



LOMA LINDA UNIVERSITY

Loma Linda University
TheScholarsRepository@LLU: Digital
Archive of Research, Scholarship &
Creative Works

Loma Linda University Research Reports

2019

How do the Exercise Practices of Registered Dietitian Nutritionists Affect their Exercise Recommendations to their Patients/Clients?

Ledy Ann Cordero
lcordero@students.llu.edu

Kristen Muzio
kmuzio@llu.edu

Ian Karundeng

Follow this and additional works at: <https://scholarsrepository.llu.edu/rr>



Part of the [Dietetics and Clinical Nutrition Commons](#)

Recommended Citation

Cordero, Ledy Ann; Muzio, Kristen; and Karundeng, Ian, "How do the Exercise Practices of Registered Dietitian Nutritionists Affect their Exercise Recommendations to their Patients/Clients?" (2019). *Loma Linda University Research Reports*. 36.
<https://scholarsrepository.llu.edu/rr/36>

This Research Report is brought to you for free and open access by TheScholarsRepository@LLU: Digital Archive of Research, Scholarship & Creative Works. It has been accepted for inclusion in Loma Linda University Research Reports by an authorized administrator of TheScholarsRepository@LLU: Digital Archive of Research, Scholarship & Creative Works. For more information, please contact scholarsrepository@llu.edu.

How do the Exercise Practices of Registered Dietitian Nutritionists Affect their Exercise Recommendations to their Patients/Clients?

Ledy Ann Cordero

Kristen Muzio

Ian Karundeng

Edward Bitok

Gurinder Bains

Heather Javaherian-Dysinger

Lida Gharibvand

JeJe Noval

Department of Nutrition and Dietetics

Loma Linda University

Abstract

Background: Registered Dietitian Nutritionists (RDNs) are experts in food and nutrition serving to advance the profession and nation's health. As the population becomes increasingly aware of how nutrition and exercise can positively impact one's quality of life and prevent many chronic diseases, they may seek guidance from nutrition and exercise professionals for assistance in developing their personal health strategies.

Objective: To determine the exercise practices of RDNs across the United States and how their perceptions and habits of their exercise practices may affect their exercise recommendations to their patients and/or clients.

Design: This mixed methods study gathered quantitative data anonymously through a 10-minute online questionnaire and qualitative data through voluntary semi-structured interviews.

Participants: Participants met the inclusion criteria of being an RDN (licensed or not), as decreed by the Commission on Dietetic Registration, were at least 21 years old, and were working and living as an RDN in the United States at the time. There was no exclusion criteria. Five hundred fifty-nine dietitians completed the survey and 10 volunteered to be interviewed.

Main outcomes: Bring awareness to RDNs' exercise practices and emphasize the need for RDNs to recommend exercise to their patients and/or clients.

Statistics: Mean \pm SD and chi-square tests examined associations between outcomes and variables. Data were stratified by gender, age group, and education.

Results: Inpatient and outpatient RDNs were significantly more likely to exercise than RDNs in other settings ($p = 0.019$, $p = 0.042$). RDNs provided individualized exercise recommendations that encouraged reasonable goals for their patients/clients.

Conclusion: According to the Academy of Nutrition and Dietetics, recommending exercise to patients/clients is within the of RDN's scope of practice. However, our results indicate that RDNs in general do not recommend exercise to their patients/clients, regardless of their personal exercise habits.

INTRODUCTION

Registered Dietitian Nutritionists (RDNs) are experts in food and nutrition who serve to advance the profession of nutrition and dietetics and the nation's health.^{1,2} They are commissioned by the Commission on Dietetic Registration (CDR), under the Academy of Nutrition and Dietetics (AND).³ They assist populations and individuals by encouraging healthy lifestyle and eating behaviors. Registered Dietitian Nutritionists may work in one or more various settings including clinical, administrative, sports, community, research, education, and nutrition policy.²

In the medical field, each profession has a defined set of responsibilities and rules that limits the healthcare practitioner to specific duties.^{3,4} These set of rules are known as the scope of practice. The scope of practice of RDNs is established and enforced by the Academy of Nutrition and Dietetics (AND).² According to AND, the scope of practice includes a wide array of advice, counseling, and recommendations that RDNs can provide to their clients.² Within these protocols, guideline number thirteen states: "Provide nutrition counseling; nutrition behavioral therapy; lactation counseling; health coaching; and nutrition, physical activity, exercise counseling, and health education as preventative, therapeutic, and restorative health care."²

While AND guideline states that RDNs can recommend exercise, instructions on exercise prescription are not stated and are up to their personal discretion.^{2,5} For many people, exercise and physical activity are complicated to tackle alone.⁵ Therefore, RDNs may have to provide further detailed instructions on how their patient or client should exercise.⁵ Their role, knowledge of exercise practices, and recommendations may also differ with RDN practice settings.

There are a myriad of benefits that result from habitual exercise. Such benefits include retention of independence, disease prevention, lengthened lifespan, and improved quality of life.⁸ According to Robert Sallis (2015), exercise can essentially function as a form of medicine that mitigates illness and increases basic functional capacity. Decades worth of scientific evidence has shown undeniable evidence for the prevention of cancer, heart disease, diabetes, and hypertension.^{8,9,10} Resistance and strength training also improve cardio-metabolic health markers such as lowered blood pressure and fasted insulin and insulin resistance in non-athletic individuals.⁷ Greater effects were found in those that commit to medium-term and long-term resistance exercise training.⁷

While RDNs are a well-respected source for knowledge in nutrition and dietetics, they may not be as commonly sought for regarding exercise and physical activity. Unfortunately, this may be due to people being unaware that RDNs may discuss exercise. According to Klein (2017), there are ongoing efforts to include exercise interventions within the discussions between primary care practitioners.¹¹

The Academy of Nutrition and Dietetics conducted a survey exploring the collaborations between Registered Dietitian Nutritionists and exercise professionals.¹⁴ Their results revealed that professions in either field lacked equal and complete knowledge in both practices.¹⁴ As a result, it would be in their best interests to work together and complement both roles when providing care for their clients.¹⁴ Finally, to ensure a patient initiates regular physical activity, healthcare workers must be able to change their self-perception of exercising by reinforcing their desired behavior and having a structured, well thought out program for the patients to follow.^{15,16}

The theoretical framework of our study's qualitative portion rested on the Health Belief Model and Self Efficacy Theory. Developed in the 1950s by Rosenstock, Hochbaum, and Kegel,

the Health Belief Model suggests that one's health-promoting behavior is shaped by his or her perceived susceptibility and health status, benefits, barriers, cues to action, and self-efficacy.^{17,18} Studies have utilized the Health Belief Model to predict future behaviors such as seeking vaccination and determining factors influencing perceived risk.^{17,18} Although a meta-analysis has highlighted an inconsistency with the model's impact with varying health behaviors, it may be positive with exercise.¹⁷

Rosenstock's addition of self-efficacy complements Bandura's Self-Efficacy Theory.¹⁸ Self-efficacy may be described as one's confidence in his or her ability to determine and control their own behavior, motivation, and social environment.^{18,19,20} Studies have examined associations between self-efficacy and self-regulation practices with nutrition and exercise.^{20,21} When looking at self-efficacy's role with exercise, the two have been shown to be positive associated.^{20,21} Self-efficacy helps the initiation of exercise behavior and becomes less needed as an individual transitions to the maintenance stage of his or her exercise behavior.²⁰

As the population becomes more aware of how nutrition and exercise can positively affect one's quality of life and prevent many chronic diseases, they may seek out guidance from nutrition and exercise professionals for assistance with developing their own nutrition and exercise programs. Currently, there is a lack of available published literature regarding personal physical activity levels of nutrition professionals, such as Registered Dietitian Nutritionists, and other medical professionals. Therefore, the problem this study addressed was the lack of information on how the Health Belief Model and the Self-Efficacy Theory affect the decisions Registered Dietitian Nutritionists make in recommending exercise to their patients and clients. The purpose of this study of RDNs across the United States is to learn how their exercise

perceptions and experiences may affect their exercise recommendations to their patients or clients.

SUBJECTS

About 5000 email addresses of RDNs were obtained through CDR's general registry and Loma Linda University Health's dietitian email list. All emails were of Registered Dietitian Nutritionists across the United States—regardless of working position or domain. Participants met the inclusion criteria of being credentialed as a Registered Dietitian or Registered Dietitian Nutritionist (licensed or not licensed) as decreed by CDR, were at least 21 years of age, were working and living as a Registered Dietitian or Registered Dietitian Nutritionist in the United States at the time. Approval was granted by Loma Linda University's Institutional Review Board.

Of the 4100 emailed Registered Dietitian Nutritionists, 559 participated in the study. Not all 5000 CDR contacts were viable. Approximately 400 contacts deleted the email without being read, 10 were not actively practicing in the field of nutrition, 75 were out of their offices during the time of the study, 275 emails were deactivated, 115 were rejected by spam blocking programs, and 25 contacts responded as retired. Participating Registered Dietitian Nutritionists responded from 47 states. 96.7% of the subjects were female and 3.3% of the subjects were male. The distribution of the subjects' area of practices were as follows: Inpatient - 27.9%, Outpatient – 55.8%, Other – 48.7%.

METHODS

The quantitative data was obtained anonymously through a 10-minute online questionnaire emailed to all accounts within CDR's general registry and Loma Linda University Health's dietitian email list. By clicking the link to the survey, subjects gave their consent to

participate. All participants were able to complete the survey. The online questionnaire was created by student investigators and published through *Qualtrics Survey Software*. The questionnaire's initial draft contained 17 questions and was revised into 21 questions which was pilot tested by nine clinical RDNs in Southern California.

The 10-minute online questionnaire was categorized into three domains: demographics, exercise practices of Registered Dietitian Nutritionists, and recommendation practices. Seven out of the 21 questions were designed to acquire the subject's gender, age range (in ranges of 10, beginning at 21), state of residence, highest degree earned, active credentials, years of practice, and current area(s) of practice. Questions were formatted with drop down menus, multiple checking boxes, and one-click responses.

Questions of the second domain, the physical activity of RDNs, were aimed towards encouraging thorough and accurate responses. As a result, there were open-ended, scale, short answer, and multiple response questions. Questions were geared towards understanding the Registered Dietitian Nutritionist's practice and their perceived importance of exercise. Some of the questions included were: How many days per week do you engage in a structured exercise program? If you selected 0 days of structured exercise per week, please specify any barrier that prevents you from engaging in an exercise program.

Aiming to note RDN recommendation/referral practices, domain three's questions included open ended responses with yes/no structuring. These questions included: Do you recommend regular exercise to your patients or clients? Please elaborate why yes or no. Do you believe it is within an RDN's scope of practice to encourage regular exercise to a patient or client? Why or why not?

After completion of the survey, participants were asked to take part in an optional semi-structured interview with the student investigators. Semi-structured interviews were conducted to gather qualitative data on the subject's beliefs and perception of regular exercise. A student investigator's contact information for interview scheduling was provided within the email. After stating their area of practice, 10 interviewees were chosen through stratified sampling. Stratification was based on their area of practice and exercise frequency to assure an appropriate spectrum. Interviews were held individually via *Zoom* or in-person at locations convenient to the interviewee. Having given their verbal consent, all interviews were audio recorded and discarded after the study was completed. All student investigators were 30-45-minute duration. Student investigators led four field test interviews to evaluate the effectiveness of the interview questions and made appropriate changes. Questions included, "What is your exercise philosophy," and "What was your initial motivation to start exercising?"

STATISTICAL ANALYSIS

There were three outcomes for this study: Inpatient RDNs, Outpatient RDNs, and Other RDNs (i.e. RDNs in sports, hospital administration, food service administration, education, research, media settings). Mean \pm SD was computed for quantitative variables and frequency (percentage) for qualitative variables. Chi-square test was used to examine the association between the three outcome variables with each qualitative variable. Data were stratified by gender, age group, and education. All analyses were performed at an alpha level of .05. Data were analyzed using SPSS Statistics Software version 25.0 (SPSS Inc, Chicago, IL, USA).

QUALITATIVE DATA ANALYSIS

Coding of transcripts were cross-analyzed by all three student investigators. After transcription, each student investigator individually identified potential themes or codes among

the data. The student investigators then met as a team to classify and appropriately title codes for categorization and develop common themes among the interviews. Final code counts were tallied and analyzed through Dedoose version 8.1.8. (SocioCultural Research Consultants, LLC, Los Angeles, CA, USA). Final themes were identified by the narrowing and mapping of code concepts.

PROCEDURE

All subjects were emailed a survey link and letter that indicated the opportunity to participate in our anonymous online survey. By clicking on the survey's link, the subject indicated his or her consent. The survey consisted of 21 multiple choice and free response questions that took no longer than 10 minutes to complete. All emailed dietitians were able to access the online survey on any device. The email also informed survey participants that they may choose to elaborate on their answers by volunteering for an interview with the student investigators. A student investigator's contact information was provided for any dietitians who wish to volunteer for the interview. Upon receiving responses from RDNs wishing to interview, a screening process was used to categorize participants based on how many days of exercise in which they engage and an interview was scheduled. The interviews were conducted in person or online via Zoom. Subjects orally verbalized their consent to be audio recorded at the beginning of their interview.

RESULTS

Quantitative Findings

Of the 559 survey participants, with 95% being female, there was a fair distribution of RDN ages (Table 1). About 65% had more than a bachelor's degree and 71% had more than an RDN credential (Table 1). Majority of participating RDNs had 10 years or less, or 21 or more,

years of work experience (Table 1). Although more than half were in outpatient practice settings, results indicate a large number of RDNs working in more than one area of practice (Table 1).

Table 1: Characteristics of Survey Participants

Characteristic	N	%
Gender	18	3.2
<i>Male</i>	533	95.3
<i>Female</i>		
Age	134	24.0
21-30	133	23.8
31-40	71	12.7
41-50	217	38.8
≥51		
Education	188	33.6
<i>Bachelors</i>	322	57.6
<i>Masters</i>	41	7.3
<i>Doctorate</i>		
Additional Credentials^a	396	70.8
Years of Practice	246	44.0
≤10	94	16.8
11-20	215	38.5
≥21		
Inpatient RDNs^b	156	27.9
Outpatient RDNs^c	312	55.8
Other RDNs^d	272	48.7

a – Have credentials beyond a RD/RDN

b – RDNS working in Clinical settings

c – RDNs working in Outpatient or Private Practice settings

d – RDNs working in settings outside of Outpatient and Inpatient Care settings (e.g. research, education, media)

Main Findings

The Exercise Practices of Various RDNs: Exercise practices of Registered Dietitian Nutritionists vary widely according to their practice settings. Inpatient and outpatient RDNs were significantly more likely to exercise than RDNs in other settings ($p = 0.019$, $p = 0.042$) (Table 2). Furthermore, inpatient RDNs were more likely to engage in aerobic exercise compared to Outpatient RDNs and RDNs in other practice settings ($p = 0.003$) (Table 2).

Additionally, inpatient RDNs were significantly more likely to exercise for weight management reasons, compared to outpatient RDNs and RDNs in other practice settings ($p = 0.035$) (Table 2).

Registered Dietitian Nutritionists' Belief of Their Scope of Practice: Outpatient RDNs were significantly more likely to believe that recommending exercise is within their scope of practice, compared to inpatient RDNs and RDNs in other practice settings ($p = 0.004$) (Table 2).

Referral Practices of RDNs in Respect to Exercise Recommendations: Outpatient RDNs were significantly more likely to refer their patients/clients to an exercise professional, compared to inpatient RDNs and RDNs in other practice settings ($p = 0.007$) (Table 2).

Table 2: Significance of Exercise Practices, Motivators, and Perceptions According to Practice

Variable	Inpatient RDNs ^a		Outpatient RDNs ^b		Other RDNs ^c	
	N	P-value	N	P-value	N	P-value
Exercise Frequency (d/wk)	156	0.019	311	0.042	269	0.692
Type of Exercise ^d	128	0.600	279	0.254	229	0.483
Strength Training ^e (mins/wk)	114	0.687	255	0.630	209	0.989
Aerobic Exercise ^f (mins/wk)	121	0.003	272	0.193	221	0.639
Organized Sports ^g (mins/wk)	42	0.459	74	0.197	69	0.421
Strength Training Intensity	116	0.070	256	0.374	217	0.704
Aerobic Exercise Intensity	120	0.621	273	0.189	223	0.752
Organized Sports Intensity	14	0.763	32	0.569	31	0.504
Motivators ^h						
Health Benefits	129	0.835	280	0.468	228	0.435
Yes	126		273		222	
Weight Management	129	0.035	280	0.958	228	0.793
Yes	109		218		179	
Stress Relief	129	0.944	280	0.132	228	0.595
Yes	110		244		36	
Competition	129	0.250	280	0.873	227	0.729
Yes	17		30		25	
Leisure	129	0.851	279	0.797	228	0.786
Yes	65		140		115	
Scope of Practice Belief ⁱ	145	0.194	304	0.004	260	0.739
Yes	138		300		251	
No	7		4		9	

Exercise Referral ^j	144	0.000	302	0.007	256	0.158
Yes	64		190		156	
No	80		112		100	

a – RDNs working in Clinical settings

b – RDNs working in Outpatient or Private Practice settings

c – RDNs working in settings outside of Outpatient and Inpatient Care settings (e.g. research, education, media)

d – Engage in 1 type of exercise or 2+

e – Engage in strength training (e.g. CrossFit, yoga/pilates, weightlifting)

f – Engage in aerobic exercise (e.g. walking, running, hiking)

g – Engage in organized sports (e.g. basketball, soccer, tennis)

h – Factors that motivate them to exercise

i – Belief that recommending exercise is within their scope of practice

j – Refer their patients/clients to exercise professionals

Stratified Findings

We stratified by age (i.e. 21-30, 31-40, 41+) and additional credentials. RDNs between the ages of 21 and 40, beyond a bachelor's in science and Registered Dietitian certification believe that exercise recommendations are within their scope of practices, compared to those 41+. Both 21-30-year-old outpatient and inpatient RDNs were more likely to refer patients/clients to an exercise professional, compared to RDNs 31+.

Qualitative Findings

Figure 1 illustrates the main factors regarding exercise recommendations among RDNs, as discovered through the 10 interviews. Further analysis determined the perceptions and experiences of registered dietitians regarding their exercise practices, and whether they have an influence on their exercise recommendations to their patients or clients. Three themes emerged during this theme analysis.

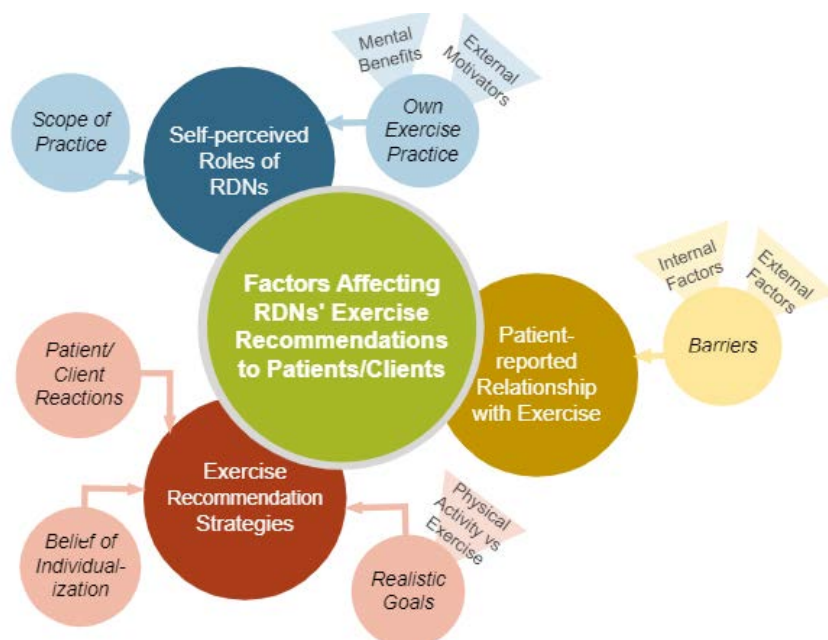


Figure 1: Summary of Factors Affecting Exercise Recommendations

Theme 1: RDNs believed it is within an RDN's scope of practice to discuss exercise with their patients/clients. They especially believed that dietitians must live the exercising lifestyles they encourage their patients/clients.

Participant 1 – “I believe that exercise is part of our role—within our scope of practice to recommend exercise, to an extent.”

Participant 2 – “I know how good it feels to exercise and I know my patients and clients will absolutely benefit from it. There’s no harm.

Participant 3 – “We need to walk the walk.”

Participant 4 – “You can only encourage others to do something that you do yourself.”

Participant 5 – “I think it is important for us to, like I said, practice what you need to teach.”

Participant 6 – “We need to be a role model. You know, I think that is a requirement.

You cannot tell people to do something that you do not do yourself. And

also to understand that to be healthy, eating healthy and exercise goes together.”

Theme 2: They recognized and empathized with the barriers that prevented their patients/clients from exercising (e.g. intimidation, lack of accountability, and physical limitations).

Participant 2 – “Lots of our patients are very low income and personal training is very expensive.”

Participant 3 – “I try just being that supportive accountability for them.”

Participant 7 – “The idea of, like, getting your heart rate up for the first time ever, or getting on a stair master, or getting on an elliptical for the first time ever can be pretty scary and daunting. I may go along side, like, ‘Oh, so-and-so, I’m learning this new exercise today too. What do you think?’”

Participant 8 – “Sometimes patients struggle with exercise not being a part of their established routine. They have yet to reach the thought of, ‘I feel comfortable with the people that I’m working with, I feel comfortable in this new environment.’”

Participant 9 – “It’s a whole huge and new area for a lot of them...this is not every patient, but I have literally called the gym for some.”

Participant 10 – “I attend the gym that our residents attend. And I started doing that as a way to help motivate them.”

Theme 3: They provided individualized exercise recommendations that encouraged reasonable goals for the patients and/or clients.

Participant 1 – “Dancing and walking may not be traditional exercise, but I consider any kind of movement to be helpful activity for my patients.”

Participant 2 – “Once they’ve started to lose some weight, I try to keep talking about it, because you want to reaffirm their excitement about it.”

Participant 3 – “Establish some small goals, something that is realistic to start with and keep challenging them until they reach the goals you want.”

Participant 7 – “Taking into account their mobility status is important.”

Participant 10 – “Sometimes patients overestimate what they think they can do, in the sense that they set an unrealistic goal for themselves; and then we’ll have to adjust it, may even down so they can build. Or maybe they easily met the goal and we can adjust the goal up so.”

DISCUSSION

This study aimed to determine the exercise practices of RDNs across the United States and how their perceptions and experiences of their own exercise practices may affect their recommendations to their patients and/or clients. To achieve this, we identified the exercise practices of RDNs across the United States; explored their perceptions and experiences around exercise; and noted their exercise recommendation practices. We had hypothesized that there may be a positive correlation between habitual exercise practice and providing exercise recommendations to patients/clients.

In a study by Robert Stanton (2015), there was no relationship between nurses’ reported level of activity and their frequency of prescribing exercise to mental health patients, as there may be substantial barriers in doing so.^{12,13} Potential barriers may have been lack of training, consumer motivation, and systemic issues (such as lack of time and prioritization).¹² We found

similar results. Exercise frequency of RDNs did not influence whether they recommended exercise. Unlike the nurses in Stanton's finding, however, RDNs reported that the barriers were more on the side of the patient, as they faced intimidation, lack of accountability, physical disabilities, and other limiting factors.

Our study discovered no significant statistical findings regarding exercise recommendations among RDNs outside inpatient and outpatient settings. We speculate this may be because such settings (e.g. research, education, and media) do not have high encounters with patients or clients. However, it was interesting to note that RDNs in research and education settings did not reveal significant findings in exercise frequency. We may postulate this may be due to long work hours in and off site, despite being surrounded with latest health research.

Our qualitative interviews may also provide an explanation for our quantitative results. On one hand, interview participants working in inpatient settings shared how they were more likely to work with patients who may have more severe diagnoses and require higher level of treatment compared to RDNs in outpatient or other settings. Their patients may come from intensive or critical care units or emergency rooms, and are often times bed bound and less able bodied. In these types of cases, most recommendations focus primarily on diet, calories, meals or tube feedings of the patients.

On the other hand, outpatient RDNs were significantly likely to believe recommending exercise is within their scope of practice and refer their patients/clients to an exercise professional. Interviewed inpatient RDNs suggested such results may be attributed to the fact that outpatient settings have less critically ill patients and exercise professionals onsite or readily available. According to Participant 1 who works in inpatient and outpatient settings, "With outpatient, exercise is always a positive thing to bring up." However, Participant 1 did not

believe discussing exercise was necessary for inpatients in critical conditions. Most recommendations focused on diet, calories, meals or tube feedings of Participant 1's patients. As a result, this leads us to speculate that RDNs working in inpatient settings may believe it is inappropriate to recommend exercise, despite knowing the importance of encouraging exercise.

Several outpatient RDN interview participants also believed working with other exercise professionals such as physical therapists or exercise physiologists who are readily available was helpful. Thus, interview participants expressed why outpatient RDNs may be more likely to see exercise recommendations as a part of their scope of practice, and are more likely to refer their patients/clients to an exercise professionals. One reason for this may be due to the fact that outpatient RDNs have more of a direct interaction with their patients and can see the first hand effects of referring to exercise professionals. A systematic review done by Williams et al. looked at the effectiveness of exercise referral schemes and how it can potentially increase physical activity in adults.²¹ They found that exercise referral schemes helped sedentary adults become more active.²¹ Outpatient RDNs working with other exercise professionals may see the direct benefit in working as a team in helping patients increase their physical activity.

Our interviews with RDNs also had underlying concepts that may be rooted with the Health Belief Model and Self-Efficacy Theory. Although dietitians noted physical benefits as exercise motivators for themselves and their patients/clients, the talk of self-efficacy was far more heavily discussed. According to Grandes and colleagues, however, the Health Belief Model may not be underestimated in its effects, as it is immensely motivation when addressed with optimization of health promotion.²³ Mental and physical benefits may convince someone that they may need to exercise, but good self-efficacy is essential to making regular exercise a habit.²² Kwan et al. stated, "A positive affective response to acute bouts of exercise can aid in

building and sustaining exercise motivation over time.”²² The study essentially found that people who enjoyed their physical activity were more likely to stick to their exercise routine and maintain their new behaviors.²² We found similar methods of recommendation in our interviews.

Many of the RDNs stated that they made sure to reinforce the idea of starting out slow with simple recommendations for the patients, instead of overwhelming them with extreme exercise practices. Some examples include walking the dogs, walking around the neighborhood, taking the stairs, or getting a certain amount of steps throughout the day. With this method of starting slow, the patient can easily track their progress and develop confidence in their abilities to stick with the plan and ultimately boost their sense of self-efficacy.

Few limitations of this study existed. First, while we did receive response from a wide range of dietitians from different practice settings, given the nature of our study, those who regularly exercise may have been more likely to participate compared to dietitians who do not exercise. Secondly, participants may have possibly exaggerated their self-reported exercise habits. This may have skewed our population to be more biased towards more physically active dietitians.

One of the major strengths of our study is that there is very limited research on the exercise practices of RDNs. Our findings may contribute to the growing body of knowledge within the field of dietetics. We also had many significant statistical findings exercise recommendation practices among RDNs. Finally, we were able to support our quantitative numbers with qualitative methods of data collection. Our 10 interviews helped us develop a clearer understanding and strengthen our results.

The results of our study left us with a few questions to better understand the relationship between exercise and the dietetic profession. First, it would be relevant to investigate how the area of practice influences the dietitian's ability to discuss exercise and what can be done to overcome potential barriers. For example, a dietitian who works in corporate wellness could include exercise recommendations as a part of the wellness program, while it may be inappropriate for a certified nutrition support specialist working in an intensive care setting to discuss exercise with their patients. However, a certified nutrition support specialist but might be able to refer to an outpatient exercise physiologist. Second, it would be insightful to examine how exercise education and encouragement is being provided to patients through an interdisciplinary approach.

CONCLUSION

Dietitians are important resources for the public as they become increasingly more aware of healthful nutrition habits. However, to truly provide a whole picture of health, dietitians should be encouraging daily exercise as well. According to the Academy of Nutrition and Dietetics, recommending exercise to patients/clients is within a dietitian's scope of practice. However, our results indicate that dietitians in general do not recommend exercise to their patients/clients. We believe our findings will increase the awareness of the need for Registered Dietitian Nutritionists to recommend exercise to their patients/clients.

REFERENCES

1. What is a Registered Dietitian Nutritionist. eatrightPRO - Academy of Nutrition and Dietetics. <https://www.eatrightpro.org/about-us/what-is-an-rdn-and-dtr/what-is-a-registered-dietitian-nutritionist>. Accessed June 28, 2018.
2. The Academy Quality Management Committee, The Scope of Practice Subcommittee of the Quality Management Committee. Academy of Nutrition and Dietetics: Revised 2017 Scope of Practice for the Registered Dietitian. *Journal of the Academy of Nutrition and Dietetics*. 2013;113(6):S17-S18. doi:10.1016/j.jand.2012.12.008.
3. Sass TR, Nichols MW. Scope-of-practice regulation: Physician control and the wages of non-physician health-care professionals. SpringerLink. <https://link.springer.com/article/10.1007/BF00134819>. Accessed August 3, 2018.
4. Fairman JA, Rowe JW. Broadening the Scope of Nursing Practice | NEJM. *New England Journal of Medicine*. <https://www.nejm.org/doi/full/10.1056/NEJMp1012121>. Accessed August 3, 2018.
5. Schutzer K. Barriers and motivations to exercise in older adults. *Preventive Medicine*. 2004;39(5):1056-1061. doi:10.1016/j.ypmed.2004.04.003.
6. Commission on Dietetic Registration. Commission on Dietetic Registration: the credentialing agency for the Academy of Nutrition and Dietetics. <https://www.cdrnet.org/about>. Accessed July 6, 2018.
7. Ashton RE, Tew GA, Gilbert SE, Lewis L, Saxton JM. Effects of short-term, medium-term and long-term resistance exercise training on cardiometabolic health outcomes in adults: systematic review with meta-analysis. *British Journal of Sports Medicine*. June 2017. doi:10.1136/bjsports-2017-098970.
8. Sallis R. Exercise is medicine: a call to action for physicians to assess and prescribe exercise. *The Physician and Sportsmedicine*. 2015;43(1):22-26. doi:10.1080/00913847.2015.1001938.
9. Gielen S. Exercise Training in Patients with Heart Disease: Review of Beneficial Effects and Clinical Recommendations. *Egyptian Journal of Medical Human Genetics*. <https://www.sciencedirect.com/science/article/pii/S0033062014001637>. Published October 22, 2014. Accessed August 3, 2018.
10. Lin X. Archive of all online content. AHA / ASA Journals. <https://www.ahajournals.org/doi/abs/10.1161/JAHA.115.002014>. Accessed August 3, 2018.
11. Klein D, Jeejeebhoy K, Tremblay A, et al. The CHANGE program: Exercise intervention in primary care. *The Official Publication of The College of Family Physicians of Canada*. 2017;63(7):546-552.
12. Stanton R, Happell B, Reaburn P. Investigating the exercise-prescription practices of nurses working in inpatient mental health settings. *International Journal of Mental Health Nursing*. 2015;24(2):112-120. doi:10.1111/inm.12125.
13. Robertson C, Devlin N, Gardner MM, Campbell J. Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 1: Randomised controlled trial. *The BMJ*. <https://www.bmj.com/content/322/7288/697.full>. Published March 24, 2001. Accessed August 3, 2018.
14. Manore MM, Hand RK, Liguori G, et al. Knowledge and Beliefs That Promote or Hinder Collaboration among Registered Dietitian Nutritionists and Certified Exercise

- Professionals—Results of a Survey. *Journal of the Academy of Nutrition and Dietetics*. 2017;117(2):280-296. doi:10.1016/j.jand.2016.05.007.
15. Gomes AR, Morais R, Carneiro L. Predictors of Exercise Practice: From Intention to Exercise Behavior. *Predictors of Exercise Practice: From Intention to Exercise Behavior*. 2017;7(2):56-65. doi:10.5923/j.sports.20170702.06.
 16. Lindsay R Duncan, Craig R Hall, Philip M Wilson, Jenny. Exercise motivation: a cross-sectional analysis examining its relationships with frequency, intensity, and duration of exercise. *International Journal of Behavioral Nutrition and Physical Activity*. <https://ijbnpa.biomedcentral.com/articles/10.1186/1479-5868-7-7>. Published January 26, 2010. Accessed August 3, 2018.
 17. Jones CL, Jensen JD, Scherr CL, Brown NR, Christy K, Weaver J. The Health Belief Model as an Explanatory Framework in Communication Research: Exploring Parallel, Serial, and Moderated Mediation. *Health communication*. 2015;30(6):566-576. doi:10.1080/10410236.2013.873363.
 18. Carey MP, Forsyth AD. Teaching Tip Sheet: Self-Efficacy. American Psychological Association. <http://www.apa.org/pi/aids/resources/education/self-efficacy.aspx>. Accessed July 9, 2018.
 19. Bandura A. Self-efficacy. *Encyclopedia of Human Behavior*. 1994;4:71-81.
 20. Shieh C, Weaver MT, Hanna KM, Newsome K, Mogos M. Association of Self-Efficacy and Self-Regulation with Nutrition and Exercise Behaviors in a Community Sample of Adults. *Journal of Community Health Nurses*. 2015;32(4):199-211. doi:10.1080/07370016.2015.1087262.
 21. Williams NH, Hendry M, France B, Lewis R, Wilkinson C. Effectiveness of exercise-referral schemes to promote physical activity in adults: systematic review. *British Journal of General Practice*. 2007;57(545):979-986. doi:10.3399/096016407782604866.
 22. Kwan BM, Bryan AD. Affective response to exercise as a component of exercise motivation: Attitudes, norms, self-efficacy, and temporal stability of intentions. *Psychology of Sport and Exercise*. 2010;11(1):71-79. doi:10.1016/j.psychsport.2009.05.010.
 23. Grandes G, Sanchez A, Cortada JM, et al. Is integration of healthy lifestyle promotion into primary care feasible? Discussion and consensus sessions between clinicians and researchers. *BMC Health Services Research*. 2008;8(1):213. doi:10.1186/1472-6963-8-213.

Appendix A: Consent Form

This study's quantitative data was obtained anonymously through a 10-minute anonymous online questionnaire emailed to all dietitian accounts within the Commission on Dietetics Registration's general registry and Loma Linda University Health's email list. By clicking the link to the survey, subjects gave their consent to participate. All participants were able to complete it on any online-working device. The online questionnaire was created by student investigators and published through *Qualtrics Survey Software*.

Date _____

Dear Registered Dietitian,

You are invited to participate in a graduate student research study titled "How do the Exercise Practices of Registered Dietitian Nutritionists Across the United States Affect Their Exercise Recommendations to Patients/Clients?" Inclusion criteria for the subjects are: You must be credentialed as a Registered Dietitian or Registered Dietitian Nutritionist (licensed or not licensed) as decreed by the Commission on Dietetics Registration, must be at least 21 years old, and currently working and living as a Registered Dietitian or Registered Dietitian Nutritionist in the United States. There are no further exclusion criteria. This study will help us fulfill requirements for our Master of Science in Nutrition & Dietetics.

Participation in this study involves answering questions about your views on exercise as a dietitian and will take approximately 10 minutes to complete. Whether or not you participate is entirely voluntary and will not affect your relationship with Loma Linda University or its affiliates. You do not give up any legal rights by participating in this study.

There is a minimal risk of breach of confidentiality; however, this risk will be minimized by using software that allows you to complete and submit the survey anonymously. There is also a risk of feeling uncomfortable answering the survey or interview questions. Participants may skip any question that makes them feel uncomfortable. The link below will take you to the survey. After finishing the questionnaire, you will submit the survey electronically. You may skip questions at any time or choose not to submit your answers at the end. When we receive the results, no information will link your answers back to you.

Your participation may help researchers understand factors influencing exercise and exercise recommendations amongst dietitians.

You may contact an impartial third party not associated with this study regarding any questions or complaints by calling 909-558-4647 or e-mailing patientrelations@llu.edu for information and assistance.

Thank you in advance for considering this invitation. If you have any questions, please give me a call at (909) 558-1000 ext. 87462.

If you wish to proceed and participate in the survey after reading this letter, please click on the link provided below. By clicking on the link, you are giving your consent to participate.

Sincerely,

JeJe Noval, PhD, RD

Principal Investigator

Anonymous Survey Link:

https://llu.co1.qualtrics.com/jfe/form/SV_85JcPHL3Ov3cbHL

Note: If, after completing the survey, you would be interested in participating in a video/in-person interview to expand and elaborate on your answers please email student investigator Ledy Ann Cordero at lcordero@llu.edu.

This research study has been approved by Loma Linda University Institutional Review Board. IRB # 5180292

Appendix B: Quantitative Survey

This study's quantitative data was obtained anonymously through a 10-minute online questionnaire emailed to all dietitian accounts within the Commission on Dietetics Registration's general registry and Loma Linda University Health's email list. By clicking the link to the survey, subjects gave their consent to participate. All participants were able to complete it on any online-working device. The online questionnaire was created by student investigators and published through *Qualtrics Survey Software*.

How Physically Active are RDN's Across the US?

Start of Block: Demographics

Q1 What is your gender?

Male (1)

Female (2)

Q2 What is your age?

21-30 years old (1)

31-40 years old (2)

41-50 years old (3)

51-60 years old (4)

61-70 years old (5)

71+ years old (6)

Q3 In what state do you currently reside?

▼ AL (1) ... WY (50)

Q4 What is your highest degree earned?

Bachelors (1)

Masters (2)

Doctorate (3)

Q5 Please mark each credential that applies to you.

Registered Dietitian (1)

Licensed Dietitian (2)

Specialized Certification. Please specify. (3) _____

Certified Personal Trainer (4)

Q6 How many years have you been practicing as a dietitian?

less than 5 years (1)

5-10 years (2)

11-15 years (3)

16-20 years (4)

21-25 years (5)

26-30 years (6)

more than 30 years (7)

Q7 In what area do you currently practice? Please mark all that apply.

Inpatient (1)

Outpatient (2)

Sports (3)

Hospital Administration (4)

Food Service Administration (5)

Education (6)

Research (7)

Private Practice (8)

Community/ Public Health (9)

Media (10)

Other. Please specify. (11) _____

End of Block: Demographics

Q8 How many days per week do you engage in a structured exercise program?

0 (1)

1 (2)

2 (3)

3 (4)

4 (5)

5 (6)

6 (7)

7 (8)

Display This Question:

If How many days per week do you engage in a structured exercise program? = 0

Q9 If you selected 0 days of structured exercise per week, please specify any barriers that prevent you from engaging in an exercise program.

Intimidation (1)

Limited Knowledge (2)

Lack of Interest (3)

Lack of Time (4)

Limited by Pain/Medical Condition (7)

Other (Please specify) (5) _____

Skip To: End of Block If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Intimidation

Skip To: End of Block If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Limited Knowledge

Skip To: End of Block If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Lack of Interest

Skip To: End of Block If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Lack of Time

Skip To: End of Block If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Other (Please specify)

Skip To: End of Block If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Limited by Pain/Medical Condition

Display This Question:

If How many days per week do you engage in a structured exercise program? != 0

Q10 What type of physical activity do you engage in throughout the week? Please mark all that apply.

Strength Training (1)

Aerobic exercise (2)

Organized Sports (3)

Q11 If you selected strength training for question 10, please mark all that apply.

Crossfit (1)

Weightlifting (2)

Ultimate Conditioning (3)

Bodybuilding (4)

Powerlifting (5)

Yoga/ Pilates (6)

Other. Please specify. (7) _____

I did not select strength training. (8)

Q12 How many minutes per week are dedicated to strength training?

<60 minutes (2)

60-90 minutes (3)

90-120 minutes (4)

120-150 minutes (5)

>150 minutes (6)

Q13 If you selected aerobic exercise for question 10, please mark all that apply.

Walk (1)

Hike (2)

Run (3)

Cycle (4)

Swim (5)

Zumba (6)

Jazzercise (7)

Other. Please specify. (8) _____

I did not select aerobic exercise (9)

Q14 How many minutes per week are dedicated to aerobic exercise?

- <60 minutes (1)
- 60-120 minutes (2)
- 120-180 minutes (3)
- >180 minutes (4)
-

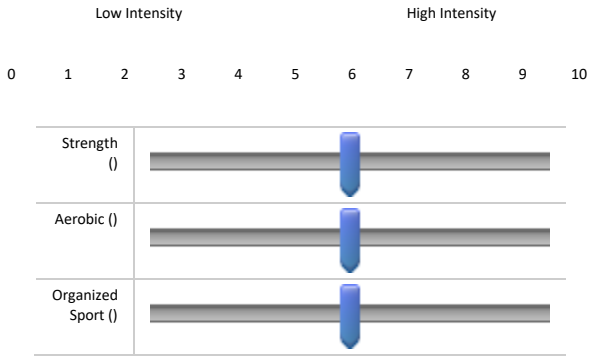
Q15 If you selected organized sports for question 10, please mark all that apply.

- Basketball (1)
- Baseball (2)
- Football (3)
- Tennis (4)
- Soccer (5)
- Rock climbing (6)
- Other. Please specify. (7) _____
- I did not select organized sports. (8)
-

Q16 How many minutes per week are dedicated to organized sports?

- <60 minutes (1)
- 60-120 minutes (2)
- 120-150 minutes (3)
- >150 minutes (4)

Q17 On a scale from 1-10, how would you rate the intensity of each exercise regimen on average?



Q18 Please specify your motivating factors for engaging in a structured exercise program. Please mark all that apply.

- Health Benefits (1)
- Weight Management (2)
- Stress Relief (3)
- Competition (4)
- Leisure (5)
- Other. Please specify. (6) _____

End of Block: # of days

Start of Block: Application to Practice

Display This Question:

If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Intimidation

Or If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Limited Knowledge

Or If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Lack of Interest

Or If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Lack of Time

Or If you selected 0 days of structured exercise per week, please specify any barriers that prevent... = Other (Please specify)

Q19 Do you recommend a regular exercise regimen to your patients and clients?

Yes. Please elaborate. (1) _____

No. Please elaborate. (2) _____

Q20 Do you believe it is within an RDN's scope of practice to encourage regular exercise practices to a patient or client?

Yes. Why? (1) _____

No. Why not? (2) _____

Q21 Do you refer your patients or clients to an exercise professional?

Yes, when appropriate or able. Please specify to which professional you would refer a patient/client. (1) _____

No (3)

End of Block: Application to Practice
