

Evaluating the Influence of the Complete Health Improvement Program (CHIP) on Blood Glucose, Blood Pressure, and Weight

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Background: Diabetes, hypertension, and obesity are vastly prevalent in the United States. Lifestyle modification programs can aid in controlling chronic disease. The aim of the study was to evaluate the health outcomes of the Complete Health Improvement Program (CHIP) concerning blood glucose, blood pressure, and weight. CHIP is a lifestyle medicine education program involving diet modification and increased physical activity.

Methods: A quantitative, summative program evaluation was performed to measure the outcomes of CHIP. Pre and post data sets were collected on 73 individuals who completed the 12-week CHIP program. Pre and post program blood glucose levels, blood pressure readings, and weight measurements were analyzed using a paired t-test with a 95% confidence level. Analysis determined influence of the intervention on the biomarkers.

Results: The post-intervention group means showed decreases in blood glucose, blood pressure, and weight. Statistical analysis revealed significant decreases in blood glucose ($p = 0.008$) and weight ($p = 0.000$). Blood pressure readings did not have statistically significant decreases ($p = 0.403$); however, the pre-intervention blood pressure readings were in the normotensive range.

Conclusion: Results indicated that the Complete Health Improvement Program decreased participants' blood glucose levels, blood pressure readings, and weight measurements. Statistically significant decreases in blood glucose and weight suggest enhanced control of diabetes and obesity through utilization of CHIP.

Key Words: Educational activities, Diabetes mellitus, Healthy lifestyle, Hypertension, Obesity

INTRODUCTION

The connection between poor health outcomes and physical inactivity has become a well-established and deep-rooted health concern in recent years [1]. Sedentary lifestyles are one of the main contributing factors towards the progress of chronic disease, premature mortality, and morbidity [2]. Chronic disease is the culmination of continued and insidious behaviors that lead to poor health outcomes [3].

Over 34 million individuals, approximately 10 percent of the United States (US) population suffer from diabetes [4].

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Thirty three percent of the adult population, an estimated 78 million individuals in the US, have hypertension [5]. And, obesity is considered a global pandemic, with increasing prevalence in the United States doubling over the past few decades [6]. Chronic lifestyle-based diseases such as diabetes, hypertension, and obesity have been a significant cause of both morbidity and mortality and will continue to increase in significance if interventions are not implemented [7]. Morbidity and mortality ensued by lifestyle are potentially preventable; diabetes, hypertension, and obesity can be better controlled through implementation of healthy lifestyle choices [8]. Lifestyle modifications are an easy, cost-effective means of controlling chronic disease.

The Complete Health Improvement Program (CHIP) is a lifestyle modification program that focuses on diet, exercise, stress management, and mitigation of unhealthy habits [9]. According to the Lifestyle Medicine Institute [10], “CHIP is a powerful disease reversal tool that disrupts and curtails the rising chronic disease rates in a highly effective manner.” CHIP has been targeting chronic disease in various clinical, corporate, and community settings around the world over the past 25 years [11]. The purpose of the study was to answer the following research question: How does the CHIP influence participants’ health outcomes regarding blood glucose levels, blood pressure readings, and weight measurements?

MATERIALS AND METHODS

Diabetes, hypertension, and obesity were selected to be evaluated due to their vast prevalence in the United States. Research on interventions to control these diseases could prove to be beneficial on a widespread basis. Subjective bias and prejudice were deflated by use of quantitative, statistical analysis. Limitations of the chosen method include lack of control group to further assess the influence of the CHIP.

1. Procedure

A quantitative, summative program evaluation was performed to measure the outcomes of the CHIP. A program evaluation is a systematic collection, analysis, and report of data about the merit and worth of a program’s outcomes

[12]. The outcomes examined were the participants’ blood glucose levels, blood pressure readings, and weight measurements. Comparisons can be made over time to determine the relative influence of the program [12]. A paired t-test was utilized to compare pre and post data sets to determine the influence of CHIP on blood glucose levels, blood pressure readings, and weight measurements. Statistical analysis was performed utilizing the Statistical Package for Social Sciences (SPSS 25) software using a 95% confidence level ($p < 0.05$).

2. Participants

The sample consisted of 73 participants from a CHIP, conducted at MercyOne Clinton Medical Center in midwestern US. Pre and post program biomarkers were obtained on site, at the time of each cycle of the CHIP program dating back to 2015. The average age of CHIP participants was 57.9. All subjects were Caucasian ($N = 73$). The gender profile was predominately female (79%). Participants of CHIP were volunteers who sought improvement of health status. The requirements of participation in CHIP are minimal; the participants must be at least 18 years old, have diagnosis of a chronic illness, and pay a fee to partake.

3. Intervention

The CHIP is a lifestyle medicine education program conducted at MercyOne Clinton Medical Center. CHIP consisted of 18 structured sessions over a 12-week time period. See Table 1 for specifics on in class activities and assigned challenges. Sessions also required reading assignments and turning in personal exercise logs. CHIP was instructed on site, by hospital staff. The educational portion was the mainstay of the program; these sessions took place in the hospital conference room. The individuals had supervised access to the hospital’s wellness gym.

CHIP participants were educated on the etiology of chronic ailments and the benefits of lifestyle modifications [11]. CHIP promoted optimal nutrition through use of a whole-food, plant-based diet [11]. Participants were encouraged to become more physically active through moderately intense exercises, including but not limited to walking, resistance exercises, strength training, and body weight movements [11,13]. CHIP aided the participants in making long

Table 1. CHIP syllabus

Date (session)	In class video	Challenge
10/18/18 (1)	Rise of the chronic disease	Jump start
10/22/18 (2)	Lifestyle is the best medicine	Start tracking exercise
10/25/18 (3)	Common denominator of chronic disease	Drink more water
10/29/18 (4)	Optimal lifestyle	Choose health spectrum position
11/1/18 (5)	Eat more, weigh less	Pantry purge
11/5/18 (6)	Fiber, your new best friend	Revisit breakfast
11/8/18 (7)	Disarming diabetes	Strategies for eating out
11/12/18 (8)	The heart of the matter	Strategies for traveling
11/15/18 (9)	Controlling blood pressure and discovering protein	Reduce salt
11/19/18 (10)	Bone health essentials	Create strength training schedule
11/26/18 (11)	Cancer prevention	Eat a rainbow
11/29/18 (12)	Understanding your results and taking action	Create one SMART goal
12/3/18 (13)	DNA is not your destiny	Identify barriers
12/6/18 (14)	Practicing forgiveness	Write a letter
12/10/18 (15)	Re-engineering your environment	Re-engineer environment
12/13/18 (16)	Stress-relieving strategies	Strategies for less stress
12/17/18 (17)	Fix how you feel	Write a gratitude letter
12/20/18 (18)	From surviving to thriving	Pass on your experience

lasting lifestyle changes by addressing the causes of chronic illness and teaching the use of lifestyle as treatment for disease [14]. Upon completion of the program, participants gained quality self-care through heightened understanding of the epidemiology, cause, and risk factors associated with chronic diseases [9].

4. Approval and ethical considerations

Approval for the study was obtained from the institutional review board (IRB) of Clarke University (IRB No. 18190461). Permissions were obtained from MercyOne Clinton Medical Center to utilize CHIP participant data. Personal health information was removed from shared data to protect the confidentiality of all participants.

RESULTS

Three separate paired t-tests were performed, permitting distinct analysis of each of the following: blood glucose, blood pressure, and weight. SPSS software delineated each groups' mean values. The mean value of all post-intervention groups (blood glucose, blood pressure, and weight) were lower than their corresponding pre-intervention group mean. The decrease in means across the pairings indicate positive health outcomes. The comparative mean values sub-

stantiate that the CHIP reduced blood glucose levels, blood pressure, and weight for participants.

The mean blood glucose prior to initiation of the program was 123.78 mg/dL (N = 73). After 18 sessions of CHIP over a 12-week time frame the group mean was decreased by 11.53 mg/dL. The post-intervention mean was lowered to 112.25 mg/dL (N = 73). The mean systolic blood pressure prior to initiation of CHIP was 128.97 mmHg (N = 73). Following 12 weeks of intervention, the systolic blood pressure values were discovered to be reduced. A scant decline of 1.42 mmHg landed the post-intervention systolic blood pressure reading at 127.55 mmHg (N = 73). However, the minimal reduction in blood pressure was not an unexpected finding, as the pre-intervention mean was not elevated, and thus, there was little need for reduction. Prior to the initiation of CHIP, members were found to have a mean weight of 213.838 pounds (N = 73). After 12 weeks of classes the 73-participant group experienced weight loss. CHIP triggered a reduction in weight by 7.945 pounds per individual. Program members were re-weighed at the culmination of CHIP, equaling out to a reduced mean weight of 205.893 pounds (N = 73).

The significance of the results was determined by the value of p in the statistical analysis. If the p-value is less than 0.05, the data was deemed significant at a 95% confidence

level. The p-value for paired t-test between pre and post blood glucose groups were 0.008, indicating statistical significance. The p-value for weight was 0.000, signifying a statistical significance between pre- and post-intervention data sets. Although the mean values of pre and post blood pressure readings showed improvement with reduced values, the blood pressure groups did not have statistically significant differences. The p-value for pre and post blood pressure t-test was 0.403. The lack of statistical significance of the blood pressure p-value is not an unexpected finding, due to the normotensive pre-intervention systolic mean (128.97 mmHg).

DISCUSSION

The encouraging results gathered from the study can have crucial implications for healthcare practitioners. The study suggests that the CHIP is a valued intervention for those who suffer from chronic illness, as the 12-weeks of education, increase in physical activity, and alterations in diet showed improvement in multiple biomarkers. The improvement in blood glucose, blood pressure, and weight equated to participants gaining positive health outcomes. Furthermore, the intervention demonstrated promise in gaining enhanced control of diabetes and obesity due to the study resulting in statistically significant decreases in these biomarkers.

Results from the study should lead providers to implement effective self-care methods for their patient population. Providers should encourage self-care with inclusion of lifestyle modifications, like diet and exercise, in patient care plans. Inclusion of lifestyle modifications in care plans allow for providers to utilize the “be your own best medicine” motto of the CHIP without having to enroll their patients into a lifestyle medicine course. Inclusion of diet and exercise in care plans will allow patients to be their own best medicine by simply living a healthful life.

Lifestyle modifications should be prescribed and trialed prior to use of medication. Diet and exercise should go beyond mere suggestions; lifestyle modifications should be monitored by providers in order to effectively and safely reverse the effects of diabetes, hypertension, and obesity. Patients can track progress on their own, but close monitor-

ing by healthcare providers would permit higher levels of compliance and allow for maintenance of safe levels of blood pressure and blood glucose. Programs like CHIP are shining examples of how lifestyle modifications can be initiated to improve health status.

Future research would be helpful in determining the following: the feasibility of prescription of diet and exercise, the ability of providers to require and monitor patient success with lifestyle modification, and specific reasons for success of different lifestyle modification programs around the world. While considerable research has been completed regarding improved health by means of diet and exercise, knowledge gaps in the area of lifestyle medicine remain.

A multitude of like experiments may enlighten future healthcare workers to develop more efficient interventions. Similar studies could evaluate the control of high cholesterol stemmed from completion of CHIP by comparing pre and post cholesterol and triglyceride levels. Experiments could continue to evaluate the reversal of diabetes, hypertension, or obesity by a lifestyle modification program that is structured differently than the CHIP, allowing for comparison of several interventions while maintaining the same research focus. Qualitative studies could also be completed with intention of evaluating the individual’s experience of making and maintaining healthy lifestyle modifications.

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