

THE EFFICACY OF A WORKPLACE WELLNESS PROGRAM TO PROMOTE HEALTHY
LIFESTYLES IN HEMODIALYSIS CENTER STAFF

BY

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DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Kinesiology
in the Graduate College of the
University of Illinois at Urbana-Champaign, 2019

Urbana, Illinois

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ABSTRACT

Increasing habitual physical activity and reducing dietary sodium intake are two lifestyle habits that are targeted in both hemodialysis patients and the general population. Hemodialysis patients have greatly reduced physical activity levels compared to the general population, and are at a greater risk of muscle wasting. They also have excessive dietary sodium intake, which increases thirst and contributes to chronic volume overload, hypertension, and cardiovascular mortality. Similar to hemodialysis patients, the general population would also benefit from increasing physical activity levels and reducing dietary sodium intake. Directly targeting the hemodialysis patients with health promotion strategies often results in poor adherence and outcomes. Targeting the patient-provider interaction may provide a better platform for behavior translation to the hemodialysis patients. Therefore, the purpose of this dissertation was to improve the understanding of the impacts of a standardized workplace wellness program on the staff of an outpatient hemodialysis clinic and the patients that they serve. Previous work suggests that workplace wellness programs have a positive impact on increasing physical activity behavior and improving dietary patterns. However, these findings were not in the unique setting of an outpatient hemodialysis center and did not factor in the impact of a standardized program on the patients served by those who participate. Working on Wellness (WOW) is a common phrase used to describe wellness programs and will be utilized to describe this novel program designed for hemodialysis centers¹. In study 1, we demonstrated that those who participated in the WOW program achieved significant improvements in body weight, body composition, systolic and diastolic blood pressure, and reduced their perceived barriers to engaging in physical activity and in making healthy dietary choices. In study 2, we confirmed that hemodialysis patients want and need information about exercise and dietary habits from the staff of

hemodialysis center and that WOW was a meaningful vehicle for clinic staff to increase their knowledge and to build skills in health promotion as it relates to physical activity and dietary sodium reduction. In study 3, we were able to validate and demonstrate the fidelity of the WOW program as a standardized program delivered by students who were; recruited, trained, and supported in the delivery of the program. In study 4, we conducted interviews with the WOW wellness coaches to evaluate the public health impact and sustainability of the program using the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework. Overall, the studies performed as part of this dissertation show that a standardized workplace wellness program, specifically the WOW program; is effective and reproducible with a high level of fidelity. Moreover, it seems that the WOW program has the potential to be transformative to hemodialysis center staff, patients and the trained interventionists.

ACKNOWLEDGEMENTS

I wish to thank Dr. Ken Wilund. I will be forever grateful for the fantastic opportunity that you have provided me. Not only have you been my academic mentor but you have treated me as a valued colleague and as a friend. I have a deep gratitude for Dr. Chung-yi Chui. You have been exceptional in your mentorship and have been instrumental in guiding me to produce a body of work that I am very proud to have put forward. As a clinician with a passion for producing translational work, your perspective has been critical and I would not have been able to do this without you. I would also like to thank my committee members Dr. Steve Petruzzello, and Dr. Linda Trinh for their guidance throughout this thesis.

I would like to thank all of my lab mates from 2013 to 2019 in the CVRL. Luis, a special thanks to you, without your help, this work would not have been possible. You are kind, honest, a passionate scientist and a stats wizard. Nichole and Alexis you made this work possible! You were amazing wellness coaches, you really “helped these guys”, and were deeply immersed in a substantial volume of this work. Thank you for joining me in the trenches.

My beautiful family - Nick, Will and Charli. I love you more than words can express. Nick you inspire me to work hard, to dig deep, and most importantly to enjoy the ride, “Enjoy when you can, endure when you must” seems to have become my mantra. Thank you for your love of science and your unwavering belief in, and support of me. Will, you joined us in the first year of my PhD and changed the trajectory of my academic career and the meaning of my life. You gave me the most important title of all, “mom”. Thank you for sharing your pre-school graduation with my PhD graduation – it has served to be a very motivating deadline. Charli your

birth brought me back to UIUC with a newfound belief that I can do anything. Thank you for helping me “Dream Crazy”. I believe I can so that you will believe you can too.

I would like to thank my mom, and sisters; Char and Leigh. You have loved me unconditionally, guided me, supported me, and just listened. You are some of the strongest women I know and not a day goes by that I am not thankful for you.

Thank you to my dad, big Al. I have had a drive to make you proud for as long as I can remember. Today, I am proud of me, and that is enough.

To my Ladies in the 613. SGDHS forever!

To all my BABS. You know who you are. Xoxoxox.

This thesis is in dedication to my family. Nick, Charli, and William.

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CHAPTER 1: INTRODUCTION

Introduction to End Stage Renal Disease

In the United States in 2015 there were approximately 661,648 patients with end-stage renal disease (ESRD) ². The most cited mechanisms leading to kidney failure are diabetes and high blood pressure ³. The most prevalent treatment modality for ESRD is hemodialysis therapy, which artificially replaces lost kidney functions such as fluid removal and blood purification.². Despite routine hemodialysis therapy (3-4x/week for 3-4 hours at a time), fluid overload persists in many patients and is linked to elevated blood pressure ⁴, as well as increased risk of other comorbidities as a result ⁵.

Indeed, the multiple co-morbidities that are associated with ESRD results in patients on hemodialysis (HD) often-feeling ill and fatigued. As such, their lifestyle behaviors are less than optimal and often include poor dietary choices and a lack of adequate physical activity. Research in this area has often targeted HD patients with intradialytic exercise programs in an attempt to protect against skeletal muscle mass loss and, in turn, maintain physical function and performance. However, exercise adherence in patients on HD is inconsistent and thus leads to inconsistent outcomes with many studies showing no impact of exercise training on various health outcomes in HD patients. Hence, it seems the most appropriate lifestyle strategy is to first focus on minimizing sedentary time and increasing habitual physical activity with the ultimate progression into targeted exercise training programs in HD patients. To do this, it is important to create a more positive environment in the dialysis clinic, and this will ultimately need to start from a 'top-down' approach with building positive lifestyle behaviors within the dialysis clinic staff to allow for a positive 'role model' for the HD patient. Therefore, this dissertation will

focus on work place wellness programs and their effectiveness in supporting healthy lifestyle in the staff of dialysis clinics.

Dietary Sodium Intake

Approximately 80% of hemodialysis patients have been classified as hypertensive, and it is often poorly controlled⁶. Chronic overload (VO) is believed to be the primary cause of hypertension in this population⁷⁻⁹. VO is often secondary to excessive dietary sodium intake, which causes thirst, subsequent fluid intake and retention due to lack of urine output¹⁰. Chronic VO and hypertension in hemodialysis patients leads to poor outcomes such as left ventricular hypertrophy, congestive heart failure, and mortality⁷. Antihypertensive medications remain the first line approach to managing hypertension aside from the prescribed dialysis treatment, but are often ineffective because most do not address the underlying causes of VO¹¹. Although reductions in dietary sodium and fluid intake are viable treatment options they are dependent on patient behaviors and clinicians lack the time and resources to intervene¹².

Hypertension is also a leading cause of death and disability in the general population. In the US, with 29.1% of adults have hypertension, and another third have pre-hypertension¹³. Research suggests that more intensive, blood pressure lowering is both safe and efficacious. In the Systolic Blood Pressure Intervention Trial (SPRINT) study, intensive blood pressure control was implemented with a target of reducing systolic blood pressure (SBP) from 130-140 mm Hg to 120 mmHg or lower with antihypertensive medications. Participants in this study experienced a 33% reduction in primary cardiovascular outcomes and 32% reduction in total mortality¹⁴. Research has also shown that reductions in dietary sodium can reduce blood pressure. In Dietary Approaches to Stop Hypertension (DASH) study, Appel et al demonstrated that a low sodium

diet reduced SBP and diastolic blood pressure by 11.5mmHG and 5.5mmHG in hypertensive patients ¹⁵, with subsequent studies demonstrating reductions in CV events¹⁶.

Physical Activity

The health benefits of regular physical activity (PA) are well established and include a considerably reduced risk of most major chronic diseases^{17,18}, as well as the prevention and rehabilitation of psychological disorders such as depression and anxiety ¹⁹. Several of the known benefits of exercise or regular PA in the general population are related to of specific concern to hemodialysis patients. Both hemodialysis patients and the general population can experience such benefits as reduced risk for cardiovascular mortality, improvement in blood pressure control among hypertensive individuals, better control of diabetes, and improvement in health-related quality of life as a result of enhanced psychologic well-being and improved function ²⁰. Given that cardiovascular mortality is the leading cause of death in hemodialysis patients in the United States and approximately 80% of incident in dialysis patients have history of hypertension ², there is great potential for mortality reduction as result of PA participation amongst this population. In addition, physical activity has the potential to improve physical functioning and health-related quality of life. Low exercise capacity ^{21,22} muscle wasting ²³⁻²⁵, and poor physical performance ^{26,27}, and functioning ²⁸⁻³⁰ are also highly prevalent among patients with ESRD and potentially modifiable with exercise interventions.

Despite the myriad of potential benefits of exercise, dialysis patients are extremely inactive ³¹, and nephrologists rarely assess patients physical activity levels or counsel patients to increase activity ³². The lack of physical activity assessment and counseling is almost certainly multifactorial, related to such factors as competing medical issues that lead to limited time available for physical activity counseling, lack of training in physical activity and exercise

prescription, and fear of adverse events related to physical activity and exercise in this population.

Similarly, based on self-report, only 49.2% of American adults engage in physical activity at the recommended levels³³, and 25% of American's are completely sedentary³³. In recent years, research has begun to examine the efficacy of interventions that target sedentary behavior^{34,35}. Findings have suggested that replacing sedentary time with low intensity activity including standing³⁶ and light physical activity³⁷ can have a positive impact on health outcomes. The most significant impact to health outcomes occurs when sedentary activities are replaced by moderate to vigorous intensity physical activity but sedentary behavior has emerged as a novel variable in behavior interventions.

Workplace Wellness Programs

Research suggests that there is an opportunity to improve and support the adoption of healthy lifestyles at an individual level through the development of programs and policies³⁸. Workplace health promotion programs are an effective means of promoting a healthy diet and regular physical activity³⁹⁻⁴¹. Through the workplace, it is possible to influence health behaviors through multiple levels of influence⁴²; through direct efforts such as health education and increasing the availability of healthy foods and opportunities for physical activity; or indirectly through social support and social norms promoting healthy behaviors.

Worksites function as a community all on their own, having a particular culture specific to the workplace. Individual health behavior changes have been proven to be more effective in the workplace than organizational interventions; however, interventions aimed at a specific culture can be beneficial⁴³. Goldgruber and Ahrens, concluded that worksite wellness programs must be adapted to the specific culture or community for which they are intended, but still be

aimed at the individual level ⁴³. In a study by Renaud, et al. personalized health promotion programs in the workplace were successful with participants significantly more likely to report more frequent physical activity and better nutritional practices ⁴⁴.

Complexity theory ⁴⁵⁻⁴⁷ offers a theoretical framework to support intervention design and implementation that acknowledges and works with the complexity of the setting. Complexity science principles are increasingly being used for understanding system-level behavior and organizational change in complex settings ⁴⁸⁻⁵⁰, including healthcare organizations, like an outpatient hemodialysis center ⁵⁰⁻⁵³. Healthcare settings are considered to be “complex adaptive systems” because they are made up of groups of individual agents who are free to act in ways that are not entirely predictable and whose actions are interconnected such that one individual’s action will change the context for the other agents in the system ⁵¹. All of the elements of a complex adaptive system that affect the system-level behavior are interrelated and are coevolving, and thus patterns of behavior in the system are unpredictable and unlikely to be altered in a stepwise fashion. These types of systems are also open systems, in that they are a component of a wider system, adding to the number of influences on the effect of an intervention in a given setting. Complexity theory also offers a promising perspective from which to understand the interactions between local context and intervention outcomes. It highlights the dynamic and relational properties of a particular setting and those aspects that enable the people in it to organize themselves into new ways of working, thinking, and relating. For complex healthcare settings, this means both understanding and working with and within the environmental and relational characteristics of the system ⁵⁴. Patterns of health-related behavior are seen as an emergent property of the workplace system: changing the behavior of people in the healthcare setting (e.g., nurses, dialysis technicians, and administrative staff) is unlikely to be

achieved through external or top-down input alone or by targeting particular behaviors or at-risk groups in isolation from their context ⁵⁵.

Consequently, organizational and environmental factors influencing health behavior that are unique to a dialysis clinic (healthcare setting), were considered in the development of the content for the WOW program. Resources such as; bulletin boards, newsletters, strength training manuals and Thera-bands, and clinic posters will provide accessible and visual cues to action for participants. The counseling, individual and group challenges in the standardized WOW intervention will facilitate participation in a busy health care setting where staff are working different shifts and work both independently and collaboratively in the care of the dialysis patients. The combination of one-on-one and group activities will factor in interpersonal differences as well as the environmental demands of a dialysis clinic. Staff will have the opportunity to be flexible in how they engage with the resources and with each other.

Health Behavior Theory and Translation to Public Health

Interventions to change health related behaviors, such as healthy eating and physical activity, are usually complex, comprising many, often interacting components ⁵⁶. In order to improve the overall effectiveness of a lifestyle intervention it is important to consider both the intervention content design and the intervention outcome evaluation.

When designing the pilot program behavior the following behavior change constructs were considered; social cognition (attitudes, perceived control, self-efficacy), self-regulation strategies (planning around barriers), preparatory actions (resources and equipment) ⁵⁷. Consistently, research has shown self-efficacy as a key variable and is said to be the most powerful factor to consider when predicting behavior ^{58,59}. Of the research that has been conducted to date, only self-efficacy was found to have any predictive value on physical activity

behavior⁶⁰. Similarly, self-efficacy for PA has been shown to predict engagement in walking and identify adherers and dropouts in PA interventions^{61,62}.

Among people who desire a healthier lifestyle and who have access to healthy foods and infrastructure for physical activity, research suggests their success at maintaining behavior change will be determined largely by how well they set goals, plan (coping and barriers), and monitor, that is, self-regulate such changes. Outside the obesity and weight-management literatures, self-regulation of nutrition has received scant attention and has often been poorly defined⁶³. Nevertheless, self-regulatory behavior has been associated with healthier eating⁶⁴⁻⁶⁷ and with promoting healthier activity levels in adults⁶⁰. Through the incorporation of behavior change techniques we aim to bridge the social cognitive tradition with contemporary theorizing and evidence in physical activity behavior change science^{68,69}.

Grounded Theory Approach: WOW pilot program

Grounded theory is a systematic methodology involving the construction of theories through methodical gathering and analysis of data⁷⁰⁻⁷². Similar to a grounded theoretical approach we chose to review the initial data collected for repeated ideas, concepts or element to become apparent. This approach is quite different from the traditional model of research, where the researcher chooses an existing theoretical framework, and only then collects data to show how the theory does or does not apply to the phenomenon under study⁷³. Based on the aforementioned literature, a workplace wellness program is intuitively a viable strategy to increase staff knowledge, self-efficacy, and self-regulation. Our purpose for the pilot WOW was to gain insight and understanding of the wellness coaching processes and to identify the theoretical constructs that came forward during the pilot work on which to base future interventions.

Multi-Process Action Control Approach (M-PAC): WOW

Intention is a necessary construct for behavioral action; there are very few reports of performing physical activity with low intention^{57,74}. Yet, almost half of those who intend to engage in physical activity do not translate the intention into physical activity behavior^{75,76}. This suggests that intention is necessary but an insufficient construct for action on its own. Therefore, an understanding of the translation of intention to action is an area for future exploration⁵⁷.

The M-PAC suggests that the first step in physical activity behavior change is the formation of a cognitive aim to enact the behavior. The initial intent is based in the individuals' perceived utility of the behavior, the enjoyment of the behavior, and the opportunity to engage and their self-efficacy related to the behavior. Once the decisional intention has formed, a phase of translation of this intention into action begins. This is called action control. Action control is thought to be dependent on planning, especially in relation to barriers and setbacks, as well as in self-monitoring. Over time, the maintenance or continuation of action control develops reflexive processes such as habit and identity (Figure. 1.1).

Reach, Effectiveness, Adoption, Implementation, Maintenance: RE-AIM Framework

To improve the reporting across behavioral interventions, Glasgow and colleagues developed the RE-AIM (reach, effectiveness, adoption, implementation, maintenance) framework to evaluate the degree to which behavioral interventions, including those targeting physical activity, report on internal and external validity factors⁷⁷. The framework specifies standards related to the reporting of; reach, effectiveness, adoption, implementation and maintenance. The reach into the target population and representativeness of the study sample. Efficacy of the intervention on the primary outcome tested under either optimal or real-world conditions, quality of life, and avoidance of unintended or negative consequences. Adoption

rates of organizations and staff that would ultimately use the intervention and the characteristics of those organizations and staff; the degree to which the intervention is “Implemented” as intended; and the “Maintenance” of effects at the individual level and sustainability of the intervention at an organizational or delivery level (RE-AIM) ⁷⁸. The RE-AIM framework has demonstrated utility in summarizing reports of internal and external validity factors across numerous bodies of literature ^{77,79–87}. Collectively, these previous reviews have provided recommendations and future directions to enhance the likelihood of research to practice. The outcome evaluation of validity, feasibility and reliable replicability of the WOW intervention will be reported using the RE-AIM framework. (Table 1.1).

Table 1.1 RE-AIM outcome evaluation of the WOW intervention

Dimensions	Assessment Level	Method
Reach	Individual Level	Participation rate within target population Interview of wellness coach
Efficacy	Individual Level	10000 steps daily, reduction in dietary sodium intake, RBP, BMI, RHR, WC, HC Interview of wellness coach
Adoption	Organizational Level	Between clinic differences Interview of wellness coach
Implementation	Organizational Level	Consistency of delivery (orientation/ facilitator training, checklists, evaluations) Interview of wellness coach
Maintenance	Individual and Organizational Level	12-week post intervention testing of initial treatment group Interview of wellness coach

Methods

To capture intervention impacts it is necessary to utilize assessment measures of; health outcomes, physical activity and dietary sodium intake behavior as well as mechanisms of behavior change.

Health Outcome Measures

Measuring both resting values for systolic and diastolic blood pressures as well as resting heart rate give a more representative depiction of the overall health of the cardiovascular system^{88,89}. One rationale for consideration of resting heart rate measures is that it is indicative of the integrity and health of the heart. Increased heart rate is common feature in hypertensive patients and elevated heart rate is associated with development of hypertension⁹⁰.

Elevated, Body Mass Index (BMI) is a major risk factor for a wide range of chronic diseases⁹¹⁻⁹³. Although BMI has traditionally been the chosen method by which to measure body size in epidemiological studies, alternative measures such as waist circumference (WC)^{94,95}, and waist:hip ratio (WHR)⁹¹, which reflect central adiposity, have been suggested to be superior to BMI in predicting CVD. In part, this stems from the observation that ectopic body fat is related to a range of metabolic abnormalities. Currently the WHO recognizes that WC between 94.0 – 101.9 cm in men and 80.0 – 87.9 cm in women and WHR >0.8 and 0.9 in women and men correspond with the BMI overweight range of 25-29.9 kg/m²⁹⁶.

Dietary Sodium Behavior

The assessment of an individual's dietary intake is an important consideration in the field of nutritional epidemiology. For the purposes of a workplace wellness program targeting dietary sodium intake it is necessary to track dietary changes over the course of the intervention. We chose to use several metrics, including; the 3 day multiple pass twenty four hour diet recall (24HDR)^{97,98}, the Automated Self-Administered 24-Hour dietary assessment tool (ASA24)^{99,100} and the Big Life Project Sodium Calculator.

The 3-day multiple pass 24HDR technique is based on the premise that individuals will be better able to recall food eaten the previous day if provided with additional memory cues¹⁰¹.

The 24HDR involves five steps; 1) the quick list, which collects a list of foods consumed in the past 24-hours; 2) the forgotten food list, which provides cues on nine categories of foods most often forgotten; 3) time and occasion; 4) detail and review, and 5) the final pass or the final set of probes which provides another opportunity to recall foods ¹⁰². This five-step multiple-pass method has been shown to increase the number of foods recalled ¹⁰³ the average energy intake reported ^{98,104} as well as accurately estimate total energy intake when compared to a biomarker for energy ^{102,104}.

Internet based automated self-administered 24-hour recall (ASA24), modeled after the 24HDR, was developed ⁹⁹ to allow for dietary recalls from a large sample of people, as well as the collection of data for multiple days. The tool utilizes an animated avatar and provides guided audio to take respondents through the process of the 24HDR. Utilizing this technology will ensure consistency of collection and make sure data are more easily collected, coded, and analyzed ^{99,100}.

There are few known tools available to screen and provide personalized information about sodium in the diet. For the purposes of the WOW intervention in support of the weekly coaching sessions we were looking for a resource to support the education we were providing and to give feedback on a more frequent basis than the diet recalls would allow. The Big Life Sodium Calculator is a 23-question tool focusing on restaurant foods, packaged foods, and added salt ¹⁰⁵. The calculator translates existing knowledge about dietary sodium into clinical practice to address the high levels of sodium in western diets.

Physical Activity

The seven-day physical activity recall (PAR) interview has been evaluated many times over the years, it is widely used in epidemiologic, clinical, and behavior change studies ¹⁰⁶. The

PAR is a semi-structured interview that estimates an individual's time spent in physical activity, strength, and flexibility activities for the last 7 days prior to the interview. The general interview format is as follows; an interviewer asks the participant to recall time spent sleeping and doing physical activities for the past 7 days. The interviewer guides the participant through the recall process, day-by-day, to determine duration and intensity of the physical activity. It is important to note that although the PAR includes a variety of physical activities it only scores those that are performed at a moderate intensity.

The International Physical Activity Questionnaire Short Form (IPAQ Short Form) assesses physical activity undertaken across a comprehensive set of domains including; leisure time physical activity, domestic and gardening (yard) activities, work related physical activity and transport related physical activity. The IPAQ short form asks about three specific types of activity undertaken in the four domains; walking, moderate intensity activity, and vigorous intensity activity. It has shown to be valid across many clinical studies ¹⁰⁷⁻¹⁰⁹.

In addition to the PAR interviews and IPAQ questionnaires we also recorded fitbit step counts during physical activity challenges in the WOW program ¹¹⁰.

Behavior Change Measures

We developed a 48-item survey about the subjects perceived obstacles, perceived barriers, to making positive choices related to physical activity and dietary choices. (see appendix 1).

In addition, we assessed beliefs, barriers, self-efficacy, and knowledge (BBSK) when shopping for foods low in sodium. The assessment was done using a survey from ¹¹¹, to provide a baseline understanding of subject's attitudes and beliefs related to nutrition. Participants completed this 8-part questionnaire that was made up of 48-questions.

We utilized the SF-12 to assess quality of life. This 12-item question measurement tool is an integrated set of broad questions about recent perceived health status and activity limitation. It is representative of an individual's or the groups perceived physical and mental health over time. The questionnaire took an average of 10-minutes to complete ¹¹².

The Self-efficacy for walking scale – distance (SEW_DIST) is a measure to determine participants' beliefs in their physical capability to successfully complete incremental quarter mile distances within four-minute intervals ¹¹³.

Self-regulation is the ability to develop, implement, and flexibly maintain planned behavior in order to achieve one's goals. In the WOW program we are working toward improving self-regulation and included two measures to track changes over the course of the intervention. The Self-Regulation Questionnaire (SRQ) is a seven-step model that identifies that a falter in self-regulation may be due to failure or deficits at any one or multiple levels of the seven steps; receiving relevant information, evaluating the information and comparing it to norms, triggering change, searching for options, formulating a plan, implementing the plan, assessing the plan's effectiveness ¹¹⁴. It consists of 63-questions targeting these seven-steps.

In addition, we utilized the Behavioral Regulation in Exercise Questionnaire (BREQ2). It was used to measure the continuum of self-determination and is specific to exercise. It can be used as a multi-dimensional instrument giving separate scores for each subscale, or as a unidimensional index of the degree of self-determination ^{115,116}.

Studies & Hypothesis Tested

The primary objective of the studies in this thesis was to assess the impact of workplace wellness programs on the staff of outpatient hemodialysis centers and the patient population under their care. The chapters that follow describe the studies that were conducted to gain insight

into the effectiveness of standardized wellness programs aimed at reducing dietary sodium content, and increasing habitual physical activity with a focus on improving walking behavior in hemodialysis clinic staff.

Chapter 2: Working on Wellness (WOW): a description of a pilot workplace wellness program in an outpatient hemodialysis center and its impacts.

Study 1 (Chapter 2) was designed to develop a better understanding of the process of implementing a workplace wellness program in a unique setting, an outpatient hemodialysis center, and to determine the potential impacts on various health outcomes. The pilot study allowed us to develop and refine the WOW education materials, resources, and weekly coaching sessions. To accomplish this, we immersed ourselves in the clinic and followed a 12-week program with challenges that alternated between physical activity and diet every other week. We provided weekly coaching sessions, 5-10 minutes. The goal of this study was to set a benchmark for future work studying workplace wellness programs in a unique health care setting and impacts to the staff and patients of the center. We hypothesized that a 12-week wellness program would result in improved physical activity, walking behavior and decreases in dietary sodium.

Chapter 3: Experiences and further needs of hemodialysis center staff and patients in a workplace wellness program

Study 2 (Chapter 3) was a follow-up to Study 1, and was implemented to gain further insight into the experiences of the participants in the WOW program and to identify programmatic changes that could be made to meet the needs of the staff. Participants in the WOW study were interviewed and the interviews were transcribed and coded to identify themes that would inform the development of the standardized WOW program. The patient population was surveyed to assess their want to receive health promotion information from the different staff that are present

in an outpatient hemodialysis center. We hypothesized that the WOW workplace wellness program would result in increased knowledge related to physical activity and dietary sodium intake and that staff would have an increased level of confidence to share health promotion information with patients. We hypothesized that patients would be willing to receive health related information from professional staff trained in the area.

Chapter 4: WOW: The reliability, fidelity, and validity of a standardized workplace wellness program for the staff of an outpatient hemodialysis center

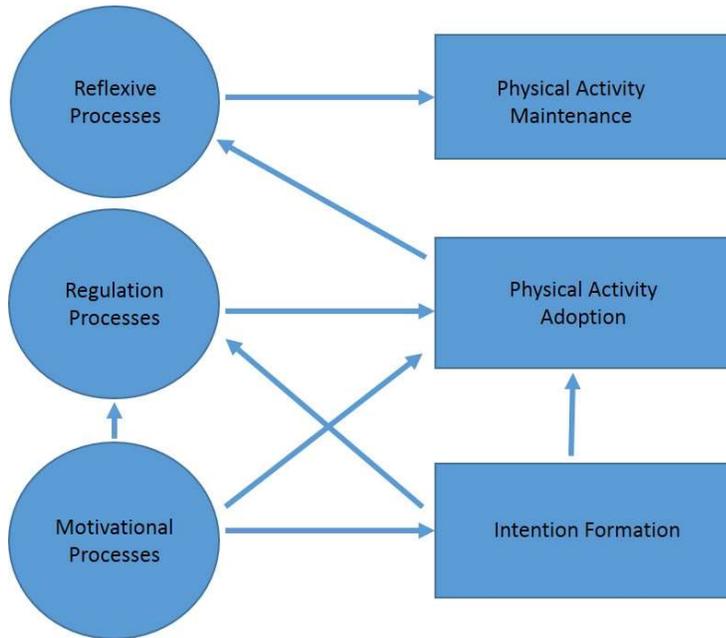
In Study 3 (Chapter 4), we sought to build upon Study 1 and Study 2 by recruiting and training wellness coaches to deliver the WOW program. A standardized manual was developed by the research team to assist wellness coaches systematically in the delivery of the WOW program at two clinics in the Chicagoland area. We hypothesized that participants in the WOW program would reduce their consumption of dietary sodium and increase their habitual physical activity, resulting in improvements in health outcomes.

Chapter 5: Using the RE-AIM framework to evaluate a workplace wellness program in outpatient hemodialysis centers

Study 4 (Chapter 5), built upon the findings of Study 3 through interviews conducted with each of the WOW coaches with questions targeting each of the constructs of the RE-AIM framework. To address the translatability and public health impact of the WOW intervention scripted interview questions regarding the perceived; Reach into the target population, Effectiveness of the WOW program, Adoption of the program into the hemodialysis center by the administrators and staff, Implementation related to the consistency and process, and Maintenance of the intervention after the study concluded.

FIGURE 1.1

Figure 1.1 The Multi-process Action Control Model (M-PAC). M-PAC suggests that continuance of physical activity is the product of reflective, regulatory, and reflexive processes that translate intention into successful action.



**CHAPTER 2: WORKING ON WELLNESS (WOW): A DESCRIPTION OF A PILOT
WORKPLACE WELLNESS PROGRAM IN A HEMODIALYSIS CENTER AND ITS
IMPACTS**

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Key words: Hemodialysis, physical activity, dietary sodium, workplace wellness

Abbreviations used: HD, hemodialysis; PA, physical activity; ESRD, end stage renal disease;
KDOQI, Kidney Disease Outcomes Quality Initiative; WOW, working on wellness

¹ All co-authors agreed to their contributions being included in the dissertation.

ABSTRACT

Objective. We aimed to examine the feasibility of a workplace wellness program (WOW) on the clinic staff at an in-patient hemodialysis center. The primary aim of the study was to characterize recruitment rate, compliance, measurement completion rate, and acceptability of the intervention in terms of staff satisfaction with the intervention. The secondary aims were the health-related measures and change in physical activity.

Methods. Dialysis center staff (n=14) participated in a 12-week workplace wellness program focused on decreasing dietary sodium and increasing habitual physical activity. The program was a goal based behavioral intervention and participants received wellness coaching and resources. Testing was conducted at baseline and at the conclusion of the program (12-14 weeks).

Results. The average systolic and diastolic blood pressure of participants decreased by 16.9 ± 21.6 mmHg ($p < 0.05$) and 4.1 ± 14.0 mmHg ($p < 0.05$) and body weight was reduced by 2.7 ± 1.9 kg ($p < 0.05$). The mean step count at baseline was $7,052 \pm 3,278$, but increased to $10,388 \pm 2,882$ ($p < 0.05$) during a walking challenge. There was a reduction in self-reported barriers to making healthy nutritional changes (< 0.05) and to engaging in habitual physical activity ($p < 0.05$).

Conclusion. Our pilot findings suggest that WOW program can be implemented because we were able to recruit the intended sample, they adhered to the program, and they found the program helpful. This translated into beneficial outcomes in health. Future studies are needed to assess if benefits from staff wellness programs matriculate to benefits for the patients as well.

Introduction

Evidence suggests that there is an opportunity to improve and support the adoption of healthy lifestyles on an individual level through the development of programs and policies within the workplace¹¹⁷. Moreover, workplace health promotion programs have been shown to be an effective means of promoting healthy diet and participation in regular physical activity^{118,119}. When evaluating interventions in the workplace focusing on diet and/or physical activity, almost all achieved small but significant changes in physical activity behavior, dietary behavior and other health-related parameters such as weight loss, BMI improvements, and fitness^{119,120}

Through the workplace, it is possible to influence health through multiple levels of influence^{42,64,121}. This can be achieved through direct efforts such as health education and increasing opportunities for physical activity, or indirectly through social social support and social norms promoting healthy behaviors. It is also feasible to link worksite health promotion efforts with broader efforts such as the impact on patient care when the workplace is a healthcare setting.

Outpatient hemodialysis (HD) centers are a unique environment in which the clinic staff have significant opportunities to influence the lifestyle of their patients through perpetual interactions during their dialysis shifts. Indeed, the clinic staff are often encouraged and expected to promote simple healthy behaviors for patients. However, many have not received training related to the promotion or prescription of physical activity, exercise, and healthy dietary choices, and also do not practice these types of healthy behaviors themselves. Some of the specific lifestyle modifications that HD patients are often counseled to improve include increasing their physical activity levels and reducing their dietary sodium intake. HD patients

have very low physical activity levels ³², and Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines suggest patients should increase their physical activity levels to prevent the development and progression of comorbid disease and increase physical function ²³. KDOQI guidelines also recommend patients to reduce their dietary sodium intake to reduce their thirst, and thus chronic volume overload and hypertension ¹²². While the physical activity and sodium intake guidelines for HD patients are unique in some ways, the need to increase physical activity levels and reduce salt intake are considered healthy behaviors for the the general population as well, certainly including the staff of HD clinics ^{123,124}.

A dialysis clinic represents a plausible environment to influence the health of both staff and patients ¹²⁵⁻¹²⁷. In general, the staff within a dialysis clinic is comprised of front desk staff, dialysis technicians, nurses, social workers, dietitians, biotechnicians, and clinic administrators. There are regular visits by a nephrologist who oversees the prescription of HD treatment to the patients ¹²⁸. As a workplace and healthcare setting, a dialysis clinic is very unique in that the clinic staff interacts with the same patients 3-4 times per week for 3 to 4 hours each visit. Hence, this provides a unique opportunity for regular patient-provider health education interactions and a platform for modeling of healthy behaviors ^{126,129,130}.

The purpose of this pilot study was to to assess the effectiveness and feasibility of initiating a workplace wellness program (Working on Wellness, WOW) in the unique environment of an outpatient HD center, and to determine if the program would result in improvements in health-related parameters of the clinic staff who participated ^{128,131}. The focus of the intervention was on two healthy lifestyle goals that are relevant to the patient population the staff work with; dietary sodium reductions (< 2400 mg) and habitual physical activity increases (10,000 steps daily). Dietary sodium reductions and increasing physical activity behavior were

targeted in the intervention for two specific reasons; 1) they have the potential to result in positive health outcomes in the general population, 2) they are specific health promotion targets in the dialysis patient population.

We hypothesized that the program would improve several metrics related to participant health, including blood pressure, body mass, and physical activity levels. Our goal was to provide a detailed description of the program, to report on the the direct and indirect outcomes observed in participants, and to identify how findings will inform changes to the development of the standardized program to be delivered in a future study examining validity, fidelity, and reliability for broader distribution.

Methods

Participants

Dialysis center staff were recruited for the pilot research study on the WOW program from a local dialysis clinic in Champaign, IL. Participants were recruited via a 10-minute presentation at their monthly staff meeting and by poster advertising the program in the clinic break room. Staff who self-selected to participate in the program were screened for participation by a member of the research team (n=17). Three participants left the study due to employment status changes. The inclusion criteria was working in the dialysis center for a minimum of 3-months. The exclusion criteria were current pregnancy or plans to become pregnant within the programs 12-week period.

Procedures

The WOW pilot program was developed to evaluate the effectiveness of a targeted program to increase habitual physical activity and improve general dietary patterns, with a specific focus on reducing the intake of dietary sodium. Key features of the WOW program are

outlined in Table 1. The table includes the following elements: 1) weekly clinic challenges, 2) wellness coaches to deliver the intervention, 3) themed weekly coaching sessions with targeted skill building opportunities, 4) intervention tools and resources to tailor to the individual participant. To fully describe the overall health of the sample, participants completed a health history questionnaire and the Physical Activity Readiness Questionnaire (PARQ). These documents were screened for exclusion criteria prior to scheduling participants for baseline testing. Participants were tested at baseline (1 -2 weeks prior to starting the program), and post intervention (week 12) in four areas; 1) questionnaires, 2) anthropometrics, 3) physical activity behavior measures, and 4) dietary sodium measures.

All testing took place at the dialysis center during a regularly scheduled work shift and those that could be done independently were assigned and picked up at a pre-determined time that was mutually agreed upon by the researcher and the participant.

Participants completed questionnaires prior to the start of the program (at baseline) and again at week 12 of the program. These questionnaires were given to the participants in a sealed envelope to be completed prior to their scheduled testing day. Participants completed the following questionnaires: Modified Obstacles to Action, Short Form 12, Beliefs, Barriers, Self-Efficacy, and Knowledge Questionnaire. Anthropometric measures; height, weight, resting heart rate, blood pressure, waist circumference and hip circumference, were collected at baseline, week 6, and within 14 days of completing the 12-week program. A member of the research team conducted a 3-day diet recall and 3-day physical activity recall at the same testing points.

Participants wore a fitbit activity tracker during one of the physical activity walking challenges in the second week of the program. The first three days that subjects wore the fitbit activity tracker was under 'normal' conditions and then they wore it during the physical activity

challenge. The challenge was for participants to accumulate a minimum of 10,000 steps across each day of the week.

Each of the weekly coaching sessions were assigned a theme and topics that the facilitator used to guide sessions (Table. 2.1). Sessions were on a drop in basis during a scheduled working shift and were between 5-10 minutes in duration on average. In addition, the wellness coach sent a text message to each of the participants on a weekly basis to remind them of the upcoming weeks challenge. Text messages were sent on Sunday's between the hours of 2 and 9pm.

Statistical Analysis

Statistical analyses was performed using SPSS v.24. Our sample size of 14 was a robust convenience sample, representative of an overall staff of 27. This allowed us to collect data for calculating effect sizes that could be used to design appropriately powered studies for continued larger scale interventions. Cohen's d was utilized to calculate effect size. One-way Analysis of Variance (ANOVA), comparing values at the different testing time points, with significance set at $p < 0.05$, was used to assess all primary and secondary outcomes.

Subject Remuneration

Participants that completed the weekly challenges had their name put into a lottery that was held at the conclusion of the program for a \$50 gift certificate.

Results

Seventeen staff were recruited to participate in this study, including 3 nurses, 9 technicians 1 social worker, 1 dietitian, and 2 clinic administrators. Participant demographics are shown in Table 1. Retention with the intervention was 82.4% as evidenced by the intervention completion of 14 of 17 subjects recruited. Three subjects left the study due to a change in their

employment status. The rate of compliance was measured by attendance at weekly coaching sessions; participants as evidenced by weekly coaching notes kept by the interventionist attended 96% of coaching sessions.

The program also resulted in improvements in several health related metrics. This included reductions in body mass, mean 2.1 ± 1.6 kg ($p < 0.05$) and in systolic, mean 17 ± 7 mm Hg ($p < 0.05$) and diastolic, mean 4 ± 8 mm Hg ($p < 0.05$) blood pressure. (Figure 2.1 and Figure 2.2). The participants also increased steps in response to our activity tracker challenge (Table 2.2)

Following the intervention period, there were significant decreases in self-reported perceived barriers for both healthy eating ($p < 0.05$) and physical activity ($p < 0.05$), as reported by the modified obstacles to action survey (Table 3, Table 4).

There was a significant ($p < 0.05$, $ES = 1.08$) increase in walking steps as measured by fitbit activity trackers during a walking challenge focused on achieving 10,000 steps across each day. The mean step count at baseline was $7,052 \pm 3,278$, but increased to $10,388 \pm 2,882$.

There were no significant changes in mean caloric intake (baseline: 1707 ± 609 kcal/day, and 12-weeks: 1468 ± 786 kcal/day) or reduction in dietary sodium (baseline: 2843.02 ± 1301.93 , and 12-week: 2702.16 ± 1629.11). There was a trend toward caloric reduction ($p = 0.08$). There were no significant changes in the SF12 measure results.

Discussion

We demonstrated that a 12-week workplace wellness program for the clinic staff in an outpatient hemodialysis clinic is both feasible and effective. Participation in the program was robust with 14-staff members completing the 12-week program and attending 96% of coaching appointments. In addition, the participants improved several health related outcomes, including

significant reductions in resting blood pressure and body weight. The participants also increased physical activity levels in response to a walking challenge. Finally, self-reported barriers to physical activity and healthy eating were significantly reduced as reported by participants from baseline to the post intervention testing.

The WOW program differed somewhat from traditional workplace wellness programs that are offered in corporate settings, as it was intentionally focused on two primary intervention components: reducing dietary salt intake, and increasing physical activity levels. This focus was chosen due to the importance placed on these specific lifestyle factors in HD patients, as a long-term goal of our project is to promote healthy behaviors in the staff that they can use to help motivate patients to also change. The intervention was designed around similar health promotion messages that dialysis patients would receive. To achieve behavior change that would result in improved health outcomes the intervention was designed to be intensive and included features such as assigned wellness coaches, frequent contact over various platforms (phone text, in person, posters, newsletters, one-on-one coaching), a structured 12-session core curriculum, and a toolbox of educational resources. These strategies proved to be very successful with participants experiencing significant blood pressure improvements and weight loss across the 12-week program. The activity challenges aligned with a significant improvement in the average number of daily steps taken with a reduction in the variability, recorded by fitbit activity tracker. Overall, participants reported a significant reduction in perceived barriers to making healthy lifestyle choices related to both nutrition and physical activity.

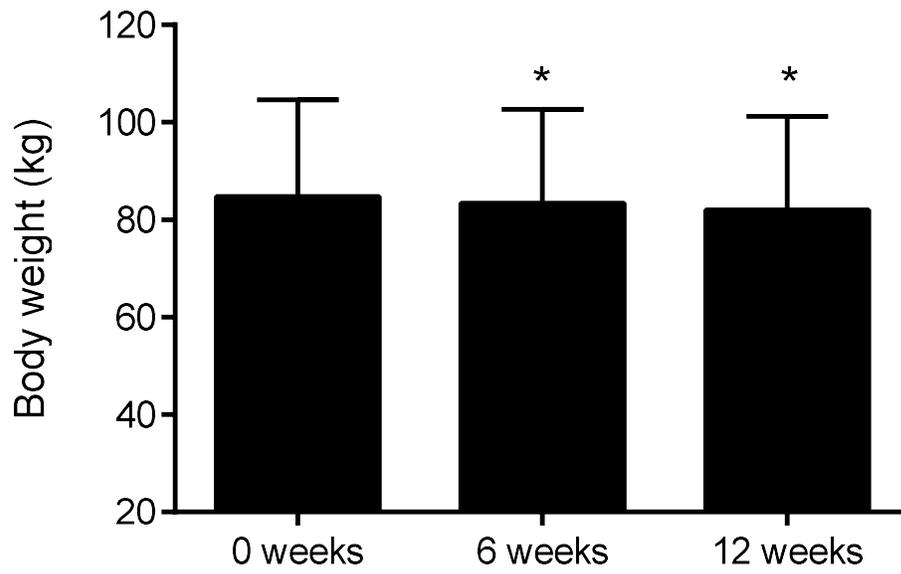
There were limitations in the study design given there was a single group tested pre and post intervention and there was no control group. Participants came from a single clinic where the program was introduced and was a convenience sample of those interested in participating.

The data collected in this pilot study will inform; the refinement of the program rationale, the trend toward impacts and effects, and the effectiveness (cost and scope of work for the interventionist) of the WOW program. The possible threats to external validity are social desirability and expectancy effect. Social desirability is when participants answer questions or report certain activities because they think that is the answer the researcher wants to hear. The expectancy effect is when attitudes projected onto individuals cause them to act in a certain way. One way that we hope to control this threat is to repeat the program with a variety of participants over time.

In conclusion, the pilot WOW program has provided the preliminary evidence for the further development of a standardized program for the staff of a dialysis clinic. Future directions for the WOW program include the refinement and development of a standardized manual for dissemination into additional clinics to assess the reliable replicability of the program and the outcomes that were achieved in the pilot WOW. Future studies need to assess if the improved health behaviors of the staff can be transferred to the patients.

FIGURE 2.1

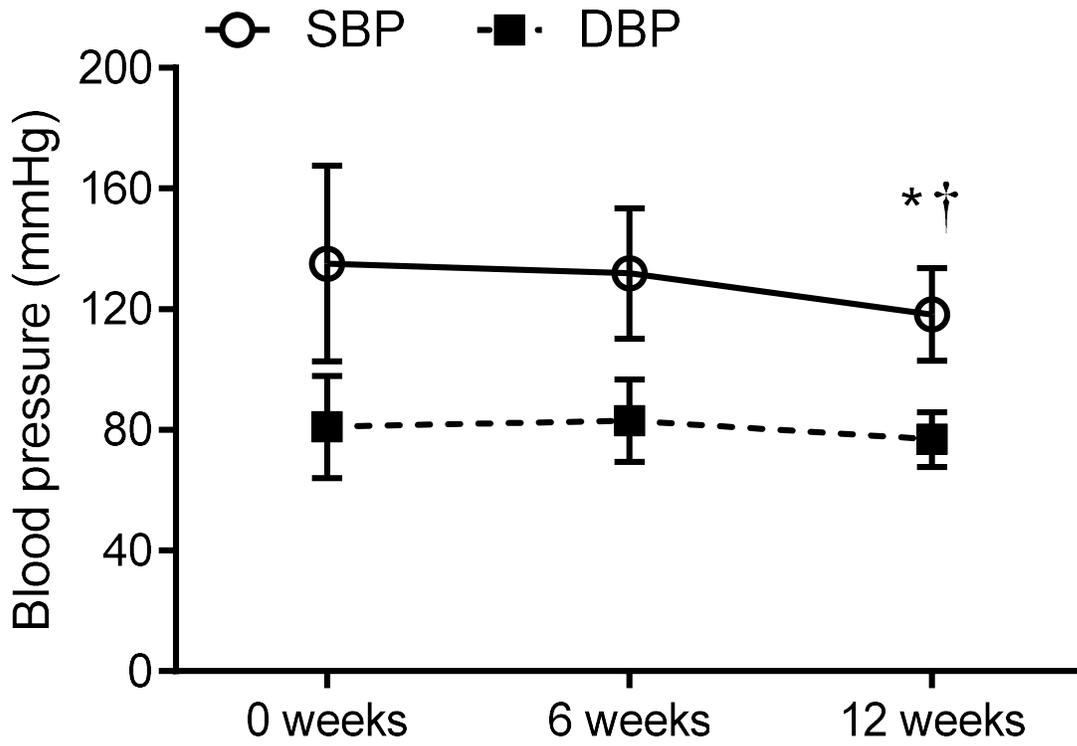
Figure 2.1 Mean Mass Change



Note: n=14, male=2, female=12, mean=2.1±1.6 kg, p <.05, ES=1.08

FIGURE 2.2

Figure 2.2 Blood Pressure Change



Note: $n=14$, male=2, female=12, decrease in mean systolic= 16.8 ± 7.1 mm Hg, $p < 0.05$, $ES=2.42$, diastolic mean= 4.1 ± 7.7 mm Hg, $p < 0.05$, $ES=1.25$

**CHAPTER 3: EXPERIENCES AND FURTHER NEEDS OF OUTPATIENT
HEMODIALYSIS CENTER STAFF AND PATIENTS IN A WORKPLACE WELLNESS
PROGRAM**

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Key words: Hemodialysis, physical activity, dietary sodium, workplace wellness

Abbreviations used: HD, hemodialysis; PA, physical activity; ESRD, end stage renal disease;
WOW, working on wellness

²This chapter is currently under review for publication in an academic journal. All co-authors
agreed to their contributions being included in the dissertation.

ABSTRACT

Background: There is growing recognition of the benefits of physical activity and reductions in dietary sodium intake on hemodialysis patient outcomes. Getting patients to adhere to these health promotion initiatives is a challenge. Workplace wellness programs targeting lifestyle behaviors have been shown to be effective and could serve as a plausible opportunity for staff to share what they learn with their patients.

Objective: We explored the experiences of outpatient hemodialysis staff who participate in the Working on Wellness (WOW) program and surveyed patients to better understand their needs and wants regarding exercise and dietary health promotion through staff in the outpatient hemodialysis center.

Setting and participants: Interviews were conducted with staffmembers of an outpatient hemodialysis clinic who had previously participated in the WOW program. Patients at the hemodialysis clinic where WOW was conducted were also interviewed.

Methods: Six semi-structured interviews were conducted and analysed using thematic analysis, namely interactions between patients and healthcare providers and needs and wants of patients.

Results: Analysis of patient participant surveys illustrate that current health promotion by the staff of hemodialysis center does not meet patient needs and wants. Six interviewees with staff who participated in the WOW program were analysed. Four themes emerged through thematic analysis; Hope and Desire for Change, Conciousness and Awareness, Role and Responsibilities, and Impacts.

Discussion and conclusion: HD patients need and want health promotion from the staff of the outpatient hemodialysis center. They frequently interact with staff and this serves as a plausible opportunity to share physical activity and dietary education. The staff of the dialysis center were

motivated to participate in WOW because they had hope and desire for personal change through participation. They increased their personal conciusness and awareness of physical activity behavior and dietary sodium intake through participation. Staff were unsure of their role and responsibilities as they relate to health promotion and outreach with dialysis center patients. Staff were largely unaware of the translational impact participation in this program could have on the patient population they serve.

Introduction

Patients with renal failure undergoing chronic hemodialysis therapy suffer from a plethora of comoribidities that adversely impact their overall health and quality of life. This includes muscle wasting, bone and mineral disorders, and cardiovascular diseases¹³². The health care staff at hemodialysis clinics are often encouraged to counsel patients on how to make healthy lifestyle choices, such as exercise and improved nutritional habits, to mitigate some of their patient's health problems. However, the staff often have significant health concerns of their own. For example, a synthesis of 187 international studies on nurse health found that nurses experience more musculoskeletal disorders and greater rates of depression than the general public^{133,134}.

Clinical trials within^{135,136} and outside the US^{82,137} support the potential value of physical activity counseling in primary care settings. In these studies, as little as 3 to 5 minutes of patient-clinician communication about physical activity was linked to short-term improvements in patients' exercise habits as well as physical activity habits up to 1 year later. Patients consult health care providers when symptoms interfere with their ability to function in their daily activities¹³⁸ and seek providers' care and cooperate with them in the process of recovery¹³⁹. The difference in knowledge between the health care providers and patients justifies

both the providers' assumption of authority and the patients' trust, confidence, and norm of compliance¹⁴⁰. Although health care providers' recommendations are important for adherence to physical activity, providers may not recommend physical activity to all people. Cabana and colleagues attribute this provider behavior to knowledge-related barriers such as lack of awareness or familiarity with the guideline, attitude-related barriers such as lack of agreement, and outcome expectancy or external/environmental barriers such as lack of time, resources, reimbursements, organizational constraints, or perceived increase in malpractice liability¹⁴¹. Indeed, dialysis patients could benefit from staff engaging in health promotion related to physical activity and reductions in dietary sodium.

Based on the nature of hemodialysis treatment patients frequent the same outpatient clinic frequently (≥ 3 times per week), for long durations of time (≥ 4 -hours), for the rest of their lives or until they are able to receive a transplant. The staff and patient interaction at a hemodialysis clinic serves as a plausible opportunity for health promotion related to physical activity and healthy dietary choices and a work place wellness program has the potential to be a vehicle for; education and training for staff, resource and skill development in coaching, and a new found responsibility as a model of health behavior.

Dietary Sodium and Physical Activity

There has been considerable interest in identifying strategies for effectively managing comorbidities in hemodialysis patients through lifestyle modifications. In particular the benefits of exercise training¹⁴² and dietary sodium reduction has been studied extensively in hemodialysis patients¹⁴³. It is well documented that exercise can improve cardiovascular health¹⁴⁴⁻¹⁴⁶, improve muscular strength and minimize muscle wasting,^{146,147} and improve treatment efficiency in hemodialysis patients¹⁴⁸. Dietary sodium restriction is also important for helping

patients reduce fluid intake, and thus minimize intradialytic weight gain (IDWG) and the cardiovascular complications associated with chronic volume overload ¹⁴⁹. Of course, increasing physical activity and reducing dietary salt intake are also beneficial for the general population. Several organizations, including the World Health Organization, United States Department of Agriculture, and American Heart Association, have recommended reductions in dietary sodium intake for the broader population based upon growing evidence showing associations with poor health outcomes ¹⁵⁰⁻¹⁵³.

Engaging in physical activity has the opportunity to improve health in the general population. Even short episodes or small amounts of physical activity have been shown to be beneficial. Yet, approximately 80% of US adults are insufficiently active ¹⁵⁴.

An Outpatient Hemodialysis Center as a Setting for a Workplace Wellness Program

The patient-staff interaction represents a plausible opportunity for exercise and healthy dietary promotion due to the frequency and duration of treatments. There is evidence to suggest that as little as a 2-4 minute intervention in primary care effectively promotes physical activity behavior change ¹⁵⁵. A position statement by the Canadian Academy of Sport and Exercise Medicine indicates that advice from health care staff may be effective in changing the physical activity behavior of clinical populations ¹⁵⁶. Studies have demonstrated that only about 25% of patients in primary care settings report receiving counseling on physical activity ¹⁵⁷. Research conducted by Courneya et al, elicited high rates of adherence to exercise prescription in patients with cancer which they attributed to more personal attention in their center of care ¹⁵⁸. It is unclear if, similar outcomes may manifest if a similar approach is adopted by staff of hemodialysis clinics during treatment. Increases in physical activity have been tied to positive clinical outcomes in cancer patients ¹⁵⁹. Hemodialysis patients have by and large been shown to

be less physically active and engage in more sedentary behavior as related to the general population¹⁶⁰. However, physical activity behavior is clearly amenable to modification, as indicated by Elley et al, (2003), who reported a 10% increase in physical activity in sedentary patients when their general practitioners gave oral and written advice on physical activity during regular visits¹⁶¹.

Health promotion counseling by providers is more effective than outsourcing counseling to a specialist or health coach¹⁶¹, in part because patients view their health care providers as the most trusted source of health information. Since physicians are key health role models and advisors who often meet with patients during potentially impressionable times, their own health behaviors may affect their ability to engage their patients in healthful behaviors^{162,163}. In fact, the majority of people cite their physician as their primary source of information regarding healthy lifestyle decisions and are more likely to adopt a healthy behavior when their physician recommends it¹⁶⁴. Therefore, the present study serves as a reasonable intervention to ascertain the impact of a workplace wellness program on the staff of an outpatient hemodialysis clinic. It will allow the research team to characterize the validity and fidelity of a workplace wellness program to have meaningful impacts on the health of both the staff of a hemodialysis clinic and the patients that they care for.

Promising Strategies for Improving Physical Activity and Nutrition Behavior

The patient-provider interaction might have further merit considering established theoretical frameworks that predict and increase exercise behavior⁶⁸. Although evidence is growing about the effectiveness of brief counseling strategies¹⁶⁵⁻¹⁶⁸, the translation to clinical practice has been poor. Logistical problems and other priorities of a busy clinic may impede even the most motivated health care staff from promoting healthy behaviors^{169,170}. Thus,

recommendations for newer integrated models of care emphasize proactive team- and system-based approaches for prevention and chronic disease management ¹⁷¹⁻¹⁷³. Specifically, recommendations for incorporating effective health behavior change strategies into routine patient care in the primary care setting include organizational change to engage other health professionals (e.g., nurses, bio-technicians, dietitians, social workers) in the practice to assist with providing preventive services as well as linking patients to resources outside of the practice ¹⁷³⁻¹⁷⁵.

The perspectives of individuals on the front lines of delivering primary care can assist us in developing better understand of current approaches and how to better integrate effective strategies into practice. Prior studies have used surveys and focus groups to elicit beliefs and explanations about providing preventive services and health behavior counselling ^{159,176-178} and predominately have focused on identifying barriers rather than encouraging identification of potential solutions.

Justification for the Research

Literature across a variety of specialties indicates that health professionals often fail to provide health education, resulting in ineffective therapies, return visits, and unfavorable responses to medical treatment Poon

There is a need to further characterize the leveraging of modeling effects from hemodialysis center staff and the clinician authority to influence a patient's behavior ¹⁷⁹. Therefore, the present study is significant and necessary to assess the outpatient hemodialysis center staff experience in a workplace wellness program and to better characterize the patients willingness to receive health promotion information from staff.

To that end, we developed a pilot, workplace wellness program for the unique culture and environment of an outpatient hemodialysis center. Our goal was to provide staff with an experiential learning opportunity, to develop skills and resources facilitate the promotion of physical activity and dietary sodium reductions to the patients of hemodialysis centers. We see this research, primarily, as an opportunity to seek to understand if the staff of a dialysis center perceive a workplace wellness program to be of benefit to their personal health and wellbeing and if they believe they are building skills to share this information with dialysis center patients. Secondly, it will allow us to identify if the hemodialysis center patients have a desire and willingness to receive healthy lifestyle promotion information from the various staff at the hemodialysis center.

There are no reported studies on the desire and willingness of hemodialysis patients to receive health promotion information about physical activity and reducing dietary salt intake from the staff in an outpatient hemodialysis center. Recent studies in other chronically ill populations that have demonstrated patients the need and want for information related to physical activity,¹⁸⁰ and there is increased importance placed on lifestyle counseling in the patient experience as a means to improve healthcare services and the health care environment¹⁸¹. Work by Learmonth et al, (2017) suggests that staff in a health care setting feel ill equipped to deliver education on exercise promotion and lack the organizational structure and cohesion¹⁸⁰. The ultimate goal of this study was to begin to assess the transferability of the WOW program content from the staff of the dialysis center to the patient population. In order to capture transferability we need to characterize the experiences of the staff who participated in the WOW program as well as to assess the openness of the hemodialysis patients to receive this information from the dialysis center staff.

Methods

The present study was approved by the institutional review board at the University of Illinois. We used interpretive description methodology (IDM) ¹⁸². The aim of interpretive description is to generate knowledge relevant for the clinical context of applied health disciplines ¹⁸². A convenience sampling of WOW participants (n=6) was recruited from the pilot trial. Using IDM allowed the first author to conduct an in-depth interview to investigate outpatient hemodialysis center staff experiences and program impacts.

In addition, we took a convenience sampling of hemodialysis center patients who had been present in the clinic (morning treatment, afternoon treatment, evening treatment) during the 12-week WOW program. We surveyed these patients with the specific aim of understanding their insights into perceptions of dialysis center staff modeling of healthy behavior and their desire and willingness to receive lifestyle promotion information from their healthcare providers.

Participants

Dialysis Center Staff. We recruited a total of six (n = 6), participants from the group who had completed the 12-week WOW program; technicians, nurses, and administrative staff. They were all female which was representative of the program participants (n = 17; male = 2, female = 15). Five of the participants were caucasian (n=5), one african american. Their mean age was 45.2 years (SD = 5.5). They had worked in an outpatient hemodialysis center for between two and sixteen years.

Outpatient Hemodialysis Center Patients. We took a convenience sampling of ten patients from three clinic shifts (morning, mid-day, evening) for controlling sampling bias. The sample was comprised of four females (40%) and six males (60%) with a mean age of 48.7 years

(SD = 12.59). The majority of patients self-identified as caucasian (n = 6), african american (n = 4), and native american (n = 1).

Procedures

A convenience sampling of outpatient hemodialysis center staff (n=6) who had completed the 12-week WOW program completed a scripted interview with a member of the research team (AH). A convenience sampling from each of the different treatment shifts being offered in the clinic (day of the week and time of the day) of outpatient hemodialysis center patients (n=10) were recruited and participated in the research study. Patients who had been receiving treatment for a minimum of 3-months at the hemodialysis center qualified to participate.

One-on-one Interviews with Outpatient Hemodialysis Center Staff

The scripted interviews with the hemodialysis center staff were; audio recorded, and transcribed verbatim by AH, and other colleagues independently read transcriptions and coded the transcriptions (Table. 1). The research team met for discussion to compare codes until a consensus for all codes was determined. If there were discrepancies the lead author used her field notes and asked the research team to review the codes for triangulating data and strengthening transparency and trustworthiness of the data. We conducted the interviews within seven days of completion of the WOW program. The duration of the one-on-one interviews ranged from 8-minutes to 21-minutes. The research team aimed to keep the duration of interviews less than 15-minutes in order to comply with allotted clinic staff break times. AH transcribed the interviews and confirmed accuracy with the interviewees when needed. Triangulation was applied in data analysis; three primary researchers were involved in analysis and this included that each interview was coded independently by a minimum of two of the primary researchers. These

steps included member checking, multiple analysts, and using field notes for achieving trustworthiness and transparency.

Table 3.1 Outpatient Hemodialysis Center Staff Interview Script

Topic	Opening question or remark
Motivation/ Intention	What were your goals when you joined the WOW program? What did you hope to achieve?
Needs/ Wants/ Desires	Did the WOW program meet your expectations?
Relationships	Did the program provide you with an opportunity to connect with others?
Feedback	Do you have any constructive feedback you would like to provide to improve the program for the future?
Communication	We sent weekly text messages. Did you find these helpful? What was your preferred method of communication?
Content	Identify the greatest strengths of the program? What did you enjoy most about your participation?
Patient Impact	Do you think the participation of the clinic staff in this program has an impact on the patients?
Feedback	Is there anything else that you would like to say or feedback that you would like to provide?

A Survey of Hemodialysis center patients

Inclusion criteria of patients were: 1) receiving dialysis care for a minimum of 3-months in the dialysis center, and 2) willingness and ability to read and complete an 11-question survey during the first hour of their dialysis treatment. The research team developed an 11-question survey to measure their desire to receive healthy lifestyle promotion information while at the hemodialysis clinic and their willingness to receive healthy lifestyle information from the various members of the staff (technician, nurse, social worker, dietitian, and administrative support staff) at the hemodialysis center. Patients from each of the three treatment shift times (morning, afternoon, and evening) and from the two shift rotations (Tuesday/ Thursday/ Saturday and

Monday/ Wednesday/ Friday) were recruited to participate within the first hour of their scheduled treatment.

Analysis

For the interview data with the healthcare practitioners, we applied thematic analysis to code the transcription and identify major themes and sub-themes¹⁸³. Three researchers independently coded transcriptions. They met after analyzing each transcription, discussed their individual codes, and resolved the discrepancies. When there were discrepancies in codings, they went back to the patients' quotes to seek clarification and to come to a consensus. After repeated immersion in the codings, we used inductive analysis to produce a codebook. Further, we used the finalized codes to develop the major themes and sub-themes.

For the survey data from the patients, we used 'likert scales', and 'yes and no', related to beliefs about the responsibilities and patients perceptions of the knowledge and ability of the staff as well as by their different position titles to promote physical activity and healthy nutrition and their desire and willingness to receive coaching about healthy lifestyle habits.

Results

For the interview data with the healthcare practitioners, we found four major themes along with their sub-themes. These major themes are: *Hope and Desire for Change*, *Consciousness and Awareness*, *Role and Responsibilities*, and *Impacts*.

Hope and Desire for Change. It involved the participants desire and willingness to learn, from who they perceived to be experts in physical activity and healthy eating, and their hope for the program to elicit change in their personal health. The staff discussed three main subthemes. The subtheme of "Open to Learning & Physical Activity" was expressed repeatedly by staff.

“Tips and ways to be able to learn to eat better. And also to get more physical activity get more active and then to ultimately of course see the health benefits of those (Staff member-1).”

Staff commonly discussed that they wereof “Open to Learning & Healthier Nutritional Choices”.

“Better understanding (laugh). Ideas about how to eat healthier and maybe workout. (Staff member-2).”

Many of the participants expressed being “Open to Learning & Stress Reduction”.

“Honestly, weight loss... and how to exercise for stress...At home. Like the bands. I know I didn't use them as much as I would have liked to because of time but I noticed I've lost weight. I'm really happy about that. (Staff member-4).”

Conciousness and Awareness. Is represented by participants description of an increase in the level of their conciousness related to nutritional choices and physical activity. The staff discussed two main subthemes. The majority of participants referenced “Planning Ahead” as a key skill that they developed.

“I did. I am always on my phone and I would get excited to start fresh on Monday's. I would make my lunch for the next day and think about the challenge for the week. (Staff member-5).”

Many of the participants referenced the focus on “Tracking Behavior” as a tool that facilitated the increase in their conciousness.

“I loved using the fitbits and counting steps. It really helped me to see how much I was doing and made me push myself. I liked being able to tell you how many I did. Remember when I did 19000 (steps) that one day? That was awesome. I'm walking more then I ever have. (Staff member-3).”

Role and Responsibilities. The third theme was the participants description of their perceived role, related to counseling patients about physical activity and nutrition and their responsibilities in the clinic, based on their assigned job. Half of participants believed it was their responsibility to talk to patients about healthy lifestyles.

“I did talk to the patients more about what I was doing. I always talked to them about walking. I think everybody needs to but I don't think everybody does. (Staff member, 3).”

One participant spoke about a specific time in her career that made her think differently about her role and how changing her lifestyle motivated her to help others.

“... When I was a nurse that worked with the patients seeing them and talking to them is what caused me to make the changes in my own life. My eating habits changed when I had to teach patients in the Peritoneal Dialysis program. So I was hoping this would help my staff learn and experience this and want to help the patients. This was a big reason I was looking forward to this program for the staff. So hopefully you did hear that feedback from some of them. (Staff member, 5).”

The culture of the clinic and the perceived value of health promoting conversation was described as being too busy to do anything else but prepare and supervise patient treatment.

“... There isn't any chit chat here about anything but work. We are very busy. (Staff member, 6).”

Impacts. The fourth theme was that the participants were very focused on the program and its impact on them as an individual. When asked, “Do you think the staff’s participation in the this program has an impact on the care they provide the dialysis patients?”, the majority of staff were caught by surprise and/or could not identify how their participation in the WOW program

could impact the quality of care they were providing to patients. One participant thought for some time before responding as though this was the first time they had considered the statement.

“I’m not sure if the....hmmmm.....well, probably more in terms of the staff that would impact them..... maybe the techs because they see them more. They have a lot more interaction with the patients every day. Techs and nurses for sure, but from our standpoint....but talking to the patients...this definitely, definitely. Staff member, 1”.

One participant had not made the connection between the content of the WOW program and the patients that they provide care to.

“I don't know. I don't think a lot of people knew what was going on. If they had known I think it might have. (Staff member, 3).”

A second participant did not consider the potential translation of what they were learning to patients.

“I think any little bit helps but I felt this was more directed at staff then at patients. But if you motivate your staff you motivate your patient too so... yeah. (Staff member, 5).”

The responses from the participants indicate that the research team should amend the program to more clearly explain to staff that it is our hope and expectation that they model and discuss healthy lifestyle behaviors with the hemodialysis patients.

Hemodialysis Center Patient Surveys. Patient surveys were 11-questions that had them answer demographic information, yes/no/other, and likert scaled questions. Data was analyzed from 10 patients of the dialysis center. Patients beliefs about the responsibilities of the staff in the dialysis clinic as it relates to the promotion of a healthy lifestyle are listed (Table 2.2) and their

willingness and openness to receive healthy lifestyle related information from the staff at a dialysis center are listed (Table 2.3).

Table 3.2 Patients’ beliefs about the healthy lifestyle outreach responsibilities of the staff in the hemodialysis clinic

Perceived Staff Responsibilities (N = 10)
<i>Gives healthy lifestyle advice (all staff), 100%</i>
<i>Provides suggestions for preventative care (all staff), 90%</i>
<i>Provides healthy lifestyle counseling</i>
Nurses, 60%
Technicians, 60%
Dietician, 100%
Social Worker, 100%
Administrative Staff, 20%
<i>Models a healthy lifestyle, 70%</i>
<i>Is capable of answering healthy lifestyle questions that I might have</i>
Nurses, 100%
Technicians, 80%
Dietician, 90%
Social Worker, 70%
Administrative Staff, 60%

Table 3.3 Patients’ willingness to receive healthy lifestyle information from dialysis center staff by position

Variables (N = 10)
<i>Physical Activity</i>
<i>Motivated by staff to engage in physical activity (all staff), 80%</i>
<i>Expectation to receive information about physical activity from</i>
Nurses, 100%
Technicians, 80%
Dietician, 100%
Social Worker, 60%
Administrative Staff, 20%
<i>Dietary Choices</i>
<i>Motivated by staff to make healthy dietary choices (all staff), 60%</i>
(Cont.)
<i>Expectation to receive information about healthy dietary choices</i>
Nurses, 100%
Technicians, 80%
Dietician, 100%
Social Worker, 70%
Administrative Staff, 20%

Discussion

Recent studies have shown that health education provided to patients can reduce mortality and morbidity of chronic disease. Although some studies describe the provision of health education by physicians, few studies have examined nurse practitioners and no reported studies of other staff in a health care setting differ in the provision of health education ¹⁸⁴.

Researchers recently established that patients report not receiving exercise promotion through healthcare providers, yet they have a strong interest in receiving such information ¹⁸⁰. The aim of this study was to characterize hemodialysis clinic staff experiences in the WOW program and patient interest in receiving health promotion information from staff in the hemodialysis center. This work will inform necessary changes to the WOW pilot to improve targeted outcomes and to validate the implementation of the program in additional hemodialysis centers.

We established four important themes related to the experiences of the staff of a hemodialysis center who participated in the WOW program; 1) *Hope and Desire* for personal change, 2) *Consciousness and Awareness* of the importance of physical activity and reducing dietary sodium intake, 3) *Role and Responsibility* in health promotion outreach to hemodialysis patients as perceived by the staff, and 4) *Impacts* of the WOW program as it related to both staff and patients. The first theme that emerged through the interviews with staff, *Hope and Desire*, provided insight into sources of motivation for participation in the study. We observed through this work that participants are motivated for personal reasons. The second theme that emerged, *Consciousness and Awareness*, demonstrated that the WOW program provided information and education that resulted in an increase in knowledge related to physical activity and dietary sodium reduction. The third theme, *Role and Responsibility*, demonstrated that staff are not all in agreement regarding their role and responsibility in engaging patients in health promotion

conversations. The culture of the clinic is described as "...there isn't any chit chat here about anything but work. We are very busy" (Staff member 6), suggesting that engaging patients in health promotion conversations is a luxury and not a core value of the organization. Future research should involve engaging clinic managers and administrators to support healthy lifestyle conversations about physical activity and dietary sodium reductions as a component of their work. Those staff who referenced personal experiences related to physical activity and healthy diet recognized the importance of engaging patients around these topics as a part of their overall care. The fourth theme that emerged was, *Impacts*, and it was clear that the hemodialysis center staff had not clearly connected the content of the WOW program to having direct translation to patients. In future research this connection will need to be made more clearly and frequently through the coaching sessions.

Our results in the patient perception survey were consistent with findings in other patient populations^{84,180}, that hemodialysis patients expressed a willingness and desire to receive health promotion information from all hemodialysis center staff. They reported an expectation that dialysis technicians, nurses, dietitians and social workers would be trained in health education but did not have the same expectation of the front desk staff. There is a gap between the desire among patients with ESRD for healthy lifestyle advice and the background and confidence of the staff of dialysis centers to provide the appropriate tools and resources.

The first theme that emerged from the analysis of the transcribed dialysis center staff interviews was that of *Hope and Desire for Change*. Dialysis clinic staff participants clearly described that their motivation for participation stemmed from a hope of lasting personal behavior change and their desire to learn and be supported by 'experts', research staff. The dialysis clinic staff viewed this program very egocentrically and did not make the connection

between the content and the dialysis patient care that they provide. One potential explanation is that training programs for the dialysis clinic staff are not inclusive of content specific to physical activity and/or healthy dietary choices¹⁸⁵. In addition, they seem not to consider that they are patients models of how to live a healthy lifestyle and the potential influence they have as healthcare professionals working with hemodialysis patients for many hours at a time and multiple times each week.

The second theme the dialysis staff identified was *Consciousness and Awareness*. The dialysis clinic staff expressed an increase in their personal consciousness and awareness of healthy lifestyle choices. The identified facilitators and motivators of personal behavior change that will inform future development of the workplace wellness program. It is important to note that strategically implementing a “workplace wellness” program is effective and feasible because clinical staff gradually increase their consciousness to plan a healthy lifestyle at work and after work. They also increased their awareness of monitoring how well and how much they practiced a learned behavior. Such self-monitoring awareness is the foundation of self-regulation and adherence to the new healthy habits. Seemingly, there is a gap between staff education and confidence in healthy lifestyle promotion as it relates to hemodialysis patients physical activity and dietary sodium reduction. In many cases, the hemodialysis center staff lacks appropriate training, resources, and tools to promote patients’ physical activity and dietary sodium reductions from their behavior modeling and experience. The reasons for the this gap have been unclear in the research to date and this work was conducted to begin to characterize and inform future interventions.

The third theme, *Role and Responsibilities*, identified the existing culture within dialysis clinic of not making personal health and health promotion of physical activity and healthy diet to

patients a priority. Based on this finding it will be very important to get the support of the clinic administration and to have them vocalize communicate this to dialysis clinic staff¹⁸⁶. Health education is time consuming and a clinic culture that embraces the importance of health education from all dialysis clinic staff is necessary¹³⁰. More importantly, the WOW program developed hemodialysis clinic staff's ability and self-efficacy. These two factors are significant to a person's responsibility and engagement. With a developed role as a healthy lifestyle model and new found committed responsibility, trained hemodialysis clinic staff will be motivated and ready to model, educate, and engage patients in transformative conversations about how they can more healthfully live their lives.

The fourth theme was *Impacts*. The ability of patients to participate in disease self-management will become more critical in the future because of the increasing prevalence of chronic disease in the United States. Health education is a key component of patient self-management. Dialysis clinic staff were not able to connect the experiential health education training they were receiving through participation in the workplace wellness program until they were asked about it directly in their one-on-one interviews.

Based on the results of the patient survey data (Table 2.3), there is a clear trend in the results that patients are willing and open to receive health promotion information, physical activity and healthy eating, from dialysis center staff. Patients were receptive to receiving lifestyle counseling from the staff at the dialysis clinic (nurses, dialysis technicians, administrative staff, dieticians, social workers and bio-technicians) regardless of their role in the clinic. It is important to note that when recruiting participants for this study we had no nephrologists sign-up. The research supports that for a workplace wellness program to be successful you must have support from administrators¹²⁷. In addition, when looking at a healthcare setting, the influence of the

physician on patient compliance has been demonstrated to be very influential^{162,163}. In future studies it will be necessary to ensure support at these levels to achieve best outcomes.

Findings of the patient survey indicate that patients are either unaware of the specific training or expertise of each staff member or are but are still open to receive health promotion information regardless of job title. This suggests that the WOW program may serve as an opportunity to provide experiential learning and educational resources for hemodialysis center staff to build skills and knowledge to facilitate health education conversations related to physical activity and dietary sodium reductions with patients and to have that information be willingly received.

In addition, based on our thematic analysis on the dialysis center staff interviews, there appears to be a disconnect between the educational resources shared with the dialysis center staff and their translation to the patients. In the development of the manualized program we will make reference to the personal health benefits of regular physical activity and dietary sodium consumption on both the dialysis center staff and how the modeling of these behaviors and direct sharing of these same resources may improve the health of the dialysis patients.

Limitations

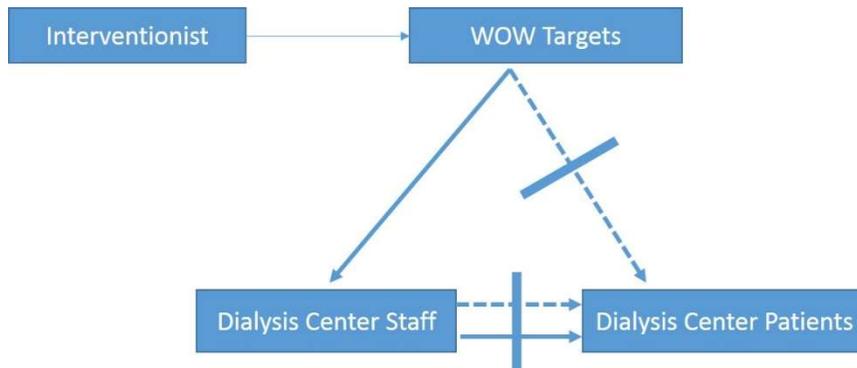
This study has some limitations worthy of consideration for future research. First, there was no measure of preliminary health education, physical activity and dietary sodium reduction, provision by position in the dialysis clinic to determine baseline counseling. Second, the research was conducted in a single hemodialysis clinic and can not be normalized to other settings due to the uniqueness of this healthcare setting. All hemodialysis clinic staff participating in the trial were females.

Conclusions and Implications

It has been reported previously that chronically ill patient populations want and need information about exercise from healthcare providers ¹⁸⁰ and herein we have confirmed similar findings in the dialysis patient population. We have identified that a workplace wellness program for the staff of a dialysis clinic represents a viable training and health education modality for all dialysis clinic staff to build skills to confidently engage patients in health promotion conversations. We further identified that such opportunities requires further education of dialysis clinic staff, and the further development and provision of tools and resources for health promotion interactions with dialysis clinic patients. Staff were able to see the program impact on themselves but there was a gap in their translation of the program content to the patients that they care for (Figure 2.1). This might be facilitated through the further development of the WOW program as well as to gauge the interest of clinic administrators in sharing this program as an inservice health promotion education opportunity for the dialysis clinic staff. The development of a conceptual framework of expectations of dialysis clinic staff to engage in health education and promotion with patients may facilitate the patient-provider interaction. This might represent the beginning of a transformative approach for increasing physical activity and exercise behavior as well as reductions in dietary sodium intake in the patient population. A future direction would be to include direct questioning of the staff as to if they believe they are responsible for healthy lifestyle coaching and whether they feel they have the expertise to deliver what the patients expect of them.

FIGURE 3.1

Figure 3.1 Schematic of the WOW targets translation from interventionist(s) to hemodialysis center staff and hemodialysis patients. Solid lines represent the transmission of physical activity and dietary sodium promotion . Dotted lines represent a dissonance in translation of physical activity and dietary sodium targets to reach the targeted recipient.



**CHAPTER 4: WOW2: THE RELIABILITY, FIDELITY, AND VALIDITY OF A
MANUALIZED WORKPLACE WELLNESS PROGRAM FOR THE STAFF OF AN
OUTPATIENT HEMODIALYSIS CENTER**

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Key words: Hemodialysis, physical activity, dietary sodium, workplace wellness

Abbreviations used: End Stage Renal Disease (ESRD), Hemodialysis (HD), Working on
Wellness (WOW)

³ All co-authors agreed to their contributions being included in the dissertation.

ABSTRACT

Background: The pilot Working on Wellness (WOW) program was feasible and effective, inducing positive health outcomes in outpatient hemodialysis staff. The program resources were further developed and standardized and a recruitment and training program for WOW wellness coaches were developed.

Objective. We aimed to reliably replicate the findings of the WOW pilot program, Chapter 2. We recruited, trained and supported wellness coaches to deliver the standardized program with a high level of fidelity.

Methods. Dialysis center staff (n=26; m = 7, f=19) participated in a 12-week workplace wellness program focused on decreasing dietary sodium and increasing habitual physical activity. The WOW program focused on the following behavior change techniques; regulatory processes; reducing barriers, identifying opportunities, goal setting, prioritizing, planning, self-monitoring, and enacting support. WOW wellness coaches facilitated a standardized 12-week program including weekly; coaching sessions, educational handouts, challenges, newsletters, and scripted text reminders.

Results. The average systolic blood pressure of participants decreased by 4.86 ± 12.91 mmHg, ($p < 0.08$, ES=0.3), and diastolic blood pressure of participants decreased by 5.26 ± 12.14 mmHg, ($p < 0.05$, ES=1.1), and body weight was reduced by $1.1 \text{ kg} \pm 21.4$ ($p < 0.05$, ES=0.9) and BMI by $0.38 \pm 5.62 \text{ kg/m}^2$, ($p < 0.05$, ES=0.9). The International Physical Activity Questionnaire (IPAQ) demonstrated an increase in walking behavior ($p < 0.05$). The Behavioral Regulation in Exercise Questionnaire-2 (BREQ2) findings indicated improvements in the subscales of introjected regulation, ($p < 0.05$) and identified regulation, ($p < 0.05$). Results of the Self-Regulation

Questionnaire (SRQ) showed improvements in the subscales of receiving, implementing, and assessing, ($p < 0.05$).

Conclusion. The WOW study demonstrated that the results of the pilot WOW could be replicated in a standardized program by trained wellness coaches. A further understanding of the mechanism for the health changes was identified with the IPAQ; an increase in walking behavior, but also a decrease in sedentary behavior, and an increase in metabolic equivalents (MET) expenditure. Self-regulation improvements in the subscales of introjected regulation and identified regulation demonstrate show promise as targets for future interventions. These results suggest the efficacy of the WOW program and future work should include a randomized controlled trial.

Introduction

Workplace wellness programs are integral to achieving a healthy workplace culture and while workplace wellness programs that aim to modify physical activity and dietary behaviors of employees are well established in corporate settings^{187,188} they are less common in the healthcare industry. This is surprising; given the potential ancillary benefits, a wellness program for healthcare providers could have on the patients they serve. It is assumed, that an industry of staff that are providing healthcare would be knowledgeable and practice a healthy lifestyle themselves. Paradoxically, it is common to see that clinician's that are under stress burn out. A specific healthcare setting that may uniquely benefit from a workplace wellness program is an outpatient hemodialysis clinic. Working at a dialysis clinic is a stressful occupation, in part due to the stress of caring for patients with kidney failure who have multiple comorbid diseases and high mortality rates^{28,189,190}. However, to date there are no reported wellness programs in the literature in dialysis clinics. This is unfortunate, as improving the health of health care workers

has the potential to influence the health behavior modeling and quality of care they provide to their patients. Therefore, the present proposal is valuable to demonstrate content validity, implementation fidelity, and outcome reliability of the proposed program, for the staff of an outpatient hemodialysis clinic.

A review of strategies employed by workplace wellness programs suggests that considerable investment of time and effort is required to run and maintain a successful program, through tasks such as developing guidance materials, interfacing with participants, goal setting, collecting and entering data for analyses, and providing feedback on progress ¹⁹¹. Approaches that streamline intervention delivery and evaluation while demonstrating content validity, implementation fidelity by the facilitators, and reliability of the tools utilized to result in repeatable outcomes are therefore needed, particularly if the evidence base is to translate into cost-effective, health promotion practice. Researchers have adopted standardized programs to automate aspects of their workplace wellness interventions ^{192,193}.

Nutrition and physical activity behaviors directly and indirectly (through weight status) impact the risk for many chronic diseases, and modifications of behaviors can improve health outcomes ^{17,194}. Variation in employment categories, such as backgrounds, occupation, and other variables, may affect implementation and guide approaches to enhance acceptance of health promotion programs. This extends beyond the individual employee to the characteristics and culture of the organization. Hannon et al, identified numerous barriers (cost, time, and an unsupportive culture) to worksite wellness programming from the perspective of human resource representatives involved in worksite programming ¹⁹⁵. Though a dialysis clinic is a unique environment with novel barriers, the motivation for lifestyle change may also be high due to the constant exposure to unhealthy patients ^{196,197}.

Multi-process Action Control Model

In the pilot study of the WOW program, participants self-selected to participate in the workplace wellness program, demonstrating an intent to make changes in their physical activity and nutritional behaviors. Intention is often considered the proximal variable to behavioral enactment. Through this pilot intervention we targeted (7) constructs in an attempt to identify a behavior change model or framework in which to ground the proposed RCT: 1) volitional regulation behaviors; 2) affect, self-efficacy/ behavioral skills; 3) outcome expectations; 4) endogenous factors; 5) external factors; 6) habit; and 7) identity. After reviewing the available models, frameworks, and theories and the results of the pilot study, a focus on behavior change techniques¹⁹⁸. The intervention was informed by many of the behavior change techniques from the multi-process action control model (M-PAC) which is composed three phases; intention, action, and maintenance. The constructs of the M-PAC model are; 1) motivational processes, 2) regulatory processes, and 3) reflexive processes. For the purpose of the WOW program we targeted these (3) constructs in the following ways; 1) *Motivational Processes*. Participants in the WOW program have selected to participate in a worksite wellness program and as a result have demonstrated a mental aim to enact the behavior (decisional intention). Once this intention has been formed, the research team targeted intention-behavior translation by facilitating; attitude and outcome expectations (reinforce utility of the behavior), affective judgements (enjoyment and pleasure), and perceived control (ability and self-efficacy) through weekly one-on-one coaching sessions and the larger group physical activity and nutrition challenges. 2) *Regulatory Processes*. Once the participants engaged in the behavior change, the research team facilitated the development of regulatory behaviors (coping, planning for barriers, self-monitoring). 3) *Reflexive Processes*. Over time, the continuation of the targeting action control and repeated

behavior developed reflexive processes such as automaticity/ habit formation. The participants developed a routine and self-identity that is inclusive of the behavior.

Reach Effectiveness Adoption Implementation and Maintenance (RE-AIM) Framework

Using the RE-AIM framework, we reported the findings of Study 3 (Chapter 4) and improved the public health translation of the program. This allowed the research team to create and disseminate a comprehensive, standardized and manualized program that can be utilized by third party facilitators in dialysis clinics across North America and the world with a high level of reliable replicability.

Over the last several decades, an epidemic of “lifestyle diseases” has developed in the United States. Unhealthy lifestyle behaviors, such as inactivity and poor nutrition choices, are driving up the prevalence of chronic disease. Chronic conditions have become a major burden, as they lead to decreased quality of life, premature death, and disability. Although chronic disease was once thought to be a problem of older age groups, there is a shift toward onset during Americans’ working age. As a result, employers are adopting health promotion and disease prevention strategies, commonly referred to as a worksite wellness program. These disease prevention programs aim to prevent the onset of disease (primary prevention) or to serve as a mechanism of disease management (secondary prevention), reducing future economic burden to the organization and to the health-care system. To date there has been limited research performed on the efficacy of worksite wellness programs amongst the staff in a healthcare setting and there have been no reported studies examining the impact of worksite wellness programs in an outpatient hemodialysis center.

Standardized, comprehensive intervention programs are necessary to allow replication of the intervention outcomes⁵⁶. They make the intervention repeatable for at least four reasons:

First, they are necessary in the identification and understanding of which techniques best contribute to intervention effectiveness. Second, they allow those who are implementing the program to compare and contrast the outcomes achieved to a normative population in the environment in which they are being introduced, (eg. a dialysis center). Third, the standardization of the delivery of an intervention is necessary for reliably linking behavior change theories to mechanisms of action, and therefore understanding how interventions work ⁵⁶. This allows intervention effectiveness to be optimized by providing knowledge about how techniques may be effectively combined together and how intervention effects are likely to generalize across situations. Moreover, such information is fundamental to theoretical development ⁵⁶ and requires linking intervention techniques with theoretical constructs and theories of behavior change. Without a reliable method of specifying techniques, such mapping, is impossible. Lastly, standard technique definitions are required for effective implementation of interventions from research protocols to practice ‘in the field’. By ensuring that effective intervention, techniques delivered as intended such definitions facilitate implementation of evidence-based practice across different health care contexts.

A standardized manual of the WOW program including a plan for the recruitment, selection, orientation and training of wellness coaches will assist with confirming the validity of the intervention. Reporting the fidelity or ability to replicate the outcomes of the program when it is implemented by others, and the reliability of the reporting of the intervention will allow for a precise delivery, with wider distribution, and the dissemination of the intervention across the United States and potentially internationally in outpatient hemodialysis centers.

Validity. The internal validity of an intervention assess whether the findings are due to the intervention or some other factor. The external validity is the degree to which we can

generalize the findings to another group, place, or time. Therefore, it is the responsibility of clinical researchers to provide extensive information on their intervention study in their reports, well beyond issues affecting its internal validity.

Fidelity. Fidelity of an intervention is demonstrated when a facilitator that is external to the original research team is able to replicate the intervention with a high degree of precision. Fidelity of intervention implementation involves: developing detailed and appropriate training and orientation to program resources, monitoring the delivery of the intervention to identify issues related to the clarity, comprehensiveness of the intervention resources, and logical sequencing of the information given to participants; and the relevance of and ease with which the intervention activities are performed.

Reliability. Current reporting of interventions in published manuscripts fall short of the detail required for reliably identifying intervention content ^{77,78,83,199} and hence limits the possibility of identifying the effective ingredients within the interventions ⁵⁶. Reporting of intervention content is often brief and imprecise with interventions being broadly characterized. In some cases, reporting does not mention content but, instead, describes mode of intervention delivery such as “face to face” or “nurse delivered” or in terms of the number of intervention sessions. Researchers must be able to perform exactly the same intervention, under the same conditions, and generate the same results. This will reinforce the findings and ensure that the wider scientific community will accept the hypothesis. Without the replication of statistically significant results, the intervention has not fulfilled all of the requirements of testability. The goal of our work is to establish an effective and sustainable worksite wellness program at an outpatient hemodialysis center and to examine the reliable replication of a standardized program by trained wellness coaches.

Specific Aim 1: To replicate the findings in Study 1 (Chapter 2)

Specific Aim 2: To demonstrate the fidelity of delivery of the WOW program by trained WOW wellness coaches

Our *central hypothesis* is that the implementation of the standardized WOW program by trained wellness coaches will result in; demonstrated content validity of the resources in the manual, implementation fidelity by the facilitators, and the reliable replicability of the program demonstrated by improvements in physical activity behavior and decreases in dietary sodium intake.

Methods

Participants

Outpatient hemodialysis center staff were recruited for the WOW research study from two clinics in Oak Park, IL and River Forrest, IL. Participants were recruited via a 10-minute presentation at their monthly staff meeting and by poster advertisement in the clinic break rooms. Staff who self-selected to participate in the program (n=26) were screened for participation by a member of the research team. Four participants dropped out of the study. The inclusion criteria was working in the dialysis center for a minimum of 3-months. Participants who met the physical activity guidelines were encouraged to engage in resistance exercise using the NIH exercise and aging manual and bands provided by the research team. The exclusion criteria were current pregnancy or plans to become pregnant within the 12-week program period.

Table 4.1 Characteristics of participants at Baseline: Means (SD)

Variable	n = 26; m = 6, f = 20
Age (years)	46.8±12.2
Height (cm)	166.9±10.6
Weight (kg)	80.3±19.7
Body Mass Index (kg/m ²)	28.7±5.6
Systolic Blood Pressure (mmHg)	126.3±17.7
Diastolic Blood Pressure (mmHg)	85.0±12.6
Resting Heart Rate (bpm)	78±11
Waist Circumference (cm)	96.9±14.8
Hip Circumference (cm)	111.7±13.6

Procedures

The WOW2 program was informed by the findings in the WOW pilot program (Chapter 2). Key changes that were made to the WOW pilot program were the development of a standardized training manual and resources to aid in the delivery the WOW program. Resources included; monthly newsletters (3), weekly handouts (12), weekly challenge posters (12), NIH strength training manual and Thera-band, and a fitbit activity tracker to borrow for the duration of the study. The scripted weekly coaching sessions had questions focused on translation of the WOW program to patients; reminders to share the information, questions about their confidence to share the information, and willingness to coach. Weekly cues to action that were delivered via text message were scripted and included in the manual as were the weekly one-on-one wellness coaching sessions.

All testing took place in the dialysis center prior to or at the conclusion of a regularly scheduled clinic shift; at baseline, week 6 and within two weeks of the conclusion of the program. Testing included anthropometric measures; resting blood pressure, resting heart rate, waist and hip circumference, height, and weight. Participants completed the following questionnaires; Modified Obstacles to Action (Appendix A), Short Form 12 (SF12)¹¹², Behavioral Regulation in Exercise Questionnaire-2 (BREQ2)¹¹⁶, Self-regulation Questionnaire

(SRQ)¹¹⁴, Self-Efficacy Walking Scale (SEW_DIST)⁶¹, International Physical Activity Questionnaire Short Form (IPAQ)¹⁰⁹. Each Wellness Coach administered the Big Life Sodium Calculator¹⁰⁵ every other week for the duration of the study and collected the ASA24^{99,100} at baseline, week 6 and week 12-14.

Each of the weekly coaching sessions had a script for the wellness coach to follow and an associated handout with educational information related to physical activity or reducing dietary sodium. Sessions were 5 to 10 minutes in duration. In addition, on Sunday's, scripted weekly prompts were sent via text message to each participant reminding them of the start of the weekly challenge and their task(s) for the week.

Statistical Analysis

Statistical analysis was performed using SPSS v.24. Our sample size of $n = 26$, was a convenience sample that will allow us to collect data for calculating effect sizes that can be used to designed appropriately- powered studies for continued larger scale interventions. All primary and secondary outcomes were assessed by one-way Analysis of Variance (ANOVA) comparing values at the different testing time points, with significance at ($p < 0.05$). Paired sample t-test was used to for the questionnaire (IPAQ, BREQ2, SEW_DIST, SF12) data that was collected at baseline and post intervention.

Subject Remuneration

Participants that completed the weekly challenges had their name put into a lottery that was held at the conclusion of the program for a \$50 gift certificate.

Results

Twenty-six staff were recruited to participate in this study, including 2 social workers, 1 dietitian, 1 clinic administrator, 8 nurses, and 14 dialysis technicians. Participant characteristics

are shown in Table 1. Retention with the intervention was 77% as evidence by the intervention completion of 20 of 26 subjects recruited. The rate of compliance was measured by attendance at weekly coaching sessions, and 88% of coaching sessions were attended by participants as evidence by the weekly coaching notes kept by the wellness coach.

The program also resulted in improvements in several health related metrics. This included reductions in body weight ($1.07\text{kg}\pm 21.4$; $p < 0.05$) (Figure 3.1.) and body mass index ($p < 0.05$). The participants also increased physical activity behavior (Table 3.1). We observed a non-significant combined scoring of the BREQ2 but a significant change in the sub-scales of introjected regulation, the type of motivation that propels individuals who engage in activities to avoid negative emotional states, and identified regulation, which is based on the importance ascribed to the outcome, not the activity itself, ($p < 0.05$) (Table 3.2). The overall score of the SRQ was non-significant but the subscales of receiving and implementing changed over the course of the WOW program, ($p < 0.05$). Systolic blood pressure change was non-significant but trending toward significance at, ($p = 0.08$) while diastolic blood pressure was reduced, ($p < 0.05$).

Table 4.2 Descriptive statistics from the BREQ2, (n = 16)

Item No	Mean Pre (SD)	Mean Post (SD)	Min-Max
Factor 1: Amotivation			
5. I don't see why I should have to exercise	3.88±0.32	3.83±0.37	0-4
9. I can't see why I should bother exercising	3.53±1.04	3.50±0.83	0-4
12. I don't see the point in exercising	3.71±0.96	3.83±0.50	0-4
19. I think exercising is a waste of time	3.82±0.51	3.72±0.56	0-4
Factor 2: External regulation			
1. I exercise because other people say I should	3.76±0.55	3.44±0.90	0-4
6. I take part in exercise because other people say I should	3.47±1.04	3.67±0.67	0-4
11. I exercise because others will not be pleased with me if I don't	3.52±1.04	3.72±0.65	0-4
16. I feel under pressure from my friends/family to exercise	3.29±1.23	3.44±0.96	0-4
Factor 3: Introjected regulation *			
2. I feel guilty when I don't exercise	1.76±1.001	2.28±1.33	0-4
7. I feel ashamed when I miss an exercise session	2.64±1.57	3.11±1.05	0-4
13. I feel like a failure when I haven't exercised in a while	2.52±1.42	3.50±1.15	0-4
Factor 4: Identified regulation *			
3. I value the benefits of exercise	3.52±0.70	2.94±0.70	0-4
8. It's important to me to exercise regularly	2.82±1.10	2.61±1.01	0-4
14. I think it is important to make the effort to exercise regularly	2.94±1.35	2.50±0.96	0-4
17. I get restless if I don't exercise regularly	1.76±1.40	1.56±1.38	0-4
Factor 5: Intrinsic motivation			
4. I exercise because it's fun	2.35±1.49	2.56±0.90	0-4
10. I enjoy my exercise sessions	2.86±1.11	2.71±0.89	0-4
15. I find exercise a pleasurable activity	2.76±1.00	2.33±0.94	0-4
18. I get pleasure and satisfaction from participating in exercise	2.64±1.13	2.67±0.88	0-4

Note: * p < .05

There were significant changes in physical activity behavior, specifically walking behavior ($p < .05$), as indicated by the IPAQ (Table 3.). There were no significant changes in mean caloric (baseline: 1720.7 ± 547.1 , 6-week: 1481.4 ± 461.6 , post: 1468.9 ± 418.3) or dietary sodium intake (baseline: $2843.0.7 \pm 1212.0$, 6-week: 2495.5 ± 1117.9 , post: 2702.2 ± 1508.3) from baseline to post testing as measured using the ASA24. There were no behavioral changes in dietary sodium intake detected using the Big Life Sodium Calculator.

Table 4.3 IPAQ self-reported physical activity behavior (n = 20)

Activity	Baseline (Mean±SD)	Post (Mean±SD)	Effect Size
Sitting (hours per day)	3.76±3.23	3.34±2.02*	.199
MIPA (minutes per day)	17.65±17.07	15.44±12.00	
VIPA (minutes per day)	14.05±21.01	14.11±15.88	
Walking (minutes per day)	114.38±234.54	197.81±223.11*	.365
Total physical activity (MET minutes per week)	934.35±911.41	1838.8±1481.70*	.76

Note: MVPA = moderate intensity physical activity; VIPA = vigorous intensity PA
* $p < .05$

Discussion

The WOW2 program was able to replicate many of the health outcomes of the WOW pilot program; body weight reductions, BMI improvements, a reduction in diastolic blood pressure and a trend toward reducing systolic blood pressure when delivered by trained wellness coaches. Through WOW2 we were able to quantify the physical activity change that occurred through participation in the program. We observed a reduction in sedentary time in the presence of an increase in walking behavior. The WOW2 study provided new insight into the potential intervention targets. We observed changes in self-regulatory functioning in the subscales of triggering ($p < 0.05$) and evaluating ($p < 0.05$) of the SRQ.

The scripted wellness coaching sessions and weekly challenges emphasized identifying barriers to making healthy physical activity and dietary sodium choices and in taking action to overcome these barriers. Similarly, the weekly handouts focused on building the knowledge base

of the participants and included exercises that had them critically evaluate their current habits and behaviors. The change in overall self-regulatory score was not significant but the mean at baseline fell into the moderate rating and the intervention was not robust enough to merit changes to high self-regulation capacity. Self-regulation related to exercise behavior as measured by the BREQ2 showed promising improvements in the subscales of introjected regulation ($p < .05$) and identified regulation ($p < .05$). Introjected motivation comes from only partially internalized activities. It propels individuals to avoid negative emotional states including shame, guilt, anxiety or to maintain their feelings of self-worth ²⁰⁰.

We did not observe a change in dietary sodium intake or nutritional behavior as measured by the ASA24 or the BigLife Sodium Calculator. Dietary assessment is time consuming and often under-estimates intake due to under-reporting and difficulties quantifying sodium concentration ²⁰¹. It is imperative to highlight that the WOW2 program occurred over two observed holidays in the United States, Thanksgiving and Christmas. The holiday season is correlated with an increase in high energy food consumption as well as an increase in the frequency of eating outside the home, which are both associated with higher dietary sodium ^{202,203}. Research suggests that the winter holiday season may present special risks for weight gain to those who are already overweight or obese ^{204,205}.

Given, that participants were engaging in new behavioral patterns, meeting with a wellness coach on a weekly basis, were assigned tasks and encouraged to report back on their behavior for what may have seemed evaluation. It makes sense that this means of self-regulation would be evident in the first 12-weeks of program. Identified regulation is one of the autonomous forms of extrinsic motivation. It regulates behaviors based on the importance ascribed to the outcome, not the activity itself ²⁰⁶. Assumed that many of the participants in the

pilot WOW described hope and desire for personal change (Chapter 3) as their reason for participation in a workplace wellness program this finding corresponds very strongly. The overall scale scores of the BREQ2 were not significant and could be attributed to the small sample size.

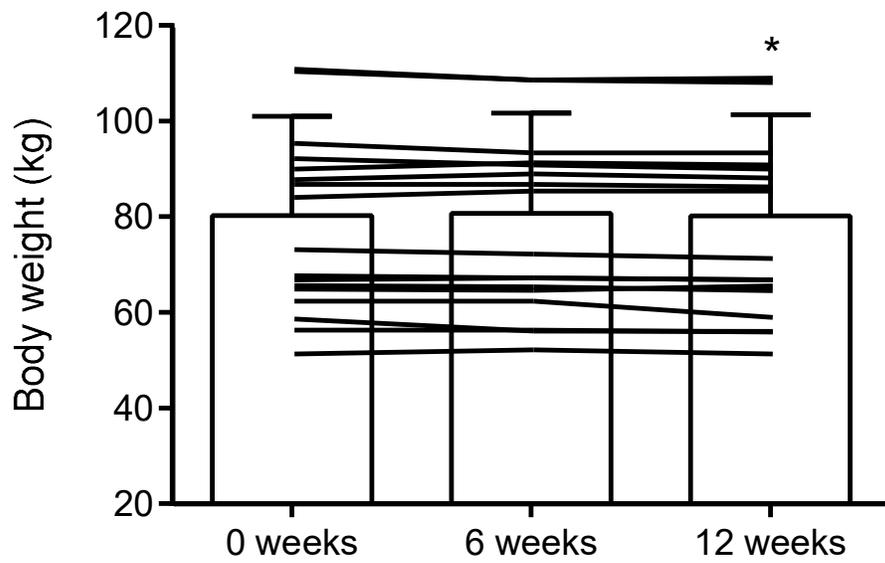
Limitation and Future Research

The single group design of the intervention is a limiting factor and the next iteration of the WOW study should have a control group. In future studies we would avoid the American Thanksgiving and winter holiday season. The sample size was small, (n = 26), with fewer male subjects, but reflected the size of the outpatient hemodialysis centers at Oak Park, IL and River Forrest, IL. Future studies need to assess if the improved health behaviors of the staff can be transferred to the patients

FIGURE 4.1

Figure 4.1 Body Mass Change

FIGURE 4.1. Body mass (kg) change throughout the 12 week Workplace Wellness Program in the staff of a dialysis clinic ($n=26$). Lines denote individual changes in body weight throughout the intervention.



**CHAPTER 5: USING THE RE-AIM FRAMEWORK TO EVALUATE A
STANDARDIZED WORKPLACE WELLNESS PROGRAM IN OUTPATIENT
HEMODIALYSIS CENTERS**

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Key words: Hemodialysis, Physical Activity, Dietary Sodium, End Stage Renal Disease, RE-AIM

Abbreviations used: End Stage Renal Disease (ESRD), Reach Effectiveness Adoption
Implementation Maintenance (RE-AIM)

⁴ All co-authors agreed to their contributions being included in the dissertation.

ABSTRACT

Background: Working on Wellness (WOW) was a 12-week intervention designed to promote physical activity, walking behavior, and decreasing dietary sodium intake in the staff of outpatient hemodialysis centers in the Chicagoland area. It is a standardized program designed to be disseminated by trained wellness coach volunteers. We used the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework to evaluate this intervention through interviews with 4 WOW wellness coaches.

Objective. We aimed to apply the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework to the standardized program.

Methods. At the conclusion of the WOW program, weeks 12-14 we held semi-structured interviews with the trained wellness coaches (n = 4). Interviews were audio-recorded and analysed using thematic analysis.

Results. The sample consisted of the four WOW wellness coaches that delivered the WOW intervention, representing 100% of the sample. Of the 80 eligible staff at the Oak Park and River Forrest Clinics we had (n = 26), a reach of 33%. To capture the perceived reach of the program the four-wellness coaches were asked, “After facilitating the WOW program, how have you applied what you have learned to others?”. Effectiveness was determined by the health outcomes achieved by the staff participants in the program and by the interview with the wellness coaches when they were asked, “Why do you think workplace wellness programs, specifically WOW are effective?”. Adoption was reported by the completion of the checklist that accompanied wellness coach training and the weekly task checklist (100% completion) for facilitators of the program (100% completion). As well as the perceived quality of adoption of the program by the WOW wellness coaches when they were asked, “How could the hemodialysis centers be more

supportive of the WOW program?”. Implementation was measured by the coach useage of the standardized manual, and task lists. Coaches were asked to, “Describe your coaching process in the WOW program”. Maintenance was addressed when the wellness coaches were asked, “Do you believe the WOW program will continue following the research intervention?”

Conclusion. Our use of the RE-AIM framework to evaluate the intervention serves as a comprehensive evaluation of the perceived health impacts of the WOW program when delivered by trained wellness coaches.

Introduction

Lifestyle interventions are often designed for tightly controlled research settings. Translating these interventions to practice allows for a greater public health effect, although the feasibility of producing the same results is often unknown ⁸³. The recent focus on translating research projects into public health interventions ⁷⁷ led to the development of the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework to assess the effects of a workplace wellness program that were developed, implemented, and evaluated in a tightly controlled environment and then disseminated for wider use ⁷⁸. Reach is the proportion of eligible people in the target population who participate in an intervention and the extent to which those participants represent the target population. Effectiveness is the extent to which the intervention has a positive effect on the targeted outcomes. Adoption is the number of participants in the larger sample population who choose to engage with the program. Implementation is sometimes called treatment fidelity. Maintenance is a measure of the intervention’s effectiveness at achieving the desired outcome for an extended time. It is also a measure of the sustainability of a program and indicates whether a program is likely to become institutionalized ¹⁹⁹.

Most evaluations do not assess all RE-AIM components: most assess reach and effectiveness, and some assess adoption, implementation or maintenance at the individual or organizational levels^{53,78}. Success at translating behavioral programs into organizational practice means that we pay close attention to the elements of a program that can most easily be translated into practice⁸³.

The WOW Program

The WOW program was a 12-week workplace wellness program, which is described in detail in Chapter 4. The intervention was designed for the staff and the unique operation characteristics of an outpatient hemodialysis center. The lifestyle intervention was targeted two specific lifestyle behaviors; increasing physical activity and decreasing dietary sodium intake. These two specific lifestyle habits were the focus as they are two important health promotion messages that are shared with End Stage Renal Disease patients.

Several intervention activities and resources were developed: weekly scripted wellness coaching sessions, weekly challenge posters, once monthly newsletters, weekly educational handouts to assist participants to become active and eat more healthfully.

Training WOW Wellness Coaches

The WOW project research staff trained wellness coaches to coordinate their subjects and to deliver the intervention within their assigned dialysis center(s). Wellness coaches were recruited from the University of Illinois, Chicago from a Kinesiology internship class. The opportunity to participate was shared by their instructor during class. Students applied to the posting with a cover letter and curriculum vitae. Applications were reviewed by the research team and applicants were invited and scheduled for a phone interview. Phone interviews consisted of 8-questions in the areas of; knowledge, experience, communication, and future

career aspirations. Following the offer of a position wellness coaches were scheduled for programmatic training and orientation, (4-hour training), and were required to provide documentation of CITI training and vaccination records in order to work in the hemodialysis center. The in-person training consisted of a checklist of requirements consisting of reading and reviewing; the IRB protocol, the daily and weekly program checklists, the WOW facilitator manual, the posters, challenges and weekly handouts. Wellness coaches demonstrated their ability to take the following measures; waist circumference, hip circumference, blood pressure with an automated cuff, resting heart rate, height and weight. They received a pass, a pass with corrections, or a fail from the research team. All WOW coach trainees passed the skills test. Wellness Coaches were graded on their WOW program facilitation on a grading rubric .

Methods

We interviewed the 4 trained wellness coaches from the WOW program (3 undergraduate students studying Physical Education and Kinesiology and 1 graduate student studying Kinesiology and Community Health). The interviewees consented verbally to participate. A trained member of the research team conducted all of the interviews and audio recorded the interviews.

An interview guide was developed to assess each component of RE-AIM. The guide consisted of open-ended questions. Wellness coaches were asked to describe details about their program activities, barriers they encountered, and their successes and struggles with offering the WOW program. Additional details about the interview guide are given in the next section with the description of how we assessed each component of the RE-AIM framework.

Reach

To assess reach (the proportion of eligible people in a hemodialysis center who participated in the WOW intervention) we calculated the percentage of those who self-selected to participate to those who met the recruitment criteria in both the River Forrest and Oak Park hemodialysis centers. In addition, we asked interviewees, “After facilitating the WOW program, how have you applied what you have learned to others?”

Effectiveness

The effectiveness of the WOW program was determined by measuring dietary sodium reduction via the Automated Self-Administered Recall System (ASA24) and increases in physical activity via the International Physical Activity Questionnaire (IPAQ), at baseline and post intervention (12 to 14-weeks). WOW wellness coaches were asked, “Why do you think the WOW program was effective?”

Adoption

Prior to the start of the WOW program the research team conducted checklist based training for the WOW intervention for each of the WOW coaches. Training was verified by both the wellness coach and the trainer and the checklist was signed by both parties. Wellness coaches were asked “How could the hemodialysis centers be more supportive of the WOW program?”.

Implementation

We measured the level of implementation (ie. Fidelity to delivering the WOW program as the developers intended) at outpatient hemodialysis centers by providing each wellness coach with a program manual with a weekly checklist of to-do items. Wellness coaches kept clinical notes, with each session beginning with a theory based scripted prompt or cue to action. Interviewees were asked, “Describe your coaching process”. The checklist training, weekly

checklists, scripted prompt/ cue to action, clinical notes, and interview question determined how well each wellness coach adhered to the program's principles when implementing the intervention.

Maintenance

Following the research study (0-2 weeks after, we conducted wellness coach interviews. The wellness coaches were asked, "Do you believe the WOW program will continue following the research intervention?"

Results

We were able to recruit the entire sample of wellness coaches (n = 4). All interviewees were female. The interviews were performed 2-weeks following the conclusion of the WOW program.

Reach

A total of (n = 26) outpatient hemodialysis center staff (Oak Park; n = 7, River Forrest; n = 19), about 33% of all eligible staff, participated in the WOW program. A total of n = 4, (40% of those eligible), wellness coaches were selected, trained and participated in the of the WOW program. We recruited (n = 10), eligible coaches, from those who interviewed two (n = 2), were not selected to move forward to the orientation and training, and four (n = 4), self-selected not to participate in the research study.

Interviewees were asked "After participating as a coach in the WOW program how have you been able to apply what you learned to others?". Coach 2 said, "...I have been using pieces of the program with my family and parents", similarly Coach 4 stated "...I would talk about the handouts with my friends in classes and shared what I learned with my family. It made me really happy to share with my grandma (who is on dialysis)".

Effectiveness

As previously reported in chapter 4, (n = 20), subjects started and completed the WOW program (77%). The intervention had significant effect on physical activity behavior as reported in the IPAQ ($p < 0.05$) and a decrease in body weight ($p < 0.05$) and body mass index ($p < 0.05$). The four wellness coaches were asked, “Why do you think workplace wellness programs, specifically WOW are effective?”.

Coach 2. “I think it was effective because of how frequently they met with us...we build a relationship and they trust us...knowing them let us individualize it.”, similarly, Coach 3. said “...they are setting a good example for their patients. I see them changing what they talk their patients about and making the connections about what we talk about.“.

Coach 4. “The staff is learning a lot ...there are a lot that their patients can get from this as well... many of my participants said they were sharing what they were learning with their patients.”

Adoption

The most commonly reported challenges by the wellness coaches in the clinic adopting the program were; support from clinic managers in the recruitment process, a flexible schedule to allow meetings during the work day, and dedicated space to conduct the program from.

Coach 2. said, “I feel like I was getting in the way...it would be nice to have a dedicated space”. In addition,

Coach 1. said, “It would be great to have more staff participate but I think the clinic manager needs to encourage them to join...it would be nice to have the freedom to meet with them while they are working or during their work day“.

Coach 3. said, “..they were supportive but it would have been great to have the clinic supervisors participate and tell the staff that they should participate.”

Implementation

Adherence to wellness coaching appointments was (92%). Wellness coaches completed the weekly checklist with a 100% compliance.

Coach 3. said, “I always followed the script and I used my manual to prepare ahead of my scheduled appointments...it made me feel more comfortable because I knew what we would talk about.”

Coach 4. said, “..the manual and resources were very helpful...if ever I wondered what to do I would just look at the checklists or manual.”.

The coaches all mentioned the importance of relationship building in the implementation of the resources.

Coach 2, “...to make sure the person feels comfortable and that you are listening...take time to listen..”.

Maintenance

When asked, “Do you believe the WOW program will continue following the research program?”, coaches responded with elevated and/or excited tone to their voices. Wellness coaches had hope that the program would continue as referenced by their responses.

Coach 3. “I think it will...they were excited to see us and they listened...” and,

Coach 2. “I do think they will...I think 12-weeks was the right amount of time to develop habits...”.

They believed that at an individual level they had observed transformational changes.

They believed that without the weekly accountability that a meeting with a wellness coach provided that those who were not intrinsically motivated would not continue.

Coach 1. “It’s if the motivated people are able to inspire their peers....I saw a lot of variability between participants.”

Discussion

This study was done in response to 1) the the recent call for evaluations of how research findings translate into clinical practice, and 2) the need for understanding the logistics and global implementation of such research projects ^{77,83,199,207}. Study findings provide a comprehensive overview of the implementation and evaluation of the WOW program for outpatient hemodialysis center staff. By using the RE-AIM framework, research project staff collected valuable formative and summative information that assisted with implementing the intervention and providing wellness coaches with technical assistance. Overall, the intervention was effective at increasing physical activity, and resulted in improvements in health outcomes ($p < 0.05$). The WOW intervention was not successful at inducing reductions in dietary sodium intake. This can be attributed to the timeframe at which the intervention was conducted, over the American Thanksgiving and winter holiday(s). Elements of the RE-AIM analysis demonstrate why the WOW program was not more impactful.

We examined the public health effect of the WOW program using the RE-AIM framework to assess the individual and organizational factors associated with a public health project in a complex healthcare setting, an outpatient hemodialysis center. The intervention as designed did not reach male coaches, which means the training and wellness coach support may

need to be adapted for males. Other public health programs found that recruiting an organizational leader as a role model and supporter of the program can increase participation ²⁰⁸.

More than one person for each hemodialysis center was trained as a wellness coach so that program implementation was not dependent on one person. Our results emphasize that the program's success depended on wellness coach volunteers that were recruited from an academic class for credit as an internship. Future interventions should consider other approaches to implementing the program in hemodialysis centers. Theories on the capacity of a community to implement and maintain health promotion programs emphasize the need to train and motivate volunteers in order to be successful ²⁰⁹.

To ensure the institutionalization and sustainability of the intervention, it is essential to ensure that wellness coaches are recruited, interviewed, and receive adequate training and support. Future large scale interventions could include additional trainings related to overcoming barriers, recognize successes, and network with other wellness coaches.

Based on the hopeful, but not confident responses of the wellness coaches when asked whether they believed the WOW program would continue at the conclusion of the research study, we believe that additional strategies to encourage and support continuation of the intervention are needed. Some ideas are holding special in-service trainings at future hemodialysis center meetings, and developing new program activities to increase interest and excitement for the program, and to engage clinic administrators to encourage the staff to participate.

This intervention included activities designed to create opportunities for social interaction in the work environment. Perhaps providing additional social opportunities and the placement of additional environmental cues and reminders about the program would have improved engagement and participation.

This study assessed factors that affect the many layers of this intervention in order to understand individual and organizational participation. The RE-AIM model allowed us to examine comprehensively the intricacies of program design, implementation, and evaluation. Klesges et al (2005), indicated the need for designing health promotion programs with dissemination in mind ²¹⁰. Recent research ^{77,83,211} identifies the need to focus on the public health effect of health promoting programs when considering issues of design and dissemination. This study contributes to the limited body of knowledge on interventions that are translatable beyond a tightly controlled research setting.

Limitations and Future Research

This study has some limitations. Although the interviewees were representative of the entire sample they may have been biased. Those who acted as wellness coaches were receiving course credit for facilitating the WOW program. Some may be reluctant to disclose that they were not successful with their programs for fear of repercussions. Related to this limitation, because this study relied on self-reported information, the possibility that interviewees gave socially desirable responses must be considered. Interviewees may have wanted to make themselves or their clinic group look successful. Despite these limitations, these results contribute to a growing body of knowledge about the design, implementation, and evaluation of workplace wellness programs implemented in health care setting, specifically outpatient hemodialysis centers, to increase levels of PA and to decrease dietary sodium intake. Limited information is available about the RE-AIM framework for health promotion programs conducted in partnership with health care settings. This study provides the groundwork for future outpatient hemodialysis center health promotion programs as a model for intervention design,

implementation, and dissemination. In addition, the results of this study contributed to the further development of the standardized program.

CHAPTER 6: GENERAL DISCUSSION

The comprehensive aim of this dissertation was to improve the understanding of the feasibility, impact, and sustainability of implementing a standardized workplace wellness program in an outpatient hemodialysis center; the impact of the program on the staff and the opportunity to positively affect the patient population. Previous work has focused on the workplace as a setting for wellness interventions and demonstrated that some workplace interventions can improve both health and important worksite outcomes²¹². To date there have not been any studies conducted in the specific healthcare setting of an outpatient hemodialysis center, and we sought to close this gap. In addition, evidence has demonstrated that health care providers' recommendations act as a catalyst for adherence to health-promoting behaviors within their patients^{82,141,161}. The present chapter will highlight the major findings from the studies presented in chapters 2-5, and discuss any potential limitations of the studies. Future areas for research in this area will also be discussed.

Chapter 2: Working on wellness (WOW): a description of a pilot workplace wellness program in an outpatient hemodialysis center and its impacts

In study 1, of this dissertation, we wished to establish the structure of the workplace wellness program in the unique setting of an outpatient hemodialysis center, develop the standardized resources for the WOW program, and to seek out and conceptualize the latent social patterns and structures to ground future work in behavior change theory. This information was important for the development and implementation of a more effective future versions of WOW intervention that was described in chapter 4. It was previously demonstrated that workplace wellness programs targeting physical activity and dietary habits can be successful in creating more healthy lifestyles in other health care settings (e.g., nursing staffs). We replicated this

success within a unique setting of a dialysis center by demonstrating increased walking behavior and body weight loss. The latter had an obvious positive effect on their BMI score, which is important given the relationship between BMI and disease risk.

Overall, the hemodialysis clinic is a unique healthcare setting in that patients spend a great deal of time there (2-3 days/week for 4-5 hours per session) ongoing for the remainder of their lives or until they receive a transplant. The hemodialysis clinic staff have a very complex role with the patients such as being a caregiver, educator, and performing their training specific responsibilities while patients receive hemodialysis treatment. It seems plausible that if we can have a positive impact on the factors related to health amongst hemodialysis staff, this will in turn help improve patient outcomes.

Study limitations and future directions:

As with any pilot study, the participant enrollment numbers are inherently low. However, pilot work serves to provide a compass for future study design, and in this specific case, it provided the framework for study 3. The pilot work was a single group research design without the inclusion of a control group, which could be considered a weakness. Moreover, the weekly coaching sessions and resources were loosely scripted which allowed for between interventionist differences. Despite all this, the study within chapter 2 provided the necessary information to design a larger study to assess our outcomes.

Chapter 3: Experiences and further needs of outpatient hemodialysis center staff and patients in a workplace wellness program

In study 2, of this dissertation, we wished to dive deeper into the experiences and future needs of the participants in the pilot of the WOW program as well as to explore the willingness of the hemodialysis patients in the center to receive health promotion information from the staff

of the center. Interviews allowed a qualitative, deeper understanding of WOW participant perceptions, opinions, beliefs and attitudes related to their experience in the program. A patient survey allowed us to capture desire and willingness to receive health promotion information from all staff present in the hemodialysis center. Overall, this chapter revealed that hemodialysis patients are interested and willing to receive health promotion information from a variety of staff members at the hemodialysis center. In addition, the scripted interviews provided insight into; subjects motivation for participating in WOW; hope for and a personal desire for change, the raised consciousness and awareness related to physical activity and dietary sodium reductions, clarification of the staff's perceived roles and responsibilities related to health promotion, and finally that they did not clearly make the connection between their engagement in the WOW program on the hemodialysis patients that they provide care to.

Study limitations and future directions:

This work provided valuable information to inform improvements to the WOW program for future studies. In the staff interviews a larger sample of participants from all positions in the hemodialysis center would have been helpful to see be able to identify differences based on job. The participant enrollment numbers in the hemodialysis patient survey are low, (n = 10). A larger sample of hemodialysis patients and a validated survey instrument would be recommended for future work.

Chapter 4: The fidelity and efficacy of the standardized WOW program when delivered by trained wellness coaches

In study 3 of this dissertation we developed the standardized program for WOW including; weekly challenge posters, monthly newsletters (3), weekly handouts, weekly scripted coaching sessions, and a training manual for wellness coaches. We recruited, interviewed,

trained and supported undergraduate students to act as facilitators of the standardized WOW program. We implemented this program within various Chicago area clinics. Our ultimate goal was capture a larger sample size, but dialysis clinics operate within the constructs of strict administrative oversight. Hence, this limited the number of clinics that we could interact with and implement the WOW2 program. However, we managed to recruit a larger sample size, when compared to the initial WOW program, and demonstrated a similar success in terms of reductions in body weight, increases in physical activity, and improvements in subscales of self-regulation.

Study limitations and future directions:

A randomized control trial would be the next logical progression to determine the efficacy and potential for successful wider distribution of the WOW program. We would aim to avoid having the study fall across both the American Thanksgiving and winter holiday season as we believe this strongly influenced our nutritional outcomes. What is noteworthy, however, is that holidays (mid-November to mid-January) are periods of increased weight gain (~0.5-2.0 kg) within US adults^{203,205}, and most of this weight is not lost afterwards. Hence, the WOW program did successfully counteract this common body weight trend within our study participants. Future studies would factor the engagement of clinic administrators and wider institutional policy in the adoption of the WOW program. In addition, the program fidelity and sustainability may benefit from the development and evaluation of a training video for wellness coaches.

Chapter 5: Trained wellness coaches thoughts and experiences in the WOW program using the RE-AIM framework

After implementing the standardized WOW program it was evident that the recruitment, selection, and training processes of the wellness coaches would be vital to the sustainability of

the WOW program. In study 4 of this dissertation we applied the RE-AIM framework to evaluate this intervention for a wider public health impact. Reporting on measures taken within the intervention and through interviews with the four wellness coaches. The major findings from this study were; firstly, that the *Reach* of the WOW program was to 33% of all eligible staff, 40% of the eligible wellness coaches were selected and according to wellness coach interviews that the program reached others outside of the hemodialysis clinic, coach 4 stated "...it made me really happy to share with my grandma (who is on hemodialysis)". Secondly, that the *Effectiveness* of the program was reported based on a program completion rate of 77% as well as increases in physical activity behavior, decreases in body weight, and via coach interviews – Coach 4 said "...many of my participants said they were sharing what they were learning with their patients". Thirdly, *Adoption* of the program was reported based on the question posed to staff, "How could the clinics assist further with the adoption of the WOW program?" Coach 1. said, "It would be great to have more staff participate but I think the clinic manager needs to encourage them to join...it would be nice to have the freedom to meet with them while they are working or during their work day, Fourthly, *Implementation* of the program was described by staff attendance at wellness coaching appointments (92%) and by wellness coach descriptions of how they delivered the standardized program. Coach 4. said, "...the manual and resources were very helpful...if ever I wondered what to do I would just look at the checklists or manual.". Finally, the *Maintenance* of the program was determined based on reports from the coaches when they were asked if they believed that WOW would continue once the research study concluded. Coaches said with hope in their voices, Coach 3. "I think it will...they were excited to see us and they listened..." and, Coach 2. "I do think they will...I think 12-weeks was the right amount of time to develop habits...". They believed that at an individual level they had observed transformational changes.

They believed that without the weekly accountability that a meeting with a wellness coach provided that those who were not intrinsically motivated would not continue, Coach 1. “It’s if the motivated people are able to inspire their peers....I saw a lot of variability between participants.”.

Study limitations and future directions:

WOW wellness coaches were recruited from University of Illinois, Chicago where the PI has affiliation. Recruitment of students may serve to be a challenge in other regions of the state and country. Future studies would look at longitudinal maintenance of the program and associated behavior change to report in the maintenance domain of the RE-AIM framework.

Conclusions

The studies in this thesis lend support for the recommendation that a standardized WOW program for the staff of an outpatient hemodialysis center is efficacious. In addition, the program can be delivered with a high level of fidelity when WOW wellness coaches are; recruited, interviewed, oriented/ trained, and evaluated. Finally, the patients are indeed willing and have a desire to receive health promotion information from the staff of the outpatient hemodialysis center. Taken together, these data suggest that implementing a standardized workplace wellness program in an outpatient hemodialysis clinics is efficacious, and wanted and needed by staff and hemodialysis patients.

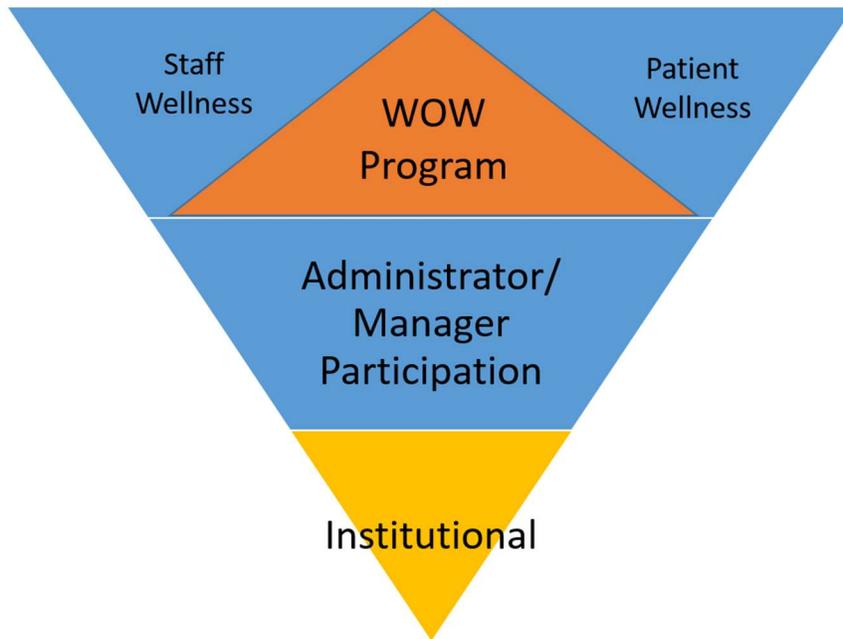
As shown in Figure 1, the studies included in this dissertation have demonstrated that the WOW program can be delivered with fidelity to that staff of hemodialysis clinics. In addition, the replicability was demonstrated when the program was delivered by trained wellness coaches which lends the program to broader dissemination. We were able to demonstrate that patients desire and are willing to receive health promotion information from a variety of members of the

hemodialysis center staff. Future research should include a randomized controlled trial that considers the transference of the program to the hemodialysis patients.

Research in workplace wellness programs to date has demonstrated the importance of higher level managements engagement with the program in order for them to be successful and research in patient-provider health promotion has demonstrated that patients are more likely to receive and put into action recommendations made by their physicians ^{163,164,181,213}. Yet in this dissertation work we did not have nephrologists choose to participate. The next ideration of the WOW program should include a targeted recruitment of nephrologists. Ideally, we would have a top down support for the program to ensure its success in hemodialysis clinics. Future work should include surveying of administrators at Fresenius and the Renal Research Institute to assess their want and desire for a workplace wellness program for their staff that may result in positive lifestyle changes in the hemodialysis patient population. Finally, to ensure sustainability of the program, video training modules to prepare coaches to deliver the program are necessary.

FIGURE 6.1

Figure 6.1 Schematic of the path of research for the WOW program.



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APPENDIX A: QUESTIONNAIRES

Beliefs, Barriers, Self-Efficacy and Knowledge (Physical Activity and Nutrition)

Part I. Please tell us about your beliefs regarding healthy foods.

1. Please indicate how much you agree or disagree with the following statements about healthy foods?

Agree						Disagree
1. Eating healthy foods would help me feel better	1	2	3	4	5	
2. Eating healthy foods would help me to take care of my body	1	2	3	4	5	
3. Eating healthy foods would help me lose weight	1	2	3	4	5	
4. Eating healthy foods would help me get more nutrients	1	2	3	4	5	
5. Eating healthy foods would help me be healthier	1	2	3	4	5	
6. Eating healthy foods would give me the energy I need	1	2	3	4	5	
7. Eating healthy foods would help me to look young	1	2	3	4	5	
8. Eating healthy foods would help to “cleanse” my body	1	2	3	4	5	
9. Eating healthy foods would be consistent with the advice of my doctor or nurse	1	2	3	4	5	
10. Eating healthy foods would help me to improve my health in other ways	1	2	3	4	5	
11. Eating healthy foods would help to keep me regular (avoid constipation)	1	2	3	4	5	
12. Healthy foods are too expensive	1	2	3	4	5	
13. Healthy foods do not taste good	1	2	3	4	5	
14. Healthy foods take too long to prepare	1	2	3	4	5	

<p>15. Healthy foods are <u>not</u> sweet enough </p> <p>16. Healthy foods are <u>not</u> salty enough </p> <p>17. Healthy foods are too low in fat </p> <p>18. Healthy foods do <u>not</u> satisfy my cravings </p> <p>19. I do <u>not</u> know how to find healthy foods in a grocery store</p> <p>20. I do <u>not</u> know how to prepare healthy foods </p> <p>21. My children don't like to eat healthy foods </p> <p>22. My friends don't like to eat healthy foods </p> <p>23. My husband/wife doesn't like to eat healthy foods </p>	
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2. Please indicate how healthy in your opinion are the following foods? (please check one answer for each food listed)

	Very unhealthy	Some-what unhealthy	Neither healthy/unhealthy	Some-what healthy	Very healthy	I do not know
Whole wheat bread	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Whole wheat cereal						
.....	<input type="checkbox"/>					
....	<input type="checkbox"/>					
Oat meal or rolled oats						
.....	<input type="checkbox"/>					
Flax seeds/meal						
.....	<input type="checkbox"/>					
.....	<input type="checkbox"/>					
Unsalted nuts (e.g. peanuts, pecans, walnuts)	<input type="checkbox"/>					
Fruits						
.....						
.....						
Orange/yellow vegetables such as carrots, squash						
Leafy green vegetables such as collards, lattice,						
Beans such as lima or kidney beans						
Red meat such as pork or beef						
Processed meats (sausages, hotdogs, etc)						

3. How often do you eat any of the following foods? (check one answer for each food type)

	I eat some but not enough	My intake is about right	I should eat more of it/the m	I should eat less of it/the m
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Whole wheat bread	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whole wheat cereal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oat meal or rolled oats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flax seeds/meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unsalted nuts (e.g. peanuts, pecans, walnuts)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Orange/yellow vegetables such as carrots, squash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leafy green vegetables such as collards, lattice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beans such as lima or kidney beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Red meat such as pork or beef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Processed meats (sausages, hotdogs, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Which of the following in your opinion may help you to prevent from diseases such as heart diseases, sugar diabetes, or high blood pressure?

	Does not at all prevent	Not prevent	Neither	Prevent	Strongly prevent	I do not know
Eating more fruits	<input type="checkbox"/>					
Eating more vegetables	<input type="checkbox"/>					
Eating more whole grains	<input type="checkbox"/>					
Eating more fiber	<input type="checkbox"/>					
Eating less total fat	<input type="checkbox"/>					
Eating less saturated fat	<input type="checkbox"/>					
Eating less trans fats	<input type="checkbox"/>					

Eating less cholesterol						
Eating less sugar						
Eating less salt						
Taking vitamins and/or mineral supplements						

Part II. Please tell us about your ability to eat healthy foods.

Healthy foods are high in dietary fiber, provide adequate amounts of vitamins and minerals and in the same time are low or free of saturated fat, trans fat, cholesterol and sodium. Such foods include fruits, vegetables, whole grains, unsalted nuts and seeds, low fat dairy products, and fish.

1. When you are grocery shopping how confident are you in your ability to? (check one answer for each food type)

How confident are you in your ability to	Not at all confident	Not confident	Somewhat confident	Very confident
Select whole grain bread or cereal in a grocery store? ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Select low fat dairy products (e.g. yogurt)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Select foods that are low in sodium?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Select foods that are low in saturated fat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Select foods that are low in cholesterol?				
Select foods high in dietary fiber?				

Select foods that are low in or free of trans fats?				
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2. Please rate how confident you feel about eating healthy foods under each circumstance.

Please circle your answers.

	Not at all confident	Not confident	Neither	Confident	Very confident
When I am hungry	<input type="checkbox"/>				
When I am happy	<input type="checkbox"/>				
When I am bored.	<input type="checkbox"/>				
When I am frustrated	<input type="checkbox"/>				
When I am stressed	<input type="checkbox"/>				
When I am feeling good	<input type="checkbox"/>				
When I am lonely	<input type="checkbox"/>				
When I am angry.	<input type="checkbox"/>				
When I am busy	<input type="checkbox"/>				
When I am depressed	<input type="checkbox"/>				
When I am anxious	<input type="checkbox"/>				
While eating out at a restaurant with close friends	<input type="checkbox"/>				
When only unhealthy foods are readily available	<input type="checkbox"/>				
When I have to prepare healthy meals for myself	<input type="checkbox"/>				
In situations when eating a healthy meal is just too much trouble	<input type="checkbox"/>				
When eating a healthy meal means I have to cook it	<input type="checkbox"/>				
When substituting a healthy food for the unhealthy food I really want is a pain	<input type="checkbox"/>				

When eating an unhealthy food is more convenient					
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Part III. Please tell us about your dietary behavior.

1. How often do you eat the following foods? (check one answer for each food type)

	More than once a day	About once a day	4 to 6 times a week	1 to 3 times a week	Less than once per week
Whole wheat bread	<input type="checkbox"/>				
Whole wheat cereal	<input type="checkbox"/>				
Oat meal or rolled oats	<input type="checkbox"/>				
Flax seeds/meal	<input type="checkbox"/>				
Unsalted nuts (e.g. peanuts, pecans, walnuts)	<input type="checkbox"/>				
Fruits	<input type="checkbox"/>				
Orange/yellow vegetables such as carrots, squash	<input type="checkbox"/>				
Leafy green vegetables such as collards, lattice,	<input type="checkbox"/>				
Beans such as lima or kidney beans	<input type="checkbox"/>				
Red meat such as pork or beef	<input type="checkbox"/>				
Processed meats (sausages, hotdogs, etc)	<input type="checkbox"/>				

2. Please indicate how often do you do the following? (check one answer for each food type)

	Never	Seldom	Sometimes	Often
Skip breakfast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Take vitamin/mineral supplements (e.g. multivitamin)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Go on a diet to lose weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Read food labels when grocery shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Look for healthy options when grocery shopping or at a restaurant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overeat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase foods that are labeled low-fat, fat-free, non-fat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase foods that are labeled low-sodium or sodium-free	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. In the next 10 to 12 months, how likely are you to increase the following foods in your diet? (check one answer for each food type)

	Not likely	Somewhat likely	I am not sure	Likely	Very likely
Whole wheat bread	<input type="checkbox"/>				
Whole wheat cereal	<input type="checkbox"/>				
Oat meal or rolled oats	<input type="checkbox"/>				
Flax seeds/meal	<input type="checkbox"/>				
Unsalted nuts (e.g. peanuts, pecans, walnuts)	<input type="checkbox"/>				
Orange/yellow vegetables such as carrots, squash	<input type="checkbox"/>				
Leafy green vegetables such as collards, lattice,	<input type="checkbox"/>				
Beans such as lima or kidney beans	<input type="checkbox"/>				
Red meat such as pork or beef	<input type="checkbox"/>				
Processed meats (sausages, hotdogs)	<input type="checkbox"/>				

4. When preparing your own food, what fat do you use most often? (check one)

- Vegetable Oil Butter

- Canola Oil
- Olive Oil
- Crisco
- Margarine
- Other (please specify): _____

5. Who would you say prepares the majority of your meals?

- Self
- Spouse/significant other
- Parent
- Fast food restaurants (McDonalds, Burger Kind, KFC)
- Restaurant
- Other (please specify): _____

Part 4. Please select the best answer to each of the following questions.

1. From the following list of foods, please select the one that is highest in fiber
 - a. kidney beans
 - b. low-fat milk
 - c. eggs
 - d. yogurt

2. Which of the following may help you to lower your cholesterol level?
 - a. low fat yogurt
 - b. oatmeal
 - c. scrambled eggs
 - d. croissant sandwich

3. Which of the following have the highest content of trans fats?
 - a. colas
 - b. doughnuts
 - c. collard greens
 - d. baked potatoes

4. Which of the following have the highest content of saturated fat?
 - a. low fat cottage cheese
 - b. cooked potatoes
 - c. eggs and sausages
 - d. raw baby carrot sticks

5. Which of the following food groups contributes most to the overall saturated fat intake in the American diet?
 - a. fruits
 - b. meats
 - c. dairy
 - d. grains

6. Which of the following have the highest content of cholesterol?
- citrus fruits
 - eggs
 - low fat milk
 - whole wheat flour
7. Which of the following is more likely the highest in sodium?
- low fat cottage cheese
 - cooked potatoes
 - rolled oats
 - raw baby carrot sticks
8. Which of the following have the highest content of added sugar?
- fruit salad
 - potato salad
 - cola
 - eggs and sausages
9. Which of the following is the recommended daily number of servings of fruits for a reference 2,000kcal diet?
- a. one b. two c. three d. four
10. Which of the following is the recommended daily number of cups of vegetables for a reference 2,000kcal diet?
- a. one and one half b. two and one half c. three and one half d. four and one half
11. Adequate intake of whole grains could help me to stay regular (prevent constipation).
- a. True b. False c. I do not know
12. Regular consumption of nuts such as walnuts, pecans or peanuts helps to lower cholesterol.
- a. True b. False c. I do not know
13. Regular intake of flax seeds helps in reducing risk for heart disease.
- a. True b. False c. I do not know
14. Cakes, cookies, crackers, are high in trans fats.
- a. True b. False c. I do not know
15. Trans fats may contribute to the development of a heart attack or a stroke.
- a. True b. False c. I do not know
16. Olive oil is a good source of beneficial fat.
- a. True b. False c. I do not know

17. Heart diseases are the number one cause of death in America.

- a. True b. False c. I do not know

18. Eating adequate amounts of fruits may help prevent from developing cancer.

- a. True b. False c. I do not know

19. Regular intake of whole grains may help to prevent diabetes.

- a. True b. False c. I do not know

20. Eating foods that are high in fiber (e.g. oats, beans, fruits) may help to reduce blood cholesterol level.

**1. Please express your agreement with the following statements about physical activity.
(check one answer for each statement)**

	Strongly disagree	Dis-agree	Neither agree/ disagree	Agree	Strongly agree
I would like my body better if I was more physically active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would feel more confident if I was more physically active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would have more energy for my family and friends if I was more physically active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I was more physically active I would help me have a more positive outlook on life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would feel less stressed if I was more physically active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would feel more comfortable with my body if I was more physically active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I was more physically active I would feel as if I was taking a good care of myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I was more physically active I would keep my mind active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If I was more physically active I would be healthier	<input type="checkbox"/>				
Being physically active would take too much of my time	<input type="checkbox"/>				
I feel uncomfortable when I am physically active because I get out of breath and my heart beats very fast					
I am too exhausted when I am physically active					
I think I would be too tired to do my daily work if I was more physically active					
I do not have enough strength to be physically active					
Fear of hurting myself prevents me from being physically active					

2. Approximately how many minutes of physical activity (exercise, sports, recreation, e.g. walking, basketball, tennis, gardening, golf) do you generally undertake on a typical day?

- Less than 30 minutes
- 30 to 60 minutes
- 60 to 120 minutes
- More than 120 minutes

Part 6. Please tell us about your current weight and height.

1. What is your height? _____ ft. _____ in.

2. What is your current weight? _____ lbs.

3. How satisfied are you with you current weight?

- a. Not at all satisfy, b. somewhat satisfy, c. satisfy d. very satisfy,

4. At what weight do you feel you would be most healthy? _____ lbs

5. At what weight do you feel you would be most attractive? _____ lbs

6. What weight do you think would be most desirable for you? _____ lbs

7. Do you feel pressure to be a certain weight?

Yes No

8. Do you think you are overweight or obese?

Yes No

Part 7. Please tell us which of the following would you most likely trust as a source of nutrition or dietary information? (cycle one)

- Doctor
- Dietitian
- Internet
- Science/Research
- Other _____

Part 8. For these final questions, please circle your answers or write your answers in the spaces provided.

1. I am (cycle one) Male Female

2. Do you currently have any children living with you? Yes No

3. My age is _____ years.

4. Which of the following best describes your ethnic background?

- a) African American
- b) Hispanic American
- c) Asian American
- d) Native American
- e) Non-Hispanic white
- f) Other (specify):

5. Circle the letter that **BEST** describes your annual household income during 2016.

- a) less than 10,000
- b) 10,000 -20,000
- c) 20,001-35,000
- d) 35,001-50,000
- e) 50,001-65,000
- f) 65,001-85,000
- g) 85,000 or more

6. Please circle your highest level of education.

- a) Graduated from high school or completed the GED
- b) Some College
- c) Graduated from college
- d) Some post graduate schooling

e) Completed a graduate degree

7. Have you ever been diagnosed with any of the following (mark all that apply):

Heart disease	Yes	No	I don't remember/I don't know
Angina	Yes	No	I don't remember/I don't know
Hypertension	Yes	No	I don't remember/I don't know
High cholesterol	Yes	No	I don't remember/I don't know
Diabetes	Yes	No	I don't remember/I don't know

Thanks you very much for completing this survey!

Obstacles to Action Questionnaire

Section A: Physical Activity

“Physical activities” are things that you do that increase your breathing and/or heart-rate (this includes but is not limited to exercise). Examples of these physical activities include brisk walking, biking, swimming, dancing, aerobics, gardening, sports and other activities that “get you moving”.

Barriers	Rate the importance of each perceived barrier to engaging in sufficient physical activity from 1-10 with 1, being no barrier whatsoever and 10 being a major barrier
Previous negative experience with physical activity	1 2 3 4 5 6 7 8 9 10
Lack of time	1 2 3 4 5 6 7 8 9 10
Cost of activity	1 2 3 4 5 6 7 8 9 10
Lack of energy	1 2 3 4 5 6 7 8 9 10
Lack of knowledge	1 2 3 4 5 6 7 8 9 10
Lack of motivation	1 2 3 4 5 6 7 8 9 10
Lack of skills	1 2 3 4 5 6 7 8 9 10
Feeling uncomfortable (intimidated in exercise surroundings)	1 2 3 4 5 6 7 8 9 10
Fear of injury (or re-injury)	1 2 3 4 5 6 7 8 9 10
Fear of making an existing illness worse	1 2 3 4 5 6 7 8 9 10
How I see my body	1 2 3 4 5 6 7 8 9 10
Failure to achieve goals in previous attempts to become active	1 2 3 4 5 6 7 8 9 10
Know that I can't achieve the results I want so why bother	1 2 3 4 5 6 7 8 9 10
Lack of access to opportunities such as nearby facilities	1 2 3 4 5 6 7 8 9 10
Keep talking myself out of it	1 2 3 4 5 6 7 8 9 10
Lack of safe places	1 2 3 4 5 6 7 8 9 10
Lack of child care	1 2 3 4 5 6 7 8 9 10
Lack of a partner	1 2 3 4 5 6 7 8 9 10
Lack of available and suitable programs at my level	1 2 3 4 5 6 7 8 9 10
Lack of support from others	1 2 3 4 5 6 7 8 9 10
Lack of transportation	1 2 3 4 5 6 7 8 9 10
Have other areas in my life that I feel must take priority in my day	1 2 3 4 5 6 7 8 9 10
Don't feel that I have the ability to exercise at a sufficient level for it to be worthwhile	1 2 3 4 5 6 7 8 9 10
Pain when I exercise	1 2 3 4 5 6 7 8 9 10
Other (identify)	1 2 3 4 5 6 7 8 9 10

Section B – Nutrition

The following is a list of possible things that keep people from making healthy dietary choice's each day. For each one, please indicate how much each influences your dietary choice's.

Barriers	Rate the importance of each perceived barrier to making healthy dietary choices from 1-10 with 1, being no barrier whatsoever and 10 being a major barrier
Previous negative experience with healthy food	1 2 3 4 5 6 7 8 9 10
Lack of time	1 2 3 4 5 6 7 8 9 10
Cost of healthy food	1 2 3 4 5 6 7 8 9 10
Lack of energy	1 2 3 4 5 6 7 8 9 10
Lack of knowledge	1 2 3 4 5 6 7 8 9 10
Lack of motivation	1 2 3 4 5 6 7 8 9 10
Lack of skills	1 2 3 4 5 6 7 8 9 10
Feeling uncomfortable	1 2 3 4 5 6 7 8 9 10
Fear of choosing the wrong things	1 2 3 4 5 6 7 8 9 10
Fear of making an existing illness worse	1 2 3 4 5 6 7 8 9 10
How I see my body	1 2 3 4 5 6 7 8 9 10
Failure to achieve goals in previous attempts to make healthy dietary choices	1 2 3 4 5 6 7 8 9 10
Know that I can't achieve the results I want so why bother	1 2 3 4 5 6 7 8 9 10
Lack of access to healthy foods	1 2 3 4 5 6 7 8 9 10
Keep talking myself out of it	1 2 3 4 5 6 7 8 9 10
Healthy foods spoil too quickly	1 2 3 4 5 6 7 8 9 10
I do not like the taste of healthy foods	1 2 3 4 5 6 7 8 9 10
My family does not like healthy foods	1 2 3 4 5 6 7 8 9 10
Healthy foods are not available where I work	1 2 3 4 5 6 7 8 9 10
Lack of support from others	1 2 3 4 5 6 7 8 9 10
Lack of transportation	1 2 3 4 5 6 7 8 9 10
Have other areas in my life that I feel must take priority in my day	1 2 3 4 5 6 7 8 9 10
Healthy food is not filling enough	1 2 3 4 5 6 7 8 9 10
Healthy food is not easy on the go	1 2 3 4 5 6 7 8 9 10
Other (identify)	1 2 3 4 5 6 7 8 9 10