

Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ Date

Evaluation of Emory Healthy Kitchen Collaborative (EHKC)
as a Worksite Wellness Program

By

Krystyna Rastorguieva

Master's in Public Health

Prevention Science

Kelley Chester, PhD Committee Chair

Sharon H Bergquist, MD Committee Member

Evaluation of Emory Healthy Kitchen Collaborative (EHKC)
as a Worksite Wellness Program

By

Krystyna Rastorguieva

Bachelor of Science in International Business, Minor in Russian Studies

College of Charleston, Charleston SC

2015

Thesis Committee Chair: Kelley Chester, DrPH, MPH

Thesis Committee Chair: Sharon Bergquist, MD

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of Master of Public Health in
Prevention Science
2020

Abstract

Evaluation of Emory Healthy Kitchen Collaborative (EHKC) as a Worksite Wellness Program

By Krystyna Rastorguieva

Objective: The purpose of this thesis was early evaluation of Emory Healthy Kitchen Collaborative (EHKC) – a multidisciplinary experiential learning behavior change pilot that took place at Emory in Atlanta, GA - as a worksite wellness program.

Design: EHKC was a year-long program registered as a clinical trial that included a 10-week intervention course with 20 hours of self-care curriculum that combined didactic information and experiential learning in 6 domains of health (nutrition, exercise, yoga, mindfulness, stress resilience and ethnobotany), followed by 9 months of resources and group support for participants. Four study visits (baseline, 3, 6 and 12 months) took place to collect self-reported and biometric data.

Methods: Guided by findings from the literature review four outcome measures were identified as appropriate criteria to evaluate the Emory Healthy Kitchen Collaborative (EHKC), including (1) feasibility based on ease of recruitment and attendance; (2) acceptability based program evaluation feedback; (3) effectiveness based on (a) change in knowledge, behaviors/skill and attitudes/self-efficacy as a primary measure, and (b) changes in biometrics as a secondary measure; (4) program comprehensiveness based on evaluation of the larger context of workplace environment in which the program took place. Data analyzed included selected data points for up to 3 months into the program and constituted early evaluation.

Results: The program achieved satisfactory results based on four key evaluation measures: (1) feasibility - through surpassing recruitment goal at 205% within the first month and achieving high attendance rates (91%); (2) acceptability through achieving very positive participant feedback; (3) effectiveness – through showing statistically significant increase in most categories of health knowledge, skill and self-efficacy (17 out 21); and (4) comprehensiveness – through incorporating all 10 principles of comprehensive work-site wellness programs based on literature review.

Conclusion: EHKC early evaluation results suggest that the program was a feasible, acceptable, and comprehensive program, that showed to be effective in improving knowledge, skills and behaviors, and attitudes and self-efficacy for participants. No statistically significant change was observed in biometric measures at this time. Further research and complete evaluation is recommended once data from all study visits is available.

Evaluation of Emory Healthy Kitchen Collaborative (EHKC)
as a Worksite Wellness Program

By

Krystyna Rastorguieva

Bachelor of Science in International Business, Minor in Russian Studies

College of Charleston, Charleston SC

2015

Thesis Committee Chair: Kelley Chester, DrPH, MPH

Thesis Committee Chair: Sharon Bergquist, MD

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of Master of Public Health in
Prevention Science
2020

Table of Contents

| | |
|------------------------------------------------------------------|-----------|
| <i>Chapter I: Introduction.....</i> | 1 |
| Rationale..... | 2 |
| Approach | 3 |
| Problem | 4 |
| Problem Statement | 4 |
| Purpose Statement..... | 5 |
| Research Question..... | 5 |
| Significance Statement | 5 |
| Definition of Terms | 6 |
| Ethics in Research..... | 7 |
| <i>Chapter II: Review of the Literature.....</i> | 8 |
| Introduction..... | 8 |
| Worksite Wellness Programs: History, Definition and Trends | 9 |
| Combating Presenteeism..... | 12 |
| Comprehensiveness | 12 |
| Nutrition-Related WWP..... | 15 |
| Evaluation Criteria: Defining Success | 16 |
| Summary of Current Problem and Study Relevance | 19 |
| <i>Chapter III: Methodology.....</i> | 20 |
| Introduction..... | 20 |
| Population | 23 |
| Sample | 23 |
| Research Design..... | 24 |
| Procedures | 25 |
| Feasibility | 25 |
| Acceptability..... | 26 |
| Effectiveness | 26 |
| Comprehensiveness | 26 |
| Instruments | 26 |
| Data Analysis | 29 |
| <i>Chapter IV: Results</i> | 29 |

| | |
|-------------------------------------------------------------------------------|------------------|
| Introduction..... | 29 |
| Key Findings..... | 29 |
| Population | 29 |
| Feasibility | 34 |
| Acceptability..... | 35 |
| Effectiveness | 36 |
| Comprehensiveness | 39 |
| Summary..... | 41 |
| <i>Chapter V: Conclusions, Implications, and Recommendations</i> | <i>42</i> |
| Summary of Study..... | 42 |
| Discussion of Key Results..... | 43 |
| Strengths and Limitations..... | 45 |
| Strengths | 45 |
| Limitations | 46 |
| Implications..... | 46 |
| Recommendations | 47 |
| Implementation | 47 |
| Curriculum | 48 |
| Incentive structure..... | 49 |
| Evaluation | 50 |
| The Role of Culture | 50 |
| Conclusion..... | 51 |
| <i>References</i> | <i>52</i> |
| <i>Appendix A: EHKC Curriculum Overview.....</i> | <i>58</i> |
| <i>Appendix B - Emory Employee Population Metrics.....</i> | <i>59</i> |
| <i>Appendix C – Curriculum Evaluation Survey Results.....</i> | <i>60</i> |

Table of Figures

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Figure 1. EHKC Program Structure | 6 |
| Figure 2. Why Develop a Healthy Workplace Framework? The Business Case in a Nutshell. Source: WHO Healthy Workplace Framework and Model | 10 |
| Figure 3. EHM Value Chain. Source: Program Evaluation Guide, HERO.org | 11 |
| Figure 4. EHKC Logic Model. | 22 |
| Figure 5. EHKC Study Design Map. | 25 |
| Figure 6. EHKC Survey Tool Inventory..... | 28 |
| Figure 7. EHKC Scoring Criteria..... | 30 |
| Figure 8. EHKC Recruitment Process Overview..... | 31 |
| Figure 9. EHKC Applicants. Gender. Figure 10. EHKC Applicants. BMI. | 32 |
| Figure 11. EHKC Applicant Number Comorbidities..... | 32 |
| Figure 12. EHKC Applicant Comorbidities Description. | 33 |
| Figure 13. EHKC Participants Ethnicity. Figure 14. EHKC Participants Gender. | 33 |
| Figure 15. EHKC Recruitment Timeline. | 34 |
| Figure 16. EHKC Attendance. | 35 |
| Figure 17. EHKC Weight Change, 0-3 Months. T-test, $P>0.05$ | 38 |
| Figure 18. EHKC Weight Change, 0-3 Months. Histogram, $P>0.05$ | 39 |
| | |
| Table 1. EHKC Class Evaluation Results. | 36 |
| Table 2. EHKC Curriculum Evaluation Results. | 37 |

Chapter I: Introduction

Chronic disease is a leading cause of disability and death in the United States and is the main driver for the rising healthcare expenditure reaching \$3.5 trillion in 2019 (*Chronic Diseases in America* | CDC, 2020). Six in ten adults have at least one chronic disease, and four in ten have two or more diseases. Chronic disease can be attributed to a number of risk factors, but there are a few specific ones that are disproportionately responsible for most of its burden. Such factors include tobacco use, poor diet, physical inactivity, excessive alcohol consumption, uncontrolled high blood pressure, and hyperlipidemia (Bauer et al., 2014). These risk factors are modifiable and can be successfully mitigated through lifestyle change (Hyman et al., 2009).

While 75% of healthcare costs are related to preventable chronic conditions, less than 5% of healthcare dollars are spent on prevention (Lever, 2011). Part of the reason is complexity of the U.S. healthcare system, high level of specialization and its prioritization of acute conditions. Another component is misaligned incentives inherent to fee-for-service model, where hospitals get most of their income receiving reimbursement for the number of procedure performed, rather than value-based care, or pay-for-performance model, which ties reimbursement to metric-driven outcomes, best-practices and quality of care (Kyeremanteng et al., 2019).

The worksite may present an ideal environment to invest in early prevention through lifestyle change. Employers provided health insurance coverage for 49% of the U.S. population in 2017 (Health Insurance Coverage of the Total Population, 2018), and are directly incentivized to keep their employees healthy. Employers that deliver workplace wellness programs promoting health behavior change, reducing adverse health outcomes, improving quality of life, mental health and well-being, can benefit from healthcare savings

resulting from improved health of their employees (Astrella, 2017). Additional benefits would include increased productivity, employee retention, decreased absenteeism and presenteeism, improved morale, more engaged workforce and elevated brand perception (Cancelliere et al., 2011).

Rationale

Work-site wellness programs (WWPs) have evolved as a widely accepted approach to manage and improve employee health, as well as enhance employee benefit packages (Cancelliere et al., 2011). With increased interest came a great variety of such programs addressing different aspects of health in different modalities. Because of this variability in programs' goals, design and delivery it is hard to benchmark the programs to determine their relative effectiveness. Ability to understand and measure value of such programs is instrumental as it informs stakeholders' decision-making regarding future investments. Several credible organizations, such as Center for Disease Control and Prevention (CDC), Health Enhancement Research Organization (HERO), Mercer, and others, have put forward tools and proposed metrics for measuring success of employee health management efforts. While these tools are helpful, they focus more on the overall employee health strategy, rather than individual programs and interventions. It is important to understand the goals and differentiation factors for the specific WWP in questions in order to identify the appropriate measure of their success.

The purpose of this thesis is to select a set of criteria from existing literature to evaluate the success of a specific targeted innovative multi-behavior change work-site wellness pilot, the Emory Healthy Kitchen Collaborative (EHKC).

EHKC was a year-long clinical trial that included a 10-week multidisciplinary self-care intervention course followed by 9 months of support and resources available to participants (“Emory Healthy Kitchen Collaborative,” 2019). This pilot was administered at Emory University Hospital in Atlanta, GA in 2019-2020 and was open to Emory employees. It was designed to improve overall health and wellness of participants through education about lifestyle change and skill-building activities in areas of nutrition, culinary arts, exercise, yoga, mindfulness and stress resilience (“Emory Healthy Kitchen,” 2019). The goal of the pilot was to test the proof of concept as a work-site wellness program, and to evaluate its feasibility and effectiveness to impact the health and wellness of participants. Evaluation results of the program would be used to develop and implement future instances of Emory Healthy Kitchen Collaborative at Emory and other sites.

Approach

A literature search was conducted to assess existing standards for work-site wellness programs, look at current trends and understand the metrics that are being used to evaluate programs with characteristics similar to EHKC. Based on this review four domains, feasibility, acceptability, effectiveness and comprehensiveness were chosen as appropriate to evaluate the success of the EHKC.

The application, attendance, biometric and self-reported participants data gathered during EHKC was then organized and analyzed. Population sample information included analysis of biometrics and survey data gathered from 38 participants. Data included baseline information gathered before the intervention (biometric data, ASA24 food recall, pre-program survey data), participation and survey data from each of the 5 Saturday classes, and 3-month data (biometric data, ASA24 food recall, post-intervention survey data). Based on

this data, as well as flow charts, process maps and context maps gathered or developed as a part of this early evaluation, general conclusions and recommendations about the effectiveness of the pilot were made.

Problem

Workplace wellness programs continue to grow in popularity. From 2006 to 2013 the percentage of such programs have increased from 27% to 75 % (Astrella, 2017). The Centers for Disease Control and Prevention (CDC) share the belief that the use of effective workplace programs and policies can reduce health risks and improve the quality of life for American workers (*Workplace Health Promotion* | CDC, 2019). However, different outcomes have been reported on effectiveness of the worksite wellness programs. Some studies show positive return in investment (ROI), while other articles suggest no obvious benefit (Appleby, 2019). The reason for inconsistent results may be the variability in quality of study design and different outcome measures used to define its success. Additionally, the evaluation measures used must be aligned with the purpose of the specific program and be realistic based on the program's length and engagement levels. Further research is needed to identify optimal key metrics that enable effective evaluation of specific types of targeted worksite wellness programs. Effective metric-driven evaluation practices would help improve these programs, communicate their value to stakeholders, and secure investment in the future programs thus improving the health of employees and bottom line of employers.

Problem Statement

There is a need to determine if the Emory Healthy Kitchen Collaborative pilot has achieved its goals of improving health behaviors, quality of life and health outcomes of

participants, and would therefore be an effective and feasible worksite wellness program for Emory employees in Atlanta, GA.

Purpose Statement

The purpose of this thesis is to identify the optimal evaluation criteria and to perform an evaluation of Emory Healthy Kitchen Collaborative pilot as a worksite wellness program able to improve health behaviors, quality of life and health outcomes of its participant.

Research Question

Is Emory Healthy Kitchen Collaborative a feasible, acceptable, effective and comprehensive worksite wellness program effective in improving health behaviors, quality of life and health outcomes of its participants?

Significance Statement

Teaching kitchens are a novel setting for worksite wellness programs. Currently, there is not a standard way to measure their success and define ROI. Emory Healthy Kitchen Collaborative is a unique multidisciplinary teaching kitchen program with a distinct structure and curriculum that differs from other worksite wellness programs and other teaching kitchens. This work will execute an evaluation of the program based on proposed criteria, contribute to academic research, and help inform future implementation and secure funding in this and similar programs.

Definition of Terms

Several terms are used to describe components of Emory Healthy Kitchen Collaborative. In the context of EHKC, “Program” refers to a 1-year program. “Course” refers to the 10-week intervention that included five Saturday classes (every two weeks) with 3-4 sessions each (Figure 1). The schematic of complete study design is presented in Chapter 3.

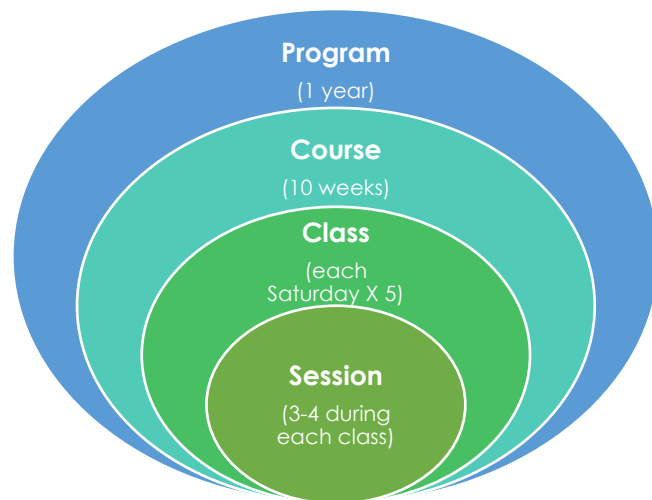


Figure 1. EHKC Program Structure

“Lifestyle Medicine” refers to the use of a whole food, plant-predominant dietary lifestyle, regular physical activity, restorative sleep, stress management, avoidance of risky substances and positive social connection as a primary therapeutic modality for treatment and reversal of chronic disease (*What Is Lifestyle Medicine?*, 2020).

“Worksite wellness programs” (WWPs) - are a coordinated and comprehensive set of health promotion and protection strategies implemented at the worksite that include programs, policies, benefits, environmental supports, and links to the surrounding

community designed to encourage the health and safety of all employees (*Workplace Health Model | Workplace Health Promotion | CDC, 2019*).

“Teaching kitchen” is a “virtual learning laboratory for life skills” that offers education in basic cooking techniques in addition to other self-care topics like enhanced nutrition, mindfulness, physical activity, and behavioral health coaching (*FAQs - Teaching Kitchen Collaborative, 2020*).

Ethics in Research

Emory Healthy Kitchen Collaborative (EHKC) is a clinical trial registered in ClinicalTrials.gov (NCT04005495) and is approved by the Emory University Institutional Review Board (IRB 00109546). Student’s name has been added to the IRB and permission obtained to use the data.

Chapter II: Review of the Literature

Introduction

In the U.S. chronic diseases are currently the leading cause of morbidity and mortality and account for most of our health care spending (Dieleman et al., 2016). Most of these chronic conditions, like heart disease, diabetes and cancer, are preventable and are result from an unhealthy lifestyle (Bodai & Tusso, 2015). Adopting healthier habits, such as plant-based nutrition, exercise, mindfulness practices, sleep, and abstaining from addictive substances, can help prevent or reverse more than 80% of chronic conditions (Hyman et al., n.d.).

Adults today spend more of their waking hours at work than they do at home or in other surroundings (*American Time Use*, 2019). Work-related stress, prolonged sitting, sub-optimal dietary choices, combined with lack of knowledge about and nudges towards a healthier lifestyle, often create a work environment that is not only not conducive of long-term health, but is often harmful (Lohr, 2012). It significantly increases the risk of chronic disease in employees, and reflects negatively on the bottom line of the employer as their health insurance claims rise, and productivity decreases.

Worksite wellness programs may offer a solution to this crisis. Creating a workplace culture that promotes overall employee wellness and nudges behaviors contributing to long-term health has value for all stakeholders involved (*Health: Our Business*, 2019). Employees benefit directly from spending most of their waking hours in an environment conducive to health. Employers benefit from health cost savings of early detection of disease, cost savings associated with overall healthcare dollar spent, decreased absenteeism, increased job satisfaction and retention rates, and overall positive brand as a company that invests in their employees. Worksite wellness, therefore, yields a platform where strategic investment in

primary prevention (before the disease occurs) through lifestyle medicine programs that result in behavior change makes economic sense because of favorable ROI.

Worksite Wellness Programs: History, Definition and Trends

Worksite health promotion programs originated after World War II from executive fitness programs and grew slowly throughout 1970s (Sparling, 2009). In the next several decades, the programs started expanding broader including other aspects of wellness and being more inclusive of all employee population. Today, eight out of every ten organizations with more than 50 employees report having a wellness program in place (*Piecing It Together*, 2020). What exactly is included in the wellness program varies significantly. The content, structure, delivery methods, goals, and, consequently, expected benefits of such programs are constantly evolving beyond physical health and spending to include more areas, such as mental health or financial wellness (Frias, 2020). Some programs target motivating individual behaviors, while others leverage the power of environmental design through choice architecture (Al-Khudairy et al., 2019).

The importance and potential of WWPs is acknowledged by internationally respected health organizations. In 2011 the World Health Organization (WHO) published *WHO Healthy Workplace Framework and Model* making the case for the need to invest in healthy workplace environment based on the following pillar arguments: (1) it is the **right** thing to do because “creating a healthy workplace that does no harm to the mental or physical health, safety or well-being of workers is a moral imperative; (2) it is the **smart** things to do, laying out the business case for financial implication and employee engagement and retention (see

Figure 2); and (3) it is the **legal** thing to do due to a number of existing legislation requiring healthy and safe workspaces (Burton, 2010).

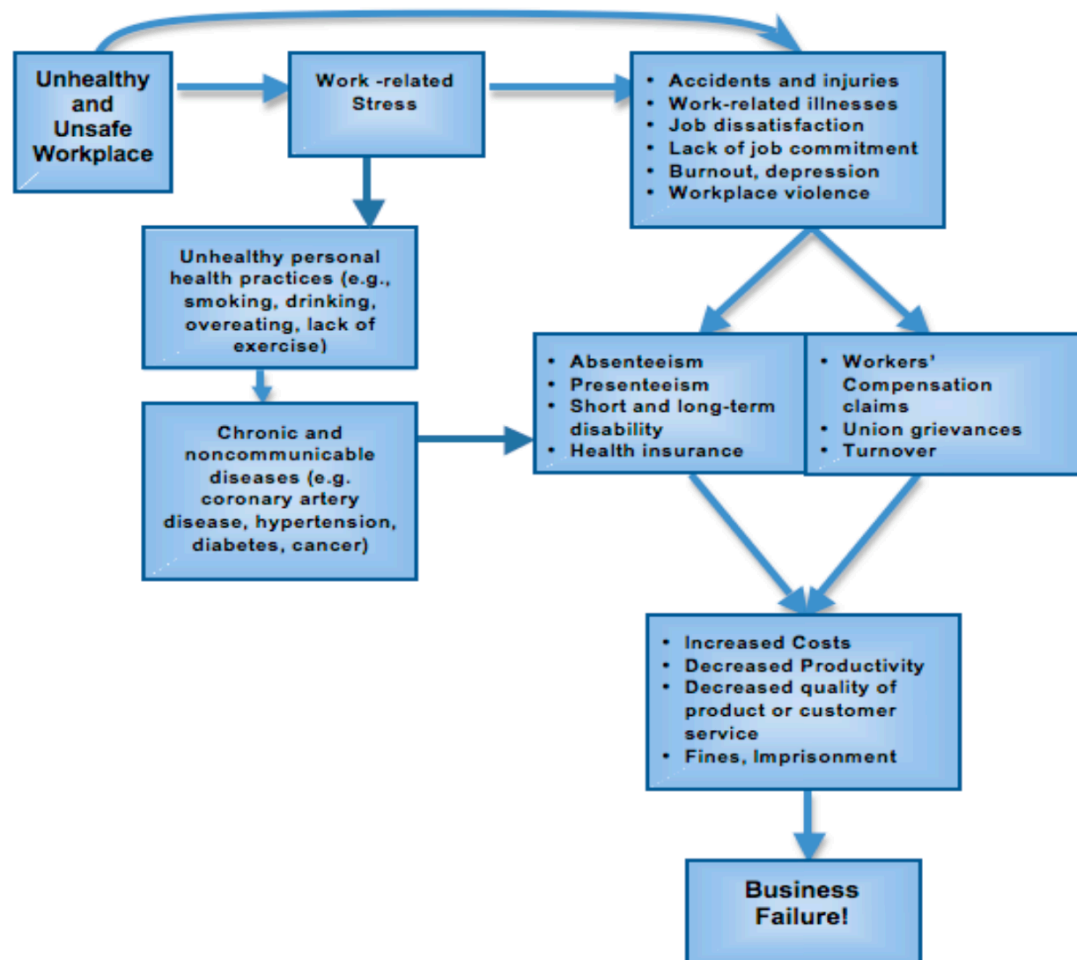


Figure 2. Why Develop a Healthy Workplace Framework? The Business Case in a Nutshell.

Source: WHO Healthy Workplace Framework and Model

Health Enhancement Research Organization (HERO) proposed a Program Measurement guide in partnership with Mercer, that further lays out the argument about how employee health management (EHM) programs can yield improved clinical, utilization and financial outcomes (*Program Measurement and Evaluation Guide: Core Metrics for Employee Health Management*, 2015). It starts with identifying target audience with opportunities for

health improvements, creating effective and continued engagement that leads to positive outcomes (Figure 3).



Figure 3. EHM Value Chain. Source: Program Evaluation Guide, HERO.org

The United States Department of Health and Human Services included WWP in Healthy People 2020, the nationwide program of health promotion and disease prevention. The goals, under the Educational and Community-based Programs (ECBP) (*Educational and Community-Based Programs | Healthy People 2020*, n.d.), include (1) increasing the number of organizations of all sizes that offer worksite wellness programs to their employees (ECBP-8) as well as (2) increasing employee engagement in worksite wellness programs (ECBP-9). . Worksite wellness is now a part of the proposed Healthy People 2030 goals. Four out of thirteen developmental objective under ECBP are related to preventative worksite program and cover overall health promotion (ECBP-2030-D020), exercise (ECBP-2030-D03), nutrition (ECBP-2030-D04), and smoking cessation (ECBP-2030-D05) (*Secretary's Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2030 | Healthy People 2020*, 2020). This is a noteworthy mention as it could yield favorable support and credibility to initiatives and projects that set out to accomplish these goals.

Availability of financial resources is imperative to implementation as offering worksite wellness programs is often associated with additional costs. According to Workplace Health in America in 2017 report done by the CDC, employers with more workers were more likely to provide screenings to their employees (with 25.5% being

national average while companies with over 500 people residing at 69%) and more likely to offer any type of health promotion practice (*Workplace Health in America, 2017, 2017*).

Combating Presenteeism

Workplace health promotion (WHP) is a common strategy used to enhance on-the-job productivity (Cancelliere et al., 2011). A systematic review of literature done by Cancelliere, Cassidy and others in 2011 concluded that there is preliminary evidence that some WHP programs can positively affect presenteeism and that certain risk factors are of importance.

Presenteeism is highly prevalent and costly to employers. It is defined as being present at work, but limited in some aspect of job performance by a health problem (Cancelliere et al., 2011). Potential risk factors contributing to presenteeism included being overweight, a poor diet, lack of exercise, high stress, and poor relations with co-workers and management.

Future research would benefit from standard presenteeism metrics and studies conducted across a broad range of workplace settings (Cancelliere et al., 2011). Based on the systematic review of presenteeism literature done in 2011, successful programs offered (1) organizational leadership, (2) health risk screening, (3) individually tailored programs, and (4) a supportive workplace culture.

Comprehensiveness

The Centers for Disease Control and Prevention (CDC) Workhealth Promotion Center provides a number of resources that can help define the terms related to worksite wellness and build the foundation of worksite wellness programs. According to the CDC

definition, “workplace health programs” refer to a “coordinated and comprehensive set of strategies which include programs, policies, benefits, environmental supports, and links to the surrounding community designed to meet the health and safety needs of all employees” (*Workplace Health Model | Workplace Health Promotion | CDC, 2019*). A theme that stands out from that definition is a comprehensive approach – the program must be integrated with policies and structure of the company in order to be successful and have a lasting effect.

In the 2017 article titled “Return on Investment: Evaluating the Evidence Regarding Financial Outcomes of Workplace Wellness Programs” Astrella further elaborates on the meaning of “comprehensive” worksite wellness programs, by identifying three necessary components of such programs – (1) screening, (2) lifestyle or risk factor management, and (3) disease management. According to the article, for a program to be considered comprehensive, it must include assessment and intervention in chronic disease prevention, as well as detection and management (Astrella, 2017).

Healthy People 2010 goals defined five elements of a comprehensive workplace health promotion programs (National Center for Health Statistics (U.S.), 2012). Those include (1) skill development and lifestyle behavior change along with information dissemination; (2) supportive social and physical environment that includes an organization’s expectations regarding healthy behaviors, and implementation policies that promote health and reduce risk of disease (e.g., policies restricting smoking, increasing access to healthy foods at work); (3) integration of the health promotion program into the organization’s structure; (4) linkage to related programs like employee assistance programs and programs to help employees balance work and family; (5) Worksite health screening programs ideally linked to medical care to ensure follow-up and appropriate treatment as necessary.

The Director of Institute for Health and Productivity Studies at Johns Hopkins, Ron Goetzel, also took into consideration comprehensiveness of worksite wellness programs when classifying them in buckets on the scale from least to most effective (*Piecing It Together*, 2020). He suggested 3 buckets of WWP: “feel good”, including programs that look and sound good, but ultimately do not produce noticeable impact; ”traditional” programs, which value constructing a “culture of health” for employees through introduction of new offerings facilitated by the organization; finally, “hollistic” programs that encompass more dimensions of well-being and could potentially involve many different parts of the organization, these comprehensive programs are more likely to incorporate what Goetzel calls factors “non-traditionally associated with well-being” (for example, flexible work schedules, professional development opportunities, community service projects etc) (*Piecing It Together*, 2020).

In the essay “Worksite Health Promotion: Principles, Resources, and Challenges” Sparling also writes that successful worksite health promotion depends on the cooperation and collaboration of many different stakeholders and sectors (Sparling, 2009). Sparling examines the recent history of worksite health promotion and highlights 10 underlying principles that he concludes are the markers of successful. Those include programs that (1) strive to be comprehensive and integrated; (2) demonstrate commitment to employee health from leadership; (3) are open to all employees; (4) provide health assessment and follow up support; (5) tailor to the needs of employees; (6) attain high participation through creative incentives; (7) implement policy that supports and sustains healthy behaviors; (8) links services to occupational safety and job performance; (9) actively extend services to spouses and family members; (10) systematically evaluate its performance against the need of employees (Sparling, 2009).

Nutrition-Related WWPs

There are different types of worksite wellness programs that address different aspects of health and wellness. Common areas include nutrition, exercise, sleep, stress-management, connection, mental health, financial wellness (“Employee Health Promotion Disease Prevention Guidebook,” 2011). WWPs can vary in scope and be focused on one specific issue or include several aspects. They could be delivered live in-person and include an experiential component; or be delivered remotely, and be a-synchronous, or a hybrid of both. They could target the whole employee population of the company or have a very specific target audience (for example disease-specific programs). They could last days, months or years. This work will give special attention to nutrition and diet-related programs, as it focuses on evaluation of the teaching kitchen pilot. Even though EHKC was based on a multidisciplinary self-care curriculum, 15 out of 20 sessions covered topics and/or encouraged skills directly related to nutrition, diet, culinary art, or mindful eating practices (please refer to Appendix A for EHKC curriculum overview).

Analysis of risk factors in United States during 1990–2010 showed that the leading cause of early death and disability is diet (“The State of US Health, 1990-2010,” 2013). Nutrition-based WWPs show substantial potential for improving employee health and wellness (Sutcliffe et al., 2018). These include educational programs, nutrition interventions, teaching kitchens, culinary coaching, and multidisciplinary experiential learning opportunities.

An example of intervention was a 6-week worksite nutrition education pilot that emphasized micronutrient-dense, plant-rich diet and was conducted at Northern Arizona University. It included thirty-five university employees who received a dietary protocol that

emphasized the daily consumption of greens, beans/legumes, a variety of other vegetables, fruits, nuts, seeds, and whole grains. Participants showed significant improvements in sleep quality, quality of life, and depressive symptoms (Sutcliffe et al., 2018).

Another mode of nutrition-related programs are teaching kitchens - innovative programs that allow individuals to learn skills “to improve the ways they eat, move, and think” (Eisenberg et al., 2017). Teaching kitchens (TKs) and their related strategies are often referred to as “learning laboratories” and are being implemented across multiple organizations, including universities (Vanderbilt, Princeton, Stanford) and corporate site (Google, Compass) (Eisenberg et al., 2017).

Culinary coaching is a diet-related program example defined as "behavioral intervention that aims to improve nutrition and overall health by facilitating home cooking through an active learning process for participants that combines culinary training with health and wellness coaching competencies" (Polak et al., 2018).

EHKC combined components of all of these to some degree. It started with a 10-week education intervention course that presented information about diet and nutrition, included teaching kitchen sessions where participants received hands-on culinary training, and allowed access to virtual group coaching.

Evaluation Criteria: Defining Success

As Sparling mentioned in “Worksite Health Promotion: Principles, Resources, and Challenges”, systematic evaluation of these programs against the needs of employees is an integral principle of successful WWP (Sparling, 2009). Effective evaluation is important because it allows to continuously improve the programs, define and communicate their value,

and attract funding for future programs. This section looks at various frameworks and criteria for evaluating the employee health management strategies and targeted WWPs.

Workplace wellness programs are often expected reduce employee healthcare costs, increase productivity and provide positive return in investment (ROI). Literature review from 2000 to 2016 conducted by Astrella revealed a number of financial metrics used to evaluate WWPs, including direct and indirect healthcare costs and ROI (Astrella, 2017). Indirect cost is the actual amount spent on healthcare for covered individuals. Indirect costs encompass a loss of productivity from employee absenteeism or disability. Return on investment is a financial metric used to calculate the amount of money gained or lost related to the amount invested and is considered the most relevant metric to determine the economic impact of WWPs.

As a part of their resource package, CDC provides a Workplace Health Model that includes an evaluation as one of its components. Based on that model, suggested measures are (1) workers productivity (e.g. absenteeism, presenteeism); (2) healthcare costs (e.g. quality of care, performance standards); (3) improved health outcomes (e.g. reduced disease and disability); and (4) organizational change and shift towards “culture of health” (e.g. morale, recruitment/retention, alignment of health and business objectives) (*Workplace Health Model | Workplace Health Promotion | CDC, 2019*).

List of measures based on the framework put forth by a team of experts at Health Enhancement Research Organization and Population Health Alliance included the following: financial outcomes, health impact, participation, satisfaction, organizational support, productivity and performance, value on investment (VOI) (*Program Measurement and Evaluation Guide: Core Metrics for Employee Health Management, 2015*). Health impact is measured based on physical health (BMI, blood pressure, cholesterol, perceived health status etc), mental and emotional health (perceived stress, depression, anxiety, perceived life

satisfaction), health behaviors (physical activity, tobacco use, alcohol use, fruit and vegetable consumption, sleep, etc), and risk status reduction. Participation looks at levels of engagement between the program and participant. Satisfaction includes both patient / employee and client / employer satisfaction (especially helpful when programs are implemented by a third-party). Organizational support refers to the degree to which organization is committed to health and well-being of its employees. Productivity and performance account for time away from work due to poor health, productivity loss while at work, and worker performance. Finally, the guide proposes VOI formula based on a cost effectiveness analysis convention, which places the dollar investment or resources used first (the numerator) and the outcomes second (the denominator). The outcomes may be specific clinical measures (reduced rates of a particular disease state), or in dollar amounts representing the monetized value of the outcomes.

Similar outcome measures also appeared in published studies exploring the effects of specific WWP. For example, in their 2019 JAMA article Song & Baicker talk about a company-wide implementation of worksite wellness program as a randomized control trial, including 20 primary control worksites and 4106 employees (Song & Baicker, 2019). The measure used for its evaluation included (1) participation; (2) self-reported health and behaviors, (3) clinical measure (cholesterol, hypertension, obesity rates); (4) healthcare spending; (5) employment outcomes. (absenteeism, work performance, and job tenure) (Song & Baicker, 2019). The program resulted in significantly greater rates of some positive self-reported health behaviors among those exposed compared with employees who were not exposed, but there were no significant differences in clinical measures of health, health care spending and utilization, and employment outcomes after 18 months. Similar challenges in measuring ROI of WWP were addressed by Astrella in the previously mentioned literature

review (Astrella, 2017). These challenges with measuring clinical and financial measure will be discussed later.

A deeper dive into evaluation of WWP that address physical health yielded further insight on evaluation measures. In worksite nutrition intervention that included a 12-hour immersion followed by six-week intervention Sutcliffe used anthropometric, physiological, well-being and participation outcome measures (Sutcliffe et al., 2019). Anthropometric measures included measures of weight, waist circumference, and blood pressure; physiological included a measures of blood cholesterol, triglycerides, blood glucose, and hemoglobin A1c; well-being included measures of gastroesophageal reflux disease, depression, sleep, pain, and worksite productivity, pre-, mid-, and post-intervention. Other metrics included *Attendance at Weekly Meetings, Completion of Food Trackers, and Participation in Outcome Measurements* (Sutcliffe et al., 2019).

For Community Culinary Coaching Program evaluation Polak included goals accomplishment assessed by foods purchases by the central kitchens and residents' feedback through focus groups (Polak et al., 2018). Measures included (1) program delivery - completion of the education program and group session; (2) program uptake - measured by change in food items purchased by the community; and (3) community perception of the program – done through focus groups (Polak et al., 2018).

In the Teaching Kitchen pilot led by Eisenberg, feasibility of the program was assessed through recruitment and attendance records. Biometric and self-reported behavioral outcomes were assessed 4 times: at baseline, after the 14- or 16-week educational intervention, 6 months, and 12 months. Behavioral change assessment was done through self-reported surveys (Eisenberg et al., 2017).

Summary of Current Problem and Study Relevance

Evaluation of worksite wellness programs is an important prerequisite of their optimization and financing. Different short and long terms measures are used based on the program structure, focus and goals. Even though tools like CDC and HERO score cards exist to evaluate overall employer worksite wellness strategy, further research is needed to identify optimal outcome measure for specific targeted WWP's similar to EHKC. Popular key measures include participation, engagement, completion, self-reported knowledge and behaviors, employee outcomes, clinical outcomes, healthcare savings, and ROI to measure feasibility, acceptability, effectiveness and comprehensiveness of a program.

Difficulty lies in accurately measuring the financial value of WWP's due to their wide variability and the fact that change takes time (Song & Baicker, 2019). It is also more challenging to measure subjective improvements, such as mood and perceived wellbeing, versus objective measures, such as blood pressure or weight, which are only a part of overall health and take longer timeframe to improve. Another component that is even harder to measure is externalities – the positive effect WWP's may have on employee families. This brings forth the idea of value on investment (VOI), as opposed to ROI (*Program Measurement and Evaluation Guide: Core Metrics for Employee Health Management*, 2015). WWP's may simply be the “right thing to do” – a responsibility the employer has to create the work environment that is not harmful to but enhancing of employees’ health and wellness.

Chapter III: Methodology

Introduction

On August 10th, 2019 Emory launched a pilot program, Emory Healthy Kitchen Collaborative (EHKC), a year-long multidisciplinary work-site wellness program. The program was free to participants and was set up as a clinical trial (“Emory Healthy Kitchen

Collaborative,” 2019). This pilot was designed to improve overall health and wellness of participants through education about lifestyle change and skill-building activities in areas of nutrition, exercise, mindfulness and stress management (“Emory Healthy Kitchen,” 2019). The pilot was open to 40 benefit-eligible Emory employees ages 18-65, with preference given to those with body mass index greater or equal to 30. Priority was given to participants with comorbidities and those who expressed strong motivation to change. Exclusion criteria included conditions that would prevent participating in the program, such as bariatric surgery, pregnancy, inability to exercise due to medical condition and food allergies. The goal of the pilot was to test the proof of concept, and to evaluate if the program could be successful in improving physical health metrics, such as body composition and BMI, as well as improve self-efficacy of participants and their overall well-being.

Guided by findings from the literature review a number of outcome measures were identified as potential criteria to evaluate the Emory Healthy Kitchen Collaborative (EHKC). Data available about EHKC for to 3 months into the pilot was gathered and reviewed to assess the feasibility of using each of the criteria to evaluate success of the EHKC program.

The final key measures included evaluating (1) **feasibility** based on ease of recruitment and attendance; (2) **acceptability** based program evaluation feedback; (3) **effectiveness** based on (a) change in knowledge, behaviors/skill and attitudes/self-efficacy as a primary measure, and (b) changes in biometrics as a secondary measure; (4) **program comprehensiveness** based on evaluation of the larger context of workplace environment in which the program took place.

EHKC logic model can be found in the Figure 4.

Emory Healthy Kitchen Collaborative (EHKC) Logic Model

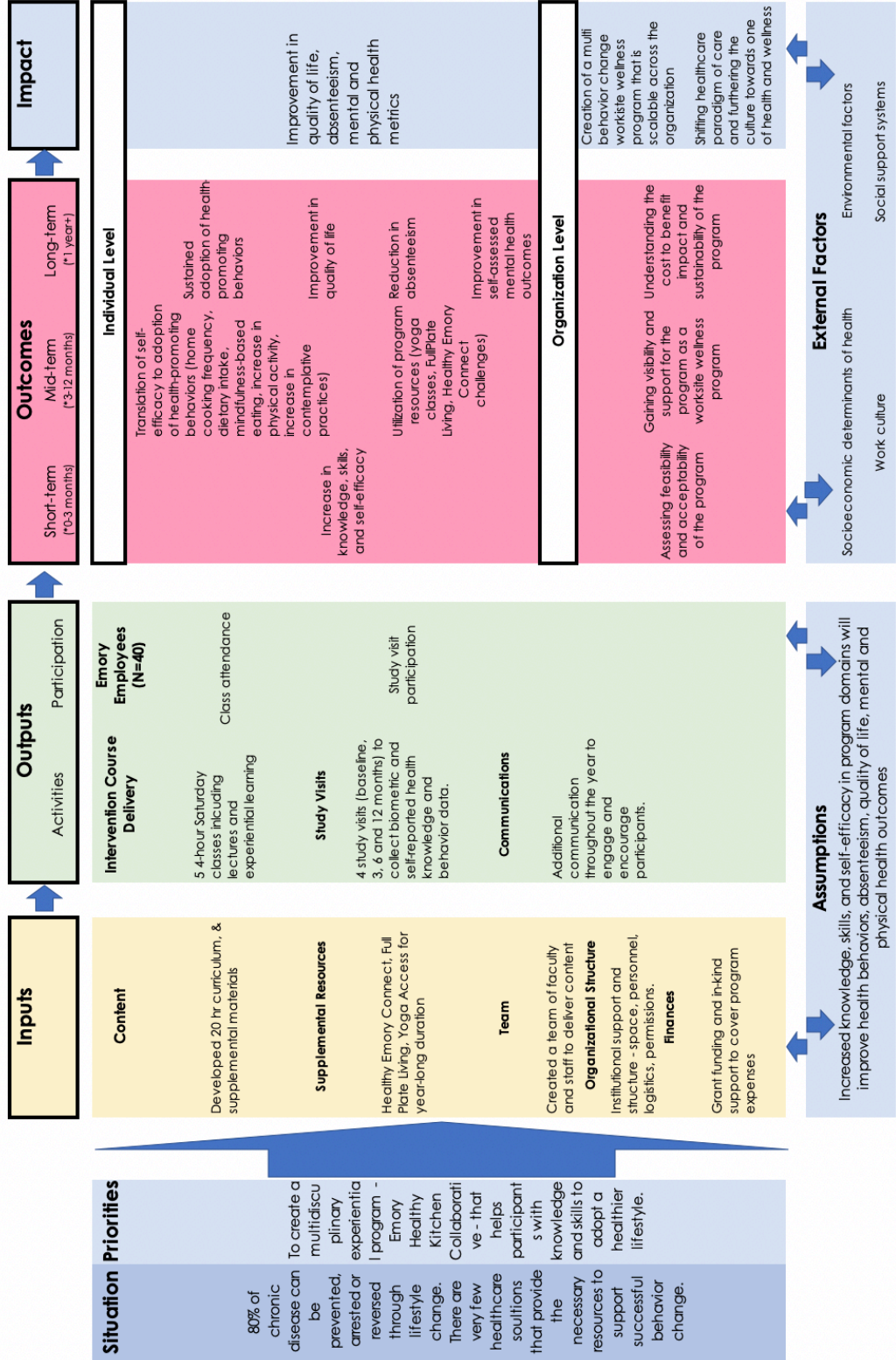


Figure 4. EHKC Logic Model.

Population

EHKC was open to all benefit-eligible Emory employees, including both Emory Healthcare and Emory University. Emory employee population consist of a total of about 36,000 people spread out across Atlanta. Emory Healthcare has 10 hospitals, over 150 preventive care units and over 500 specialty care units. Emory University includes nine different schools. Geographically Emory Clifton campus has the largest center of Emory employee population and includes Emory University Hospital, several preventive and specialty care units, and all 9 schools. Emory Clifton Campus was also the physical location for EHKC.

Based on generic demographic data obtained from Emory Health & Wellness department about Emory Clifton campus employees in 2019, 79% were female and 21% were male. The most prevalent risk factors among this population were blood pressure, waist circumference, and body mass index (34% in “high risk” category). See Appendix A.

Sample

Forty benefit-eligible Emory employees ages 18-65, with preference for body mass index greater or equal to 30 that were willing to appear in video and photographs were recruited for the study. From a self-selected sample of those who applied, preference was given to participants with comorbidities (including hypertension, high blood pressure, high cholesterol, diabetes, history of cancer, personal history of heart disease) who expressed strong motivation to change. Exclusion criteria included conditions that would prevent participating in the program, such as bariatric surgery, pregnancy, inability to exercise for various reasons and food allergies. The program was free of charge for participants. Participants received a small kitchen supply kit at the beginning of the program and were allowed to bring a significant other to the Saturday classes during the intervention course.

Research Design

Emory Healthy Kitchen Collaborative is a year-long registered clinical trial that included a 10-week intervention course with 20 hours of health and self-care curriculum followed by support and free resources available to participants for the duration of the year. Resources included Full Plate Living, a virtual education and coaching platform for healthy eating; access to weekday yoga classes at Emory University Hospital; Healthy Emory Connect a digital platform and an app focused on employee wellness; and a closed Facebook group.

The design of the EHKC study was one group time series design, in which dependent variables were measured at four different points in time in one group before and after an intervention (10-week course) following the cadence:

O₁ X O₂ O₃ O₄

Intervention course is marked with “X”. Participants were assessed with biometric and survey tools at 4 times: at baseline (O₁), after the 10-week course (O₂), at 6 months (O₃) and at 12 months (O₄). Additional information was gathered while participants were in classes during the 10 week course. The tools used to gather data will be described later. The timeline and main research design components of EHKC are reflected in Figure 5.

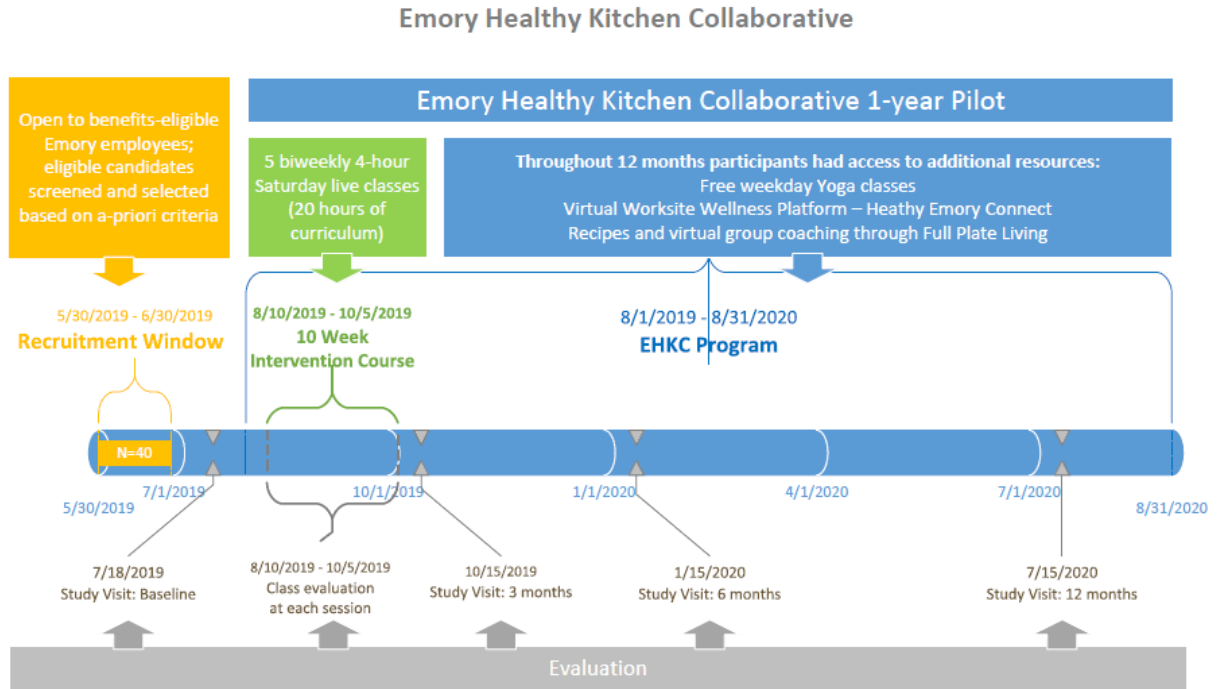


Figure 5. EHKC Study Design Map.

Procedures

The goal of this work is to evaluate feasibility, acceptability, effectiveness and comprehensiveness of EHKC.

Feasibility

Feasibility of EHKC was measured by ease of recruitment and attendance. Recruitment was defined by how fast the program was able to recruit the desired number of participants (40) into the program during the recruitment window. To measure that the number of interest inquiries and eligibility surveys filled out, was kept and graphed over time. Attendance was measured by the percent of total participants who attended each of 5 classes. The target attendance goal was established at 80% based on literature review and feedback from Emory Health & Wellness about previous worksite wellness programs.

Acceptability

Acceptability of EHKC program, as it refers to the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention, was measured through questions included in program evaluation survey administered at the end of the intervention course.

Effectiveness

Effectiveness of EHKC was measured based on change in knowledge, behaviors and skill, attitudes and self-efficacy. This was done using the results for 49-item questionnaire (curriculum evaluation survey) administered before and after the intervention course. Changes in biometric markers (such as weight, BMI, and blood pressure) were also measured, but were not used as primary determinants of effectiveness due to (1) relatively short length of the program and (2) multidisciplinary nature of the program that focused on several aspects including physical, mental and emotional health, rather than diet change being the primary focus.

Comprehensiveness

Program comprehensiveness was assessed based on the larger context of workplace environment in which the program took place using 10 principles outlined by Sparling in the essay “Worksite Health Promotion: Principles, Resources, and Challenges”.

Instruments

A wide range of tools was used to collect data about EHKC. These tools included seven different sets of surveys administered at different times during the program. Five out of the seven surveys were developed by EHKC committee specifically for the program. The

other two surveys comprised validated questions in the specific domains of interest (full list of surveys and their details can be found in the Figure 6). All surveys were administered with the help of Qualtrics experience management surveying tool (*Qualtrics XM - Experience Management Software*, 2020). In order to take the surveys during the four study visits participants were provided iPads. For surveys administered during the Saturday classes participants used their phones. For both those cases, QR code and vanity link were created and displayed on the projector screen as a part of the presentation. Participants could scan the QR code with their cameras or input the shortened link in the browser to access and fill out the survey.

The Automated Self-Administered 24-hour (ASA24®) Dietary Assessment Tool was used at each study visit to help participants recall foods eaten in prior 24 hours and assess macro and micronutrient intake. Body composition was measured by SECA medical Body Composition Analyzer (mBCA) 514. This device utilizes 8-point Bioelectrical Impedance Analysis to assess percent body fat and performs compartmental fat and fat-free mass analysis, including measurements of visceral fat, and basal metabolic rate. This is a non-invasive technique, taking about two minutes, that requires standing on a scale. Finally, Excel spreadsheet was utilized by the EHKC team to manually track participants' application, attendance, and survey completion.

A full list of surveys, their purpose and timing of dissemination can be found in Figure 6.

| Survey (Assessment Tool) Working Name | Brief Description | Tool Details | Initial Inquiry (Pre-Program) | 1st Study Visit (Pre-Program) | Timepoint | | | | | 2nd Study Visit (3 months) | 3rd Study Visit (6 months) | 4th Study Visit (12 months) |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------|---------------------|--------------------|---------------------|---------------------|----------------------------|----------------------------|-----------------------------|
| | | | | | Class 1 (8/10/2019) | Class 2 (8/24/2019) | Class 3 (9/7/2019) | Class 4 (9/21/2019) | Class 5 (10/5/2019) | | | |
| Eligibility | Initial survey filled out by participants during recruitment phase | Created by EHKC personnel | X | | | | | | | | | |
| Self-assessment surveys | Absenteeism, cooking frequency, nutritional intake, quality of life, mental and physical health self-assessment surveys | SF 36, PSS, Starting the conversation, MEQ, and PAVS used in validated form (additional questions were added to PAVS) | X | | | | | | | X | X | X |
| ASA24 | Dietary recall assessment tool | Automated self-assessment 24 hour diet recall tool by NIH | | X | | | | | | X | X | X |
| Seca (mBCA) 514 | Body composition analysis | Bioelectrical impedance analysis | | X | | | | | | X | X | X |
| Blood Pressure | Manual measurement | Tracked in Excel spreadsheet | | X | | | | | | X | X | X |
| Curriculum evaluation questionnaire | Knowledge, behavior, and attitude assessment in lifestyle domains | Created by EHKC personnel | | | | | | | | X | | |
| Introductory Goals | What participants hope to get out of the program | Created by EHKC personnel | | | | | | | | X | | |
| Class Evaluation | Feedback on each overall class and each of the class sessions | Created by EHKC personnel | | | | | | | | X | | |
| "Homework" assignments | Recommended applications of knowledge and skills between classes | Created by EHKC personnel | | | | | | | | X | | |
| Program Evaluation | Program evaluation and resource utilization surveys appropriate to the queried time periods | Created by EHKC personnel | | | | | | | | X | X | X |

Figure 6. EHKC Survey Tool Inventory.

Data Analysis

At the time of this work the data available included 3 months study visits (data past 3 month mark was not collected yet) and therefore is considered an early evaluation of EHKC. Simple Excel functions were used to assess feasibility through ease of recruitment and attendance. A combination of Qualtrics features and Excel functions was used to assess acceptability. StataSE 14 (College Station, TX) was used to analyze all quantitative data for effectiveness measure and comparative statistics and chi-square analysis were performed for both self-assessment results data and biometrics.

Chapter IV: Results

Introduction

The purpose of this work was to evaluate feasibility, acceptability, effectiveness and comprehensiveness of EHKC applying the based on the data gathered during the clinical trial. The data and methodology were chosen based on the literature review and common trends for evaluation of WWP.

Key Findings

Population

EHKC was open to benefit-eligible Emory employees. A priory selection criteria was developed giving preference to participants with BMI>30 and pre-existing conditions (Figure 7). The intention was to maximize potential value of EHKC based on limited

amount of resources available (funds to cover 40 participants) and offer the program to those who need it most.

| A priori scoring criteria for recruitment for the EHKC | |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| Biometrics | |
| BMI ≥ 30 | 5 points |
| BMI 27-29.9 | 3 points |
| BMI < 27 | 0 points |
| Pre-existing conditions | |
| Hypertension | 3 points |
| Diabetes mellitus | 1 point |
| High cholesterol | 1 point |
| Heart disease | 1 point |
| Cancer | 1 point |
| Readiness for making a lifestyle change | |
| Self-rated 10-point Likert scale response to motivation for making a change in the following five areas: | Likert scale response Score for each question |
| 1) A healthier lifestyle | 7 - 10 2 points |
| 2) Making more home-prepared meals | 4 - 6 1 point |
| 3) Increasing physical activity | 0 - 3 0 points |
| 4) Attending weeknight yoga classes | |
| 5) Working with an online health coach | |

Figure 7. EHKC Scoring Criteria.

From a total of 234 participants who inquired about the program during the recruitment period 182 applied, 82 were eligible, and 41 were accepted in the program (Figure 8). Application included filling out an eligibility survey which provided some insight into the applicants’ demographics.

Emory Healthy Kitchen Collaborative (EHKC) Recruitment Overview

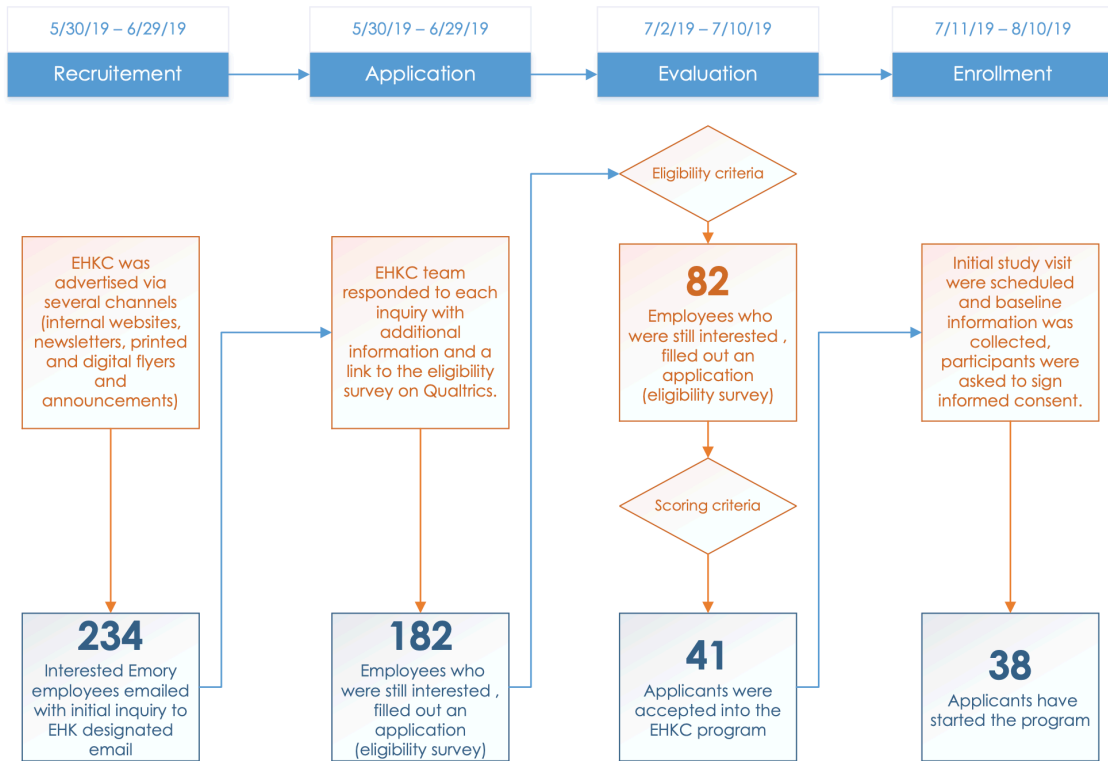


Figure 8. EHKC Recruitment Process Overview.

From 182 applicants 95% were female, 58% reported BMI>30, 28% reported having hypertension, 25% reported being prescribed blood pressure medication, 21% reported having high cholesterol, less than 10 % reported diabetes, history of cancer or personal history pf heart disease, and 54% reported having no pre-existing conditions (see Figures 9-12).

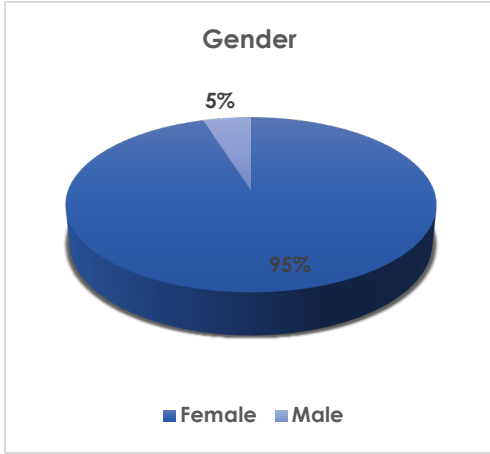


Figure 9. EHKC Applicants. Gender.

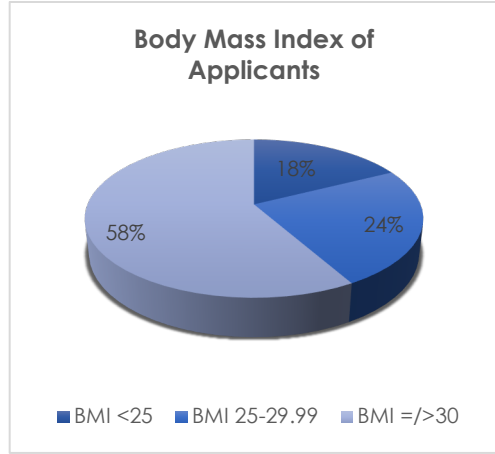


Figure 10. EHKC Applicants.

BMI.

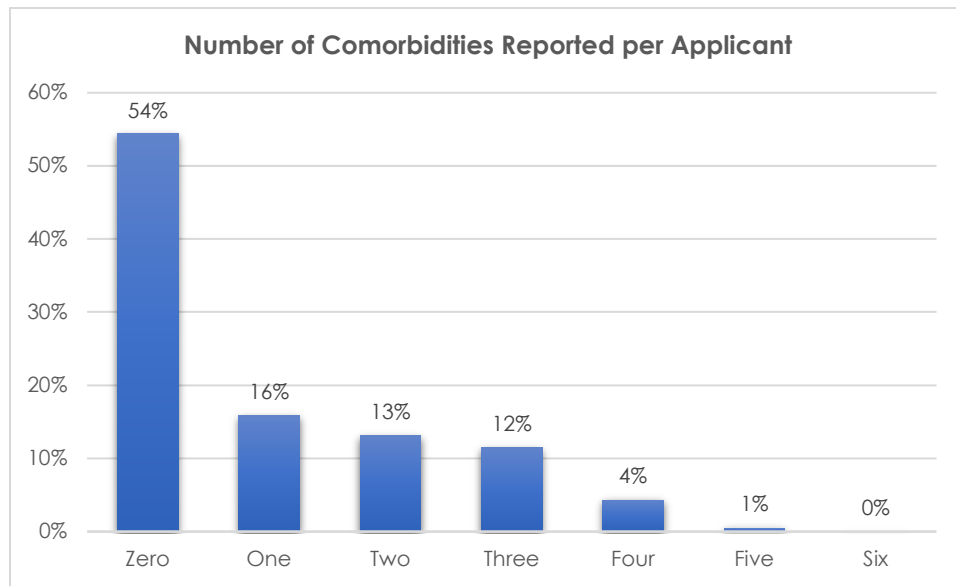


Figure 11. EHKC Applicant Number Comorbidities.

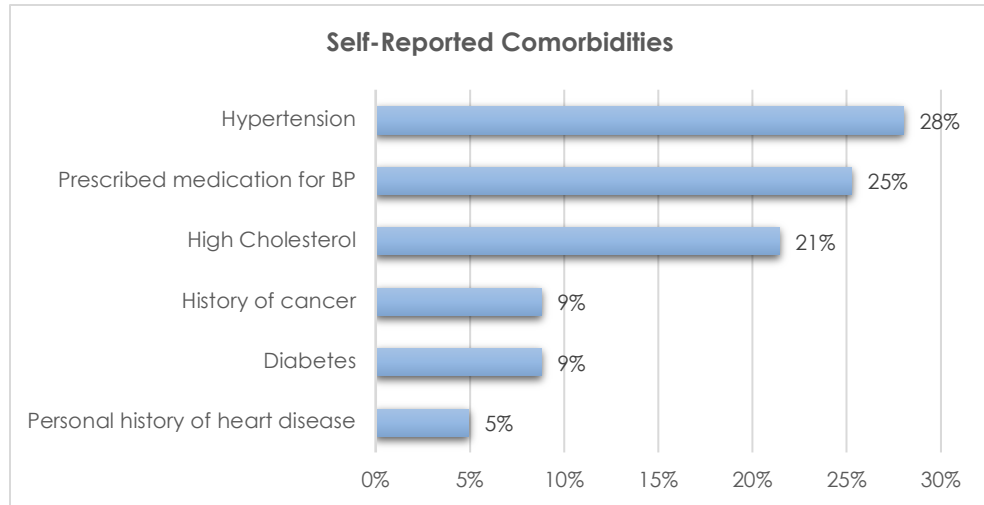


Figure 12. EHKC Applicant Comorbidities Description.

Based on 40 participants who received baseline screening, mean age was 49.9 years and mean BMI was 35.9, 74% of participants were African American, and 26% were Caucasian, 95% were female and 5% male (see Figures 13-14).

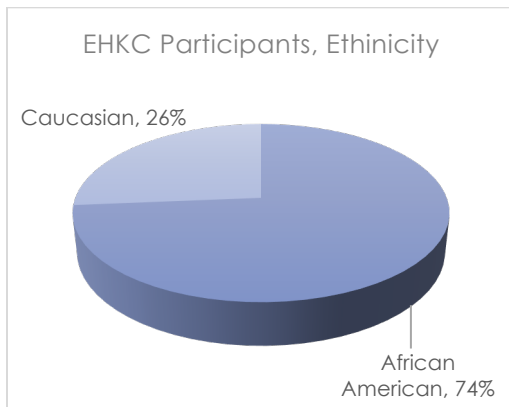


Figure 13. EHKC Participants Ethnicity.

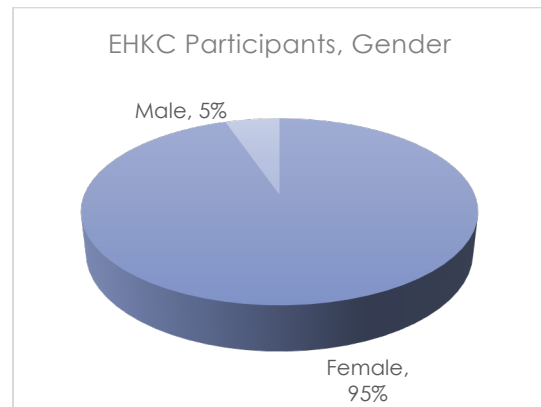


Figure 14. EHKC Participants Gender.

Feasibility

Feasibility of EHKC was measured based on ease of recruitment and attendance.

Ease of Recruitment

The recruitment timeline serves as a measure of feasibility (see Figure 15). During the planning process an estimate of 1-3 months was suggested as reasonable timeline to recruit 40 participants based on previous experience for similar programs at Emory. EHKC was able to recruit the desired amount of participants into the program during the first month of recruitment. Eighty two eligible participants willing to participate in the program were identified after first month of recruitment, at which point the recruitment window was closed. Based on the capacity of the program (limit of 40 participants) recruitment goal was reached at 205% (82 eligible participants/40 spots), thus completing first component of ease of recruitment measure.

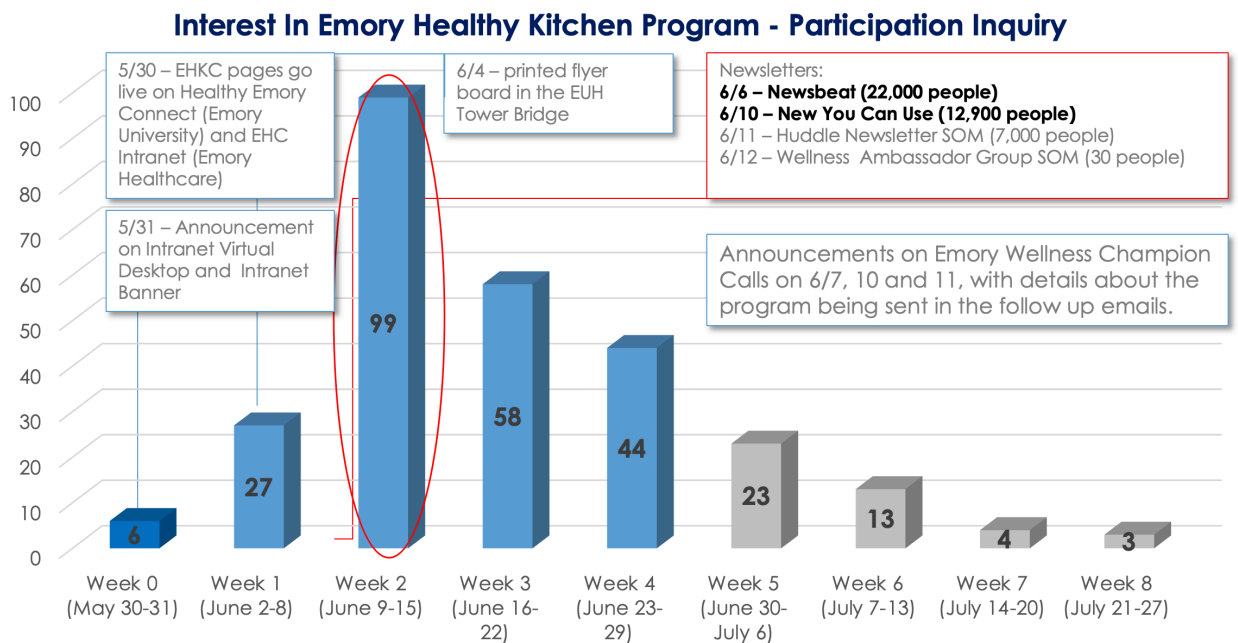


Figure 15. EHKC Recruitment Timeline.

Attendance

Attendance was tracked and measured as a second measure of feasibility. A target of 80% was set as a threshold based on literature review and internal discussion of EHKC team. For the purpose of this work attendance for 5 Saturday classes, pre-program study visit and 3 month study visit attendance was considered. Average attendance was 91% suggesting positive marker of feasibility of EHKC (see Figure 16).

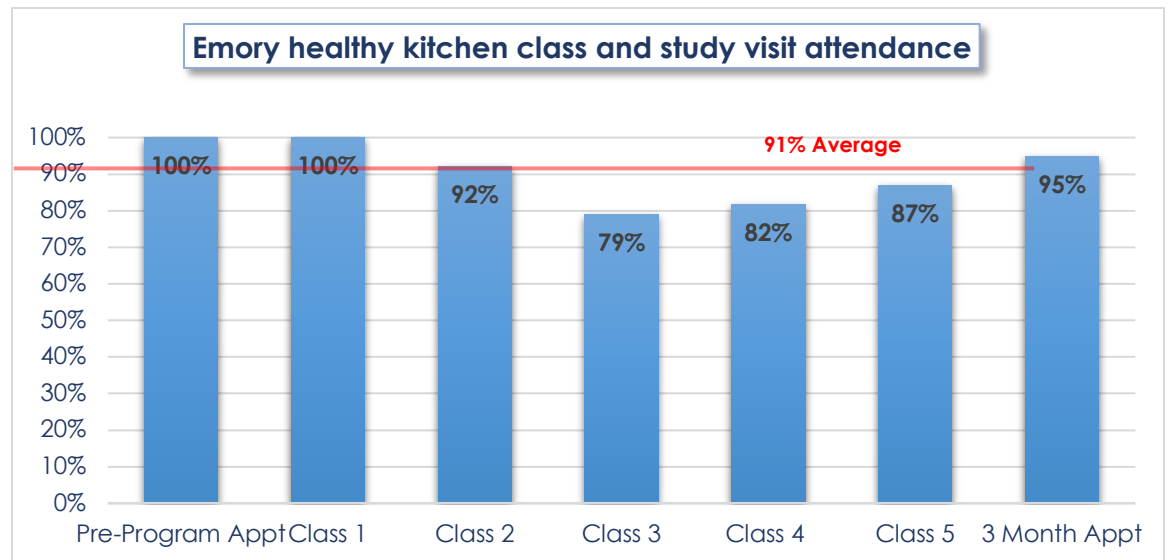


Figure 16. EHKC Attendance.

Acceptability

Acceptability was measure based on participant feedback from class evaluations (see Table 1). The results proved to be overwhelmingly positive. Among 38 participants who took the survey, 89% strongly agree and 11% agreed with being satisfied with the overall quality of the classes in the course; 95% of participants strongly agreed or agreed that the classes helped them meet their health goals; 97% strongly agreed or agreed that their ability to make meals has improved; all participants (100%) strongly agreed or agreed that they were

both likely to make changes and their knowledge about healthy eating, mindfulness, exercise, stress, and yoga increased as a result of this course. These findings suggest that EHKC rates highly on acceptability.

Table 1. EHKC Class Evaluation Results.

| Teaching Kitchen Class Evaluation Results | | |
|-----------------------------------------------------------------------------------------------------------------|----------|----------|
| All Classes | | |
| 10/5/19 | N | % |
| I am satisfied with the overall quality of the classes | | |
| Agree | 4 | 11% |
| Strongly Agree | 34 | 89% |
| The classes helped me meet the goals I outlined at the beginning of the course | | |
| Neither Agree nor Disagree | 2 | 5% |
| Agree | 9 | 24% |
| Strongly Agree | 27 | 71% |
| My ability to make healthy meals has improved | | |
| Neither Agree nor Disagree | 1 | 3% |
| Agree | 10 | 26% |
| Strongly Agree | 27 | 71% |
| I am likely to make changes as a result of this course | | |
| Agree | 8 | 21% |
| Strongly Agree | 30 | 79% |
| My knowledge has increased about healthy eating, mindfulness, exercise, stress, and yoga because of this course | | |
| Agree | 5 | 13% |
| Strongly Agree | 33 | 87% |
| N=38. | | |

Effectiveness

Primary Measure: Change in Knowledge, Skill/Behavior, and Attitude/Self-efficacy

Effectiveness of EHKC was measured based on changes in knowledge, skill/behavior, and attitude/self-efficacy. Participants were given a 49-item self-assessment questionnaire before the intervention course began and after the course. Questions were grouped based on 6 different categories – nutrition, culinary art, yoga, exercise, stress

resilience, mindful eating, as well as overall health; and three domains – knowledge, skill/behavior, and attitudes/self-efficacy. EHKC data showed statistically significant gain in knowledge in all 6 categories of health as well as overall lifestyle knowledge. Improvement in skill/behavior was statistically significant for all health categories, except exercise, where not all answers showed statistically significant improvement based on $p < 0.05$. Data also showed statistically significant positive change in attitude and self-efficacy in the categories of nutrition, culinary art, and mindful eating, as well as overall lifestyle (Table 2).

Table 2. EHKC Curriculum Evaluation Results.

| N=37, $p < 0.05$ | Nutrition | Culinary Art | Yoga | Exercise | Stress Resilience | Mindful Eating | Overall Lifestyle |
|------------------------|-----------|--------------|------|-----------------|-------------------|----------------|-------------------|
| Knowledge | YES | YES | YES | YES | YES | YES | YES |
| Skill/behavior | YES | YES | YES | *NOT CONSISTENT | YES | YES | YES |
| Attitude/self-efficacy | YES | YES | NO | *NOT CONSISTENT | *NOT CONSISTENT | YES | YES |

Secondary Measure – Biometrics

Changes in BMI, weight, waist circumference, visceral fat between baseline and 3 months into the program were analyzed. No statistically significant findings in biometric changes were identified among EHKC participants at this time. Figures 17 and 18 show changes in weight between 0 and 3 months with a mean of 1.29 lbs lost, but no statistically significant change based on P value of 0.2768.

t Test
The TTEST Procedure
Difference: Weight 2 - Weight 1

| N | Mean | Std Dev | Std Err | Minimum | Maximum |
|----|---------|---------|---------|----------|---------|
| 31 | -1.2942 | 6.5049 | 1.1683 | -25.6900 | 11.7900 |

| Mean | 95% CL Mean | Std Dev | 95% CL Std Dev |
|---------|-------------|---------|----------------|
| -1.2942 | -3.6802 | 1.0918 | 5.1981 |

| DF | t Value | Pr > t |
|----|---------|---------|
| 30 | -1.11 | 0.2768 |

Figure 17. EHKC Weight Change, 0-3 Months. T-test, $P > 0.05$.

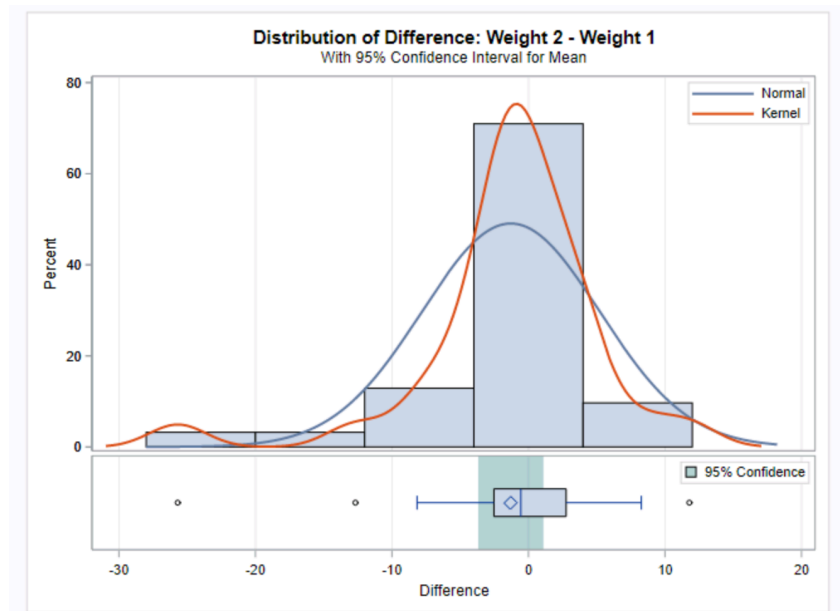


Figure 18. EHKC Weight Change, 0-3 Months. Histogram, $P > 0.05$

Comprehensiveness

Comprehensiveness of EHKC program was measured based on 10 underlying principles outlined by Sparling (Sparling, 2009). Those include programs that (1) strive to be comprehensive and integrated; (2) demonstrate commitment to employee health from leadership; (3) are open to all employees; (4) provide health assessment and follow up support; (5) tailor to the needs of employees; (6) attain high participation through creative incentives; (7) implement policy that supports and sustains healthy behaviors; (8) links services to occupational safety and job performance; (9) actively extend services to spouses and family members; (10) systematically evaluate its performance against the need.

Below are comprehensiveness principles as they apply to EHKC:

(1) strive to be comprehensive and integrated – EHKC was a multidisciplinary multi behavior change program that address several pillars of health through both didactic and experiential learning. In addition, program was integrated with current offerings and

employee benefits such as Healthy Emory Connect (Virgin Pulse platform) and Yoga at Emory initiative.

(2) demonstrate commitment to employee health from leadership – EHKC was made possible because of Emory executive leadership support with securing the grant from Ardmore Institute of Health, in-kind resources from Emory University Hospital for hosting Saturday classes on site; support from Seavey General Internal Medicine Clinic in form of staff and resources for study visits; Emory HR support in promoting the program.

(3) be accessible to all employees – EHKC was open to all Emory employees for application but could only accommodate 40 participants due to limited funding.

(4) provide health assessment and follow up support – EHKC participants received health assessment (blood pressure check and SECA body scan) at each study visit. Support network in the form of yoga classes, Full Plate Living online program, and Healthy Emory Connect Program, closed Facebook page, and seasonal newsletters with additional resources and tips.

(5) tailor to the needs of employees – program curriculum was developed ahead of time, however time was allowed at the end of all didactic sessions for questions for participants, all experiential sessions (such as yoga and culinary sessions) allowed room for responding to participants' tastes or fitness levels. Each Saturday class ended with group discussion where participants could address their specific concerns and help each other work through the issues.

(6) attain high participation through creative incentives – the program was free to participants; additional incentives included Virgin Pulse Vouchers (which count towards employee health deductible), as well as a chance to win a giftcard for up to \$300 for

completion of the full course. Attendance was calculated after 3 month study visit and reached 91%, which was considered high.

(7) implement policy that supports and sustains healthy behaviors – EHKC provided information and skill-training opportunities for developing and sustaining healthy behaviors over time. Additional resources were provided and shared after the program to help further build on the skills acquired creating continuity. The policy implementation refers to Emory Healthcare leadership and Human Resources and was beyond the scope of EHKC pilot.

(8) links services to occupational safety and job performance –the EHKC curriculum was crafted in a way to positively impact employee health and happiness and improve job performance; stress resilience and mindfulness resources were provided to help participants better handle work-related and personal stress.

(9) actively extend services to spouses and family members – spouses or significant other were encouraged to attend Saturday classes and utilize resources shared with participants.

(10) systematically evaluate its performance against the need – class evaluation forms were fill out by participants after each Saturday class and appropriate adjustments made, if resources allowed to do so.

Summary

Data suggests that EHKC was an effective work-site wellness program that has achieved its goals to positively impact health behaviors of its participants. The program met the criteria for the 4 key evaluation measures chosen: (1) feasibility - through surpassing recruitment goal at 205% within the first month and achieving high attendance rates (91%);

(2) acceptability through achieving very positive participant feedback; (3) effectiveness – through showing statistically significant increase in most categories of health knowledge, skill and self-efficacy (17 out 21); and (4) comprehensiveness – through incorporating all 10 principles of comprehensive work-site wellness programs as described in literature review based on what was possible within the scope of the program.

Chapter V: Conclusions, Implications, and Recommendations

Summary of Study

As new types of targeted worksite wellness programs emerge, there is a need to define and measure their success in order to understand ROI, inform the decision-making of investors and maximize their effectiveness in future.

Emory Healthy Kitchen Collaborative was an innovative multidisciplinary work-site wellness program pilot that took place at Emory Healthcare, Atlanta GA in 2019-2020. Forty Emory employees were recruited on a voluntary basis in accordance with a priori eligibility and selection criteria and went through a 10-week intervention course which provided knowledge and skill-building opportunities in 6 domains of health, including nutrition, culinary art, exercise, yoga, stress resilience, mindfulness eating and ethnobotany. Participants received a number of supporting tools and resource for the remainder of the year. The pilot was a registered clinical trial and included a total of 4 study visits where biometrics and self-reported data were collected.

The purpose of this work was to conduct a literature review of current trends in the field of worksite wellness, determine attributes of programs that employers found valuable, and identify optimal way to evaluate success of EHKC. Data from Emory Healthy Kitchen

Collaborative was then analyzed to measure the outcomes based on criteria selected from literature review, which included feasibility, acceptability, effectiveness and comprehensiveness of the program. EHKC met the criteria for feasibility based on ease of recruitment (goal met at 205% during the recruitment window) and attendance (91% including 5 Saturday classes, pre-program and 3-month study visit). Acceptability of EHKC rated high based on overwhelmingly positive program evaluation feedback received from participants regarding program's curriculum. Effectiveness was measured based on changes in behaviors in knowledge, skill and attitudes as a primary marker, and biometric changes as a secondary measure. Primary marker showed statistically significant positive changes in knowledge, skills and attitudes in most categories of health and wellness. The secondary measure, biometrics, showed no statistically significant changes at the time it was evaluated (3 months). Comprehensiveness of EHKC was evaluated based on 10 principles suggested by Sparling, and met all of the criteria.

Discussion of Key Results

Findings from data analysis clearly suggest that EHKC is a feasible and acceptable worksite wellness program. Part of high feasibility rating (based on ease of recruitment and attendance criteria) could likely be attributed to the fact that program was well planned and implemented. Recruitment was done in a diligent and strategic manner, leveraging all communication channels and resources at hand. Ability to attend all 5 classes and study visits was a part of eligibility criteria. Attendance was also encouraged and incentivized through the duration of the program. Additionally, the program was free to participants, which eliminated the financial barrier to enrollment and participation.

Effectiveness of the EHKC program and the criteria used to measure it may present the biggest opportunity for discussion. Even though the measure preferred by employer organizations is typically changes in biometrics, which makes it easy to quantify the ROI, the primary measure of effectiveness for EHKC was chosen to be the self-reported changes in knowledge, skills/attitudes and attitudes/self-efficacy. The reasons for that were multifold. First, in comparison to other worksite wellness programs discussed in literature review section, that were focused on nutrition, EHKC encompassed many different aspects, including exercise, yoga, mindfulness and stress resilience, improvements in which are not defined by weight or BMI changes as a primary marker of success. Secondly, with only 3-month and selected 6-month data available at the point of writing this paper, the timeframe was arguably too short to show significant biometric changes. Additionally, EHKC did not provide an immersive environment where intake of foods, exercise and/or other behaviors could be controlled, like in some other programs mentioned in literature review. Based on these reasons, preference was given to tracing changes in three domains: (1) knowledge, (2) skill/behavior and (3) attitudes/self-efficacy in six categories of health covered in EHKC curriculum – nutrition, culinary art, exercise, yoga, stress resilience and mindfulness eating. Statistically significant positive change was observed in knowledge gained in all six categories of health. Data also showed statistically significant improvements in skills and behavior in nutrition, culinary art, yoga, stress resilience, and mindful eating. The exercise category showed improvement, but answers were not consistently significant across all questions in that category even though all were suggestive of improvement. Finally, in attitudes and self-efficacy category, nutrition, culinary art and mindful eating showed statistically significant consistent improvement. Based on the structure of the classes, the latter three categories – nutrition, culinary art and mindful eating – were components that stayed consistent across all

5 Saturday classes; while yoga, exercise and stress resilience were only discussed and practiced at some of the five classes. This observation may suggest that consistency and repetition played a role in translating knowledge gain to skills and behaviors, which over time translated into attitudes and self-efficacy. It is also important to note that the program showed statistically significant improvement in all 3 domains - knowledge, skill and behavior, attituded and self-efficacy – in overall lifestyle self-assessment.

Comprehensiveness of EHKC measured high based on 10 principles suggested by Sparling. It is worth mentioning that an important component of program's comprehensiveness is its integration with other wellness programs and offerings at employer site, as well as employer site culture overall. Thus, comprehensiveness of the program also evaluates the symbiotic relationship between the overall organizational employee wellness strategy and the specific program. With future implementations of EHKC it is important that the program continues to be aligned with larger wellness strategy and integrated seamlessly and effectively with other offerings.

Strengths and Limitations

Strengths

EHKC was a registered clinical trial. The program was meticulously planned and well-structured, with intentionally developed built-in tools to gather a variety of data points through the program. Strong ties to the Emory University and highly qualified academic staff, allowed for the creation of high-quality curriculum. Funding from Ardmore Institute of Health and the in-kind support of Emory's leadership helped cover the costs of the program and provide it at no cost to participants.

Limitations

Some limitations remain. The sample was based on a self-selected group of people who chose to apply for the program. Additional biases were introduced as a result of a selection criteria. Preference was given to participants with BMI over 30 and pre-existing conditions, which in turn could have potentially suggested a lifestyle or set of habits and behaviors that contributed to those conditions to start with. EHKC did not have a control group. The budget only allowed for a small sample size of 40 participants, limiting statistical power to make conclusions about the potential implications of the program. Some missing data challenges exist due to surveys or study appointments missed by participants.

Implications

EHKC is a feasible, acceptable and comprehensive worksite wellness program, effective in increasing participants' knowledge, skills and behaviors, and attitudes and self-efficacy in major categories of health and wellness.

Based on these findings EHKC is a desirable program to be implemented again at Emory. In addition to employees with pre-existing conditions and high BMI (above 30), perhaps, employee target audience may expand to include the relatively healthy and health-conscious employees. In Emory's case, EHKC can serve as an alternative for the diabetes prevention program to those employees who do not qualify for the latter, because they are not "sick enough" based on the selection criteria, but are still looking to improve their health.

As future iterations of the program are planned and implemented opportunity may lie in customizing the structure of the program to fit the particular employer needs or target audience (class duration and frequency, distribution of various topics and learning modalities

among class days) and identifying additional biometrics and biomarkers helpful to track progress.

Recommendations

This section provides recommendations that could help improve implementation and evaluation of EHKC with future programs.

Implementation

Based on official as well as candid feedback from participants and EHKC implementation team a number of recommendations were considered as plausible for future instances of EHKC.

- Class space – because participants spent several hours in the same room, it was suggested to have additional space to allow moving conveniently around the room, place for personal belongings, and stretch breaks. The official room capacity for EHKC auditorium was 75 people. The space was set up for approximately 50 people with classroom set up (long tables and chairs facing the projector).
- Kitchen space – both participants and lead chef noted the potential utility of actual teaching kitchen – a space specifically designed as a culinary classroom with proper kitchen equipment available to participants at individual or group stations. EHKC culinary classes were set up in Emory University Hospital physician’s lounge, and while maximum accommodations were made to create cooking stations from scratch (between six and eight stations were set up and taken down for every class, organizing participants in groups) some technical challenges remained (example: power issues for individual burners).

- Health coach (s) – who could take a proactive approach when working with participants could increase engagement and encourage resource utilization. Participants had access to group coaching through Full Plate Living program, however they had to initiate participation themselves.
- Behavioral scientists – several participants noted struggling with emotional eating. An ability to refer participants to behavioral therapy could help improve outcomes.
- Structure of the program – based on participants’ feedback shorter, but more frequent classes could prove valuable.
- Sustainability – creating a platform for utilization of knowledge, behaviors and skills gained during the program is essential for sustainability. EHKC hosted a 6-month “plant-luck” reunion, where participants had an opportunity to bring a dish they prepared, socialize and discuss any challenges and/or progress experienced in the program.

Curriculum

The quality of curriculum included in the EHKC was exceptional due to high caliber of faculty from Emory University. There could, however, be an opportunity to include additional areas of health education and experiential learning. Pillars of health that were not directly addressed were sleep and connection. Other aspects that appeared to gain momentum in literature review were financial and mental health. Additionally, basic food agricultural skills and horticulture could be included as a part of the experiential learning. Finally, there may be added benefit in incorporating more yoga and exercise sessions in the classes.

Incentive structure

Clever and creative incentives have an opportunity to effectively increase attendance and engagement for worksite wellness programs. EHKC was a program free to participants, which eliminated significant barrier to enrollment in the program. Participants were incentivized with Virgin Pulse points for attending classes and filling out surveys. Small prizes (healthy cooking books) were given away in cooking competitions. Participants who completed the full program were also given an opportunity to participate in a raffle for a final prize (under \$300 value). Incentive budget was limited due to funding and tax regulations, but existing incentives worked well to achieve high rates of attendance.

For next iteration of the program there may be an opportunity to outline clear incentives structure, and consider tying incentives to desired outcomes (attendance, participation, biometric changes). There could also be an opportunity to structure cost of the program in a way that increases participants' emotional investment and increases motivation to follow through. An example of such cost/reward structure was the Complete Health Improvement Program (CHIP) administered at Lee Health System (Lacagnina, 2013). Participants were enrolled in the program at no cost with the explicit prior commitment to adhere to the program for 12 months (including class participation and appointment attendance). If they dropped out, it was understood that they will have to pay back the cost of the program (over \$1200 automatically deducted from their paycheck in installments). This resulted in 100% participation, and improved health outcomes as a result of perfect attendance and active engagement through the duration of 12 months.

Evaluation

The evaluation plan developed for EHKC worked well to measure program's ability to achieve its goals. In order to measure the effectiveness of future such programs, and potentially measure success of EHKC in the context of other WWP's at the same worksite, it could be helpful to understand the data that is already being collected at that institution, including potential demographic, biometric, and clinical measures, as well as attendance and engagement. It could also give insight into metrics that are important to that specific employer, and measure EHKC based on those metrics. For example, data provided by Emory Health & Wellness about general employee population included metrics also tracked by EHKC, such as BMI, waist circumference, blood pressure. Additional biomarkers that were tracked by Emory (but not collected under EHKC) were biomarkers like cholesterol, HDL, and glucose levels. These measures could be measured and evaluated in future programs.

Additionally, it could be helpful to measure the actual lifestyle change made by participants even before their health metrics change. Wearable devices to track movement, heart rate, standing hours and other metrics. Additional data, such as mindfulness minutes, food journal entries, and mood reports could be collected in real time through phone applications. Budget and security of patient information should be considered carefully when selecting those metrics. Potential technology and data managements partners for remote patient monitoring could be considered.

The Role of Culture

Finally, it is important to mention the role of culture in worksite wellness. "Culture first, programs second," said Isaac Prilleltensky, the inaugural Erwin and Barbara Mautner

chair in community well-being at the University of Miami (*Piecing It Together*, 2020). The role of leadership modeling and supporting the behaviors related to employee health and wellness cannot be overestimated. Culture shifts take time, but their effect in creating the environment of health wellness is invaluable. Ultimately, every program, and especially a comprehensive program such as EHKC, contributes to that shift. And even if biometric changes are not yet there to argue for its importance, it is unavoidably shaping the culture of the whole institution towards the one that leaves its employees better than it found them.

Conclusion

Emory Healthy Kitchen Collaborative is an innovative multidisciplinary behavior change worksite wellness program implemented at Emory in Atlanta, GA in 2019-2020. Evaluation criteria were determined, and success of the program measured based on data available at 3 months mark. Early evaluation suggests that EHKC is a feasible, acceptable, and comprehensive program effective in improving knowledge, skills and behaviors, and attitudes and self-efficacy for participants. No statistically significant change was observed in biometric measures at this time. Final evaluation is suggested once all data has been collected upon pilot's completion. Additional recommendations for future programs and further research have been provided.

References

- Al-Khudairy, L., Uthman, O. A., Walmsley, R., Johnson, S., & Oyebode, O. (2019). Choice architecture interventions to improve diet and/or dietary behaviour by healthcare staff in high-income countries: A systematic review. *BMJ Open*, *9*(1), e023687. <https://doi.org/10.1136/bmjopen-2018-023687>
- American Time Use*. (2019). U.S. Bureau of Labor Statistics. <https://data.bls.gov/PDQWeb/tu>
- Astrella, J. A. (2017). Return on Investment: Evaluating the Evidence Regarding Financial Outcomes of Workplace Wellness Programs | Ovid. *JONA: The Journal of Nursing Administration*. <https://oce-ovid-com.proxy.library.emory.edu/article/00005110-201707000-00007/HTML>
- Bauer, U. E., Briss, P. A., Goodman, R. A., & Bowman, B. A. (2014). Prevention of chronic disease in the 21st century: Elimination of the leading preventable causes of premature death and disability in the USA. *Lancet (London, England)*, *384*(9937), 45–52. [https://doi.org/10.1016/S0140-6736\(14\)60648-6](https://doi.org/10.1016/S0140-6736(14)60648-6)
- Bodai, B. I., Nakata, T. E., Wong, W. T., Clark, D. R., Lawenda, S., Tsou, C., Liu, R., Shiue, L., Cooper, N., Rehbein, M., Ha, B. P., McKeirnan, A., Misquitta, R., Vij, P., Klonecke, A., Mejia, C. S., Dionysian, E., Hashmi, S., Greger, M., ... Campbell, T. M. (2017). Lifestyle Medicine: A Brief Review of Its Dramatic Impact on Health and Survival. *The Permanente Journal*, *22*. <https://doi.org/10.7812/TPP/17-025>
- Bodai, B. I., & Tusso, P. (2015). Breast Cancer Survivorship: A Comprehensive Review of Long-Term Medical Issues and Lifestyle Recommendations. *The Permanente Journal*, *19*(2), 48–79. <https://doi.org/10.7812/TPP/14-241>

BUPA: *Our strategy*. (n.d.). Bupa - an International Healthcare Company. Retrieved July 12, 2020, from <https://www.bupa.com/corporate/who-we-are/our-strategy>

Burton, J. (2010). *WHO Healthy Workplace Framework and Model: Background and Supporting Literature and Practices*.

https://www.who.int/occupational_health/healthy_workplace_framework.pdf

Cancelliere, C., Cassidy, D., Ammendolia, C., & Cote, P. (2011). Are workplace health promotion programs effective at improving presenteeism in workers? A systematic review and best evidence synthesis of the literature. *BMC Public Health*, 11.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3123596/>

Chronic Diseases in America | CDC. (2020, February 24).

<https://www.cdc.gov/chronicdisease/resources/infographic/chronic-diseases.htm>

Dieleman, J. L., Baral, R., Birger, M., Bui, A. L., Bulchis, A., Chapin, A., Hamavid, H., Horst, C., Johnson, E. K., Joseph, J., Lavado, R., Lomsadze, L., Reynolds, A., Squires, E., Campbell, M., DeCenso, B., Dicker, D., Flaxman, A. D., Gabert, R., ... Murray, C. J. L. (2016). US Spending on Personal Health Care and Public Health, 1996–2013.

JAMA, 316(24), 2627–2646. <https://doi.org/10.1001/jama.2016.16885>

Educational and Community-Based Programs | *Healthy People 2020*. (2020).

HealthyPeople2020.Gov. <https://www.healthypeople.gov/2020/topics-objectives/topic/educational-and-community-based-programs/objectives>

Eisenberg, D. M., Richter, A. C., Matthews, B., Zhang, W., Willett, W. C., & Massa, J.

(2017). Feasibility Pilot Study of a Teaching Kitchen and Self-Care Curriculum in a Workplace Setting: *American Journal of Lifestyle Medicine*.

<https://doi.org/10.1177/1559827617709757>

- Employee Health Promotion Disease Prevention Guidebook. (2011). *VHA Center for Engineering & Occupational Safety and Health (CEOSH)*, 203.
- Employee Health Promotion Disease Prevention Guide.pdf*. (n.d.). Retrieved May 31, 2020, from <https://www.publichealth.va.gov/docs/employeehealth/health-promotion-guidebook.pdf>
- FAQs—Teaching Kitchen Collaborative*. (2020). Teaching Kitchen Collaborative. <http://www.tkcollaborative.org/about/faqs/>
- FIn Wellness—New aspect of WWP*. (n.d.).
- Frias, Y. (2020). *Increasing Financial Security with Workplace Emergency Savings*.
- Frias—INCREASING FINANCIAL SECURITY WITH WORKPLACE EMERG.pdf*. (n.d.). Retrieved May 18, 2020, from https://www.prudential.com/wps/wcm/connect/b1474cb2-7fcf-40f0-b09d-0b7aef9ceed0/Building_Employer-Aided_Emergency_Savings.pdf?MOD=AJPERES&CVID=mqxCTvL
- Health: Our Business*. (2019). Bupa House. https://www.bupa.com/~/_media/files/site-specific-files/our%20purpose/workplaces/bupa_health-our-business_vf.pdf
- Healthy_workplace_framework.pdf*. (n.d.). Retrieved May 31, 2020, from https://www.who.int/occupational_health/healthy_workplace_framework.pdf
- Hyman et al. - LIFESTYLE MEDICINE TREATING THE CAUSES OF DISEASE.pdf*. (n.d.). Retrieved June 13, 2020, from <https://drhyman.com/downloads/Lifestyle-Medicine.pdf>
- Hyman, M. A., Ornish, D., & Roizen, M. (2009). *Lifestyle Medicine: Treating the Causes of Disease*. *Lifestyle Medicine*, 3.

- Kyeremanteng, K., Robidoux, R., D'Egidio, G., Fernando, S. M., & Neilipovitz, D. (2019). An Analysis of Pay-for-Performance Schemes and Their Potential Impacts on Health Systems and Outcomes for Patients. *Critical Care Research and Practice*, 2019. <https://doi.org/10.1155/2019/8943972>
- Lacagnina, S. (2013). *Health Plan Steering Committee*. Lee Health.
- Lever, K. T., Ph D. , Jonathan. (2011, May 24). Prevention: The Answer To Curbing Chronically High Health Care Costs (Guest Opinion). *Kaiser Health News*. <https://khn.org/news/052411thorpelever/>
- Lifestyle Medicine*. (2020). American College of Lifestyle Medicine. <https://www.lifestylemedicine.org//What-is-Lifestyle-Medicine>
- Lohr, S. (2012, December 1). *Taking a Stand for Office Ergonomics*. <https://www.nytimes.com/2012/12/02/business/stand-up-desks-gaining-favor-in-the-workplace.html>
- Mokdad, A. H., Ballestros, K., Echko, M., Glenn, S., Olsen, H. E., Mullany, E., Lee, A., Khan, A. R., Ahmadi, A., Ferrari, A. J., Kasacian, A., Werdecker, A., Carter, A., Zipkin, B., Sartorius, B., Serdar, B., Sykes, B. L., Troeger, C., Fitzmaurice, C., ... Murray, C. J. L. (2018). The State of US Health, 1990-2016: Burden of Diseases, Injuries, and Risk Factors Among US States. *JAMA*, 319(14), 1444–1472. <https://doi.org/10.1001/jama.2018.0158>
- ObjectivesPublicComment508.pdf*. (n.d.). Retrieved July 3, 2020, from <https://www.healthypeople.gov/sites/default/files/ObjectivesPublicComment508.pdf>
- Piecing It Together*. (2020, April). The Practice: Approaching Lawyer Well-Being. <https://thepractice.law.harvard.edu/article/piecing-it-together/>

- Polak, R., Pober, D., Morris, A., Arieli, R., Moore, M., Berry, E., & Ziv, M. (2018). Improving Adherence to Mediterranean-Style Diet With a Community Culinary Coaching Program: Methodology Development and Process Evaluation. *Journal of Ambulatory Care Management*, 41(3), 181–193.
<https://doi.org/10.1097/JAC.0000000000000240>
- Program Measurement and Evaluation Guide: Core Metrics for Employee Health Management*. (2015). Health Enhancement Research Organization and Population Health Alliance.
- Qualtrics XM - Experience Management Software*. (2020). Qualtrics. <https://www.qualtrics.com>
- Secretary's Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2030* | *Healthy People 2020*. (2020). <https://www.healthypeople.gov/2020/About-Healthy-People/Development-Healthy-People-2030/Advisory-Committee>
- Song, Z., & Baicker, K. (2019). Effect of a Workplace Wellness Program on Employee Health and Economic Outcomes: A Randomized Clinical Trial. *JAMA*, 321(15), 1491–1501. <https://doi.org/10.1001/jama.2019.3307>
- Sparling, P. B. (2009). Worksite Health Promotion: Principles, Resources, and Challenges. *Preventing Chronic Disease*, 7(1).
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2811520/>
- Sutcliffe, J. T., Carnot, M. J., Fuhrman, J. H., Sutcliffe, C. A., & Scheid, J. C. (2018). A Worksite Nutrition Intervention is Effective at Improving Employee Well-Being: A Pilot Study. *Journal of Nutrition and Metabolism*, 2018.
<https://doi.org/10.1155/2018/8187203>
- Sutcliffe, J. T., Gardner, J. C., Gorman, M. M., Carnot, M. J., Wetzel, W. S., Fortin, T., Sutcliffe, C. A., & Adams, A. (2019). Impact of a 6-Month Micronutrient-Dense

Plant-Rich Nutrition Intervention on Health and Well-Being at the Worksite. *Journal of Nutrition and Metabolism*, 2019. <https://doi.org/10.1155/2019/2609516>

The State of US Health, 1990-2010: Burden of Diseases, Injuries, and Risk Factors. (2013).

JAMA, 310(6), 591–608. <https://doi.org/10.1001/jama.2013.13805>

United States. (2015, September 9). Institute for Health Metrics and Evaluation.

<http://www.healthdata.org/united-states>

What Is Pay for Performance in Healthcare? (2018, March 1).

<https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0245>

Workplace Health in America, 2017. (2017). CDC.

<https://www.cdc.gov/workplacehealthpromotion/data-surveillance/docs/2017->

[Workplace-Health-in-America-Summary-Report-FINAL-updated-508.pdf](#)

Workplace Health Model | Workplace Health Promotion | CDC. (2019, June 26). Centers for Disease Control and Prevention.

<https://www.cdc.gov/workplacehealthpromotion/model/index.html>

Workplace Health Program Development Checklist. (2019). CDC.

Appendix A: EHKC Curriculum Overview.

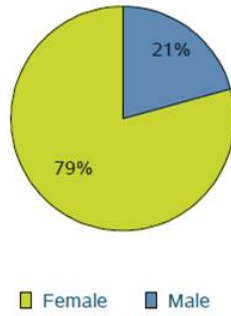
| Formula | Class 1 | Class 2 |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <i>*Breakfast was served every morning.</i> | 8:00 AM Check in, registration, surveys 9:00 AM Introduction and welcome | |
| 9:00 AM Lecture | 9:15 AM Lecture 1 - Sharon Bergquist, MD Can We Say Which Diet Is Best? | 9:00 AM Lecture 3 - Carla Haack, MD, RYT-200 Medicine and Mind-Body Practice |
| 10:00 AM Exercise Session | 10:00 AM Lecture 2 - Linda Craighead, PhD Mindful Eating Coach | 10:00 AM Exercise Session - Carla Haack, MD, RYT-200 Yoga session |
| 11:00 PM Culinary Session | 11:00 PM Culinary Session Salads and Salad Dressings | 11:00 PM Culinary Session Soup's On |
| 12:00 PM Mindful Lunch | 12:00 PM Mindful Lunch | 12:00 PM Mindful Lunch |
| 12:30 PM Group discussion | 12:30 PM Group discussion | 12:30 PM Group discussion |
| Class 3 | Class 4 | Class 5 |
| 9:00 AM Lecture 4 - Felipe Lobelo, MD, PHD Exercise is Medicine | 9:00 AM Lecture 5 - Sharon Bergquist, MD Choosing Healthy Protein, Fats and Carbs | 9:00 AM Lecture 7 - Jennifer Mascaro, PhD Stress and Meditation |
| 10:00 AM MPH Group fitness exercise | 10:00 AM Lecture 6 - Jenny Bilko, RD Grocery Shopping and Mealprep | 10:00 AM Lecture 8 - Cassandra Quave, PhD Spices and Anti-Inflammatory diet |
| 11:00 PM Culinary Session Beans | 11:00 PM Culinary Session Whole Grains | 11:00 PM Culinary Session Spices and Ethnic Foods |
| 12:00 PM Mindful Lunch | 12:00 PM Mindful lunch | 12:00 PM Mindful lunch |
| 12:30 PM Group discussion | 12:30 PM Group discussion | 12:30 PM Concluding personal statements; commitments for future; feedback |

Appendix B - Emory Employee Population Metrics

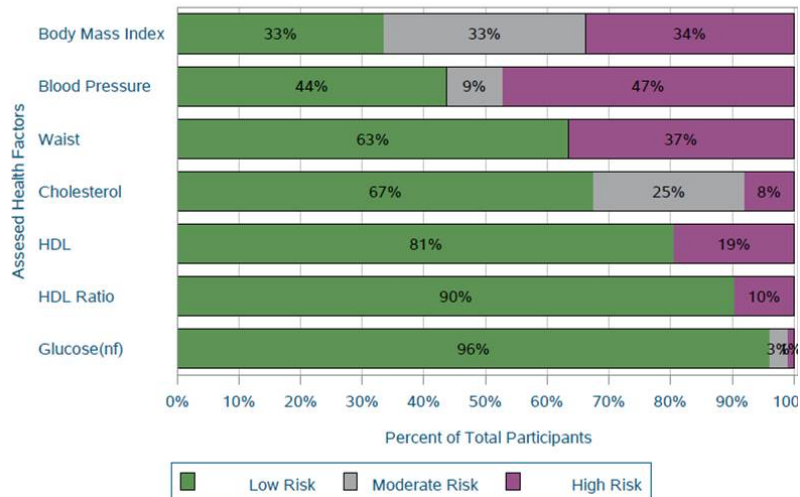
Incurred Quarter: 2019Q1,2019Q2,2019Q3,2019Q4

| Age Band Groups | Unique Members |
|-----------------|----------------|
| 20-29 | 1,024 |
| 30-39 | 2,418 |
| 40-49 | 2,209 |
| 50-59 | 1,978 |
| 60+ | 1,093 |
| Summary | 8,722 |

Participation in 2019



Top Risks Of All Participants (N=8,129)



Appendix C – Curriculum Evaluation Survey Results

| # | ID_CODE | Question: For each of the following statements, please indicate if you agree or disagree. | Category | Subcategory | Domain # | Domain N | P-Value | Statistically Significant Change (Yes/No) |
|----|---------|-----------------------------------------------------------------------------------------------------------------|--------------|-------------|----------|------------------------|---------|-------------------------------------------|
| 1 | Q1_DIF | I have a clear understanding of which foods are healthier choices to prevent and manage illness | Nutrition | | 1 | Knowledge | 0.000 | YES |
| 2 | Q2_DIF | I understand how different foods function in my body to influence my health | Nutrition | | 1 | Knowledge | 0.000 | YES |
| 3 | Q3_DIF | I know the difference between healthy and unhealthy fats, proteins, and carbohydrates | Nutrition | | 1 | Knowledge | 0.000 | YES |
| 4 | Q4_DIF | I feel confident in my ability to understand nutrition labels | Nutrition | | 1 | Knowledge | 0.000 | YES |
| 5 | Q5_DIF | I know the flavor and aroma of different spices | Nutrition | Ethnobotany | 1 | Knowledge | 0.000 | YES |
| 6 | Q6_DIF | I can describe the effect of different spices on my health | Nutrition | Ethnobotany | 1 | Knowledge | 0.000 | YES |
| 7 | Q7_DIF | I stock my pantry with healthy essentials | Nutrition | | 2 | Skill/behavior | 0.000 | YES |
| 8 | Q8_DIF | My food choices can make a big difference in my mood and mental wellbeing | Nutrition | | 3 | Attitude/self-efficacy | 0.006 | YES |
| 9 | Q9_DIF | I feel confident in applying basic cooking techniques | Culinary Art | | 3 | Attitude/self-efficacy | 0.001 | YES |
| 10 | Q10_DIF | I feel comfortable making meals from scratch | Culinary Art | | 3 | Attitude/self-efficacy | 0.003 | YES |
| 11 | Q11_DIF | I have the skills to prepare healthy, delicious meals | Culinary Art | | 2 | Skill/behavior | 0.000 | YES |
| 12 | Q12_DIF | I can make healthy meals quickly and affordably | Culinary Art | | 2 | Skill/behavior | 0.000 | YES |
| 13 | Q13_DIF | Preparing home-cooked meals from whole foods is a good use of my time | Culinary Art | | 3 | Attitude/self-efficacy | 0.000 | YES |
| 14 | Q14_DIF | I understand the ways yoga uses the mind, body, and breath to benefit physical and mental wellbeing | Yoga | | 1 | Knowledge | 0.000 | YES |
| 15 | Q15_DIF | I have an understanding of the different styles of yoga | Yoga | | 1 | Knowledge | 0.000 | YES |
| 16 | Q16_DIF | If YES is selected When I practice yoga: I am able to remain comfortable while doing movements | Yoga | | 2 | Skill/behavior | 0.003 | YES |
| 17 | Q17_DIF | If YES is selected When I practice yoga: I can coordinate the movements of my body with my breath | Yoga | | 2 | Skill/behavior | 0.001 | YES |
| 18 | Q18_DIF | If YES is selected When I practice yoga: I am able to focus my mind on my breath | Yoga | | 2 | Skill/behavior | 0.001 | YES |

| | | | | | | | | |
|----|---------|-------------------------------------------------------------------------------------------------------|-------------------|--|---|------------------------|-------|-----|
| 19 | Q19_DIF | I am confident in my ability to improve my physical health through yoga | Yoga | | 3 | Attitude/self-efficacy | 0.383 | NO |
| 20 | Q20_DIF | I feel I can improve my mental health by practicing yoga | Yoga | | 3 | Attitude/self-efficacy | 0.285 | NO |
| 21 | Q21_DIF | I know the recommended amount of aerobic and strength resistance exercise that I should get each week | Exercise | | 1 | Knowledge | 0.000 | YES |
| 22 | Q22_DIF | I can describe aerobic and strength resistance types of exercise | Exercise | | 1 | Knowledge | 0.001 | YES |
| 23 | Q23_DIF | I can describe the health benefits of exercise for preventing and managing diseases | Exercise | | 1 | Knowledge | 0.000 | YES |
| 24 | Q24_DIF | I can comfortably exercise with my current health condition | Exercise | | 2 | Skill/behavior | 0.051 | NO |
| 25 | Q25_DIF | I feel confident I can get the recommended amount of exercise even when I am busy with other demands | Exercise | | 3 | Attitude/self-efficacy | 0.002 | YES |
| 26 | Q26_DIF | I can find ways of incorporating physical activity into my day | Exercise | | 3 | Attitude/self-efficacy | 0.028 | YES |
| 27 | Q27_DIF | I am motivated to be physically active for maintaining and improving my health | Exercise | | 3 | Attitude/self-efficacy | 0.090 | NO |
| 28 | Q28_DIF | I use physical activity to improve my mood | Exercise | | 2 | Skill/behavior | 0.007 | YES |
| 29 | Q29_DIF | I know the effect of short term and <u>long-term</u> stress on my body | Stress Resilience | | 1 | Knowledge | 0.000 | YES |
| 30 | Q30_DIF | I know techniques for building my capacity to respond to stress | Stress Resilience | | 1 | Knowledge | 0.000 | YES |
| 31 | Q31_DIF | I am aware of how I react under stress | Stress Resilience | | 3 | Attitude/self-efficacy | 0.002 | YES |
| 32 | Q32_DIF | I have the skills to cope with stress | Stress Resilience | | 2 | Skill/behavior | 0.000 | YES |
| 33 | Q33_DIF | I am confident in my ability to focus and think clearly under pressure | Stress Resilience | | 3 | Attitude/self-efficacy | 0.060 | NO |
| 34 | Q34_DIF | I have specific skills that help me control how I respond to stress | Stress Resilience | | 2 | Skill/behavior | 0.001 | YES |
| 35 | Q35_DIF | I feel confident in my ability to practice meditation to reduce my stress | Stress Resilience | | | | 0.001 | YES |
| 36 | Q36_DIF | I believe I can strengthen my ability to handle stress | Stress Resilience | | 3 | Attitude/self-efficacy | 0.765 | NO |
| 37 | Q37_DIF | I know that I can be in control of my life | Stress Resilience | | 3 | Attitude/self-efficacy | 0.705 | NO |
| 38 | Q38_DIF | I know techniques of applying mindfulness to eating | Mindful eating | | 1 | Knowledge | 0.000 | YES |

| | | | | | | | | |
|----|---------|----------------------------------------------------------------------------------------|-------------------|--|---|------------------------|-------|-----|
| 39 | Q39_DIF | I understand the benefits of mindfulness-based eating | Mindful eating | | 1 | Knowledge | 0.000 | YES |
| 40 | Q40_DIF | I can tune in to my hunger and fullness cues | Mindful eating | | 2 | Skill/behavior | 0.000 | YES |
| 41 | Q41_DIF | I believe I can control my portions by applying mindfulness to eating | Mindful eating | | 3 | Attitude/self-efficacy | 0.000 | YES |
| 42 | Q42_DIF | By eating mindfully, I can improve my relationship with food | Mindful eating | | 3 | Attitude/self-efficacy | 0.004 | YES |
| 43 | Q43_DIF | I have knowledge about the lifestyle habits that can improve my health and wellbeing | Overall Lifestyle | | 1 | Knowledge | 0.000 | YES |
| 44 | Q44_DIF | I feel confident in my ability to improve my health and wellbeing through my lifestyle | Overall Lifestyle | | 3 | Attitude/self-efficacy | 0.007 | YES |
| | Q45_DIF | I can control my health and wellbeing through my lifestyle habits and behaviors | Overall Lifestyle | | 3 | Attitude/self-efficacy | 0.001 | YES |