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ARTICLE

Epidemiology and Population Health

Associations among enacted weight stigma, weight self-stigma, and multiple physical health outcomes, healthcare utilization, and selected health behaviors

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BACKGROUND: This study examined the relationship among enacted weight stigma, weight self-stigma, and multiple health outcomes. Weight stigma, a stressor experienced across all body sizes, may contribute to poorer physical health outcomes by activating the nervous and endocrine system or by triggering counterproductive health behaviors like lower physical activity, maladaptive eating patterns, and delayed health care, as well as provider bias that may cause a medical concern to be discounted. While associations of weight stigma with mental health issues are well documented, less is known about its association with physical health.

METHODS: We enrolled 3821 adults who completed an online survey assessing enacted weight stigma, weight self-stigma, multiple self-reported physical health outcomes, healthcare utilization, and selected health behaviors.

RESULTS: After controlling for BMI, health care delay or avoidance, sedentary behavior, and selected demographic characteristics, enacted weight stigma, significantly increased the odds of six physical health problems including hypertension (OR 1.36; CI 1.08, 1.72), hyperglycemia (OR 1.73; CI 1.29, 2.31), thyroid disorder, (OR 1.65; CI 1.27, 2.13), any arthritis (OR 1.70; CI 1.27, 2.26), non-arthritic chronic pain (OR 1.76; CI 1.4, 2.29), and infertility (OR 1.53; CI 1.14, 2.05). Weight self-stigma significantly increased the odds for three physical health problems including hypertension (OR 1.43; CI 1.16, 1.76), hyperglycemia (OR 1.37; CI 1.03, 1.81), and non-arthritic chronic pain (OR 1.5; CI 1.2,1.87). Enacted stigma was associated with more than a four-fold increase in odds of believing that a medical concern was disregarded by a health care provider.

CONCLUSIONS: In this study, enacted stigma and weight self-stigma were independently associated with heightened risk for multiple physical health problems, as well as, believing health concerns were discounted by providers. Reducing weight stigma may be an important component of managing multiple physical health conditions.

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INTRODUCTION

Weight stigma is the devaluation of an individual or group due to weight or body size [1–4] and affects up to 57% of all persons regardless of body size [5]. Persons labeled as having obesity are increasingly recognized as more stigmatized than any other social group [1, 2]. They are viewed as lazy, weak-willed, unsuccessful, unintelligent, lacking self-discipline, and noncompliant with self-care and weight loss recommendations [1, 6]. Weight stigma is comprised of two main but distinctly different constructs: enacted weight stigma and weight self-stigma. Enacted weight stigma is bias, judgment, prejudice, or discrimination toward individuals based on their body size, body shape, or body weight [1, 7]. It includes, but is not limited to, discrimination in employment, education, and health care, as well as, teasing or bullying, and judgment [3, 8–12]. Weight self-stigma, also referred to as internal weight stigma, is the devaluation of oneself due to weight or body size [4, 8, 13]. It is characterized by a pervasive sense of shame, guilt, self-blame, poor self-worth, [13–17] and inferiority [18] and occurs when persons accept society's appraisal of them because of their body size [14–18].

There is substantial evidence linking both enacted stigma and weight self-stigma to poorer mental health outcomes, especially anxiety, depression, and low self-esteem [1, 12, 18–20]. Although limited, there is growing evidence that weight stigma also contributes to poorer physical health outcomes. Weight stigma, as with other stigmas, is viewed as stressful [21, 22]. Physiologically, stress activates the sympathetic nervous system (SNS) and the Hypothalamic Pituitary Axis (HPA) [23], increasing

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catecholamines and cortisol, which disrupts the cardiovascular and endocrine systems and plays a well-documented role in the development of obesity [24, 25], metabolic, and cardiovascular diseases [9, 25, 26]. Weight discrimination has also been associated with increased f2-isoprostanes (a measure of oxidative stress) [22], c-reactive protein [27], cortisol [28], and allostatic load [29]. In addition, the motivation to avoid or escape weight stigma often initiates counterproductive behaviors that contribute to poorer health including delayed or less frequent health care visits [30–34], lower engagement in physical activity, and more extreme or maladaptive eating patterns [35–37]. Further, weight bias on the part of health professionals can lead to discounted medical concerns because of weight, potentially delaying treatment and exacerbating the problem [5]. The need to end weight stigma is recognized internationally [38] and reducing weight-stigma, especially among health care providers, is considered key to improving the health of persons labeled as having obesity [12, 30, 38]. Despite strong theoretical support, research linking weight stigma to poor physical health outcomes rarely includes both enacted weight stigma and weight self-stigma, almost exclusively focuses on obesity as the disease outcome of interest [18, 20], primarily includes people who are labeled as having obesity, overweight, seeking weight-loss treatment, or older [19, 35, 39], and does not consider the competing roles of health care utilization or health behaviors.

The purpose of this study was to examine the relationship between enacted weight stigma and weight self-stigma with multiple self-reported health outcomes while controlling for health care delay or avoidance, and selected health behaviors.

METHODS

Subjects

All adults were recruited through university email listservs at two large, midwestern universities, social media (Facebook) and word of mouth. Our invitation to participate was worded as follows "*Researchers from the University of Iowa College of Nursing are recruiting participants who are age 18 or older to complete a survey about* **body weight**, **stigma**, *and* **health**. *The goal of this survey is to better understand how body weight, stigma, and health are related. Your survey responses are anonymous*". The only exclusion criteria were failure to complete consent and eligibility questions.

Data was collected via an electronic survey using the Qualtrics^{XM}® platform (Qualtrics, Provo, UT). Initially, 4606 accessed the survey and met the inclusion criteria (adults, age 18 or older). Of those, 785 failed to complete the consent or eligibility questions, leaving a final sample of 3821 (80.9%). All procedures were approved by The University of Iowa Institutional Review Board (IRB).

Measures

Enacted weight stigma. Enacted stigma was assessed using two questions. To be consistent with the most common measure of enacted weight stigma, we used the dichotomous, yes/no question "have you ever been discriminated against because of your weight?" [12, 40, 41]. A second dichotomous measure, "have you ever been mistreated, been teased, made to feel bad, or bullied by anyone because of your weight?" was included to reflect current literature describing the broader experience of enacted stigma [5]. For our sample, the Kuder-Richardson Formula (KR-20), a measure for internal consistency for dichotomous data, was 0.866.

Weight self-stigma. Weight self-stigma was measured using the 11-item Weight Bias Internalization Scale (WBIS). This scale conceptually evaluates "negative social stereotypes and how self-statements about individuals with overweight and obesity apply to oneself" [13, 42]. Following feedback from pilot testers, and as supported in the literature, we modified the original 7-point Likert scale by removing the neutral response options [11, 43]. Response options ranged from "strongly disagree" to "strongly agree". One item "Because of my body weight, I don't understand how anyone attractive would want to date me" had a high level of missingness (17.9%); pilot testers indicated the question was left blank because they were not dating and felt the question did not apply. Therefore, we imputed scores for this item based on the individual's mean response to all other items. A composite score was created by assigning a value of 0 to "strongly disagree" and 6 to "strongly agree". Possible scores ranged from 0-66, where higher scores indicate higher levels of weight self-stigma [10, 13]. Cronbach α for our sample was 0.935.

Health outcomes. Health outcomes were chosen to reflect common conditions that result, in part, from disruptions in the sympathetic nervous system (SNS) or HPA axis or exacerbated by stress, as well as major conditions that have been identified by the CDC, American Medical Association (AMA), or National Academy of Medicine (NAM) as being related to obesity or weight stigma. These include hypertension, hypercholesterolemia and hyperlipidemia, heart disease, thyroid disorder, arthritis or rheumatoid arthritis, chronic pain not related to arthritis, infertility, selected cancers, eating disorders, anxiety, and depression [44, 45]. The wording of the questions followed well-established health survey instruments such as the National Health Information Survey (NHIS) [46] and the Behavioral Risk Factor Survey (BRFS) [47]. In general, the stem for these questions was worded as "has a health care provider ever told you that you have [disease]? Body mass index (BMI) was calculated using self-reported height and weight and categorized using the Center for Disease Control and Prevention (CDC) categories of BMI: underweight (>18.5 kg/m^2), normal or healthy weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obesity (≥30.0 kg/m^2) [45].

Healthcare utilization and health behaviors. Health care utilization and health behaviors were considered as they may affect the relationship between weight stigma and disease outcomes. We asked participants about their health care utilization by asking whether they had ever delayed or avoided healthcare due to body size or whether they felt medical concerns were disregarded because of their weight. Physical activity was assessed by asking the frequency of engaging in regular exercise or physical activity (0–7 days per week). We were conservative in our estimate of sedentary behavior; persons reporting no regular exercise (0 days physical activity per week) were classified as sedentary. Cigarette smoking status was classified as ever, current, and never.

Data analysis

Means and standard deviations were used to describe sample characteristics that were normally distributed. Medians or percentages were used to describe non-normally distributed and categorical characteristics. The WBIS composite score was dichotomized, at the midpoint, with scores greater than or equal to 33 indicating high levels of weight self-stigma [5]. Fisher's Exact tests were used to examine bivariate associations between health outcomes, healthcare utilization, health behavior, and the weight stigmas. We used Bonferroni correction to adjust for multiple comparisons. Separate logistic regression models were developed using each health outcome as the dependent variable with one measure of weight stigma as the major independent variable. Final models were adjusted for age, gender race/ethnicity, BMI, education level, sedentary behavior and delayed or avoided health care. Odds ratios (OR), 95% confidence intervals (CI), and p-values are reported. All analyses were completed using R Studio (version 1.1.453) [48].

RESULTS

Of the 3821 participants, most (80%) were female and non-Hispanic white (86%). Over half (61%) had either a bachelor's degree or postgraduate education. Age was not normally distributed, therefore, was categorized according to the Behavioral Risk Factor Survey (BRFS) [49] with 72% of the sample between 18 and 44 years old. The average BMI was 28.16 kg/m^2 (SD 7.82); 2% were underweight, 40% normal weight, 26% overweight, and 31% with obesity. (Table 1).

High weight self-stigma was reported by 24% of participants, 15% reported weight discrimination and 32% reported being teased, made to feel bad or bullied because of their weight. Overall, the prevalence of physical health problems ranged from 9% for hyperglycemia to 22% for hypertension. Anxiety and depression were more common at 33% and 36% respectively. The prevalence of all physical and mental health conditions was 8% to 17% higher among persons reporting enacted stigma, regardless

Table 1. Selected demographic characteristics of the 3821 study participants.

	N (%)
Gender	
Male	715 (19)
Female	3055 (80)
Other	51 (1)
Age	
18–44	2750 (72)
45–64	872 (23)
≥65	199 (5)
Race/Ethnicity	
Non-Hispanic White	3304 (86)
Latino or Hispanic American	143 (4)
Black, African	64 (2)
Asian	132 (3)
Mixed	101 (3)
Other	77 (2)
Body Mass Index (BMI) (kg/m^2)	
Underweight (<18.5 kg/m^2)	90 (2)
Normal Weight (18.5-24.9 kg/m^2)	1530 (40)
Overweight (25.0-29.9 kg/m^2)	1001 (26)
Obesity (≥ 30.0 kg/m^2)	1200 (31)
Education	
High school or less	1136 (30)
Associates or vocational	333 (9)
Bachelor's	1213 (32)
Postgraduate	1133 (29)

of how weight stigma was measured ($p < 0.001$). Seven of the 10 health conditions were more common among persons reporting high weight self-stigma ($p < 0.05$); the exceptions were hyperlipidemia, arthritis, and infertility (Table 2). The prevalence of heart disease and cancer (breast, colon, ovarian) was less than 2% and not considered in the analysis.

Sedentary behavior was reported by 26% of the sample and again was more common among persons reporting *any* type of weight stigma. Current smoking among participants was too low (approximately 3%) to be included in subsequent analyses. Most people (73%) reported delaying or avoiding health care; this was significantly more common among those reporting either enacted or weight self-stigma but greatest (88%) among those reporting weight self-stigma.

More than one third (34%-36%) of persons reporting any form of weight stigma believed that a medical concern had been discounted because of their body weight or body size. This was 13–16% higher than the total population.

After controlling for age, gender, race/ethnicity, education level, sedentary behavior, and delayed health care, persons reporting any type of weight stigma had an increased odds of nine diseases/conditions. Enacted weight stigma, defined as discrimination, increased the odds of six physical health problems including hypertension (OR 1.36; CI 1.08, 1.72), hyperglycemia (OR 1.73; CI 1.29, 2.31), thyroid disorder (OR1.65; CI 1.27, 2.13), any arthritis (OR 1.70; CI 1.27, 2.26), chronic pain unrelated to arthritis (OR 1.76; CI 1.4, 2.29), and infertility (OR 1.53; CI 1.14, 2.05). However, enacted stigma defined as being teased, made to feel bad or bullied, increased the odds of only two physical diseases/conditions hypertension (OR 1.24; CI 1.03, 1.50) and chronic pain, unrelated to arthritis (OR 1.58; CI 1.29, 1.94). Weight self-stigma was associated with 43% to 50% increased odds for three physical health diseases/conditions including hypertension (OR 1.43; CI 1.16, 1.76), hyperglycemia (OR 1.37; CI 1.03, 1.81), and chronic pain unrelated to arthritis (OR 1.5; CI 1.2, 1.87) (Table 3).

All types of weight stigma significantly increased the odds of anxiety disorders and depression with ORs ranging from 1.63 for enacted stigma to 2.33 for weight self-stigma. Weight self-stigma and enacted stigma, defined as being teased, made to feel bad or bullied also increased the odds of eating disorders (OR 2.67; CI 1.97, 3.64) and (OR 1.98; CI 1.49, 2.65), respectively.

All weight stigmas, especially enacted stigma, were associated with an increased odds of believing a health care concern had been discounted. There was more than a four-fold increase in the odds of having a health care concern discounted for those reporting enacted stigma via discrimination (OR 4.82; CI 3.77, 6.16) or for being teased, made to feel bad or bullied (OR 4.05; CI 3.08, 5.38) compared to those without enacted weight stigma. The OR for weight self-stigma was substantially lower (OR 1.56; CI 1.23,1.98).

DISCUSSION

We examined the association between enacted weight stigma and weight self-stigma in a large, diverse population. Our research suggests that weight stigma may heighten the risk for multiple physical health outcomes including hyperglycemia, hypertension, arthritis, chronic pain unrelated to arthritis, thyroid disorders, and infertility, independent of BMI, race/ethnicity, education, sedentary behavior, or delaying or avoiding health care.

We found an increased adjusted odds of hyperglycemia among persons with high weight self-stigma and weight discrimination which supports an association between weight stigma and adverse metabolic outcomes. Although the metabolic indicators among studies differed, our findings are consistent with those of Pearl and colleagues who report increased risk for metabolic syndrome among treatment seeking adults with high internalized weight stigma [50], as well as, two other small studies that observed positive associations between weight discrimination and glycated hemoglobin (HbA1c) [51] or diabetes [50].

Weight stigma increased the adjusted odds of hypertension by 24–43% with the greatest increase for those reporting higher weight self-stigma. To our knowledge this finding has not yet been reported; however, hypertension has been observed among other stigmatized or discriminated groups and is consistent with SNS activation that occurs as part of the physiological response to stress [52]. Given the high prevalence of both hypertension and weight stigma in the general population, an independent contribution of weight stigma to the development of hypertension, even if small, could have a substantial population impact and warrants more comprehensive evaluation.

We found no significant association between our other measures of cardiovascular disease (CVD) (self-reported high cholesterol and hyperlipidemia) and any type of weight stigma. This contrasts with the only study we found addressing CVD and weight stigma, which showed an increased risk for atherosclerosis and minor heart disease among persons reporting weight discrimination [39]. That study, completed in 2005, included only people labeled as overweight or having obesity from the National Survey of Alcohol and Related Conditions (NESARC) dataset where the prevalence of weight discrimination was low (3.2%) and who likely were at greater risk for CVD making comparisons between studies difficult [39]. However, since there is literature linking stigma from race and gender to CVD [52] this area deserves further research.

We found the adjusted odds of non-arthritic, chronic pain 50% to 79% higher among those reporting high weight self-stigma or enacted stigma after controlling for BMI. This finding is consistent with two small studies of adults with overweight or obesity where

Table 2. Prevalence of weight stigma and health outcomes, health behavior, and healthcare utilization by weight self-stigma and enacted weight stigma.

	Total	Weight self-stigma (WBIS ≥ 33[a])	Enacted weight stigma: discrimination	Enacted weight stigma: teased, made to feel bad, bullied
Overall prevalence, *N* (%)		912 (24)	565 (15)	1218 (32)
Health outcomes	*N* %	*N* (%)	*N* (%)	*N* (%)
Hypertension	834 (22)	278 (30)‡	195 (35)‡	447 (26)‡
Hypercholesterolemia or Hyperlipidemia	786 (21)	219 (24)	160 (29)‡	401 (23)‡
Hyperglycemia	346 (9)	127 (14)‡	105 (19)‡	197 (11)‡
Thyroid Disorder	516 (14)	155 (17)*	126 (23)‡	260 (15)
Arthritis or Rheumatoid Arthritis	494 (13)	132 (14)	120 (22)‡	238 (14)
Chronic Pain not related to arthritis	552 (14)	198 (22)‡	142 (26)‡	323 (19)‡
Infertility	369 (10)	100 (11)	89 (16)‡	181 (11)
Anxiety Disorder	1280 (33)	473 (52)‡	273 (49)‡	727 (42)‡
Depression	1360 (36)	513 (56)‡	295 (53)‡	790 (46)‡
Eating disorders	270 (7)	116 (13)‡	59 (11)*	170 (10)‡
Health behavior				
Sedentary (No Weekly Exercise)	976 (26)	358 (40)‡	203 (37)‡	526 (31)‡
Healthcare utilization				
Delayed or avoided seeking care	2771 (73)	805 (88)‡	463 (84)‡	1004 (85)‡
Medical concern disregarded	809 (21)	331 (36)‡	206 (37)‡	398 (34)‡

*$p < 0.05$; †$p < 0.01$; ‡$p < 0.001$ tested for multiple comparisons using Bonferroni corrections.
[a]A Weight Bias Internalization Scale (WBIS) score ≥ 33 indicates higher weight self-stigma.

Table 3. Adjusted odds for health outcomes, health behavior, and healthcare utilization by weight stigmas.

	Weight self-stigma (WBIS ≥ 33)	Enacted weight stigma: discrimination	Enacted weight stigma: teased, made to feel bad, bullied
Health outcomes	OR (CI)	OR (CI)	OR (CI)
Hypertension	1.43 (1.16, 1.76)‡	1.36 (1.08, 1.72)†	1.24 (1.03, 1.50)*
Hypercholesterolemia or Hyperlipidemia	0.96 (0.77, 1.20)	1.11 (0.87, 1.41)	1.21 (1.00, 1.47)
Hyperglycemia	1.37 (1.03, 1.81)*	1.73 (1.29, 2.31)‡	1.26 (0.97, 1.65)
Thyroid Disorder	1.20 (0.94, 1.53)	1.65 (1.27, 2.13)‡	1.10 (0.89, 1.37)
Arthritis or Rheumatoid Arthritis	0.93 (0.70, 1.22)	1.70 (1.27, 2.26)‡	1.16 (0.91, 1.48)
Chronic Pain not related to arthritis	1.50 (1.20, 1.87)‡	1.79 (1.40, 2.29)‡	1.58 (1.29, 1.94)‡
Infertility	0.94 (0.71, 1.25)	1.53 (1.14, 2.05)†	1.01 (0.79, 1.29)
Anxiety Disorder	2.01 (1.69, 2.40)‡	1.65 (1.34, 2.03)‡	1.63 (1.40, 1.90)‡
Depression	2.33 (1.96, 2.78)‡	1.66 (1.35, 2.03)‡	1.89 (1.62, 2.20)‡
Eating disorders	2.67 (1.97, 3.64)‡	1.43 (1.00, 2.03)	1.98 (1.49, 2.65)‡
Healthcare utilization			
Medical concern disregarded	1.56 (1.23, 1.98)‡	4.82 (3.77, 6.16)‡	4.05 (3.08, 5.38)‡

Adjusted for gender, age, race/ethnicity, BMI, education level, sedentary behavior, and delayed or avoided care.
OR odds ratio, 95% CI confidence Interval.
*$p < 0.05$; †$p < 0.01$; ‡$p < 0.001$.

internalized weight stigma, measured by WBIS, was associated with higher levels of non-joint bodily pain [53, 54]. There is a well-established link between obesity and chronic pain, mediated primarily through mechanical loading and inflammatory mechanisms; however, the presence of chronic pain independent of body size or joint disease suggests other mechanisms may be important. One hypothesis, offered by Olson and colleagues, is that social and physical pain is processed by the same neuroanatomical and physiological mechanisms [53]; thus, weight stigma may affect the experience of physical pain through shared pathways. Pain is associated with decreased quality of life and may hinder mobility and engagement in activities that promotes health [55]. If the relationship between weight stigma and pain holds in future studies, then reducing weight stigma may be one way to reduce pain related morbidities.

We are unique in our inclusion of thyroid disease and infertility. While weight discrimination was associated with 65% increased odds of thyroid disease and 53% increased odds of infertility, this

relationship was not consistent for weight-self-stigma or enacted stigma defined as teased, bullied or made to feel bad. Because activation of the HPA system can affect thyroid hormones and suppress gonadal function [56, 57], we included these conditions in our survey. An additional concern, is that women labeled as having obesity report experiencing weight stigma during prenatal health care [58], which may lead women seeking infertility care to delay or avoid care from their obstetrician/gynecologist. However, our questions were general; future studies should have more details, particularly regarding the type of thyroid disease (hyper/hypo) and the nature of the infertility.

To be consistent with other literature, we included three mental health conditions. Similar to previous research, we found an increased odds of anxiety, depression, and eating disorders among people with any weight stigma [20, 41, 59, 60]. We note that these three mental health disorders were most prevalent among those endorsing weight self-stigma. Further, those endorsing weight self-stigma exceeded two times the odds of having anxiety disorder, depression, or an eating disorder, respectively compared to those who didn't. This supports the supposition that internalization of a weight stigma may be more disruptive to mental health than enacted stigma [20, 60].

Our study provides evidence that a high proportion of people feel their medical concerns have been *disregarded* because of their body weight, particularly among those who report experiencing enacted stigma. The impact of disregarding or discounting medical concerns was demonstrated in a study of virtual patients complaining of shortness of breath. Persons labeled as having obesity were more likely to receive lifestyle change recommendations while those who not labeled as having obesity were more likely to receive medication management [34]. Similarly, a recent study demonstrated a relationship between BMI, stigmatizing experiences, and switching primary care providers. Participants with higher BMI were found to avoid or delay care or switch doctors as a result of stigmatizing experiences or poor communication [61]. There is substantial literature on the effect of provider weight bias on patient/provider relationships [5, 60], however, the literature on discounting or disregarding a medical concern and its impact on treatment and health outcomes is sparce. Our study only reports the perception that a medical problem has been disregarded/discounted and more research substantiating this phenomenon coupled with outcome effects is needed.

We included two conceptually different forms of weight stigma, enacted stigma, and weight self-stigma to identify differences in potential risks. Enacted stigma, defined as discrimination, was the more powerful measure significantly associated with increased odds for six physical health problems. Enacted stigma defined as teased, made to feel bad or bullied and weight self-stigma, were associated with fewer conditions, none of which were unique to those measures. The reasons for the differences among measures cannot be determined in the present study; however, our study suggests that it is important to include both in research and clinical practice. Excluding weight discrimination in research on weight stigma and physical health problems could miss important risks. Since including the broader measure of enacted stigma (teased, made to feel bad or bullied) and weight self-stigma likely capture more people, excluding those measures may overlook people at heightened risk for any physical health problems related to weight stigma.

Our study has several strengths but is not without limitations. The sample, while large and selected from a general, non-treatment seeking population, was cross-sectional and not randomly selected. It was diverse with respect to weight, including a distribution of persons labeled as having obesity, overweight, and normal weight (per BMI using self-reported height and weight) that is like the general population but, typical of weight stigma studies, males and racial and ethnic minorities were underrepresented. BMI was calculated using self-reported height and weight therefore subject to reporting bias. However, self-reported BMI is widely used in large survey studies and was shown to be highly correlated with direct measures of height and weight [12]. Although we worded our study questions in accordance with reliable national health surveys, our health outcome measures were self-reported and therefore subject to undetectable bias. It is important to corroborate our findings with longitudinal studies and objective health outcome measures.

CONCLUSION

We provide evidence that weight stigma, particularly, enacted stigma, defined as discrimination, increases the odds of six physical health problems including hyperglycemia, hypertension, chronic pain unrelated to arthritis, arthritis, infertility, and thyroid disease and confirms its association with anxiety, depression and eating disorders. Importantly, by controlling for delaying or avoiding healthcare and sedentary behavior we demonstrated that the associations of weight stigma with physical health problems is not simply due to those factors. If our findings are confirmed in future studies, then reducing enacted weight stigma and weight self-stigma will be important in the management of multiple physical health problems.

DATA AVAILABILITY

The data generated from this study are available upon reasonable request from the corresponding author.

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AUTHOR CONTRIBUTIONS

AP, MKC, SE conceptualized the study, interpreted the data, and prepared the manuscript. AH and AO analyzed the data and contributed to the manuscript.

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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