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U.S. medical students personal health behaviors, attitudes and perceived skills towards weight management counseling

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ABSTRACT

Physicians' abilities to address obesity in routine care may be affected by their own health behaviors, skills in and attitudes toward weight management counseling (WMC). Gender differences have been noted amongst these factors as well. We examined gender differences in personal health behaviors and predictors of perceived WMC skills and attitudes of medical students enrolled in a WMC trial. Enrollment took place in 2020 and consisted of students from eight U.S. medical schools. Baseline measures included demographics, exercise, and weight management behaviors, WMC attitudes and perceived skills. Descriptive statistics were calculated, and linear mixed models used to assess the effect of personal health behaviors on outcomes of WMC attitudes and perceived skills. Complete data were available for 1145 medical students. More males reported exercising 4 or more days/week (58.6% v. 41.4%), being more likely to monitor their weight (75.6% v. 70.3%) and less likely to intentionally attempt weight loss in the past (50.3% v. 65.3%) compared to females (all p 's < 0.05). Exercising 4 or more days per week was positively associated with perceived WMC skills in the adjusted model ($\beta = 0.10$, CI 0.06 to 0.14, $p < 0.01$). Exercise frequency was positively associated with perceived WMC skills, regardless of gender. WMC curriculum may consider focusing on personal health behaviors such as exercise to increase perceived WMC skills.

1. Introduction

Recent 2020 data suggests a large proportion (42%) of Americans are affected by obesity, and obesity is associated with poor health outcomes (Centers for Disease Control and Prevention, 2020). Physicians are trusted sources of advice and may help to address obesity through weight management counseling (WMC) in routine care visits (Tham and Young, 2008). However, physicians and medical residents' report not having the knowledge and skills to provide WMC (Huang et al., 2004; Davis et al., 2008), which may hinder their ability to deliver effective counseling (Davis et al., 2008). Further, physicians' and medical students' personal health behaviors, including exercise and weight management, have also been associated with their WMC practices (Lobelo et al., 2009). For example, providers who met the physical activity guidelines of 150 min per week (U. S. Department of Health & Human Services, 2018) had greater self-efficacy for WMC compared to those

who did not (Howe et al., 2010). Physical activity may also have an effect on their attitudes toward and subsequent delivery of WMC to patients (Bocquier et al., 2005).

Physician personal characteristics, including gender, have also been associated with occurrence and extent of WMC. One study found no differences in attitudes toward obesity management between male and female physicians (Ferrante et al., 2009), while another found female physicians displayed less negative attitudes toward WMC than their male counterparts (Foster et al., 2003). Personal weight management behaviors have also varied between genders, with males achieving higher levels of physical activity than females (Troiano et al., 2008). These findings are particularly salient in young adulthood (Wilson et al., 2019), a developmental period marked by transition and declines in health behavior trajectories (Frech, 2012). Gaining a better understanding of gender differences in personal health habits of medical students may allow for development of interventions to target these

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behaviors and/or curricula to increase their likelihood of delivering WMC in their future work.

Therefore, the purpose of this study was to describe personal health behaviors, WMC perceived skills and attitudes in United States medical students participating in a trial that delivered WMC curriculum to them to improve their WMC skills and delivery to patients. We also sought to examine associations between health behaviors and WMC perceived skills and attitudes.

2. Materials/methods

2.1. Design and sample

The present study was an examination of baseline data from a larger study, MSWeight (Ockene et al., 2018). In brief, MSWeight was a group randomized controlled trial in which first, second and third year medical students (N = 1234) from eight schools in all four regions across the United States participated in didactic and clinical training on delivering weight management counseling using the 5As approach (Ask, Assess, Advise, Assist and Arrange) over the course of three years. We analyzed baseline data collected from eligible students enrolled in the study. All participants in the trial signed a consent form. The parent study was approved by the Institutional Review Board at the University of Massachusetts Medical School and all 8 participating institutions.

2.2. Measures

Data collected on participant characteristics included age, gender, race, and ethnicity. Three questions assessed personal health behaviors. The first assessed whether they exercised for at least 20 min once in the past 3 months (yes or no), and if yes, how many days per week did they exercise (options: 0–1 days, 2–3 days, 4–6 days, or every day). The second asked if they monitored their own weight (does not weigh self, or weighs self less than weekly to weekly), and the third if they had ever intentionally lost weight (yes or no).

The perceived WMC skills and WMC attitudes surveys were previously pilot tested for ease of understanding with medical students from the University of Massachusetts Medical School and site PIs (Ockene et al., 2018). We also calculated internal consistency (Cronbach’s α). We asked participants 16 questions to assess perceived WMC skills (responses 1 = not at all skilled, to 5 = very skilled). Examples of questions included, “Assisting the patient by identifying behavior change strategies that will help achieve their goals.” The Cronbach’s α was 0.93. We asked participants 5 questions to assess their WMC attitudes, specifically their perceptions on physician delivered WMC for patients with overweight/obesity (responses 1 = strongly disagree, to 5 = strongly agree). Examples of questions included, “It is important for all physicians to have training in weight management counseling to help patients who are overweight and obese”, and “Weight management counseling by a physician can be effective in helping patients manage their weight.” The Cronbach’s α was 0.78.

2.3. Statistical analysis

Missing values, normality, and outliers were checked prior to analysis. We calculated descriptive statistics for participants’ health behaviors and characteristics. Number of days exercising was further collapsed into two categories (0–3 days and 4 or more days) to better reflect meeting physical activity guidelines or not, as prior literature⁷ has also done. T-tests and chi-square analyses were conducted to examine differences in demographic variables, health behaviors, perceived WMC skills and attitudes by gender. Linear mixed modeling, with school as a random effect to account for within-school clustering, was used to analyze the relationship of health behaviors with perceived WMC skills and attitudes, adjusting for demographic covariates. Due to differences in outcome variables by gender, we conducted interaction tests to

examine whether gender had a significant interaction effect with health behaviors on primary outcomes. All analyses were conducted using Stata 14.2 (StataCorp LP, College Station, TX) in July 2020.

3. Results

The final analytic sample with complete data consisted of 1,145 medical students from 8 Institutions after removing those with incomplete questionnaire data. Similar to national data (Weiss et al., 2021), 51% (n = 583) were female, 96% (n = 1099) Non-Hispanic, and 71% (n = 812) White (Table 1). These data are similar to others. Of the 98.9% (n = 1132) of the sample reporting exercising on at least one occasion for 20 min in the last three months, almost half (52.7%, n = 596) reported exercising for 20 min on 4 or more days per week. About three quarters (73%, n = 835) reported weighing themselves and more than half (58%, n = 659) intentionally tried to ever lose weight.

3.1. Gender differences in health behaviors, perceived WMC skills and attitudes

There were significant differences in number of days exercising/week between men and women (see Table 1). A greater number of men (58.6%, n = 327) exercised 4 or more days per week compared to women (47%, n = 269), and a greater number of women (53%, n = 303) exercise 0–3 days per week compared to men (41.4%, n = 231; p <

Table 1
Differences in demographics and personal health behaviors by gender (N = 1,145).

Variables	n (%) or Mean \pm SD N = 1,145	n (%) or Mean \pm SD		p-value
		Female (n = 583)	Males (n = 562)	
Age	23.8 \pm 2.69	23.9 \pm 2.9	23.8 \pm 2.4	0.54
Race	1	1		0.70
American Indian/Alaskan Native	(0.1%)4	(0.2%)2	02	
Native Hawaiian/Pacific Islander	(0.4%)68	(0.3%)47	(0.4%)21	
Black/African/American	(5.9%)185	(8.1%)87	(3.7%)98	
Asian	(16.2%)	(14.9%)	(17.4%)	
White	812	408	404	
Other	(70.9%)14	(70.0%)6	(70.9%)	
Multiracial	(1.2%)61	(1.0%)32	14	
Ethnicity	(5.3%)	(5.5%)	(1.2%)61	0.90
Hispanic	46	23	23	
Non-Hispanic	(4.0%)	(3.9%)	(4.1%)	
Exercised at least 20 min in last 3 months	1,099	560	539	0.06
Yes	(96%)	(96.1%)	(95.9%)	
No		10	(0.5%)	
Number of days exercising at least 20 min (N = 1,130; Females = 572; Males = 558)				<0.01
0–3	534	303	231	
4 or more	(47.3%)	(53%)269	(41.4%)	
Monitors weight	596	(47%)	327	
Does not weigh self	(52.7%)		(58.6%)	
Weighs self less than weekly to weekly	310	173	137	0.04
Weight loss attempts	(27.1%)	(29.7%)	(24.4%)	
Never intentionally tried to lose weight	835	410	425	
Intentionally tried to lose weight	(72.9%)	(70.3%)	(75.6%)	
Weight loss attempts	486	204	282	<0.01
Never intentionally tried to lose weight	(42.5%)	(34.5%)	(50.2%)	
Intentionally tried to lose weight	659	379	280	
	(57.5%)	(65.5%)	(49.8%)	

*Includes only participants who responded “yes” to exercising 20 min in the last 3 months.

0.01). Sixty-five percent of women (n = 398) reported intentionally trying to lose weight in the past, significantly more than men (n = 301, 50.3%, p < 0.01).

3.2. Linear mixed models (outcomes of WMC attitudes and perceived WMC skills)

No significant associations were found between health behaviors and WMC attitudes in either the unadjusted or adjusted models (Table 2). For WMC skills, the unadjusted (β = 0.11, model revealed those who reported exercising 4 or more days/week had significantly greater perceived WMC skills as compared to the referent group of 0–3 days/week (β = -0.11, p < 0.01). The adjusted model was significant as well (β = -0.10, p < 0.01). No significant interactions were found between gender and health behaviors on WMC attitudes or perceived skills, though the main effect of gender was significantly associated with WMC attitudes in the models including number of days exercising (β = -0.16), monitoring weight (β = -0.13) and losing weight (β = -0.16, all p's < 0.05).

4. Discussion

In this cross-sectional descriptive study of medical students participating in a weight management counseling trial, we identified significant differences between male and female medical students in personal health behaviors. Males reported a greater number of days exercising, were more likely to have weighed themselves and less likely to have intentionally attempted weight loss in the past compared to females. Number of days exercising was positively associated with perceived WMC skills after adjusting for gender and other covariates. Our findings suggest those who report exercise more frequently experience greater perceived WMC skills, regardless of gender.

Acquisition of skills may be affected by self-efficacy, or one's belief in their capacity to implement behaviors (Bandura, 1993). Our findings suggest that more frequent exercisers had greater perceived WMC skills. Our samples' mean perceived WMC skills score was 1.83 (SD 0.59) on a

scale of 1 to 5, suggesting the need to address factors that may be associated with perceived WMC skills. Self-efficacy has directly and positively predicted the weight management practices of nurses (Zhu et al., 2013) and primary care providers (Welsh et al., 2015). Nursing and medical students' physical activity levels have positively correlated with self-efficacy for exercise (r = 0.40, p < 0.01) (Blake et al., 2017). We can postulate that as one's self-efficacy for exercise increases, their self-efficacy for WMC, including exercise counseling, may also increase. However, one prior trial found that regularly active medical students felt more confident, but were not more competent in providing exercise-related prescriptions (Mandic et al., 2017). Future trials should assess both confidence and competency in delivering WMC to patients in actual clinical practice using objective measures. Self-efficacy and perceived skills are expected to be lower in medical students prior to experiencing curriculum and internship clinical practice (Gude et al., 2017), as has been shown in other skillsets (Wu et al., 2007; Zapka et al., 2000). Future trials should examine longitudinal changes in perceived skills and self-efficacy across medical skillsets to better inform curriculum domains needing further didactic or experiential training.

Physical activity levels are lower in females compared to males across the lifespan, including during the college years (Wilson et al., 2019). This is consistent with our findings that female medical students report exercising less than their male counterparts. Though females displayed slightly lower perceived WMC skills than males, gender was irrelevant when examining the effect of days exercising on perceived WMC skills. Curriculum compulsory courses addressing medical students' behaviors and lifestyle have been suggested to increase their likelihood of WMC counseling and model positive behaviors to their patients (Kordi et al., 2011). Within these courses, it may be prudent to consider barriers to exercise within gender, considering the lower activity levels in females. Interventions are being developed to specifically target female young adults (Sharkey et al., 2020) and could be further refined for this population of medical students.

Those who believe obesity is out of a person's control tend to have less negative views toward WMC and obesity (Puhl et al., 2015). Regardless of gender, physician's confidence in and attitudes toward exercise advising are associated with an increased likelihood of providing subsequent counseling (Frank et al., 2000). Our sample displayed a mean WMC attitudes score of 3.46 (SD 0.38) on a scale of 1–5. Thus, our findings suggest in addition to addressing perceived WMC skills, there is room to elicit more positive WMC attitudes. Prior work shows female physicians have more positive attitudes toward and were more motivated to provide WMC than males (McFadden et al., 2020), and male physicians have indicated more negative attitudes toward obesity and greater weight-bias (Schwartz et al., 2003). Components of medical school curriculum should address WMC attitudes, possibly through modules increasing knowledge of biological risk factors of obesity and importance of WMC in addressing obesity.

This study has limitations. All data were cross-sectional, thus only represent correlational relationships. In addition, all data was self-reported, including the physical activity questions which were not from a validated questionnaire. Thus, we were unable to determine the intensity at which students were exercising and can only make inferences as to whether they met the physical activity guidelines. Due to the volume of questions, our attempt to decrease participant burden lends itself to future studies, including assessing objective measures of physical activity to accurately quantify frequency, intensity, and time of activity in medical students, in addition to sedentary behaviors. Other personal characteristics we did not examine in this study and can be included in future trials are weight, BMI, and dietary intake.

5. Conclusion

In conclusion, a greater number of days exercising was associated with greater perceived skills in delivering weight management counseling regardless of gender. This suggests that medical students'

Table 2
Linear mixed models of personal health behaviors on outcomes of WMC attitudes (model 1) and perceived WMC skills (model 2).

WMC Attitudes models	Unadjusted β (95% CI)	p-value	Adjusted β, (95% CI)	p-value
Exercise 20 min/day (yes/no)	-0.07 (-0.27 to 0.13)	0.48	-0.48 (-0.25 to 0.15)	0.64
Number of days exercising (0–3, 4 or more days)	-0.01 (-0.03 to 0.02)	0.55	0.01 (-0.02 to 0.03)	0.71
Monitor weight (yes/no)	0.01 (-0.04 to 0.06)	0.76	0.02 (-0.03 to 0.07)	0.44
Intentionally lost weight (yes/no)	0.01 (-0.04 to 0.05)	0.84	-0.02 (-0.06 to 0.02)	0.40
WMC Skills models	Unadjusted β (95% CI)	p-value	Adjusted β, (95% CI)	p-value
Exercise 20 min/day (yes/no)	0.07 (-0.25 to 0.39)	0.67	0.01 (-0.31 to 0.33)	0.95
Number of days exercising (0–3, 4 or more days)	0.11 (0.07 to 0.15)	<0.01	0.10 (0.06 to 0.14)	<0.01
Monitor weight (yes/no)	0.04 (-0.03 to 0.12)	0.26	0.04 (-0.04 to 0.12)	0.31
Intentionally lost weight (yes/no)	0.05 (-0.02 to 0.12)	0.14	0.07 (-0.01 to 0.14)	0.40

Each model run independently; Adjusted models included for gender, age, race, and ethnicity
In linear mixed models school is treated as random effect to account for clustering, β = beta coefficient, 95% CI = 95% confidence intervals; p < 0.05 statistically significant

perceived weight management counseling skills may be driven by their own weight management behaviors. In addition to enhancing weight management counseling curriculum, medical educators may consider educating students on their own personal health behaviors, including exercise. This may include didactic and hands-on exercise training with the intention of increasing students' personal exercise behaviors.

CRedit authorship contribution statement

Jamie M. Faro: Conceptualization, Methodology, Formal analysis. **Lori Pbert:** Conceptualization, Investigation. **Sybil Crawford:** Methodology, Validation, Data curation, Formal analysis. **Christine F. Frisard:** Methodology, Validation, Data curation, Formal analysis. **Jyothi A. Pendharkar:** Project administration, Resources. **Rajani S. Sadasiyam:** Conceptualization. **Alan C. Geller:** Conceptualization. **Kathleen M. Mazor:** Conceptualization. **Judith K. Ockene:** Funding acquisition, Supervision, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethics approval

The parent study was approved by the Institutional Review Board at the University of Massachusetts Medical School and at all 8 participating institutions.

Disclaimers

None.

Previous presentations

A poster presentation of these data was presented at the Annual Society of Behavioral Medicine Conference (virtual) in April 2021.

References

- Bandura, A., 1993. Perceived self-efficacy in cognitive development and functioning. *Educ. Psychol.* 28 (2), 117–148.
- Blake, H., Stanulewicz, N., McGill, F., 2017. Predictors of physical activity and barriers to exercise in nursing and medical students. *J. Adv. Nurs.* 73 (4), 917–929.
- Bocquier, A., Verger, P., Basdevant, A., Andreotti, G., Baretge, J., Villani, P., Paraponaris, A., 2005. Overweight and obesity: knowledge, attitudes, and practices of general practitioners in France. *Obes. Res.* 13 (4), 787–795.
- Centers for Disease Control and Prevention. Overweight and Obesity. U.S. Department of Health & Human Services, <https://www.cdc.gov/obesity/data/adult.html>. Published 2020. Updated February 20th, 2020. Accessed.

- Davis, N.J., Shishodia, H., Taqui, B., Dumfeh, C., Wylie-Rosett, J., 2008. Resident physician attitudes and competence about obesity treatment: need for improved education. *Med. Educ. Online* 13 (1), 4475.
- Ferrante, J.M., Piasecki, A.K., Ohman-Strickland, P.A., Crabtree, B.F., 2009. Family physicians' practices and attitudes regarding care of extremely obese patients. *Obesity* 17 (9), 1710–1716.
- Foster, G.D., Wadden, T.A., Makris, A.P., Davidson, D., Sanderson, R.S., Allison, D.B., Kessler, A., 2003. Primary care physicians' attitudes about obesity and its treatment. *Obes. Res.* 11 (10), 1168–1177.
- Frank, E., Rothenberg, R., Lewis, C., Belodoff, B.F., 2000. Correlates of physicians' prevention-related practices: findings from the Women Physicians' Health Study. *Arch. Fam. Med.* 9 (4), 359.
- Fruch, A., 2012. Healthy behavior trajectories between adolescence and young adulthood. *Adv. Life Course Res.* 17 (2), 59–68.
- Gude, T., Finset, A., Anvik, T., Bærheim, A., Fasmer, O.B., Grimstad, H., Vaglum, P., 2017. Do medical students and young physicians assess reliably their self-efficacy regarding communication skills? a prospective study from end of medical school until end of internship. *BMC Med. Educ.* 17 (1).
- Howe, M., Leidel, A., Krishnan, S.M., Weber, A., Rubenfire, M., Jackson, E.A., 2010. Patient-related diet and exercise counseling: Do providers' own lifestyle habits matter? *Preventive Cardiol.* 13 (4), 180–185.
- Huang, J., Yu, H., Marin, E., Brock, S., Carden, D., Davis, T., 2004. Physicians' weight loss counseling in two public hospital primary care clinics. *Acad. Med.* 79 (2), 156–161.
- Kordi R, Moghadam N, Rostami M. Sports and exercise medicine in undergraduate medical curricula in developing countries: a long path ahead. *Med. Educ. Online.* 2011;16:10.3402/meo.v3416i3400.5962.
- Lobelo, F., Duperly, J., Frank, E., 2009. Physical activity habits of doctors and medical students influence their counselling practices. *Br. J. Sports Med.* 43 (2), 89–92.
- Mandic, S., Wilson, H., Clark-Grill, M., O'Neill, D., 2017. Medical students' awareness of the links between physical activity and health. *Montenegrin J. Sports Sci. Med.* 6 (2), 5–12.
- McFadden, T., Fortier, M., McGinn, R., Levac, B.M., Sweet, S.N., Tomasone, J.R., 2020. Demographic differences in Canadian medical students' motivation and confidence to promote physical activity. *Fam. Pract.* 37 (1), 56–62.
- Ockene, J.K., Ashe, K.M., Hayes, R.B., Churchill, L.C., Crawford, S.L., Geller, A.C., Jolicoeur, D., Olenzki, B.C., Basco, M.T., Pendharkar, J.A., Ferguson, K.J., Guck, T.P., Margo, K.L., Okuliar, C.A., Shaw, M.A., Soleymani, T., Stadler, D.D., Warrior, S.S., Pbert, L., 2018. Design and rationale of the medical students learning weight management counseling skills (MSWeight) group randomized controlled trial. *Contemp. Clinical Trials* 64, 58–66.
- Puhl, R.M., Latner, J., O'Brien, K., Luedicke, J., Danfölsdóttir, S., Forhan, M., 2015. A multinational examination of weight bias: predictors of anti-fat attitudes across four countries. *Int. J. Obesity* 39 (7), 1166–1173.
- Schwartz, M.B., Chambliss, H.O.N., Brownell, K.D., Blair, S.N., Billington, C., 2003. Weight bias among health professionals specializing in obesity. *Obes. Res.* 11 (9), 1033–1039.
- Sharkey, T., Whatnall, M.C., Hutchesson, M.J., Haslam, R.L., Bezzina, A., Collins, C.E., Ashton, L.M., 2020. Effectiveness of gender-targeted versus gender-neutral interventions aimed at improving dietary intake, physical activity and/or overweight/obesity in young adults (aged 17–35 years): a systematic review and meta-analysis. *Nutr. J.* 19 (1).
- Tham, M., Young, D., 2008. The role of the General Practitioner in weight management in primary care—a cross sectional study in General Practice. *BMC Family Practice* 9 (1), 66.
- Troiano, R.P., Berrigan, D., Dodd, K.W., Masse, L.C., Tilert, T., McDowell, M., 2008. Physical activity in the United States measured by accelerometer. *Med. Sci. Sports Exerc.* 40 (1), 181.
- U. S. Department of Health & Human Services. 2018 Physical Activity Guidelines Advisory Committee Scientific Report. In: Office of Disease Prevention and Health Promotion, Washington, DC; 2018.
- Weiss, J., Balasuriya, L., Cramer, L.D., Nunez-Smith, M., Genao, I., Gonzalez-Colaso, R., Wong, A.H., Samuels, E.A., Latimore, D., Boatright, D., Sharifi, M., 2021. Medical students' demographic characteristics and their perceptions of faculty role modeling of respect for diversity. *JAMA Network Open* 4 (6), e2112795.
- Welsh, J.A., Nelson, J.M., Walsh, S., Sealer, H., Palmer, W., Vos, M.B., 2015. Brief training in patient-centered counseling for healthy weight management increases counseling self-efficacy and goal setting among pediatric primary care providers: results of a pilot program. *Clin. Pediatr.* 54 (5), 425–429.
- Wilson, O.W.A., Papalia, Z., Duffey, M., Bopp, M., 2019. Differences in college students' aerobic physical activity and muscle-strengthening activities based on gender, race, and sexual orientation. *Preventive Med. Rep.* 16, 100984.
- Wu, E.H., Fagan, M.J., Reinert, S.E., Diaz, J.A., 2007. Self-confidence in and perceived utility of the physical examination: a comparison of medical students, residents, and faculty internists. *J. Gen. Intern. Med.* 22 (12), 1725–1730.
- Zapka, J.G., Luckmann, R., Sulsky, S.I., et al., 2000. Cancer control knowledge, attitudes, and perceived skills among medical students. *J. Cancer Educ.* 15 (2), 73–78.
- Zhu, D.Q., Norman, I.J., While, A.E., 2013. Nurses' self-efficacy and practices relating to weight management of adult patients: a path analysis. *Int. J. Behav. Nutr. Phys. Activity* 10 (1), 131.