Payer Source Influence on Effectiveness of Lifestyle Medicine Programs

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The Complete Health Improvement Program (CHIP)[1] is an intensive, community-based lifestyle intervention program that offers significant benefits in reducing cardiovascular disease,[2-4] type 2 diabetes (T2D),[5,6] and depression.[7,8] Lifestyle intervention programs are primarily attractive to middle-class individuals who are generally employed, have the financial means to enroll, and have a level of education that facilitates the understanding, assimilation, and application of the healthy lifestyle principles presented.[9]

In the heart of Appalachia, Athens County has the highest poverty rate in Ohio at 31%,[10] with over 16% of the population being uninsured.[11] Many people in this region are struggling with poverty-related issues such as limited access to healthcare, inadequate housing and transportation, and limited education.

This pilot study is an analysis of results from participants of 3 CHIP classes in Athens. The aim of this study was to examine the differences in outcomes based on how participants' tuition was paid. There were 3 different sources of payment: out of pocket by the participants themselves, coverage by an employer, or by scholarship based on financial need.

METHODS

This study examined changes in selected chronic disease risk factors of 79 self-selected participants who attended 1 of 3 classes (CHIP 7-9) offered January through May 2013 in Athens, Ohio. (Results from Athens CHIP classes 1 through 6 were reported on in a prior paper.[12]) Approval for the study was obtained from the local CHIP administration and the Ohio University Institutional Review Board, protocol number 12X212. Scholarship funds for the study were principally obtained through a grant from the Ohio University Heritage College of Osteopathic Medicine, Research and Scholarly Activity Committee (# RP1310). Local organizations, businesses, and individuals provided additional scholarship funds.

Study Participants

Participants learned about CHIP through word of mouth, local media, community organizations, religious institutions, and healthcare providers. Interested individuals attended an information session

providing an overview of CHIP and an opportunity to enroll in the CHIP program. Participants were then informed of this specific study, which would examine their health screen data, attendance record, and tuition payment method. If interested, they were given an opportunity to ask questions about the study and were asked to sign a consent form. Nonparticipation in this study did not alter their eligibility for a scholarship or their participation in CHIP.

Assignment of Payer Source

Participants were categorized into 3 groups based on the source(s) of their tuition payment: self-pay, employer-pay, or scholarship. Many participants had a mix of payer sources, (eg, 80% employer, 20% self; 60% scholarship, 40% self). Fifty-one percent was used as the threshold to assign payer category. Financial assistance was offered based on the participants' statement of need on a scholarship request form completed at the information session; participants were asked to state what they could afford and the balance was given as a scholarship. No verification of need was performed.

Description of CHIP

CHIP classes are facilitated by volunteers trained and authorized by the Lifestyle Medicine Institute/CHIP through Athens CHIP, administered locally by Live Healthy Appalachia, a 501(c)3 organization, located in Athens, Ohio. Eighteen class sessions were conducted over approximately a 2 to 4 month period (CHIP 7: 17 weeks; CHIP 8 and 9: 8 weeks).

Each 90- to 120-minute session consisted of video presentations and discussion. Many sessions included cooking demonstrations and supplementary material. The primary focus of CHIP is the consumption of plant-based whole foods ad libitum, such as fresh fruits, vegetables, whole grains, legumes, and some nuts. The goal is to keep dietary fat content below 20% of the total calories, daily intake of added sugar below 10 teaspoons, sodium below 2000 mg, and cholesterol below 50 mg. Water consumption (8 glasses/day) and high-fiber food intake (>35 g/day) is encouraged, along with flexibility exercises and a daily walk of 30 minutes, 2 miles, or 10,000 steps on the pedometer.

Program tuition cost increased incrementally from $450 to $599 over the time frame covered by the study. The cost included class tuition, 2 biometric assessments, food samples, textbook, workbook, cookbook, water bottle, pedometer, and other reference materials. The biometric assessments provided at the beginning and conclusion of the program included weight, height, blood pressure (BP), fasting total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), triglycerides (TG), and fasting blood glucose (FBG).

A second health screen was conducted prior to the 12th class session. During that session, each participant received their personal health screen results and de-identified aggregated class results. They were also given an explanation of the results and encouraged to continue their newly acquired

lifestyle changes.

Data Collection and Reporting

The biomedical assessments, including weight, height, and BP (using a sphygmomanometer), were obtained by trained medical professionals. Fasting blood samples were collected by trained phlebotomists and analyzed for TC, LDL-C, HDL-C, TG, and FBG by the pathology laboratory at O'Bleness Memorial Hospital in Athens, Ohio, an American College of Pathologists-certified clinical laboratory, utilizing a Beckman Coulter DXC-600 analyzer.

Data for each participant were entered into a password-protected proprietary Access-based database maintained on the CHIP administration computer at the Live Healthy Appalachia office. For this study, CHIP administration provided aggregated data from CHIP 7 through 9 on a password-protected Excel database file.

Data Analysis

Outcome variables included: actual change and percent change between pre- and post CHIP measures ([post – pre ÷ pre] × 100) of body mass index, systolic blood pressure, diastolic blood pressure (DBP), TC, LDL-C, HDL-C, TG and FBG. Independent variables were payer source (out of pocket vs employer and/or scholarship) and CHIP classes (CHIP 7-9). To test whether results differed by payer source, *t* tests were used with self-pay (or not) for each of the outcome measures. Pearson correlation coefficients (*r*) were also computed to see whether the amount of money participants had paid out of pocket was correlated with the degree of improvement. After, to test whether the results of the 3 CHIP classes differed, 1-way analyses of variance (ANOVAs) were performed with the CHIP classes as the independent variables for each of the outcome variables. All tests were performed 2-tailed, and the alpha level was set at 5%. Due to the small, exploratory nature of the study, no alpha adjustment was applied. Note that the total number of participants across payer source (eg, 12 + 51 + 13 = 76 in **Table 1**) does not match the total number of participants (79) because 3 participants did not receive a majority of funding from any one source.

RESULTS

A total of 79 individuals (73.4% female and 26.6% male) with a mean age of 50.6 years (range = 25-74 years) participated in this program and were included in this analysis. Seventy-five individuals (95%) completed at least some part of the second biomedical assessment. Payer status was defined as having greater than 50% of the tuition paid by that particular source; 3 participants did not receive a majority of their tuition payment from any single source.

Participants were enrolled in 1 of 3 classes (CHIP 7-9) offered in Athens between January and May 2013. Data from CHIP 7-9 were compared with data collected from the first 6 CHIP classes in Athens

(CHIP 1-6).[12] Overall findings were consistent with CHIP classes 1 through 6. Participants in the higher-risk categories generally had the most significant improvements. (Table 1 describes the population of this study.) Women constituted the majority in all groups, and age was similar across the payer categories and classes.

Tables 2A and **2B** present actual and mean changes in each of the risk factors for all participants in CHIP 7 through 9, as well as results based on payer category (2a) and specific class attended (2b). Participants experienced a significant reduction in most risk factors. It was indicated with the *t* tests that the participants that had paid out of pocket and had received employer compensation did not differ in how much they improved in any of the outcomes (all *P* values >.05). Likewise, correlation analysis suggests that the amount of money paid did not predict how much participants would improve over time (range of $r = -0.12$ to 0.123; all *P* values >.05). These effects remained nonsignificant even after controlling for the differences among CHIP classes. There was no significant difference in results based on payer source, tuition cost, or duration of program.

On average, participants experienced a reduction in risk for all categories except DBP, HDL-C, and TG. Those who experienced the most benefits from the program were those who started with the highest risk profiles. Importantly, when looking at DBP, HDL-C, and TG, participants whose numbers were in the highest risk strata at the beginning of the study (DBP >80; TG >100; HDL-C <45) experienced improvements in all of these variables, even though participants as a whole did not.

DISCUSSION

The primary aim of this study was to examine the results of CHIP based on tuition payer source. Participants were categorized by their payment source for the program: self-pay, employer-pay, or scholarship. This study demonstrates that source of payment for CHIP has no bearing on outcome measures, suggesting that the benefit of CHIP is possibly present across socioeconomic lines. This is particularly important for the ongoing discussion of personal investment in the program.

Conventional wisdom has been that each participant needs financial “skin in the game” to ensure their attentiveness and commitment. However, this study suggests that the dedication to participate in the study is sufficient enough to ensure results. We are attempting to demonstrate that should third-party funding be made available for those of lower socioeconomic status who perhaps could not otherwise afford the expense of CHIP, they should be expected to experience the same benefit as those covering its costs out of pocket.

Employers and society at large derive benefits from lifestyle intervention programs. Conservative estimates are that a 5% reduction in prevalence of chronic disease will yield an annual savings of

$24.7 billion nationally—over $1.2 billion in Ohio alone.[13] Medical costs for employers fall $3.27 for every $1 spent on wellness programs, and absenteeism costs fall $2.73.[14]

Lifestyle interventions are typically cost-effective and virtually free of side effects, leading to sustainable health benefits. With the current escalation of healthcare costs and decreasing assistance for the economically disadvantaged,[15] there is a need for improved public health services.[16] CHIP, a community-based intensive lifestyle program pays for itself by contributing to a healthier population.[6,17-19]

Limitations

This study has a number of limitations. Participants were self-selected, which could affect selection bias since these participants already demonstrated a desire to engage in lifestyle change that differed from the average population. Since there is no control group, a proportion of the results can be attributed to a regression to the mean. The number of scholarship recipients is small, and the range of scholarship amounts is wide. The attribution of payer source was imperfect, as many participants had multiple sources of funding. Nonetheless, with no statistical difference between funding sources, the potential confounding effect by how the payer was defined is minimized.

Additionally, as this was a retrospective study, the groups were imbalanced. Although the number of people in each group was enough to establish statistical significance, there is a greater number of people in the employer-pay group (51) than either the scholarship-pay (12) or self-pay (13) group. Some participants also reduced or eliminated some of their medications during the program, potentially producing a dampening effect on their results. Data pertaining to medication usage and existing medical conditions were not collected in the study and would have likely made the results even stronger if they were properly controlled for. Future studies could be designed to overcome many of these limitations.

CONCLUSIONS

CHIP is effective in reducing multiple chronic disease risk factors. These results are present independent of program tuition payer source, which suggests that the benefits of CHIP are present across socioeconomic lines. In poverty-stricken regions, like Appalachia, that also have a greater burden of chronic and preventable diseases,[20] it is advantageous from a personal and public health perspective to provide funding for those in financial need to attend an intensive lifestyle intervention program, such as CHIP.

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