

RESEARCH

Physical Activity of Osteopathic Medical Students

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Context: Physical inactivity has been identified as one of the greatest current health burdens worldwide. In addition to physical activity's primary, secondary, and tertiary prevention benefits related to many diseases, physical activity has been shown to be associated with improvements in concentration, memory, and performance on standardized tests. Studies on physical activity and medical education have suggested that given the scholastic demands required to become a physician, medical trainees may find it challenging to meet the recommended amounts of physical activity.

Objective: To determine the extent to which osteopathic medical students (OMS) in the United States are meeting minimum recommendations for physical activity.

Methods: Utilizing a cross-sectional design, in partnership with the Student Osteopathic Medical Association (SOMA) and Nova Southeastern University Dr. Kiran C. Patel College of Osteopathic Medicine (NSU-KPCOM), we conducted an online survey of third and fourth year OMS across USA, from August through December 2015. The survey collected self-reported data on frequency and duration of vigorous and moderate physical activity per week.

Results: Most participants (60.7%) met or exceeded the American College of Sports Medicine (ACSM) physical activity guidelines of at least 150 minutes of moderate intensity aerobic activity per week. The OMS respondents' mean of 215 minutes of physical activity per week significantly exceeded the ACSM recommendation ($p = .000$).

Conclusions: OMS are well positioned to become physically active physicians and, in turn, promote physical activity in their patients. Future studies may look at barriers to physical activity in medical students and attempt to increase participation in active lifestyles in this population.

Keywords: physical activity; exercise; medical students; osteopathic medicine; medical education

Introduction

Physical inactivity has been described as one of the greatest health burdens worldwide, lowering life expectancy similar to reported findings for smoking and obesity (Lee, Shiroma & Lobelo 2012). According to the same source, 6% to 10% of major non-communicable diseases (coronary heart disease, type 2 diabetes, and breast and colon cancers) are attributable to physical inactivity. Moreover, there is strong evidence that physical activity decreases the risk of such diseases (Blair 2009).

The benefits of being physically active extend beyond disease prevention and include improvements in general cognitive processing, as well as academic performance. According to Blair (2009), physical activity delays cognitive decline through the lifespan and can delay fatigue associated with studying, particularly in university aged students. The benefits of physical fitness related to concentration, memory, and classroom behavior have been demonstrated in grade school students, and they have become topics of public health initiatives (Centers for Disease Control and Prevention 2010). Moreover, better physical fitness correlates with improved standardized test scores and higher grade point averages in non-medical student populations (Rauner, Walters & Avery 2013; Trudeau & Shepard 2008).

In terms of the OMS' future selves, the physical activity habits of healthcare providers are relevant. Providers who practice active lifestyle habits are more likely to counsel patients on the benefits of an active lifestyle (Brehm, Summer & Khoury 2016). Evaluation of medical students' competence in prescribing physical activity for their patients reveals challenges rooted in student confidence levels when counseling patients on this topic (Valence, Willie & MacDonald 2009).

It has been reported that medical education itself is demanding enough to be a barrier to physical activity due to increased work hours (Stanford, Durkin & Blair 2012). Stanford, Durkin, and Blair (2012) found that increased work hours, particularly during residency and fellowship training in the United States, can be related to a decrease in physical activity and higher body mass index (BMI), and they recommended that efforts be made to encourage active lifestyle among residents so as to positively impact their patients.

Two studies are found in the literature that examine physical fitness measures in OMS (Licciardone & Hagan 1992; Peterson, Degenhardt & Smith 2003). However, no recent studies have defined physical activity levels of OMS in larger sample sizes from multiple medical schools and regions in the United States. The goal of this study was to identify if third and fourth-year OMS in the United States are meeting recommended physical activity levels according to the American College of Sports Medicine (ACSM) criteria (Bushman 2017).

Methods

Design

To determine the extent to which third and fourth year OMS satisfied the ACSM's minimum physical activity levels, we utilized a cross-sectional survey design. We analyzed physical activity levels of OMS across the country.

Participants

During the summer of 2015, the Student Osteopathic Medical Association (SOMA), the student affiliate organization of the American Osteopathic Association, and the Office of Student and Alumni Affairs at Nova Southeastern University (NSU) Dr. Kiran C. Patel College of Osteopathic Medicine (KPCOM) assisted in data collection by distributing an anonymous online questionnaire to the osteopathic medical school classes, across the nation, graduating in 2016 and 2017. No incentives were offered for completing this voluntary questionnaire. The only inclusion criteria was osteopathic medical students in the graduating classes of 2016 or 2017.

Data collection instrument

Chevan et al's "Survey of Leisure-Time Exercise Activities for Physical Therapists" is composed of National Health Interview Survey (NHIS) Sample Adult Questionnaire survey questions to measure aerobic physical activity levels (Chevan & Haskvitz 2010). To collect information on OMS's physical activity levels, we utilized survey items from sections 4 (vigorous activities) and 5 (moderate activities) of Chevan & Haskvitz's (2010) work, consisting of four NHIS questions.

Survey Administration

Data collection started in August 2015 and ended in December 2015. REDCap Version 4.3.12 (copyright 2015, Vanderbilt University) powered the survey, and we provided a weblink to access the survey to both SOMA and NSU-KPCOM. SOMA distributed the survey in their newsletter on research updates that its national members receive. NSU-KPCOM student services sent a mass e-mail to their third and fourth-year OMS, which were at the time the graduating classes of 2017 and 2016, respectively. We attempted to contact all osteopathic medical schools online or via phone call, either through their student government or through their administrative offices, to request their classes of 2016 and 2017 receive our survey through their class e-mail list. There was a total of 33 accredited osteopathic medical schools within the United States during the recruitment phase. Twenty-one schools confirmed that they had sent the questionnaire to their students. The rest of the schools did not respond to our recruitment efforts. In addition to contacting particular schools, social media, such as osteopathic Facebook groups and Student Doctor Network, assisted with subject recruitment.

Survey Measures

Physical activity

The primary outcome of interest to our study was the extent to which OMS engaged in healthful amounts of physical activity. The standard used for determining healthy physical activity levels was the ACSM recommended level of 150 minutes of moderate level of aerobic physical activity a week. This criteria of at least 150 minutes of moderate intensity aerobic activity per week is a standard agreed upon by multiple

organizations, such as the Centers for Disease Control and Prevention, American Heart Association, and the World Health Organization (Centers for Disease Control and Prevention 2016; American Heart Association 2014; World Health Organization). We assessed vigorous and moderate activities separately. Our measure of *total physical activity (minutes per week)* consisted of summing *vigorous physical activity (minutes per week)* and *moderate physical activity (minutes per week)*.

The survey items addressing vigorous and moderate physical activity levels involved questions regarding frequency and questions regarding duration. The frequency questions, based on the NHIS question ID AHB.090_01.00 and ID AHB.110_01.00, asked “on how many days each week do you typically do vigorous activities for at least 10 minutes that cause heavy sweating or large increases in breathing or heart rate” and “on how many days each week do you typically do moderate activities for at least 10 minutes that cause only light sweating or a slight to moderate increase in breathing or heart rate.” The survey contained response options of zero to seven days a week and an “unable to do this type of activity” option for these two questions. The duration questions, based on NHIS questions ID AHB.100_01.00 and ID AHB.120_01.00, asked “on average, for how many minutes do you do these vigorous activities each time” and “on average, for how many minutes do you do these moderate activities each time.” These were open-ended questions, allowing respondents to enter their particular averages for each. *Vigorous physical activity (minutes per week)* and *Moderate physical activity (minutes per week)* were calculated by multiplying the frequency responses by the duration responses.

Data analysis

We performed statistical analyses using SPSS version 22.0 (IBM Corp., Armonk, NY). We used descriptive statistics to describe the OMS physical activity levels in days per week, minutes per day, and minutes per week of both vigorous and moderate physical activity. We used a one sample t-test to determine differences between OMS physical activity and the ACSM minimum recommended level of 150 minutes per week. Tests were two-tailed, and p values $< .05$ were considered significant.

Ethical Considerations

This research was approved in April 8, 2015 by the Institutional Review Board at NSU.

Results

The 679 OMS from twenty-one osteopathic medical schools across all regions of the United States consented for participation in our study. The subjects participated in physical activity for an average of 215.68 ± 179.78 minutes a week. Approximately, sixty-one percent (60.5%) of OMS met or exceeded the ACSM recommended minimum levels of 150 minutes. This involved an average of 121.72 (SD = 117.86) minutes of vigorous physical activity a week and 93.95 (SD = 106.17) minutes of moderate physical activity a week. (**Table 1**).

The OMS respondents' minutes of weekly physical activity significantly exceeded the ACSM recommendation of 150 minutes per week ($p = .000$) (**Table 2**).

Discussion

Our study population of OMS overall met or exceeded the ACSM recommended minimum guideline of 150 minutes of moderate intensity aerobic activity per week. Our study is consistent with past research by Stanford, Durkin & Blair (2012) concluding that most US medical students exceed the minimal

Table 1: Descriptive statistics of physical activity of third and fourth year osteopathic medical students during the 2015–2016 academic year, USA, 2016.

Measure	Mean (SD)
Total physical activity (PA) (minutes per week) ^a	215.68 (179.78)
Vigorous PA (days per week)	2.7 (1.98)
Vigorous PA (minutes per day)	36.46 (25.6)
Vigorous PA (minutes per week)	121.72 (117.86)
Moderate PA (days per week)	2.62 (2.03)
Moderate PA (minutes per day)	30.81 (25.22)
Moderate PA (minutes per week)	93.95 (106.17)

^a n = 679

Table 2: Physical activity levels of third and fourth year osteopathic medical students during the 2015–2016 academic year compared to the American College of Sports Medicine recommendation of 150 minutes of physical activity per week, USA, 2016 (n = 679).

Physical Activity (PA) (minutes per week)	Test Value	Mean (SD)	Mean Difference	t ^a	95% Confidence Interval of the Difference		p value
					Lower	Upper	
Total PA	150	215.68 (179.78)	65.68	9.52	52.13	79.22	.000
Vigorous PA	150	121.72 (117.86)	-28.28	-6.25	-37.16	-19.40	.000
Moderate PA	150	93.95 (106.17)	-56.05	-13.76	-64.05	-48.05	.000

^a T-test

requirement of physical activity. It is also noteworthy to mention that US medical students in other cross-sectional studies across the country engage in more physical activity compared to the general US adult population (Stanford, Durkin & Blair 2012). The fact that our OMS participants excel in getting sufficient physical activity also agrees with two separate studies on OMS in two different osteopathic medical schools which examined markers of physical fitness in OMS (Licciardone & Hagan 1992; Peterson, Degenhardt & Smith 2003).

Apart from our study, the physical activity of OMS has not been studied for more than a decade, with publications on the topic in 1992 and 2003 (Licciardone & Hagan 1992; Peterson, Degenhardt & Smith 2003). Those studies identified measures of physical fitness and did not compare activity levels to contemporary, professional recommendations. Despite osteopathic medical schools' unique emphasis on preventive medicine and the musculoskeletal system compared to their allopathic counterparts (American Association of Colleges of Osteopathic Medicine, 2017) there is no significant difference in the emphasis of physical activity and exercise between allopathic and osteopathic medical curriculum in the United States (Cardinal, Park & Kim 2015).

The physical activity habits of OMS, and healthcare providers in general, are relevant because providers who have healthy lifestyle habits are more likely to counsel patients on the benefits of an active lifestyle (Brehm, Summer & Khoury 2016). Such a philosophy is consistent with findings from a study with physical therapists, physical therapy assistants, and physical therapy students in Chevan & Haskvitz's (2010) study. The Healthy Doc = Healthy Patient (HD = HP) initiative, a study of 2,316 medical students from 16 medical schools in the United States, indicated that a significant predictor to perceived relevance of counseling is for the medical student to have healthy personal practices (Frank, Carrera & Elon 2007). Medical students might not be attuned to the probabilities that a physically active physician is more likely to motivate patients to engage in healthier lifestyle practices.

This study is not without its limitations. The relatively small sample size, compared to the total number of OMS eligible for the survey, potentially limits the generalizability of our study to all OMS. In addition to self-selection, self-reporting is a limitation of the study. Including sociodemographic items in our questionnaire could have helped us better understand our findings.

Conclusion

Most of the OMS across the United States in our study met or exceeded the ACSM minimum physical activity recommendation. The extent to which the physical activity levels of students will correspond with future willingness and/or effectiveness of counseling patients in physical activity is an area for subsequent study. Lastly, investigating strategies to decrease the barriers to physical activity in medical students is another area for future research.

Acknowledgements

We would like to thank Dr. Fatima Ramirez and Student Doctor Hytham Rashid, OMS-IV, for assistance with data collection. We also appreciate the help of Dr. Patrick Hardigan for the initial data analysis and interpretation. Finally, we are grateful for the medical students across the nation who completed our survey, providing the data upon which this article is based.

Funding Information

No funding source or grant was used to conduct our study.

Competing Interests

The authors have no competing interests to declare.

Author Contribution

Dr. Law provided substantial contributions to conception and design, acquisition of data, and drafted and revised the article critically. Dr. Hollar drafted the methods section, analyzed and interpreted the data, and made article revisions. Dr. Sklar contributed to the content and editorial revisions of the article. Dr. Sprague contributed to its conception and design and also revised the article.

References

- American Association of Colleges of Osteopathic Medicine.** (2017). *What is Osteopathic Medicine?* Available at: <http://www.aacom.org/become-a-doctor/about-om> [Last accessed 26 January 2017].
- American Heart Association.** (2014). *Recommendations for Physical Activity in Adults.* Available at: [http://www.heart.org/HEARTORG/HealthyLiving/PhysicalActivity/FitnessBasics/American-Heart-Association-Recommendations-for-Physical-Activity-in-Adults_UCM_307976_Article.jsp-WyFTjRI\]k1g](http://www.heart.org/HEARTORG/HealthyLiving/PhysicalActivity/FitnessBasics/American-Heart-Association-Recommendations-for-Physical-Activity-in-Adults_UCM_307976_Article.jsp-WyFTjRI]k1g) [Last accessed 13 June 2018].
- American Osteopathic Association.** (2018). *Osteopathic Medical Profession Report.* Available at: <http://www.osteopathic.org/inside-aoa/about/aoa-annual-statistics/Pages/default.aspx> [Last accessed 13 June 2018].
- Blair, S. N.** (2009). Physical inactivity: the biggest public health problem of the 21st century. *British Journal of Sports Medicine*, 43(1), 1–2. DOI: [https://doi.org/10.1016/S1440-2440\(07\)70066-X](https://doi.org/10.1016/S1440-2440(07)70066-X)
- Brehm, B. J., Sumner, S. S., Khoury, J. C., et al.** (2016). Health Status and Lifestyle Habits of US Medical Students: A Longitudinal Study. *Annals of medical and health sciences research*, 6(6), 341–347. DOI: https://doi.org/10.4103/amhsr.amhsr_469_15
- Bushman, B. A.** (2017). *American College of Sports Medicine's Complete Guide to Fitness & Health – 2nd Edition.*
- Cardinal, B. J., Park, E. A., Kim, M., et al.** (2015). If Exercise is Medicine, Where is Exercise in Medicine? Review of U.S. Medical Education Curricula for Physical Activity-Related Content. *Journal of physical activity & health*, 12(9), 1336–1343. DOI: <https://doi.org/10.1123/jpah.2014-0316>
- Centers for Disease Control and Prevention.** (2010). *The Association Between School-Based Physical Activity, Including Physical Education, and Academic Performance.*
- Centers for Disease Control and Prevention.** (2016). *Current Physical Activity Guidelines.* Available at: http://www.cdc.gov/cancer/dcpc/prevention/policies_practices/physical_activity/guidelines.htm [Last accessed 13 June 2018].
- Chevan, J., & Haskvitz, E. M.** (2010). Do As I Do: Journal of Exercise Habits of Physical Therapists, Physical Therapist Assistants, and Student Physical Therapists. *The American Physical Therapy Association*, 90(5), 726–734. DOI: <https://doi.org/10.2522/ptj.20090112>
- Frank, E., Carrera, J. S., Elon, L., et al.** (2007). Predictors of US medical students' prevention counseling practices. *Preventive Medicine*, 44(1), 76–81. DOI: <https://doi.org/10.1016/j.ypmed.2006.07.018>
- Lee, I. M., Shiroma, E. J., Lobelo, F., et al.** (2012). Effect of physical inactivity on major non communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*, 380(219), 219–229. DOI: [https://doi.org/10.1016/S0140-6736\(12\)61031-9](https://doi.org/10.1016/S0140-6736(12)61031-9)
- Licciardone, J. C., & Hagan, R. D.** (1992). The physical fitness of first-year osteopathic medical students. *Journal of American Osteopathic Association*, 92(3), 327–333.
- Peterson, D. F., Degenhardt, B. F., & Smith, C. M.** (2003). Correlation between prior exercise and present health and fitness status of entering medical students. *Journal of American Osteopathic Association*, 103(8), 361–366.
- Rauner, R. R., Walters, R. W., Avery, M., et al.** (2013). Evidence that aerobic fitness is more salient than weight status in predicting standardized math and reading outcomes in fourth- through eighth grade students. *Journal of Pediatrics*, 163(2), 344–348. DOI: <https://doi.org/10.1016/j.jpeds.2013.01.006>
- Stanford, F. C., Durkin, M. W., Blair, S. N., et al.** (2012). Determining levels of physical activity in attending physicians, resident and fellow physicians and medical students in the USA. *British Journal of Sports Medicine*, 46(5), 360–364. DOI: <https://doi.org/10.1136/bjsports-2011-090299>

- Trudeau, F., & Shephard, R. J.** (2008). Physical education, school physical activity, school sports and academic performance. *International Journal of Behavioral Nutrition and Physical Activity*, 5(10). DOI: <https://doi.org/10.1186/14795868-5-10>
- Vallance, J. K., Wylie, M., & MacDonald, R.** (2009). Medical students' self-perceived competence and prescription of patient-centered physical activity. *Preventive Medicine*, 48, 164–6. DOI: <https://doi.org/10.1016/j.ypmed.2008.12.006>
- World Health Organization.** *Physical Activity and Adults*. Available at: http://www.who.int/dietphysicalactivity/factsheet_adults/en/ [Last accessed 13 June 2018].

How to cite this article: Law, A., Hollar, L., Sklar, E. M., and Sprague, P. (2018). Physical Activity of Osteopathic Medical Students. *Physical Activity and Health*, 2(1), pp.45–50. DOI: <https://doi.org/10.5334/paah.16>

Submitted: 31 August 2018 **Accepted:** 23 September 2018 **Published:** 26 November 2018

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