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Associations of Health Self-Efficacy with Engagement in Health-Promoting Behaviors and Treatment Adherence in Rural Patients

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Corresponding Author:	Julia Roncoroni, PhD University of Denver Denver, Co UNITED STATES
First Author:	Julia Roncoroni, PhD
Order of Authors:	Julia Roncoroni, PhD
	Carolyn Tucker, Ph.D.
	Whitney Wall, Ph.D.
	Guillermo Wippold, Ph.D.
	Julia Ratchford, Ph.D.
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Abstract:	Rural residents have lower levels of engagement in health-promoting behaviors and treatment adherence than their urban counterparts. This cross-sectional study sought to understand the role of health self-efficacy as a precursor to engagement in health-promoting behaviors and treatment adherence in 273 rural patients. SEM was used to examine whether health self-efficacy predicted engagement in health promoting behaviors and treatment adherence. Results show that health self-efficacy predicts engagement in health-promoting behaviors and treatment adherence. Boosting patients' health self-efficacy could be a way of increasing their engagement in health-promoting behaviors and treatment adherence, and thus of improving their health outcomes.

Cover Letter

Morgridge College of Education
Department of Counseling Psychology
Julia Roncoroni
juliaroncoroni@gmail.com

1999 E. Evans Ave.
Denver, CO 80210-4605
(303)871-3784

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Bettina M. Beech, Dr.PH, MPH
Editor
Family and Community Health
University of Mississippi Medical Center
2500 North State Street
Jackson, MS 39216

Dear Dr. Beech:

Please find attached a manuscript that we are submitting to be reviewed for publication in *Family and Community Health*. The title of this submitted manuscript is: "Associations of Health Self-Efficacy with Engagement in Health-Promoting Behaviors and Treatment Adherence in Rural Patients."

The study we are submitting has a focus on health disparities as they pertain to rural communities, and it aims to advance health equity for this vulnerable population. The research reported in this manuscript is not under review by or accepted for publication in any other journal and has not been published in whole or part elsewhere. This research was conducted in accordance with the principles of research ethics of the American Psychological Association regarding research with human subjects. Additionally, the research study reported in this manuscript received approval from the University of Florida Institutional Review Board-01.

The authors declare no conflicts of interest. Further, all authors have been personally and actively involved in substantive work leading to this manuscript and hold themselves jointly and individually responsible for its content.

The attached manuscript has been seen and approved by all authors for submission to *Family and Community Health.* Correspondence about this submission should be sent to Julia Roncoroni, PhD, Department of Counseling Psychology, Morgridge College of Education, University of Denver, 1999 E Evans Ave., Denver, CO, 80210; juliaroncoroni@gmail.com.

Thank you in advance for your support with reviewing the attached manuscript.

Sincerely,
Julia Roncoroni, Ph.D.
Assistant Professor
Department of Counseling Psychology, University of Denver

Associations of Health Self-Efficacy with Engagement in Health-Promoting Behaviors and Treatment Adherence in Rural Patients

1- Julia Roncoroni, PhD, Assistant Professor, Department of Counseling Psychology, Morgridge College of Education, University of Denver, 1999 E Evans Ave, Denver, CO, 80210; email: juliaroncoroni@gmail.com.

2- Carolyn M Tucker, PhD, Professor, Department of Psychology, University of Florida, P.O. Box 112250 Gainesville, Florida 32611-2250, cmtucker@ufl.edu, (352) 392-0601.

3- Whitney Wall, PhD, Department of Psychology, Fayetteville State University, 1200 Murchison Road, Fayetteville, NC 28301-4298, whitneywall@gmail.com.

4- Guillermo Wippold, Assistant Professor, Department of Psychology, University of South Carolina, Columbia, SC, 29208, gwippold@gmail.com

5- Julia Ratchford, Department of Counseling Psychology, Morgridge College of Education, University of Denver, 1999 E Evans Ave, Denver, CO, 80210; email: julialratchford@gmail.com

HEALTH SELF-EFFICACY IN RURAL PATIENTS

Abstract

Rural residents have lower levels of engagement in health-promoting behaviors and treatment adherence than their urban counterparts. This cross-sectional study sought to understand the role of health self-efficacy as a precursor to engagement in health-promoting behaviors and treatment adherence in 273 rural patients. SEM was used to examine whether health self-efficacy predicted engagement in health promoting behaviors and treatment adherence. Results show that health self-efficacy predicts engagement in health-promoting behaviors and treatment adherence. Boosting patients' health self-efficacy could be a way of increasing their engagement in health-promoting behaviors and treatment adherence, and thus of improving their health outcomes.

Key words: health self-efficacy, health-promoting behaviors, treatment adherence, rural health

Associations of Health Self-Efficacy with Engagement in Health-Promoting Behaviors and Treatment Adherence in Rural Patients

Rural residence is a noteworthy social determinant of poor health outcomes, both in the United States and internationally.[1-3] Residents of rural areas are more likely to report fair to poor health than urban individuals (19.5% versus 15.6%).[3-4] Furthermore, residents of rural areas tend to have higher rates of obesity, diabetes, hypertension, high cholesterol, and asthma than their urban counterparts.[2-4,5-8]In comparison with their urban counterparts, rural residents are older, poorer, and sicker (more affected by chronic health conditions).[7,9]

In Florida (where the present study was conducted), rural counties fare worse than urban ones in measures of morbidity and mortality, engagement in health-promoting behaviors, and health care access and utilization.[10] Rural residents in Florida, for example, have high rates of diabetes and arthritis when compared to national data.[11] There are disproportionately higher death rates in rural areas than in urban areas for 20 of the 25 leading causes of death.[12]

When compared to urban residents, residents of rural areas, in particular racial/ethnic minorities, face a unique combination of sociodemographic variables (e.g., lower household incomes, higher rates of poverty, lower rates of health insurance, lower levels of education) that put them at higher risk for morbidity and mortality than urban residents.[3,7,9,11] Factors like inadequate health facilities, shortage of health care providers, and lower access to preventive and specialized health care, which have a negative impact on residents of rural areas, also lead to health disparities.[2,3,12,13] In sum, rural communities have sociodemographic characteristics that help explain the health disparities they experience.[14,15,16] In face of these demographic disadvantages, rural residents must commit to consistently engaging in behavioral health

practices such as treatment adherence and engagement in health promoting behaviors (e.g., exercising and healthy eating) to stay healthy.

However, rural patients have lower rates of treatment adherence and engagement in health promoting behaviors than their urban counterparts.[17,18] Exact rates of treatment adherence are inconsistently depicted in the health care literature.[19] However, research consistently shows that rural individuals' demographic characteristics (e.g., lower levels of education and literacy) may put them at risk for lower treatment adherence, and therefore, at increased risk for poor health outcomes.

Rural residents also have lower rates of engagement in health-promoting behaviors than do their urban counterparts. Rural residents have a higher percentage of sedentary lifestyle than urban residents.[20-23] Leisure time inactivity is most common for men and women in rural counties.[7] Residents of rural areas are less likely to have nutritional diets and more likely to be current or former smokers than their urban counterparts.3,[7,24-26] The largest urban-rural increases in smoking are seen in the South of the United States.[7]

Precursors of Treatment Adherence and Engagement in Health-Promoting Behaviors

Health Self-Empowerment Theory (HSET) is a literature-based theory that is useful in understanding treatment adherence and engagement in health-promoting behaviors.27,28 HSET recognizes the effect of social, environmental, and economic conditions on health behaviors.[27,28] These conditions could partially explain the differences in health outcomes between residents of rural areas and residents of urban areas. Yet, given that many of these variables are intractable, research is needed that identifies modifiable psychological and knowledge variables that may empower rural individuals to engage in health-promoting behaviors (like healthy eating and

physical activity) and to adhere to treatment under whatever environmental, cultural, social, and economic conditions that may exist in their lives.

Health Self-Empowerment Theory asserts that self-empowerment-oriented, cognitive-behavioral variables (i.e., motivation to engage in health-promoting behaviors such as eating a healthy diet and exercising, self-praise of health-promoting behaviors, active coping strategies/skills for managing stress, taking responsibility for one's health/health responsibility, health knowledge, and health self-efficacy) influence the occurrence of health-promoting behaviors.[27] These variables become key to understanding and modifying the health behaviors of racial/ethnic minorities and individuals with low incomes and limited health resources (such as minorities residing in rural areas), who often have low actual or perceived power over their health and many other aspects of their lives.[28]

Health self-efficacy is one of the self-empowerment-oriented variables included in Health Self-Empowerment Theory. In urban individuals, health self-efficacy (i.e., one's perceived capability of engaging in mental and physical health-promoting behaviors and healthy lifestyles, and the expectations that personal effort can lead to these healthy behaviors and a healthy lifestyle)[29-31] has been identified as a determinant of both treatment adherence[32] and engagement in health-promoting behaviors like engagement in physical activity, health eating, and smoking. [31,33-35] Literature on these associations is scarce for rural patients.

Present Study Hypothesis

Given the research linking health self-efficacy to engagement in health-promoting behaviors and treatment adherence mostly with urban individuals, this study examines the links between health self-efficacy and treatment adherence and engagement in health-promoting behaviors in a sample of adult rural patients in North Florida. This study intentionally includes

an overrepresentation of racial/ethnic minorities (in particular, African American/Black individuals) as they are most affected by health disparities in the area where this study was conducted. Using a cross-sectional design, the following research hypothesis will be investigated: health self-efficacy will predict levels of treatment adherence and engagement in health-promoting behaviors (i.e., individuals with lower health self-efficacy will exhibit lower rates of treatment adherence and engagement in health-promoting behaviors; see Figure 1).

Methods

Participants

Participants in this study were a convenience sample of 273 patients from two clinics in North Central Florida. Both clinics serve predominately indigent and low-income rural patients. To be enrolled in the proposed study, patients had to: (a) be at least 18 years old, (b) be patients at one of these two health care centers in the 12 months prior to the study, (c) be able to communicate either verbally or in writing in English or in Spanish, and (d) be able to read and sign an informed consent form that documents agreement to participate in the study.

The race/ethnicity distribution among participants was as follows: 22 (8.1%) self-identified as Hispanic; 3 (1.1%) as American Indian or Alaska Native, 90 (33.0%) as Black or African American, 129 (47.3%) as Caucasian/White/European American, and 22 (8.1%) as other. Of the 273 participants, 175 (64.1%) self-identified as female, 73 (26.7%) self-identified male, and 25 (9.2%) did not report their sex. Participants were primarily low income. For additional demographic information, please see Table 1.

The sample included an overrepresentation of individuals who self-identified as African American/Black given that: (1) they are the largest racial/ethnic minority in North Florida, in particular in the area where the study was conducted (with a population of 21.7% Black vs.

57.2% White vs. 10% Hispanic);[36] and (2) they are the racial/ethnic minority group with the highest rate of overweight and obesity (70.3% vs. 60.6% in non-Latino Whites) in Florida.[37] Females were overrepresented in this sample (64.1% vs. 26.7% males).

Instruments

Participation involved anonymously completing a research participation packet that included: (1) two copies of the Informed Consent Form – one for participants to keep and one for the researchers to keep, and (2) an assessment battery. The following four questionnaires were used in this study: (a) the Demographic Data Questionnaire (DDQ), (b) the Self-Rated Abilities for Health Practices Scale (SRAHP), (c) the Health Promoting Lifestyle Profile II (HPLP-II), and (d) the General Adherence Measure (GAM).

The *Demographic Data Questionnaire (DDQ)* was constructed for the proposed study by the principal investigators. It was used to obtain information about each patient participant's sex, age, marital status, race/ethnicity, level of education, employment status, generation status, and household income.

The *Self-Rated Abilities for Health Practices Scale* (SRAHP)[38] is a 28-item inventory that assesses patients' self-perceived ability to implement health-promoting behaviors. The inventory contains four subscales: Exercise, Nutrition, Responsible Health Practice, and Psychological Well Being. Each subscale is comprised of seven items. Instructions ask respondents to rate the extent to which they are able to perform health practices related to these four subscales (above listed). Sample items include: "I am able to find healthy foods that are within my budget" (Nutrition), and "I am able to do exercises that are good for me" (Exercise). Items are scored on a 5-point Likert scale (with 0= *Not at All*, and 4= *Completely*). There are no reverse scored items. Total scores range from 0 to 112, with higher scores indicating higher self-efficacy for health

practices. In a sample similar to the sample of the current study, the SHRAP demonstrated high reliability and validity.[38] Cronbach's alpha for participants in this study was .94 for the total scale, and .92 and .83 for the Exercise, Nutrition subscales, respectively.

The *General Adherence Measure* is a 5-item measure of treatment adherence, developed during the Medical Outcomes Study to assess patients' tendency to follow medical recommendations from their healthcare providers.[39] The instructions on the GAM asks participants to rate adherence to medical treatment in the prior 12 months using a 4-point Likert scale where 1 = "None of the time" and 4 = "All of the time". Sample items include: "I had a hard time doing what my provider suggested I do," and "I followed my provider's suggestions exactly." Two of the items on the scale (items 1 and 3) are reversed scored. The five items on this measure can be averaged to yield a general adherence score. Higher scores mean higher treatment adherence. Internal consistency reliability for this scale is acceptable (Cronbach's alpha = .81), and it has a two-year stability of .41.[39] Cronbach's alpha for this study's sample was.49. No particular item seemed to be driving this Cronbach alpha (which would increase only up to .57 by removing scale items).

The 52-item *Health Promoting Lifestyle Profile II* (HPLP-II)[40] is a self-report inventory that assesses participants' level of engagement in an overall health-promoting lifestyle. Participants are asked to indicate how frequently they engage in specific health-promoting behaviors (e.g. "choose a diet low in fat, saturated fat, and cholesterol" and "follow a planned exercise program"). Items are rated on a 4-point Likert scale (1= *never* to 4= *routinely*). Higher scores indicate a lifestyle with self-reported higher health-promoting behaviors. The instrument has six different subscales. Healthy eating (nutrition) and physical activity were used in the

present study. Walker & Hill-Polerecky have reported a cronbach's alpha of .94 for the overall measure.[40] Cronbach alpha for the overall measure for participants in this study was .91.

Procedure

Before the start of the study, the two principal investigators (co-authors of this study) met with the directors of the two identified rural health care clinics for the purpose of obtaining their permission to conduct the study at their respective health care clinics. Once this permission was obtained from the directors of the clinics and the Institutional Review Board at the university where principal investigators conducted this project, study implementation occurred in three phases.

Phase I: Training Research Team Members

Prior to the launch of the study, the principal investigators trained undergraduate research assistants on the specifics of study implementation. This training lasted one hour. The study implementation training covered the following topics: (a) the purpose of the study, (b) potential benefits to patients due to participation in the study, (c) culturally sensitive strategies for recruiting culturally diverse, mostly rural, low-income individuals, who may or may not speak English (e.g., addressing patients with a title such as Mr. or Mrs. unless otherwise requested as a sign of respect, speaking assertively but slowly, etc.), and (d) culturally sensitive strategies for collecting data from culturally diverse adults (e.g., administering the language-appropriate battery, assisting with reading and completing questionnaires as needed, allowing participants the time that they need to complete the questionnaires, encouraging participants to take breaks when completing the assessment battery, and pleasantly answering any questions that may come up for participants). This training encompassed mock participant recruitment and data collection sessions that included having research assistants practice the learned study-related behaviors and

skills with their peers and then ask questions to the principal investigators. The principal investigators observed these mock sessions and provided feedback to the trainees. The principal investigators also conducted external control monitoring during some of the actual recruitment and data collection sessions at the health care clinics.

Phase 2: Recruitment of Patient Participants

Once training was complete, the trained, culturally diverse research assistants met patients at the two aforementioned clinics during normal patient care office hours and invited them to participate in the study after they saw their health care providers. Research assistants approached patients and verbally explained the purpose of the study (i.e., to understand what might influence their health outcomes, and to use the results of the proposed study to develop interventions that help rural patients reach optimal health). Research assistants also handed patients a recruitment flyer that included the patient participation criteria, the purpose of the study, and the principal investigators' contact information. Research assistants explained to participants that they would receive a $15 visa gift card for enrolling in the study. This information was also included on the aforementioned recruitment flyer.

Research assistants explained participation criteria to patients. Patients who expressed interest in participating and met participation criteria were ask to read (or have someone read to them) the ICF and then sign this form in front of a witness. Each patient participant was given a copy of the ICF to keep.

Phase 3: Data Collection

Data collection took place in the waiting room of the clinics. After being enrolled in the study, participants completed the assessment battery, which took approximately 1 hour. Participants could involve the help of a trained research team member to complete the

questionnaires, as needed. Payment forms and completed questionnaires were stored in separate envelopes. To protect patient confidentiality, no identifying information was written on the participants' assessment batteries.

To protect patients' confidentiality, ICFs and assessment batteries were kept separately during the data collection process and later in the principal investigators' lab. All data were processed in accordance with the ethical IRB standards at the university where the study was conducted. The overall study (data collection at the clinics) lasted two months.

The research team requested participating patients to help recruit additional patients for the study by asking adults that they knew who used either of the two participating health care clinics. Patients who agreed to invite other patients were given flyers to help with this recruitment.

Results

Data from the measures of health self-efficacy, treatment adherence, and engagement in health promoting behaviors showed multivariate and univariate normality. In this way, it fit the assumptions of the General Linear Model (GLM) and univariate and multivariate analyses. The means and standard deviations are presented in Table 2.

Bivariate correlations were conducted to examine the associations among the major variables of interest in this study among the total sample of patient participants. Results are presented in Table 3.

Analyses to Test the Study Hypothesis

A structural equation model (SEM) with maximum likelihood estimation (Figure 1) was conducted using SPSS AMOS 22 to investigate the study hypothesis: health self-efficacy will predict levels of treatment adherence and engagement in health-promoting behaviors (i.e.,

individuals with lower health self-efficacy will exhibit lower rates of treatment adherence, healthy eating, and engagement in physical activity).

Overall, the model was a good fit. Chi-square (2, N = 273) was non-significant and less than twice the degrees of freedom (= 3.080, p = .214), suggesting that the data does not significantly depart from the model. Furthermore, absolute and incremental fit indices were used as adjuncts to assess model fit. RMSEA (= .045) pointed to excellent fit. Other indicators also showed excellent fit (CFI = .99, TLI = .97, IFI = .99, NFI = .98). Health self-efficacy significantly predicted levels of treatment adherence, (β = .187, p = .005). Additionally, health self-efficacy significantly predicted levels of engagement in health-promoting behaviors, (β = .548, p < .001). This model explained 39.8% of the variance in health-promoting behaviors and 3.5% of the variance in treatment adherence. (See Figure 2)

Discussion

The health disparities experienced by rural Americans have been extensively documented. However, while rural health disparities are 1 of 14 disparity concerns present in *Healthy People 2020,* efforts to support focused research to understand the nature of these disparities and possible avenues of repair have been limited.[41] The present study responds to a need in the health care literature for research that attempts to understand what promotes healthier lifestyles among rural residents.

This study tested the hypothesis that health self-efficacy would predict levels of treatment adherence and engagement in health-promoting behaviors (i.e., healthy eating and physical activity) in a group of culturally diverse patients in North Florida. Overall, the model was a good fit. Health self-efficacy significantly predicted levels of treatment adherence and engagement in health-promoting behaviors.

Interpretations and Implications

Health self-efficacy is increasingly receiving recognition as a precursor to positive health behaviors. This study shows that research linking health self-efficacy, treatment adherence, and health-promoting behaviors in urban patients can, to an extent, be generalized to rural patients, too. When specific health practices are believed to lead to desired health outcomes but patients struggle to adjust their behavior, taking health self-efficacy into consideration is key.[42]

Boosting patients' health self-efficacy could potentially be a way of increasing their treatment adherence and engagement in healthy eating and physical activity, and thus of improving their health outcomes. Specific suggestions for increasing patient's self-efficacy may include: (a) breaking down the target behavior into smaller components, (b) coming up with a plan including specific behavioral strategies with the patient, (c) allowing patients to make their own choices (grounded on their cultural beliefs/practices and developmental level), and (d) giving patients' consistent, focused feedback.

Limitations

Despite its several methodological strengths, this study has four main limitations. First, the participating health care clinics and individual participants were not randomly selected. The sample of individuals participating in this study was from only two rural health care clinics in North Central Florida. Thus, generalizability of findings from this study to other rural patients in other parts of Florida or the U.S. is limited. Additionally, patients who participated were active in receiving health services (were targeted at clinics where they had received care for at least one year) and also expressed interest in participating. This form of participant self-selection may further limit generalizability of the present findings to patients who are accessing and actively

utilizing health services (vs. patients who may not be adherent enough to be in care or to agree to participate). The present study should be replicated with a larger and randomly selected sample.

Second, the measure of treatment adherence had relatively poor internal consistency. This may limit interpretation of results. Future studies may employ other measures of treatment adherence and even combine sources of adherence information (e.g., medical record data) to overcome the limitations of any single approach. Multiple measures of adherence have been used in health care research (e.g. self-reports, practitioner reports, physiological parameters, etc.), and each of these measures yields different nonadherence rates (even for the same participants in the same study).[43] Because health care research on residents of rural areas, in particular racial/ethnic minorities, is limited, it is unclear what measures might be more appropriate for assessing treatment adherence in this population.

A third limitation is that, given the cross-sectional nature of this study, it is not possible to establish whether changes in the precursor set in this study (i.e., health self-efficacy) lead to changes in levels of treatment adherence and engagement in health-promoting behaviors. Longitudinal research could provide a more reliable picture of the relationship between health self-efficacy and treatment adherence/engagement in health-promoting behaviors.

A final limitation of this study is that it used a mono-method approach to data collection, relying only on self-report measures. While self-report instruments have been found reliable in health care, they may encourage "socially desirable" responses in patients.[43] Future research similar to the present study ideally should include data retrieved from multiple sources (e.g., health care records of appointment keeping) and measures of social desirability.

Conclusion

The present study is an effort to meet the calls to investigate health disparities among culturally diverse rural patients—a population experiencing high rates of morbidity/mortality and typically underserved in health care and under-represented health care research. Rural residence is a social determinant of poor health outcomes, and yet precursors of treatment adherence and engagement in health behaviors in rural patients are poorly understood.

Findings from this study show that health self-efficacy predicts engagement in health-promoting behaviors and adherence to treatment. For patients to engage in health promoting behaviors such as healthy eating, they need to feel empowered to act on their knowledge and believe that their actions will bring about the desired results. Future research should concentrate on understanding specifically how to best meet the needs of patients with low health self-efficacy so that they too can engage in health promoting behaviors and lead healthy lifestyles.

If the findings of future similar studies without the limitations of the present study provide support for the findings in the present study, the need to develop interventions to promote health efficacy among rural patients will be supported. Such research is critical for developing effective strategies to reduce health disparities that disproportionately impact racial/ethnic minorities in rural communities in the United States.

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Table 1. Demographic characteristics of the participating sample

Characteristic	*N*	%
Gender		
Male	73	26.7
Female	175	64.1
Missing	25	9.2
Age		
18-24	18	6.6
25-34	22	8.1
35-44	29	10.6
45-54	55	20.1
55-64	78	28.6
65 or older	46	16.8
Missing	25	9.2
Educational Attainment		
Elementary School	2	0.7
Junior High/Middle School	21	7.7
High School	128	46.9
Technical School	23	8.4
2-year college	9	17.9
4-year college/ University	18	6.6
Professional/Graduate School	5	1.8
Missing	27	9.9
Annual Household Income		
Less than $10,000	100	36.6
$10,000 to $19,999	67	24.5
$20,000 to $29,999	43	15.4
$30,000 to $39,999	18	6.6
$40,000 to $49,999	10	3.7
$60,000 or more	3	1.1
Missing	33	12.1
Relationship Status		
I do not have a partner	98	35.9
I am living with my partner	99	36.3
I am not living with my partner	50	18.3
Missing	26	9.5

Table 2. Means (*M*), Standard Deviations (SD), and Ranges for the Study Variables

Variable	Possible Range	*M*	SD
Health Self-Efficacy	0 to 112	95.71	22.12
Nutrition	1 to 4	2.4	0.52
Physical Activity	1 to 4	2.09	0.66
Treatment Adherence	1 to 5	2.54	0.53

* Higher scores indicate more positive attributes/behaviors.

Table 3. Correlations among variables of interest

Group/Variable	1	2	3	4
1. Health Self-Efficacy	--			
2. Treatment Adherence	.184**	--		
3. Nutrition	.554**	.173**	--	
4. Physical Activity	.386**	.166**	.530**	--

* Correlation is significant at the $p < .05$ level.

** Correlation is significant at the $p < .001$ level.

Figure 1. Structural Equation Model (SEM)

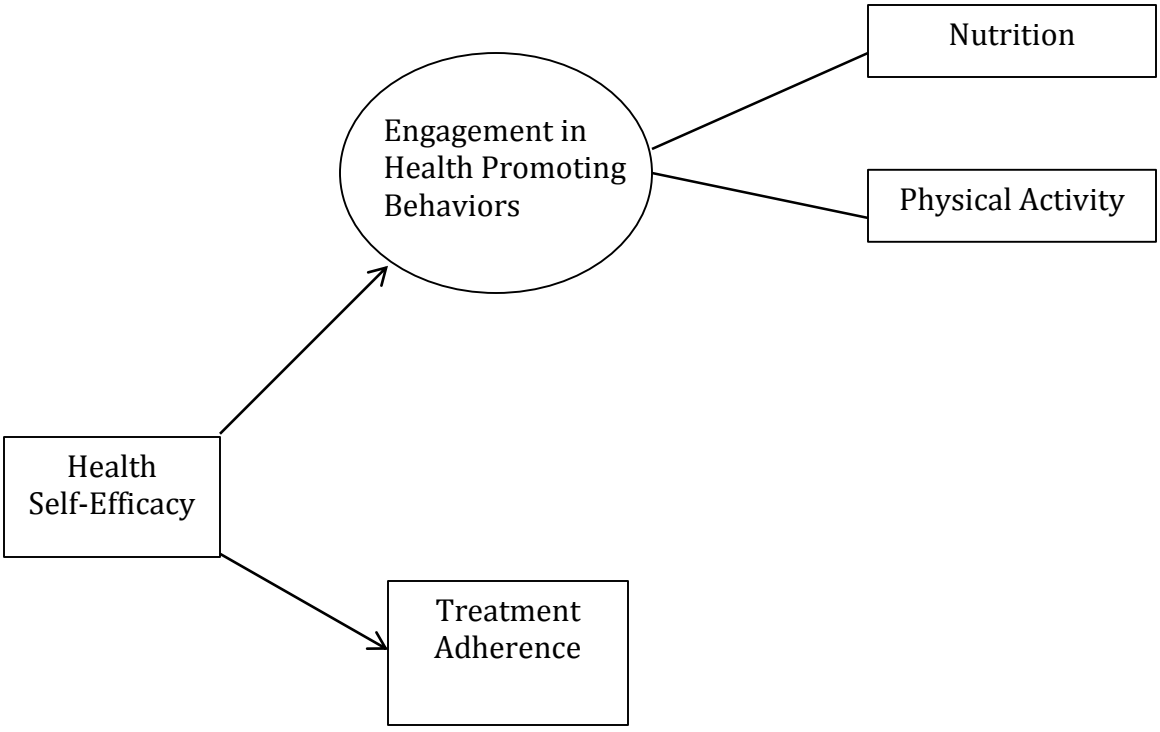

Figure 2. SEM Results