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Research Brief

Weight Measurements in School: Setting and Student Comfort

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ABSTRACT

Objective: To examine how body mass index assessments are conducted in schools and whether student comfort with assessments varies by students' perceived weight status, weight satisfaction, or privacy during measurements.

Methods: In-person cross-sectional surveys with diverse fourth- to eighth-grade students (n = 11,510) in 54 California schools in 2014–2015 about their experience being weighed in the prior school year.

Results: Half of the students (49%) reported being weighed by a physical education teacher and 28% by a school nurse. Students were more comfortable being weighed by nurses than physical education teachers ($P = 0.01$). Only 30% of students reported privacy during measurements. Students who were unhappy with their weight ($P < 0.001$) and those who perceived themselves as overweight ($P < 0.001$) were less comfortable being weighed than their peers.

Conclusions and Implications: Student weight dissatisfaction, higher perceived weight status, and being female were associated with discomfort with school-based weight measurements. Prioritizing school nurses to conduct weight measurements could mitigate student discomfort, and particular attention should be paid to students who are unhappy with their weight to avoid weight stigmatization.

Key Words: policy, schools, child and adolescent health, obesity, BMI screening (*J Nutr Educ Behav.* 2022;54:249–254.)

Accepted November 19, 2021.

INTRODUCTION

In approximately half of the schools in the US, school staff measure students' height and weight annually to assess students' body mass index (BMI),[1] thereby assessing health risk. Despite the widespread use of BMI assessments in schools, few studies have reported on who conducts measurements, the level of student privacy, and how comfortable students are with the measurements. A handful of validation studies examining school staff's accuracy in conducting anthropometric measurements have provided details on who conducted the assessments,[2–5] but no studies have reported on who conducts assessments in day-to-day practice, which may have implications on both the accuracy of the measurement data and students' comfort with the measurements. Furthermore, although the Center for Disease Control and Prevention (CDC) recommends maintaining privacy during weight measurements,[6] there is limited literature on students' perceptions of privacy and how this may impact students' comfort with the process; 1 study found that 20% of elementary students thought privacy was lacking during weight screening, and students with overweight had higher odds of reporting discomfort with being weighed.[7]

The goal of the present research was to determine who conducts weight measurements in schools, the degree of privacy of such assessments, and whether student comfort with these measurements varies by who conducts them, the students' perceived weight status, weight satisfaction, and privacy during measurements, and parent-reported sex. This research leverages data collected for a statewide study of BMI screening and reporting in California schools.

METHODS

Participants and Recruitment

In the 3-year Fit Study[8,9] (from 2014–2015 to 2016–2017), we cluster randomized 79 schools in 5 California school districts (1 in northern California, 1 in central California, and 3 in southern California) to 1 out of 3 study arms: 1) BMI screening and reporting (27 schools); 2) BMI screening only (27 schools); or 3) no BMI screening (25 schools).[8] Students

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Conflict of Interest Disclosure: The authors have not stated any conflicts of interest.

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https://doi.org/10.1016/j.jneb.2021.11.007

enrolled in participating schools in grades 3–7 during the fall of 2014 and 2015 were eligible for the study. This study was approved by the Committee for the Protection of Human Subjects, University of California, Berkeley, and by participating school districts. Parents could opt out of participating; schools sent parents a letter describing the study and asked that they return a form if they did not want their child to participate.

The present cross-sectional analyses are limited to students in arms 1 (BMI screening and reporting) and 2 (BMI screening only) who had their height and weight measured at school during their baseline year of study participation (from third to seventh grade, Spring 2014 or 2015) and completed a survey the following school year (from fourth to eighth grade, Fall 2014 or 2015).

Procedure

California Education Code requires that all public schools conduct the Fitnessgram, a battery of 6 fitness assessments including BMI, with students in fifth, seventh, and ninth grade each spring. For the Fit Study, arm 1 and 2 schools expanded BMI assessments to include all third to eighth-grade students. School staff involved in BMI assessments were asked to watch a 10-minute training video on collecting heights and weights appropriately (available on the study website) and received laminated instruction cards for measuring heights and weights, along with research-grade assessment equipment[8] and height and weight recording forms. The video and instruction cards emphasized the importance of finding an appropriate location for BMI assessments to maintain student privacy. Among the 119 school staff who conducted BMI assessments at baseline, almost half (47%) attested to watching the video, 23% registered for the video and watched all or part of it, and 30% did not open the video link.

Student Survey and Demographics

The survey, administered by research team members (nonauthors), asked students who conducted the weight measurement (another student, physical education [PE] teacher, classroom teacher, school nurse, another adult, student weighed themselves, other); the perception of privacy during their measurements ("could other students see you being weighed at school last year?" with the following response options: no, sort of, yes, and don't remember); and comfort being weighed ("how did you feel being weighed at school last year?" with the following response options: it did not bother me at all, it bothered me a tiny bit, it bothered me somewhat, and it bothered me a lot). Students were asked how happy they were with their weight (with responses ranging on a 5-point scale from very unhappy to very happy).[10,11] The survey also asked students how they felt about their weight (with responses ranging on a 5-point scale from very underweight to very overweight).[12,13]

For all participating students, schools provided parent-reported sex (male, female), race/ethnicity (Black, Asian, Latinx, White, other), and grade.

Data Analysis

For analysis, we created a 3-level student weight satisfaction variable for students who were unhappy (collapsing very unhappy and unhappy), neutral, or happy (collapsing very happy and happy) with their weight. We also created a 4-level variable for how students felt about their weight, collapsing very underweight and underweight into 1 category. The outcome variable, comfort with the measurements, was collapsed into a binary variable (not bothered at all and bothered). Using mixed-effects logistic regression with a random effect for school, we assessed associations between comfort being weighed and the following: the person conducting weight measurements, the perceived privacy of weight measurements, student weight satisfaction, and perceived weight status, and additionally adjusted for sex, race, and grade. All analyses were conducted in Stata/SE 16.1 (StataCorp LLC, 2019).

RESULTS

A total of 11,510 students were included in this analysis; 4,566 students were excluded because they did not remember being weighed at school during the prior school year, and 298 students were excluded because of missing outcome or covariate data. Those who remembered being weighed at school the prior year had a slightly higher mean BMI than those who did not (19.4 vs 20.0, P <0.001). The sample was diverse: 60% Latinx, 16% White, 16% Asian, and 6% Black (Table 1). Forty percent of students had a BMI ≥ 85th percentile for age and sex on the basis of the CDC growth charts,[14] although only 26% considered themselves somewhat or very overweight. Most students reported being weighed by a PE teacher (49%), school nurse (28%), or classroom teacher (10%). Only 1% of students were weighed by another student, 5% by another adult, and 1% by themselves; 6% did not remember who weighed them. Among the 90% of students who remembered how private their weight measurement was, only 30% of students reported complete privacy while being weighed; 32% reported partial privacy, and 38% reported no privacy. One out of 5 students (20%) reported being unhappy with their weight. Overall, 64% of students reported that being weighed at school did not bother them, 25% were bothered a tiny bit, 7% somewhat, and 5% a lot.

In the fully adjusted model (Table 2), students who were weighed by nurses were less bothered by the weight measurements than those who were weighed by PE teachers (odds ratio [OR] 0.81; 95% confidence interval, 0.69–0.96). Those who reported having partial privacy were more bothered by being weighed at school than those with no privacy (OR, 1.34; 95% CI, 1.21–1.49). Students neutral (OR, 2.26; 95% CI, 2.04–2.51) or unhappy with their weight (OR, 3.31; 95% CI, 2.92–3.75) were more bothered by being weighed at school than students happy with their weight; and students who considered themselves somewhat overweight (OR, 2.33; 95% CI, 2.07–2.61) or very

Table 1. Characteristics of Students Who Remembered Being Weighed at School in Prior School Year in 4 School Districts Across California (n = 11,510)

Characteristic	Overall, n (%)	Student comfort with measurements, n (%)	
		Not bothered (7,328 [64%])	Bothered (4,182 [36%])
Female	6,066 (53)	3,349 (54)	2,717 (65)
Grade			
Fourth	3,837 (33)	2,556 (35)	1,281 (31)
Fifth	2,222 (19)	1,379 (19)	843 (20)
Sixth	982 (9)	588 (8)	394 (9)
Seventh	2,624 (23)	1,624 (22)	1,000 (24)
Eighth	1,845 (16)	1,181 (16)	554 (16)
Race			
Latinx	6,876 (60)	4,265 (58)	2,611 (62)
White	1,815 (16)	1,191 (16)	617 (15)
Asian	1,808 (16)	1,160 (16)	655 (16)
Black	737 (6)	536 (7)	201 (5)
Other	274 (2)	176 (3)	98 (2)
BMI category			
Underweight (BMI < fifth percentile)	379 (3)	261 (4)	109 (3)
Normal weight (BMI ≥ fifth to < 85th percentile)	6,498 (57)	4,786 (66)	1,712 (42)
Overweight (BMI ≥ 85th to < 95th percentile)	2,032 (18)	1,119 (15)	913 (22)
Obese (BMI ≥ 95th percentile)	2,498 (22)	1,103 (15)	1,395 (34)
Perceived weight status			
Underweight	2,424 (21)	1,728 (24)	696 (16)
About the right weight	6,044 (53)	4,419 (60)	1,625 (39)
Somewhat overweight	2,486 (22)	991 (14)	1,495 (36)
Very overweight	556 (5)	190 (3)	366 (9)
Weight satisfaction			
Very happy	2,243 (19)	1,887 (26)	356 (9)
Happy	4,132 (36)	3,016 (41)	1,116 (27)
Neutral	2,885 (25)	1,568 (21)	1,317 (31)
Unhappy	1,446 (13)	550 (8)	896 (21)
Very unhappy	804 (7)	307 (4)	497 (12)

BMI indicates body mass index.

overweight (OR, 2.59; 95% CI, 2.11−3.19) were more bothered than those who felt they were about the right weight. Female students were more bothered by being weighed than male students (OR, 2.17; 95% CI, 2.00−2.36).

DISCUSSION

Despite half of the schools in the US assessing students' BMI, we have a limited understanding of the student experience of getting weighed in schools.[1] The objective of the present research was to determine who conducts weight measurements in schools, the degree of privacy of such assessments, and whether student comfort with being weighed varies by the person conducting the measurements, students' perceived weight status, their weight satisfaction, and privacy during measurements. To our knowledge, this is the first study to document this among a large and diverse group of elementary and middle school students. We demonstrated significant associations between student discomfort and being weighed by PE teachers compared with school nurses, and that student weight dissatisfaction, higher perceived weight status, and being female were associated with discomfort with school-based weight measurements.

In the present study, PE teachers conducted more measurements than any other school staff, but students were least comfortable with PE teachers weighing them. Physical education teachers, who feel pressure to be role models with respect to their body shape,[15] have been shown to demonstrate weight bias[15,16]; which may affect students' comfort with being weighed by PE teachers compared with other adults. Although having school nurses conduct all BMI screenings would be ideal, not all schools have a school nurse. As of 2014, 85% of elementary schools and 78% of middle schools had access to a school nurse, although < 60% had a full-time nurse.[17] With limited access to nurses, many schools rely on PE teachers or other adults to conduct BMI screenings. Our findings suggest that if schools continue to

Table 2. Odds of Discomfort With Weight Measurement by Characteristics of Students Who Remembered Being Weighed at School in the Prior School Year in 4 School Districts Across California (n = 11,510)[a]

Characteristic	Odds Ratio	95% Confidence Interval	*P*
Person weighing			
Physical education teacher	Reference		
Nurse	0.81	0.69–0.96	0.01
Classroom teacher	0.82	0.67–1.01	0.06
Other adult	0.82	0.64–1.05	0.12
Other student	1.46	1.00–2.12	0.05
Self	1.11	0.67–1.82	0.69
Don't know	0.98	0.79–1.20	0.81
Privacy during measurement			
None	Reference		
Partial	1.34	1.21–1.49	<0.001
Complete	1.11	1.00–1.25	0.06
Don't remember	0.95	0.81–1.12	0.55
Perceived weight status			
Underweight	0.94	0.84–1.05	0.25
About the right weight	Reference		
Somewhat overweight	2.33	2.07–2.61	<0.001
Very overweight	2.59	2.11–3.19	<0.001
Weight satisfaction			
Happy	Reference		
Neutral	2.26	2.04–2.51	<0.001
Unhappy	3.31	2.92–3.75	<0.001
Sex			
Male	Reference		
Female	2.17	2.00–2.36	<0.001
Grade			
Fourth	1.31	1.09–1.57	0.004
Fifth	1.49	1.23–1.80	<0.001
Sixth	1.45	1.18–1.79	<0.001
Seventh	1.18	1.03–1.36	0.02
Eighth	Reference		
Race			
Latinx	1.43	1.18–1.73	<0.001
Asian	1.27	1.01–1.58	0.04
Black	Reference		
White	1.39	1.13–1.73	0.002
Other	1.35	0.97–1.88	0.07

[a]Data derived from a mixed-effects logistic regression model with a random effect for school, adjusted for the person conducting weight measurements, the perceived privacy of weight measurements, student weight satisfaction, student perceived weight status, sex, race, and grade.

conduct BMI screenings, they must ensure that all staff involved are trained to demonstrate sensitivity around the process.

Although the CDC advocates for privacy during BMI assessments in schools,[6,18] only 30% of students reported full privacy in the present study. Notably, this was the case despite that all assessments were done in the context of a research study in which all school staff were asked to watch a training video and were given additional instructions on the importance of privacy during weight measurements. A study in Massachusetts, in which PE teachers weighed fifth- through eighth-grade students (n = 786) in the corner of a gym, reported that 80% of students said they had enough privacy during measurements.[7] Thus, comfort may be less about whether or not other students can see and more about the appropriateness of, and fidelity to, a privacy protocol. This may explain our findings that having partial or complete privacy during weight measurements was associated with greater odds of discomfort compared with those who reported no privacy. Nonetheless, schools should take extreme care to ensure that weight measurements follow a clear protocol and are conducted as privately as possible.

We found that being unhappy with one's weight and perceiving oneself as overweight were risk factors for discomfort with weight

measurements, independent of each other and the setting for such measurements. A prior study similarly found that students with overweight were less comfortable with weight measurements than students with normal weight.[7] Notably, in the present study, 28% of students did not remember being weighed, suggesting the process did not bother them, and the majority of students who did remember being weighed reported no discomfort. Thus, the students whom BMI assessments are intended to help—those with an elevated weight status—are precisely those who tended to experience discomfort with the process. This raises concerns for weight stigmatization, as research suggests that weighing students at school leads to decreased weight satisfaction,[9] and adolescents with the overweight report being teased more than those with average weight.[19,20] In addition, our findings demonstrate that female students experienced greater discomfort being weighed than male students. This is consistent with previous research that found a greater focus on weight and lower body satisfaction among adolescent girls.[11,13]

The present study has important limitations. Schools included in the study may not represent weight measurement settings in other schools in and outside of California. Students who did not remember being weighed the prior school year had a lower mean BMI than those included in our study but were excluded from the analysis. As is a concern in many studies, unmeasured confounders such as the extent to which students previously experienced weight stigmatization in schools, or the gender of those conducting the measurements, may have biased our findings. In addition, the question that asked students about their comfort with measurements was not previously validated. Despite low levels of complete privacy and only a portion of school personnel completing training, results regarding complete privacy during weight measurement may be higher than normal because of training that school personnel received as part of the Fit Study. Finally, at the time of publication, the data are aged at least 4 years and may not reflect current practices or feelings of students.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The present research highlights student discomfort with school-based weight measurements, particularly among students weighed by PE teachers, those who are unhappy with their weight, and those who perceive themselves to be overweight. Staff sensitivity and following privacy protocols during weight measurements may aid in increasing student comfort; however, our results suggest this may be difficult to achieve in the real world, and some students will continue to feel uncomfortable with the process, regardless. When conducting school-based weight measurements, students unhappy with their weight may be most at risk for weight stigmatization. Our results warrant the need for future studies to explore whether students' previous experiences of weight stigmatization play a role in this relationship.

ACKNOWLEDGMENTS

This study was funded by the National Institutes of Health National Heart, Lung, and Blood Institute Award Number NIH/NHLBI R01HD074759. The funders were not involved in the collection, analysis, or interpretation of study data.

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