IMPLEMENTATION AND EVALUATION OF A PRESCRIBED EXERCISE PROGRAM LED BY A NURSE PRACTITIONER

By

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A Project Submitted in Partial Fulfillment of the Requirements

for the Degree of

DOCTOR OF NURSING PRACTICE

in

Nursing

University of Alaska, Anchorage

December 2016

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Abstract

Insufficient physical exercise contributes to many disease processes and increases mortality and morbidity rates worldwide. If the world population were to adhere to recommended levels of physical activity, health outcomes would improve. To that end, clinical practices need to consider exercise interventions to improve patient self-efficacy to adhere to recommended physical activity guidelines. A family nurse practitioner led such an intervention in a primary care clinic in Anchorage, Alaska. It evaluated a prescriptive-exercise program using the *Exercise is Medicine*® (EIM) guidelines of the American College of Sports Medicine. This pilot targeted healthy adults between 18 and 64 years old who were not exercising at least 150 minutes per week. From 20 applicants, eight participants qualified and entered into a 12-week prescribed exercise program. Seven completed the intervention and the subsequent post self-efficacy survey and measurement collection. Measured outcomes were self-efficacy, blood pressure, body mass index and participant's commitment to follow through with continued exercise. Significant findings from this exercise intervention included (1) increased self-efficacy from "sense of accomplishment", (2) reduced systolic and diastolic blood pressure and (3) indications that participants would continue physical activity level per recommended guidelines. It is conclusive that implementation of a prescription-exercise guideline in clinical practice can improve the population's self-efficacy to adhere to the recommended levels of physical activity, and lower blood pressure. Meeting adequate physical activity levels mitigates disease development, improves health outcomes and reduces health care system costs.

Keywords: Exercise is Medicine®, physical activity intervention, self-efficacy, blood pressure, physical activity guidelines

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Acknowledgments

There are several people and organizations I want to acknowledge and thank for the support, encouragement, contribution, and time they have given me and this endeavor.

To the staff at Northwest Medical, Body Renew, and the community of Anchorage, Alaska, I thank you for your understanding, participation and generosity. To my peers, Jill Rife, Jyll Green and Robin Bassett, candidates forging the first DNP program at UAA, I offer a special appreciation and thank you. To my project chairperson, Molly Rothmeyer, and my committee member, Bethany Buchanan, I thank you for your reviews and valuable suggestions in the development of this manuscript. To Lisa Jackson and Kitty Wellmann, I thank you for your support and assistance to project completion. And to Jill Janke, I thank you for your feedback regarding the statistics.

To Donald Keefer, a special thanks for your assistance with editing the manuscript. To my family, friends and patients, thank you for your encouragement, kindness and support.

And of special note and in remembrance, to my late grandmother, Louise Peck, I thank you. You continue to inspire me daily to practice disease prevention, to promote community health, to continue learning and pursue higher education.

Implementation and Evaluation of a Prescribed Exercise Program Led by a Nurse Practitioner

Overview of the Problem of Interest

Public health care systems worldwide demand continued and expanded infrastructure improvement to promote and benefit wellness and to reduce illness. In contrast, something as simple as the lack of an individual's physical activity and its translation to disease has continued to affect – and burden – the individual, family, community, and increase health system management costs respectively (Halpin, Morales-Suarev-Varela & Martain-Moreno, 2010). Lack of physical activity has increased the morbidity and mortality from chronic disease: obesity, heart disease, diabetes, depression, cancer, and premature death (American College of Sports Medicine, 2013).

In 2008, the first American guidelines addressing physical activity for health were published, in recognition that an estimated 80% of Americans were not meeting the recommended physical activity level (U.S. Department of Health and Human Services [USDHHS], 2008). These guidelines were consistent with the Healthy People 2020 principal goals to promote exercise and "improve health, fitness, and quality of life through daily physical activity" (Healthy People 2020, 2010, para.1). Among the key Healthy People 2020 objectives pertaining to physical activity were (1) a reduction in the proportion of adults who are not physically active, (2) an increase in the proportion of the population exercising at least 150 minutes per week at a moderate to vigorous physical activity intensity, and (3) participation in muscle-strengthening exercises at least two days per week (Healthy People 2020, n.d., para. 1-3). Further, the Healthy People 2020 recommended that during office visits, the health care providers increase the proportion of patients counseled and educated to exercise, to include not

only healthy patients, but also those patients who have chronic disease such as dyslipidemia, heart disease, and diabetes.

The Affordable Care Act Title IV, Sections 4004(i) and 4106, encourage the promotion of evidence-based, preventative strategies for Americans (U.S. Centers for Medicare & Medicaid Services, n.d.). Third-party payers cover preventative care services that include annual general physical exams and obesity screening and counseling. Reimbursement for time to counsel on physical activity has made it a cost effective solution to introduce and monitor a structured exercise program in clinical practice (U.S. Centers for Medicare & Medicaid Services, n.d.).

The nurse practitioner has been a leader in health promotion and disease prevention. Participation in regular physical activity has been shown to better health outcomes; regardless, a large portion of our population has continued to be physically inactive, opting for a sedentary lifestyle. This begs the question, "Can the participant be empowered to exercise through prescription?" Thus, the focus here has been (1) to evaluate and implement a formal prescriptive exercise intervention led by a nurse practitioner, (2) to identify and evaluate the patient's expected outcome from such intervention, and (3) to monitor, evaluate, and mentor the patient's self-efficacy to exercise, at baseline and after intervention. The intervention group: a low-risk adult population at a family practice clinic in Anchorage, Alaska.

Background

Up to one-third of the world population is considered physically inactive (American College of Sports Medicine, 2013). Barriers to physical activity participation have included lack of time, support, motivation, energy and/or resources; social influences; work, family, and/or

travel obligations (Patay, Patton, Parker, Fahey, & Sinclair, 2015). Bauman et al. (2012) reported age, sex, health status, self-efficacy, and motivation influence physical activity level.

Lee et al. (2012) estimated the burden of physical inactivity worldwide. Six percent (6%) of heart disease, 7% of diabetes, 10% of breast cancer, 10% of colon cancer, and 9% of premature mortality have been directly attributable to physical inactivity. Healthcare leaders who participate and promote physical activity as a healthcare intervention can help diminish preventable disease and its associated burden.

Exercise is Medicine® (EIM) offered a collaborative community support design for prescription of exercise safely and effectively (American College of Sports Medicine, 2013). Currently there are no published studies investigating the EIM action guidelines in clinical practice. The nurse practitioner (NP) is in an opportunistic position to help identify the organizational challenges, including the cost and time effectiveness, and implement the "Exercise is Medicine" intervention model in clinical practice.

Clinical Significance

Evidence has strongly linked physical activity to positive outcomes on cholesterol, independent of diet (Huffman et al., 2012). In a meta-analysis, physical activity reduced blood pressure (Cornelissen & Smart, 2013). Physical activity has improved survivability of heart failure, the patient's quality of life, atrial and ventricular function (Edelmann et al., 2011), as well as brain functions of memory and depression (Erickson, Miller & Roechlein, 2012). Regardless of body mass index (BMI), adults who participated in regular physical activity, when compared to inactivity, had higher quality of life ratings (Cohen, Baker & Ardern, 2015).

Self-efficacy to exercise has been shown to be a predictor of participation in an activity program (Pederson et al., 2013). A meta-analysis by Olander et al. (2013) suggested a small but significant effect of an exercise intervention and self-efficacy in obese adults. Further, Orlander et al. found two approaches to help promote exercise behavior, "prompt self-monitoring of behavioral outcome and plan social support/social change" (p.5). A separate systematic review demonstrated a positive effect on exercise and self-efficacy in adults over age 60 after a behavioral change intervention (French, Orlander, Chisholm & McSharry, 2014).

Understanding factors that influence behavioral change have helped the healthcare provider facilitate and promote health-related activities. The nurse practitioner can intervene to evaluate a patient's current self-efficacy to exercise. Then, the NP can offer and monitor a structured regimen to promote the patient's self-efficacy to participate and recommend physical activity (and any respective alterations) throughout and post intervention.

Theoretical Framework

The Health Promotion Model (HPM) is a framework that has promoted the theory that individuality and unique relationship(s) influence health promoting behaviors (Srof & Velsor-Friedrich, 2006). The HPM was developed by Nola J. Pender (1983, revised in 1996); it explained multifaceted components that shape human behavior (Pender, 1996; Pender, Murdaugh & Parsons, 2006). A major underpinning of the HPM has been the social cognitive theory by Bandura (1997; 2004).

Bandura (2004) described the concepts of social cognitive theory: knowledge of the health risk and benefits of different health practices, perceived self-efficacy that one can exercise control over one's health habits, outcome expectation about the cost and benefit for different

health habits, the health goals people set for themselves, and the concrete plans and strategies for realizing them...(p. 144).

The HPM demonstrates how the interpersonal influence from the health care provider can aid in patient acceptance and engagement in a health promoting behavior.

Current Clinical Practice

Current exercise guidelines for adults have been, and still are, simple. Avoid physical inactivity and participate in at least 150 minutes of moderate-intensity exercise each week (Health.gov, 2015). Physical activity is known to have beneficial impacts on various conditions. Therefore, clinical guidelines have recommended nurse practitioners to routinely assess, evaluate, and track patient physical activity levels over time (and presumably at each visit) as an integral part of their health care plan (Strath et al., 2013).

It is unclear how practitioners are currently utilizing physical activity recommendation guidelines in clinical practice. A review by Slade and Keating (2012) of 73 studies (involving adults with chronic illness) examined the exercise reporting practices of the provider and discovered an inconsistent and inadequate description of the exercise regimen(s). Eden, Orleans, Mulrow, Pender and Teutsch's (2002) research found counseling of adults by clinicians to improve physical activity was inconclusive. Physical activity is a collective effort. Healthcare providers who themselves have followed the recommended guidelines and participated in a physical activity regimen have been more likely to recommend physical activity to their patients (Stanford et al., 2014).

Ideally, the nurse practitioner would routinely (at periodic intervals) assess the patient's physical activity and strive to develop or alter an individualized physical activity plan and then

monitor its effectiveness much like prescribing a medication, but instead, an exercise intervention. There are no current recommendations on how often a provider should perform follow-up assessments to measure progress and concerns, and identify barriers. Exploring a NP-led prescriptive exercise program as an intervention strategy for primary disease mitigation (or prevention) would be an integral part of long-term solutions to reduce the many undesirable and undesired health-related consequences and costs.

Question Guiding Inquiry

Clinical inquiry begins with a question format that describes the key components of the project. Melnyk and Fineout-Overholt (2011) discussed how to pose the question using a **PICOT** format:

- **P** describes the population, and may include sex, ethnicity(ies), disease, and/or age group;
- **I** is the intervention or problem of interest, and may include "any exposure, treatment, diagnostic test or predictor/prognostic factor or may be an issue that the clinician is interested in" (p.29);
- **C** is the comparison to which the intervention is assessed, namely the same group before and after intervention or a group that did not receive the intervention (control group);
- **O** is the outcome that is expected (or unexpected), measurable; and
- **T** is the timeline in which the project will occur to affirm the expected outcome.

PICOT question. Does implementation of a prescriptive physical activity intervention led by a nurse practitioner in a family practice setting improve patient's self-efficacy to continue to exercise?

Population (P). Low risk adults in Anchorage, Alaska between the ages of 18 and 64 who at the time were not participating in the recommended amount of physical activity.

Intervention (I). The "Outcome Expectation for Exercise Scale" (OEES) Resnick (2000) was administered. An exercise regimen using EIM guidelines was prescribed. Vital signs were monitored weekly: physical activity (in minutes per week), blood pressure, and body mass index.

Comparison (C). A comparison was performed of the pre and post scores of the OEES Resnick (2000). Vital signs identified above.

Outcome (O). The NP evaluated the effects of a prescribed exercise regimen. Did it promote and increase patient self-efficacy to continue exercising, and track and "log" (document) vital sign information?

Timeframe (T). This project spanned 12 consecutive weeks. Patients were volunteers recruited from a family practice clinic, screened for existing health issues prior to acceptance and participation in accordance with the physical activity readiness questionnaire (PAR-Q) (Canadian Society for Exercise Physiology, 2012). Prior to prescribing an exercise regimen, the participant completed a pre-OEES and provided descriptive data including age, sex, current activity level, blood pressure, weight, and height. After the intervention period, patients completed a post-OEES and an open-ended project evaluation.

Conclusion

The purpose of this project was to evaluate and implement a *prescription for exercise* led by a nurse practitioner in a safe and effective manner to improve patients' self-efficacy to participate in recommended physical activity. Adequate physical activity has been demonstrated

to be a clinically important therapy to reduce and/or prevent the consequences of non-infectious chronic diseases and to extend and/or improve quality of life. It is unacceptable for a third of the world's population to be considered physically inactive (American College of Sports Medicine, 2013).

The cost of healthcare has been — and is — rising and will continue to rise if there are no proactive approaches for each of us to take responsibility to better care for ourselves. The nurse practitioner can (and helps) guide patients to achieve optimal health, and is a trusted entity to employ a structured physical activity intervention. Knowing that self-efficacy is a predictor of participating in regular physical activity, the nurse practitioner can promote patient's self-efficacy, and motivate and empower the patient to take initiative to exercise. This project promoted the awareness of the benefits of exercise and engaged patients to participate in a structured exercise program to reduce their overall health risks and improve quality of life.

Review of the Literature

Review of the literature yielded sufficient evidence-based research to recommend physical activity and its benefits to health-related outcomes. Professional organizations have established guidelines in recommending physical activity, guidelines grounded in evidence-based meta-analysis and systematic reviews. The American College of Sports Medicine is recognized as a leader among healthcare organizations promoting physical activity interventions to benefit health. Moreover, numerous other organizations have adopted position statements advocating physical activity for primary and secondary disease prevention: American Diabetic Association, American Heart Association, USDHHS, and U.S. Preventive Services Task Force.

The collaborative community has continuously brainstormed strategies to engage the population in the recommended amount of physical activity to benefit individual health, and reduce costs associated with physical inactivity. To understand how to promote physical activity in the community, review of the literature focused on the relationship between self-efficacy and physical activity.

Methodology

A review of literature was undertaken, searching for evidence-based articles that examined physical activity guidelines, exercise interventions, and self-efficacy. Clinical guidelines for physical activity were consistent across major professional organizations. The primary focus of this project: to examine research of behavioral-related exercise interventions that promotes self-efficacy to exercise.

Strategies. The tools and materials used for review of literature included the library databases at the University of Alaska and at Alaska Pacific University, specifically the databases of PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane library, ProQuest and National Guideline Clearinghouse. Key concepts were *physical activity*, *exercise* and *behavioral intervention*(s), and *self-efficacy*. Using key word concepts, the initial search rendered 12,979 articles in CINAHL; 42,324 in Proquest; 4,087 in Pubmed; 858 in the Cochrane library; and 69 evidence-supported guidelines from National Guideline Clearinghouse.

To narrow the search, articles that specifically pertained to *behavioral techniques*, *exercise intervention*, and *self-efficacy* were sought. Selection criteria also included evidence-based practice, availability in the English language, peer reviews, and adult population. The results revealed evidence-based practice guidelines, clinical trials, randomized-clinical trials, systematic reviews, meta-analysis, and correlation tables and charts.

Data evaluation. Harder et al. (2014) developed a framework to critically appraise evidence-based research. The model is known as "Project on a Framework for Rating Evidence in Public Health" (PRECEPT). This model has provided an accepted methodology to evaluate and grade evidence, and determine strength of research in the public health setting. Harder et al. (2014) described the highest level of research as the well-conducted systematic review of randomized-controlled trials.

Quality appraisal tools (QAT) have been used to grade and evaluate research findings. A quality review has consisted of how the research was conducted, sample size, study design, limited selection, confounding and measurement biases, examination of both internal and

external validity, and the applicability of the findings (Harder et al., 2014). The selected studies were peer-reviewed, evidence-based and followed the criteria described by QAT.

Findings

The critical appraisal of evidence-based practice regarding *self-efficacy*, *physical activity* and *exercise interventions* produced few articles that addressed the behavioral component of exercise self-efficacy. Instead, most articles examined various exercise interventions in different populations and their outcomes. The literature supported future research and evaluation of the relationship between self-efficacy and physical activity using validated tools. Common themes emerged from the literature: physical activity guidelines, behaviors that promote physical activity and self-efficacy.

Physical activity guidelines. In 2008, the USDHHS released the first physical activity guidelines for Americans. The guidelines reinforced that some activity is better than no activity, and then recommended activity levels to attain beneficial health-related outcomes. These guidelines recommended at least 150 minutes per week of moderate intensity exercise to include aerobic and muscle strengthening in the adult population. A longitudinal study by Kaushal and Rhodes (2015) reported exercising at least four times per week for a duration of six weeks met the minimum amount of time and frequency to establish an exercise habit.

Current evidence-supported guidelines recommend that the healthcare provider offer patients behavioral counseling to increase physical activity, a practice that has helped improve health-related outcomes. Health benefits have included decreased lipid levels and blood pressure, reduced insulin resistance, and improved glucose tolerance (Moyer and U.S. Preventive Services Task Force, 2012). Among its objectives, Healthy People 2020 recommended clinicians increase

the proportion of patients they counsel to promote physical activity, for both the healthy patients and not-so-healthy patients (chronic disease) who can benefit from recommended activity levels (USDHHS, 2014).

Colberg et al. (2010) developed a joint position statement in collaboration with the American Diabetic Association and American College of Sports Medicine (ACSM) — supported by Agency for Healthcare Research and Quality — that recommended healthcare providers promote and support patient self-efficacy to exercise. ACSM grades the practice recommendations based on an evidence scale from A (highest level of evidence) to D (panel census judgment). Supporting patient's efficacy to exercise is graded as a B recommendation (based off randomized-controlled trials but limited data) (Colberg et al., 2010).

Self-efficacy and physical activity. A review of 27 intervention studies by Williams and French (2011) examined physical activity level and self-efficacy of healthy adults and found a small, but significant ($p < .01$) association between recommendations to promote physical activity including "action planning", "provide instruction" and "reinforcing effort towards behavior" helped increase self-efficacy and physical activity level. This meta-analysis gave evidence-base support and credence to examine a behavioral approach to improve self-efficacy and adherence to physical activity.

A randomized-controlled trial examined the effects physical activity intervention and long-term adherence and self-efficacy had in adults over the age of 50 with memory deficits. Cox et al. (2013) randomized 85 men and women to a physical intervention with behavioral counseling group and compared results to a control group. The intervention consisted of weekly behavioral counseling, worksheets, newsletters, and phone calls; and recommended 150 minutes

per week of physical activity for a 6-month period. Self-efficacy and physical activity levels were evaluated at baseline, and again at 6, 12, and 18 months.

Significant findings of the Cox et al. (2013) study were (1) the physical activity adherence rate during the 18-month study was 72.8% (men had better adherence than women) ($p < .01$); and (2) Self-efficacy was greater in the intervention group compared to the control group at the 6-month evaluation period ($p < .01$). This study suggested behavioral support with an exercise intervention recommendation improves long term physical activity adherence and self-efficacy.

Olander et al. (2013) performed a systematic review of 61 studies that examined behavioral change techniques and specifically, which ones increased physical activity and self-efficacy in obese adults. Using behavioral change techniques the studies supported a small but significant effect *(*$p < .001$) of increased self-efficacy and medium effect of increased physical activity ($p < .001$). Two behavioral techniques that were positively associated with physical activity and self-efficacy were 'prompt self-monitoring of behavioral outcome' and 'plan social support/social change' (p.5).

Social cognitive theory interventions. Self-efficacy has been a major construct from the social cognitive theory by Bandura (1997; 2004). A recent systematic review performed a meta-analysis on 18 studies that involved social cognitive behavioral constructs, physical activity, and nutrition among patients with cancer (Stacey, James, Chapman, Courneya, & Lubans, 2015). The authors suggested there was a positive effect of using various social behavior-based interventions, and physical activity, and diet change. However, it lacked detailed description and definition of the employed behavioral techniques, and the self-efficacy constructs

pre-post intervention were rarely measured. This meta-analysis of the literature warranted additional details of behavior-interventions used and the measure of self-efficacy using validated tools.

A systematic review performed by Richards, Hillsdon, Thorogood and Foster (2013) examined 10 randomized-controlled studies that involved 6292 healthy adult participants to assess the face-to-face intervention and its effect on physical activity level for at least one year. Although no significant effects were found, there was a positive relationship of the effect of face-to-face intervention with physical activity at one year with a moderate evidence quality (Richards et al., 2013).

The team of Richards et al. (2013) offered "personal counseling and advice, feedback, offering choices of exercise and supervision" (p. 2). The disadvantage of these studies was the sample of participants lacked statistically significant heterogeneity, so careful interpretation was needed if drawing conclusions from this review, and further research was indicated to improve the findings. Additionally, Richards et al. noted that this review's participants did not increase exercise-related injuries or risks of falls. The authors concluded that additional research was warranted to learn more regarding methods encouraging long-term physical activity participation (Richards et al., 2013).

Additional studies. The health care provider helps patients set personal goals to improve targeted outcomes. This includes recommendations for physical activity. A systematic review by Levack et al. (2015) examined goal setting in the context of an acquired disability and physical rehabilitation. The authors examined 39 studies that collectively involved 2846 participants who had common health conditions including musculoskeletal, brain injury, mental

health, and cardiovascular disease, and examined whether (or not) goal setting improved health outcomes. The results were low quality, but they did find that goal setting improved psychosocial outcomes (compared to physical ones) including self-efficacy, emotion and improved quality of life (Levack et al., 2015). The authors indicated that further research would strengthen the effect.

Australian Cochrane Musculoskeletal Group reviewers (Aitken, Buchbinder, Jones & Winzenberg, 2015) performed systematic reviews of the literature to examine interventions that improve physical activity adherence with patients who have chronic musculoskeletal pain. Jordan et al. (as cited by Aitken et al., 2015) reviewed 42 trials collectively representing 8243 participants with arthritis or chronic back pain. Findings suggested that adherence to physical activity was more effective when supervised (as opposed to unsupervised) (five of six trials); and when programs were self-managed (six of eight trials) including education on increasing physical activity levels may help exercise adherence.

Behavioral-based interventions (two of seven trials) may also have had a positive effect on long-term physical activity adherence in those who suffer from musculoskeletal pain (Aitken et al., 2015). Unfortunately, per the Aitken et al. (2015) review, the association between physical activity adherence and outcomes on pain reduction and improved functioning was conflicting; out of 18 trials, only eight demonstrated significant improvement in clinical outcomes. However, the researchers argued that variable measurements were used; and some studies failed to report how the intervention affected the clinical outcomes and only examined techniques to improve physical activity adherence, thus having applicability for the purpose of this project to examine the behavioral aspect of exercise compliance and self-efficacy.

Limitations and Literature Gaps

There were many limitations associated with the literature review, including lack of heterogeneity, risks of biases, participants failing to follow up, and most studies were not blinded (Aitken et al., 2015). Current research examined different exercise intervention regimens and evidence of positive outcomes in physical, social, and mental well-being. However, it was unclear what the best approach is in promoting, initiating and adhering to the recommended physical activity level. The evidence suggested a major influence in physical activity is self-efficacy, however there was little data describing the direct relationship of behavioral-approach to self-efficacy and physical activity (Stacey et al., 2015). There currently is no research describing a nurse practitioner-led exercise program.

Conclusion

Physical activity is important to individual health and the healthcare system. The nurse practitioner is in a privileged position to help guide and empower patients through behavioral counseling and encouragement to improve their self-efficacy to engage in lifelong healthy behaviors including (lifelong) exercise. Current literature pertinent and pertaining to finding the most effective approaches to improving self-efficacy and thus physical activity was lacking (Williams & French, 2011).

Therefore, exploring the outcomes of this project put forth more groundwork for individual and community health promotion practices. Systematic reviews provided enough favorable evidence to justify having pursued, applied and evaluated a supervised exercise intervention and the self-efficacy outcomes. It is important to remember that an individual's

health is an autonomous personal responsibility and thus a behavioral-approach focus was applied to this project.

Organizational Framework

The purpose of this project was to translate evidence-based research to promotion of physical activity at the clinical setting. The model for evidence-based practice change has been an accepted organizational approach to inquire whether a practice can be initiated or improved by evidence-supported data. Graham, Tetroe and KT Theories Research Group (as cited in Melnyk & Fineout-Overholt, 2011) outlined a step-by-step approach to practice change:

1. Identify the clinical problem or practice.
2. Identify the stakeholders who will assist in changing the practice.
3. Identify the methodology of practice change supported by evidence-based, high quality research.
4. Identify the potential barriers and how to address them to effect practice change.
5. Distribute information about the change of practice to those who are applying it.
6. Execute the practice change.
7. Evaluate the practice change.
8. Identify actions that will help sustain the practice change. (p. 278)

The Iowa Model of Research in Practice, an evidence-based practice framework, served the purpose of this project well: to implement and evaluate a prescriptive exercise program. This model "is a practice model with the primary purpose of guiding clinicians (physicians, nurses and allied health care) in the use of evidence to improve healthcare outcomes" (Rycroft-Malone & Bucknall, 2013; 2010, p. 137). This model's framework provided a clear guideline to implement practice changes to improve healthcare delivery and quality.

Evidence-Based Practice Model

The Iowa Model of Research in Practice (hereinafter, the Iowa Model) provided a structure to translate research findings/data and apply it to practice(s) to improve patient outcomes (Brown, 2014). This model has been commonly used to apply evidence in nursing practice (Doody & Doody, 2011). Melnyk and Fineout-Overholt (2011) outlined distinct steps of the Iowa Model.

First, the clinician must identify the problem or "trigger". This problem may be either problem- or knowledge-focused. The problem-focus looks at areas requiring improvement to manage risk, process, or financial data, or addressing clinical issues. The knowledge-focus investigates new practice(s) and/or guideline(s) that benefit practice outcomes. This project was aligned with the problem-focused investigation.

After identifying the "trigger", the second step evaluates its priority for the organization. The clinical query needs organizational support and involvement to implement the project. This project was significant to the organizational goals. Its applications and future practice implications justified the investment.

Step three establishes a team to implement the pilot project, a team formed from the organization and the community.

Step four gathers and reviews the available research pertaining to the clinical problem.

Step five critically appraises the research evidence to determine if there is a reasonable amount of high quality data to support pursuit of clinical inquiry.

The sixth step is piloting the project. In this step, there is an ongoing assessment of the process, the project's implementation, identified outcomes before and after the pilot, and measurement of its success.

Step seven evaluates the pilot. Evaluation is based on the realized outcomes, and establishes whether the project has validation for implementation in general practice.

The final (eighth) step evaluates whether or not the project will justify practice change — compared to the usual (past) practice — and determines if there were positive patient outcomes. If change is justified, the results are disseminated to the community to improve future health care (Melnyk & Fineout-Overholt, 2011). The Iowa Model is an adaptable model to apply practice inquiry, supported by evidence-based research, to bolster practice changes that benefit health outcome.

Step one: Problem or trigger. It has been well documented that there is a significant part of the population that does not attain the recommended amount of physical activity (USDHHS, 2008). Physical activity levels have been influenced by age, sex, health status, self-efficacy, and motivation (Bauman et al., 2012). Additionally, health care providers have demonstrated inconsistent exercise reporting practices (Slade & Keating, 2012). Self-efficacy to exercise has been shown to be a predictor of participation in an activity program (Pederson et al., 2013). Healthy People 2020 recommended health care providers include counseling and education to exercise in a higher proportion of office visit (USDHHS, n.d.).

Step two: Organization support. In family practice, our organizational goals have focused on preventative medicine and counseling to attain and maintain a healthy lifestyle. Simply recommending the patient exercise has consistently shown no significant impact to

behavioral change. It is a priority for the organization to discover methods and incentives to get patients to increase their physical activity levels.

Step three: Form a team. The team participants in this project included the front desk receptionist, a certified medical assistant, a registered nurse, personal trainers and a physician. The stakeholders included health care providers, the athletic club and associates, and the participants. A collaborative and community effort promoted and monitored participation.

Step four: Review of the literature. Review of the literature revealed that physical inactivity is a major worldwide health concern (American College of Sports Medicine, 2013). National guidelines recommended healthcare providers increase the proportion of patients they counsel, educate, and motivate to exercise. Regardless, little is known of the best or optimal technique to get patients to motivate themselves to participate in suggested exercise (levels, types, and durations). Evaluating the patient self-efficacy to exercise requires a behavioral approach, an approach supported by systematic reviews and numerous professional organizations: American College of Sports Medicine, American Diabetes Association, American Heart Association, USDHHS, and the U.S. Preventive Services Task Force.

Step five: Evaluate and appraise the evidence. Physical activity has improved health-related outcomes, to include lowered lipid levels and blood pressure, reduced insulin resistance, and improved glucose tolerance (Moyer and U.S. Preventive Services Task Force, 2012). Systematic review of the literature suggested positive effects of exercise and self-efficacy (French et al., 2014). The “Outcome Expectation for Exercise Scale” instrument has eight exercise-related statements to which the subject selects an answer from 1 to 5 for each, strongly disagreeing to strongly agreeing with each statement respectively.

Descriptive statistics were used to describe the sample and responses at baseline and post intervention. To discover/identify any barriers that subjects might have experienced during the intervention, an open ended question was available in the post intervention survey. Any content analysis was performed by the principal investigator.

OEES was tested for reliability and validity in a sample of 173 older individuals using face-to-face interviews (Resnick, Zimmerman, Orwig, Furstenberg & Magaziner, 2000). The factor analysis of this study's questionnaire resulted in a Cronbach's alpha of .89, a measure of internal consistency reliability in the older population (Resnick et al., 2000). This suggests the study's survey questions had a relatively high internal consistency among test takers. In the field of health and social sciences, a Cronbach's alpha of .70 and higher has been considered to be acceptable (Garson, 2011). Evaluating each patient's self-efficacy to exercise was an initial step taken prior to recommending and prescribing any level of physical activity.

Step six: Pilot the project. Organizational support by the owner of the clinic was critical to pilot the project in the family practice setting (see Appendix A). Community support of the local athletic club was secured (see Appendix B). The athletic club volunteered individual passes for interested participants, to include an initial consultation with a personal trainer and a complimentary three-month club membership.

The American College of Sports Medicine supports employing “Exercise is Medicine” protocol in practice, and pledges its continued support. Prior to the project, two meetings with the staff assigned and explained roles. Meetings also focused on the clinic/team members reviewing the “Exercise is Medicine” guidelines, and receiving instruction on access to, and content of, the forms that interested participants would complete prior to the project.

Step seven: Pilot evaluation. The pilot evaluation used the physical activity readiness questionnaire (PAR-Q) (Canadian Society for Exercise Physiology, 2012) (see Appendix C) to screen for qualifying participants. Participants were determined to be low-risk by if they answered "no" to all PAR-Q questions. Prior to prescribing an exercise regimen, qualified participants completed a preliminary or pre-OEES evaluation by Resnick (2000) (see Appendix D).

Again, descriptive statistics were used to describe the sample and responses at baseline and post intervention. To discover/identify any barriers that subjects might have experienced during the intervention, an open ended question was available in the post intervention survey. Any content analysis was performed by the principal investigator.

OEES was tested for reliability and validity in a sample of 173 older individuals using face-to-face interviews (Resnick, Zimmerman, Orwig, Furstenberg & Magaziner, 2000). The factor analysis of this study's questionnaire resulted in a Cronbach's alpha of .89, a measure of internal consistency reliability in the older population (Resnick et al., 2000). This suggests the study's survey questions had a relatively high internal consistency among test takers. In the field of health and social sciences, a Cronbach's alpha of .70 and higher has been considered to be acceptable (Garson, 2011).

Participants provided descriptive data on age, sex, current activity level, blood pressure, weight, and height. After the intervention period, patients were asked to complete a final or post-OEES and an open-ended (free comment) project evaluation. The project spanned a 12-week time frame.

Step eight: Practice change and disseminate results. The pilot project evaluated the effects of a nurse practitioner led prescribed exercise regimen. Comparison of the preliminary OEES scores to the final (post) OEES scores measured success of the pilot. If the final post-intervention OEES scores are higher than preliminary (pre) scores, then a positive relationship is found between self-efficacy and physical activity participation. This has been supportive to a practice change to assess the level of a patient's self-efficacy before recommending a physical activity program. Dissemination of the results are intended via a poster-presentation at Alaska Nurse Practitioner Conference.

Conclusion

The Iowa Model gave a clear framework to guide and implement this project. The Iowa Model clearly delineated the critical process to apply evidence-based research to the clinical setting. It is a continuous, working model that identifies a clinical problem(s) and suggests the health care practitioner investigate a different or improved modality (as opposed to the usual practice) to benefit patient outcomes.

Physical inactivity is a real — and alarming — issue and concern. For every individual, adequate physical activity would translate to improved health. The clinic owner strongly supported promoting adequate physical activity levels to prevent disease, and was willing to participate and provide organizational support. A review of the literature yielded myriad examples of the health benefits (physical and mental) from exercise and it suggest self-efficacy plays a tremendous role in activity participation. Critical appraisal of the review of literature gave an ample amount of evidence to address the self-efficacy component in exercise participation.

The “Exercise is Medicine” program was chosen because of its worldwide organizational support and its free and ready access. The “exercise” part of the project took place over 12 consecutive weeks. The OEES was used to measure pre and post self-efficacy scores and to evaluate if assessing self-efficacy is an important aspect in promoting and adhering to physical activity recommendations. Other measured outcomes included minutes of physical activity, blood pressure, and BMI.

Project Design

The purpose of this evidence-based practice change project was to evaluate a nurse practitioner led intervention following the exercise guideline protocol, "Exercise is Medicine", set forth by the American College of Sports Medicine. Additional information derived from this program will have beneficial use in future practice. The goals were to assess the patient's self-efficacy to exercise, at baseline and after intervention.

Additional evaluation included the population's self-efficacy to exercise the recommended 150 minutes per week by taking part in moderate physical activity to maintain and sustain long-term health. Surveys of participants established whether the intervention improved body mass index, blood pressure, minutes exercised per week, and self-efficacy to continue to exercise once the intervention period was complete. The Iowa Model of practice change framework provided a step-by-step structure to implement a small scale trial incorporating an exercise intervention. Measuring participant outcomes determined the success of the pilot, its indications and implications. This project has contributed to establishing recommendations from which nurse practitioners can strive to improve their patient's physical activity level for better life-long health.

Institutional Review Board (IRB)

Projects or research must be reviewed and approved by the Institutional Review Board (IRB) if any data is collected and/or human subjects are involved (Sullivan, 2011). The IRB's mission is to protect the participants (subjects) in a planned study, looking out for their best interest and safety. The IRB is comprised of individual(s) who are not party to the project, are unbiased, and are well informed of human rights and ethical considerations.

There are three classifications of IRB review: Exempt, expedited, and full. The University of New Hampshire (2014) explains the differences. The exempt review applies to projects that incorporate data collected from subjects anonymously and present no risk(s) to the subjects. The expedited review applies to projects having minimal risk(s) to the subjects and to studies with expectation of moderate exercise by healthy volunteers. The full review applies to all projects that do not qualify as exempt or expedited, involve more than minimal risk, or involve vulnerable populations.

This project qualified for an expedited review from the IRB. It involved moderate-exercise intervention and presented only minimal risk. Minimal risk was ensured by screening participants for pre-existing conditions by employing the Physical Activity Readiness Questionnaire (PAR-Q), a tested and validated tool (Canadian Society for Exercise Physiology, 2012). For this project, selected participants were healthy and subject to minimal risk, which is defined as risk normally encountered in the activities of everyday living.

Prior to the start of the project a written proposal was submitted and approved by the IRB at the University of Alaska (see Appendix H). The expedited review application included the study's purpose, plan, design, and methodology; a sample participant consent form and the targeted population; an example of the PAR-Q and the OEES questionnaires (see Appendix C & D); and engagement letters from internal and external agencies (see Appendix A & B).

The confidentiality and privacy extended to participants was protected and preserved. There was no participant identifying information included in the data. One exception was the consent form, which was (and remains) secure in a locked file for three years post intervention, and after which will be destroyed. Written consent was obtained from participants prior to

intervention. Consent clearly stated that the intervention could present, but would not exceed, minimal risk(s) and the participants were counseled that they would be permitted to withdraw from the project at any time without repercussion (see Appendix E).

Potential Risk and Benefits to Subjects

The most common (and possible) risks of participating in *any* activity are injury, initial muscle soreness and fatigue. To mitigate and reduce risk, there was a careful assessment and evaluation of participant using the PAR-Q. Additionally, a licensed family nurse practitioner worked with certified physical trainers to plan, lead, and monitor individualized level of activity at a public exercise facility. The project posed no more than minimal risk and the potential benefit of exercise mitigated risk.

The identity and identifiable information of study participants was not recorded or disclosed, in keeping with the policies of the Health Insurance Portability and Accountability Act (HIPPA). All policies, procedures, and practices conformed to HIPPA. Participants self-reported their scores anonymously through a written survey. Vital signs of participants were recorded during clinic visits. The project leader ensured confidentiality and privacy throughout the intervention by not disclosing participants' information.

Outside agencies (fitness facility) required the participants' names to enroll with the facility. Their personal information for such enrollment was not — and is not —linked to any of their survey entries. The principal investigator did not disclose any of the participant's personal information to the personal trainers.

Participants benefited through inclusion in a family nurse practitioner-led, prescriptive exercise program to improve personal health. Other potential benefits of physical activity

included reduction in blood pressure (Cornelissen & Smart, 2013); a better quality of life as reported by patients with heart failure and improved cardiac health to atrial and ventricular function (Edelmann et al., 2011); improved memory and reduced depression (Erickson, Miller & Roechlein, 2012); and finally, stronger self-efficacy to continue participating in physical activity (Olander et al., 2013).

Evidence-Based Practice Change Design

The design for this evidence-based practice change followed the Iowa Model to implement the "Exercise is Medicine" (EIM) healthcare provider action guide offered by the American College of Sports Medicine. The main goal of this program was to evaluate a nurse-practitioner led exercise program. Intended goals of this project were to implement and evaluate a prescription exercise program by evaluating the following outcomes: physical activity level and duration of same in minutes, and OEES (measuring self-efficacy, blood pressure, and body mass index (BMI).

Leadership. Simply recommending exercise to patients has not been enough. The family nurse practitioner is in a lead position to facilitate activities that promote disease prevention. Melnyk and Fineout-Overholt (2011) described innovation leadership as action that "empowers and encourages to challenge the status quo" (p. 238) or the usual practice, to improve effectiveness of healthcare practice and its associated outcomes.

Leaders in healthcare advocate for health promoting behaviors including physical activity. The project aimed to facilitate improved health outcomes through exercise. Leaders in healthcare organizations must provide guidance and support to effect changes that benefit community well-being.

Quality improvement team. The team consisted of staff from a family practice clinic: a medical receptionist, a registered nurse, a certified medical assistant, and another family practitioner; and "outside" personal trainers. The NP recommended an individualized exercise regimen to selected participants. Participants could choose to either self-select their exercise environment or be referred to an outside agency with professional physical fitness trainers for a one-time personal consultation. The physical fitness trainers were available at the exercise facility during routine exercise sessions.

Methodology and resources. Methodology for this evidence-based practice change began with cultivating enthusiasm across the quality improvement team. Although not a requirement, the team members themselves were encouraged to follow the recommended exercise guidelines to model healthy behaviors. Participants were recruited from interested inquiries responding to fliers in the organization advertising the EIM pilot project. The team was trained on EIM protocol, the use of PAR-Q to screen patients, and the information and direction needed to assist participants in accessing the OEES survey.

Support staff routinely checked vital signs as part of their normal daily routine duties during patient intake. The EIM program is free, is publicly accessible from the internet, and it provided fliers germane to this project for downloading, printing, and posting throughout the clinic. EIM is a global health initiative to encourage healthcare practitioners' use of this guideline to support the benefits of exercise through prescription. Each team member received a copy of the EIM for ready reference.

A local athletic agency volunteered a three-month trial memberships to also include a complimentary session with a volunteer personal trainer(s) who reviewed the practitioner's

written prescription for exercise, customized to the participant. Due to limited resources, only healthy, adult volunteers were included in this project. After the 12-week exercise period, participants were asked to complete a post-intervention questionnaire and vital signs to measure their outcomes.

The PAR-Q is a questionnaire that screens for pre-existing health issues. Permission to use and reprint the questionnaire was secured from Canadian Society for Exercise Physiology (see Appendix F). Permission to use the OEES was secured from its creator, B. Resnick (see Appendix G).

Material and equipment. The time required of clinic staff and agency trainers was volunteered. Organizational time was authorized to train staff. Outside agencies were instructed to follow a prescription.

EIM program materials were printed and made available for reference at any time. Required equipment included a computer, paper, a copier/printer to access and print educational resources for distribution. Phone access to participants was desirable at the end of the intervention period to remind participants to submit survey responses and follow up to collect vital sign data.

Health care providers. The practitioner's role was to screen and review the PAR-Q responses of the prospective participants, obtain informed consent, and "prescribe" each participant an exercise regimen catering to their physical ability. The practitioner followed up with the patient by phone and clinic visit at the end of the intervention period. The practitioner provided the leadership and training for the staff, facilitated meetings and was available for any questions or concerns that arose pertinent to the project.

Clinical support staff. The clinical support staff received training via verbal presentation of, and review of, forms pertinent to the project. Staff assisted in providing project information to potential (and selected) participants. Additionally, staff collected vital signs from participants: weight, height, blood pressure, and minutes per week of physical activity, before and after intervention.

Physical fitness staff. The physical fitness staff consisted of certified personal trainers, volunteers from an outside fitness agency/facility. Through meeting time the physical fitness staff were informed of project goals and of their role. Each participant met with a personal trainer for orientation to the fitness facility and equipment, and to review and interpret/explain the written exercise regimen prescription.

Participants. The organization provided and displayed fliers advertising the project's purpose and duration, and verbalized need for interested participants. Participants were volunteers who verbally expressed interest in being a part of this monitored exercise program. The participants could and were permitted to "drop out" at any time during the project without penalty. Accepted participants were expected to complete a survey prior to the study and again after the 12-week exercise intervention.

Challenges of Collaboration

Anticipated challenges included recruitment of healthy patients that met the criteria to participate. Participant response was voluntary. The project was susceptible to losing participants and/or participants' full interest, possibly compromising follow-up, responses, and data to evaluate the program. Limited (and volunteer) resources from outside agencies added challenge.

Staff or agency turnover required additional recruitment and training. Additional time was required for practitioners and support staff to inform interested participants and answer questions/concerns during the project period. The program depended on the participant and physical trainers to follow the practitioner's recommended exercise regimen(s).

The fitness staff was educated on the EIM protocols prior to implementation. A trainer or participant with an opposing view of an exercise regimens could present a challenge. The project leader had access to the fitness staff and fitness staff had access to the project leader at any time during the project intervention period.

Plan for Project Evaluation

Project evaluation consisted of a post intervention survey. Vital signs of the participants were collected during a follow-up visit in the clinic at the end of the 12-week project period. The simple benchmark for this project was to measure outcomes at baseline and post intervention, comparing values to see if there is any positive effect on self-efficacy, blood pressure, and BMI as a result of implementing a prescriptive exercise program. This information would have value for future practice recommendations.

Data collection and analysis. Data was collected by participants completing and submitting “self-report” surveys, and reporting physical activity sessions. Clinic staff recorded select vital signs/data: BMI and blood pressure. The data was measured by descriptive statistics and paired t-test, comparing the pre and post intervention scores of the OEES, BMI, blood pressure, and minutes of physical activity per week. OEES was organized in a Likert-type scale, accessed online and completed by the participants (see Appendix D). The project leader used the

IBM SPSS Statistical package to perform an analysis of the scores to determine if positive outcomes were associated with this project's exercise intervention.

Post Intervention Plans

Future monitoring to evaluate sustainability of this intervention occurs if participants are patients who continue to come to the clinic for an annual wellness exam. As a preventative health initiative, this presents opportunity to continue to assess physical activity level, identify any barriers, and formulate a plan to surmount these barriers. Additional attention may be required for patients for whom a health-related condition is a concern, but will benefit from physical activity.

It is essential to encourage and lead community activity to improve access to resources and facilities that promote physical activity. Continual inquiry and evaluation of patient's self-efficacy to exercise are essential to identify barriers and develop or alter a reasonable and attainable exercise plan. This plan is customized to the patient's abilities. The nurse practitioner can deliver individualized care to support healthy behaviors, and ultimately prevent or mitigate the onset of disease.

Conclusion

The project design required a collaborative, community effort to test an evidence-based practice change in the implementation of a prescriptive exercise program in the family practice setting. Multiple entities were involved. Therefore, the project required leadership, enthusiasm, and passion to promote a health benefiting behavior.

Human subjects were involved; therefore IRB approval was a prerequisite to start of the project. Participants were required to sign written informed consents prior to participation.

Future recommendations for practice were dependent on volunteer participation, follow through, and proactive responses. The greatest anticipated —and realized — challenge to this project was the unpredictability of human behavior.

Implementation Process and Procedures

To successfully implement evidence-based practice change in a clinical setting, one must use and follow a proven methodology or approach. For this prescriptive exercise project, guidelines from the Iowa Model for Evidence-Based Practice was employed. The next step into this project was in alignment with the fifth step of the Iowa Model process, describing the implementation and piloting of the exercise program. Cullen and Adams (2010) discussed the importance of this step in the process to initiate an evidence-based practice change. They also asserted that practices effective in research may not be realistic in clinical practice (Cullen & Allen, 2010).

Piloting the project helped determine if recommendations were practical and effective, further identifying areas that needed revision (Cullen & Adams, 2010). Outcomes to be observed included: pre- and post-intervention self-efficacy scores, blood pressure, body mass index and the likelihood participants would continue to exercise after the interventional period was complete. This chapter explains the process to implement an exercise-based intervention led by a nurse practitioner.

Project Implementation

The recruitment period for this prescribed exercise program began April 18, 2016 and ended June 1, 2016. The interventional period spanned 12 weeks, June 1 to September 1, 2016. To recruit interested parties, posters advertising the project were placed in the exam rooms, lobby, and waiting areas of a clinic that serves as a primary care facility in Anchorage, Alaska. Responding to the announcement, parties would speak to the clinicians, staff members or the

receptionist to express their interest, and then receive the PAR-Q (see Appendix C) questionnaire to complete and return.

The PAR-Q is an assessment tool used to screen prospective participants for potential risks that may be accrued from participation in physical activity. Each question and response was reviewed and discussed with the individual, and concern were addressed. To ensure safety during this pilot phase of the project, participants must have had no pre-existing adverse conditions. This included cardiovascular, pulmonary or musculoskeletal problems. For some, exercise could exacerbate an existing condition, could prove harmful, or the participant would not benefit from this trial. At the end of the recruitment period, of the 20 interested patients screened through the PAR-Q, eight met the participation requirements. Accepted participants were between the ages of 18 and 64 and responded “no” to all PAR-Q questions.

The family nurse practitioner met with each of the eight participants in the clinical setting, discussed the intent of the study, reviewed the participation letter, answered any questions, and addressed any concerns. The nurse practitioner collected the written and signed informed consent from each participant; provided a brief physical examination including cardiac, lung, and musculoskeletal assessments; and recorded the participant's age, weight, height and blood pressure. Each participant completed a handwritten questionnaire describing their current self-efficacy to exercise, and current level of activity in minutes. The medical assistant entered vital sign data (blood pressure, weight and height) at the initial and follow-up visit. (see Appendix D).

Using the American College of Sports Medicine *Exercise is Medicine* guidelines, the nurse practitioner provided each participant with a personalized, prescribed exercise regimen of

moderate exercise, a recommended routine of 90 minutes of aerobic exercise and 60 minutes of strength training per week. Each participant kept track of time spent in his or her exercise regimen. Each of the participants received a complimentary three month gym pass at Body Renew. The participant was directed to contact the exercise facility to schedule a free consultation with a personal trainer with the following intent: once the participant and trainer jointly reviewed the prescription, the trainer would guide and instruct the participant in accordance with the nurse practitioner's recommendations.

At the end of the twelve week implementation period the clinic's receptionist and medical assistant contacted each participant to schedule a follow-up visit with the nurse practitioner. At this visit, the medical assistant gathered patient vital signs: blood pressure, age, height and weight. The participant completed a post self-efficacy assessment, reporting the minutes of prescribed exercise they engaged in, evaluating the likelihood they will continue to exercise and exercising an option to provide open-ended comments, concerns and recommendations for improvement. By September 18, 2016, seven of the eight participants had followed up to complete the post-intervention questionnaire, the post-intervention vital signs collection, and comments, concerns or observations for future improvements.

Barriers and Challenges of Implementation

Several challenges became apparent during the implementation phase of this prescriptive exercise project. Challenges included recruitment, turnover of support staff, time constraints, cost, and the lack of direct oversight or objective recording devices to track the participant activity levels to verify participants' observance of the nurse practitioner's recommendations.

Recruitment. The first challenge presented was patient selection. All subjects were self-selected volunteers who verbalized interest of participating in this project. However, twelve were either younger than 18, older than 64, and/or answered "yes" to one or more of the PAR-Q questions. The latter indicated the participant had a current musculoskeletal, lung, or cardiac limitation, a factor that excluded them from the project. Although interested parties might not have qualified to participate, it is a routine and standard practice for the practitioner to dedicate time with each of them to recommend an age-appropriate exercise regimen, and/or investigate the patient's positive answers on the PAR-Q and subsequently provide recommendations, treatment, or referrals to address the underlying clinical concern.

The American Association College of Nursing (AACN) (2006) *Essential II: Organizational and Systems Leadership for Quality Improvement* describes the ability of the Doctorate of Nursing Practice to employ practice management skills and leadership to include the coordination of interventional methods, or in this project, prescriptive exercise, to improve quality of care for the community. Although four staff meetings were held, specifically dedicated to describing and explaining the exercise program protocols during the 12-week course of the project, some staff members were unclear of what to do when at a patient inquired and expressed interest in this project, further compounding recruitment issues. This lack of clarity or understanding of how to communicate the project's intentions resulted in potential loss of qualified participants.

Staff turnover. Employee turnover at the clinic played a significant role in the implementation phase. New staff lacked adequate familiarity with this project in the mid-intervention period, which prompted more meetings to explain the program goals and

intentions. The nurse practitioner was able to educate and direct the new employees to the resources necessary for the exercise intervention to continue and succeed. Communicating the essential evidence and purpose behind the project goals are applicable to the principles of *Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice* and *Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes* (AACN, 2006).

Time constraints and timing of the intervention. Lack of time was a well-recognized barrier to implementing an Evidence-Based Practice (EBP) change (Majid et al, 2011). Time was — and continues to be — a barrier for the participants and provider alike. The initial plan included the introduction and implementation of the program during routine clinic visits. However, for the provider, other clinical priorities took precedence during the visit, and due to time constraints interested participants were instructed to schedule another no-cost appointment specifically dedicated to go over the program and prescription to exercise. Two or three complimentary clinic visits were dedicated to the participants during the 12-week program. With additional and intricate planning, bundling care guidelines can improve provider efficiency, for example: implementing an exercise-based prescription during a visit that addresses hypertension, obesity, diabetes, etc. (Saunders, 2015).

From the participants, the project sought commitment to take part in the recommended physical activity 150 minutes per week for 12 weeks. Many participants were wary of committing to a program for this length of time, citing conflict with or crowding of their personal schedules. No alteration was made in the length of time commitment from the participants, as any method change necessitated prompt institutional review board approval. For future

programs, more frequent assessments, perhaps monthly instead of every three months, may be reasonable to assess physical activity program compliance, evaluate time barriers, and formulate solutions with the participant to overcome these barriers.

Lack of direct oversight. This program was based on self-reporting, and trusted the patients to respond truthfully to the PAR-Q, survey questions, and participation in the exercise regimen prescribed by the nurse practitioner. Participants are entitled to autonomy, self-will and freedom of choice (Westrick, 2014). *Autonomy,* with respect to a competent person, describes the capacity to make informed and uncoerced choices (Westrick, 2014). It identified the action of the patient making an informed settlement to accept or decline recommendations instructed by the practitioner. Autonomy respects the patient's decisions (Bernhofer, 2012). Compliance and follow up could not be ascertained. Tracking exercise through a written log or electronic step-tracker could improve future implementations.

Cost. The clinic offered this particular project/program to the participant at no cost. Reimbursement for a diabetic education program,to include exercise, is based on the Medicare National Schedule Fees of $73.39 per patient (American Association of Diabetic Educators [AADE], 2016). Commercial plans may reimburse up to 150% of the Medicare rate. For reimbursement purposes, prescriptive exercise may be incorporated with visits to include physical activity as adjunctive treatment to dyslipidemia, cardiovascular disease, and hypertension.

The amount of time and commitment of resources to implement EBP recommendations for patients with diabetes may be billed approximately $111 per visit (AADE, 2016). This program was offered at no cost to the patient and no claim was submitted for reimbursement

from any third-party payers. Offering healthcare-related services without adequate reimbursement to the provider is not economically sustainable for any healthcare organization. In order to continue this prescriptive exercise EBP change project, the patient or third-party payer must be charged, reimbursing the provider accordingly for the respective diagnosed conditions, including hypertension, diabetes, cardiovascular disease, and the practitioner's time spent to successfully sustain this intervention's financial feasibility.

Conclusion

The Iowa Model for Evidence-Based Practice guidelines were used to implement this project. The fifth step is the implementation process or piloting the project. Participants were recruited, selected, and consented; completed the questionnaire; and, were given specific directions in the form of a prescription for an individualized physical activity routine.

Several barriers and challenges to implementing an exercise program were identified: participant recruiting, selection and commitment, changes in staffing support, time consumption, the cost to implement, and lack of direct program oversight. O'Hagan, De Vito and Boreham (2013) suggested barriers to their prescription exercise intervention program included financial and environmental restrictions, lack of time, physical or disease limitations experienced by the participant, participant low self-efficacy and lack of motivation, low levels of social support and participant lack of awareness of the benefits of physical activity. These barriers were similar to the findings of this project's implementation process.

It was beneficial to identify prescriptive exercise intervention barriers and challenges during the pilot stage of this project. This allowed the practitioner to perform strategic planning and prepare for program adaptation recommendations to minimize these concerns (Peters, Adam,

Alonge, Agyepong & Tran, 2013). Finally, identifying the key barriers and challenges heightened the awareness to the practicality and sustainability of the implementation of a prescribed exercise program in an outpatient clinical practice setting.

Evaluation and Outcomes of the Practice Change Initiative

Introduction

The Iowa Model for Evidence-Based Practice change calls for the evaluation of outcomes after piloting the intervention (Cullen & Allen, 2010). This chapter discusses the pre- and post-survey responses, and evaluates the effectiveness of this 12-week prescribed exercise intervention. The outcomes focus on physical activity level and duration; scores of the Outcomes for Expected Exercise Scale (OEES) measuring self-efficacy; systolic and diastolic blood pressure; body mass index (BMI); and, the likelihood of participants to continue to exercise after intervention. Finally, there is discussion of themes from participant feedback regarding ways to improve future implementation.

Relevance to practice change. The World Health Organization (WHO) and U.S. Healthy People 2020 recommended increasing the portion of the population to engage in regular physical activity for a variety of health benefits (U.S. Department of Human and Health Services, 2010; WHO, 2010). According to the Center for Disease Control's 2014 National Health Interview Survey, merely 20.8% of U.S. citizens over age 18 was engaged in the recommended 150 minutes per week of combined aerobic and muscle-strength training activity. There has been a plethora of evidence culminating in the sustained health benefits and the positive impact of physical activity for health promotion, disease prevention and mitigated burden of chronic illness and disability (American College of Sports Medicine, 2013). Many healthcare organizations and practitioners alike have recognized the beneficial impact of exercise. However, how to best engage patients in the recommended physical activity levels has remained vague (Eden et al., 2002; Slade & Keating, 2012).

Evidence in the literature has supported the importance of the health practitioner to promote patient's self-efficacy to engage the recommended physical activity levels (Pederson et al., 2013). Thompson, Arena, Riebe, Pescatello and the American College of Sports Medicine (2013) set forth guidelines for the practitioners to write prescriptions for physical activity as a method to encourage compliance to recommended physical activity levels. Austin, Qu, & Shewchuk, R. M. (2013) studied 10,892 arthritis patients and found patients were more likely to adhere to physical activity recommended by their healthcare provider. The main focus of this evidence-based practice change was to evaluate the impact of a prescriptive exercise regimen led by a nurse practitioner, and the likelihood of a participant to continue to exercise.

Outcome Measures

Self-efficacy was measured using the Outcome Expectations for Exercise Scale (OEES), a Likert-type scale. This scale was developed by Resnick et al. (2000) based on Bandura's theory of self-efficacy. Originally, it was developed to measure the outcome expectations of exercise in the older adult population. The OEES survey has been evaluated for reliability and validity. The factor analysis of the OEES supports Cronbach's alpha coefficient of .89, a measure of internal consistency reliability (Resnick et al., 2000). This suggests the survey has a high consistency. In the field of health sciences, a Cronbach's alpha of .70 to .95 has been considered an acceptable consistency among surveyed participants (Tavakol & Dennick, 2011).

Systolic and diastolic blood pressure was measured using a manual sphygmomanometer. A certified medical assistant took pre- and post-intervention blood pressure measurements; the nurse practitioner repeated the measurements to lessen the risk of operational error and to increase data accuracy. If the two measurements differed, an average of the two readings was

recorded. The eighth Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8) (2013) recommended resting blood pressure less than 140 (systolic) and 90 (diastolic) to reduce the risk of complications of heart disease, stroke, and renal disease (Thomas, Shishehbor, Brill & Nally, 2014).

The standard body mass index (BMI) is a weight-to-height measure defined by the WHO. A BMI less than 18.5 was considered underweight; 18.5 to 24.9, normal; 25.0-29.9, overweight; and greater than 30, obese (Pasco, et al., 2014). The WHO BMI has not accounted for body fat composition, age, or gender difference. Much criticism exists in the literature regarding its accuracy, however it can be used as an estimated criterion for the purpose of this project. Pasco et al.'s study reported that using the BMI as a single measure may actually underestimate the true prevalence of obesity.

To attain the greatest health benefits from physical activity, the National Heart, Lung, Blood Institute (2016) recommended adults to participant in at least 150 minutes of moderate-intensity physical activity per week. More than 150 minutes per week offered even greater health benefits. For this project, patients kept their own record of minutes of activity per week. Their accounts were recorded before and after intervention. Activity levels in minutes were compared for any differences. These comparisons are explained in the data analysis and results.

Upon completion of the intervention, participants were surveyed regarding their plans to continue to be physically activity post-intervention. Responding to ratings on a 1 to 3 scale, 1 being unlikely to 3 being most definitely, this survey would indicate whether this program was or was not successful to promote continued recommended physical activity.

The purpose of the project under the direction of a nurse practitioner was to implement a prescribed exercise program and observe any differences in participants' self-efficacy, physical activity level, blood pressure, BMI and willingness to continue to engage in physical activity. The prescribed physical activity program spanned 12 weeks, participants were self-selected and completed questionnaires before and after the intervention. The expected outcomes were to improve self-efficacy to exercise, increase level of activity in minutes per week, lower systolic and diastolic blood pressure, and promote continued engagement in physical activity.

Data Analysis and Results

The intervention concluded with seven participants ($N = 7$): each in good health; 3 males; 4 females; 22 to 41 years in age; and, of Caucasian, Asian, or Hispanic ethnicity. The pilot study had a small sample size, lacking the assumption of normal distribution and ranked data. The nonparametric alternative to the paired *t*-test, the Wilcoxon Signed-Rank Test, was used to analyze the participant responses. The null hypothesis is that no differences will be found pre and post prescribed exercise intervention.

The OEES questionnaire (see Appendix D) seeks the participants' self-ranking of their self-efficacy, on a scale of one to five, one being low and five, high. The OEES asked participants if exercise made them feel better physically; if it improved their mood, lessened fatigue, and made them feel stronger; how much they enjoyed the activity, if they had a sense of accomplishment; if they experienced improved mental alertness; and if they had noticed improved endurance in performing activities of daily living (Resnick, 2000). Wilcoxon Signed-Rank Test indicated no statistically significant differences in self-efficacy pre- and post-intervention rankings, with one exception, that being sense of accomplishment (Table 1).

The Wilcoxon Signed-Rank Test indicated sense of accomplishment post-test ranking was statistically and significantly higher than the pre-test rank $p < .025$ (Table 1). Of note, there was a perfect correlation between pre and post scores that exercise improved mood.

Table 1

OEES Results

Exercise…..	*p*
Makes me feel better physically	.32
Improves my mood	1.00
Makes me feel less tired	.41
Makes me and my muscles stronger	.16
Is an activity that I enjoy	.26
Gives me a sense of accomplishment	.03
Improves my mental alertness	.32
Improves my endurance in daily activities	.10

Note. Wilcoxon Signed Ranks Test. Significant at the $p < .05$ level.

Wilcoxon Signed-Rank Test indicated post-test systolic and diastolic blood pressures were statistically and significantly lower than pre-test measurements, systolic $p < .018$ and diastolic $p < .017$.

The Wilcoxon Signed-Rank Test indicated minutes of activity per week post-test scores was statistically and significantly higher than pre-test scores $p < .018$.

When participants were asked if they would continue to exercise post intervention, given the options of unlikely, undetermined or likely all participants responded they were likely to continue to participate at the recommended physical activity levels.

During a post intervention meeting with participants, common themes emerged from their feedback about the program. Generally they voiced positive views and opinions of the program, enjoyed participating, supported accountability, and expressed motivation to continue to engage in recommended physical activity levels. They suggested or advised that future programs be modified to include dietary recommendations and that the health care provider check in with each participant at more frequent intervals throughout the program.

Discussion of Results

The intent of this evidence-based practice change was to evaluate the experience of a prescribed exercise program led by a nurse practitioner. The Iowa Model guided implementation and evaluation of this pilot project. The literature suggested promoting self-efficacy to exercise plays a critical role to physical activity participation (Pederson et al., 2013).

Following comparison of the pre and post intervention self-efficacy scores, with one exception, most of the outcomes lacked statistical significance. An inference was made from the observations however. The cohort was a self-selected sample. The participants were likely to already exhibit motivation, or possess strong self-efficacy, with their interest, desire and election to participate in an activity program. Hence their self-efficacy *would not be* expected to significantly change after the program. Future change evaluation programs might suggest

evaluating self-efficacy as a secondary variable with a larger cohort and prescribed exercise for a specific medical condition like diabetes, heart disease, and arthritis.

A statistically significant improvement, "sense of accomplishment", was most likely explained by the participants' success of having completed the 12-week activity program. Another observation was the perfect correlation found in the "improved mood" expectation before and after the program. This signified that the participants' expected moods did not change.

To control confounding variables, nutritional counseling was not offered in coordination with the physical activity prescription. This may have influenced the body mass index as BMI was found to not change significantly during this intervention. Foster-Schubert et al. (2012) studied more than 400 overweight to obese sedentary postmenopausal women in a randomized trial to examine the effect on BMI of (1) exercise alone, (2) diet alone, and (3) the combination of both. Their findings suggested that women who followed the diet alone lost 8.5% of body weight; exercise alone, 2.4%; and, the combination of diet and exercise, 10.8%. The work of Foster-Schubert (and their research team) illustrated the importance of diet in achieving weight loss and decreasing BMI.

Overall, the participants increased their level of activity during the program and all seemed confident they would continue their commitment to exercise. This observation achieved the U.S. Healthy People 2020 goal to increase the proportion of the population to exercise. Even though various and extenuating factors may have influenced participant compliance levels, all participants made the effort and plan to continue to do so, expressing their aspirations to achieve the 150 minute per week prescribed exercise goal to benefit, sustain, or improve their health.

Regarding blood pressure, the post-intervention systolic and diastolic values were found to be statistically and significantly lower when compared to baseline values. Cornelissen & Smart (2013) performed a meta-analysis and systematic review of 93 trials collectively representing over 5000 participants. They examined the effect of various exercise routines completed one to seven days a week, over a period of four weeks or more. The researchers' findings suggested that endurance, dynamic resistance, and isometric resistance training all reduced systolic and diastolic blood pressure. The greatest effect on blood pressure was after endurance training at moderate to high intensity level. The researchers suggested that exercise frequency, intensity and duration were linked to greater health outcomes (Cornelissen & Smart, 2013).

To disseminate this study's findings, the project was presented orally to the community of healthcare practitioners. An abstract will be submitted to the American College of Sports Medicine for review and consideration of including this project's findings at their next annual meeting in Spring 2017. This evidence-based project lended support to continue to recommend and prescribe exercise to improve the population's activity level. Supporting health promotion and empowering patients to exercise for their well-being could save billions of direct and indirect healthcare costs, resulting in less hospitalizations and less reliance on medications (Espeland et al., 2014).

Future suggestions for implementation of prescribed exercise include using adequate and accurate recording, tracking, and communicating devices or tools to monitor and report the amount of exercise objectively, for example, electronic mobile devices. Offering incentives to complete the recommended (prescribed) physical activity level may help motivate and foster

interest in participation. Including dietary counseling would support and effect desired reduction of BMI. And finally, assess more frequently the patient's progress and adherence to the recommended regimen, opening communication and discussion with them at least monthly.

Conclusion

The steps of the Iowa Model for Evidence-Based Practice change model guided the implementation and evaluation of the outcomes of a prescribed exercise regimen led by a nurse practitioner in a primary care setting. In order to recommend future practice changes, it is essential to describe the process of implementing a trial program and evaluate its effectiveness by observing the outcomes.

Seven participants followed a 12-week prescribed exercise regimen. Although their self-efficacy scores and BMI did not change significantly after the program, their sense of accomplishment did improve significantly. They increased their level of activity in minutes per week for the duration of the program. Furthermore, participants plan to sustain their level of activity following program completion.

Notable and significant health outcomes included reduced systolic and diastolic blood pressure measurements. Previous research, supported by large epidemiological studies, have also noted the positive impact of exercise on blood pressure reduction (Thomas et al., 2014). Current recommended guidelines for healthcare providers in the treatment of hypertension have encouraged lifestyle modifications, directing patients to participate in moderate levels of physical activity at least 30 minutes per day, and that’s each and every day (Gupta & Guptha, 2010).

It is well known — and common knowledge — that regular physical activity has promoted better health benefits. This pilot provided further insight towards best practice to

promote the populations' increased level of activity and associated beneficial health outcomes. This process revealed and accentuated the role of self-efficacy in physical activity recommendations. Further, this project helped identify the successes, barriers, and changes that materialized during its implementation. This project realized some positive results and outcomes to support continued efforts in the implementation of an exercise-based prescription in clinical practice.

Implications for Nursing Practice

This practice change capstone project integrated a prescription-based physical activity recommendation in clinical practice led by a nurse practitioner. A plethora of evidence in the literature documented that lack of physical activity increases the morbidity and mortality from chronic disease: obesity, heart disease, diabetes, depression, cancer, and premature death (American College of Sports Medicine, 2013). This chapter incorporates the *DNP Essentials,* identifying competencies and relationships to the project's outcomes, evaluation of the outcomes, and further suggestions, limitations and conclusions of a prescriptive-exercise intervention.

The American Association College of Nursing (2006) *DNP Essentials* put forth and define the underpinnings of eight competencies that enabled the nurse practitioner to process and apply evidence-based research principles to improve patient outcomes. The *DNP Essentials* do not have one specific focus, but instead incorporate a spectrum of advanced nursing skills and leadership qualities to embody the concept of a complete, functional healthcare culture. The *Essentials* blend both inter and intrasystemic networks, philosophies and collaboration to improve the health care system and ultimately, population health (AACN, 2004). This chapter presents the application of *DNP Essentials* to an exercise-based prescription and designates further implications for nursing practice.

Essential I: Scientific Underpinning for Practice

The DNP project applies evidence-based knowledge and communicates relevant and pertinent research findings to enlist support and promotion of best practices. This project

advocated for the primary care provider to recommend and prescribe physical activity in clinical practice. Achievement of recommended physical activity levels contributes to reduction and prevention of health risks, burdens, costs and sequelae of chronic disease. As frequently noted in published studies, this projected also exhibited significant outcomes of lowered systolic and diastolic blood pressure. In meta-analytic studies, physical activity reduced blood pressure (Cornelissen & Smart, 2013). Blood pressure control reduces the mortality risk from cardiac disease, strokes, renal disease, and type 2 diabetes (Adamsson Eryd et al., 2016).

Essential I relates the nursing application of using "psychosocial, analytical and organizational sciences" to enhance health (AACN, 2004, p.9). Importantly, the patient's self-efficacy to exercise has been shown to be a predictor of continued and continual participation in an activity program (Pedersen, et al., 2013). This project evaluated the nurse practitioner's role to promote the patient's self-efficacy by prescribing physical activity. Findings of significance included sense of accomplishment and indication that participants will continue to participate in activity long term, hopefully for the remainder of their lives.

Incorporating Nola Pender's Health Promotion Model brought the application of nursing theories into practice. Prescribing and promoting patient self-efficacy in physical activity is an action that "enhances, alleviate and ameliorate" the overall function and well-being of the patient (AACN, 2004, p. 9). The health care provider's positive expectations for the patient to exercise supports physical activity engagement (Mothes et al., 2016).

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

The DNP degree supports acquiring the necessary organizational skills and position to seek changes, confronting the barriers to physical activity promotion and collaborating plans to overcome them. Barriers found in the literature that align with the findings of this project include lack of time, support, motivation, energy and/or resources; social influences; and, work, family, and/or travel obligations (Patay, Patton, Parker, Fahey, & Sinclair, 2015). This indicates the DNP should enlist and promote community support, establish goals and plans to implement physical activity, and strategize and employ techniques to manage barriers.

Slade and Keating (2012) research indicated that health care providers do not consistently recommend a standardized exercise regimen. The frequency for providers recommending a structured exercise regimen to patients is inconclusive (Eden et al., 2002). The DNP critically appraises the current delivery of care, reviews the evidence-base, and creates, develops, implements and evaluates a prescribed exercise regimen to improve health outcomes (AACN, 2004).

Leadership skills are paramount to improve healthcare quality and safety (AACN, 2004). This project undertook measures to protect the patient population from possible risk from physical activity, implementing the PAR-Q to screen and identify at-risk populations prior to recommending exercise intervention (Canadian Society for Exercise Physiology, 2012).

The DNP understands the importance of networking, and its respective collaboration, when considering and evaluating cost effectiveness and financial impact to implement changes within an organization or system. In 2011, the systematic reviews by Garrett et al. reported

evidence that prescribed exercise regimen in primary care practice is cost effective, assessing the cost per quality-adjusted life-year. This indicates the DNP can advocate for fair reimbursement from third-party payers to prescribe physical activity during clinic visits. Further implication included using physical activity as a reported measure, examining the amount of physical activity in minutes as a vital sign and health-related outcomes.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The DNP receives instruction to interpret design and application of evidence-based interventions and screening and diagnostic tests to measure outcomes. From review of the literature, the DNP critically appraises the evidence of the benefits of physical activity and draws recommendations from proven outcomes. The DNP is poised to "translate research into practice and the dissemination and integration of new knowledge" (AACN, 2006, p. 11). In this case, a trial applying an exercise-based prescription exemplified the process of using an evidence supported concept and putting it into action. This process identified the methodology, collaborative involvement, the successes, the barriers, and the outcomes. The findings of this project were disseminated for their applications in practice and implications for further research.

Ongoing research increases awareness of future advancements and related positive outcomes in health sciences. The use of non pharmacological prescriptions, including a supervised physical activity regimen, is a cost effective strategy to improve health and prevent disease (Garrett et al., 2011). Further, prescribing individually catered exercise regimens lessens the reliance on pharmaceutical approaches, appreciates cost containment, and reduces the risks of adverse side effects from medications, thereby enhancing patient safety (Vina, Sanchis-Gomar, Martinez-Bello,, & Gomez-Cabrera, 2012).

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Healthcare

The DNP program embraces and broadens the advantages of using information systems to improve patient health. Technological *tools* improve communication, access, and efficiency of healthcare delivery. The DNP contributes to data collection, utilization, and interpretation. The DNP considers the ethical and legal boundaries and barriers in technological advances and implements strategies to provide patient protection and promote efficiencies in the healthcare system. The DNP uses technology to facilitate communication and to promote and improve access to care.

Technological tools are readily available to boost and track physical activity. Riiser et al. (2014) examined the effectiveness of a three-month internet intervention in a primary care setting involving overweight and obese adolescents. They found a positive association with changed levels of body mass index, quality of life and cardiorespiratory fitness. In 2013, Connelly, Kirk, Masthoff, & MacRury examined systematic reviews on use of mobile phones, internet, text messages, websites and CD-ROMS, and found them to be effective technological tools that contributed to diabetic patient adherence to physical activity. Interestingly, the current literature delivered mixed results to whether or not step-trackers improved adherence to recommended physical activity levels, and further research in this area was recommended (Cadmus-Bertram, Marcus, Patterson, Parker, & Morey, 2015).

Patient suggestions drawn from this project indicated they desired additional involvement of the healthcare practitioner to support their adherence to the prescribed physical activity regimen. Further implementations might consider using activity trackers that communicate the

data virtually (and easily) to the health care provider to improve patient accountability. "Big data" represents a collective of specific information generated by our population. We live in an era of technology and digitalization, data is constantly being generated, recorded, stored, and analyzed (Kum, Krishnamurthy, Machanavajjhala & Ahalt, 2014).

Mathias et al (2013) research demonstrated how big data computing is assisting in predicting life expectancy outcomes. One can consider using technology to objectively evaluate level of physical activity and related outcomes. Using this information supports clinical decision making and assists in the cost-benefit analysis of practice recommendations (Mathias et al., 2013).

Essential V: Health Care Policy for Advocacy in Health Care

The DNP applies for statewide recognition of the benefits of regular physical activity, and supports community and policy involvement. The DNP considers the financial and political challenges to implement healthcare alterations, and advocates to develop statewide and national policies to support changes. This can be achieved by serving on committees and/or hospital boards, meeting with legislators, following legislative bills and proposals, and submitting testimonials (Institute of Medicine, 2010). The DNP is in a position to encourage and participate in policy development to improve delivery of care and enhance population health.

A study by Carlson, Fulton, Pratt, Yang, & Adams (2015) examined physical activity data from 2004 to 2010 (obtained by National Health Interview Survey) and merged it with health expenditures data from 2006 to 2011. Their research suggested that 8-11% of healthcare expenditures are directly related to physical inactivity, costing $117 billion annually in the United States (Carlson et al, 2015). In light of the research, healthcare costs will benefit and

realize reductions from an infrastructure that supports populations to aspire to acceptable levels of physical activity.

Healthcare organizations nationwide need to adopt policies to educate and encourage healthcare providers to assess patients for implementation of a personalized physical activity program. This service could become a component of routine preventative health care visits. Further, third-party payers need to consider and adopt fair reimbursement to the provider for these services.

Similarly, federal guidelines promote populations to regularly participate in physical activity (Office of Disease Prevention and Health Promotion, 2016). The American College of Sports Medicine promotes improving population health by incorporating physical activity as a "fifth" vital sign, assessing patient's activity level at each visit (Sallis, 2011). By including a physical minutes of activity benchmark measurement, the outcomes for those that participate at adequate level can be compared with those who don't, thereby demonstrating and advocating its effectiveness. Guidelines also promote healthcare systems include physical activity as a quality measure in the CMS Quality Incentive Program (CMS, 2015).

Regulation of third-party payers can be amended or augmented to allow for reimbursement to providers who perform services relating to physical activity counseling, including physical activity in the Quality Incentive Program(s), and lending and leading to achieving outcome benchmarks, such as blood pressure, weight, cholesterol, HbA1c, etc. (CMS, 2015). Further incentives to exercise and improve health may be realized if third-party payers were to reimburse costs of membership to fitness facilities and provided direct reimbursement to personal or athletic trainers who assist with patient fitness care.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

The DNP occupies a strong position for encouraging and recognizing professional "teamwork" or community building, described by Brown and Kaplan (2016). Working together collaboratively achieves greater goals and outcomes. *Partnerships* build working relationships with allied healthcare professionals, shareholders, and the public community to participate in collaboration to make changes (Waldrop, Caruso, Fuchs & Hypes, 2014).

Brown and Kaplan (2016) discussed the benefits of community building, a process that encouraged the authors to reach out and solicit collaborative community support and involvement, elements needed and necessary for success. Relationships are built with allied health professionals who share the same (or similar) mission to improve health and healthcare. For this project, coordination with personal trainer groups and athletic facilities took time, patience, and effective communication skills. Allied health professionals who shared and conveyed the same goals in physical activity promotion strengthened the project's success by their participation and encouragement.

In 2016, the Agency for Healthcare Research and Quality (AHRQ) released a proposition to engage patients in shared decision making. It lent its support to a sufficient evidence base to engage patients in their health care decisions and results, to include the practitioner's assessment of the individual's self-efficacy to adhere to recommended physical activity (AHRQ, 2016). The patient is the ultimate autonomous decision maker in their healthcare and lifestyle choices; the provider has the ethical responsibility to communicate and

share with the patient the potential benefits, harms, societal and financial impacts of the patient's choices and decisions (Westrick, 2014).

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

Prescribing physical activity and patient participation highlights the concept of clinical intervention to promote health, to reduce risk and prevent disease (AACN, 2004). The DNP implemented the Iowa Evidence-based practice change model to support and facilitate preventive protocols in our community. Evaluating standardized and well-endorsed guidelines, such as exercise, offers primary care providers options, tools, and/or protocols to improve health outcomes. Providers that promote preventive strategies reduce the risk for disease and illness. The DNP must communicate, encourage and model positive behaviors and encourage activities that will benefit the long-term health of a population. The DNP must consider epidemiological trends for such things as inactivity and the subsequent development of disease to understand the risks, and administer the most appropriate approach to improve individual and community health.

Healthy People 2020 set objectives pertaining to physical activity to reduce the proportion of the adult population that is not physically active. The objectives aim to increase the proportion that exercises at least 150 minutes per week at a moderate to vigorous physical activity intensity and participates in muscle-strengthening exercises at least two days per week (Healthy People 2020, 2010, para. 1-3). Healthy People 2020 recommends that healthcare providers increase the proportion of patients they counsel and educate to exercise, to include not just the healthy patients, but also those who have chronic disease such as dyslipidemia, heart

disease, and diabetes. This project exemplified a process that a health care provider can adopt to achieve these goals to improve population activity levels. The project outcomes demonstrated effectiveness through the increased level of physical activity participation by the end of the three month intervention.

Essential VIII: Advanced Nursing Practice

The Advanced Nurse Practitioner is responsible to offer the most current and relevant evidence-based guidelines to facilitate optimal health in clinical practice. Clinical guidelines recommend healthcare providers routinely assess, evaluate, and track patient physical activity levels over time as an integral part of their health care plan (Strath et al., 2013). The DNP can direct individuals, providers and organizations to the American College of Sports Medicine (ACSM) physical activity tools and guidelines. They can use ACSM publications to promote statewide awareness and involvement in physical activity, even encouraging the governor to consider dedicating an "Exercise is Medicine Month" (ACSM, 2014).

Benefits of a physical activity program include a decreased risk for the development of diabetes, and positive impact in lowering blood pressure, cholesterol and triglyceride levels (Balk et al., 2015). It improves brain functions, the most notable being memory and depression (Erickson, Miller & Roechlein, 2012). Regardless of body mass index (BMI), adults who participated in regular physical activity, when compared to inactivity, had higher quality of life ratings (Cohen, Baker & Ardern, 2015).

The DNP role reaches beyond the traditional focus on patient care to examine the complexities of the patient and the patient's integration into the healthcare system(s). It considers the process to implement changes to improve healthcare delivery and population

health. DNPs are leaders who practice high-impact leadership, and are motivated to participate in collaborative efforts striving to meet the triple aim goals: improve patient experience, improve quality, reduce costs (Swensen et al., 2013). DNPs, through their research and experiences, can innovate actions based on evidence-based literature, measure outcomes, and disseminate information to the healthcare community by conferences and/or publications. The DNP role is crucial to the advancement and improvement of health care.

Implications. This project highlights the feasibility and benefits of a personalized and tailored prescription-based exercise program recommendation by a nurse practitioner. The health care practitioner should prioritize time to evaluate and elevate a patient's self-efficacy to participate in exercise and offer subsequent monitoring of their progress to promote physical activity as an adjunctive, non pharmacological care measure to improve health, prevent disease, and reduce costs.

Employable options to adjust organizational perceptions include promoting awareness and offering education to the shareholders, emphasizing the importance of physical activity for better health and in reducing burden on the healthcare system. The DNP can broadcast the health betterments and cost-savings attained through physical activity. The DNP can advocate for third-party payers to invest in exercise, and to develop and offer patients some level of reimbursement, perhaps one to get well and then an incentive to stay well.

Limitations. Many barriers hinder the promotion of physical activity in primary care practice; these include time, staff involvement, lack of reimbursement, and extra costs to the patient. These become ever so evident as populations increase and respective time and funding does not. But this situation, in and of itself, emphasizes the importance of constantly

proclaiming the advantages of physical activity. These barriers were also evident in this scholarly project. There exists a disconnect between the feasibility of long term intervention to coach and monitor adherence to physical activity and the financial support or incentives to provide the requisite support.

A plan to minimize or alleviate barriers include advocating for a policy of fair reimbursement by penning and providing letters to third-party payers proposing adequate reimbursement for services relevant to prescribed physical activity. If a physical activity prescription was viewed in the same context as a prescription medication, one could lobby for patient reimbursement for out-of-pocket expenditures, such as access to trained exercise professionals and facilities. Additionally, it is essential to elicit legislative support to promote public awareness of the benefits of physical activity.

Conclusion

The Advanced Nurse Practitioner evolving to a DNP is a valuable contributor and asset to the improvement of healthcare delivery. The *DNP Essentials* describe the interplay of competencies in the application of standardized exercise recommendations, such as the "Exercise as Medicine" guidelines to promote physical activity in clinical practice and the community (ACSM, 2013). Several *Essentials* are applied when proposing and evaluating ways to convince the population to exercise and to increase the number that follow through for its many and undisputed benefits.

The outcomes of this three month physical activity intervention have been thoroughly discussed. Barriers were identified and future implications within the *DNP Essentials* purview were discussed and substantiated to extend further action to this practice change

recommendation. Evidenced-based literature, leadership and organizational principles, application of up-to-date guidelines, and utilization of nursing theories and frameworks guided this practice recommendation to prescribe therapeutic physical activity in clinical practice.

Conclusions

Around the globe, we face an epidemic of physical inactivity, an epidemic that has contributed to, and continues to contribute to, the fourth leading cause of mortality (Kohl et al., 2012). The alarming prevalence of inactivity should put all health care providers on notice that community action must be undertaken to reduce the health consequences of this dilemma. American College of Sports Medicine (ACSM) (2013) recognized that the population was not meeting the recommended physical activity levels necessary to prevent disease and optimize health outcomes, and published a written protocol and how-to guide, *Exercise is Medicine® (EIM)*. This guideline is free and accessible to all health care providers to encourage them to take action and prescribe physical activity in clinical practice.

The purpose of this project was to implement the ACSM's EIM protocol in clinical practice and observe its applications and influence on each participant's self-efficacy, BMI, blood pressure and future participation goals. Moreover, this project provided the clinician insight of the practicality of using the ACSM EIM guide as a method to promote physical activity among patients. Increasing the population to participate in physical activity can prevent and lessen the burden of disease (ACSM, 2013).

Key Points

The costs of physical inactivity drastically burden the healthcare system. In 2015 a study by Carlson et al. found 11.1% percentage of health expenditures were directly related to physical inactivity, costing the United States $117 billion annually. To decrease this cost burden, a preventative strategy promoting exercise must be adopted and implemented. Health care providers can utilize the EIM guidelines to prescribe physical activity in the clinical setting,

work collaboratively with community physical health trainers, and engage the patient to adhere to physical activity recommendations.

The nurse practitioner utilized the Iowa Model for Evidence-Based Practice change model to incorporate ACSM EIM guidelines. Surveys were given pre and post intervention to observe the outcomes of seven participants who took part in a three-month pilot study at a family practice setting in Anchorage, Alaska. Resources for this project included the clinic and its staff, three-month fitness passes for each participant, a local community fitness facility and the assistance of its personal trainers.

Significant outcomes were observed. The participants improved self-efficacy to exercise, sensing a feeling of accomplishment. Participants maintained a positive mood throughout the intervention, lowered their blood pressure values, and stated desire and willingness to continue to exercise post intervention. These outcomes demonstrated small but significant successes to contribute to the improved health status of our population through physical activity.

Currently, there are no standardized protocols that describe how to implement recommended physical activity guidelines to patients in clinical practice (Slade & Keating, 2012). Clinical guidelines recommend health care providers to routinely assess, evaluate, and track patient physical activity levels over time (Strath et al., 2013). This project demonstrated the effectiveness of employing EIM as a standardized protocol to implement physical activity program in the healthcare setting.

This DNP project enabled the author to gain more confidence and knowledge to enhance leadership skills and provide leadership, a characteristic that can translate to strength when

assisting others, and when communicating and demonstrating recommendations to improve clinical care and delivery. The DNP education program emphasized the application of research-based practices and the steps to adopt and adapt these changes into clinical practice (Melnyk & Fineout-Overholt, 2015). The DNP curriculum expanded my exposure to, and understanding of, the underpinnings of legal, ethical, financial, and organizational processes of healthcare delivery. I have gained a much deeper appreciation and understanding of the complexities in the healthcare system. The curriculum provides a well-rounded view of current and future healthcare challenges, how to approach these challenges, and ways to globally contribute to, and therefore improve, the health of our nation and patients.

Reflecting on this project, I drew the conclusion that increasing the population to become physically active is not limited or isolated to the clinical practice setting. The DNP is positioned to make recommendations to improve public and private policies that address physical activity. Through meetings with local government officials to promote applicable community infrastructure, the DNP can persuade and influence assembly members, our local community leaders, to encourage and bolster public physical activity levels by reducing environmental and cost barriers. The Assembly can support programs and projects by budgeting funds and cost allocations, and awarding subsequent contracts. For example, they can lend support and funding to rural public trails, and urban and suburban sidewalks, trails and bike paths. Safe, well maintained, and, where applicable, lighted pedestrian and bike corridors encourage outdoor activities and events, and promote public participation in events such as community walks, runs, and “rides”.

Well planned recreational and sports parks offer myriad opportunities for increased physical activity. Program and funding support extends to the school districts, approving budgets inclusive of and dedicated to physical activities. To "get the information out there", active promotion of community-wide campaigns and dissemination of information to encourage physical activity is absolutely essential (Heath et al., 2012). Healthcare shareholders are encouraged to take part in, offer and advertise incentives to populations that are actively maintaining a healthy lifestyle, or are transitioning to a healthier one, including participation and fulfillment of the recommended amount of exercise (Horwitz, Kelly & DiNardo, 2013).

The DNP works collaboratively with public and private business leaders, encouraging them to follow in like fashion, and offer and advertise similar incentives (Horwitz, Kelly & DiNardo, 2013). Examples of possible incentives in the public and private business sectors include offering reductions in health insurance premiums for healthy behaviors and exercising, offering subsidized or free gym memberships, and providing bonuses to those who meet strategic preventive benchmarks. Although the health benefits of exercise should be adequate motivators, tangible incentives offer further encouragement (Horwitz, Kelly & DiNardo, 2013). The DNP is in a position to play an integral role to promote a healthier community through a prescribed exercise intervention and to advocate for and support an environment to achieve this goal.

Conclusion

Advanced nurse practitioner and all healthcare shareholders need to take interest and invest in the well-being of their community. This can be achieved by promoting an environment that caters to improving and increasing the population's ability to participate in the recommended physical exercise levels for its many health benefits. The American Association

College of Nursing (2006) *DNP Essentials* described how the eight nursing competencies were interwoven into this practice change recommendation. These competencies were met and described in the exploration and implementation of this prescribed exercise intervention. Conclusions and future implications were drawn from this project and disseminated to the community to heighten awareness of the benefits and challenges of a formal exercise program. Continued work to promote the population to be physically active is congruent to the National Institute of Health triple aim goals to improve our future health care system delivery, and improve patient experience, quality of care and financial efficiency (Swensen et al., 2013).

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Appendix A

Letter of Engagement: Northwest Medical

University of Alaska Anchorage

School of Nursing

3211 Providence Dr, Anchorage, AK 99508

December 8th, 2015

To Whom It May Concern,

A prescriptive exercise program endorsed by American College of Sports Medicine has been brought to my attention by Leigh Keefer, family nurse practitioner and a DNP student University of Alaska. I have reviewed the proposed exercise program and agree this would be a beneficial program for our patient population. I agree to host this exercise intervention and its implementation at Northwest Medical Professional Corporation.

I have been informed that a proposal will be submitted for IRB review.

Sincerely,

John Clyde Cates, D.O.

Clinic Owner

Northwest Medical Professional Corporation

2841 Debarr Rd. Suite 22

Anchorage, Alaska 99508

Appendix B

Letter of Engagement: Body Renew

University of Alaska Anchorage

School of Nursing

3211 Providence Dr, Anchorage, AK 99508

December 8th, 2015

To Whom It May Concern,

A prescriptive exercise program endorsed by American College of Sports Medicine has been brought to my attention by Leigh Keefer, family nurse practitioner and a DNP student University of Alaska. I have reviewed the proposed exercise program and agree this would be a beneficial program for Anchorage, Alaska's community. I agree to involve our agency's participation and support to implement this project.

I have been informed that a proposal will be submitted for IRB review.

Sincerely,

Melissa Lampert

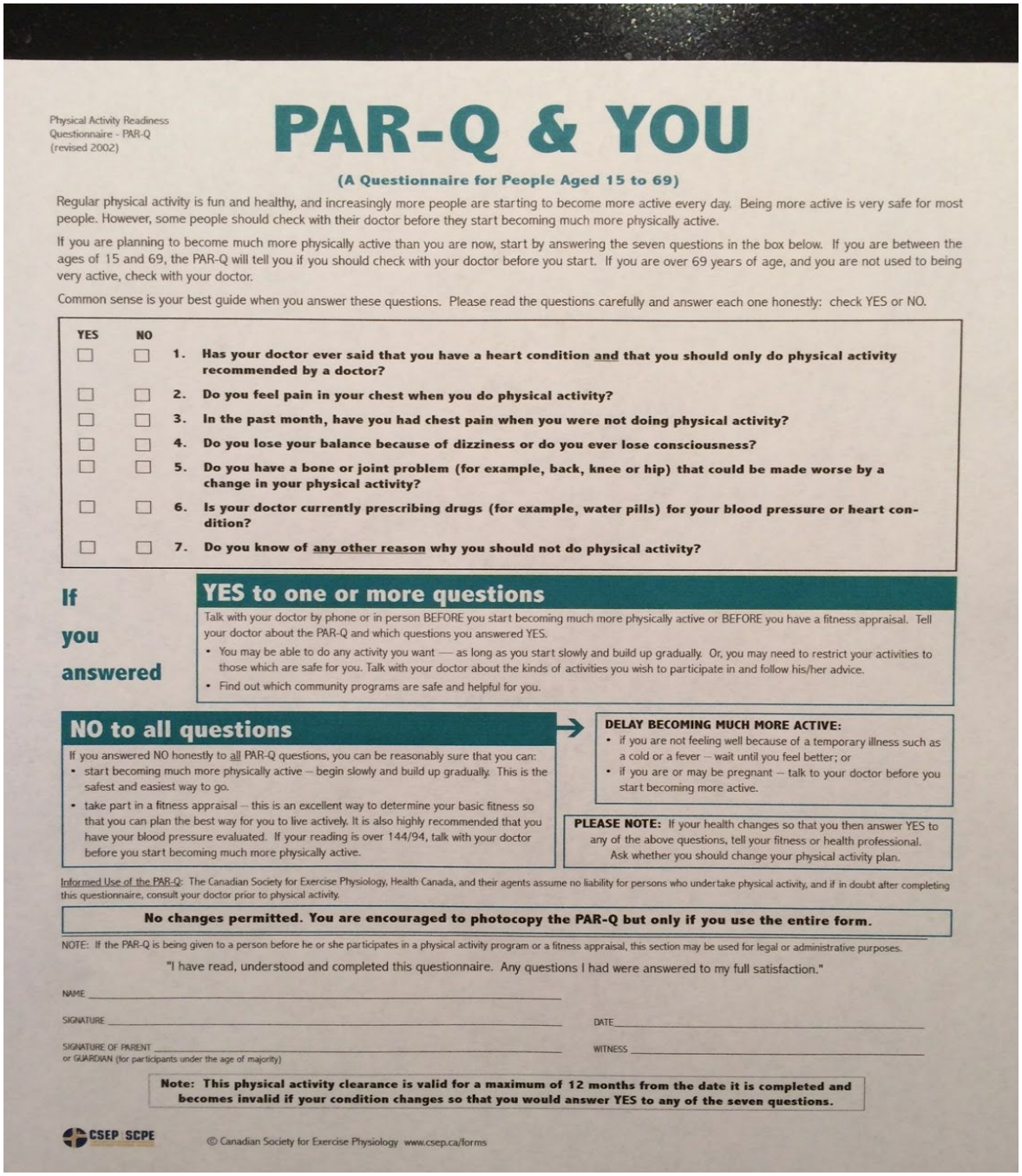
Body Renew Communications and Marketing Director

10325 Old Seward Hwy

Anchorage, AK 99515

Appendix C

PAR-Q Form



Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1.	**Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2.	**Do you feel pain in your chest when you do physical activity?**
☐	☐	3.	**In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4.	**Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5.	**Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6.	**Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7.	**Do you know of any other reason why you should not do physical activity?**

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

CSEP SCPE

Appendix D

Questionnaire

Exercise..... Likert Scale 1-5 Strongly agree, agree, neutral, disagree, strongly disagree

Makes me feel better physically

Makes my mood better in general

Helps me feel less tired

Makes my muscles stronger

Is an activity I enjoy doing

Gives me a sense of personal accomplishment

Makes me more alert mentally

Improves my endurance in performing my daily activities

Outcomes Expectation for Exercise Scale. Adapted by B. Resnick, 2000. Reprinted with author's permission.

Height:

Weight:

Age:

Current level of exercise per week in minutes:

Blood pressure:

What is the likelihood to continue to exercise after intervention?

1 (none at all)

2 (undetermined)

3 (plan to continue to exercise)

What are your comments/questions or concerns regarding this program?

Appendix E

Letter of Participation and Consent

Project Leader:
Leigh Keefer, NP-C, MSN, RN, BSN
Graduate Nursing Student
University of Alaska, Anchorage
Email: laluczakpeck@alaska.edu

Faculty Advisor:
Molly Rothmeyer DNP, FNP-BC,CPNP-AC
Associate Professor
University of Alaska,Anchorage
Email: mkrothmeyer@uaa.alaska.edu

To Prospective Participants,

I am a graduate student at University of Alaska, Anchorage pursuing a Doctorate of Nursing Practice. I am inviting you to participate in my project: *Implementation and Evaluation of a Prescribed Exercise Program led by a Nurse Practitioner*. The purpose of this project is to promote physical activity through a prescription exercise program and evaluate participants' self-efficacy (motivation), minutes of physical activity, blood pressure, and body mass index. The outcomes of this project will help support the best approach the nurse practitioner can employ to promote greater physical activity in our community.

You will be asked to complete a written questionnaire (survey) for "Outcome Expectations for Exercise Scale" before and after a 12-week (activity) intervention. Vital signs including blood pressure, body mass index, and minutes of physical activity per week will be collected in the clinic. After the intervention period, you will be asked to repeat the survey and follow up with the clinic to collect another set of vital signs. The survey is anonymous since neither your name nor any other identifying information unique to you is attached to the survey. Standard clinic policies follow confidentiality and privacy practices. The data is confidential, kept in a locked, secure location for three years; it will be only accessible to my project chair and me.

There is minimal personal risk associated with (and anticipated in) this project. A consent form will clearly identify possible risks. Your acknowledgement and consent are required prior to participation. Signing the consent form acknowledges that you have read it and agree to the terms of the project. Upon request, a copy will be provided to you. The benefits you derive from participation in this project include the opportunity to be included in a nurse practitioner-led physical exercise program. Your participation is completely voluntary; you are not required to participate. If you choose to participate, you may elect to stop at any time without repercussions.

If you have any questions or concerns about this project, please feel free to contact my adviser or me at the email addresses located at the top of this invitation. If you have any questions about your rights as a participant, please call Sharilyn Mumaw, M.P.A, Compliance Officer at the University of Alaska, Anchorage at (907) 786-1099.

Thank you for your time and consideration of participation.

Signing this letter acknowledges that you have read and agree and fully understand with the terms of this project, and are signing voluntarily. If you have questions, please ask now or any time during the study.

SIGNATURE:

Signature _____ Date _____

Printed Name _____

A copy of this consent form is available for you to keep.

Appendix F

PAR-Q Permission

Mary Duggan <mduggan@csep.ca>

Hello Leigh,
Find attached the PAR-Q - PDF. It may be used as attached or reproduced for your research, unmodified, and in its entirety. Please use the following acknowledgement line:

All the best with your research.

Appendix G

OEES Permission

10/4/15 email

Dear Dr. Barbara Resnick;

My name is Leigh Keefer (the email is in my maiden name) and I am currently a practicing Family Nurse Practitioner with a Master's degree in Nursing. I am currently enrolled at University of Alaska Anchorage pursuing Doctorates of Nursing Practice and would like to investigate an exercise intervention for my project. I was wondering if I can obtain your permission to use your "Outcome expectations for Exercise Scale" for my project?

Thank you,

Leigh Keefer BSN,RN, MSN, FNP, DNP-c

10/4/15 email

absolutely feel free to use it and tweak it as you need to. May need an item to say Exercise helps me to stay warm!!! Barb

Barbara Resnick, PHd, CRNP, FAAN, FAANP
Professor
Sonya Ziporkin Gershowitz Chair in Gerontology
University of Maryland, School of Nursing
655 West Lombard Street Room 390
Baltimore, MD 21201
Tel: 410 706 5178
email: resnick@son.umaryland.edu

Appendix H

IRB Approval Letter

DATE:	April 1, 2016
TO:	Leigh Keefer, MSN
FROM:	University of Alaska Anchorage IRB
PROJECT TITLE:	[864319-3] Implementation and Evaluation of a Prescribed Exercise Program led by a Nurse Practitioner
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
DECISION DATE:	April 1, 2016
EXPIRATION DATE:	March 31, 2017
REVIEW TYPE:	Administrative Review

Your proposal received an expedited review and was granted approval with minor revisions. Thank you for a copy of these revisions. Therefore, in keeping with the usual policies and procedures of the UAA Institutional Review Board, your proposal is judged as fully satisfying the U.S. Department of Health and Human Services requirements for the protection of human research subjects (45 CFR 46 as amended/ revised). This constitutes approval for you to conduct the study.

This approval is in effect for one year. If the study extends beyond a year from the expiration date listed above, you are required to submit a progress report and to request continuing approval of your project from the Board. At the conclusion of your research, submit the required final report to the IRB. These report forms are available on IRBNet.

Please report promptly proposed changes in the research protocol for IRB review and approval. Also, report to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

On behalf of the Board, I wish to extend my best wishes for success in accomplishing your objectives.

Ronald S. Everett, Ph.D.

Chair, Institutional Review Board