Veterinary Medical Students' Motivations for Exercise

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ABSTRACT

The Centers for Disease Control (CDC) declares exercise to be one of the most important activities one can do to improve health. The benefits of exercise are well documented and include both physiologic and psychological health. Given the current landscape of wellness issues in veterinary medical education, it is necessary that students engage in exercise activities to manage stress and increase overall health. Therefore, to develop targeted interventions with the greatest likelihood for success, it is first necessary to understand what motivates veterinary medical students to exercise given their unique situational and environmental factors. This study is the first to explore this issue systematically in veterinary medical education, thus it is the authors' hope that the findings from this research will help identify exercise-related wellness interventions that could be implemented in veterinary medical schools.

Key words: academic affairs, curriculum, environment, outcomes, psychology, public health, student affairs, student health and well-being

INTRODUCTION

The Centers for Disease Control (CDC) declares exercise to be one of the most important activities one can do to improve health.[1] The benefits of exercise are well documented and include both physiologic and psychological health.[1,2] For example, regular exercise has been shown to lower risk of early death, coronary heart disease, hypertension, Type 2 diabetes, metabolic syndrome, and some types of cancers (e.g., colon, breast, endometrial, and lung); further, physiologic benefits include strengthened bones and muscles, improved weight management, and improved quality of life. Psychological benefits include a reduced risk for depression and anxiety, improved mood, better sleep quality, and better cognitive functioning.[1,2]

Research indicates the prevalence of those who achieve the physical activity recommendations set forth by the CDC rapidly declines in adults between the ages of 18 and 24[3] and nearly half of the general United States population do not meet minimal levels of physical activity.[4] Studies investigating physical activity among college students have found similar statistics, with approximately 50% meeting the minimum recommendations.[5–8] Existing research, however, has focused primarily on undergraduate college students between the ages of 18 and 22 who reside on campus. Therefore, much is unknown about the exercise motives and behaviors among students in graduate and professional degree programs who are typically older than traditional undergraduate students and do not reside on campus. A recent study by Kulavic and colleagues[9] found significant differences in motives for exercise between traditional and nontraditional students (e.g., older, part-time, financially independent). Their research has significant implications for promoting physical health as it not only demonstrated differences in students' motives for exercise, but also differences in students' needs across populations.

Context for Veterinary Medical Students

Students in veterinary medical education represent a vastly different population than traditional undergraduate college students. Doctor of Veterinary Medicine (DVM) students typically experience long spans of time, often 8–9 hours, in the classroom or laboratory potentiating sedentary behavior. In addition, they are burdened with a large "outside of class" workload in the form of studying and assignments, which will also contribute to extended sedentary behavior. Time management is paramount in veterinary medical education, and the stress of accomplishing academic success can cause other life goals to become less of a priority, including physical activity.

Students enrolled in DVM programs typically also experience pressures related to academic competition, financial burdens, and sleep deprivation, which significantly affect their personal lives.[10] Consequently, professional students are more likely to experience high levels of stress correlating to higher levels of depression.[11–13] Recent literature has confirmed these phenomena in veterinary medicine, as numerous studies have revealed veterinary medical students are particularly at risk for stress, depression, and burnout.[14]

Veterinary medicine is also somewhat distinct from other medical professional programs. Nearly every veterinary student enters school with the idea of helping animals and people, applying years of training, studying, examinations, and experience toward this goal. While some DVM students have a set career path (e.g., a family member is a veterinarian with a standing job offer), most have broad interests. They struggle with prioritizing the numerous educational opportunities available, because pursuing a residency program upon completion of the DVM degree is not a requirement. This can result in students overcommitting, overachieving, and experiencing stresses not found in some other medical school curricula. Further, students face additional anxiety over their professional future, and perhaps most of all, the paradox of being trained to heal yet constrained by the fact that their patients are property. Veterinary students are also the only health professionals who are trained to perform euthanasia and can do so legally. While this can be a blessing, it comes with tremendous responsibility, and at times unparalleled conflict. Furthermore, recent studies have suggested veterinary medical students suffer from more stress and depression than medical students.[15,16] Some theories propose veterinary medical students suffer from high rates of stress-related disorders because the veterinary career field is uniquely stressful.[17] In fact, veterinarians are four times more likely to commit suicide compared to the general population.[18]

Purpose

Perhaps, if coping mechanisms related to stress-management and increasing overall health and well-being were developed early during veterinary training, students would be more successful not only during veterinary training, but after graduation as well. Therefore, to develop targeted interventions with the greatest likelihood for success, it is first necessary to understand what motivates veterinary medical students to exercise given their unique situational and environmental factors. The purpose of this study was (1) to investigate the motivational factors for exercise among veterinary medical students, (2) to determine if exercise motivations differ based on key demographic criteria, and (3) to identify the extent to which students report currently meeting nationally recommended guidelines for exercise.

METHODS

Sample and Procedures

An anonymous electronic survey was administered in the fall semester of 2016 to all DVM students in a large college of veterinary medicine in the United States. A total of 393 students spanning 4 program years were invited to participate. Of these 393 potential participants, 222 completed the survey, resulting in a 56.5% response rate. The median age for participants was 25 years. A breakdown of student demographic characteristics is presented in Table 1. Results indicate the proportion of students who completed the survey were not statistically significantly different than the larger population with respect to sex ($\chi^2[1] = 1.453$, $p = .228$) and race/ethnicity ($\chi^2[1] = 1.254$, $p = .263$); however, results did indicate that a greater proportion of first-year students completed the survey than other class cohorts ($\chi^2[3] = 8.225$, $p = .042$). Permission to conduct the study was granted by the university's Institutional Review Board.

Table 1: Demographic characteristics of the sample

	n	%
Year		
1	77	34.68%
2	39	17.57%
3	48	21.62%
4	58	26.13%
Sex		
Male	39	17.57%
Female	183	82.43%
Race/ethnicity		
White	185	83.33%
Other	37	16.67%

Table 2: Reliability statistics

Subscale	Mean	*SD*	α
Stress Management ($n = 4$)	3.50	1.18	.919
Revitalization ($n = 3$)	3.16	1.35	.829
Enjoyment ($n = 4$)	2.82	1.58	.930
Challenge ($n = 4$)	2.20	1.34	.815
Social Recognition ($n = 4$)	1.12	1.10	.783
Affiliation ($n = 4$)	1.51	1.41	.918
Competition ($n = 4$)	1.66	1.50	.933
Health Pressures ($n = 3$)	1.52	1.19	.575
Ill-Health Avoidance ($n = 3$)	3.43	1.20	.824
Positive Health ($n = 3$)	4.11	0.93	.881
Weight Management ($n = 4$)	3.42	1.41	.889
Appearance ($n = 4$)	2.97	1.26	.864
Strength and Endurance ($n = 4$)	3.59	1.16	.895
Nimbleness ($n = 3$)	2.94	1.32	.858

Instrumentation

The Exercise Motivations Inventory-2 (EMI-2) is a 51-item instrument that measures an individual's self-reported motives for exercise.[19] The instrument uses a 6-point rating scale, with values ranging from 0 (*not at all true for me*) to 5 (*very true for me*). At the beginning of the instrument participants are instructed to answer each item in light of the following stem: "Personally, I exercise (or might exercise)…" The instrument consists of 14 subscales, ranging from three to four items per subscale. The instrument has been widely administered in the exercise science and health psychology fields. For the present study, reliability estimates were calculated both for the overall instrument and each of the 14 subscales (see Table 2). As a whole, the EMI-2 had a Cronbach's α reliability of .958, exhibiting highly reliable scores. Reliability measures were moderate

Table 3: Subscale results by program year

Subscale	PGY1 Mean (*SD*)	PGY2 Mean (*SD*)	PGY3 Mean (*SD*)	PGY4 Mean (*SD*)
Stress Management ($n = 4$)	3.67 (1.15)	3.22 (1.39)	3.64 (1.05)	3.34 (1.12)
Revitalization ($n = 3$)	3.46 (1.26)	3.06 (1.54)	2.92 (1.32)	3.03 (1.31)
Enjoyment ($n = 4$)	3.21 (1.57)	2.73 (1.70)	2.56 (1.54)	2.57 (1.48)
Challenge ($n = 4$)	2.53 (1.30)	1.98 (1.37)	2.31 (1.54)	1.83 (1.10)
Social Recognition ($n = 4$)	1.48 (1.18)	1.12 (1.11)	0.96 (1.18)	0.78 (0.73)
Affiliation ($n = 4$)	1.67 (1.40)	1.29 (1.32)	1.54 (1.45)	1.43 (1.45)
Competition ($n = 4$)	2.15 (1.55)	1.35 (1.40)	1.54 (1.60)	1.32 (1.27)
Health Pressures ($n = 3$)	1.72 (1.20)	1.18 (1.08)	1.68 (1.35)	1.36 (1.06)
Ill-Health Avoidance ($n = 3$)	3.57 (1.15)	3.41 (1.30)	3.39 (1.12)	3.29 (1.27)
Positive Health ($n = 3$)	4.29 (0.80)	4.08 (0.92)	4.06 (0.97)	3.93 (1.03)
Weight Management ($n = 4$)	3.43 (1.34)	3.26 (1.49)	3.27 (1.60)	3.66 (1.27)
Appearance ($n = 4$)	3.27 (1.12)	2.92 (1.26)	2.68 (1.40)	2.87 (1.25)
Strength and Endurance ($n = 4$)	3.81 (1.12)	3.51 (1.16)	3.49 (1.17)	3.42 (1.20)
Nimbleness ($n = 3$)	3.03 (1.30)	2.91 (1.23)	2.97 (1.23)	2.80 (1.49)

Table 4: Subscale results by sex

Subscale	Male Mean (*SD*)	Female Mean (*SD*)
Stress Management ($n = 4$)	3.16 (1.29)	3.57 (1.14)
Revitalization ($n = 3$)	3.15 (1.42)	3.16 (1.34)
Enjoyment ($n = 4$)	2.97 (1.55)	2.79 (1.59)
Challenge ($n = 4$)	2.49 (1.29)	2.14 (1.35)
Social Recognition ($n = 4$)	1.64 (1.27)	1.01 (1.03)
Affiliation ($n = 4$)	1.76 (1.40)	1.46 (1.41)
Competition ($n = 4$)	2.36 (1.69)	1.51 (1.42)
Health Pressures ($n = 3$)	1.58 (1.11)	1.51 (1.21)
Ill-Health Avoidance ($n = 3$)	3.54 (1.01)	3.40 (1.24)
Positive Health ($n = 3$)	3.97 (1.15)	4.14 (0.87)
Weight Management ($n = 4$)	3.16 (1.39)	3.48 (1.41)
Appearance ($n = 4$)	3.16 (1.31)	2.93 (1.24)
Strength and Endurance ($n = 4$)	3.56 (1.33)	3.59 (1.13)
Nimbleness ($n = 3$)	2.99 (1.41)	2.93 (1.30)

Table 5: Subscale results by race/ethnicity

Subscale	White Mean (*SD*)	Other Mean (*SD*)
Stress Management ($n = 4$)	3.51 (1.15)	3.43 (1.30)
Revitalization ($n = 3$)	3.13 (1.34)	3.33 (1.37)
Enjoyment ($n = 4$)	2.76 (1.58)	3.11 (1.57)
Challenge ($n = 4$)	2.16 (1.37)	2.41 (1.23)
Social Recognition ($n = 4$)	1.11 (1.08)	1.20 (1.22)
Affiliation ($n = 4$)	1.44 (1.35)	1.89 (1.62)
Competition ($n = 4$)	1.63 (1.49)	1.83 (1.55)
Health Pressures ($n = 3$)	1.46 (1.16)	1.79 (1.30)
Ill-Health Avoidance ($n = 3$)	3.41 (1.20)	3.50 (1.24)
Positive Health ($n = 3$)	4.11 (0.92)	4.10 (0.97)
Weight Management ($n = 4$)	3.42 (1.45)	3.42 (1.24)
Appearance ($n = 4$)	2.98 (1.25)	2.93 (1.31)
Strength and Endurance ($n = 4$)	3.56 (1.18)	3.71 (1.08)
Nimbleness ($n = 3$)	2.88 (1.31)	3.21 (1.34)

to high ($\alpha \geq .75$) for each subscale category[20] with exception of the Health Pressures subscale, which yielded a low-moderate reliability estimate of .575. It should be noted the Health Pressures subscale contains items addressing recovery from illness/injury, hereditary disease, and medical advice; these factors were likely less relevant to this sample than other subscale categories.

In addition to the EMI-2, we included three supplemental questions intended to identify the degree to which students meet current American Heart Association (AHA)[21] guidelines. We generated three questions that embody the AHA recommendations and asked students (yes/no) if they currently meet each level of exercise.

Statistical Analysis

All data were analyzed using SPSS statistical software. Data analyses consisted of calculating a variety of statistics, including mean subscale scores for the EMI-2, and ANOVA. Given all subscale analyses consisted of multiple comparisons, a Bonferroni correction was applied to correct for compounding family-wise error. The Bonferroni correction reduced the p value for detecting statistically significant differences from $p \leq .05$ to $p \leq .0035$. Thus, the level of significance was set at $p \leq .0035$ for all subscale analyses.

RESULTS

Program Year

A comparison of subscale results by program year (PGY) are presented in Table 3. ANOVA results indicated only one subscale, Social Recognition, differed by program year ($F[3] = 5.268$, $p = .002$) given the Bonferroni correction reduced the p value for detecting statistical significance to .0035. The η^2 effect size for this measure was .068, indicating moderate practical significance.[22]

Table 6: Number of students meeting recommended exercise guidelines

Question	Yes	No
In an average week, do you perform at least 2.5 hours of moderate-intensity exercise?	118 (58.1%)	85 (41.9%)
In an average week, do you perform 1 hour and 15 minutes of vigorous-intensity aerobic activities?	96 (48.7%)	101 (51.3%)
In an average week, do you perform muscle-strengthening exercises that work all major muscle groups on 2 or more days per week?	76 (38.2%)	123 (61.8%)

Sex

A comparison of subscale results by sex are presented in Table 4. ANOVA results indicated two subscales, Social Recognition ($F[1] = 10.985$, $p = .001$) and Competition ($F[1] = 10.647$, $p = .001$) differed by sex given the Bonferroni correction reduced the p value for detecting statistical significance to .0035. The η^2 effect size for these measures was .048 and .046, respectively, indicating small-to-moderate practical significance for each.[22]

Race/Ethnicity

A comparison of subscale results by race/ethnicity are presented in Table 5. ANOVA results indicated no subscale differed on the basis of race/ethnicity.

Supplemental Questions

Three additional items were included to assess the degree to which students' exercise behaviors were in alignment with the recommended guidelines from the AHA[21] and the CDC.[23] Results indicate nearly 60% of students get sufficient moderate-intensity exercise per week, approximately 50% get sufficient vigorous-intensity aerobic exercise, and approximately 40% get sufficient exercise performing muscle-strengthening exercises working all major muscle groups (see Table 6).

DISCUSSION

Substantive Findings

A recent study by Kulavic and colleagues[9] compared the exercise motivation factors between traditional and nontraditional college students and found differences on 8 of the 14 subscales appearing on the EMI-2. Findings suggested that traditional college students' exercise motivations included challenge, competition, appearance, nimbleness, affiliation, and social recognition. In contrast, Kulavic and colleagues[9] found that nontraditional students were more motivated by health pressures and ill-health avoidance. Results of this study found positive health, stress management, ill-health avoidance, strength and endurance, weight management, and revitalization were the largest overall exercise motivation factors for DVM students. These factors are in stark contrast to both traditional undergraduate and other graduate students' exercise motivations and underscore the need for unique, targeted health interventions for students in veterinary medical training programs.

Previous studies focusing on undergraduate college students found students are largely motivated by physical appearance,[5] and exercise motives differ by sex, with men desiring muscle gain and women desiring weight loss.[24] Further, undergraduate college students do not typically perceive personal health as a significant reason to exercise.[5] Some researchers speculate this may be an attribute of younger populations, who present fewer health problems than other adult populations.[5] Results from this study, however, indicate that while physical appearance obviously matters for DVM students, this factor does not matter nearly as much as it does for undergraduate students. With respect to sex, exercise motives do not generally differ among DVM students except with respect to competition and social recognition goals. It should be noted, however, that although these two goals were statistically significantly different, the scores for both sexes averaged around 1–2 on the 6-point scale and so the findings are likely somewhat inconsequential. Motivations concerning weight also yielded interesting comparisons between undergraduate and DVM students. While undergraduates reported pursuing weight loss, DVM students reported pursuing weight management. This finding may further distinguish the qualitative difference between undergraduate and DVM students as it relates to concerns about physical appearance.

With respect to attaining adequate levels of moderate-intensity exercise, it is an interesting phenomenon that college student populations similarly reflect insufficient levels of physical activity per week given that most colleges and universities have a variety of resources and platforms (e.g., campus recreation centers, intramural sports) for students to engage in exercise.[25] Some scholars speculate the lack of physical activity is due to rigorous academic demands,[26] lack of time,[27–30] and potentially a lack of tailored interventions for young adults.[5] Despite campuses devoting facilities and resources for promoting physical activity, this is evidently insufficient to motivate students to exercise. Existing research suggests the most successful strategies for promoting physical activity among college students are interventions that empower the individual by creating a supportive learning environment to improve health and well-being.[31] Further, research suggests behavioral change is highly dependent on individual motivation, social support, and environmental conditions, including the availability of facilities and the physical activity characteristics.[32]

Targeted Intervention Plan and Evaluation

It seems apparent that in order for any intervention to have the greatest likelihood of success, it is necessary to implement programming based on best practices in exercise promotion and tailored to the unique needs of the DVM student population, and each of its individual members. By using students' reported motivations for exercise, our aim is to increase physical activity that will have a spillover effect into other areas of health (e.g., stress and anxiety management, coping skills, etc). To that end, we intend to use the results of the EMI-2 to create a tailored intervention approach that will include educational programming, on-site exercise programming to reduce barriers to exercise, and physical activity challenges.

A unique feature of our veterinary school is the recent adoption of a "house system" in 2016. The primary goal of the program is to promote wellness in areas relating to intellectual, mental/emotional, social, cultural, and physical health.[33] Implementing targeted interventions as part of our house system initiative will create opportunities for students to receive greater social and institutional support, as they will win house points and receive social recognition for their successes. We believe these factors will also help reduce attrition rates among participants.

Due to time constraints and the intensity of the veterinary curriculum, both of which often potentiate sedentary behavior, we will strategically attempt to provide timely motivational, educational, and informational activities about physical activity within the veterinary school facilities. These will be offered in between classes and tailored for each student cohort, thus reducing time and location barriers to student participation. Many of these interventions will focus on exercises and activities that students can perform while sitting in class to increase their levels of physical activity. Upon completion of these tailored interventions, DVM students will again be assessed to determine if they have adopted any of the strategies and behaviors presented to them. We will attempt to learn which specific educational sessions, motivational techniques, and activities were most helpful in promoting physical activity. A post-test (repeated measure) will ask students about the degree to which their exercise behaviors are in alignment with AHA and CDC guidelines. These collective data will help determine the success or failure of the interventions and will be published in a future article.

Limitations and Future Research

There are several important limitations of this study, although some will segue into additional avenues of research. First, it is important to note that all survey data were self-reported. To minimize this limitation we made the survey anonymous to increase the likelihood that students would avoid providing socially desirable responses. Second, the proportion of first-year students who completed the survey was significantly larger than each of the other class cohort years. In an effort to prevent these values from potentially distorting our findings we opted not to report a single, summative analysis. Instead, we reported findings by cohort year to ensure this overrepresentation of first-year students did not potentially contaminate other results. Third, like most all other veterinary schools our institution contains a disproportionate number of females to males. For this reason, comparisons by the sex variable may not be statistically stable given the small sample of male participants per class year. Thus, readers are encouraged to be cautious when interpreting differences in exercise motivations by sex. Finally, this study was limited to a single veterinary medical school in the United States. While veterinary medical students typically undergo similar training and experience similar stressors, the extent to which our findings generalize to other veterinary schools with different curricula, resources, and environments remains unknown. We encourage other veterinary educators to replicate this study at their respective institutions for confirmatory purposes.

Avenues for future research might involve (1) replication of the present study to discern the degree to which findings generalize across institutions, (2) specific intervention strategies evidenced to promote physical activity among DVM students, and (3) comparisons of exercise motivations among students in other medical professional programs (e.g., [human] medicine, pharmacy, dentistry, etc).

CONCLUSION

Researchers have noted that long-term health behaviors are mainly developed during the college years,[5,34] thus making the need for early, targeted inventions crucial for student wellness. This article sought to fill a void in the research literature by investigating DVM students' motivations for exercise, which we found to be significantly different from the motivations of undergraduate and many other non-medical graduate students. We identified strategies evidenced to be most successful for promoting physical activity and described a plan for a targeted intervention at our college of veterinary medicine. It is our hope that others in veterinary medical education will leverage our findings and create additional interventions that will promote sustainable exercise behaviors among DVM students. Ultimately, we envision a review of intervention practices that illustrate the degree to which various strategies were successful among DVM students to create some "best practice" guidelines for promoting exercise among DVM students.

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