The Application of Exercise Prescription Education in Medical Training

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BACKGROUND

- Physical inactivity is a hallmark of chronic disease and a contributor to many acute medical conditions.
- Physicians play a vital role in addressing physical inactivity and are often seen by patients as a significant source of exercise related information.
- While the dangers of physical inactivity are well understood and physicians have a desire to address them, a lack of education in exercise prescription (ERx) may be a barrier to properly prescribing exercise to patients.
  - Exercise prescription refers to the specific plan of fitness related activities designed to meet individual health and physical fitness goals within the context of individual health status, function, and the respective physical and social environment.
- The aim of this research was to explore the need for ERx education amongst students and physicians in training and determine the effectiveness of ERx didactic.

METHODS

- A one-hour curriculum was developed based on the American College of Sports Medicine principles of ERx.
  - Curriculum included information on types of exercise, the basics of creating an exercise program (FITT-VP method), and ERx for special patient population groups (diabetes, pregnancy, asthma, etc.). (Table 1)
  - Practical examples were also discussed using the template in figure 1.
- Standardized pre- and post-surveys were administered to assess perceived ERx education level and confidence levels for prescribing aerobic and anaerobic exercise to patients among groups of Wayne State School of Medicine medical students and residents.
  - Surveys were administered immediately before and after curriculum delivery.
- Data was also collected assessing physical activity (PA) habits and beliefs.
- Virtual curriculum sessions were held over Zoom.
- Results were assessed using Wilcoxon Ranked Sum Test. All statistical analyses were performed using IBM SPSS 28.0.1.1 (IBM, Armonk, NY, USA).

Curriculum Section	Section Description
What is ERx?	Definition of ERx, its benefit to patients, and the need for its inclusion in medical education.
Pre-exercise screening	Basics of screening before PA.
Types of exercise	Definitions of the two major types of exercise, aerobic and resistance exercise.
Principles of ERx	Descriptions and recommendations for the FITT-VP method of ERx. (Frequency, Intensity, Time, Type, Volume, Progression)
Considerations for special populations	Recommendations and considerations for special patient populations including older adults, pregnancy, cardiac diseases, asthma, COPD, diabetes, hypertension, kidney disease, arthritis, and osteoporosis.
Creating an ERx	An ERx template and practical patient examples.

Table 1. Section headings of ERx curriculum with detailed descriptions of what was included.

RESULTS

- 144 pre-survey and 119 post-survey results were reported. 43 residents completed the pre-survey and 27 completed the post-survey. 101 medical students completed the pre-survey and 92 completed the post-survey. Surveys were reported on a 10-point scale and a 1-5 Likert scale.
  - Likert scale: 1 = strongly agree, 5 = strongly disagree
- **Mean perceived ERx education level significantly increased from 4.67/10 + 1.98 to 7.35/10 + 1.56 (P<.001).** Among residents, mean perceived ERx education level significantly increased from 4.86/10 + 1.72 to 7.56/10 + 1.58 (P<.001). Among medical students, mean perceived ERx education level significantly increased from 4.59/10 + 2.08 to 7.29/10 + 1.57 (P<.001).
- Mean confidence level discussing PA with patients, ability to answer exercise related questions, confidence level in ability to prescribe aerobic exercise, and ability to prescribe anaerobic exercise significantly increased in all groups and overall (P<.001). (Table 2)

Group	Survey Question	Pre-Education Survey (Mean +SD)	Post-Education Survey (Mean + SD)
	I am confident in my ability to discuss PA with a healthy patient	2.52 ± 1.03	1.66 ± .60
	I am confident in my ability to answer exercise related questions for a healthy patient	2.58 ± 1.05	1.66 ± .66
	I am confident in my ability to prescribe aerobic exercise to a healthy patient	2.59 ± 1.10	1.63 ± .58
	I am confident in my ability to prescribe strength or resistance exercise to a healthy patient	2.68 ± 1.14	1.64 ± .61

Table 2. Perceived ERx confidence level data. Data was reported on a 1-5 Likert scale (1 = strongly agree, 5 = strongly disagree).

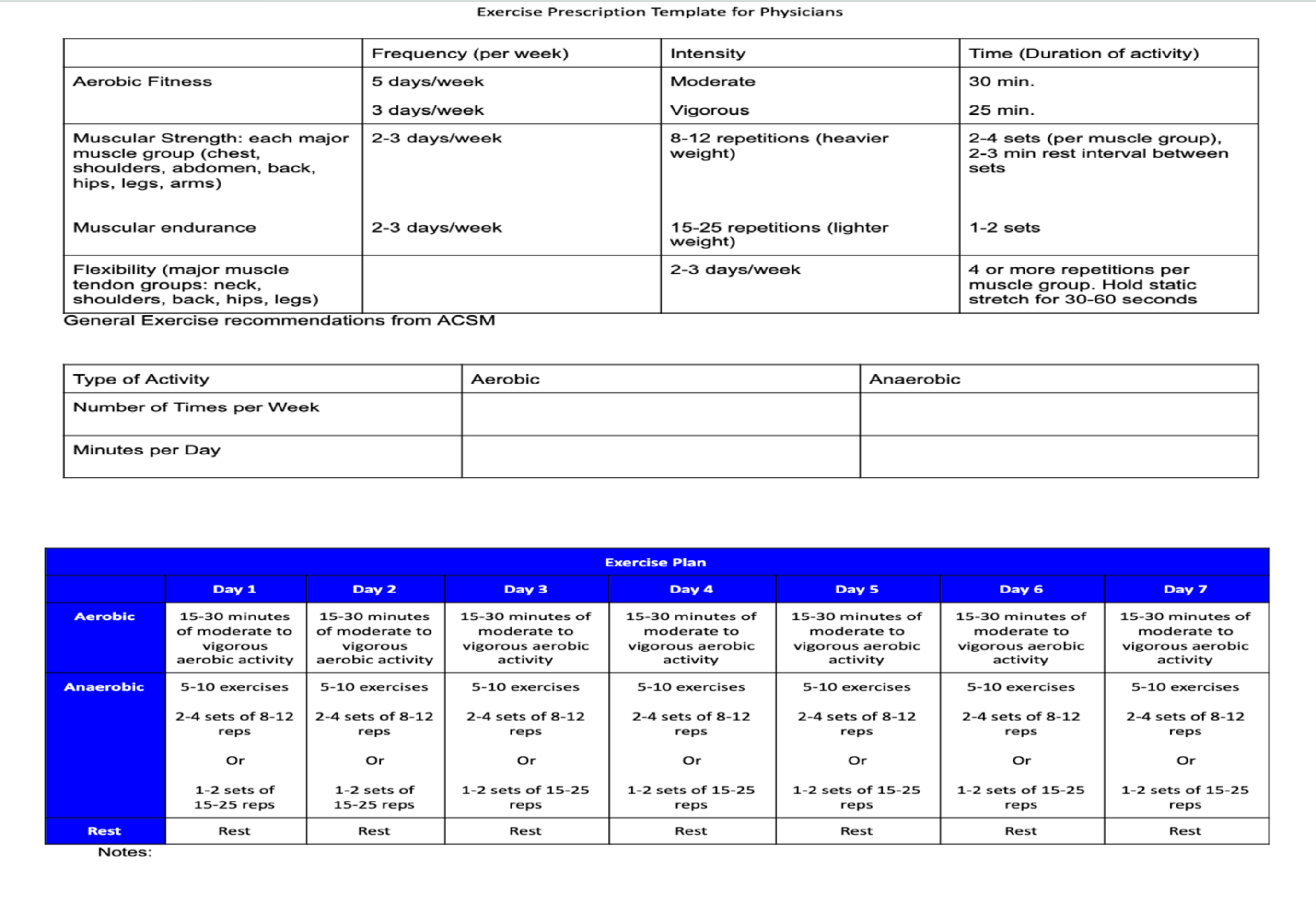
- Physical Activity Habits and Beliefs (Table 3)

Survey Question	Response Rating (Mean ± SD)
I believe PA is integral to my patient's health	1.2 ± .50
I will be able to provide more credible and effective counselling if I exercise and stay fit	1.52 ± .72
I believe physicians have a responsibility to promote PA to their patients	1.34 ± .60
Medical schools/Residency programs should encourage their residents to practice physically active lifestyles	1.40 ± .68
My medical school/residency program encourages trainees to exercise and be PA	2.43 ± 1.03
My future patients are not going to do more exercise even if I discuss PA with them	3.43 ± 1.11
I have received an adequate amount of education/training on PA counselling and ERx for health, prevention, and treatment of disease during my medical training and/or residency	3.61 ± .97
I would like to receive more education/training on PA counselling and exercise prescription for health, prevention, and treatment of disease	1.63 + .68
The largest barrier to prescribing PA is lack of time during a patient encounter	2.37 + .83

Table 3. PA habit and belief data. Data was reported on a 1-5 Likert scale (1 = strongly agree, 5 = strongly disagree).

CONCLUSIONS

- Our study found that an ERx curriculum delivered in a single-hour session led to a significant increase in perceived ERx knowledge, confidence in discussing and answering aerobic and anaerobic exercise related questions, and confidence in prescribing aerobic and anaerobic exercise immediately following the session.
- We also found that medical students and residents believe that PA is integral to patient health, that they have not received adequate education on PA counselling and ERx training, and that they want to receive more education in these areas.
- Recent interventions have been successful at increasing PA awareness in medical students and ERx behavior in practicing physicians.
  - These interventions fell short of evaluating knowledge retention and ERx capability in physicians in training, however, they do point to the possibility that an ERx education session like ours could have longer term results and realistic application.
  - Furthermore, our results indicate that physicians in training recognize the importance of this type of education and desire more of it during their training.
- Limitations of this study include being conducted at a single medical school and residency program, no long-term knowledge retention testing, lack of behavioral change tracking, and the medical student session being offered as voluntary.
- Further investigations should focus on long term knowledge retention and assessment of prescribing ability after education to determine ERx competency in physicians in training in US medical schools and residencies. Research should also be done to examine behavioral change in physician ERx practice and patient exercise practices under the care of physicians undergoing this type of training to understand the applicability and impact of this education in practice. (Figure 1)



Exercise Prescription Template for Physicians

	Frequency (per week)	Intensity	Time (Duration of activity)
Aerobic Fitness	5 days/week 3 days/week	Moderate Vigorous	30 min. 25 min.
Muscular Strength: each major muscle group (chest, shoulders, abdomen, back, hips, legs, arms) Muscular endurance	2-3 days/week 2-3 days/week	8-12 repetitions (heavier weight) 15-25 repetitions (lighter weight)	2-4 sets (per muscle group), 2-3 min rest interval between sets 1-2 sets
Flexibility (major muscle tendon groups: neck, shoulders, back, hips, legs)		2-3 days/week	4 or more repetitions per muscle group. Hold static stretch for 30-60 seconds

General Exercise recommendations from ACSM

Type of Activity	Aerobic	Anaerobic
Number of Times per Week		
Minutes per Day		

Exercise Plan

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Aerobic	15-30 minutes of moderate to vigorous aerobic activity	15-30 minutes of moderate to vigorous aerobic activity	15-30 minutes of moderate to vigorous aerobic activity	15-30 minutes of moderate to vigorous aerobic activity	15-30 minutes of moderate to vigorous aerobic activity	15-30 minutes of moderate to vigorous aerobic activity	15-30 minutes of moderate to vigorous aerobic activity
Anaerobic	5-10 exercises 2-4 sets of 8-12 reps Or 1-2 sets of 15-25 reps	5-10 exercises 2-4 sets of 8-12 reps Or 1-2 sets of 15-25 reps	5-10 exercises 2-4 sets of 8-12 reps Or 1-2 sets of 15-25 reps	5-10 exercises 2-4 sets of 8-12 reps Or 1-2 sets of 15-25 reps	5-10 exercises 2-4 sets of 8-12 reps Or 1-2 sets of 15-25 reps	5-10 exercises 2-4 sets of 8-12 reps Or 1-2 sets of 15-25 reps	5-10 exercises 2-4 sets of 8-12 reps Or 1-2 sets of 15-25 reps
Rest	Rest	Rest	Rest	Rest	Rest	Rest	Rest

Notes:

Figure 1. Sample exercise prescription template presented during virtual sessions and currently being used to investigate medical student exercise prescription use in student health clinics.