



Review Article

Exercise Prescription-related Course Offerings in U.S. Medical Schools

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Abstract

Background: Exercise is Medicine® was launched in 2007 to call on health care providers to counsel patients and prescribe exercise in the prevention and treatment of chronic disease states. However, a large proportion of Americans still do not meet the national physical activity guidelines. One factor may be under-education of medical professionals on how to counsel patients and develop exercise prescriptions. Therefore, the aim of the study was to determine the prevalence of course offerings in U.S. medical school curricula regarding training in exercise prescription. **Methods:** University websites were accessed for information regarding course offerings in MD and DO programs. The search terms were exercise prescription, exercise, fitness, and physical activity. **Results:** Four programs offered courses with the term “exercise prescription” in the course title or description. Only 4 programs offered courses with the terms “exercise”, “fitness”, or “physical activity” in the course title. 35.5% of programs offered courses with the terms “exercise prescription”, “exercise”, “fitness”, or “physical activity” in the course description or list of topics, with only 17% of those programs offering required courses. **Conclusion:** The data suggests that medical students may be under-educated in the area of exercise and exercise prescription.

Keywords: Physical activity; Fitness; Exercise; Curriculum; Medical students; Exercise is medicine

Introduction

Exercise training has proven to be beneficial in the prevention of disease. In addition, exercise can improve the pathogenesis and symptoms associated with a variety of chronic disease states and can also attenuate drug-induced adverse effects [1-4]. Thus, exercise has been described as a drug-free polypill [5]. Exercise is Medicine®, a joint initiative between the American Medical Association and the American College of Sports Medicine, was launched in 2007 to call on health care providers to assess physical activity levels and prescribe exercise in the prevention and treatment of chronic disease [6]. However, based on self-reported data 51% of Americans adults still do not meet the national physical activity guidelines. Even more, the prevalence of inactivity has been reported to be much higher when the data is based off of objective measures, such as accelerometry, rather than subjective self-reported recall data which is more prone to human error and bias [7]. The cause behind the high prevalence of inactivity is likely multifactorial including lack of time, motivation, social support, and resources. Another contributing factor may be under-education of medical professionals on how to develop an exercise prescription (Rx) and effectively counsel patients [8]. In the U.S. only 32.4% of patients seen by clinicians in 2010 received physical activity counseling that year [7]. Healthy People 2020 objectives include a goal of increasing the number of physician visits where exercise counseling and Rx is provided to all patients in order to prevent or treat chronic disease [9].

Exercise Rx refers to the development of a specific exercise regimen designed for a specific purpose. Exercise Rx

is based on the “FITT” principle which includes the frequency, intensity, type, and time of exercise that is appropriate for the goal of patients with various conditions and disease states [10]. One generalized exercise regimen is not sufficient to meet the goals of every patient. For example, the physical activity sufficient to decrease risk of developing chronic diseases and delay mortality is typically not sufficient to prevent or reverse weight gain [10]. Furthermore, exercise regimens that may be safe for most, are not safe for all. The type and/or intensity of exercise may need to be modified depending on varying medical conditions and physical limitations [10]. Thus, sufficient training is typically required to acquire the competence and confidence to develop a safe and effective exercise Rx.

To meet the goals of Exercise is Medicine® and Healthy People 2020, it would be beneficial if medical students received training to assess physical activity levels, develop a safe and effective exercise Rx, to counsel patients regarding the role of exercise in the prevention and treatment of chronic diseases, and to know when it is prudent to refer patients to an exercise specialist. Therefore, the aim of the study was to determine the prevalence of course offerings in U.S. medical school curricula regarding exercise Rx to determine if physicians are receiving training.

Methods

University websites were accessed during the 2019 year for information regarding exercise Rx-related course offerings in all fully accredited doctor of medicine (MD) and doctor of

osteopathic medicine (DO) programs in the United States. Only those programs whose course descriptions of their full curriculum were accessible online were included in the analysis. The course titles, course descriptions, and course topics (if listed) were analyzed for the key search terms, which were: exercise Rx, exercise, fitness, and physical activity. The analysis was completed by two individuals working independently. After the analysis was complete, the data was combined and discrepancies were spot checked by a third individual. The study aimed to determine: 1. how many MD and DO programs offered courses with the term “exercise Rx” in the course title, course description, or course topics, 2. how many MD and DO programs offered courses with the terms “exercise”, “fitness”, and/or “physical activity” in the course title, course description, or course topics, and 3. if these courses were more likely to be elective or required.

Results

Of 141 accredited MD programs in 2019, 86 (61%) were included in the analysis. Twenty four (69%) of 35 accredited DO programs were also included. No courses with the term “exercise Rx” in the course title were offered in an MD or DO program. In total only 3.6% of programs, three (3.5%) MD programs and one (4.2%) DO program, offered courses with the term “exercise Rx” in the course description or list of course topics. Four (4.7%) MD programs, and zero DO programs, offered courses with the terms “exercise”, “fitness”, or “physical activity” in the course title. In total only 35.5% of programs, 34 (39.5%) MD programs and five (20.8%) DO programs, offered courses with the terms “exercise Rx”, “exercise”, “fitness”, and/or “physical activity” in the course description or list of topics. If the keyword was utilized in the title it was also used in the description and/or list of topics. Seventeen percent of the programs which offered exercise-related courses offered required courses; the remaining 83% of programs only offered elective courses. No MD or DO program offered a course dedicated to exercise Rx or exercise; all of the courses that contained the keywords also included a variety of other discussion topics unrelated to exercise/fitness/physical activity (Table 1).

	MD Programs	DO Programs
“Exercise Rx” in Course Title	0	0
“Exercise Rx” in Course Description or Topics	3 (3.5%)	1 (4.2%)
“Exercise,” “Fitness,” or “PA” in Course Title	4 (4.7%)	0
Any Keyword in Course Description or Topics	34 (39.5%)	5 (20.8%)

Table 1: Number and percent of programs that offered exercise-related courses.

Of the courses that were identified as having the keywords in the course description, four of them were entitled “Sports Medicine”, four of them “Physical Medicine and Rehabilitation”, and four of them “Family Medicine/Primary Care”. Another three had titles similar to “Exercise Physiology/Movement Science/Musculoskeletal Systems”. Twenty three identified courses had titles similar to “Wellness/Preventative Medicine/Lifestyle Medicine/Health

Promotion/Integrative Medicine”. The course titles of six were associated with “Bariatric Medicine/Surgery/Women’s Heart Clinic/Diabetes”. Eight programs offered two courses with the keywords in the course descriptions, while the others offered one.

The geographical area of the programs that offered exercise-related courses was determined. Of the 39 programs that offered courses with the keywords in the course description, 21 were located in the North (mostly Northeast and mid-Atlantic areas), 13 in the South (most in the Southeast), and four in the West (California and Utah). New York was the state with the most programs (eight) offering courses with the keywords in the course description.

Of the programs that offered exercise-related courses, the median and mode of the founding year of the programs were 1950 and 1977, respectively. The range of the founding year was 1782-2014. Six programs were founded in the year 2000 or later, the remaining programs were founded before 2000.

Discussion

Analysis of course titles, descriptions, and topics accessed via university websites revealed that the prevalence of exercise Rx-related course offerings in MD and DO programs appears to be low. No MD or DO programs offered a course dedicated to exercise Rx nor did the majority offer coursework relating to exercise, physical activity, or fitness.

The general population turns to physicians for their recommendation on all things relating to health and disease [11]. Therefore, it is reasonable to expect that MDs and DOs be knowledgeable on exercise and exercise Rx. However, based on this analysis, MD and DO students are likely not receiving adequate training to confidently assess physical activity levels, develop a safe and effective exercise Rx, to counsel patients on exercise in order to prevent or treat chronic disease, or to know when it is prudent to refer a patient to an exercise specialist. Not only do the minority of programs offer courses with the search terms in their titles or descriptions, the majority of these courses are elective. Only 17% of programs offered courses which were required.

Furthermore, of the 34 MD programs that offer courses with the keywords “exercise, fitness, or physical activity” in the description or topics, at least eight (23.5%) of them seem to be offering courses that do not apply to the role of exercise in prevention or treatment of chronic disease states, but rather focus on the rehabilitation of injuries or other unrelated topics. The names of such courses are Physical Medicine and Rehabilitation, Sports Medicine, Musculoskeletal Systems, and Bariatric Medicine. This also applies to two (40%) of the five DO programs where the names of the courses are Sports Medicine and General Surgery.

In the remaining courses identified that may focus to some extent on the role of exercise in prevention and treatment of chronic disease states, it is not possible to determine the actual topics that were covered regarding exercise since it is a broad term, nor can we determine the depth of discussion on the topics. However, since exercise Rx is such an encompassing area of practice requiring significant content knowledge [10], it is possible that a 1-3 unit course that includes “exercise” as just one topic amongst many,

would do more than barely scratch the surface of “exercise Rx.” As a comparison, it is common that undergraduate clinical exercise physiology programs require at least a 3-unit didactic course solely dedicated to exercise testing and Rx, along with additional exercise-related coursework and training. Exercise Rx involves much more than simply suggesting to every patient to engage in exercise [10]; and it can be dangerous to do so.

Evidence suggests that simply advising patients to exercise is not sufficient for behavioral change [12]. The 5A framework, which consists of assess, advise, agree, assist, and arrange, is a more effective approach [7,12]. The 5A framework includes assessing baseline physical activity levels, advise on increasing physical activity levels and relating the patient’s laboratory findings to physical inactivity, jointly develop and agree on an exercise Rx that includes goals, milestones, and preferences, assist patients by providing strategies to overcome impediments to meeting goals, and arrange follow-ups and reminders. Primary care physicians have listed several reasons for not counseling patients: lack of time during office visit, insufficient knowledge in field of exercise, insufficient knowledge on how to counsel effectively, lack of perceived effectiveness of their counseling, insufficient counseling protocols, and lack of reimbursement [8]. Many of these impediments can be resolved through education, which supports the need for exercise Rx-related coursework or training in medical school curricula. Indeed, it has been shown that training of physicians does improve self-confidence, perceived impact of many barriers, and the proportion of physicians prescribing exercise [13].

The difference between MD and DO training stems from a variance in their fundamental philosophy, with DO programs putting more emphasis on preventative and holistic medicine. Due to this difference in philosophy, it was expected that more DO programs would include courses with training in exercise Rx compared to MD programs. However, this is seemingly not the case. According to our analysis, a lower percentage of DO programs include courses with the keywords in their course descriptions compared to MD programs.

Our conclusions are similar to Cardinal et al; the only other study to analyze published course descriptions in U.S. medical school curricula for number of courses relating to physical activity and exercise [14]. They reported that the majority (~52%) of U.S. MD and DO programs did not offer coursework relating to physical activity and that the courses offered were most often elective. Thus, the majority of institutions (82%) did not require their students to take a single course relating to physical activity or exercise. The analysis of medical school curricula in this report was completed in 2013, thus it does not appear that there has been a significant change to better educate medical students on exercise or exercise Rx in the past 6 years. As was the case in 2013, it appears that most medical students are still graduating with no formal education relating to the role of exercise Rx in the prevention and treatment of chronic disease. It is worth pointing out that Cardinal et al did report a slightly higher percentage of institutions offering courses relating to physical activity and exercise. This is likely due to their more expansive list of keywords, which also included terms such as “athletics”, “behavioral medicine”, “lifespan”, “sports”, and

“sports medicine” in addition to the keywords that were used in the current study. However, we believe that several of these keywords would not accurately identify courses that discussed how to develop an effective exercise Rx and to apply it to the prevention and treatment of chronic disease. Thus, we believe that our analysis is a more accurate indication of the instructional intent of exercise Rx in the realm of chronic disease.

There have been other previous studies that attempted to estimate the physical activity education content in U.S. medical school curricula [15-18]. However, these studies relied mostly on mailed questionnaires to administrators for their analyses, with the most recent being published in 2002 before the Exercise is Medicine initiative was launched. Thus, there are no current administrator surveys to compare our results.

To determine possible reasons why medical programs include little exercise Rx-related content, we looked at the content of all levels of the United States Medical Licensing Exams (USMLE.org). “Exercise (e.g. benefits of exercise)” was listed under the topic Lifestyle and Routine Preventative Health Care. The content list did not specifically include developing an exercise Rx. If developing an exercise Rx is not included on the USMLE exams, it may be a possible explanation as to why most medical schools do not seemingly include exercise Rx in their curriculum. Furthermore, the American Board of Family Medicine certification exam also does not list “exercise Rx” on its content list (theabfm.org). However, it does list “exercise” as a topic under the subsection Preventative Care for Geriatrics and lists “benefits of exercise for prevention and management of disease” under the subsection Sports Medicine. Thus, it may be more likely that when medical school course content pertains to “exercise”, there may be more of a focus on benefits of exercise rather than how to develop an exercise Rx.

A recent study in Teaching and Learning in Medicine aimed to consolidate health professional expert opinion on key physical activity categories and topics that should be included in the curriculum of health professional training programs [19]. A three-round modified e-Delphi process examined the opinions of 73 experts from various health professions including medicine, physician assistants, exercise physiology, nursing, clinical nutrition, occupational therapy, and physical therapy. The experts ranked 5 categories in order of importance. The experts believed that all categories were important. The top ranking category was health behavior change, followed by cellular and systemic implications of exercise, clinical exercise physiology, physical activity and public health, and administrative aspects of integrating physical activity into health systems. The two topics ranked of highest importance within the clinical exercise physiology category were general physical activity assessment and prescription and exercise prescription for special populations and clinical conditions. Safety screening and risk assessment was also found to be important.

Although physicians should be knowledgeable about exercise Rx, it is not expected that they should become exercise specialists. Basic knowledge would allow physicians to prescribe exercise to healthy patients or those with common chronic disease states with classic presentation during routine visits. In other cases, it may be prudent to refer patients to an

exercise specialist. Having an exercise specialist as a member of the health care team would also prove to be helpful for increasing the number of patients who are prescribed exercise during their physician visits. Interprofessional collaboration would be ideal to optimize patient care. Some healthcare professions now include interprofessional education in their curriculum and/or co-curriculum as a means to improve interprofessional collaboration [20,21].

There are some limitations to this study. First, search terms did not include other terms that may encompass exercise, such as wellness, preventative medicine, lifestyle medicine. Therefore, we may have undercounted the number of programs that have courses that discuss exercise to some degree. However, courses that included the terms “lifestyle medicine” or “preventative medicine” in their titles, often contained our keywords in the course description so were included in the count for those programs which did include exercise-related coursework. For example, the American College of Lifestyle Medicine (ACLM) published a list of MD and OD programs that include lifestyle medicine in their curriculum, which was described to include exercise. The list only includes 6 programs; however, we had identified 4 of the 6 programs as having courses with our keywords in the course description. We also identified 3 additional programs, which were not included in the ACLM list, with courses with “lifestyle medicine” in their titles which included our keywords in the course descriptions. Secondly, latent content or experiences were likely unaccounted for. Thirdly, 37.5% of MD/DO programs were not included in the analysis due to inaccessibility of course descriptions.

Conclusion

Based on the analysis of university website course titles, descriptions, and topics it appears that the majority of MD and DO programs do not offer exercise Rx coursework and when they do, it is most often elective content. Therefore, the data supports the need to incorporate more training pertaining to exercise and exercise Rx into the curriculum. Improved student training may lead to more practicing physicians assessing for physical activity levels, developing personalized exercise Rxs in order to prevent or manage chronic disease, and/or to refer their patients to an exercise specialist, thereby, helping to meet the goals of Exercise is Medicine® and Healthy People 2020.

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