to me as I have been doing gymnastics for almost my entire life, and every day we had it ingrained in our minds that fat was evil. I was told almost every day that there is nothing worse than being fat, and that has played a large role in how I subconsciously view weight (both my own and other's)." (P25)
	"I recall countless comments made by my parents about other individuals needing to lose weight and how they hoped they would never let their bodies "get like that," typically for appearance and cosmetic reasons rather than medical. I similarly recall my dad's anger at and frustration with my sister for gaining ten pounds during her first year of college (despite her being well within a healthy BMI) as an indicator of their investment in their children's weight." (P48)
	"I grew up in a family of very thin people who prided themselves on eating healthy and exercising every day. It was very much ingrained in me growing up, explicitly or implicitly, that (barring extreme circumstances) being fat is a choice and denotes an underlying pathology or laziness." (P16)
Equating weight with morality	"When I weighed more, I was incredibly self-conscious about my body and thought I was constantly being perceived as ugly, undisciplined, undesirable, and invisible. I still struggle today with balancing a true concept of health and wellness with unhealthy thoughts about weight, body image, and the "need" to be thin." (P74)
	"Throughout my childhood, it was constantly reinforced to me that being fat was not only "gross" but meant I was undeserving of love. . . Furthermore, there is also a popular sentiment that being fat is a moral failing. That if only fat people had will power and work ethic they could lose the weight and be 'normal'." (P165)
Observed family struggle with weight	"I have seen my older brother struggle with his weight since we were children. No matter how much he exercised or tried to eat well, he still looked "big" – and was constantly berated for it by friends, family, and society. This has led me to be conscious of gaining excess weight, as I was afraid to go through what my brother has." (P158)
	"When I was growing up, my aunt (Type 2 diabetes, obesity) moved in with us after she could no longer support herself. My brothers and I did not enjoy having her around and my parents would occasionally use my aunt as an example of the effects of poor diet and exercise." (P113)
	"My father is obese and has hypertension and diabetes. I often find myself frustrated with him for not making healthier choices - he absolutely always goes for that extra slice of cake or that afternoon snack. I think food is one of his sources of happiness, but even though he knows he needs lose to weight he seems unwilling and unable to." (P169)

weight" P186). Although some acknowledged that complex barriers exist for weight loss, participants often concluded that people's inability to lose weight was due to a lack of "long term commitment" (P51) and/or "personal motivation to achieve their goals" (P167) and thus ultimately "a shortcoming of the person themselves" (P15). Participants expressed how the strong impact of their personal "success" in controlling and losing weight made it difficult to believe those who were unable to do so. Because of everything they personally overcame to lose and maintain their weight loss in their formative years, they described an unwillingness and inability to accept that others cannot accomplish what they did. Their personal experiences are a testimony that anybody "can take responsibility for their situation" (P51) if they put their mind to it. Some participants expressed the feeling that to believe otherwise would be to absolve people of their personal "responsibility to change it."

Discussion

To our knowledge, this is the first study to explore medical student's reflections on formative experiences of weight bias and their influence on their own current attitudes and beliefs about obesity. From the data, four important themes emerged. In the first theme, participants reported empathy towards individuals with larger bodies based on their own weight-stigmatizing experiences (I know what it is like). The second theme centered on participant's perceived consequences of living with a larger body and how these shaped their beliefs about themselves and their worth (fear of having obesity). The third theme revealed medical students' acknowledgment of the pervasiveness of weight bias from media and cultural ideals, including the inability to achieve societal body standards (body ideals are shaped by cultural standards). Last, the fourth theme focused on beliefs of personal responsibility for overcoming obesity (If I can do it, so can you).

Weight-related teasing is, by far, the most common form of bullying among children [38, 39], and such experiences were reflected in several quotes from the medical students. Weight stigmatization and more serious forms of discrimination can be formative and traumatic, contributing to the beliefs participants hold about themselves and their patients. Whether experienced directly, through bullying, or indirectly through social media, negative messages about body size and weight become ingrained and self-directed which is also known as internalized weight bias. Internalized weight bias is the process of applying negative weight-related beliefs to one's sense of worth and has consistently been shown to be detrimental to physical and mental health independent of body weight [8, 40].

Table 3 Illustrative medical trainee quotes for theme 3: "body ideals are shaped by cultural standards"

I want to be like famous people.	"As a teenager who grew up during the times of Paris Hilton and women who were celebrated and idolized for their BMIs of 18–19 as the beauty standard, the expectations for thin vs. fat and its implications were clear in school and at home, in movies and in print." (P122)
	"I remember constantly seeing magazines in the grocery store…body shaming celebrities for having cellulite and stretch marks. These associations of fat being "bad" and skinny being "good" were somewhat burned into my brain because as a society in America we promoted "thin as being in." (P185)
	"As a young TV junkie, I remember seeing thin bodies celebrated on TV, movies, and magazines. Seventeen, Cosmopolitan, and Teen Vogue always had articles on diets and ab exercises across from editorials with high fashion models." (P23)
Messaging that equates thinness with happiness and success	"Throughout the course of our existence, magazines, social media, movies and tv shows show a preference for thin people and associate them with beauty and perfection, while overweight individuals are associated with poverty, lower intelligence, and depression." (P30)
	"In our society, and especially on social media, there is a perpetual reinforcement of the idea that thin people are more desirable, and young women like me are unfortunately incredibly susceptible to this despite being aware of the issue." (P103)
	"[G]rowing up I would always see ads for weight loss on billboards, commercials, and stores, which show people being much happier after losing weight and becoming thin, but you would never see an ad for the contrary." (P57)
Cultures that have a preference for larger bodies	"[T]he older Indian generation, including my parents and relatives consider being plumper more "healthy." In fact, I distinctly remember my mom getting very angry with my pediatrician when I was in elementary school for suggesting that I might be overweight." (P85)
	"[T]he [Middle Eastern] culture itself is very open about talking about weight and addressing another person's weight very openly…I ended up losing a lot of weight at one point for myself, to feel healthier, and because I really enjoyed running and ended up losing a lot of weight due to picking up this new activity. When I did lose weight and was at a reasonably healthy BMI, members of my family often told me I looked anorexic (even though I was not), would ask my mother if she is feeding me, and would make other comments like how I looked like a starving child from a developing world." (P71)
	"As first-generation Nigerian immigrant, I had always felt uncomfortable about my weight while growing up. When I would go back to Nigeria, extended family members and friends would always comment on how small my sisters and I were. Certain comments such as, "Wow, so the rice is not filling you out?", "Has your mother been feeding you enough", or "How can you carry children with that waist?" were on constant repeat. I internalized these comments as ways that I did not fit in with my culture. My weight and my body shape were not enough." (P37)
Cultures external to the US that promote thinness	"But more than the color of my skin, the thing that has been a lifelong struggle for me is my weight, as being an overweight and curvy woman is also looked down upon in South Asian culture. My entire life, my parents, extended family, and random family friends I did not even know would tell me I was not thin enough or that I'd gained weight, etc. Since then, I have always associated being anything other than thin with negativity, and these negative connotations that I associate with being fat have only become stronger over the years as I struggle with the side effects of having hypothyroidism and have gained a lot of weight in the past five years." (P11)
	"I'm from the Philippines and I remember growing up hearing my overweight cousins being made fun of by my aunts and uncles. I have one cousin who was nicknamed… chubby. So growing up I feared gaining weight and I did everything I could do to stay skinny." (P10)
	"I think this implicit bias stems from my upbringing and its cultural values. The average size of Indian women is relatively small, thus the range within which a woman is considered healthy and not obese is narrower and lower than that of Western countries. Being raised in a culture that does not tolerate overweight as much as underweight has shaped my understanding of what obesity looks like." (P12)

In some responses, the role of personal responsibility, including dietary and physical changes, was greatly emphasized, with little to no acknowledgment of factors such as genetic contributions, biological mechanisms that encourage weight regain, or the sociocultural environment. These findings are consistent with previous literature, such that providers with limited knowledge about the complexities and biological underpinnings of obesity generally tend to have fewer positive attitudes about patients with obesity [41]. Several medical students discussed the role of television, magazines, and social media in contributing to unrealistic appearance ideals and the negative characterization of people with obesity. Participants also discussed the difficulty of navigating Westernized appearance values in contrast to appearance expectations from their country of origin. The role of media, particularly social media, is likely to grow, indicating that media literacy, including how social media promotes weight bias, is crucial for trainee critical thinking and development.

Implications for education and training

Themes generated indicate that the subset of medical students in this study were generally aware of their weight bias and carrying varying degrees of traumatic stress from weight-related experiences. Reflecting on one's own lived experiences may help to increase empathy and understanding of a patient's lived experiences. Taking that into consideration, it is important for schools to recognize that medical students come with their own formative experiences, many of which have caused significant pain, which likely impact their own confidence, sense of worth, and their receptivity to overt and hidden curriculum messages. Drawing on early lived experiences can help medical students cultivate compassion for themselves and others through remembering their own vulnerabilities and emotional experiences surrounding weight bias. Such experiences also help us understand that weight bias is socially constructed, and by creating shifts in our social environment, such as medical training settings, new learning can occur, and biases can be shifted. Reflecting on these experiences and beliefs also has the potential to improve patient care, especially in pediatric and young adult populations. By providing a safe space to discuss weight bias and focus on patients' needs, medical students as future healthcare providers can make more equitable and compassionate treatment decisions [27].

A trauma-informed care approach [42], which is important for practicing physicians to use with their patients, may also be useful in educating students about obesity and weight bias. This approach positions faculty and educators to recognize that individuals may likely have their own experiences of trauma and uses strategies like creating space for students to share their perspectives free of judgment and creating opportunities for peer support when exploring issues related to obesity-related conditions, obesity pathophysiology, obesity care, and weight bias. Medical students will likely benefit from personal reflections or open dialogues about the role of formative experiences contributing to their current attitudes and beliefs about obesity. Self-reflection in medical training, in addition to other interventions, is common and effective for reducing stigma in other areas, including anti-racism [43] and substance misuse [44]. Strategies to reduce weight bias should also provide education about the complex, multifaceted etiology of obesity, encouraging students to place less blame on the individual for not achieving a lower weight on their own and focusing on how students can advocate for policy, environmental, and global changes that can promote novel therapeutic interventions and equitable access to resources to encourage sustainable healthy behaviors.

Furthermore, the use of narrative approaches in medical training can help to increase compassion, empathy, and a willingness to hear patient's stories. Through reflection of their formative experiences of weight bias, medical students may be able to connect more closely with their patients' narratives, and resonate with their patient's lived experiences. Narrative approaches focus on patient storytelling, active listening, and challenging assumptions about the "causes" of illness, such as the recognition of the role weight bias plays on exacerbating obesity [45, 46]. Importantly, such approaches must also be actively role-modeled by clinicians and supervisors in the field, as medical students are susceptible to repeating the behaviors they observe from their superiors. Similarly, teaching and role modeling person-first language can reduce stigmatizing language, which has been implemented in several other areas of medicine [47, 48]. Saying "patient with obesity" as opposed to "obese patient," respects the person independent of their condition. Providers should also consider patients' preferred terms for discussing body weight, as "obesity" is a clinical term and generally not preferred from a patient point of view [49, 50]. Lastly, role-playing among students of hypothetical scenarios in direct patient care offers opportunities to practice these skills [51].

Importantly, strategies to reduce weight bias can only be successful if medical schools also explicitly address the competing tensions that exist within medical training. For example, students with lived experiences of weight bias are also receiving subtle messaging that providers should role model a "healthy" (i.e., thin) body size [52]. Similarly, medical schools project a focus on student well-being, yet aspects of medical training (e.g., lack of quantity/quality sleep, increased stress/anxiety, long work hours) promote impaired metabolic health

Table 4 Illustrative medical trainee quotes for theme 4: "if I can do it, so can you"

Their experience contradicts mine	"My senior year of high school I weighed 300 pounds… The truth of the matter is that most of the things I hear contradict my own personal experience…I don't believe that removing the autonomy and agency people have by saying that "it's not their fault" or medicalizing their obesity does any good either. My belief is that someone must take on ultimate responsibility for their situation, regardless of how or why they got there. Behavior modification and change is extremely difficult and requires patience, dedication, and most importantly long term commitment." (P51)
	"While there are a myriad of complex issues that increase the likelihood that someone will have trouble maintaining a healthy weight, for my personal experience (I used to weigh 260lbs), there is not enough of a personal motivation to achieve their goals." (P167)
	"I think I have had this bias towards overweight individuals for a long time. I think it started when I was young and severely overweight and through sports and eating healthy I was able to lose weight. I just assumed that if I was able to do it then why can't others." (P42)
Importance of willpower	"I was about fourteen years old, weighed 220 pounds and was 5 feet 6 inches…Late in high school, I decided to change my diet and start exercising and it truly changed my life. Working out and healthy living has been a pillar in my life ever since…To those who currently suffer from obesity, I truly believe that they have the ability to change things, because I did it personally, and I felt like so many of those people probably do. Our bodies and what we put into them is one of the only things we can truly control in today's day and age." (P87)
	"I struggled with my own weight issues when I was younger and lost the weight over a period of a few years. Thus, my belief is that change is capable if you have the determination and will to do so - however, I do understand how difficult it can be to lose control with food, and to be unable to control one's weight or how one is perceived by others… I don't think I outwardly express a negative attitude towards overweight or obese people, but from my experience losing weight I feel as if I express a mentality where I assume people want to change their weight when they are overweight, and that an inability to do so is a shortcoming of the person themself." (P15)
	"I have fluctuated between being a ripped, 190 lbs athlete to being 240 lbs while studying for a massive exam over the course of a few months. I have been the bookends and in between most body types (severely obese excluded). I am a firm believer that mindset can control most things, and that this is true with regard to weight." (P186)
Lack of exposure to people with larger body sizes	"I grew up in a family of thin people and most of my friends are and have been thin. These are likely the first people to influence my worldview on weight. While nothing was explicitly said in my family to intentionally put down people who were overweight, there was still some degree of us and them." (P2)
	"I was raised in a family where healthy eating and consistent exercise was a priority, and was raised with the belief that obesity, while never a moral failing, was a reflection of a difference in priority. Additionally, having no people with obesity in my family, I interacted with very little people who were obese as a child." (P62)
	"All my life until college I was a professional athlete and have been surrounded by very fit individuals, including both athletes my age and even coaches. I believe that not being surrounded by obese individuals as much as I grew up and in my youth could have influenced my personal bias." (P195)

and increase risk for rapid weight gain [53]. In addition, classroom lectures and clinical experience often hyperfocus on the "othering" of individuals with obesity, because of associated disease risk reflected in the literature. Students might be encouraged to engage in reflection and other activities to reduce weight bias, yet they also might observe their superiors stigmatize patients and fail to acknowledge the complexity of obesity [54]. These competing tensions leave students dealing with a double-standard that may feel difficult to navigate. Strategies to reduce this tension might include implementing policies that prohibit derogatory language about patients with obesity and providing peer support groups for students [52].

Strengths and limitations

This research study's strengths include a large sample size of medical students, which allowed for an expansive evaluation of formative experiences of weight bias, current obesity-related beliefs, and potential implications for their work with all patients and particularly those with obesity. Furthermore, this study provided a unique opportunity to better understand the harmful experiences and pain medical students and likely many practicing clinicians carry, including internalized weight bias, some of which enhanced their own empathy towards individuals with overweight and obesity, yet was clearly still painful for many students. These findings provide a strong foundation for future research and medical training curriculum development. Limitations of the study include that only a small portion of participants described formative experiences ($N = 212/716$, 29.6%), and the use of only one writing prompt. It is likely that our sample does not represent the full pool of people for whom childhood experiences have influenced their attitudes about body size. Moreover, our prompt question did not specifically seek information about formative experiences, and it is possible our sample reflects a highly specific group of individuals that were particularly sensitive to this topic. Future research should explore the use of other qualitative research methods, including interviews and focus groups, to achieve a more comprehensive understanding of students' formative experiences and internalized weight bias. It would also be helpful to gather more information about how students perceive these formative experiences as influencing their current work in healthcare. In addition, this analysis was focused on a group of medical students who took the IAT for weight bias and whose responses were selected for analysis because they contained reference to formative experiences. Students likely perceived the importance of being aware of weight bias through their engagement in this IAT exercise, which, in partnership with social desirability bias, might have created pressure for students to write what they believed faculty would perceive more favorably as opposed to their more genuine thoughts. The generalizability of findings from this cohort to other medical students, trainees, and practicing clinicians is important to explore in future research.

Conclusion

While weight bias has been long documented as harmful to patient care, there is a paucity of research on the impact of internalized weight bias among practicing clinicians, trainees and medical students. Internalized weight bias comes from lived experience, which may help providers better relate to their patients, and is consistent with narrative approaches in medicine. Future research should not only evaluate internalized weight bias among practicing clinicians, trainees, and medical students, through interviews and psychometric established measures, like the Weight Bias Internalization Scale [40], but also ask questions about how internalized weight bias impacts their perception of medical training on obesity, as well as their patient care and their own mental and physical health.

In summary, medical students are not blank slates or a neutral canvas entering their training; they come with their own assumptions and biases about weight influenced by formative experiences, which are proven to ultimately impact patient care. Many individuals have stories about weight bias, whether through direct experience or observation. From the themes generated in this research, it is evident that the medical students examined here have strong presumptions of where their biases may come from, how they are interwoven into present culture, and how they may impact their patient care. It is important to utilize these experiences as learning opportunities for increasing empathy and a better understanding of patient experiences. Devoting time to reflection and discussion, in addition to awareness building, narrative approaches, role-playing, and person-first language, will better prepare medical students in their working alliance with patients with obesity.

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Author contributions

KE, EC, TY, KG, and LD contributed to the initial conceptualization of the research idea. KE, EC, TY, and KG developed the methodology and performed the data analysis and coding. AD, EC, KE, TY, and KG created the manuscript tables and figure. All authors discussed the results and contributed to the writing of the final manuscript.

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Data availability

The anonymized participant responses examined in this manuscript can be provided upon request by contacting the first author.

Declarations

Ethics approval and consent to participate

All procedures were approved by the Institutional Review Board of the George Washington University Office of Human Research (NCR202270).

Competing interests

The authors declare no competing interests.

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