Predictors of Health Self-Management Program Preference among Lower-to-Middle Wage Employed Adults with Chronic Conditions

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Abstract

Purpose—We examined the extent to which demographic, chronic disease burden, and financial strain characteristics were associated with a preference for engaging in the CDSMP (presented as a 'health self-management program' [HSMP]) over a financial self-management program (FSMP) and a no program preference (NPP) group among employed adults.

Design—Cross-sectional, correlation design using baseline data from a randomized clinical trial (RCT).

Subjects—The analytic sample included 324 workers aged 40–64 years with one or more chronic disease conditions recruited into the RCT from 2015 to 2017.

Measures—Chronic disease burden measures included the number of chronic conditions, BMI, the PHQ-8, and PHQ-15. Financial strain was measured as the inability to purchase essentials and food assistance receipt. Both individual and household measures of income were assessed.

Analysis—Multinomial logistic regression and post-hoc marginal effects models.

Results—Moderate-to-severe depressive symptoms increased the likelihood of having a HSMP preference compared to those preferring the FSMP (RR = 4.2, p<.05) but not those having NPP; while higher BMI marginally increased HSMP preference over FSMP preference, but not NPP

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groups (RR = 1.04, p<.05). Financial strain differentially, but significantly, reduces the likelihood of HSMP preference at varying levels of household poverty, depressive symptom severity, and financial strain.

Conclusion—Middle-aged, lower-to-middle income workers with moderate-to-severe depressive symptoms opt for HSMPs over FSMPs, but preference for HSMPs is significantly diminished when they are experiencing financial strain.

Keywords

chronic disease; self-management; financial strain; health disparities; symptom burden

Introduction

An estimated 60% of the U.S. population lives with at least one chronic disease, while 40% of adults have multiple chronic conditions.[1] Broadly defined, chronic diseases are "conditions that last a year or more and require ongoing medical attention and/or limit activities of daily living."[2] Although the most prevalent chronic conditions in the U.S. include heart disease and stroke, cancer, diabetes, arthritis, and obesity,[3] others (e.g., migraine headaches) exact a high toll by impairing everyday functioning and imposing demands on both patients and the healthcare system to minimize symptom burden and maximize quality of life.[4]

For employed adults living with chronic disease, meeting one's job demands can bring additional challenges for fulfilling work obligations and engaging in effective self-management. Compared to the general population of employed adults aged 25–74 years who report an average of 1.1 'impaired' work days per month (i.e., they had either missed work or had reduced productivity), those with chronic health conditions report an average of 6.7 impaired work days per month.[5] Nationally, this is equivalent to over 2.5 billion days per month that employees with chronic disease are either absent or less productive in their employment role.[5] Overall, lost worker productivity costs the U.S. economy another $1.1 trillion annually.[6] Unless projected trends are effectively halted, slowed, or reversed, the prevalence of chronic disease will increase by 42%, with total costs for chronic disease in the U.S. increasing from $1.3 to $4.2 trillion dollars by 2023.[7]

Workplace health promotion programs are effective avenues for reaching middle-aged, employed adults to reduce chronic disease risks. These programs have been shown to improve health behaviors and chronic disease risk profiles,[8] increase employee productivity,[9] and reduce employer and healthcare system costs.[10] The services offered in workplace health promotion programs, however, generally focus on preventing the onset of, or screening for chronic disease rather than providing chronic disease self-management program options.[11, 12] As such, employees with existing chronic health conditions must often rely on programs outside the workplace to learn optimal disease management strategies.

The Chronic Disease Self-Management Program (CDSMP) has been shown to improve chronic disease outcomes and reduce health care utilization costs.[13] Although CDSMP

studies have included middle-aged adults, older adults are overrepresented, given the Department of Health and Human Services Administration on Aging network of service providers in local communities is a primary channel for CDSMP delivery,[14] which predominantly serve populations ages 65 years and older.[15] Fueled by both an increase in lifestyle-related chronic disease onset at earlier ages, and heightened attention to preventing the development of comorbid disease and disability that often follows, there has been increasing interest in studying the effectiveness of the CDSMP in younger, working adults. [16, 17] A shift away from recruiting an older adult population into community offerings of CDSMP, and the need to elicit the interest of a younger, working population, requires tailoring the approaches used to engage younger, working-age adults with chronic disease. To effectively engage this group in self-management programs, a better understanding of how other issues of concern relative to health – such as financial stressors and retirement planning – might be weighted relative to health in terms of preferences for how they spend their time and energy in meeting the multiple demands they face in this stage of their lives.[18]

Purpose

The objective of this study was to explore the extent to which demographic, chronic disease burden, and financial strain characteristics would predict preference for participating in a health self-management program (HSMP) (i.e., the CDSMP) over a financial self-management program (FSMP) or having no program preference (NPP) among lower-to-middle-wage workers 40 to 64 years of age. The CDSMP as the intervention was not explicitly disclosed as such to potential study participants, and was instead generically presented as an HSMP at the time they made their program preference selection. Because of this, we refer to the *HSMP* when specifically discussing preference selection within the context of the study, and refer to the *CDSMP* when discussing the study and implications generally.

Design

We used a cross-sectional, correlational design to examine baseline data that were collected between June 29, 2015 and September 30, 2017 as part of a randomized controlled trial (RCT). Marketed as The SMART Life Study, the aims of the ongoing RCT are to: (1) test the effect of the CDSMP on select employment, health, and healthcare utilization outcomes, (2) conduct an economic evaluation of the CDSMP for employers, the health care system, and state governments, and (3) assess factors associated with the reach, effectiveness, adoption, and implementation of the CDSMP using social marketing strategies designed to improve program engagement.

A FSMP was adopted for the attention control condition for two primary reasons. First, there was no anticipated therapeutic effect of attending a FSMP on work performance as the primary study outcome. Second, FSMPs have been shown to be an area of interest to, and acceptable as attention controls for the target sample of lower-to-middle wage workers in similar randomized trials.[19] As such, we expected participants randomized to the control condition would perceive some benefit from study participation, thereby reducing attrition among control participants and strengthening the study's internal validity.[20]

Participants

We enrolled 327 employed adults in the RCT from the following five North Carolina counties: Wake, Durham, Cumberland, Orange, and Guilford. Those enrolled were then randomized to one of two interventions: a HSMP (i.e., the CDSMP) or a FSMP that served as an attention-control condition. We recruited widely in our key counties by circulating study advertisements through fliers, email, and digital advertisements through small and large public and private employers, state health insurance agencies, professional news outlets, and other community agency channels. There was no specific mention of the CDSMP on these materials – only a notice that the study included participating in either a HSMP or FSMP.

Study eligibility criteria included: (1) being between the age of 40–64 years, (2) working at least 32 hours per week, (3) earning less than $60,000 per year, (4) having at least one chronic health condition (very broadly defined), (5) being fluent in spoken and written English, and (6) living or working in one of the five North Carolina counties (Wake, Durham, Cumberland, Orange, and Guilford) where the CDSMP was being delivered by community-based organizations we partnered with for the study. In part in response to our community partners' concerns about safety and managing the group interaction that occurs during the CDSMP workshops, potential participants were excluded if they had mental health symptoms that have previously interfered with their participation in group activities, or had exhibited violent behavior in the past four months.

Methods

Individuals interested in the study completed a series of online survey questions that sequentially: (1) obtained informed consent, (2) determined and notified interested individuals of their study eligibility, (3) collected baseline data on key measures, and, in the final step, (4) randomly assigned and notified participants of their group assignment. Immediately preceding notification of group assignment, participants were asked to indicate their program preference, with the following four response options: (1) the HSMP, (2) the FSMP, (3) either the HSMP or FSMP, or (4) neither program. The baseline survey questions took approximately 30–45 minutes to complete. Those who enrolled were scheduled in their respective counties to attend the HSMP (i.e., CDSMP) or the FSMP and complete follow-up data collection at 3, 6, 9, and 12 months. An incentive of $25.00 was given to study participants one month post-enrollment. An additional $40.00 incentive was given when they completed 12-month data collection. The study was approved by The University of North Carolina at Chapel Hill institutional review board. While study recruitment and enrollment have been completed, follow-up data collection will continue through September 2018.

Measures

At baseline, participants were asked to provide basic demographic information, indicators of chronic disease burden, and financial strain. Although a battery of measures was collected at baseline, only those included in the analyses presented here are described in detail below.

Demographic Characteristics

Demographic measures included self-reported age, education level, race, ethnicity, marital status, income, and employment characteristics. We included three measures of income to more fully capture the differential effects that conceptually distinct measures of income might have on our outcomes of interest, including annual earned individual income, annual total household income, and household poverty ratio. *Annual individual earned income* represents yearly income earned solely by the study participant from all sources of employment and self-employment. *Total annual household* income includes earned income from all individuals living in the participant's household as well as other sources of support (i.e., child support, alimony, public assistance, etc.,). Finally, the *household poverty ratio* is the ratio of total annual household income to the U.S. poverty level income criteria for contiguous states,[21] matched to the total number of individuals living in the household. We created a categorical variable of this ratio for use in the analysis to indicate < 200%, 201–300%, and >300% the federal poverty level.

Chronic Disease Burden

Data about the *number of chronic health conditions* was collected during eligibility determination, where participants identified which, if any, chronic health conditions they had from a broad list of 26. The list was generated to include conditions from the CDSMP national evaluation and a standardized list identified as meeting chronic condition criteria for research purposes.[22] Example conditions on this list include arthritis, cancer, diabetes, seizures, and chronic pain. *Body mass index (BMI)* was calculated based on self-reported height and weight, as kg/m^2. Depressive symptom severity was measured using the 8-item Patient Health Questionnaire (PHQ-8), which is a self-report screening tool for depression with a score range of 0 to 24. The PHQ-8 is widely used in both clinical and research contexts with established validity and reliability in diverse populations, as well as established cut points for mild, moderate, moderately severe, and severe depressive symptoms.[23] *Somatic symptom burden* was measured using the sum score of the 15-item Patient Health Questionnaire (PHQ-15). With a possible score range of 0 to 30, the PHQ-15 was designed as a scale to screen for somatoform disorders among patients reporting medically unexplained symptoms. It has established validity, test-retest reliability (r = .65), and internal consistency (Cronbach *a* = .87).[24] *Unhealthy days* was measured using two items from a core set of items published by the Centers for Disease Control and Prevention's (CDC) that are widely used to measure quality of life.[25] The self-reported items ask the number of days in the past month that mental health was not good, and the number of days in the past month that physical health was not good. Categorical variables of each were constructed to reflect 0–1 days, 2–9 days, and 10 or more days per month.

Financial Strain

Two measures of financial strain were included in our analyses. *Chronic financial strain* was measured using the Chronic Financial Strain (CFS) five-item, self-report scale with a score range of 0 to 16. Items assess the frequency of not having enough money to afford necessities, leisure activities, and sufficiency of funds at the end of the month.[26, 27] It has an internal reliability of *a* = .78.[28] *Food assistance* was measured as self-reported receipt of

Supplemental Nutrition Assistance Program (SNAP) receipt benefits at any point in the prior year. A categorical variable of this CFS was created using a score of less than 5 to indicate low strain, and 5 or more to indicate moderate-to-severe strain.

Analytic Approach—A total of 327 participants were enrolled in the RCT. Our analytic sample included baseline data from 323 participants reporting a preference for the HSMP, the FSMP, or reported being equally interested in the two programs (i.e., had no program preference [NPP]). Four of the 327 enrolled participants indicated they were not interested in either program, and were excluded. Stata/SE Version 15.1® was used to conduct our analyses.

Sample characteristics were summarized using descriptive statistics. Pairwise correlations were conducted among continuous variables of interest to assess bivariate relationships. Bivariate tests of significance were assessed between all predictor variables of interest and the dependent variable (preference for HSMP or FSMP, or NPP) using chi-square and analysis of variance (ANOVA). When ANOVA omnibus tests were significant, Bonferroni pairwise comparisons were conducted. To ensure all variables with the potential to contribute to the overall regression models were included based on our bivariate analyses, we used a less stringent significance level to identify variables for model inclusion. As such, with the exception of select demographic variables, predictors that had a statistically significant association with the dependent variable at $p < .20$ were included in a series of multinomial logistic regressions. To facilitate interpretation and the ability to make direct comparisons across the HSMP and FSMP preference groups in particular, we conducted the first step-wise series using FSM as the referent group, and the second step-wise series using NPP as the referent group. Among the continuous predictor variables, PHQ-8, household poverty level, both the number of poor physical health and mental health days in the past month, and financial strain were severely right-skewed; therefore, the categorical versions of these variables were included in the analyses.

To arrive at the most parsimonious model, we applied a modified manual, backward stepwise selection approach. The decision to include demographic variables of race, education level, and income in the models was made a priori, given their variation across categories within the sample. Sex, age, and job type variables were not included, given the small proportion of men and reports of manual jobs, and a fairly restricted age range within the study sample based on inclusion criteria. We retained demographic variables in sequentially reduced models until all non-significant predictors were removed, and subsequently removed the demographic covariates that were not significant in the models (at $p < .05$). The number of chronic conditions and somatic symptoms were not significant and removed after running the full, initial model.

Finally, post model estimation, average marginal effects (AME) were calculated to better understand the effects of significant chronic disease burden predictors on program preference at varying levels of income and financial strain.

Results

Descriptive statistics for all variables of interest are summarized in Table 1. The sample was primarily female (91.3%) and highly educated (73.1% with a baccalaureate degree or higher). Although participants were predominantly White (60.6%), 33.1% were Black or African American. The vast majority of participants (92%) were employed in jobs that were not physically demanding (e.g., office/clerical/supervisory positions). The mean number of chronic health conditions was 2.7; mean depressive symptoms and somatic symptom severity scores were relatively low (5.3 and 6.8, respectively); and 13.1% and 27.5% of the sample reported 10 or more days in the past month that their physical or mental health was not good, respectively. Mean BMI was 32.7, with 28% of the sample classified as overweight, and 52.8% obese (data not shown).

In the full analytic sample, the mean annual total household income was $60,845 and the majority (55.1%) lived in households above 300% of the federal poverty level.[21] Although 42.4% reported moderate-to-high financial strain, very few received SNAP assistance in the past year (4.4%). Using an alpha of <.20 to identify relevant variables for regression model inclusion, bivariate analyses between predictors and group preference were conducted. On average, relative to those who preferred the FSMP or NPP, the HSMP preference group had higher BMI, higher rates of moderate-to-severe depressive symptoms (27.8%, compared to 11.2% and 20.1%, respectively), greater somatic symptom severity, and were more likely to report two or more physically unhealthy days in the past month (21.3% compared to 8.2% and 14.0%, respectively) (p<.10 for each). Moreover, the HSMP preference group had a significantly lower proportion of participants reporting moderate-to-severe financial strain (31.1% compared to 43.9% and 45.7% for the FSMP and NPP groups, respectively, p=.14).

Spearman rank pairwise correlations are presented in Table 2. Among income variables, annual total household income and household poverty ratio were highly correlated (r_s = .80, p<.05); therefore, only household poverty ratio was included in regression models to avoid problems associated with multicollinearity. Financial strain was moderately correlated with both annual total household income (r_s = −.34, p<.05) and household poverty ratio (r_s = −.36, p<.05), while earned annual individual income was not – suggesting that participants across a range of household income and poverty levels experienced financial strain. Financial strain and income variables were both moderately correlated with chronic disease burden variables (r_s = .11 to .25, p<.05); however, financial strain correlated with more of the six chronic disease burden variables (5 of the 6) than income at either the individual (3 of 6) or household levels (3 of 6).

Table 3 depicts findings from the multinomial logistic regression model at each step. Among the other chronic disease burden variables included in the full model, somatic symptom severity, and the number of days physical health was not good in the past month were not statistically significant predictors and dropped. In all models, depressive symptoms, BMI, and financial strain were significant, consistent predictors of program preference.

Moderate-to-severe depressive symptoms increased the likelihood of a preference for the HSMP when compared to the FSMP preference group in each model (RR = 3.6, 5.0, and

5.1, p<.05); however, these were not significant predictors of HSMP preference when compared to the NPP group. In the second and third (final) reduced models, any level of depressive symptoms (mild *or* moderate-to-severe) significantly reduced the likelihood of preferring the FSMP when compared to the NPP group (RR = .53 and .35, p<.05). Higher BMI only marginally increased the likelihood of HSMP preference when compared to the FSMP preference group (RR = 1.0 to 1.1, p<.05 across models), and marginally reduced the likelihood of FSMP preference over HSMP preference in the reduced models (RR = .95 and .96, p<.05). BMI was not a significant predictor of HSMP or FSMP preference when compared to the NPP group.

In all models, moderate-to-high financial strain consistently decreased the likelihood of HSMP preference by 56–62% when compared to the FSMP preference group (RR = .44, .44, and .38, p<.05), and decreased the likelihood of HSMP preference by over 50% when compared to the NPP group in the final model (RR = .45, p<.05). In individuals with moderate-to-high financial strain were more than twice as likely to prefer the FSMP when compared to the HSMP preference group (RR = 2.3, 2.3, and 2.5 across models, p<.05).

Adjusted for race, education, individual income, and BMI, the average marginal effects (AME) of depressive symptom severity on the predicted probability of preferring HSMP at each level of household poverty and financial strain are listed in Table 4 and displayed in Figure 1. Regardless of financial strain, being below 200% the poverty was associated with the lowest probability of HSMP preference by 6–8% for no/minimal, 7–9% for mild, and 14–17% for moderate-to-severe depressive symptoms. Among those living at 201–300% or > 300% poverty, moderate-to-severe financial strain markedly reduced the probably of HSMP preference by 10 to 17% compared to those with low financial strain at each level of depressive symptoms; however, reductions in HSMP preference probability due to financial strain was most pronounced among those with moderate-to-severe depressive symptoms (15% at 201–300% poverty, and 17% at >300% poverty).

Limitations

Some limitations of this study and the related findings include the cross-sectional nature of the data, the sample being confined to select counties in North Carolina, and the findings not being able to qualitatively address why participants had the preferences that they did. First, data used for this study were of baseline measures only and based on a discrete choice format, which are useful for providing an account of initial preferences under the condition of a one-time program participation offer, but do not reflect whether initial preferences influence program attendance, other health outcomes, or preferences under more real-world employment contexts that allow for attending multiple programs. Second, our sample was geographically limited to North Carolina, where demographic and contextual factors affecting program preference may differ from other states or regions of the county; thus, the findings may be less applicable to areas outside North Carolina or the Southeastern region of the U.S. Finally, although our findings provide some insight into characteristics associated with program preference, they do not explain the decision-making nuances around why participants selected one program over another, which a qualitative component would have been able to provide. In each of these areas, further research to expand on our findings is

needed to more fully understand the program preferences of employed populations across the U.S., and whether these preferences influence the outcomes of HSMP programs (such as the CDSMP).

Conclusion

This study's findings add to the scant literature about preferences for participating in HSMPs relative to other, non-health oriented programs available to working-aged adults with chronic conditions. In our study, depressive symptoms and financial strain were consistently, and robustly, associated with program preference, while higher BMI was a far less important predictor of program preference, and a number of other indicators of chronic disease burden (i.e., somatic symptoms, number of chronic conditions, number of days past month physical/mental health was not good) did not predict program preference. Overall, individuals with moderate-to-severe depressive symptoms were 330% more likely to prefer the HSMP over the FSMP, but were no more likely to prefer the HSMP when compared to the NPP group. In contrast, moderate-to-severe depressive symptoms significantly reduced FSMP preference compared to both the HSMP preference and NPP groups by 76% and 37%, respectively. These findings align with the comorbidities that participants voluntarily enrolling in the CDSMP nationwide report.[29]

Financial strain played a far more nuanced role in predicting HSM program preference than measures of income alone. Overall, participants with moderate-to-high levels of financial strain were 62% less likely to prefer the HSMP compared to those preferring the FSMP, and 55% less likely to prefer the HSMP to the NP, while household poverty level, household income, and individual earned income were not associated with preference. The magnitude by which financial strain reduces HSMP preference, however, differed across levels of household poverty and depressive symptoms. Specifically, among participants with the highest levels of depressive symptoms, moderate-to-high financial strain reduced the probability of HSMP preference to a greater extent by those above 200% of the federal poverty level (between 15–17%) compared to those below 200% poverty (3%). Moderate-to-high financial strain also reduced HSMP preference probability among participants with no/minimal or mild depressive symptoms and in households at >200% the federal poverty level, but to a lesser extent. For participants with household incomes below 200% poverty, the influence of financial strain on HSMP preference was far less pronounced across all levels of depressive symptom severity. While floor effects could account for the minimal influence that financial strain has at lower levels of depressive symptom severity among those at < 200% poverty, the influence of financial strain is also minimal among participants with moderate-to-severe depressive symptom severity, suggesting there are other factors mitigating HSMP preference that may be unique to those living in households with the least financial resources.

Our findings around the marginal effects that both household poverty level and financial strain have on HSMP program preference across depressive symptom severity categories are consistent with other findings in the literature. These include findings related to individuals prioritizing meeting basic needs over making healthcare investments such as provider visits for routine or preventive care,[30] or adherence to prescribed medications[31] when

experiencing financial strain. More recently, others have found that, across income levels, a sense of mastery over one's life circumstances moderates the relationship between financial strain and psychological distress[32] – suggesting mitigating factors such as mastery might also be relevant to explaining variation in HSMP preferences across levels of household poverty, financial strain, and depressive symptom severity.

The fact that measures of chronic disease burden other than depressive symptoms (and, minimally, BMI) were *not* associated with HSMP preference while adjusting for income and financial strain in our regression analyses was somewhat surprising. Several participants in our sample had high levels of somatic symptoms (20%) and 10 or more days per month of poor physical health (14%) or mental health (25%), yet these were not significant, independent predictors of HSMP preference. As suggested by other studies, it may be that symptom *severity*, per se, isn't the issue, but rather, symptoms that are most likely to interfere with everyday functioning, carrying out expected or necessary roles (work, parenting, etc.), or negatively affected quality of life.[33] Additional research is needed to understand the extent to which the relationship between symptom severity and program preference might be modified by symptom-specific functional limitations.

This study was designed to explore factors associated with individual preference for a HSMP over FSMP preference or NPP groups. Our results suggest that the preferences of employed adults with low-to-middle individual earned income who also have one or more chronic disease conditions are influenced by depressive symptoms, household income, and financial strain. Specifically, those with high depressive symptoms generally prioritize a health-focused program, while the added burden of moderate-to-high financial strain shifts the preference away from a health-focused program. As programs to improve both the health and financial well-being of workers are made more available in both employment and community settings, our findings suggest that employed adults experiencing greater financial strain may be more likely to opt into programs geared toward financial well-being over those focused on health. By extension, this means that workers suffering from moderate-to-high depressive symptoms may choose to bypass program offerings that could identify and facilitate treatment of depression. This scenario is a concern not only for public health reasons related to the general adult workforce – it also has direct implications for employers as well as the broader economy, as employees suffering from depression are also more likely to have reduced productivity and job performance.[34–36] To better understand program preferences in the middle-aged, lower-to-middle income workforce, further research is needed on preference, program participation, and outcome data in both real-world, and experimental contexts that offer unconstrained participation in (i.e., the ability to participate in more than one) HSMP and FSMP types.

Acknowledgments

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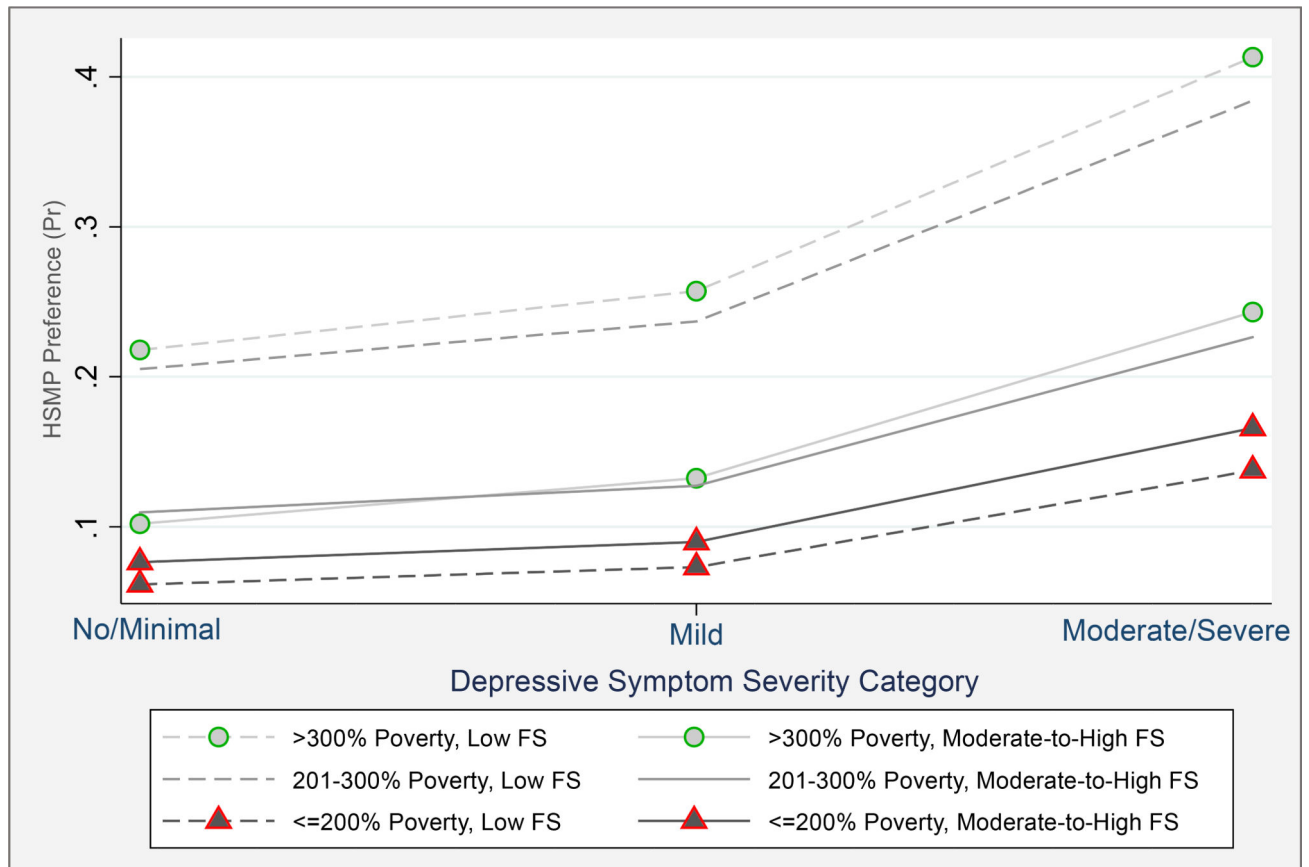
Figure 1.
Average Marginal Effects of Poverty & Financial Strain (FS) on Health Self-Management
Program (HSMP) Preference Probability, by Depressive Symptom Severity

Table 1.

Sample Demographic, Chronic Disease Burden, and Financial Strain Characteristics

Characteristic	Full Sample (n=323) Mean, %, [SD]	HSMP Pref. (n=61) Mean, %, [SD]	FSMP Pref. (n=98) Mean, %, [SD]	NPP (n=164) Mean, %, [SD]	$p(x^2F)$
Age	50.6 [6.6]	50.4 [7.0]	50.5 [6.4]	50.7 [6.6]	.94

Sex
    Female
    Male
	89.2%
	10.8%
		88.5%
		11.5%
			92.9%
			7.1%
				87.2%
				12.8%
					.36

Race
    White
    Black / African American
    Other
	53.3%
	39.0%
	7.7%
		65.6%
		27.9%
		6.6%
			57.1%
			36.7%
			6.1%
				46.3%
				44.5%
				9.2%
					.10

Education Level < 4-Year Degree 4-Year Degree or More	26.9% 73.1%	26.2% 73.8%	26.5% 73.5%	27.4% 72.6%	.97
Earned Individual Income (Yearly)	41,661	40,962	42,167	41,618	.83
Household Income (Yearly, All Sources)	60,845	67,076	59,484	59,340	.27

Household Poverty Level
    <200%
    201–300%
    >300%
	22.6%
	22.3%
	55.1%
		11.5%
		23.0%
		65.6%
			21.4%
			19.4%
			59.2%
				27.4%
				23.8%
				48.8%
					.08

Job Type
    Non-manual/Sedentary
    Manual/Physical
	91.6%
	8.4%
		91.8%
		8.2%
			92.9%
			7.1%
				90.9%
				9.1%
					.93

Number of Chronic Health Conditions
    0–1 Conditions
    2–4 Conditions
    5+ Conditions
	26.3%
	55.4%
	18.3%
		22.9%
		55.7%
		21.3%
			30.6%
			58.2%
			11.2%
				25.0%
				53.7%
				21.3%
					.27

BMI	33.1 [8.9]	34.6 [9.7]	31.6 [7.9]	33.4 [9.1]	.08

Depressive Symptoms (PHQ-8)
    None or Minimal
    Mild
    Moderate-Severe
	50.1%
	31.0%
	18.9%
		40.9%
		31.1%
		27.8%
			62.2%
			26.5%
			11.2%
				46.3%
				33.5%
				20.1%
					.03

Somatic Symptoms (PHQ-15)	7.2 [4.1]	7.7 [4.0]	6.3 [3.7] [***]	7.7 [4.3]	.03

Days Physical Health Not Good, Past Month
    0–1 Days
    2–9 Days
    10+ Days
	35.6%
	50.8%
	13.6%
		23.0%
		55.7%
		21.3%
			41.8%
			50.0%
			8.2%
				36.6%
				49.4%
				14.0%
					.06

Days Mental Health Not Good, Past Month
    0–1 Days
    2–9 Days
    10+ Days
	34.4%
	40.3%
	25.4%
		31.2%
		42.6%
		26.2%
			33.7%
			37.8%
			28.6%
				36.0%
				40.9%
				23.2%
					.86

Financial Strain
    Low
    Moderate-to-High
	57.6%
	42.4%
		68.9%
		31.1%
			56.1%
			43.9%
				54.3%
				45.7%
					.14

Supplemental Food Assistance Program (SNAP) Receipt, Past Year	3.1%	4.9%	4.1%	1.8%	.40

HSMP = Health Self-Management Program, FSMP = Financial Self-Management Program.

Significant differences between groups with Bonferroni pair-wise comparison:

[*] HSMP, FSMP

[**] HSMP, No Program Preference (NPP)

*** FSMP, NPP

Table 2

Pairwise Correlations among Demographic, Chronic Disease Burden, and Financial Strain Variables

Variable	Age	Earned Individual Income[Ψ]	Household Income	Household Poverty Ratio	Financial Strain	BMI	Depressive Symptoms (PHQ-8)	Somatic Symptoms (PHQ-15)	Number of Chronic Conditions	Days Physical Health Poor
Age	1.0									
Earned Individual Income[Ψ]	−.07	1.0								
Household Income	−.08	.50*	1.0							
Household Poverty Ratio	.06	.51*	.80*	1.0						
Financial Strain	−.04	−.22*	−.34*	−.36*	1.0					
BMI	−.07	.01	−.13*	−.10	.21*	1.0				
Depressive Symptoms (PHQ-8)	−.02	−.14*	−.06	−.11*	.17*	.14*	1.0			
Somatic Symptoms (PHQ-15)	.04	−.07	.02	−.04	.12*	.06	.58*	1.0		
Number of Chronic Conditions	.03	−.07	−.13*	−.14*	.25*	.13*	.30*	.41*	1.0	
Days Physical Health Poor[ϕ]	.02	−.11*	−.08	−.10	.11*	.08	.35*	.37*	.32*	1.0
Days Mental Health Poor[ϕ]	−.08	−.11*	−.04	−.04	.05	−.04	.60*	.30*	.24*	.31*

Spearman rank-order correlations for ordinal and continuous measures of variables of interest. *Earned Individual Income* includes income for participant only from wages, salary, earnings from all jobs. *Household Income* includes yearly income from all income sources, combined (earned, public assistance, child support, alimony, etc.,). *Days Physical Health Poor* and *Days Mental Health Poor* refer to past month.

*
p<.05

Table 3.

Multinomial Regression Results of Program Preferences across Preference Groups

Predictor Variables	Model 1				Model 2			
	RRR [95% CI]				RRR [95% CI]			
	HSMP: FSMP	HSMP: NPP	FSMP: HSMP	FSMP: NPP	HSMP: FSMP	HSMP: NPP	FSMP: HSMP	FSMP: NPP
Race								
White	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Black	.86	.55	1.2	.63	.82	.52	1.2	.63
	[.39–1.9]	[.27–1.1]	[.52–2.5]	[.35–1.1]	[.38–1.8]	[.26–1.1]	[.55–2.6]	[.35–1.1]
Other	.98	.60	1.0	.61	1.0	.62	.96	.60
	[.24–4.0]	[.18–2.0]	[.25–4.2]	[.21–1.8]	[.26–4.2]	[.19–2.1]	[.24–3.8]	[.21–1.7]
Education Level								
< 4-Year Degree	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
4-Year Degree	.90	.88	1.1	.98	.93	.87	1.1	.94
	[.41–2.0]	[.43–1.8]	[.51–2.5]	[.53–1.8]	[.43–2.0]	[.43–1.8]	[.49–2.3]	[.51–1.7]
Earned Income (Individual, Yearly)	1.0	1.0	.99	.99	1.00	1.0	.99	.99
	[.99–1.0]	[.99–1.0]	[.99–1.0]	[.99–1.0]	[.99–1.0]	[.99–1.0]	[.99–1.0]	[.99–1.0]
Poverty Level								
<200%	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
201–300%	2.1	2.2	.47	1.0	2.1	2.2	.48	1.0
	[.65–7.0]	[.76–6.4]	[.14–1.5]	[.46–2.3]	[.65–6.8]	[.75–6.3]	[.15–1.5]	[.46–2.3]
>300%	1.7	3.0	.60	1.8	1.6	2.9	.62	1.8
	[.50–5.5]	[.99–9.0]	[.18–2.0]	[.79–4.1]	[.49–5.3]	[.98–8.7]	[.19–2.1]	[.80–4.2]
BMI	1.02*	1.0	.95	.98	1.1*	1.0	.95*	.97
	[1.0–1.1]	[.99–1.1]	[.91–.99]	[.95–1.0]	[1.0–1.1]	[.99–1.1]	[.92–.99]	[.95–1.0]
Depressive Symptoms								
None	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Mild	1.5	.99	.68	.67	1.8	1.0	.56	.56
	[.64–3.4]	[.46–2.2]	[.29–1.6]	[.35–1.3]	[.82–3.9]	[.49–2.0]	[.26–1.2]	[.31–1.0]
Moderate-Severe	3.3*	1.9	.31*	.58	4.2*	1.8	.24*	.43*
	[1.1–9.7]	[.73–4.9]	[.10–.92]	[.24–1.4]	[1.6–11.1]	[.80–4.1]	[.09–.61]	[.19–.95]
Somatic Symptoms	1.0	.96	.99	.95	*Dropped*			
	[.91–1.1]	[.87–1.0]	[.89–1.1]	[.87–1.0]				
Days Physical Health Not Good, Past Month								
0–1 Days	Ref.	Ref.	Ref.	Ref.				
2–9 Days	1.8	1.9	.55	1.1	*Dropped*			
	[.82–4.0]	[.92–4.0]	[.25–1.2]	[.61–1.9]				
10+ Days	3.2	2.5	.32	.80				
	[.97–10.2]	[.93–6.9]	[.10–1.0]	[.30–2.1]				
Financial Strain								
Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Moderate-to-High	.44*	.58	2.3*	1.3	.44*	.58	2.3*	1.3
	[.20–.96]	[.29–1.2]	[1.0–4.9]	[.74–2.3]	[.21–.95]	[.29–1.2]	[1.0–4.8]	[.73–2.3]

Predictor Variables	Model 3 (Final Model)			
	RRR [95% CI]			
	HSMP: FSMP	HSMP:NPP	FSMP:HSMP	FSMP:NPP
Race				
White	*Dropped*			
Black				
Other				

Education Level		*Dropped*		
< 4-Year Degree				
4-Year Degree				
Earned Income (Individual, Yearly)		*Dropped*		
Poverty Level		*Dropped*		
<200%				
201–300%				
>300%				
BMI	**1.04**[*] [1.0 – 1.1]	1.0 [.99 – 1.0]	**.96**[*] [.92 – .99]	.98 [.94 – 1.0]
Depressive Symptoms	*Ref.*	*Ref.*	*Ref.*	*Ref.*
None	1.9 [.86–4.0]	1.1 [.55–2.2]	.54 [.25–1.2]	.59 [.33–1.1]
Mild	**4.2**[*] [1.7–10.7]	1.8 [.83–3.9]	**.24**[*] [.10-.60]	**.43**[*] [.20-.93]
Moderate-Severe				
Somatic Symptoms		*Dropped*		
Days Physical Health Not Good, Past Month		*Dropped*		
0–1 Days				
2–9 Days				
10+ Days				
Financial Strain	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Low	**.38**[*] [.19-.82]	**.45**[*] [.24-.87]	**2.5**[*] [1.2–5.2]	1.1 [.67–1.9]
Moderate-to-High				

HSMP = Health Self-Management Program, FSMP = Financial Self-Management Program, NPP = No Program Preference

[*]*p* < .05

HSMP = Health Self-Management Program, FSMP = Financial Self-Management Program, NPP = No Program Preference

[*]*p* < .05

Table 4.

Average Marginal Effects (AME) of Depressive Symptom Severity on Probability of Health Self-Management Program (HSMP) Preference, across Varying Levels of Household Poverty and Financial Strain (FS)

Estimate	Margin	p	[95% CI]	Pr*
No/Minimal Depressive Symptoms				
>300% Poverty, Low FS	.22	<.001	[.13-.31]	
>300% Poverty, Moderate-to-Severe FS	.10	.02	[.02–.18]	−.12
201–300% Poverty, Low FS	.21	.004	[.07–.35]	
201–300% Poverty, Moderate-to-Severe FS	.11	.03	[.01–.21]	−.10
200% Poverty, Low FS	.06	.19	[−.29–.15]	
200% Poverty, Moderate-to-Severe FS	.08	.05	[−.001–.15]	−.02
Mild Depressive Symptoms				
>300% Poverty, Low FS	.26	<.001	[.14–.38]	
>300% Poverty, Moderate-to-Severe FS	.13	.01	[.03–.23]	−.13
201–300% Poverty, Low FS	.24	.004	[.07–.40]	
201–300% Poverty, Moderate-to-Severe FS	.13	.03	[.01–.24]	−.11
200% Poverty, Low FS	.07	.19	[−.04–.18]	
200% Poverty, Moderate-to-Severe FS	.09	.05	[−.005–.18]	−.02
Moderate-to-Severe Depressive Symptoms				
>300% Poverty, Low FS	.41	<.001	[.23–.60]	
>300% Poverty, Moderate-to-Severe FS	.24	.004	[.08–.41]	−.17
201–300% Poverty, Low FS	.38	.002	[.15–.62]	
201–300% Poverty, Moderate-to-Severe FS	.23	.01	[.06–.40]	−.15
200% Poverty, Low FS	.14	.14	[−.04–.32]	
200% Poverty, Moderate-to-Severe FS	.17	.03	[.02–.32]	−.03

*
Difference in predicted probability due to moderate-to-severe financial strain within poverty level, across categories of depressive symptom severity.