EXERCISE AS TREATMENT FOR DEPRESSION, DISSEMINATION OF EVIDENCE-BASED PRACTICE TO PROVIDERS

by

Amber Jewel Dean

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DEDICATION

I dedicate this paper to my husband, Jase, for his never-ending love, encouragement, and belief that I was and always will be my own hero. To our children, our Montana girl, Lennon Joy, and our mountain flower, Aven Kadi. If it was not for them, I could have gotten this done much faster. You both put all the color in our world. To my mother, Jodi, and my grandmother, Joy. Thank you for raising me to be like you, strong and independent. For everything I am, I thank you both.

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ABSTRACT

Statement of the problem: Depression is the leading cause of disability worldwide with low remission rates. Exercise has been used as an evidence-based treatment option with positive results. This project assessed the usefulness of a pocket card to disseminate evidence-based research to medication providers while collecting additional information. Methods: 93 medication providers were identified in northwestern Montana counties at 14 outpatient clinics to disburse an informational packet to, including the pocket card. A letter directed providers to take an initial survey and a follow up survey. Results: The majority of participants (86%) found the pocket card to be a useful way in receiving information regarding exercise as treatment for depression. Conclusion: The pocket card was a useful way to disseminate evidence for exercise as treatment for depression to medication providers.

CHAPTER ONE

INTRODUCTION

Background and Significance

The World Health Organization (WHO, 2016) reports that about 350 million people, including all ages, currently suffer from depression. Further, WHO (2016) states that depression is not only the leading cause of disability worldwide, but it also largely contributes to the burden of disease globally. In 2014, it was estimated that, in the United States, almost 16 million adults experienced a major depressive episode (Anxiety and Depression Association of America, 2016). Haelle (2016) estimated that the economic burden of depression cost more than $210 billion in 2010.

In 2005–2008, antidepressants were the third most common prescription drug taken by all ages (Pratt, Brody, & Qiuping, 2011). Antidepressant medications were most frequently taken by people from ages 18 to 44 years old (Pratt et al., 2011). Results from the Sequenced Treatment Alternatives to Relieve Depression (STAR*D), which was a study to examine the effectiveness of depression treatments, showed that nearly one-third of patients did not reach remission with medication or therapy (Gaynes et al., 2009). The STAR*D trial showed that medication treatment can be effective with patient adherence to medication; however, Sansone and Sansone (2012) reported that 50% of psychiatric and primary-care patients discontinue antidepressant medication prematurely.

Exercise as treatment for depression has been studied within the last two decades with promising results. The American Psychiatric Association (APA, 2010) guidelines

recommend promoting exercise for depressed patients, as evidence has shown an improvement in mood symptoms by engaging in aerobic or resistance training, especially in older adults and those diagnosed with co-occurring medical problems. “Patients with depression of any severity and no medical contraindication to exercise, physical activity is a reasonable addition to a treatment plan for major depressive disorder” (American Psychiatric Association [APA], 2010, p. 30). Further, research has shown that physical exercise is an effective adjunctive approach to antidepressants, and it may be used while pharmacological and behavioral treatments are being established (Kvam, Kleppe, Nordhus, and Hovland, 2016).

The above statements underscore why exercise is important as a treatment option for depression. It is vital that healthcare professionals are educated on treatment options and can educate patients thereby improving quality of care. However, in the clinic setting, I have not witnessed exercise being a focal point of treatment in spite of its published benefits for improving mood symptoms and being recommended by the APA.

Problem

Vastly widespread and disabling, depression is a recurrent disorder that people of all ages may experience throughout their lifetime (Simon & Ciechanowski, 2017). Depression affects people emotionally, physically, mentally, socially, and spiritually; thus impacting all areas of life. Despite antidepressants being the first-line treatment for depression, there is debate concerning their efficacy. Therefore, employing alternative,

evidence-based treatment options may improve remission rates and reduce recurrence of depression.

Purpose

The goal of this project is to complete a thorough search of evidence for exercise as treatment for depression. Then, the results of the search will be disseminated to outpatient clinic providers in the northwestern Montana counties, including Lincoln County, Flathead County, and Lake County, and post-dissemination knowledge will be assessed.

Significance of Problem to Nursing Practice

Depression is a significant public health issue affecting people emotionally, socially, and financially. According to Armstrong (2002), depression in 2020 will be at the top for the world's most incapacitating illness. Nurses are in a unique position to help with the cost and burden of depression. Many depressed patients are seen in primary care and nurses have a pivotal role in managing the disease. Dedicating time to talk with patients about exercise and how it affects depression is one example that the nurse can aide in alleviating depressive symptoms for patients.

CHAPTER TWO

REVIEW OF THE LITERATURE

A review of the literature was completed to collect evidence and a better understanding of how exercise affects depression. CINAHL complete, Cochrane, PsycInfo, and UpToDate databases were utilized for a thorough review of published research. The literature search was not restricted by year of publication. Articles that were reviewed were all in the English language. Search terms included: exercise and depression, exercise depression, exercise treatment for depression, exercise as treatment for depression, depression and exercise, and exercise treatment. The initial search using the term exercise and depression yielded over 500,000 results. The "Articles, Reviews, Full Text, and Peer Reviewed" filter was applied after the initial search to narrow results to about 300,000 and, further, I filtered by selecting "Academic Journals," which reduced the results to 947. Thirteen articles were evaluated including original and secondary research. Articles were excluded if exercise was mentioned but not defined and were not published within the last two decades. Further exclusions included exercise as treatment for anything but depression. Included were articles that were heavily focused on comparing exercise to pharmacotherapy, using exercise as an adjunct to pharmacotherapy, and exercise used alone, all in relation to depression.

Synthesis of the Evidence

Studies consistently demonstrate that exercise and fitness decrease depression severity, as well as improve physical and psychological health and quality of life, and can be used to guide and inspire patients (Danielsson et al., 2014; Schuch et al., 2016). Further, a meta-analysis conducted by Schuch et al. (2016) showed strong evidence for exercise as an evidence-based treatment for depression. Schuch et al. (2016) also conducted a meta-analysis that adjusted for publication bias for previous studies and found that over 1000 negative studies would be needed to invalidate the fact that exercise has a major and substantial antidepressant effect.

Aerobic exercise at a moderate intensity for nine weeks has been shown in randomized controlled trials to be a viable treatment for depression. Moreover, it has been concluded by Dunn et al. (2005) that aerobic exercise at the public health recommendation level, a total energy expenditure of 17.5 kcal/kg/week, is effective for the treatment of depression and that aerobic exercise at a lower amount is comparable to the placebo effect of medication (Stanton & Reaburn, 2014; Dunn et al., 2005). Home exercise has improved depression and functioning parameters in treatment-resistant depression patients and improved remission numbers (Mota-Pereira et al., 2011). Not only has exercise been found to be an effective intervention resulting in improved depressive symptoms, but it is also a viable adjunct treatment in combination with antidepressants (Balchin et al., 2016; Kvam et al., 2016). Kvam and colleagues' (2016) meta-analysis looked at exercise as an adjunctive treatment and the authors reported a trend toward significance that should be investigated further. Further studies suggest that

exercise as an add-on therapy has an alleviating effect on depression severity and on cardiovascular fitness for patients diagnosed with major depression (Danielsson et al., 2014) and treatment-resistant major depression (Mota-Pereira et al., 2011).

Blumenthal and colleague's (2007) extensive work in regards to exercise and depression shows that exercise is comparable to antidepressants for the treatment of depression. Namely, they report that exercise has a tendency to "out-perform" placebo pills. In addition, in further research, Blumenthal et al. (2012) report a reduction in Beck Depression Inventory scores with 90–120 minutes of weekly exercise for 12 months. Finally, Blumenthal et al. (1999) implemented an exercise training program that demonstrated to be an alternative treatment option to medication in older adults. Moreover, the authors reported that that, while antidepressants may have a more rapid initial response, 16 weeks of exercise was equally as effective (Blumenthal et al., 1999).

The evidence collected highlights that exercise is a viable treatment for depression and should be considered as a treatment option. The APA (2010) agrees with current literature that exercise is an important component for treating depression and should be encouraged to appropriate patients. Exercise can be tailored to individual patients based on their needs whether it is inspirational (Danielsson et al., 2014), used to improve quality of life (Schuch et al., 2016), performed at home or in a professional setting, and/or used as sole treatment for depression (Blumenthal et al., 2007).

Review of Practice Guidelines

The APA guideline was developed by medical doctors and master's-prepared professionals. In the guideline, the authors explain how rigorous was the evidence collected, how evidence tables were produced, stated strengths and weaknesses, and risks and benefits were clearly outlined for each treatment option. The guideline is clear and provides recommendations for the application of its treatments. APA published guidelines in 2010 for the treatment of patients diagnosed with major depressive disorder (MDD). Regarding exercise as treatment for depression, APA recommends educating patients that exercise is part of healthy behavior. Further, APA notes an improvement in mood symptoms for patients with MDD who participate in aerobic or anaerobic exercise (APA, 2010). Patients should be presented evidence-based information for the many treatment options available, including exercise (APA, 2010). If a patient wants to use exercise alone, the provider should continue to monitor symptoms, dose of exercise, and compliance to see if exercise is beneficial to the patient. The context of the guideline includes exercise as treatment, but does not include it in the summary of treatment modalities. The APA specifically states, "The optimal regimen is one the patient prefers and will adhere to" (APA, 2010, p. 30).

WHO Exercise Guidelines

The WHO bases their recommendations on scientific evidence and they are relevant for health outcomes including cardiorespiratory health, metabolic health, musculoskeletal health, cancer, functional health and prevention of falls, and depression

(WHO, 2010). Recommendations are separated into age categories including 5–17 years old, 18–64 years old, and 65 years old and above. For 5–17 years old, to reduce symptoms of anxiety and depression, the following is recommended: (1) 60 minutes of moderate to vigorous physical activity daily, (2) amounts greater than 60 minutes a day will provide more health benefits, (3) most of the physical activity should be aerobic, vigorous-intensity activities and should include exercises that strengthen muscle and bone, at least three times a week (WHO, 2010). For 18–64 years old, to reduce the risk of depression, the following is recommended: (1) at least 150 minutes of moderate-intensity, aerobic physical activity a week, or 75 minutes of vigorous-intensity aerobic physical activity a week, or 75 minutes of a combination of both, (2) aerobic activity should be done at least in 10-minutes duration, (3) for increased benefits, it is recommended to increase moderate-intensity activity to 300 minutes a week, or 150 minutes of vigorous-intensity aerobic activity per week, or 150 minutes of a combination of both, (4) muscle-strengthening activity should be done two or more days a week (WHO, 2010). For 65 years old and above, to reduce the risk of depression and cognitive decline, the following is recommended: (1) at least 150 minutes of moderate-intensity aerobic activity a week, or 75 minutes of vigorous-intensity aerobic activity a week, or 75 minutes of a combination of both, (2) aerobic activity should be done at least in 10-minutes duration, (3) for increased benefits, it is recommended to increase moderate-intensity aerobic activity to 300 minutes a week, or 150 minutes of vigorous-intensity aerobic activity a week, or the same amount in a combination of both (WHO, 2010).

Personal Clinical Experience and Patient Preference

I have worked with those who suffer from depression for four years. These years of experience have allowed me to see firsthand what kind of treatment is recommended to patients diagnosed with depression. I currently work in a mental-health clinic; therefore my view comes from a specialty clinic and not a primary-care clinic where it would also be equally important to learn what primary-care providers are recommending. However, I see referrals from primary-care providers and this enables me to read notes and see what treatments are recommended and prescribed. In my experience, it appears that providers do not educate patients about exercise as an evidence-based treatment for depression and, commonly, a medication is started unless it is refused by the patient. Exercise tends to be touched on in the notes by stating, "educated on benefits of healthy diet and exercise." Exercise treatment could easily be implemented as a choice for the treatment of depression in the primary-care setting or mental-health setting.

A portion of patients of all ages seem to express interest in simplifying their medication regimen and want to know about complementary and alternative treatment options. Some medication-resistant rural farmers do not like the stigma of an antidepressant and prefer the option of exercise, outside of manual labor, to manage depression. Similarly, some young adults do not like side effects from antidepressants and want to incorporate exercise to help manage depressive symptoms. Finally, some parents realize that children may not be getting enough exercise at school and want to start formally exercising to avoid their child being prescribed an antidepressant at a young age. I often hear from patients, "I am stuck, I do not know what else to do," yet

they have not tried exercising. Providers that I have talked to are concerned with compliance with and how receptive patients would be to exercise, but we will not know this until we start implementing exercise as a treatment for depression. Thus, there is a discrepancy between what patients request and what providers are recommending.

Recommendations

Exercise has an effect on depression similar to that of antidepressants (Kvam et al., 2016) and should be treated as a mainstream, evidence-based treatment option for depression. Offering exercise as a treatment option for patients with MDD provides a modality that does not include invasive or pharmacological methods. Providing evidence-based exercise treatment recommendations to healthcare professionals in primary care and specialty settings will hopefully increase remission rates and decrease the recurrence of MDD.

1. Providers should present exercise as a treatment option for their patients with MDD and educate the patient about exercise treatment results that are based in evidence.
    - Exercise has a sizable and impactful antidepressant effect and meta-analyses have confirmed that exercise is an evidence-based treatment option for depression (Schuch et al., 2016).
    - Exercise improves patients' overall quality of life while also improving physical and psychological domains (Schuch et al., 2016).

2. For patients with mild to moderate MDD, exercise should be encouraged as a sole treatment.
    - Aerobic exercise was effective in treating mild to moderate MDD (Dunn et al., 2005).
    - The APA reports that there is an insignificant amount of evidence to discourage exercise as sole treatment for mild MDD and should be monitored accordingly (APA, 2010).
    - Exercise can be recommended as the sole treatment for mild to moderate MDD (Kvam et al., 2016).
3. Exercise should be encouraged as an intervention for depression, as an alternative for nonresponders to other treatment, as an adjunct therapy to antidepressants, and/or for those who refuse pharmacotherapy.
    - The effect of exercise is high when compared with no exercise (Kvam et al., 2016).
    - Exercise has a significant effect when compared to usual care (pharmacological and psychotherapy) and has a moderate effect when used as an adjunct to medication (Kvam et al., 2016).

Summary

Studies have consistently indicated that exercise is an important component in the treatment of depression. Exercise as a sole or adjunct treatment has a positive effect on depressive symptoms. Exercise is a feasible alternative for the treatment of depression.

To reduce healthcare costs and provide best patient care, healthcare professionals should encourage exercise and educate patients about evidence-based knowledge regarding the benefits of exercise for depression.

CHAPTER THREE

THEORETICAL UNDERPINNING

Introduction

Disability for those who are ages 15 to 44 years is led by depression, affecting more than 15 million Americans (Anxiety and Depression Association of America, 2016). The third most commonly prescribed drug among Americans in 2005–2008 was antidepressants, most frequently prescribed to those of ages 18 to 44 years old (Pratt, Brody, & Qiuping, 2011). The economic burden of depression in 2000 was $83 billion (University of Michigan Depression Center, 2016). The project I have chosen is to incorporate exercise as a mainstream treatment option for depression. Presenting exercise as a low-cost treatment option that can be done anywhere is key to reducing healthcare costs and empowering the patient.

The American Psychiatric Association (2010) guidelines recommend promoting exercise as data "generally support" an improvement in mood symptoms by engaging in aerobic or resistance training especially in older adults and those that have co-occurring medical problems. "Patients with depression of any severity and no medical contraindication to exercise, physical activity is a reasonable addition to a treatment plan for major depressive disorder" (American Psychiatric Association, 2010, p. 30). The above statements underscore why exercise is important as a treatment option for depression. I have not seen exercise as a focal point of treatment despite it being recommended by the APA. Exercise is effective for mild to moderate depression, is

preferred to no intervention and typical care, is comparable, according to limited studies, to psychotherapy and antidepressants, a viable adjunct and augmentation to pharmaceuticals, and can be used in the interim for patients waiting to see a provider (Kvam et al., 2016).

The Health Promotion Model

Instead of focusing on patients' present pathology, looking at their strengths, resilience, and possibilities within them enforces a positive model of health (Pender, Murdaugh, & Parsons, 2015). The nursing theorist model that I am using is Nola Pender's Health Promotion Model (HPM) (Masters, 2015). The HPM resonates with me, as it is a way to approach a person's wellness. My project is focused on supplying providers who treat depression with the latest evidence-based practice regarding exercise as a treatment for depression. Providers will be challenged with assessing a person's motivation to engage in wellness and invest in their own wellbeing, which aligns with the definition of health promotion. Health promotion allows a person to actualize their human health potential (Gonzalo, 2011). I agree with the HPM that every person has a distinctive set of characteristics and events that they have been through that may affect future actions. These characteristics may affect how an individual looks at benefits of a potential action, sees obstacles that hinder the action, how the action affects the individual, how their interpersonal relationships are affected by the action, and also situational influences (Gonzalo, 2011). By promoting health to an individual, the provider can help that individual arrive at a commitment to a specific action, which leads to using

the healthy behavior (Gonzalo, 2011). Eden, Orleans, Mulrow, Pender, & Teutsch (2002) note that, in the primary-care setting, counseling adults to increase activity is inconclusive. Based on this information, it may be beneficial to counsel adults in a mental-health outpatient setting.

Integrating the HPM with individuals diagnosed with depression allows providers to influence patients to exercise by changing their current behavior. Understanding individuals' prior behavioral actions, influences (personal, interpersonal, and social), and questions they may have, and how he or she struggles with competing demands and preferences will allow for a solid foundation to make changes. Providers have a role within the HPM in regards to making the individual aware of health-promoting behaviors, encouraging self-efficacy, educating on benefits of making a change, and creating an environment to support the behavioral change, and helping the individual manage the obstacles (Masters, 2015). One of the advantages to this project is that there are many published articles that show the benefit of exercise. Pender notes that individuals may be likelier to commit to a change when they can anticipate a positive outcome that they value (Masters, 2015). Potential values for exercising include fewer depressive symptoms, weight loss, being off medication, and helping to protect against heart disease.

Components

The multidimensionality component of the HPM may be the most important part of the framework. Pursuing health with respect to the individual consists of the individual interacting with their environment (interpersonal and physical) (Masters, 2015).

There are three major components of Pender's HPM noted in Masters (2015): (1) Individual characteristics and experiences, (2) behavior-specific cognitions and affect, and (3) behavioral outcome (Masters, 2015, p. 214). Within the three major components of Pender's HPM there are propositions that will help guide the project's decision-making. Specifically, these included: (1) Persons commit to engaging in behaviors from which they anticipate deriving personally valued benefits, (2) Perceived barriers can constrain commitment to action, meditators of behavior, and actual behavior, (3) Persons are more likely to commit to and engage in health-promoting behaviors when significant others model the behavior, expect the behavior to occur, and provide assistance and support to enable the behavior, (4) Family, peers, and healthcare providers are important sources of interpersonal influence that can either increase or decrease commitment to and engagement in health-promoting behavior, (5) Situational influences in the external environment can either increase or decrease commitment to or participation in health-promoting behavior, (6) Commitment to a plan of action is less likely to result in the desired behavior when competing demands over which persons have little control require immediate attention, (7) Commitment to a plan of action is less likely to result in the desired behavior when other actions are more attractive and preferred over the target

behavior, (8) Persons can modify cognitions, affect, and the interpersonal and physical environments to create incentives for health actions. (p. 218)

CHAPTER FOUR

METHODS

The purpose of this project was to collect evidence-based research for exercise as treatment for depression. The second part of this project was to educate healthcare providers at outpatient clinics with the research that has been found.

Ethical Considerations

This project was submitted to Montana State University's Institutional Review Board for review and approved before the project was initiated.

Materials and Methods

Primary-care outpatient clinics and mental-health outpatient clinics were identified through knowledge base and Google. A total of 14 clinics have been identified in Eureka, Whitefish, Columbia Falls, Kalispell, Polson, Bigfork, Evergreen, and Lakeside, with a total of 93 medication providers receiving informational packets. Informational packets contained an introductory letter, a pocket card listing current evidence for exercise as treatment for depression, and a web link (on the introductory letter) to complete post-informational surveys and were hand-delivered to the clinics.

Providers either received a direct reminder to their e-mail address or a forwarded e-mail from their clinic manager to complete both surveys. Reminder e-mails were sent out two weeks, four weeks, and five weeks after initially receiving information packets.

Upon completion of each survey the option of receiving a $5 Amazon gift card was available.

Survey Development

A post-knowledge survey has been developed using a guide developed by Mendonca et al. (2013) evaluating impact of presentation. The initial survey (Appendix A) and follow-up survey (Appendix B) consisted of 16 items and six items, respectively. Effectiveness of communication of information will be assessed by using a 4-point Likert scale including very effective, somewhat effective, not effective, and don't know/no opinion. Yes and no questions were used to assess awareness of current recommendations and if providers currently recommend exercise to their patients. A drag-and-drop ranking question was included assessing preference of treatment modalities of depression. Comfort of utilizing different treatment modalities was assessed using a 5-point Likert scale including very comfortable, somewhat comfortable, don't know/no opinion, somewhat uncomfortable, and very uncomfortable. Free-text-box answers were utilized in regards to preferred dissemination method of evidence, barriers and challenges for recommending exercise, if provider was recommending exercise (why or why not), if the provider was currently using the pocket card (why or why not), and providing an e-mail address to receive a gift card.

Statistical Analysis

Descriptive statistics were used to evaluate responses received using the total number of responses per survey as the denominator.

Results

A total of n=22 responses were collected from the initial survey (24% response rate) and n=14 responses were collected from the follow up survey (15% response rate). The providers completing the initial survey and follow-up survey were composed of a psychiatrist (5%, initial survey, 7%, follow-up survey), primary-care physicians (50% initial survey, 57% follow-up survey), family nurse practitioners (27% initial survey, 21% follow-up survey), psychiatric mental-health nurse practitioners (9% initial survey, 7% follow-up survey), and physician's assistants (9% initial survey, 7% follow up survey). There were n=11 (50%) females who completed the initial survey. Gender was not collected on the follow-up survey. Combined age demographics completing both surveys (*n=36*) were 25–34 years (25%), 35–44 years (53%), 45–54 years (6%), 55–64 years (6%), and 65 years and older (11%). Combined years experience in role (*n=36*) include 0–5 years (28%), 6–10 years (25%), 11–15 years (17%), 16–20 years (14%), 21 years or more (17%).

Table 1. Demographics Table

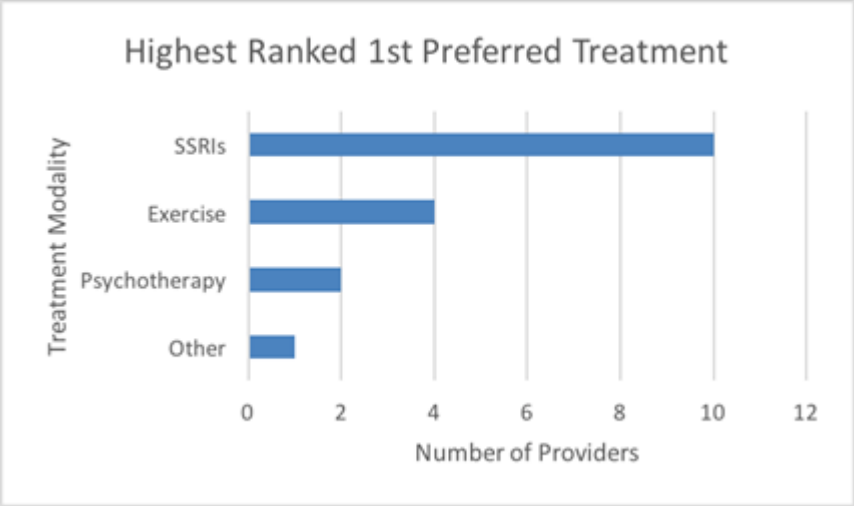
	Frequency (Initial Survey)	Frequency (Follow-Up Survey)
Respondents, N (%)	22 (24%)	14 (15%)
Provider type		
FNP	6 (27%)	3 (21%)
PA	2 (9%)	1 (7%)
PCP	11 (50%)	8 (57%)
PMHNP	2 (9%)	1 (7%)
Psychiatrist	1 (5%)	1 (7%)
Age, years, N (%)		
25-34	5 (23%)	4 (29%)
35-44	11 (50%)	8 (57%)
45-54	2 (9%)	0
55-64	2 (9%)	0
65+	2 (9%)	2 (14%)
Gender, N (%)		
Female	11 (50%)	Not collected
Years in role, N (%)		
0-5	7 (32%)	3 (21%)
6-10	5 (23%)	4 (29%)
11-15	3 (14%)	3 (21%)
16-20	3 (14%)	2 (14%)
21+	4 (18%)	2 (14%)

Legend 1 – FNP (Family Nurse Practitioner), PA (Physician Assistant), PCP (Primary-Care Provider), PMHNP (Psychiatric Mental-Health Nurse Practitioner)

Number of depressed patients seen each month (n=22) ranged from 1–5 depressed patients (5%), 6–10 depressed patients (18%), 11–15 depressed patients (27%), and 16 or more depressed patients (50%). Providers were asked to rank their preference (1 being the highest; 9 being the lowest) in treating depression with different modalities including SSRIs, SNRIs, atypical agents, serotonin modulator, TCAs, MAOIs, psychotherapy, exercise, and other. "Other" included free-text to type in the provider's preferred treatment options, which included "dietary changes," "combination therapy—meds,

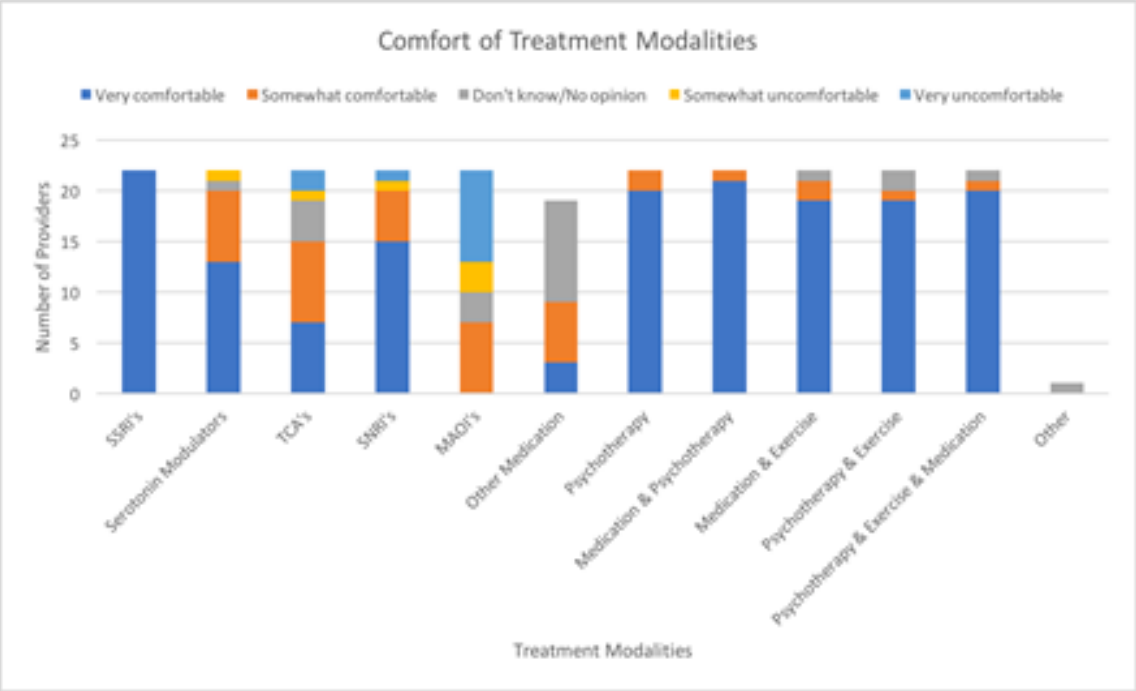
counseling, exercise (yoga, hiking, running, walking)," and "mindfulness" (Figure 1). The majority of providers (n=17) preferred SSRIs (59%), followed by exercise (24%), psychotherapy (12%), and other (6%), as their number one preferred modality.

Figure 1. Provider Comfort Level of Different Treatment Modalities for Patients with Depression



All of the providers (*n=22)* (100%) indicated that that are "very comfortable" with using SSRIs for treating patients with depression (Figure 2). Further, 95% of the respondents selected "very comfortable" with prescribing medication and psychotherapy, 91% indicated "very comfortable" for recommending psychotherapy alone, 91% chose "very comfortable" for recommending the combination of psychotherapy, exercise, and medication, 86% selected "very comfortable" prescribing medication and exercise, and 86% indicated "very comfortable" for psychotherapy and exercise. In contrast, not as many providers were "very comfortable" with prescribing SNRIs (68%), serotonin modulators (59%), TCAs (32%), and other medication (14%).

Figure 2. Provider Ranking of Different Treatment Modalities for Treating Patients with Depression



The majority of providers (73%) were aware of the APA guidelines for treatment of depression. Similarly, 73% of the respondents reported knowing that APA guidelines suggest that mood symptoms improve for patients with major depressive disorder who engage in aerobic exercise or resistance training before the pocket card was distributed. Also, 73% of the providers were aware, before receiving the pocket card, that the APA endorses exercise as part of the treatment plan for depression of any severity. The majority of providers (n=15, 68%) knew, before the pocket card was provided, that the APA supports exercise as a first-intervention treatment option for mild depression. At the time of the initial survey, 91% of providers were recommending exercise to their patients, whereas 9% were not.

Providers (86%) largely found the pocket card to be a useful way of receiving information regarding exercise as treatment for depression (Table 2). In contrast, 14% (n=3) found the pocket card to not be effective or didn't know/had no opinion.

Table 2. Effectiveness of Receiving Information via Pocket Card

	Providers
Very effective	36%
Somewhat effective	50%
Not effective	9%
Don't know/No opinion	5%

Free-text answers were used to receive input on types of communication providers thought would be the best way to disseminate evidence regarding treatment for depression. The following were identified: literature via brochure, community outreach, CME/presentation, publications, e-mail, staff meetings, social media, mail, and handouts. Free-text answers were used to receive input on barriers and challenges for recommending exercise as treatment for depression, which included: time, cost, lack of motivation, lack of resources, patient compliance, difficulty to prescribe to patient population (dementia patients), weather, obesity, and depression.

At post-survey completion, 93% (n=13*)* of providers were recommending exercise and 8% (n=1) were not recommending exercise to patients. Half of the providers at the time of post-survey completion were still utilizing the pocket card.

CHAPTER FIVE

DISCUSSION

The aim of this project was to explore if giving providers a pocket card with evidence-based practice was a good way to distribute information, in particular for recommending exercise as treatment for depression to patients. A pre- and post-dissemination survey collected provider demographics, utilization of exercise treatment, comfort with different treatment modalities, preferred dissemination methods, and perceived barriers to using exercise as a treatment for depression.

The majority of providers indicated that the pocket cards were a useful way to receive evidence for treating patients with depression by exercise. Pocket cards were chosen for this project as they are a quick reference tool to access guidelines in a clear and concise way. To this student's knowledge there is not any formal research on using pocket cards to disseminate evidence to providers, but the use of them allows for easy access to translate evidence into practice. At the time of the follow-up survey, only half of the providers were still using the pocket cards primarily because they reported that the evidence was retained; eliminating the need to continue to access the pocket card.

In this sample, the most preferred treatment for depression was utilizing SSRIs (45%) even though the majority of providers (68%) reported that they were aware that the APA recommends exercise as first-line treatment for mild to moderate depression. One possible explanation for the discrepancy between the preferred treatment despite knowledge of the APA recommendation to use exercise could be due to most providers

seeing patients diagnosed with severe depression. However, the APA recommendations including the use of exercise for any severity. The simplicity of prescribing a medication rather than discussing the benefits of exercise for depression could be another factor in preferred treatment modality. Finally, while the survey did not capture these data, patient preferences for taking a medication as opposed to engaging in physical activity might also explain these findings.

Additionally, providers selected the modality they were most comfortable with for treating depression as SSRIs, closely followed by medication of some type, then psychotherapy, psychotherapy alone and, finally, a combination of psychotherapy, exercise, and medication. It's worth mentioning again that 91% of the providers indicated that they recommend exercise in the initial survey. Providers who do not recommend exercise explained that this is largely due to the specific population of patients that they saw. Barriers to recommending exercise that providers listed were consistent with what is reported in the literature. However, the literature shows that those suffering with severe mental illness widely accept exercise as part of their treatment and have adherence rates that are comparable to the general population (Richardson, Faulkner, McDevitt, Skrinar, Hutchinson, & Piette, 2005).

A study was conducted by Janney et al. (2017) that surveyed mental-health outpatients and specifically asked if providers were discussing exercise with them. Only one-third of outpatients (n=103) reported that their provider discussed physical activity with them often or always, and over half of the patients wanted more information from a personal trainer on physical activity (Janney et al., 2017). In a similar survey study by

Ussher, Stanbury, Cheeseman, and Faulkner (2007), the authors noted that the majority of respondents indicated that they are more likely to exercise if it is recommended by their healthcare provider. Moreover, Phillips and Kennedy (2012) report that prescribers are seen as respected sources to patients, but they are not talking about exercise. This results in a missed opportunity to talk about exercise benefits, and their recommendation is that exercise should be discussed as seriously as medications are as well as prescribed as often as medications are (Phillips & Kennedy, 2012). Finally, Barnes and Schoenborn (2012) found that only a little over 30% of adult patients were advised to initiate or continue an exercise program or engage in physical activity by a healthcare professional. The discrepancy in the high number of providers indicating that they recommend exercise to patients and what is consistently reported in the literature could be due to the Hawthorne effect, meaning that providers thought they should indicate that they recommend exercise given the focus of this project.

Limitations

There are a few limitations to this project that merit discussion. First, this project recruited a small sample that only included outpatient providers in northwestern Montana. A larger sample that included providers from several geographic locations would be a more representative sample of outpatient healthcare providers. Second, the survey response rate was low. A total of 22 responses were received, averaging a 24% response rate for the initial survey; the follow-up survey was lower at 15%. The low response rate does not mean the results have low validity; however, a higher response

rate would have decreased the risk of lower validity (Morton, Bandara, Robinson, & Carr, 2012). Third, the surveys relied heavily on self-assessment instead of actual, observed treatment practices. This could have led to providers choosing what they thought was the "correct" thing to do versus what choice actually applied to them and their practice. Finally, surveying both patients and healthcare providers would have provided a more accurate picture whether exercise was being prescribed for depression and whether patients understood what that meant. The survey developed over represents the providers' perceptions of recommending exercise and does not address if the patient believes they were recommended to exercise. Involving the patient would have provided a unique perspective in how they view their providers' recommendations. In addition, the literature search did not find any validated measures for surveying providers related to exercise recommendation. The surveys used in this project were developed to address this concern.

Future Recommendations

There is a large gap in our knowledge with respect to utilizing exercise as a treatment for depression. Topics that warrant further investigation include what type of exercise is beneficial as a treatment for depression. How often should people exercise to experience relief from depressive symptoms? What is an adequate duration of exercise to achieve benefits from depressive symptoms? Further, it would be helpful if there was a standardized provider education on how to recommend exercise as treatment for depression. Both nurses and providers need to be educated about exercise as treatment for

depression and how to tailor individual plans as personalized approaches may improve adherence.

Conclusion

Exercise has a significant antidepressive effect and is underutilized as a treatment approach for depression. The evidence is growing regarding use of exercise as a treatment option for depression and should not be ignored. Providers need to take the time to discuss all treatment options for depression in an effort to provide holistic care, as well as to improve adherence to treatment plans. Using evidence-based interventions is of utmost importance for providers to practice while also respecting the patient's wishes.

APA guidelines, again, recommend exercise for any severity of depression and as first-line treatment for mild to moderate depression. There is a gap in the literature specifically providing a treatment outline of exercise, but currently, the WHO recommends participating in 150 minutes of exercise a week; more for additional mental and physical benefits. The results from this project found that there is a discrepancy between what the providers believe they are recommending or prescribing and what the literature suggests that patients believe they are being recommended or prescribed. This research also supports the need for additional research regarding how exercise is being used to treat depression and perceived barriers of the provider to recommend this versus the patient's actual barriers. Additionally, education for providers about the APA recommendations regarding exercise for treatment of depression at any severity would be of value to increase exercise utilization.

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APPENDICES

APPENDIX A

INITIAL SURVEY

Exercise as Treatment for Depression

Start of Block: Default Question Block

Participation in this survey is voluntary, you can stop at any time, and you can choose to not answer any questions you do not want to answer. The data from the survey may be used in a publication that describes the results of the survey. By entering the survey, you provide your informed consent to participate in this study and for your anonymous data to possibly be used in a publication. Thank you for taking my survey.

○ I give my informed consent to participate in this study and understand my anonymous data may be used in a publication. (4)

Q1 What is your role?

- ○ Primary Care Physician (1)
- ○ Resident (2)
- ○ Medical Student (3)
- ○ Family Nurse Practitioner (4)
- ○ Psychiatric Mental Health Nurse Practitioner (5)
- ○ Nurse Practitioner Student (6)
- ○ Physician Assistant (7)
- ○ Physician Assistant Student (8)
- ○ Psychiatrist (9)

Q2 What is your age group?

- ○ 18-24 (1)
- ○ 25-34 (2)
- ○ 35-44 (3)
- ○ 45-54 (4)
- ○ 55-64 (5)
- ○ 65 and older (6)

Q3 How many number of years have you been practicing in your profession?

- ○ 0-5 years (1)
- ○ 6-10 years (2)
- ○ 11-15 years (3)
- ○ 16-20 years (4)
- ○ 21 years or more (5)
- ○ Current student (6)

Q4 What gender do you identify as?

_____

Q5 How many depressed patients do you see each month?

- ○ Less than 1 patient (1)
- ○ 1-5 patients (2)
- ○ 6-10 patients (3)
- ○ 11-15 patients (4)
- ○ 16 or more (5)

Q6 Which of the following do you feel you treat depression with the most (most preferred at top)?

_____ SSRIs (1)
_____ SNRIs (2)
_____ Atypical agent (Bupropion, mirtazapine) (3)
_____ Serotonin modulator (trazodone, vilazodone, vortioxetine) (4)
_____ TCAs (5)
_____ MAOIs (6)
_____ Psychotherapy (7)
_____ Exercise (8)
_____ Other (9)

Q7 Are you aware of the American Psychiatric Association (APA) guidelines treatment for depression?

- ○ Yes (1)
- ○ No (2)

Q8 Were you aware before the pocket card was provided that the APA guidelines report that data show at least a modest improvement in mood symptoms for patients with major depressive disorder who engage in aerobic exercise or resistance training?

- ○ Yes (1)
- ○ No (2)

Q9 Were you aware before the pocket card was provided that the APA supports exercise as a first intervention treatment for mild depression?

- ○ Yes (1)
- ○ No (2)

Q10 Were you aware before the pocket card was provided that the APA endorses exercise as part of the treatment plan for depression of any severity?

- ○ Yes (1)
- ○ No (2)

Q11 Do you currently recommend exercise for patients with depression?

- ○ Yes (1)
- ○ No (2)

Q12 Did you find the pocket card to be useful in receiving information regarding exercise as treatment for depression?

- ○ Very effective (1)
- ○ Somewhat effective (2)
- ○ Not effective (3)
- ○ Don't know/No opinion (4)

Q13 Please rate how comfortable you are with the following treatments of depression.

	Very comfortable (1)	Somewhat comfortable (2)	Don't know/No opinion (3)	Very uncomfortable (4)	Somewhat uncomfortable (5)
SSRIs (1)	○	○	○	○	○
Serotonin modulators (trazodone, vilazodone, vortioxetine (2)	○	○	○	○	○
TCAs (3)	○	○	○	○	○
SNRIs (4)	○	○	○	○	○
MAOIs (5)	○	○	○	○	○
Other medication (6)	○	○	○	○	○
Psychotherapy (7)	○	○	○	○	○
Medication + psychotherapy (8)	○	○	○	○	○
Medication + exercise (9)	○	○	○	○	○
Psychotherapy + exercise (10)	○	○	○	○	○

Psychotherapy + exercise + medication (11)	○	○	○	○	○
Other (12)	○	○	○	○	○

Q14 What type of communication would you think would be the best way to disseminate evidence regarding treatment for depression?

_____

Q15 What do you see as barriers and challenges for recommending exercise as treatment for depression?

_____

Q16 Please provide email address if you would like an Amazon gift card.

_____

End of Block: Default Question Block

APPENDIX B

FOLLOW-UP SURVEY

Exercise as Treatment for Depression Follow-Up Survey

Start of Block: Default Question Block

Participation in this survey is voluntary, you can stop at any time, and you can choose to not answer any questions you do not want to answer. The data from the survey may be used in a publication that describes the results of the survey. By entering the survey, you provide your informed consent to participate in this study and for your anonymous data to possibly be used in a publication. Thank you for taking my survey.

○ I give my informed consent to participate in this study and understand my anonymous data may be used in a publication.

Q1 What is your role?

- ○ Primary Care Physician
- ○ Resident
- ○ Medical Student
- ○ Family Nurse Practitioner
- ○ Psychiatric Mental Health Nurse Practitioner
- ○ Nurse Practitioner Student
- ○ Physician Assistant
- ○ Physician Assistant Student
- ○ Psychiatrist

Q2 What is your age group?

- ○ 18-24
- ○ 25-34
- ○ 35-44
- ○ 45-54
- ○ 55-64
- ○ 65 and older

Q3 How many number of years have you been practicing in your profession?

- ○ 0-5 years
- ○ 6-10 years
- ○ 11-15 years
- ○ 16-20 years
- ○ 21 years or more
- ○ Current student

Q4 After receiving the pocket card, have you recommended exercise to depressed patients? Why or why not?

_____

Q5 Are you currently using the pocket card that was provided to you? Why or why not?

_____

Q6 Please provide email address if you would like an Amazon gift card.

_____

End of Block: Default Question Block

APPENDIX C

KEEPER STUDIES

Keeper Studies

Citation: (i.e., author(s), date of publication, & title)	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
Danielsson, Papoulias, Petersson, Carlsson, & Waern, 2014, Exercise or basic body awareness therapy as add-on treatment for major depression: A controlled study	Single-site, three-armed randomized controlled	62 adults, ages 18-65 with depression on antidepressants, physical therapy setting	Aerobic exercise or basic body awareness therapy compared to single consultation with advice on physical activity	Depression severity using Montgomery Asberg Rating Scale, secondary outcomes measured global function, cardiovascular fitness, self-rated depression, anxiety, and body awareness	Intention-to-treat population, analyses carried out per-protocol, descriptive statistics, ANCOVA, Statistical Package for the	Exercise in physical therapy setting has an effect on depression severity and fitness, physical therapy can be used to help inspire and guide people with depression to exercise, more research is needed to clarify effects of BBAT	Limitations-Small sample size, increases type II error, recruitment of volunteers, missing data, self-reported medication status, BBAT hard to capture with psychometrics Strengths-Randomized controlled design, face-to-face interview, utilized blinded assessor, reduced risk of systematic bias through employing same research collaborators, two parallel augmentation conditions

					Social Sciences		
Schuch, Vancampfort, Rosenbaum, Richards, Ward, & Stubbs, 2016, Exercise improves physical and psychological quality of life in people with depression: A meta-analysis including the	Systematic review, meta-analysis	6 RCT's, 198 adults with depression, mostly outpatient setting,	Mean change in QoL in exercise intervention group from baseline to post-intervention, compared to control group	Changes in scores of the QoL domains: physical, psychological, social, environment, and overall QoL	Data pooled from 5 studies. Random effects meta-analysis evaluated the Standardized Mean Difference	Exercise improved physical and psychological domains and QoL, effect on social and environmental domains not significant	Limitations: Only six trials were reviewed Strengths: Low inconsistency, analysis showed low risk of publication bias

evaluation of control group response							
Schuch, Vancampfort, Richards, Rosenbaum, Ward, & Stubss, (2016), Exercise as a treatment for depression: A meta-analysis adjusting for publication bias	Meta-analysis	RCTs of exercise interventions in people with depression, comparing exercise versus control conditions	People with depression who exercise versus control groups	Measure of depressive symptoms pre and post intervention	Random effects meta-analysis calculating SMD, meta-regressions, trim and fill and fail safe n analyses	Data strongly supports that exercise is an evidence-based treatment for depression and previous meta-analyses may have underestimated benefits of exercise due to publication bias	Strengths: 25 RCTs examined and adjusted analysis for publication bias

Stanton & Reaburn, (2014), Exercise and the treatment of depression: A review of the exercise program variables	Systematic review	RCTs that included adults ages 18-65 with depression	Adults with depression who did aerobic or resistance traning, combination, compared to other interventions	Validated depression rating scales	Studies analyzed for exercise descriptives, assessed using PEDro scale	Evidence for aerobic exercise 3 times a week at moderate intensity for a minimum of 9 weeks for treatment of depression	Limitations: Only clinical depression, only included studies that had structured exercise interventions, methodological inconsistencies Strengths: Analysis of RCTs
Dunn, Trivedi, Kampert, Clark, & Chamblis s, (2005), Exercise treatment for depression: Efficacy and dose	Random ized 2x2 factorial design, plus placebo control	Adults with mild to moderate depression , exercise performed in lab setting, ages 20 to 45	Particpants in aerobic exercise groups compared to exercise placebo control	Score on 17 item HRSD	Intent-to-treat analysis of random ized particip ants and efficac y analysis of	Aerobic exercise at dose consistent with public health recommend ations is effective for treatment of MDD, a lower dose of exercise	Limitations: Participants were unable to be blinded, maintaining adherence to group assignment, sample relatively small Strengths: Randomized design, high internal validity

response					treated-only participants	is comparable to placebo effect	
Mota-Pereira, Silverio, Carvalho, Ribeiro, Fonte, Ramos, (2011), Moderate exercise improves depression paramters in treatment-resistant patients with major depressive disorder	Prospective, randomized, investigator blinded, two-arm, parallel assignment	individuals with treatment resistant MDD, taking combined therapy in doses "adequate" for 9-15 months w/o remission, 33 randomized to usual pharmacotherapy or plus exercise	Individuals with depression on medication compared to those who additionally exercised	HAMD scores, BDI scores, CGI-S scores, and GAF scores	T-tests, Fisher exact tests, ANCOVA, post hoc tests, ANOVA	Home exercise program improved depression and functioning paramaters in treatment-resistant MDD patients and contributed to remission, moderate intensity exercise may be an effective treatment adjunctively for treatment-	Limitations: No assessment of medication compliance, the season, fitness was no tmeasured, no control of structural conditions Strengths: Prospective, randomized, investigator blinded, two-arm, parallel assignment study, controlled social interaction component

						resistant MDD	
Balchin, Linde, Blackhurst, Rauch, Schonbachler, (2016), Sweating away depression? The impact of intensive exercise on depression	Randomized control pilot study, three-armed	30 depressed males randomly assigned to one of three groups	Depressed males compared within groups of differing exercise intensity	HAMD scores, MADRS scores, and ANPS, B-endorphin levels measured	Descriptive analysis of psychological data, ANOVAs with Kruskal-Wallis and Mann-Whitney tests	Demonstrated improvement in depressive symptoms	Limitations: Problems with measuring B-endorphins, lack of a state measure of basic emotion systems Strengths: Three-armed prospective randomized control pilot study
Dunn, Trivedi, Kampert, Clark, & Chamblis, (2002), The DOSE study: A	Design paper, randomized clinical trial	Individuals with MDD ages 20 to 45	Adults with depression and whether exercise is an efficacious treatment	HRSD scores, inventory of depressive sypmtoms	Will use statistical measures, design paper	First study to manipulate the dose of exercise among participants	Design paper

clinical trial to examine efficacy and dose response of exercise as treatment for depression			option				
Kvam, Kleppe, Nordhus, Hovland, (2016), Exercise as a treatment for depression: A meta-analysis	Meta-analysis of RCTs	Total of 23 RCTs and 977 participants	Efficacy of physical exercise as treatment for depression, as an independent intervention and as an adjunct intervention to antidepress	Reduction in depressive symptoms or remission	Effect sizes computed with random effects models	Physical exercise is an effective intervention for depression, also viable adjunct treatment in combination with antidepressants	Limitations: Use of the arms with largest clinical effect instead of dose may have overestimated effect Strengths: Meta-analysis of RCTs with almost 1000 participants

			ant medication				
Blumenthal, Babyak, Doraiswamy, Watkins, Hoffman, Barbour, Herman, Craighead, Brosse, Waugh, Hinderliter, Sherwood, (2007), Exercise and pharmacotherapy in the treatment of major depressive disorder	Prospective, RCT (SMILE study), w/ allocation concealment and blinded outcome assessment	202 adults with major depression assigned to one of four conditions	Assess patients receiving aerobic exercise training at home or group and effects on depression compared to medication and placebo	Structured clinical interview for depression and HAM-D scores	Generalized linear models with likelihood estimation	Efficacy of exercise is comparable with those recieivng antidepressants and both exercise and antidepressants tend to be better than placebo	Limitations: Patient volunteers, results possibly could be attributed to social situation and support, effect size Strengths: Consistent with meta-analytic reviews, RCT

Blumenthal, et al., (2012), Effects of exercise training on depressive symptoms in patients with chronic heart failure	Multicenter, randomized control trial	2322 stable patients treated for heart failure, with ejection fraction of 35% or lower, with depression scores of 14 or higher	Participants randomized to exercise followed by home exercise or assigned to usual care	Composite of death or hospitalization due to any cause and scores on the BDI at month 3 and 12	Separate general linear models, Cox regression models	78 patients died or were hospitalized in the usual care group compared with 759 in the exercise group, compared with usual care, exercise resulted in lower BDI scores at 3 and 12 months	Limitations: Generalizability is limited, participants were not randomized to different exercise volumes, missing data, use of BDI to assess depressive symptoms Strengths: RCT, large sample size

Blumenthal, et al., (1999), Effects of exercise training on older patients with major depression	RCT	156 men and women, older than 50, with MDD, randomly assigned to exercise, antidepressant or combination	Assess effectiveness of aerobic exercise compared with medication	HAM-D scores and BDI scores, secondary outcomes were aerobic capacity, life-satisfaction, self-esteem, anxiety, dysfunctional cognitions	1-way multivariate analysis of variance, ANCOVA	Exercise training program may be an alternative to medication for treatment of depression in older persons, antidepressants may have a more rapid initial response, but after 16 weeks of treatment exercise was just as effective	Strengths: RCT, feasible and effective, large sample size, small dropout rates Limitations: Short term intervention, all highly motivated to volunteer, highly educated, small generalizability, absence of a true no-treatment control group,

Legend

ANPS-affective neuroscience personality scale 2.4

BBAT-basic body awareness therapy

BDI-Beck depression inventory

CGI-S-clinical global impression scale

GAF-global assessment of functioning

HAM-D-Hamilton Depression Rating Scale

HRSD-Hamilton Rating Scale for Depression

MADRS-Montgomery-Asberg depression rating scale

MDD-major depressive disorder

RCT-randomized controlled trials