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Weight Stigma among Undergraduate Healthcare Students: A Vignette Study

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Abstract: Weight stigma is described as prejudice and discrimination concerning body weight. People stigmatized by their body weight report worse physical and mental health and, consequently, poor psychosocial functioning. Research has shown a high prevalence of weight stigma among health professionals. However, less is known about weight stigma among healthcare undergraduate students. In this vignette study, we assessed weight stigma in 217 healthcare students, who filled sociodemographic and weight stigma measures, and read one of three vignettes at random, each one with a hypothetical patient which differs only in terms of body weight (underweight, healthy weight, and overweight). Then, participants answered ten questions/statements about patient characteristics described in the vignette to assess the influence of body weight on stigmatizing beliefs. Weight stigma was found in 39.44% of healthcare students. Moreover, weight stigma was higher among men, healthy weight people, and Physical Therapy students. This experimental study showed more negative attitudes in participants exposed to the patient with overweight and underweight vignettes compared to those exposed to the healthy weight patient vignette. Due to the known impacts of weight stigma, efforts are needed to address this issue during the training of healthcare undergraduate students.

Keywords: weight prejudice; anti-fat attitudes; discrimination; social stigma; obesity; students; health occupations

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1. Introduction

Obesity is associated with comorbidities that affect global public health [1,2]. Interestingly, not only being overweight (i.e., body mass index [BMI] > 25.0 kg/m^2) stands out as a source of concern, but also being underweight (i.e., BMI < 18.9 kg/m^2), because both are significant risk factors for cardiometabolic diseases [1,3]. However, the comorbidities associated with BMI go beyond physical ones, as such conditions elevate the risk of body dissatisfaction, eating disorders, discrimination, and prejudice [4,5]. Data indicate that the prevalence of discrimination based on body weight, hereafter referred to as weight stigma, can reach 57% in adults from the U.S. [6]. Moreover, although health professionals are directly involved in the treatment of individuals living with obesity, they are also recurrent sources of weight stigma [7,8].

Weight stigma is described as prejudice and discrimination concerning body weight [7,9], which encompasses attitudes, feelings, stereotypes, attributes, beliefs, and behaviors contrary to individuals perceived to be overweight, which is equivalent to the prevalent rates of racial discrimination [10,11]. Weight stigma is frequent in social media, newspapers, television programs, books, children's media, and health campaigns [4,12,13]. It is used as a social control tool based on blaming or holding individuals responsible for their excessive weight [6]. To promote healthy habits, speeches are propagated with stigmatizing

messages [14,15]. However, the evidence available to date indicates that stigmatizing individuals based on their body weight is harmful to health and can lead to physical, psychological, and social disorders [5,16]. It is worth noting that individuals perceived to be underweight are also victims of weight stigma and its harmful effects on health [17].

Contrary to expectations, health professionals, even those specialized in obesity, are sources of weight stigma [8,16,18]. Individuals with overweight or obesity report the occurrence of inappropriate and disrespectful comments during care and consultations, in addition to reporting feeling misunderstood by these professionals [18]. Therefore, the current literature shows evidence of elevated weight stigma among health professionals [8,16,18]. On the other hand, there are reports from doctors who feel unprepared and have little knowledge on how to conduct treatments involving individuals with overweight, claiming to receive little information during their training [19,20]. Unexpectedly, even claiming a lack of preparation and little knowledge, they consider that obesity is part of their professional field, and it is a medical obligation to warn individuals with overweight about the risks and health consequences that obesity entails [21,22]. When treating an individual with overweight, health professionals can change their approach, care, and treatment [23]. The heavier the patient evaluated, the fewer tests prescribed, as well as less patience and commitment to treatment and, consequently, less time dedicated to the consultation [23,24]. Thus, weight stigma perpetrated by health professionals is notorious [5,8].

Studies have reported high rates of weight stigma among physical education professionals [25,26]. Furthermore, individuals with obesity frequently report experiencing weight stigma in physical exercise environments [27]. Physiotherapists, for example, use weight control strategies as part of their scope of practice [28], but exhibit high levels of weight stigma [29,30], such as believing that people with obesity are unmotivated, nonadherent, and unattractive [29,30]. Similar results were found among nutritionists, who describe individuals with obesity as inelegant, lacking willpower, lazy, and greedy [25]. Current literature shows that when nutritionists are asked about the causes of obesity, they tend to blame individuals, claiming that patients with overweight are unaware and do not care about their bodies, as well as arguing that they are addicted or dependent on food and could achieve their ideal weight if they were motivated [25]. This emphasis on a patient's lack of awareness and willpower represents a stigmatizing view, given that individuals with overweight or obesity already blame themselves and are ashamed of their bodies [5,8].

Existing literature regarding weight stigma is aimed especially at trained professionals and medical students (residents) [8,16,18]. Given the above, it is worth asking: What are the perceptions among future health professionals regarding individuals underweight, of a healthy weight, and overweight? Is weight stigma directed only at individuals overweight, or underweight? Given the above, the main aim of the present study was to evaluate weight stigma and the influence of body weight on weight stigma among undergraduate healthcare students.

It was hypothesized that readers of the vignette describing a patient as overweight or underweight would show higher weight stigma perceptions (i.e., overall negative perceptions about the patient) than readers depicting a healthy-weight patient. As previously stated, health professionals are described as recurrent sources of weight stigma, which may originate from daily social interactions, including during their formal professional training (graduation). Healthcare students will eventually become professionals and serve their communities, including individuals with and without overweight. If they present weight stigma at this stage of training they may act in a stigmatizing way toward patients in the future.

2. Materials and Methods

2.1. Participants

This vignette study [31,32] was conducted using an online survey with 217 undergraduate healthcare students at a higher education institution in Brazil. Inclusion criteria included students who were (a) over the age of 18, and (b) regularly enrolled in any course

in the health field (i.e., physical education, nutrition, physiotherapy, pharmacy, dentistry, and medicine).

The sample size was calculated considering the ANCOVA test with fixed effects, with analysis of main effects and interactions, using the G*Power software version 3.1.9.4. The parameters specified a priori were as follows: (a) moderate effect size (f = 0.25), (b) α = 5%, (c) power of 80%, (d) comparison of three groups (respondents from vignettes A, B, and C), and (e) a control covariate (measure of weight stigma). A total of 179 participants was required. However, data were collected from all healthcare students interested in participating.

2.2. Procedures

The present study respected the principles of resolution number 466/2012 of the National Health Council (Brazil) and the principles of the Declaration of Helsinki. It was approved by the IRB, where the data were collected (approval number 4.746.480).

The study was advertised on the institution's official website with an invitation to healthcare students. The invitation described the main objective of the present study as "evaluating the perceptions of healthcare students on patients' health, using vignettes". Furthermore, an email was sent to the course coordinators asking them to send an official invitation to all students enrolled during the semester in which data collection was taking place. The invitation email explained the research objectives and provided the access link to the online form (Google Forms®). When accessing the form, participants had access to the informed consent form and, in case of agreement, questionnaires were presented in the sequence. First, participants responded to the sociodemographic questionnaire, followed by the Anti-fat Attitudes Test [33]. Afterward, they read one of the vignettes described below. Finally, they completed a questionnaire evaluating their perceptions of patients described in the vignette. Students self-selected from vignettes A, B, or C, but they were not aware of the contents of each vignette, thus serving as a method for randomizing participants between the vignettes.

Three vignettes were developed to evaluate the influence of body weight on the stigmatizing beliefs of healthcare students (see Table 1). Each presented hypothetical data from a patient. The vignettes described demographic data (i.e., gender, age, and race/ethnicity), anthropometric data (i.e., body mass, height, and BMI), biochemical data (i.e., total cholesterol, HDL, LDL, and fasting glucose), blood pressure data, and lifestyle habits, such as physical exercise, average nighttime sleep time, and food consumption. The three vignettes reflected parameters suitable for a healthy adult, so no specific blood or dietary measurement alone could indicate a poor lifestyle or habits. Data on blood pressure [34], cholesterol [35], fasting glucose [36], dietary habits [37], hours of sleep, and physical activity of patients were within the general recommendations for a healthy adult [38]. The only data that differed between the three vignettes were the patient's body weight and BMI, resulting in three vignettes: an underweight patient (vignette 'A'), a healthy-weight patient (vignette 'B'), and an overweight patient (vignette 'C'). Participants were asked to randomly choose one of the vignettes to read without knowing its content.

2.3. Measures

2.3.1. Demographic Data

The first questionnaire aimed to collect sociodemographic data, including undergraduate course, year of ingress, sex assigned at birth, age, self-reported body mass, and height (to calculate BMI).

2.3.2. Weight Stigma

Weight stigma was assessed using the Anti-fat Attitudes Test (its adapted and validated version for Brazilian Portuguese) [33]. The Anti-fat Attitudes Test includes 34 items answered on a 5-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). Higher scores reflect more negative attitudes toward obesity and individuals with obesity [33].

Through factor analysis, the authors identified that the instrument had a structure composed of three subscales, namely: *Social and character depreciation*, *Physical and romantic unattractiveness*, and *Weight control and guilt* [33]. The total score is obtained by summing the scores divided by the number of items on the scale [33]. Scores > 68 indicate weight stigma attitudes [33]. The score for each subscale is calculated by summing the scores attributed by the respondent to each item that makes up each subscale, divided by the number of items that make up each subscale. The scores obtained in the Anti-fat Attitudes Test were used to measure weight stigma in healthcare students and to verify parity between the groups allocated to each vignette (vignettes A, B, and C, explained below). In the present study, the internal consistency of the Anti-fat Attitudes Test was good (McDonald's omega [ω] = 0.90 [95% CI = 0.88, 0.92]).

Table 1. Vignettes used for the exposure (reading) experiment.

Vignettes	Description Presented to the Participant
A	Maria, aged 28, went to the place where you are an intern, looking for basic healthcare for a routine consultation, after a small assessment it was found that **she is 1.65 m tall, has a body mass of 45 kg, and has a body mass index of 16.5 kg/m^2, considered underweight within the body mass index classification**. Maria's biochemical tests showed adequate values, namely: Total cholesterol: 148 mg/dL; HDL: 50 mg/dL; LDL: 80 mg/dL; Fasting blood glucose: 95 mg/dL. After measuring blood pressure, a value was found to be within normal limits for women in her age group, corresponding to systolic blood pressure of 116 mmHg and diastolic blood pressure of 76 mmHg. When talking about her daily routine, Maria reported that she has good habits. She usually sleeps around 7 to 8 h a day at night and exercises regularly at a frequency of 5 times a week, for 50 min each session. Regarding eating habits, Maria reported an adequate caloric intake for the parameters expected for her physical constitution, consistent with her total energy expenditure. After your report, the consumption of sufficient amounts of protein, lipids, and carbohydrates is noticeable. Maria chooses natural foods, avoiding processed foods and consuming portions of fruits, vegetables, and vegetables. Finally, Maria reported being happy with her lifestyle habits and her body. *
B	* same description, except the following statement "**she is 1.65 m tall, has a body mass of 60 kg, and has a body mass index of 22 kg/m^2, considered healthy-weight within the body mass index classification**"
C	* same description, except the following statement "**she is 1.65 m tall, has a body mass of 75 kg, and has a body mass index of 27.5 kg/m^2, considered overweight within the body mass index classification**"

HDL, high-density lipoprotein; LDL, low-density lipoprotein. * Vignettes B and C have identical content to vignette A, except for the text in bold (change in body weight and height, and body mass index).

2.3.3. Overall Perceptions Questionnaire

After reading one of the vignettes, the participants responded to the fourth questionnaire, which was prepared based on questions from previous studies [39,40], and consisted of ten statements to evaluate the healthcare student's perception regarding the patient's general health status, quality of eating habits, level of physical activity, general quality of life, how well the patient took care of him/herself, level of self-esteem, health management, level of body satisfaction, and level of awareness of the current health status. Each statement was responded to using a 5-point Likert-type scale (1 = excellent; 2 = good; 3 = regular; 4 = poor, e; 5 = very poor). Higher scores demonstrate more negative attitudes of the respondent toward the patient. The overall perception questionnaire showed excellent internal consistency (ω = 0.97 [95% CI = 0.96, 0.98]).

2.4. Statistical Analysis

All data were processed using the JASP software version 0.18.3.0, with a significance level of 5%. Data were described using absolute and relative frequencies for categorical

data and mean and standard deviations for continuous data. The presence or absence of weight stigma was obtained from the Anti-fat Attitudes Test scores. An average score greater than 2 indicates the presence of weight stigma [33].

Tests were carried out to compare weight stigma scores in relation to sociodemographic variables (i.e., gender, body mass index, undergraduate course, and year of course) using the Mann–Whitney or Kruskal–Wallis U test, when relevant. The weight stigmas of participants allocated to vignettes A, B, and C were compared using the Kruskal–Wallis test. For both cases, post hoc pairwise comparisons were performed using the Dwass–Steel–Critchlow–Fligner test. Due to the identified differences in weight stigma among participants allocated to vignettes A, B, and C, to evaluate the influence of body weight described in the vignettes on the weight stigma of healthcare students, an ANCOVA test was performed, using the total scores obtained in the Anti-fat Attitudes Test as control variables. Effect sizes were evaluated for all tests, expressed in Cohen's *d*. Values were classified as 0.20–0.50 (small), 0.50–0.80 (medium), and above 0.80 (large).

3. Results

Of the 217 participants, 4 were excluded—2 for not providing sociodemographic data, 1 for not answering the Anti-fat Attitudes Test questionnaire, and 1 for not answering the questions asked after reading the vignette. Data from 213 healthcare students were analyzed, with 65.73% of the sample being female (n = 140); representing 11.4% of the response rate, taking into account the total number of healthcare students enrolled at the educational institution. The total sample had a mean age of 22.90 years (SD = 3.35) and a mean BMI of 23.20 kg/m^2 (SD = 5.46). The prevalence of weight stigma, assessed by the Anti-fat Attitudes Test, was 39.44% (n = 84). Table 2 presents the descriptive data of the sample and the comparison of weight stigma scores concerning sociodemographic characteristics.

Comparison between the sexes demonstrated statistically significant differences for the total score of the Anti-fat Attitudes Test (Mann–Whitney U = 3407; $p < 0.001$; Cohen's d = 0.33 [95% CI = 0.18–0.47]), and the *Weight control and guilt* subscale (Mann–Whitney U = 3776; p = 0.002; Cohen's d = 0.26 [95% CI = 0.10–0.41]). In both cases, men exhibited higher levels than women (Table 2). To compare between groups by nutritional status, statistically significant differences were also found for the total scores of the Anti-fat Attitudes Test ($\chi^2(2) = 9.19$; p = 0.01) and the *Weight control and guilt* subscale ($\chi^2(2) = 11.58$; p = 0.003). The Dwass–Steel–Critchlow–Fligner post hoc test demonstrated a higher total score for healthy-weight individuals compared to individuals who were overweight (p = 0.033), as well as for healthy-weight individuals compared to underweight individuals (p = 0.044) and individuals who were overweight (p = 0.011) in the *Weight control and guilt* subscale (Table 2).

Regarding health courses, a statistically significant difference was observed only for the *Social and character depreciation* subscale ($\chi^2(5) = 21.36$; $p < 0.001$). The Dwass–Steel–Critchlow–Fligner post hoc test demonstrated higher scores on this subscale for physiotherapy students compared to physical education students (p = 0.012) and nutrition students (p = 0.006). In both cases, the highest scores were for the physiotherapy course students (Table 2).

To verify the pairing between the students who read vignettes A, B, and C concerning weight stigma, a comparison test was carried out between the groups, which indicated that there were statistically significant differences regarding the total scores of the Anti-fat Attitudes Test ($\chi^2(2) = 8.54$; p = 0.014) and the *Physical and romantic unattractiveness* subscale ($\chi^2(2) = 7.17$; $p < 0.028$). The Dwass–Steel–Critchlow–Fligner post hoc test demonstrated higher total scores in readers of vignette C compared to readers of vignette A (p = 0.019). For the *Physical and romantic unattractiveness* subscale, higher scores were observed for readers of vignette B compared to readers of vignette A (p = 0.042; Table 2). Due to the non-matching of weight stigma among the groups of readers of vignettes A, B, and C, the ANCOVA test, considering weight stigma as a covariate, was used to evaluate the influence of body weight described in the vignettes on the stigmatizing beliefs of healthcare students.

Table 2. Descriptive data and comparison of variables concerning the total scores of the Anti-fat Attitudes Scale (weight stigma) and its subscales among healthcare students (*n* = 213).

Variables	Anti-Fat Attitudes Test (Total Score) *M* (*SD*)	*Weight Control and Guilt* Subscale *M* (*SD*)	*Physical and Romantic Unattractiveness* Subscale *M* (*SD*)	*Social and Character Depreciation* Subscale *M* (*SD*)
Sex				
Male (*n* = 73; 34.27%)	2.20 (0.52) [a]	2.52 (0.74) [a]	2.20 (0.50)	1.81 (0.49)
Female (*n* = 140; 65.73%)	1.95 (0.41) [a]	2.20 (0.65) [a]	2.09 (0.45)	1.77 (0.48)
Body mass index				
Underweight (*n* = 20; 9.39%)	1.93 (0.47)	2.10 (0.68) [d]	2.11 (0.48)	1.63 (0.56)
Healthy weight (*n* = 120; 56.34%)	2.11 (0.51) [b]	2.46 (0.74) [c,d]	2.18 (0.52)	1.80 (0.47)
Overweight (*n* = 73; 34.27%)	1.94 (0.36) [b]	2.14 (0.57) [c]	2.05 (0.36)	1.83 (0.46)
Course				
Physical Education (*n* = 48; 22.53%)	1.98 (0.45)	2.34 (0.64)	2.08 (0.46)	1.65 (0.28) [e]
Pharmacy (*n* = 25; 11.74%)	2.19 (0.48)	2.41 (0.70)	2.20 (0.49)	1.93 (0.68)
Physiotherapy (*n* = 23; 10.80%)	2.10 (0.54)	2.31 (0.72)	2.12 (0.54)	2.06 (0.59) [e,f]
Medicine (*n* = 45; 21.13%)	2.09 (0.52)	2.33 (0.80)	2.28 (0.50)	1.68 (0.49)
Nutrition (*n* = 48; 22.53%)	1.91 (0.33)	2.18 (0.60)	2.03 (0.34)	1.64 (0.35) [f]
Dentistry (*n* = 24; 11.27%)	2.08 (0.49)	2.43 (0.76)	2.08 (0.55)	1.89 (0.48)
Course year				
1st and 2nd year (*n* = 63; 29.58%)	2.02 (0.36)	2.33 (0.63)	2.12 (0.31)	1.75 (0.46)
3rd and 4th year (*n* = 78; 36.62%)	2.03 (0.48)	2.33 (0.70)	2.12 (0.51)	1.85 (0.47)
5th and 6th year (*n* =72; 33.80%)	2.05 (0.54)	2.30 (0.76)	1.75 (0.46)	1.78 (0.51)
Vignette				
A (*n* = 86; 40.37%)	1.93 (0.38) [g]	2.24 (0.62)	2.03 (0.38) [h]	1.77 (0.45)
B (*n* = 68; 31.93%)	2.05 (0.38)	2.23 (0.56)	2.17 (0.36) [h]	1.77 (0.46)
C (*n* = 59; 27.70%)	2.18 (0.62) [g]	2.54 (0.88)	2.22 (0.65)	1.87 (0.55)

M, Mean; SD, standard deviation. [a] Significant difference between sexes. [b] Significant difference between healthy weight and overweight respondents. [c] Significant difference between healthy weight and overweight respondents. [d] Significant difference between healthy weight and underweight respondents. [e] Significant difference between Physiotherapy and Physical Education. [f] Significant difference between Physiotherapy and Nutrition. [g] Significant difference between respondents from vignette C and A. [h] Significant difference between respondents from vignette B and A. Significant differences mean $p < 0.05$.

For all ten questions, statistically significant differences were observed (Table 3). Bonferroni post hoc demonstrated that readers of the vignettes with the patients underweight ($t(209) = 5.82$; $p < 0.001$; Cohen's $d = 0.95$ [95% CI = 0.62–1.29]) or patient with overweight ($t(209) = 5.37$; $p < 0.001$; Cohen's $d = 0.96$ [95% CI = 0.60–1.33]) judged the patient's general health status (Question 1) as worse than vignette readers with patients. A similar result was observed among readers of the vignettes with patient with underweight ($t(208) = 4.96$; $p < 0.001$; Cohen's $d = 0.81$ [95% CI = 0.48–1.14]) overweight ($t(208) = 5.45$; $p < 0.001$; Cohen's $d = 0.98$ [95% CI = 0.61–1.34]) compared to readers of the vignettes describing patient (Question 2).

Table 3. Comparison of overall perceptions between respondents who read vignettes A, B, or C (n = 213).

Questions of the Overall Perceptions Questionnaire	Vignette A *M* (*SD*)	Vignette B *M* (*SD*)	Vignette C *M* (*SD*)	ANCOVA *F* (*df*)
1. How do you classify Maria's general health status?	2.23 (1.05) [b]	1.44 (0.72) [a,b]	2.42 (1.12) [a]	F (3) = 23.1 *
2. How do you classify Maria's daily energy intake?	2.32 (1.21) [b]	1.57 (0.68) [a,b]	2.73 (1.42) [a]	F (3) = 25.1 *
3. How do you classify Maria's eating habits?	2.07 (1.12) [b]	1.43 (0.68) [a,b]	2.71 (1.49) [a]	F (3) = 28.3 *
4. How do you evaluate Maria's level of physical activity?	1.67 (0.90) [c]	1.57 (0.65) [a]	2.27 (1.19) [a,c]	F (3) = 10.6 *
5. How do you evaluate Maria's general quality of life?	1.91 (0.84) [b]	1.52 (0.66) [a,b]	2.51 (1.17) [a]	F (3) = 20.6 *
6. How good do you believe Maria's care for your health is?	1.99 (0.91) [b]	1.46 (0.68) [a,b]	2.45 (1.27) [a]	F (3) = 22.0 *
7. How good do you believe Maria's self-esteem is?	2.23 (1.06) [b]	1.78 (0.71) [a,b]	2.85 (1.54) [a]	F (3) = 17.1 *
8. In your opinion, how does Maria manage her health?	2.02 (1.01) [b]	1.49 (0.64) [a,b]	2.48 (1.22) [a]	F (3) = 23.6 *
9. In your opinion, what is Maria's level of body satisfaction?	2.20 (1.17) [b,c]	1.72 (0.79) [a,b]	2.95 (1.59) [a,b,c]	F (3) = 20.6 *
10. In your opinion, what is Maria's level of awareness regarding her current health condition?	2.29 (1.12) [b]	1.16(0.72) [a,b]	2.59 (1.36) [a]	F (3) = 13.9 *

Vignette A, patient underweight; Vignette B, healthy weight patient; Vignette C, patient with overweight; M, Mean; SD, standard deviation. [a] Significant difference between respondents from vignettes B and C. [b] Significant difference between respondents from vignettes A and B. [c] Significant difference between respondents from vignettes A and C. * $p < 0.05$.

Assessments regarding the patient's eating habits (Question 3) demonstrated that readers of the vignettes featuring patients underweight ($t(209) = 4.46$; $p < 0.001$; Cohen's $d = 0.73$ [95%CI = 0.40–1.06]) and the patient with overweight ($t(209) = 6.24$; $p < 0.001$ Cohen's $d = 1.12$ [95% CI = 0.75–1.49]) presented higher scores when compared to readers of the vignette describing a healthy weight patient. These results indicate that those readers judge the patient's eating habits to be worse compared with readers of the vignette of the healthy weight patient.

It was observed that readers of the vignette describing a patient overweight judged the patient's level of physical activity (Question 4) as worse when compared to readers of the vignette with the healthy weight patient ($t(209) = 3.95$; $p < 0.001$; Cohen's $d = 0.71$ [95% CI = 0.35–1.07]) and the patient underweight ($t(209) = 3.11$; $p = 0.006$; Cohen's $d = 0.54$ [95% CI = 0.19–0.89]). In turn, readers of the vignettes describing a patient with underweight ($t(208) = 3.41$; $p = 0.002$; Cohen's $d = 0.56$ [95% CI = 0.23–0.88]) and the patient overweight ($t(208) = 5.38$; $p < 0.001$; Cohen's $d = 0.97$ [95% CI = 0.60–1.33]) judged the patient's quality of life as worse (Question 5) when compared with readers of the vignette describing a healthy weight patient. A similar result was observed among vignette readers of the patient underweight ($t(207) = 4.15$; $p < 0.001$; Cohen's $d = 0.68$ [95% CI = 0.35–1.01]) or the patient overweight ($t(207) = 5.39$; $p < 0.001$; Cohen's $d = 0.97$ [95% CI = 0.61–1.34]) compared with the readers of the vignette describing the healthy weight patient for patient's care with her health (Question 6).

Regarding self-esteem (Question 7), a more negative judgment was obtained for readers of the vignettes describing the patients underweight ($t(208) = 3.07$; $p = 0.007$; Cohen's $d = 0.50$ [95% CI = 0.18–0.83]) and the patient with overweight ($t(208) = 5.02$; $p < 0.001$; Cohen's $d = 0.90$ [95% CI = 0.54–1.27]) compared to the readers of the vignette of the healthy weight patient. A similar result was observed among vignette readers describing the patient underweight ($t(209) = 4.26$; $p < 0.001$; Cohen's $d = 0.70$ [95% CI = 0.37–1.34]) or the patient overweight ($t(209) = 5.44$; $p < 0.001$; Cohen's $d = 0.97$ [95% CI = 0.61–1.34]) compared with readers of the vignette of the healthy weight patient for patient's quality of health management (Question 8).

Readers of the vignettes describing patients overweight ($t(209) = 5.46$; $p < 0.001$; Cohen's $d = 0.98$ [95% CI = 0.61–1.34]) with underweight ($t(209) = 3.11$; $p = 0.006$; Cohen's

d = 0.51 [95% CI = 0.18–0.83]) presented worse perceptions regarding the patients' body satisfaction (Question 9) compared with the readers of the vignette describing the healthy weight patientReaders of the vignette of the patient overweight ($t(209) = 2.71$; $p = 0.02$; Cohen's d = 0.47 [95% CI = 0. 13–0.47]) presented worse perceptions regarding the patient's body satisfaction compared to readers of the vignette of the patient underweight.

Finally, readers of the vignettes describing the patient overweight ($t(209) = 4.83$; $p < 0.001$; Cohen's d = 0.87 [95% CI = 0.50–1.23]) and the patient with underweight ($t(209) = 4.47$; $p < 0.001$; Cohen's d = 0.73 [95% CI = 0.40–1.06]) presented worse perceptions regarding the patient's level of awareness regarding their current health condition. (Question 10) compared with readers of the vignette of the patient.

4. Discussion

Health professionals, even those specialized in treating patients with obesity, exhibit weight stigma [8,18]. Less is known about weight stigma in healthcare students, especially in Brazil [33]. The results from the present study found weight stigma in 39.44% of healthcare students. In general, weight stigma was greater in men, healthy weight students, and physiotherapy students. Using a vignette study, we identified more negative attitudes in healthcare students who read the vignettes describing patients overweight or underweight compared to healthcare students who read the vignette of the healthy weight patient. More negative attitudes were found regarding general health status, quality of eating habits, level of physical activity, general quality of life, how well the patients took care of themselves, level of self-esteem, health management quality, body satisfaction, and level of awareness of the current health condition.

Research demonstrates weight stigma among healthcare students [8,39–42]. Interestingly, four trials in healthcare students investigated the effects of providing causal information, focusing on the genetic and/or socioenvironmental determinants of weight, in reducing weight stigma [41]. The results of these studies are promising and demonstrate that by following educational intervention based on the multifactorial nature of obesity and weight stigma, it can be possible to modify prejudices and conceptions about obesity among future healthcare professionals [41,42]. Given the prevalence of weight stigma found in healthcare students in the present study, it is necessary to implement strategies to mitigate weight stigma. Weight stigma needs to be addressed early on and continuously throughout healthcare education and practice, by teaching risk factors for obesity and socioenvironmental determinants of weight, and explicitly discussing the sources, impacts, and implications of weight stigma [42].

Men exhibit higher total scores on the Anti-fat Attitudes Scale and the *Weight control and guilt* subscale compared to women. A multinational study with individuals in Canada, the U.S., Iceland, and Australia found similar results [13]. In each nation evaluated, attributions of behavioral causes of obesity predicted stronger weight stigma, as did beliefs that obesity can be attributed to a lack of willpower and personal responsibility. Studies have observed that weight stigma is greater among men compared to women [13,43]. These results can be explained by women's greater vulnerability to societal judgments based on their physical appearance [13]. Women are more sensitive to possible prejudices and stereotypes related to body weight, and, therefore, show less weight stigma [13].

Regarding groups by classification of nutritional status, a higher weight stigma score was observed for healthy-weight people compared to people with overweight, as well as higher scores on the *Weight control and guilt* subscale of the Anti-fat Attitudes Scale in healthy weight individuals compared to participants classified as underweight and overweight. Schwartz et al. [43] examined the influence of one's body weight on weight stigma in young adults and found that healthy weight individuals were more likely to associate negative attributes with people overweight, as well as classify people with overweight as lazier and less motivated than thin people [43].

When comparing courses in the health area, it was observed that physiotherapy students had higher scores on the *Social depreciation and character* subscale of the Anti-fat

Attitudes Scale compared to physical education and nutrition students. Studies focused on weight stigma among health students are scarce, and those comparing students from different courses in the health area are even scarcer. This makes it difficult to discuss the results obtained here with the current literature on weight stigma. It is possible that characteristics inherent to physiotherapy students, or stigmatizing beliefs present in their training, better explain the results found in the present study. Future studies should explore why students in certain courses have greater weight stigma.

Studies involving health professionals and the general population indicate the presence of attitudes contrary to individuals perceived as overweight, such as prejudice, stereotypes, and discrimination [5–8,43]. Our study corroborates these findings as participants exposed to the vignette describing the patient as overweight judged the patient's health as worse than participants exposed to the vignette describing the weight patient. Weight stigma presented by participants exposed to the vignette describing the weight patient included beliefs that people overweight are dissatisfied with their bodies, have poor eating habits, and have low self-esteem [5,8].

Interestingly, participants exposed to the vignette describing the patient as underweight also revealed more negative attitudes toward the patient compared to participants exposed to the vignette of the healthy weight patient. Thus, it can be argued that weight stigma is not only aimed at those individuals with overweight, despite the available literature demonstrating that they are recurring victims of discrimination and prejudice based on body weight. Previous research found negativity toward individuals with obesity and anorexia (i.e., individuals underweight). Marini [44] investigated and compared the explicit (i.e., conscious) and implicit (i.e., unconscious) preferences between these two conditions. The results showed preferences for the healthy weight category when this category was compared with the overweight and underweight categories [44]. Therefore, both overweight and underweight are seen as less acceptable, and susceptible to stigma, unlike a healthy weight.

The present study presents relevant advances in the study of weight stigma in healthcare students, especially in Brazil. Although the results found in this study are promising, it does have its limitations. Firstly, the study was carried out with healthcare students from a single institution in Brazil, which does not allow for generalization. As this is a vignette study and not epidemiological research, a sample size calculation was carried out to estimate the number of participants needed to identify possible differences between groups regarding weight stigma. Future studies should include participants from different Brazilian regions to replicate the results obtained here, as well as carry out epidemiological studies on the prevalence of weight stigma in healthcare students. Second, we must acknowledge the limitation of using a self-report measure to assess weight stigma. Self-report measures are susceptible to social desirability bias. However, self-report measures are used in numerous studies on weight stigma and are widely accepted in the literature [13,39,40]. Third, we did not assess the participants' sexual orientation. Research shows that weight stigma impacts sexual and gender minority individuals differently than their cisgender and heterosexual counterparts [45,46]. Sexual minority individuals reported higher levels of experienced weight stigma and internalized weight bias than heterosexual individuals [46]. Future studies should consider sexual orientation when assessing weight stigma in healthcare students. Fourth, the vignettes were all of female patients. Given that the present study included both men and women, the absence of vignettes representing male patients may have had an impact on the results of weight stigma. Finally, the presence of weight stigma during graduation does not mean that when students graduate they will have stigmatizing attitudes toward people overweight or underweight [39]. However, current literature points out that these stigmatizing attitudes can persist during professional careers given that health professionals, even those specialized in obesity, are significant sources of weight stigma [8,16,18].

5. Conclusions

Weight stigma was found among healthcare students. Men, healthy weight individuals, and physiotherapy students showed higher levels of weight stigma. Participants who read the vignettes describing patients with underweight and overweight showed more stigmatizing attitudes toward the patients than participants who read the vignette of a healthy-weight patient. As body weight influences healthcare students' perceptions of patients' health status, level of physical activity, eating habits, quality of life, body satisfaction, self-esteem, and other characteristics described in the vignettes, it is recommended to include discussions about prejudice, stigma, and discrimination toward body weight into the curricula of these students.

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