Spring 5-22-2021

Weight Reduction Motivation in Osteoarthritis Patients Through Nurse Practitioner Driven Education and Follow-Up: A Pilot Project

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Author Note

Portions of this evidence-based practice project was presented as a poster at the 2021 California Association for Nurse Practitioners virtual conference. There are no financial disclosures or conflicts of interest to report.

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Acknowledgments

I would like to express my great appreciation to Dr. Martha Fuller, for her unwavering encouragement and support as my faculty advisor throughout my academic career. Your guidance was essential in my navigation through the world of pediatrics as well as keeping me motivated throughout the evidence-based project process.

I would like to thank my peers and faculty at the University of San Diego, who showed strength and resilience as healthcare workers during an unprecedented time.

I would also like to thank Dr. Tara Kelly, as my first preceptor in orthopedics as well as my clinical mentor during the implementation of my evidence-based practice project at UCSD Hillcrest's Outpatient orthopedic clinic. Her encouragement and patience increased my confidence as a future provider. Additionally, I am grateful for all of my other preceptors during my clinical experiences: Nurse Practitioner Anna Gardiner with surgical oncology experience at UCSD Jacobs Medical Center, Nurse Practitioner Katrina Durkee providing me with my first pediatric experience at Sharp Rees-Stealy Grossmont, and lastly Dr. Yosuke Horikawa, my other pediatric mentor at Sharp Rees Stealy in Santee, where I learned time management skills when seeing an overwhelmingly large volume of pediatric patients despite COVID-19.

Lastly, without the support of my family and friends, I would not be here. If I were to list everyone, I would either exceed the word limit or forget someone and they'd probably make a big deal about it (Colleen). Dad, Mom, Erin, Ian, Michaela, both Nana's and G-ma, all of the Mulveys and McDonnells, thank you, and I love you. To Ryan O'Connor, and the O'Connor and Thornton family: thank you for opening your hearts and your home to me from day one and treating me like your own family.

Abstract

Purpose of Project: The ultimate goal of this short-term pilot project is for overweight or obese osteoarthritis patients to increase their knowledge on the benefits of weight loss and physical activity. Research shows that for every kilogram of weight lost, 2.2–4.0 kilograms of weight is taken off of the joint and could reduce joint pain up to thirty to fifty percent and improve quality of life. Following education from the provider, patients will understand the correlation of osteoarthritis symptom management with weight loss.

EBP Model/Frameworks: This project utilizes the Iowa Model of Evidence-Based Practice to Promote Quality Care. This addresses implementing practice change in a specialty care outpatient setting to improve patient outcomes.

Evidence Based Interventions: This project provided an educational intervention to overweight or obese osteoarthritis patients seen in an ambulatory orthopedics clinic in an urban, Southern California city. A follow-up telephone intervention was conducted after one-month to assess their motivation for physical activity. A "smart phrase" will be available in EPIC™ (electronic health record) for future implementation.

Evaluation/Results: At one-month, fifty percent of patients showed an improvement (or maintenance) in their readiness for physical activity.

Implications for Practice: Both obesity and osteoarthritis can be debilitating to quality of life. This conservative approach to osteoarthritis management can be cost effective in preventing hospitalization and lost wages.

Conclusion: Nurse practitioner education on the benefits of weight management and osteoarthritis increases patient education and readiness for physical activity.

Weight Reduction Education in Osteoarthritis Patients Through Nurse Practitioner Driven Education and Follow-Up

Osteoarthritis (OA) is a chronic disease that causes the breakdown of cartilage and underlying bone changes in joints, such as the hands, knees, hips, and spine and has affected 32.5 million adults (Center for Disease Control and Prevention [CDC], 2020). With the population age increasing and obesity numbers trending up, this number has been projected to surge to 78.4 million by 2040 (CDC, 2020). OA has caused pain, stiffness, and swelling in the joints that can affect mobility and a person's daily function (NPHA, 2020). Between 2008–2014, those affected by OA have earned $4,274 less than those who have not (National Public Health Agenda for Osteoarthritis, 2020). Medical costs and costs due to lost wages have been estimated to be nearly $304 billion and counting (UC Davis, 2020).

There are non-modifiable risk factors of osteoarthritis, including gender, age, genetics, and race, and modifiable risks; joint overuse or injury; and extra weight placed on the joints (NPHA, 2020). Obesity has been a major risk factor for developing symptomatic osteoarthritis, and two-thirds of obese adults will develop OA during their life. Data analysis by the National Health and Nutrition Examination Survey showed that obese women had 4 times the risk of developing knee osteoarthritis than those who were of healthy weight, and for men they were 5 times more likely to develop OA (Johns Hopkins Arthritis Center, 2019). Both obesity and OA can be debilitating to a person's quality of life as well as contribute to many other health complications (CDC, 2020).

Treatments for OA have included pain relief with over-the-counter and prescription pain medication; physical activity and physical therapy to improve muscle

strength; supportive equipment, such as canes, crutches, and braces; and ultimately surgery if no treatment options are effective (CDC, 2020). The cost of a joint replacement surgery can be upwards of $57,000 dollars per patient, not including postoperative care and follow-up and potential complications (CDC, 2020). The Centers for Disease Control and Prevention, the Arthritis Foundation, and the National Public Health Agenda for OA have united with a common goal to address the impact OA has on public health and the economy and improve patient outcomes (NPHA, 2020).

Despite the growing prevalence of osteoarthritis globally, it has still been an underappreciated chronic condition contributing to a sedentary lifestyle that can contribute to heart disease, diabetes, mental health issues, and other medical issues. Patient education on the management of OA should promote physical activity and a healthy diet in combination with other noninvasive supportive care. Research has indicated that for every kilogram of weight loss, 2.2–4.0 kilograms of weight is alleviated off weight-bearing joints (Davis et al., 2005).

Literature Review

I conducted a literature search using CINAHL and PubMed databases. Keywords used for this search included osteoarthritis, weight loss, weight management, weight loss motivation, patient education, and telephone follow-up. To support the implementation of this evidence-based practice (EBP) project, I included a single, blind, randomized controlled trial (RCT); a 2-phase parallel-group randomized controlled trial; an interim analysis; observational review; a systematic review; and meta-analysis. More data are needed to be collected in longitudinal studies to determine if weight loss and physical activity will slow the progression of OA.

In 2005, an 18-month long single-blind, randomized, controlled clinical trial was conducted at Wake Forest University to compare effectiveness of interventions for 62 overweight and obese sedentary adults with knee OA. The interventions included exercise only, dietary weight loss only, combined dietary weight loss and exercise, and a healthy lifestyle control group (Davis et al., 2005). The trial found each pound of weight loss resulted in a weight reduction 4 times that being exerted on the knee with each step during activities (Davis et al., 2005,). Over the 18-month trial, an average of 5% weight loss led to improvement in function and mobility by 18%. The most effective intervention in the study was weight loss combined with exercise, improving patient function and mobility by 24%.

Another RCT was conducted in 2015 by the Department of Rheumatology at Frederiksberg Hospital in Denmark (Christensen, 2015). One hundred and ninety-two obese patients with a diagnosis of knee OA were enrolled and put through phase 1 of the RCT, which was a strict dietary program for weight loss for 16 weeks. Mean weight loss achieved was 12.8 kg. In phase 2, patients received 52 weeks of maintenance in one of three groups: (a) 1 year of dietary support, (b) a knee exercise program, and (c) no attention (control group). Results showed a statistically significant pain reduction after the weight loss from phase 1 regardless of the maintenance therapy received in phase 2.

At the Osteoarthritis Chronic Care Program at Royal North Shore Hospital in Australia, an interim analysis was done in 2015 to evaluate the effectiveness of the program that focused on weight reduction to improve pain and function in patients with knee and hip OA (Claes et al., 2015). Eighty-eight patients were followed over 26 weeks, with a check-in at 12 weeks. Outcome measures included percent of weight loss, pain

improvements, a timed walking test, and mobility tests. At the 12-week mark, knee OA participants had a decreased average of pain on their utilized pain scale and were able to walk longer than those with hip OA. At 26 weeks, there was a statistically significant improvement in mobility and walking distance in those with knee OA compared to those with hip OA.

Similarly, in 2016, a community-based study by the Osteoarthritis Healthy Weight for Life program enrolled participants in an 18-week weight loss program and assessed them at baseline, 6 weeks, and the 18-week mark (Atukorala et al., 2016). The significance of this study showed "a greater weight reduction is likely to cause incremental improvement in symptoms and function in knee OA and those with higher levels of baseline function require less weight loss to achieve a clinically meaningful improvement in function" (Atukorala et al., 2016, p. 1107).

Lastly, I summarized a meta-analysis and systematic review published by the Seminars in Arthritis and Rheumatism that discovered the overall effectiveness (improvements in pain, function, mobility) were evident in patients with OA after diet-induced weight loss or a combination of diet and exercise. The study also looked to identify if inflammatory markers decreased with either treatment (Calders et al., 2019). The article included 19 systematic reviews and 9 meta-analyses that met those criteria. Results discussed that diet-only treatment of OA was ineffective in pain reduction, although a combination of diet and exercise yielded a moderate response in decreased pain. Physical function and mobility were improved moderately in both diet-only weight loss measures and the combined diet and exercise treatment. The inflammatory marker

IL-6 was reduced with the diet-only treatment option but was not statistically significant enough to affect overall results (Calders et al., 2019).

Need for Practice Change Project

A large healthcare system's Center for Joint care in San Diego was ranked among the best orthopedic care hospitals in America by *U.S. News & World Report* for 2020–2021 (Brubaker, 2020). The orthopedic team at this institution specializes in joint repair surgery for those with significant joint injury or degeneration after conservative treatments have been exhausted. At the Outpatient Orthopedic clinic in an urban area of a large Southern California city, providers have assessed patients with OA who have come in hoping to obtain joint replacement surgery. In this urban patient population, patients with a diagnosis of OA were mostly federally insured and had a body mass index (BMI) classifying them as overweight or obese. The current standard of practice for this patient population has been conservative treatment with over-the-counter pain medication, physical therapy referrals, fitting for braces, and referrals to pain management. Although it has been known that diet and exercise are beneficial for overall health, there was a need for specific patient education on the benefits of weight management and physical activity for OA.

PICO Question

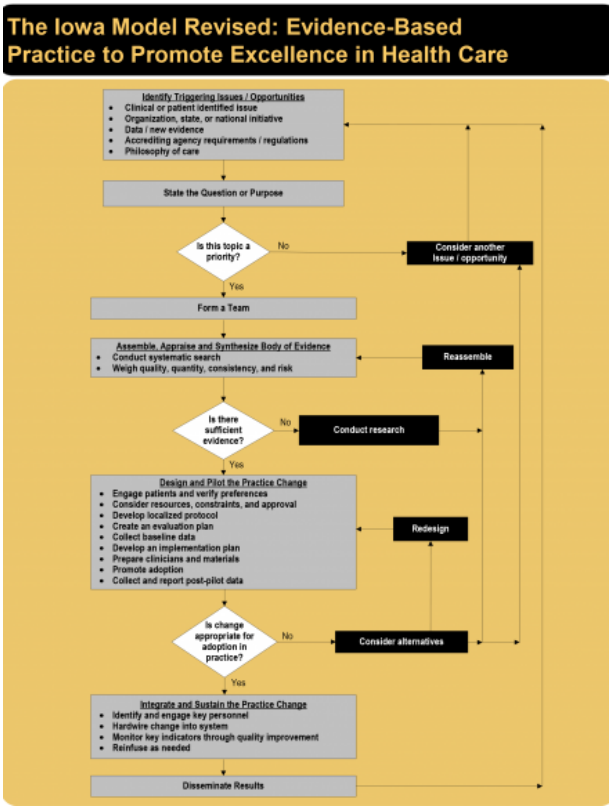
In overweight adult patients with OA in an outpatient orthopedic clinic, does weight loss education and telephone follow-up after 1 month lead to an increase in patient understanding and motivation for weight loss measured among 15 patients?

Model and Theory

The Iowa Model of Research-Based Practice to Promote Quality Care developed by Marita Titler has been a widely used evidence-based tool since its origination in 1994 (Titler, 2001). This model has served as a guide for both nurses and providers and can be applied in a variety of clinical settings. The Iowa model has focused on a clinical question or problem that triggers a review of the current practice, identifying the need for a change, assembling a team, designing and piloting a change, and sustaining the new practice change (Melnyk, 2019). This model has been effective due to its ability to evolve with the complex healthcare system in America today and can lead to better patient outcomes and decreased costs.

Figure 1

The Iowa Model Revised



Note. Used with permission from the University of Iowa Hospitals and Clinics, copyright 2015. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at 319-384-9098. "Iowa Model of Evidence-Based Practice: Revisions and Validation," by Iowa Model Collaborative, 2017, *Worldviews on Evidence-Based Nursing, 14*(3), 175–182. https://doi.org/:10.1111/wvn.12223.

Asking what could be done better in health care identifies disparities in the current care setting. This particular institution's Outpatient Orthopedic clinic is in an urban setting and serves mainly publicly insured individuals. One of the disparities identified has been the lack of patient education on weight management in the treatment

of OA. It has been known from research that weight loss can greatly lessen pain in those with OA; however, patients visiting this clinic were looking for symptom relief with the goal of getting joint replacement surgery without understanding surgical risks or exhausting all conservative measures prior to surgery. With proper education on weight management, surgery may be avoidable. This and other conservative methods may contribute to effective pain relief.

The biggest strength of this model has been the ability to implement it in many different clinical settings. The model is detailed, guiding the provider through the EBP process (See Figure 1). It incorporates feedback loops with positive and negative feedback; provides opportunities for analysis and evaluation; and allows for modifying or tailoring based on evaluation, data, and team expertise, as well as the structure and process (Melnyk, 2019). This has helped highlight errors in the EBP process and tailors it to individual, interdisciplinary, or unit-based needs.

Although a strength of the model has been its ability to be applied anywhere, it can also be a weakness in its generalizability and lack of uniqueness. It has not assessed barriers to change, which requires a cultural assessment of the organization prior to implementing the new process. It does not assess sustainability once the EBP process is implemented, such as staffing requirements to maintain the project once it is done.

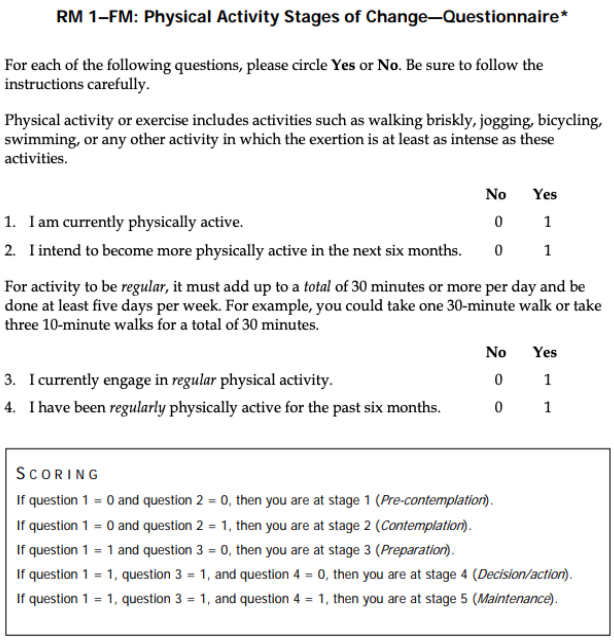
Practice Change Process

This EBP was initiated based on literature evidence and an identified need in this clinical setting based on the Iowa model. The researcher obtained approval from the hospital's Institutional Review Board (IRB) and the university-affiliated IRB prior to implementation. A certified DNP was the mentor overseeing implementation and assisted

with inclusion/exclusion criteria when selecting eligible patients. Criteria consisted of patients with a diagnosis of OA of any joint, based on the literature that diet alone may decrease inflammatory markers associated with patients with OA and a BMI greater than or equal to 25 who are primarily English-speaking. Spanish and other language speaking patients were included if a telemedicine interpreter and an English-speaking family member were available for assistance.

Figure 2

Physical Activity Stages of Change-Questionnaire



RM 1–FM: Physical Activity Stages of Change—Questionnaire*

For each of the following questions, please circle **Yes** or **No**. Be sure to follow the instructions carefully.

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity in which the exertion is at least as intense as these activities.

	No	Yes
1. I am currently physically active.	0	1
2. I intend to become more physically active in the next six months.	0	1

For activity to be *regular*, it must add up to a *total* of 30 minutes or more per day and be done at least five days per week. For example, you could take one 30-minute walk or take three 10-minute walks for a total of 30 minutes.

	No	Yes
3. I currently engage in *regular* physical activity.	0	1
4. I have been *regularly* physically active for the past six months.	0	1

SCORING

If question 1 = 0 and question 2 = 0, then you are at stage 1 (*Pre-contemplation*).

If question 1 = 0 and question 2 = 1, then you are at stage 2 (*Contemplation*).

If question 1 = 1 and question 3 = 0, then you are at stage 3 (*Preparation*).

If question 1 = 1, question 3 = 1, and question 4 = 0, then you are at stage 4 (*Decision/action*).

If question 1 = 1, question 3 = 1, and question 4 = 1, then you are at stage 5 (*Maintenance*).

Note. Public access, published by Manitoba and adapted, with permission, from *Motivating People to Be Physically Active* (p. 21), by B. H. Marcus and L. H. Forsyth, 2003, Human Kinetics. Copyright 2003.

The Physical Activity and the Stages of Motivational Readiness for Change Model was utilized to assess current patient motivation pre- and post-patient education (See Figure 2.) (Research Digest, 2003). This assessment has been implemented in many research studies to increase physical activity behavior among high-risk patient populations. This model identifies an individual's current state of readiness to think about, start, and maintain physical activity. The model uses a Likert scale and classifies individuals in one of the following stages: precontemplation, contemplation, preparation, action, and maintenance.

After administration of the physical activity stages of change Likert scale at the beginning of the education session, patients were provided with a packet written at a 5th grade literacy level that I designed drawing on resources from the CDC about OA management. The packet also included free resources for the patient to utilize workout classes, community-based workout settings, and free phone applications. Tips on beginning to workout with OA were included to ensure safety was a priority. Lastly, the packet included a weeklong dietary intake form and physical intake form that was also retrieved from the CDC website. I reviewed the packet with the patient and provided teaching on topics including OA statistics, facts about weight loss, and conservative OA management and answered any questions (See Figure 3). All patients agreed to a 1-month follow-up assessment via telephone where they were would again be administered the Likert scale to reassess their readiness for physical activity.

Figure 3

Patient Education Handout

To assist in the future implementation of this project in a more long-term setting, I created a "smart phrase" to be included in the patient's electronic health record (EHR). Any provider can locate the smart phrase by beginning a patient note in their record and entering "OBESITYANDOSTEOARTHRITIS." Upon entering this phrase, a note will come up to assist in documentation ease, which will promote provider compliance in making this project part of a regular dialogue with OA patients. The note states:

> Obesity and osteoarthritis information was provided to patient during this encounter. Patient provided with Likert scale to assess exercise readiness, and received an educational packet on exercise, including an exercise and food diary provided by the CDC. Patient agreeable to one-month telephone follow up phone call to reassess exercise readiness.

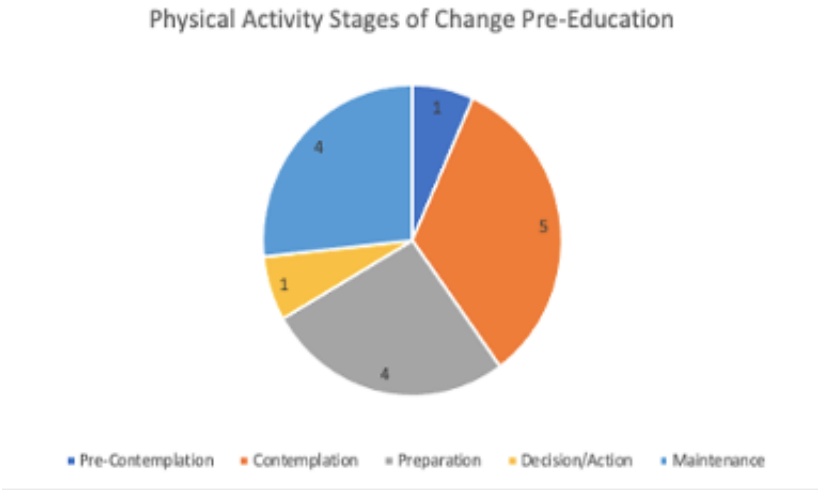
Data Analysis

Data were collected from the 15 patients included in the pilot project between October 12, 2020, and November 16, 2020. Among the 15 patients, the mean BMI calculated was 33. The mean age of patients was 59. Eight patients were male, and seven

were female. Race and ethnicity of participants included five White/European, eight Hispanic, one African American, and one Arab American. Twelve of the patients fell into the category of knee OA, three were being seen for OA of the spine, and one was being seen for oligoarthritis, primarily in the hip. Eleven patients were primarily English speaking, three primarily spoke Spanish with family members present with them in clinic, and one Arabic-speaking patient had family member present. Figure 4 below shows the pre-education assessment of patients' current stage of physical readiness.

Figure 4

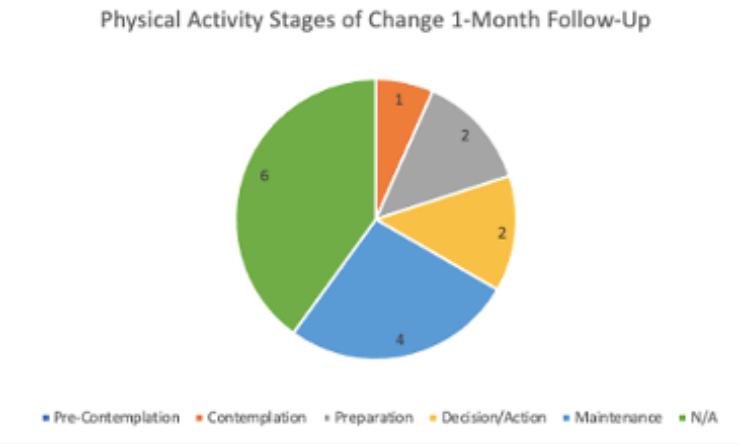
Physical Activity Stages of Change Pre-Education



After 1 month, telemedicine was utilized to readminister the physical activity stages of change Likert scale. Of the 15 participants, a change in motivation was seen in nine. Six patients were unavailable for a telephone follow-up, four of those were the non-English speaking participants (see Figure 5).

Figure 5

Physical Activity Stages of Change: 1 Month Follow-Up



Cost-Benefit Analysis

Although there may be some barriers upon implementation of this project, such as patient adherence, a cost-benefit analysis supports the sustainability of this project. As far as development of this project, printed materials were the main program cost. For the 15 patients in this project, the total cost of 15 educational packets was $63. The educational packet took no longer than 5–10 minutes to complete per patient and could be included as part of the main provider dialogue during the patient appointments. Another cost incurred would be the telephone follow-up phone calls required during administrative time. The average hourly rate of an orthopedic nurse practitioner is $64.32 an hour (Unitek, 2020). Calculating one hour of administrative time for one hour a week for one year resulted in a cost of $3,087.36 dollars in wages. Based on the amount of time the provider may be following up with a patient, CPT code “98966” may be used to bill the patient’s insurance for medical advice (Torrey, T., 2020). The cost of a joint-replacement surgery per patient could be upward of $59,000, showing an immense cost avoidance

opportunity. A cost-benefit analysis here supports that for every dollar spent, there is $18.70 in healthcare savings. This cost-benefit analysis would yield an astounding 1,773% return on healthcare investment for 5–10 minutes of extra dialogue with a patient per office visit.

Discussion and Implications

This pilot project showed that a brief discussion about weight loss and its ability to potentially alleviate many symptoms associated with OA is effective. All participants were appreciative of the opportunity to speak openly about their current struggles with diet and exercise, including lack of motivation, resources, and support. It was hopeful to see that of the nine patients who responded to the telephone follow-up assessment, zero were in the pre-contemplation phase and only one patient was in the contemplation phase. The rest of the eight participants moved to the next phase of physical readiness or continued with their current exercise maintenance.

Ideally, this project would have been conducted on a larger scale and over the course of a longer period of time. This could be expanded to measure additional outcomes, including pain, change in mobility, and function. Educational packets could be translated into other languages, such as Spanish or Arabic, which may result in increased compliance among these populations.

Many members of this patient population, one located in an urban setting, have been publicly insured and may continue to lack the resources necessary to lose weight and increase their physical activity. This project can be implemented in primary care or other community settings rather than just a specialty clinic. Many of these patients have been referred to or are currently in physical therapy programs. Additional education on

diet, exercise, and conservative management of OA could be implemented in those settings as well.

Although the literature has not supported the idea that physical activity and diet can slow the progression of OA, it is known that physical activity and diet do improve the pain and physical disabilities associated with OA. Knowing that obesity is a prominent modifiable risk factor for developing OA in the future, implementing a prevention project in the pediatric and adolescent setting could lead to a decrease in obesity, thus decreasing the prevalence of OA.

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