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The Impact of a Practice Redesign to Improve Self-Management Among Obese Safety Net Patients

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The Impact of a Practice Redesign to Improve Self-Management Among Obese Safety Net Patients

A dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy in Health Services

by

Mona AuYoung

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ABSTRACT OF THE DISSERTATION

The Impact of a Practice Redesign to Improve Self-Management

Among Obese Safety Net Patients

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Mona AuYoung

Doctor of Philosophy in Health Services

University of California, Los Angeles, 2013

Professor Hector P. Rodriguez, Chair

There are growing numbers of individuals with at least one chronic disease in the United States, creating a greater need for primary care services despite limited health care resources within safety net clinics. Patient self-management has been studied as a possible solution to improve the efficiency and effectiveness of primary care. In order to work, patients must feel confident in their ability to manage their own health and engage in the decision making process of their care. Providers also need adequate time to spend with patients to provide sufficient information as well as listen to patient concerns.

Three safety net clinics in Northern California underwent practice redesigns to enhance care for obese patients and improve their self-management skills. A mixed methods approach was used to assess the effects of the practice redesign on staff, clinicians, and patients. Patients were mailed questionnaires during early and late implementation of the practice redesign.

Questionnaire measures included patient-provider communication (based on the CG-CAHPS), patient activation (PAM-13), general health (SF-12v2), physical activity, dietary habits, chronic conditions, and demographic information. Clinical outcome measures from clinic administrative data were merged with patient questionnaire data to evaluate patient outcomes relative to self-reported measures. Key informant interviews were conducted with randomly selected clinic staff and clinicians, also during the same baseline and six-month follow-up periods. Topics included practice change implementation experiences, team activities, interactions with overweight or obese patients, team development activities, and practice characteristics.

Higher patient activation was associated with increased odds of regular fruit and vegetable consumption. For physical activity, the presence of comorbidities affected the relationship between patient activation and physical activity. Although the patient-provider relationship had a strong bivariate relationship with patient activation, it did not impact the relationship between patient activation and health behaviors. As seen in previous studies, patient activation was related to systolic blood pressure, diastolic blood pressure and weight. However, the clinical practice redesign only had an effect on diastolic blood pressure. The implementation of a teamlet model within safety net clinics to improve patient health may be feasible, but the composition of the teamlet may need to be modified for financial sustainability. Future change efforts should have support from different levels of management and staff, preferably championed by multiple people to aid the sustainability of the change in the face of staffing changes.

The dissertation of Mona AuYoung is approved.

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2013

DEDICATION

To my parents and their parents, who traveled the world as far as they did so that I could go as far as I could.

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

Obesity rates have skyrocketed in the past two decades; the World Health Organization estimated in 2008 that one in ten adults in the world were obese.((WHO), 2012) The obesity epidemic has reached all corners of the world, including rural and urban neighborhoods, high and low-income areas, and both developed and developing societies.(Popkin, Adair, & Ng, 2012) Future generations face the same problem, since children of overweight or obese parents are at greater risk of also becoming overweight or obese adults. Overweight and obesity are linked to a number of health risks, particularly chronic conditions such as hypertension, diabetes, high cholesterol, coronary artery disease, and more. (Desouza et al., 2012) These chronic conditions require regular medical check-ups, medication, and can lead to severe health consequences if not maintained, creating tremendous health care costs in addition to the heavy burden of patient time spent seeing clinicians.(Barr et al., 2003; T Bodenheimer, Lorig, Holman, & Grumbach, 2002) There are concerns about whether the current primary care delivery system is equipped to meet the needs of the growing number of chronically ill individuals. The number of individuals with at least one chronic illness in this country is expected to rise from 133 million in 2005 to 157 million in 2020.(Anderson & Horvath, 2004; T Bodenheimer, Chen, & Bennett, 2009) A large proportion of health care spending (an estimated 78 percent), on costs such as prescriptions and inpatient hospital stays, is directed at treating chronic disease.(Anderson & Horvath, 2004; T Bodenheimer et al., 2009)

Potential solutions include both redesigning primary care as well as engaging patients in their own health care. The traditional patient-physician relationship places the power of decision

making on the physician while the patient takes on a passive role. The traditional patient implicitly trusts that the physician's decisions are in the patient's best interest without questioning and without providing input. However, recent literature suggests that patients who are more engaged and knowledgeable about their health care tend to have better health outcomes.(Carman et al., 2013; Cosgrove et al., 2013) The level of patient engagement can range from just providing their opinions about their care, such as through focus groups or surveys, to having their opinions influence their plan of treatment or even decisions about hospital quality improvement efforts.(Carman et al., 2013) In order for patients to become more engaged in their health care, they need more time with physicians or at least more efficient methods of communication with physicians and access to resources to help with decision making.(Bernabeo & Holmboe, 2013; Danis & Solomon, 2013) Recent studies have evaluated different approaches to redesigning primary care; this dissertation will examine the use of a teamlet model and its relationship to patient activation, which has been used as a proxy for patient engagement. To be clear, patient engagement refers to the larger concept of patients actively taking part in making decisions about their health care while patient activation refers to how capable the patient feels about making health care decisions.(Carman et al., 2013; Danis & Solomon, 2013)

1.2 SPECIFIC AIMS, RESEARCH QUESTIONS, AND HYPOTHESES

In order to research the utility of practice redesign within primary care, there must be an understanding of its impact on staff and clinicians as well as patients. The following three chapters each address one of these research aims.

Aim 1: Evaluate the relationship between patient activation and safety net patient health behaviors

Research Question 1: What is the relationship between patient activation and regular physical activity?

Hypothesis 1: More highly activated patients will be more likely to be regularly physically active.

Research Question 2: What is the relationship between patient activation and daily consumption of fruits and vegetables?

Hypothesis 2: More highly activated patients will be more likely to consume fruits and vegetables at least daily.

Research Question 3: What is the relationship between patient activation and avoidance of soda consumption?

Hypothesis 3: More highly activated patients will be more likely to avoid consuming soda each week.

Aim 2: Assess the process of practice redesign implementation within safety net clinics

Research Question 1: What are the barriers and facilitators to implementing practice redesign within safety net clinics?

Research Question 2: How do perspectives on practice redesign vary across clinic roles and over time?

Aim 3: Evaluate the relationship between patient activation and safety net patient health outcomes

Research Question 1: What is the relationship between patient activation and systolic blood pressure over time?

Hypothesis 1: Higher patient activation will be related to a decrease in systolic blood pressure over time.

Research Question 2: What is the relationship between patient activation and diastolic blood pressure over time?

Hypothesis 2: Higher patient activation will be related to a decrease in diastolic blood pressure over time.

Research Question 3: What is the relationship between patient activation and weight over time?

Hypothesis 3: Higher patient activation will be related to a decrease in weight over time.

1.3 CONCEPTUAL MODEL

This research is based on the Chronic Care Model, which describes six different areas in which health care delivery can be modified in order to optimize care for chronically ill patients: delivery system design, self-management support, decision support, clinical information systems, health care organization, and community resources.(Coleman, Austin, Brach, & Wagner, 2009; Pearson et al., 2005; Wagner et al., 2001) Although studies that have utilized the Chronic Care Model have shown mixed results about the relative effectiveness of Chronic Care Model components in improving the quality of patient care and health outcomes, changes in delivery system design and self-management support are the most consistently associated with changes in patient health outcomes.(Tsai, Morton, Mangione, & Keeler, 2005; Wagner et al., 2001)

1.4 DATA SOURCES AND MEASURES

Three safety net clinics in Northern California planned to redesign their practices based on Bodenheimer's teamlet model of care. Within these clinics, there were two primary study

populations: the patients and the clinic staff and clinicians. Questionnaires were mailed to a random sample of patients and baseline respondents also received a six-month follow-up questionnaire. Measures included patient-provider communication (based on the CG-CAHPS), patient activation (PAM), general health (SF-12v2), physical activity, dietary habits, chronic conditions, and demographic information. Clinical outcome measures from clinic administrative data were merged with patient questionnaire data to evaluate the third study aim. Key informant interviews were conducted with randomly selected clinic staff and clinicians, also during the same baseline and six-month follow-up periods. Topics included practice change implementation experiences, team activities, interactions with overweight or obese patients, team development activities, and practice characteristics.

1.5 CONTRIBUTION TO THE FIELD

The first paper focused on the impact of a clinic practice redesign on patient care experiences and health behaviors. The goal of the redesign was to increase patient self-efficacy about weight loss through regular motivational interviewing and check-in phone calls provided by medical assistants. Since this program could potentially be implemented more broadly in primary care practices, it is important to understand the types of barriers that primary care practices face, as well as to understand the variation in health behaviors for participating patients and non-participating patients over time. There has been little research available on the relationship between patient activation and health behaviors among Spanish-speaking Latinos, so this research can also inform future uses of the patient activation as a screening tool in this and other minority populations.

The second paper examined the impact of a new health coaching program from the perspectives of clinic staff. The implementation of interdisciplinary workflow changes in a primary care clinic requires extensive preparation and coordination. Baseline key informant interviews with clinicians and clinic staff from diverse roles and professions within the clinic helped to clarify the baseline challenges with addressing the needs of overweight and obese patients, while the follow-up interviews helped to indicate which parts of the practice redesign were more effective and identified areas for future process improvement or adaptation. Assessing the perspectives of staff and clinicians over time provided a valuable range of perceptions of practice changes and how much change has been sustained.

The third paper took a longitudinal view of the relationship between patient activation and patient health outcomes. The practice redesign was intended to change patient and provider interactions to provide patients with a greater voice in their own health care, so it was essential to understand how this dynamic impacted patients at different times during this change. The examination of patient clinical outcomes, instead of just health behaviors, is another measure of the effect of the practice change on patients. These results may also be useful to clinic administrators or clinicians who seek to understand how clinic changes might impact patients.

Together, these papers examined how the expansion of the role of medical assistants in primary care will affect team dynamics and patient outcomes within safety net clinics. There are a number of studies on the implementation of different aspects of the Chronic Care Model, but not many that have focused on its use within safety net clinics or the effects on diverse patient populations such as Spanish-speaking Latinos. Given the increasing numbers of those with chronic disease, any proposed methods to improve chronic disease management should be applicable to all of these population subgroups.(T Bodenheimer et al., 2009)

CHAPTER 2: THE RELATION OF PATIENT ACTIVATION AND HEALTH BEHAVIORS AMONG DIVERSE SAFETY NET PATIENTS

2.1 ABSTRACT

Background

Self-management support has been especially challenging for primary care practices to integrate into busy practices, especially safety net clinics serving vulnerable patient populations. Patients must be activated in order for investments in self-management systems to yield benefits to patients. We examine the association between patient activation and patient physical activity, and dietary behaviors among obese patients of safety net clinics.

Methods

The Patient Activation Measure (PAM-13), a validated measure of a patient's ability to self-manage his or her own health, has been associated with more effective self-management of chronic conditions. Activation scores are grouped into four different levels based on individual level of participation in making health care decisions. Established patients of one of three safety net clinics were surveyed about their patient activation and health behaviors such as physical activity, fruit and vegetable consumption, and avoidance of soda consumption. Other predictor variables were grouped into one of the following domains and added sequentially: 1) patient and provider communication, 2) sociodemographic characteristics, and 3) patient health status. Multivariate logistic regression models predicting physical activity and dietary behaviors estimated the relative importance of patient activation to patient engagement in key health behaviors.

Results

The mean PAM score among respondents is 63.2 (on a 100 point scale), which is ranked within activation level three (second highest). In the unadjusted model, respondents in the highest level of activation had 2.76 times the odds of regularly consuming fruits and vegetables compared to respondents in the lowest level of activation. Patient activation was not related to regular physical activity in the unadjusted model. After controlling for patient-provider communication and demographics, as well accounting for as the interaction effect from comorbidities, respondents in activation level three had 0.65 times the odds of being physically active and respondents in activation level four had 0.69 times the odds of being physically active ($p<0.05$) than respondents in activation level one (the lowest level). There was no statistically significant relationship between patient activation and no regular soda consumption.

Discussion

There is a limited association of patient activation and health behaviors among safety net patients from diverse backgrounds. The positive relationship between patient activation and regular fruit and vegetable consumption may be due to the relative ease of improving dietary behaviors over physical activity behaviors. The interaction effect of comorbidities may explain the negative relationship between patient activation in relation to physical activity.

Conclusion

Patient activation was associated with a positive dietary behavior, but did not have the expected relationship with physical activity in this population. Although the patient-provider relationship has a strong bivariate relationship with patient activation, it does not impact the relationship between patient activation and health behaviors.

2.2 BACKGROUND

As the U.S. health care system has shifted its focus from acute care to chronic care, primary care systems must be reorganized and strengthened to address the obesity epidemic.(Coleman et al., 2009; Rothman & Wagner, 2003) Obesity is linked to a number of health risks, particularly the development and exacerbation of chronic conditions such as hypertension, diabetes, high cholesterol, coronary artery disease, and more. (Desouza et al., 2012) Chronic conditions require regular medical check-ups, medication, and can lead to severe health consequences if not well-managed, resulting in tremendous health care costs and a heavy burden for primary care practices.(Barr et al., 2003; T Bodenheimer et al., 2002) Although studies of the Chronic Care Model (CCM) indicate mixed results about the impact of CCM on improving the quality of patient care and health outcomes, changes in delivery system design and self-management support are the CCM components most consistently associated with positive patient outcomes.(Tsai et al., 2005)

Self-management support for obese and chronically ill patients has been especially challenging for primary care practices to integrate into practices serving patients with complex health problems, especially safety net clinics. In national surveys of physician organizations, only a minority of small and medium sized primary care practices have self-management support systems for patients and a high proportion of large practices lack key self-management supports for patients.(Rittenhouse et al., 2011; Shortell et al., 2009) Accordingly, we conducted a survey of primary care patients in the early stages of implementation of a practice redesign to improve the availability of self-management resources for obese patients by making health coaching available at the point of care. The goals of the practice redesign were to enable patient goal-setting to increase physical activity through structured support and feedback from trained

medical assistant staff during routine primary care visits, and to connect obese patients to clinic and community resources for physical activity improvement.

2.2.1 Conceptual Model

In the context of implementing practice changes to improve the management of obesity, practice stakeholders were interested in understanding the utility of assessing patient activation. Even if a practice is able to provide self-management support for obese patients at the point of care, patients must be engaged or have a high level of interest and involvement in their health and be willing to engage in goal-setting and improvement (Carman et al., 2013; Hibbard & Greene, 2013) Patient activation, an important component of patient engagement, encompasses the patients' ability and readiness to self-manage their health. Patient activation has been linked to positive health behaviors: more highly activated patients have been shown to engage in positive health care and health behaviors such as preventive screenings, regular physical activity, and eating healthy foods.(Greene & Hibbard, 2011; Hibbard & Greene, 2013; Rask et al., 2009).

An important factor related to patient activation and patient outcomes is the patient-provider relationship. Specifically, more positively rated or more frequent provider communication with patients is linked to higher patient activation or more positive health outcomes.(Alexander, Hearld, Mittler, & Harvey, 2012; Levinson, Lesser, & Epstein, 2010a; Tarn, Young, & Craig, 2012) For this study, patient and provider communication is considered a possible moderator in the relationship between patient activation and health behaviors (see Figure 2.1).

Information about patient activation might aid in the targeting of clinical interventions. For example, if the least activated patients have constellations of problem health behaviors, then routinely assessing patient activation might efficiently target patients with the most needs for

obesity management interventions like medical assistant health coaching or group visits. However, there is little information on patient activation in low-income, safety net, and Spanish-speaking Latino populations.(Alegría, Sribney, Perez, Laderman, & Keefe, 2009; Lubetkin, Lu, & Gold, 2010) In order to assess the utility of measuring patient activation in the safety net, it is important to examine the extent to which activation is associated with important health behaviors. Based on previous literature on patient activation in other populations, we hypothesize that there is also a positive relationship between patient activation and health behaviors within a low-income, Spanish-speaking Latino population. That is, more highly activated patients will be more likely to be regularly physically active, more likely to consume fruits and vegetables regularly, and more likely to not consume soda than less activated patients (see Figure 2.1).

2.3 METHODS

2.3.1 Study Design

Questionnaires were mailed in three waves to eligible patients at three safety net clinics in Northern California during the early implementation period in April to June 2012. The first mailing included a $10 gift card as a token of appreciation. Questionnaires were mailed in both English and Spanish languages, depending on patient preference. In order to maintain patient privacy, patients were assigned random identifiers which were then used to label the surveys, which the clinics mailed out themselves. However, in order to keep the survey results confidential from the clinic staff and clinicians, completed surveys were mailed directly to the researchers without any identifiers.

2.3.2 Sample Population

A random patient sample (n=393) was drawn from the three safety net clinics' administrative databases with the following restrictions: at least two visits to the clinic in the past calendar year, age 18 and over, and BMI of 30 to 34. These inclusion criteria were used to target patients that were most likely exposed to any changes in clinic practices due to regular visits and also likely to have experienced the health coaching program. Exclusion criteria were also established to limit patients with conditions that predispose to fluctuations in weight independent of diet and physical activity, including pregnancy in the last year, and conditions that may cause involuntary weight loss such as cancer and uncontrolled diabetes (the sample does include those who are currently treating their diabetes). Of the original sample of 393 patients, 8.4 percent (n=33) of surveys were returned due to invalid addresses. An additional 162 patients did not respond to the survey, so the analytic sample includes a total of 198 patients for an adjusted response rate of 55.3 percent (see Figure 2.2).

2.3.3 Measures

The patient questionnaire includes questions about patient experiences with clinicians, exercise behavior, patient activation measures, general health, diet, chronic conditions, and demographic information. Spanish translations were already available for measures on patient experiences, patient activation, Medical Outcomes Study 12-Item Short Form Version 2 (SF-12v2), height, weight, diet, language preference and education. The remaining measures about physical activity, chronic conditions and race were independently translated by two research staff bilingual and biliterate in Spanish who then reached a consensus about the proper translation from English to Spanish.

2.3.4 Primary Predictor Variable

The Patient Activation Measure (PAM) was developed by Hibbard, et al., as a way to quantify patient activation and assign patients to four different levels of activation based upon their scores (see Appendix A).(Hibbard & Mahoney, 2010; Hibbard, Mahoney, Stockard, & Tusler, 2005; Hibbard, Stockard, Mahoney, & Tusler, 2004) Patient activation has been associated with positive health behaviors such as aerobic exercise and receiving preventive cancer screenings, as well as more favorable emotional health.(Chubak et al., 2012; Greene & Hibbard, 2011; Munson, Wallston, Dittus, Speroff, & Roumie, 2009) This 22-item measure has been validated in different populations and has been shown to be reliable with a Cronbach's alpha of 0.87.(Chubak et al., 2012; Hibbard et al., 2005; Hibbard et al., 2004; Munson et al., 2009) The levels of activation are similar to the Transtheoretical Model, in which individuals move through different stages of change before changing a specific behavior, such as quitting smoking.(Johnson et al., 2008) Individuals are thought to move through these stages of activation in order, although stages may change with time and stressful circumstances could lower patient activation.(Chubak et al., 2012; Hibbard et al., 2004)

Patient activation was measured as a composite score on the PAM-13, which is the short form of the original PAM, but has been validated against the original 22-item scale.(Hibbard et al., 2005) In this study, the PAM-13 had a Cronbach's alpha of 0.94. There is one additional screener question included within the PAM-13 for this survey that clarifies whether or not the patient has made any lifestyle changes due to the presence of chronic conditions. This additional question does not factor into the scoring of the PAM-13, but elucidates whether or not the patient is currently dealing with chronic conditions. The PAM-13 uses four Likert-scale responses for each question: strongly disagree, disagree, agree, and strongly agree. The responses are totaled to

then categorize the overall responses into a 4-part ordinal variable, representing levels of activation. The lowest level of activation indicates that an individual is a passive participant in health care decisions, just following what is prescribed by providers. The second level of activation is where an individual has the knowledge and confidence to take a more active role in their health care, but they have not yet acted on it. The third level of activation involves the patient playing an active role in making health care decisions with their providers. The highest level of activation describes a patient who has the knowledge and confidence to take action about their own health care, even during times of stress.(Hibbard et al., 2004)

2.3.5 Outcome Variables

Three different health behaviors were examined: physical activity level, fruit and vegetable consumption, and soda consumption. The main outcome of interest was patient physical activity level, since that was the central goal of the intervention. Patient physical activity level was determined by two questions modified from the Exercise Vital Sign that assess the frequency and duration of engagement in moderate to vigorous physical activity.(Sallis, 2011) Regular physical activity was then measured as being active for at least 150 minutes per week, which is the national recommended level of physical activity for adults.

Secondary outcomes included fruit and vegetable consumption, as well as soda consumption. The measures on dietary habits were modified from questions used in Starting the Conversation.(Paxton, Strycker, Toobert, Ammerman, & Glasgow, 2011) Regular fruit and vegetable consumption was defined as eating fruits and vegetables at least once daily. The measure of soda consumption was characterized as no weekly consumption of soda versus any consumption. The measure on soda was specifically about the consumption of regular (not diet) soda, and excluded the low-calorie or calorie-free versions of soft drinks.

2.3.6 Control Variables

Patient Experiences. One recent study by Alexander, et al., also found that higher levels of activation were associated with more highly rated relationships with personal care providers. This finding is important because patient self-management programs may need to begin with a stronger relationship between patient and provider.(Alexander et al., 2012) Patient experience with clinic staff and providers is important to determine the nature of the patient's perceived relationship with providers. A series of questions were adapted from the Clinician and Group version of the Consumer Assessment of Healthcare Providers and Systems (CG-CAHPS) survey (see Appendix B) to assess provider communication skills.(Anastario et al., 2010; Browne, Roseman, Shaller, & Edgman-Levitan, 2010) These responses to these questions were re-scaled and summed to create a single composite measure, where higher scores indicated a more positively-rated provider communication skills. There is also a single-item question about whether or not the patient considered one clinic provider as their personal care provider, which provides further information on the nature of the patient-provider relationship. Another single-item question asked if the patient identified someone at the clinic as a health coach or someone who assisted them with reaching health-related goals. Patient trust in physicians and nurses is measured in a single-item question, which is a modified version of the short form of the Wake Forest Physician Trust scale.(Hall et al., 2002)

General Health. Patients were asked to rate their general health and also about any limitations to their daily activities due to emotional or physical health issues, which is from the SF-12v2, a measure that has been previously validated as a measure of overall health.(Jenkinson et al., 1997) The measure creates summary variables for overall physical and mental health. Patients were also asked to report their height and weight. There was also a question from the

Ambulatory Care Experiences Survey that asked about the diagnosis of eight different chronic conditions.(Rodriguez, Rogers, Marshall, & Safran, 2007; Safran et al., 2006)

Demographics. The questionnaire also included measures for patient demographics, including level of education, race and ethnicity, and primary language spoken at home. Clinic administrative data provided age, gender, and body mass index (BMI).

2.3.7 Data Analysis

Provider communication skills were assessed as a possible moderator in the relationship between patient activation and patient health behaviors. An interaction term for provider communication skills and patient activation was included in unadjusted regression models to be included in multivariate analyses if main effects were significant. Logistic regression analysis was conducted after grouping the independent variables into key categories. We evaluated four separate models, sequentially adding groups of additional variables. The first model evaluated the relationship between patient activation and the outcome measure. The second model includes variables related to patient-provider communication. The third model included demographic information. The final model added factors related to patient health. A correlation matrix indicated no strong correlations among predictor variables before entering them into the models. Analyses were conducted using Stata 11.2 and graphs were created in Stata 12.

2.4 RESULTS

2.4.1 Patient Characteristics

The analytic sample included 38.9 percent Spanish-language questionnaires, which approximates the 39.2 percent of the sample population that were sent Spanish-language questionnaires. The majority of respondents were female (70 percent) with a mean age of 49

years (see Table 2.1). The largest racial/ ethnic group was Spanish-speaking Latinos (38 percent), followed by English-speaking Latinos (30 percent). The rest of the respondents were non-Latino White (14 percent), non-Latino Black (7 percent), non-Latino Asian Pacific Islander (7 percent) and other (4 percent). For the regression models, the non-Latino Black, non-Latino Asian Pacific Islander, and other racial/ ethnic groups were merged into a larger non-Latino non-White group due to small cell sizes. Nearly half of respondents (45 percent) had been utilizing these clinics for at least three years. Most respondents considered someone at the clinic as their primary care provider (83 percent) and most identified a clinician or staff member who helped them meet their health goals (78 percent). Based on a two-sample t-test, there were no significant differences in terms of age, gender, or preferred language spoken at home between patients who did and did not respond to the questionnaire. Other characteristics for the population of non-responders were not available for analysis.

2.4.2 Moderator Effect

An interaction term between patient activation and provider communication skills was assessed in unadjusted regression models with the outcomes of regular physical activity, regular fruit and vegetable consumption, and avoidance of soda consumption. The three models were not statistically significant, so the interaction terms were not retained for the multivariate regression models. However, interaction terms between patient activation levels and comorbidities was included in the regression models for physical activity to help account for limitations to physical activity due to chronic conditions. The interaction terms were not retained in the regression models for regular fruit and vegetable consumption or avoidance of soda consumption because they were not statistically significant. Further, the effect of comorbidities on patient activation is not likely to affect dietary behaviors in the way it impacts physical activity.

The mean PAM score among respondents was 63.2, which is ranked within the third level of activation (second highest). The largest proportion (38 percent) of respondents scored in the highest level of the four levels of activation; among Latinos, 35 percent of respondents scored within the highest level of activation. Spanish-speaking Latinos had higher mean PAM scores (66) than English speaking Latinos (59) and non-Latino Whites (64). When the sample population was stratified by activation level, there were no statistically significant differences in educational backgrounds among activation levels. However, most of the individuals with a college degree or higher scored within the highest two levels of activation (see Table 2.1). Patients with more comorbidities tended to score within the higher activation levels, with more diabetic patients in activation level three than the lowest activation level. Individuals who trusted their providers were more heavily represented in the highest two levels of activation. The distribution of the outcome variables by patient level of activation varied, with no apparent linear relationship with each outcome and patient activation (see Figure 2.3).

2.4.3 Regular Physical Activity

In the unadjusted model of physical activity and patient activation level, there was no statistically significant relationship between the two (see Table 2.2). After adjusting for covariates, the model with the best fit was not the full model, but rather the model that adjusted for chronic conditions, the interaction between patient activation and chronic conditions, provider communication skills, and demographic characteristics (see Table 2.2). The addition of the physical and mental health composite scores from the SF-12v2 did not improve model fit (see Table 2.2). For the best-fit model, there was a significant difference between activation level and physical activity (see Table 2.2). The main effect of each comorbidity was associated with 2.04 times the odds of being physically active ($p<0.10$), but for individuals with comorbidities,

the net effect of comorbidities and activation is lower for individuals in activation level three (0.65 times the odds) and activation level four (0.69 times the odds). Females had 0.32 times the odds of being regularly physically active than males ($p<0.05$).

While holding all covariates at their means, the predicted probability of being physically active was similar (PP=0.14) for individuals in the lowest activation level and those in the highest activation level (PP=0.12) (see Figure 2.4). However, there were no significant differences between levels of activation, as shown by the overlapping confidence intervals (see Figure 2.4). When examining the predicted probability of regular physical activity across ages, there is a slight decrease from age 40 to age 60 regardless of activation level (see Figure 2.5). However, compared to the other activation levels, individuals in activation level two started with a higher probability of regular physical activity at age 40 (PP=0.35) and maintained the highest relative probability of regular physical activity (PP=0.25) at age 60.

2.4.4 Regular Fruit and Vegetable Consumption

In the unadjusted model of patient activation and fruit and vegetable consumption, individuals in the highest level of activation had 2.76 times the odds of consuming fruits and vegetables daily than those in the lowest level of activation ($p<0.05$) (see Table 2.3). This difference between the highest and lowest levels of activation weakened ($p<0.10$) with the addition of covariates for patient-provider communication and patient demographics. In the full model with covariates on patient health, the only significant relationships were within racial/ethnic groups (see Table 2.3). Relative to non-Latino Whites, English-speaking Latinos had 0.17 times the odds ($p<0.01$) and non-Latino non-Whites had 0.08 times the odds ($p<0.01$) of consuming fruits and vegetables daily.

The predicted probability of regularly consuming fruits and vegetables was lower (PP=0.16) for individuals in the lowest activation level than for individuals in the highest activation level (PP=0.36), while holding all covariates at their means (see Figure 2.6). The only significant difference in outcome is between activation level two (PP=0.11) and activation level four (PP=0.36). The overall relationship between activation level and fruit and vegetable consumption was nearly linear, with the exception of a lower predicted probability of regular physical activity for individuals in activation level two relative to level one. When comparing the predicted probability of regular fruit and vegetable consumption by age, there is a general decline for all levels of activation with age (see Figure 2.7). However, those in the highest level of activation maintained the highest probability of regular fruit and vegetable consumption with age; their probability of regular fruit and vegetable consumption at age 60 (PP=0.30) was higher than the probability for respondents in lower levels of activation at ages 40 through 60 (PP=0.09 to PP=0.27) (see Figure 2.7).

2.4.5 Avoidance of Soda Consumption

In the unadjusted model, there was no statistically significant relationship between patient activation level and no weekly soda consumption (see Table 2.4). Individuals in the highest level of activation had 2.33 times the odds of not consuming soda compared to individuals in the lowest level of activation ($p<0.10$) before adjusting for covariates (see Table 2.4). Once the models were adjusted for provider communication skills, demographics, and health, there was only a significant relationship with the mental health rating and no soda consumption (see Table 2.4). Higher mental health scores on the SF-12v2 were associated with 1.69 times the odds of not consuming soda each week ($p<0.05$).

There was no clear pattern with the predicted probability of no soda consumption across activation levels. The predicted probability of no soda consumption was highest within activation level two (PP=0.41) and level four (PP=0.41), but the lowest was within activation level three (PP=0.22) (see Figure 2.8). There were no significant differences between activation levels for predicted probability of no soda consumption. When the predicted probability of no soda consumption was examined by age, there was a decrease in probability across all activation levels (see Figure 2.9) Activation levels two and four maintained the greatest probability of no soda consumption from age 40 (PP=0.50 for both level two and level four) to age 60 (PP=0.34 for level two and PP=0.33 for level four).

2.5 DISCUSSION

Similar to previous studies on patient activation within lower-income populations, the average participant scored within activation level three, indicating they had some self-management skills but still needed support for self-management during times of stress or change.(Alexander et al., 2012; Deen et al., 2012; Rask et al., 2009) Most studies on patient activation have focused on English-speaking populations, so it is important to note that that a similar distribution of activation scores was seen within this population that included both English and Spanish-speakers. Spanish-speaking Latinos in this study had a higher PAM score than English-speaking Latinos, which was the opposite of findings from previous studies.(Alegría et al., 2009; Lubetkin et al., 2010) This difference in results may be due to the other studies' respective use of a national sample and a New York-based sample or perhaps their mode of questionnaire administration (telephone interviews and paper questionnaires with researcher support), compared to this study's California-based sample and mailed questionnaires.

Interestingly, the Latino population in this study averaged a slightly higher unadjusted mean PAM score than non-Latino Whites, contrary to previous studies .(Cunningham, Hibbard, & Gibbons, 2011; Cunningham & Hibbard, 2008) Additionally, the proportion of Latinos who scored within the highest level of activation (35 percent) in this study was greater than that reported in a national study (25 percent).(Cunningham et al., 2011)

Previous research has indicated that the relationship of patient activation to health behaviors and outcomes are not always linear, which is supported by these results.(Dixon, Hibbard, & Tusler, 2009) This study found a significant relationship between the highest level of patient activation and greater consumption of fruits and vegetables, which is consistent with the literature.(Hibbard et al., 2004) The stronger and positive relationship between patient activation and fruit and vegetable consumption in comparison to physical activity and soda consumption may be because that type of health behavior is relatively easy to adopt. Fruit and vegetable consumption only requires the addition of food to existing meals, whereas decreasing soda consumption requires the sacrifice of something from the diet and increasing physical activity requires the addition of a new behavior within daily routines.

This study found a small but significant relationship between the two highest levels of patient activation and regular physical activity only when accounting for comorbidities. However, contrary to the literature, more highly activated patients were not associated with greater odds of being regularly physically active.(Harvey, Fowles, Xi, & Terry, 2012; Hibbard & Greene, 2013; Hibbard, Mahoney, Stock, & Tusler, 2007; Hibbard et al., 2004) Previous research on patient activation suggests that low-income patients may tend to report more positive health behaviors because they hope this will enable them to receive better care, so patients may have overreported their physical activity during this particular intervention on physical activity.(Rask

et al., 2009) This different result also appears to be related to the interaction between patient activation and comorbidities. Patients with more comorbidities tended to score within the higher levels of activation, although this may have indicated more confidence in health care behaviors such as taking medications regularly or receiving preventive care rather than engaging in health behaviors such as regular physical activity. These highly activated patients with comorbidities may also face physical or medical limitations to being physically active, so making dietary changes may simply be more feasible than making changes in physical activity.

Quality patient-provider relationships have been found to be important for patient self-management, since providers familiar with their patients' medical histories are likely to be more invested in the care of their patients.(Alexander et al., 2012; Otero-Sabogal et al., 2010) Despite significant relationships between patient activation and patient-provider relationship factors (including provider communication skills and patient trust in provider) in bivariate analyses, the patient-provider relationship did not have a statistically significant impact on any of the three outcomes. It did not have a moderating effect on the relationship between patient activation on patient health behaviors, but could possibly have a mediating effect that was not explored.

Since the data were all self-reported, there is the chance of social desirability bias with outcome variables such as physical activity and dietary habits. However, the distributions of these variables were not skewed in any particular direction, which reduces the likelihood of that bias. Additionally, some key measures such as patient activation and patient-provider relationship rely on patient perception and self-assessment. The small sample size may also present insufficient statistical power to find truly significant relationships. For that reason, the regression models also note which variables were statistically significant at $p<0.10$.

2.6 CONCLUSION

There is a positive relationship between patient activation and regular fruit and vegetable consumption and low-income, safety net population with a large proportion of Spanish-speaking Latinos. Patient activation did not have the same positive relationship with physical activity, although this appeared to be related to the effect of comorbidities on higher levels of patient activation. More highly activated with patients with comorbidities may face limitations with physical activity and their higher activation scores may be related to health care behaviors such as taking medications and not behaviors such as physical activity. Although the patient-provider relationship has a strong bivariate relationship with patient activation, it does not impact the relationship between patient activation and health behaviors.

Figure 2.1 Conceptual Model for Relationships Between Patient Activation, Patient-Provider Relationship, and Patient Health Behaviors

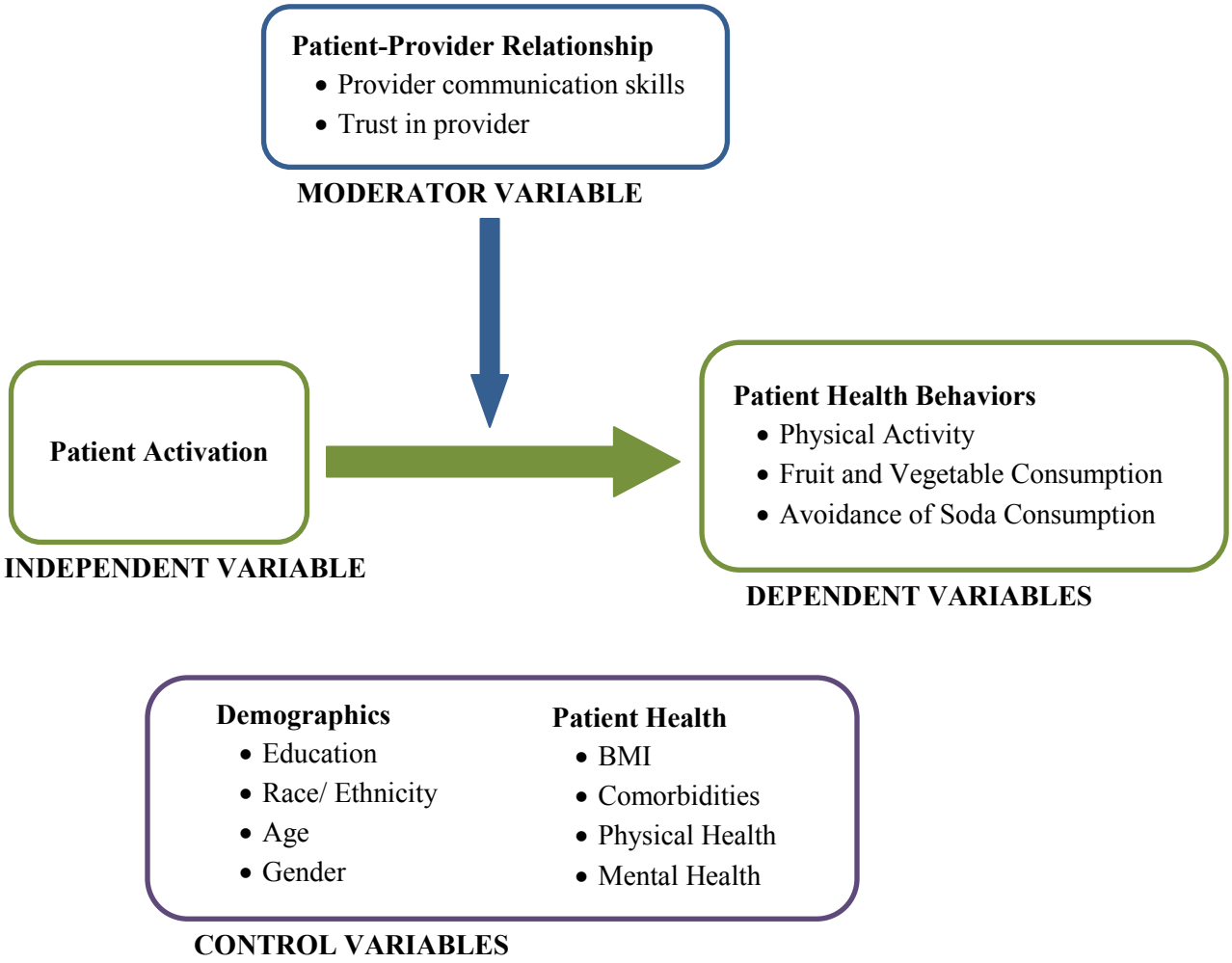

Figure 2.2 Sampling Frame

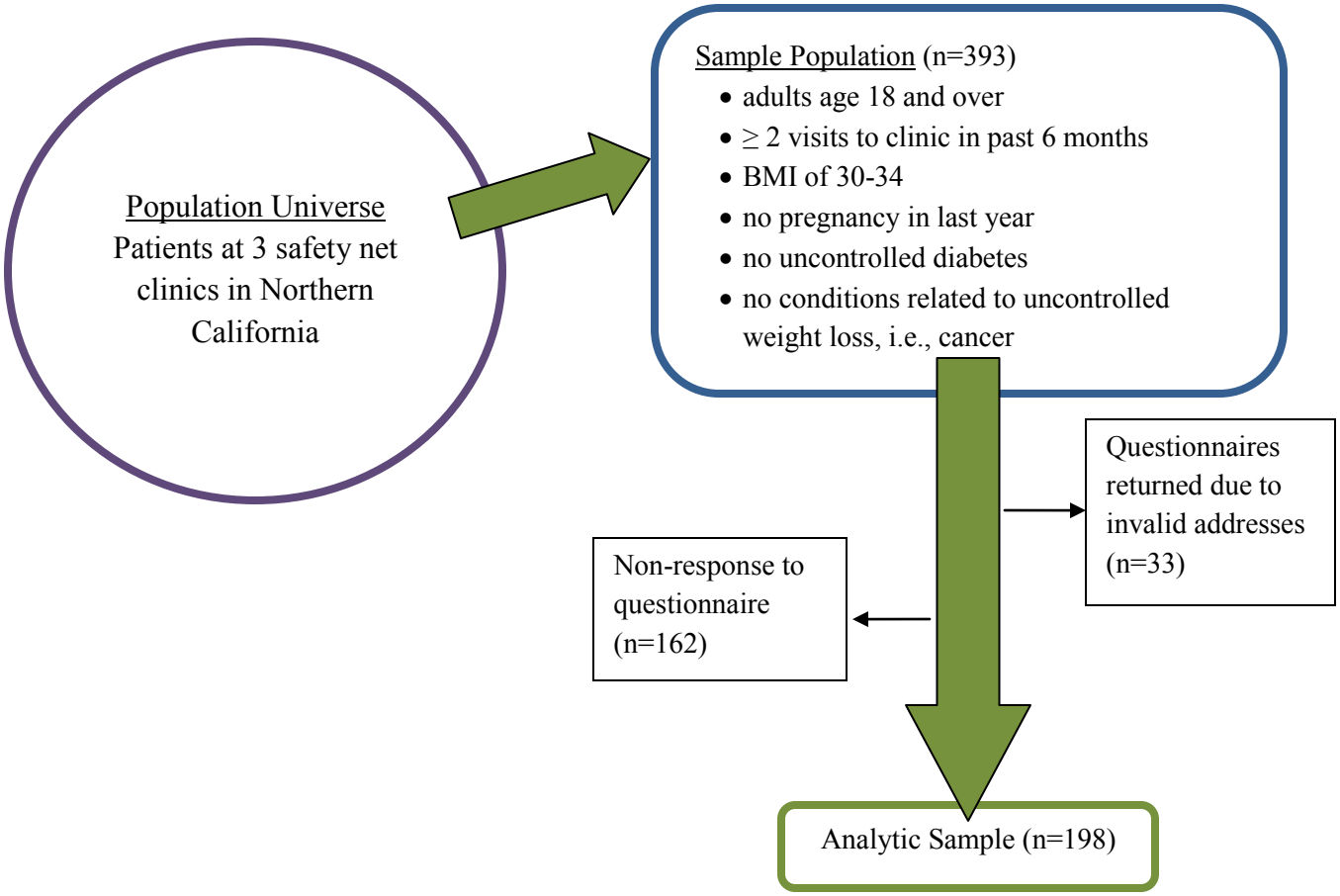

Figure 2.3 Distribution of Outcome Variables by Patient Activation Level

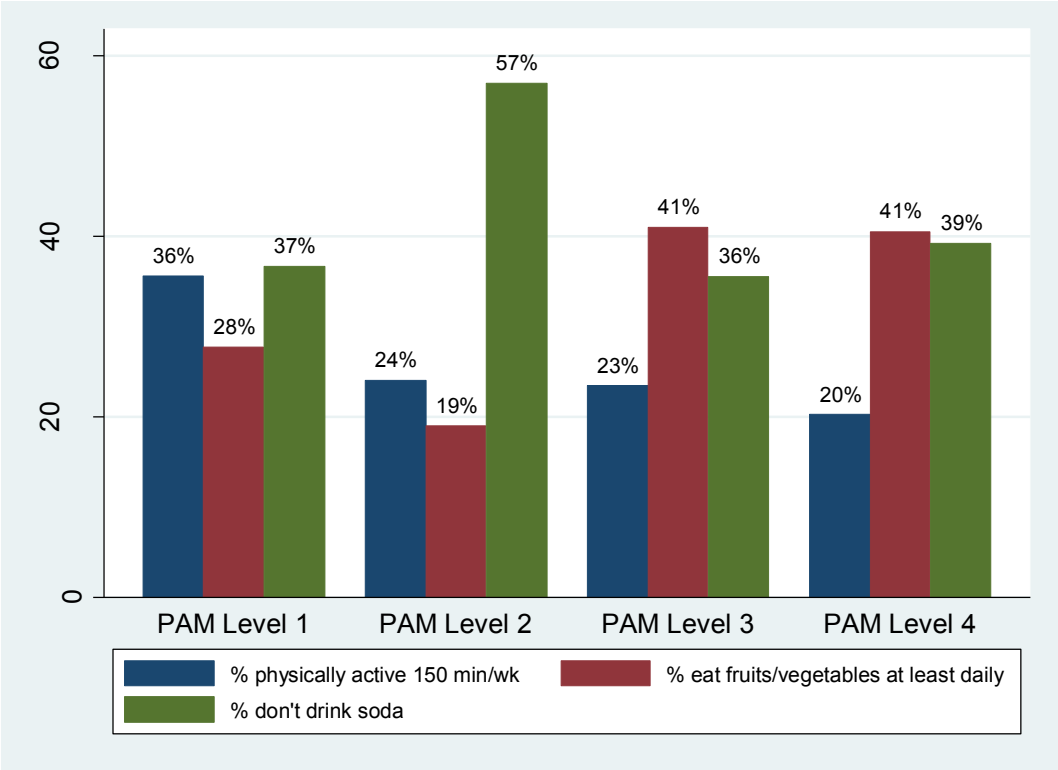

Figure 2.4

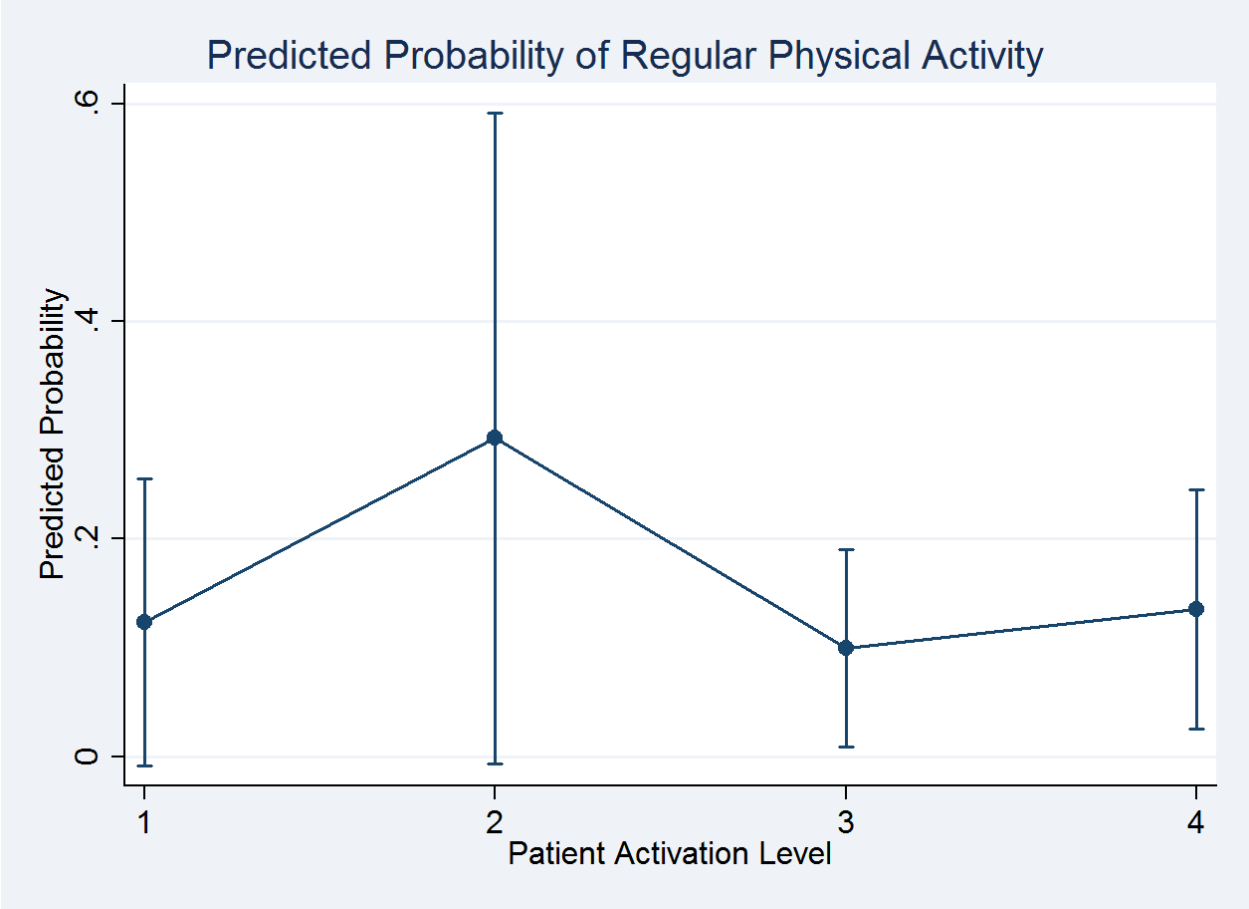
Predicted Probability of Regular Physical Activity
Predicted Probability
0
.2
.4
.6
1
2
3
4
Patient Activation Level

Figure 2.5

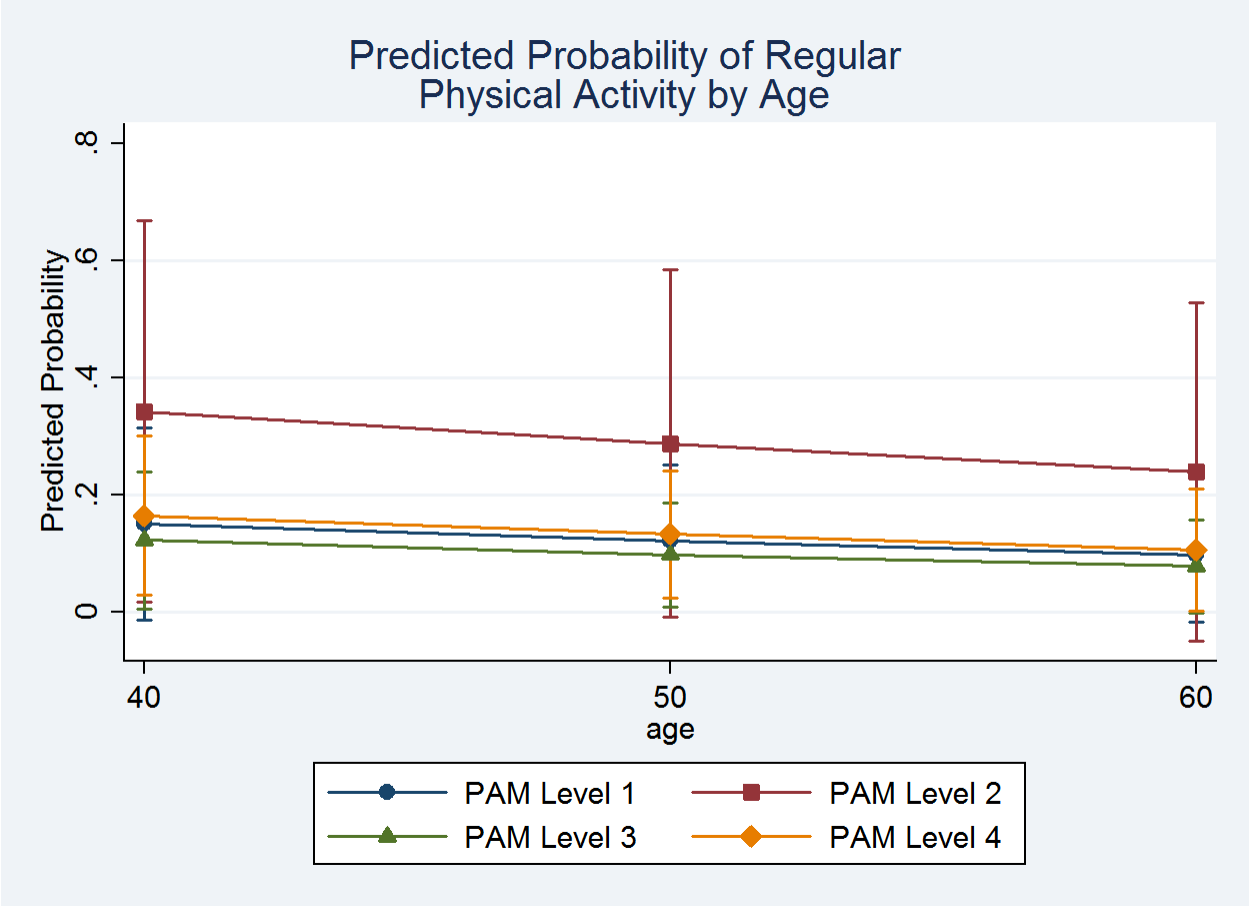
Predicted Probability of Regular Physical Activity by Age
Predicted Probability
0
.2
.4
.6
.8
40
50
60
age
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Figure 2.6

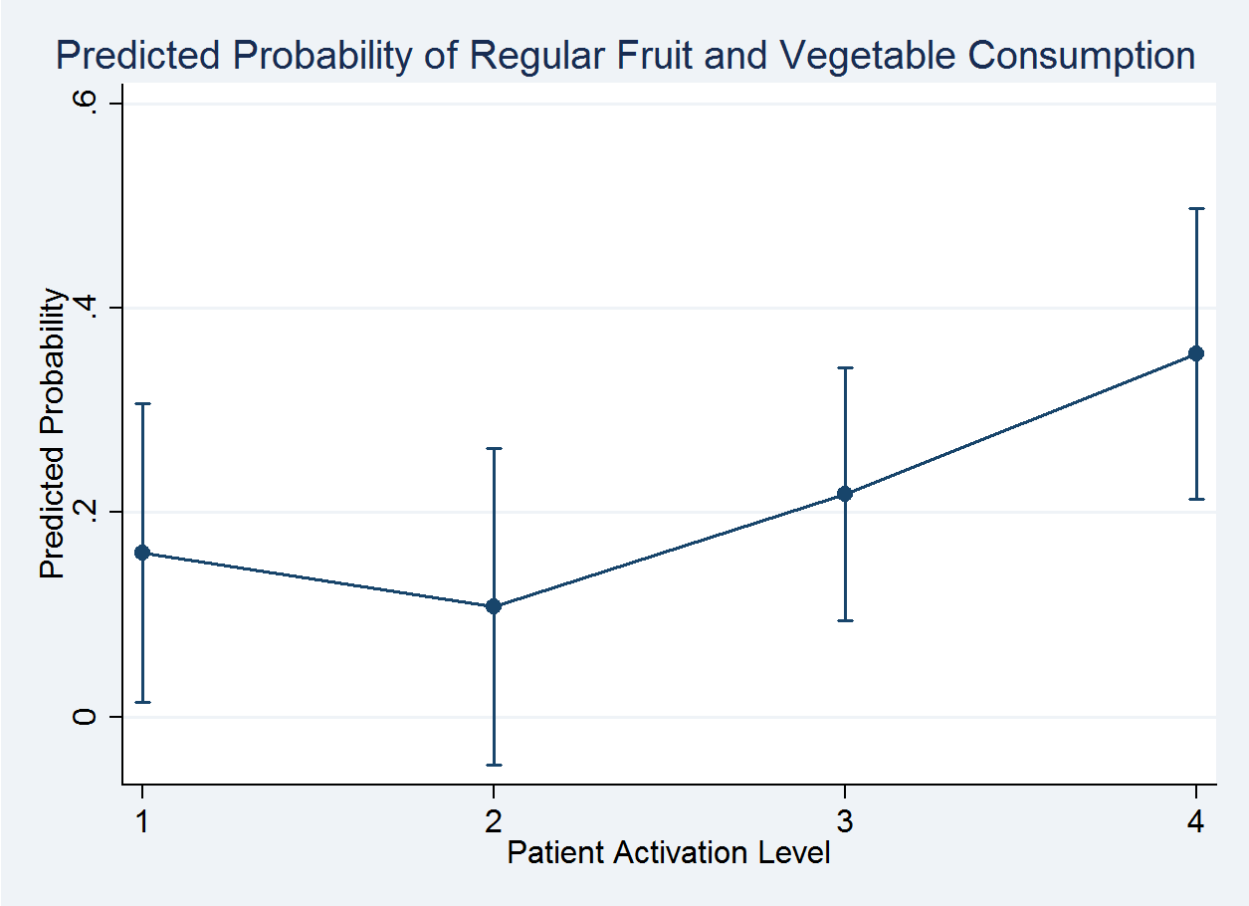
Predicted Probability of Regular Fruit and Vegetable Consumption
Predicted Probability
0
.2
.4
.6
1
2
3
4
Patient Activation Level

Figure 2.7

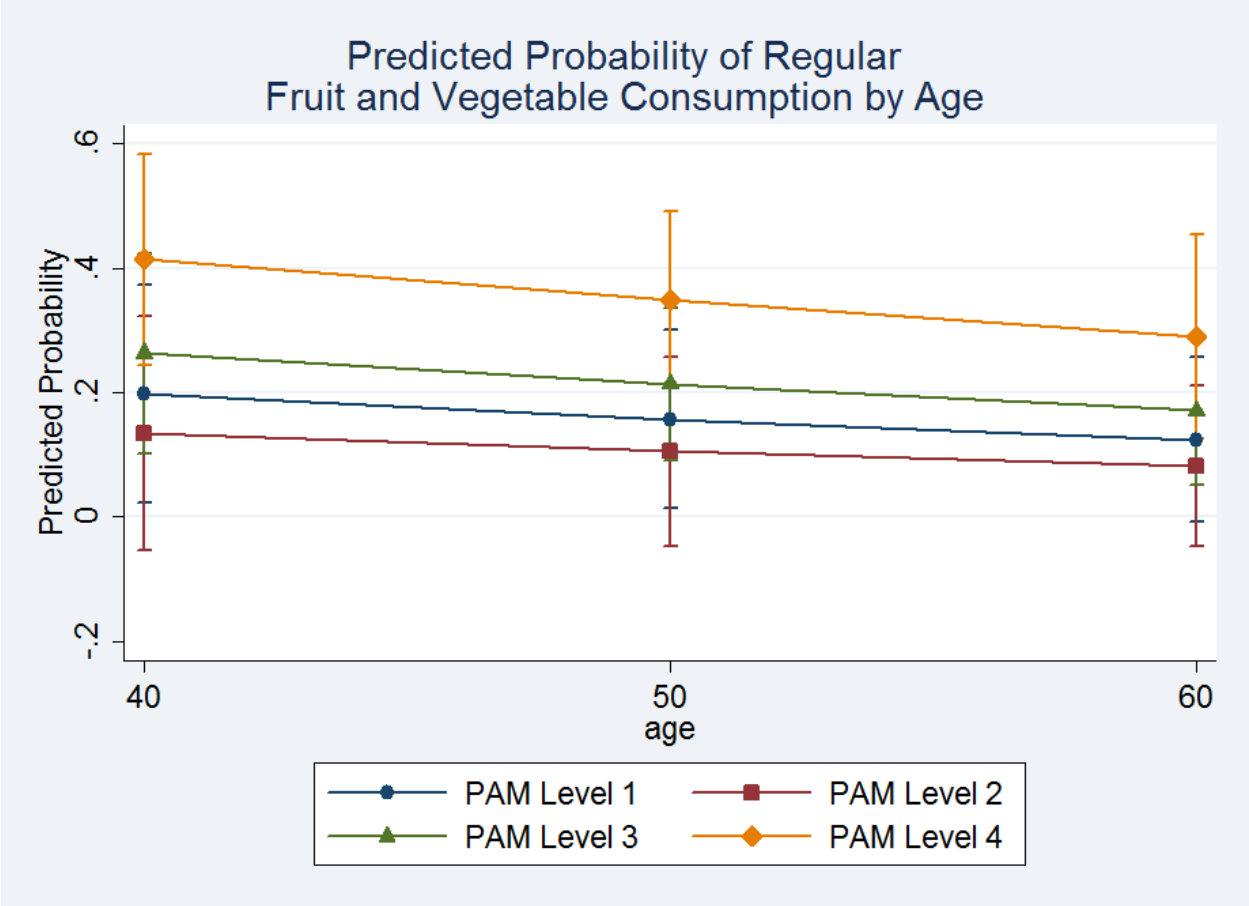
Predicted Probability of Regular
Fruit and Vegetable Consumption by Age
Predicted Probability
-.2
0
.2
.4
.6
40
50
60
age
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Figure 2.8

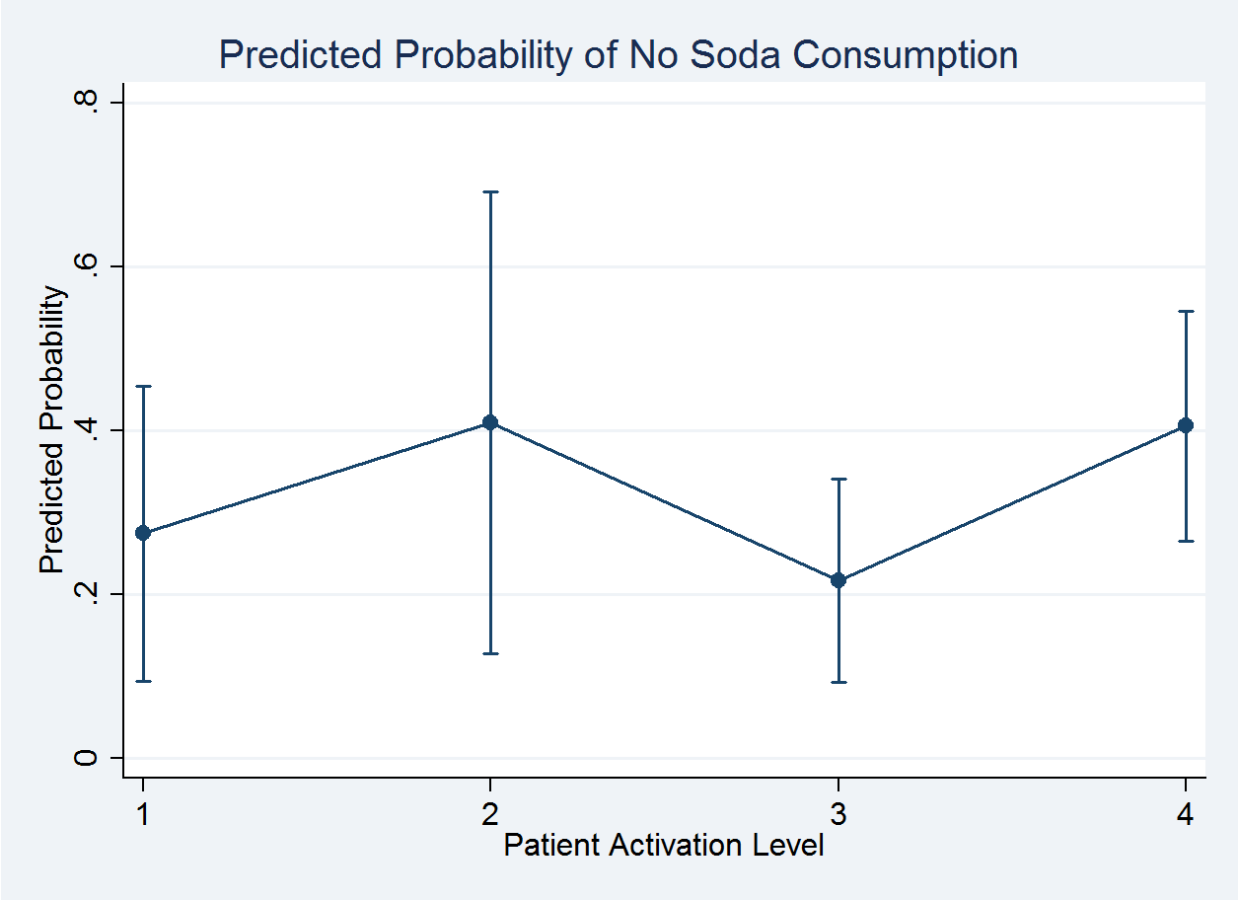
Predicted Probability of No Soda Consumption
Predicted Probability
0
.2
.4
.6
.8
1
2
3
4
Patient Activation Level

Figure 2.9

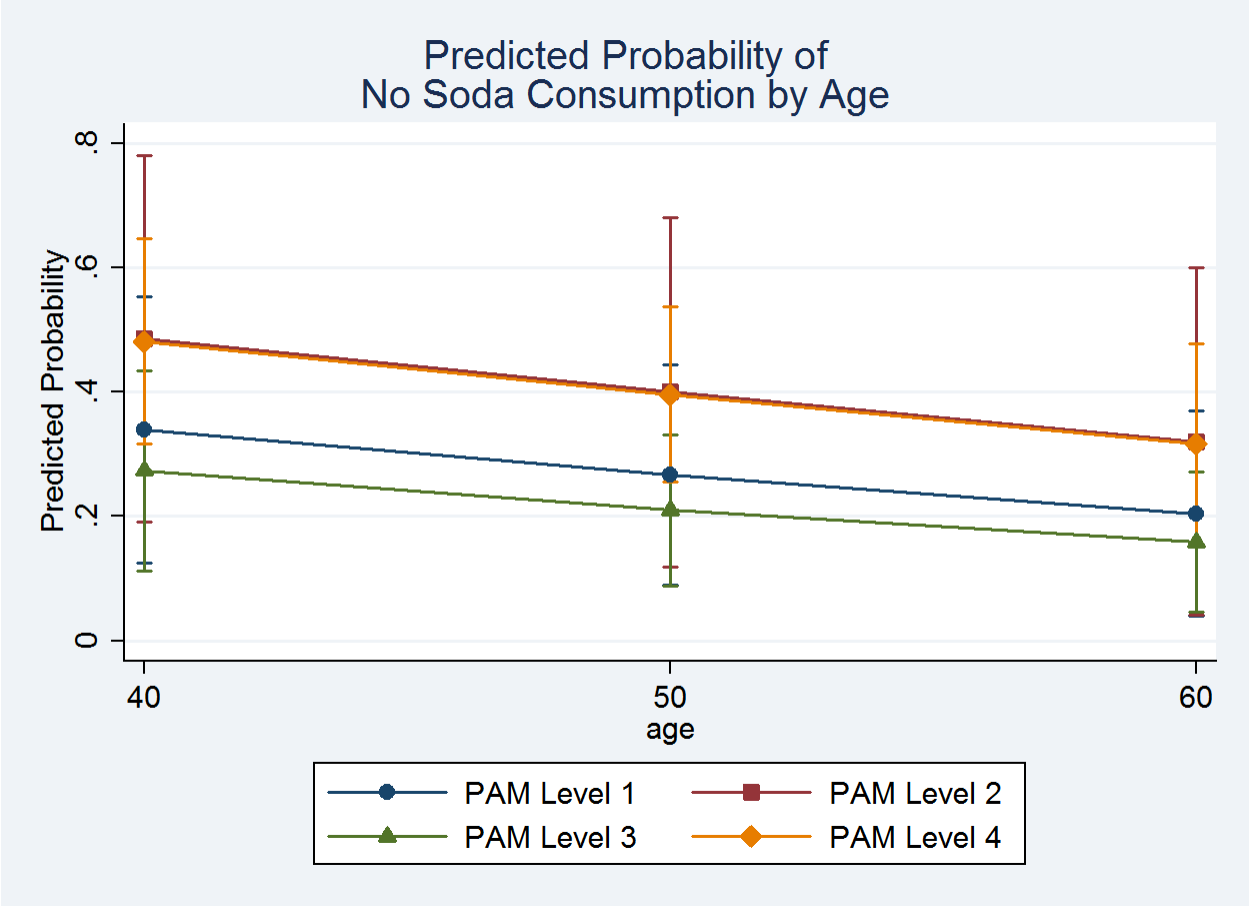
Predicted Probability of
No Soda Consumption by Age
Predicted Probability
0
.2
.4
.6
.8
40
50
60
age
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Table 2.1 Population Characteristics Stratified by Patient Activation Level (N=198)

Characteristic	Overall	Level 1	Level 2	Level 3	Level 4	P-value§
Overall Population	100%	18%	11%	33%	38%	
Clinic						0.83
A	30%	31%	33%	33%	23%	
B	27%	34%	19%	23%	31%	
C	41%	34%	48%	42%	45%	
PATIENT-PROVIDER RELATIONSHIP						
Patient-clinician relationship (modified CG-CAHPS score 0-100)	89.5	82.0	80.6	89.0	95.6	0.00§
Trust clinicians at clinic	89%	77%	74%	93%	96%	0.00‡
DEMOGRAPHICS						
Race/Ethnicity						0.04
Latino – Spanish speaking	38%	26%	38%	42%	43%	
Latino – English speaking	30%	31%	52%	28%	23%	
Non-Latino White	14%	23%	5%	6%	19%	
Non-Latino Other	14%	20%	5%	23%	15%	
Primary language spoken at home						0.55
English	44%	51%	33%	41%	46%	
Spanish	38%	29%	38%	45%	36%	
Other	18%	20%	29%	14%	18%	
Female	70%	73%	70%	77%	63%	0.35
Age (years)	49	49	46	50	49	0.51
Education						**0.01**†
Less than high school	42%	28%	55%	53%	38%	
High school graduate/ GED	23%	33%	35%	15%	23%	
Some college	23%	33%	10%	26%	20%	
College graduate or more	11%	6%	0%	6%	19%	
Length of time attended clinic						0.83
<6 months	4%	3%	0%	2%	5%	
6 months – 1 year	4%	9%	10%	3%	1%	
1 year – 3 years	47%	54%	43%	46%	46%	
3 years – 5 years	22%	11%	24%	29%	22%	
> 5 years	23%	23%	24%	21%	26%	
HEALTH						
Number of comorbidities						0.82
0	13%	9%	14%	11%	12%	
1	24%	26%	24%	30%	19%	
2	20%	29%	19%	17%	18%	
3+	44%	37%	43%	42%	52%	
Diabetes	41%	26%	33%	53%	42%	0.05*
Hypertension	48%	43%	43%	52%	51%	0.76
High cholesterol	47%	49%	38%	45%	51%	0.72
BMI	32.3	32.4	32.3	32.3	32.3	0.37
SF-12 Dimensions (mean score)						
Physical Component Summary Score	42.1	40.0	42.7	41.6	43.1	0.08*
Mental Component Summary Score	42.0	39.9	41.2	44.2	41.5	0.13

* p<0.10, † p<0.05, ‡ p<0.01; §Chi-square analysis or one-way ANOVA

Table 2.2 Comparison of Odds Ratios of Patient Activation Level on Physical Activity

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4
PATIENT ACTIVATION LEVEL				
PAM-13				
(lowest) Level 1	*Ref*	*Ref*	*Ref*	*Ref*
Level 2	2.91 (0.26, 32.62)	4.55 (0.31, 66.25)	6.09 (0.36, 102.42)	5.76 (0.31, 106.59)
Level 3	1.67 (0.19, 14.32)	1.47 (0.15, 14.16)	3.00 (0.25, 35.31)	2.82 (0.24, 33.69)
(highest) Level 4	4.08 (0.52, 31.76)	3.40 (0.43, 26.70)	4.50 (0.42, 48.08)	4.52 (0.42, 49.02)
Comorbidities (number)	1.41 (0.72, 2.77)	1.34 (0.66, 2.71)	2.04* (0.91, 4.59)	1.96 (0.87, 4.43)
PAM-13* Comorbidities				
PAM Level 1 Comorbidities*	*Ref*	*Ref*	*Ref*	*Ref*
PAM Level 2 Comorbidities*	0.63 (0.24, 1.66)	0.56 (0.19, 1.71)	0.47 (0.14, 1.55)	0.51 (0.15, 1.68)
PAM Level 3 Comorbidities*	0.53 (0.23, 1.24)	0.51 (0.20, 1.32)	**0.32†** **(0.11, 0.93)**	0.35* (0.12, 1.01)
PAM Level 4 Comorbidities*	0.46* (0.21, 1.03)	0.52 (0.23, 1.18)	**0.34†** **(0.13, 0.88)**	**0.34†** **(0.13, 0.88)**
PATIENT-PROVIDER RELATIONSHIP				
Provider communication skills (modified CG-CAHPS score)		0.90 (0.58, 1.40)	1.10 (0.68, 1.80)	1.09 (0.66, 1.80)
DEMOGRAPHICS				
Race/ ethnicity				
Latino – Spanish speaking			4.24 (0.69, 26.09)	4.57 (0.71, 29.50)
Latino – English speaking			1.85 (0.35, 9.62)	1.89 (0.35, 10.21)
Non-Latino White			*Ref*	*Ref*
Non-Latino Other			0.99 (0.15, 6.33)	1.22 (0.18, 8.12)
Female			**0.32†** **(0.12, 0.85)**	**0.28†** **(0.10. 0.78)**
Age			0.74 (0.47, 1.18)	0.76 (0.48, 1.21)
Education				
Less than high school			*Ref*	*Ref*
High school graduate/ GED			0.37 (0.09, 1.57)	0.38 (0.09, 1.59)
Some college			0.98 (0.23, 4.28)	1.16 (0.25, 5.34)
4-year college degree or more			1.56 (0.30, 8.08)	1.64 (0.32, 8.41)
HEALTH				
SF-12 Dimensions				
Physical Component Summary Score				0.96 (0.57, 1.60)
Mental Component Summary Score				0.82 (0.51, 1.34)
MODEL FIT STATISTICS				
Log likelihood	-87.07	-79.91	-69.70	-68.38
AIC	190.15	177.82	173.39	174.76
Pseudo R^2	0.06	0.07	0.17	0.17
Pr >chi2	0.15	0.12	0.03	0.05
Observations	191	183	178	172

** p<0.10, † p<0.05*

Table 2.3 Comparison of Odds Ratios of Patient Activation Level on Daily Fruit and Vegetable Consumption

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4
PATIENT ACTIVATION LEVEL				
PAM-13				
(lowest) Level 1	*Ref*	*Ref*	*Ref*	*Ref*
Level 2	0.56 (0.13, 2.47)	0.41 (0.08, 2.25)	0.52 (0.08, 3.23)	0.63 (0.10, 4.15)
Level 3	1.14 (0.41, 3.16)	1.00 (0.34, 2.89)	1.30 (0.39, 4.28)	1.46 (0.40, 5.27)
(highest) Level 4	**2.76†** **(1.06, 7.23)**	2.53* (0.90, 7.09)	2.79* (0.87, 8.88)	2.88 (0.81, 10.29)
PATIENT-PROVIDER RELATIONSHIP				
Provider communication skills (modified CG-CAHPS score)		1.06 (0.72, 1.57)	1.24 (0.79, 1.94)	1.18 (0.76, 1.83)
DEMOGRAPHICS				
Race/ ethnicity				
Latino – Spanish speaking			0.47 (0.13, 1.67)	0.46 (0.12, 1.74)
Latino – English speaking			**0.24†** **(0.08, 0.75)**	**0.17‡** **(0.05, 0.58)**
Non-Latino White			*Ref*	*Ref*
Non-Latino Other			**0.08‡** **(0.01, 0.41)**	**0.08‡** **(0.01, 0.47)**
Female			0.76 (0.34, 1.70)	0.65 (0.28, 1.52)
Age			0.87 (0.60, 1.27)	0.76 (0.50, 1.15)
Education				
Less than high school			*Ref*	*Ref*
High school graduate/ GED			0.65 (0.21, 2.02)	0.64 (0.20, 2.09)
Some college			0.63 (0.18, 2.16)	0.58 (0.15, 2.20)
4-year college degree or more			0.46 (0.11, 1.99)	0.54 (0.12, 2.45)
HEALTH				
Comorbidities (number)				1.30 (0.86, 1.98)
SF-12 Dimensions				
Physical Component Summary Score				0.84 (0.53, 1.34)
Mental Component Summary Score				0.99 (0.61, 1.58)
MODEL FIT STATISTICS				
Log likelihood	-108.52	-101.82	-89.50	-84.22
AIC	225.04	213.65	204.99	200.43
Pseudo R^2	0.05	0.06	0.15	0.17
Pr >chi2	0.01	0.02	0.00	0.00
Observations	187	179	174	168

** p<0.10, † p<0.05, ‡ p<0.01*

Table 2.4 Comparison of Odds Ratios of Patient Activation Level on No Soda Consumption

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4
PATIENT ACTIVATION LEVEL				
PAM-13				
(lowest) Level 1	*Ref*	*Ref*	*Ref*	*Ref*
Level 2	2.50 (0.78, 7.97)	2.20 (0.65, 7.44)	2.06 (0.55, 7.75)	1.83 (0.44, 7.70)
Level 3	0.81 (0.30, 2.23)	0.96 (0.34, 2.70)	1.02 (0.34, 3.08)	0.73 (0.23, 2.35)
(highest) Level 4	2.33* (0.92, 5.88)	2.55* (0.94, 6.93)	2.64* (0.89, 7.83)	1.80 (0.58, 5.62)
PATIENT-PROVIDER RELATIONSHIP				
Provider communication skills (modified CG-CAHPS score)		0.89 (0.63, 1.25)	0.86 (0.58, 1.26)	0.89 (0.59, 1.33)
DEMOGRAPHICS				
Race/ ethnicity				
Latino – Spanish speaking			1.35 (0.38, 4.75)	1.37 (0.36, 5.21)
Latino – English speaking			1.99 (0.63, 6.24)	1.65 (0.50, 5.43)
Non-Latino White			*Ref*	*Ref*
Non-Latino Other			2.05 (0.60, 7.04)	2.37 (0.65, 8.72)
Female			0.68 (0.32, 1.43)	0.52 (0.23, 1.15)
Age			0.73* (0.51, 1.03)	0.71* (0.48, 1.04)
Education				
Less than high school			*Ref*	*Ref*
High school graduate/ GED			2.05 (0.76, 5.52)	2.08 (0.74, 5.90)
Some college			0.78 (0.26, 2.34)	0.59 (0.18, 1.96)
4-year college degree or more			1.34 (0.36, 5.01)	1.29 (0.34, 4.98)
HEALTH				
Comorbidities (number)				1.06 (0.72, 1.56)
SF-12 Dimensions (mean score)				
Physical Component Summary Score				1.28 (0.83, 1.98)
Mental Component Summary Score				**1.70† (1.08, 2.69)**
MODEL FIT STATISTICS				
Log likelihood	-113.40	-109.10	-100.48	-94.31
AIC	234.79	228.20	226.96	220.62
Pseudo R^2	0.04	0.04	0.09	0.12
Pr >chi2	0.02	0.09	0.07	0.04
Observations	186	178	173	167

** p<0.10, † p<0.05*

APPENDIX 2.1

Patient Activation Measure 13

1.	**I am confident I can tell doctors, nurses, and other health care providers concerns I have even when they do not ask:**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
2.	**When all is said and done, I am the person who is responsible for managing my health**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
3.	**Taking an active role in my own health care is the most important factor in determining my health and ability to function**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
4.	**I am confident that I can take actions that will help prevent or minimize some symptoms or health problems.**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
5.	**I know what each of my prescribed medications does.**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
6.	**I am confident that I can tell when I need to go get medical care and when I can handle a health problem myself:**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
7.	**I am confident that I can follow through on medical treatments I may need to do at home**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
8.	**I understand the nature and causes of my health problems.**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
9.	**I know the different medical treatment options available for my health condition(s).**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
10.	**I have been able to maintain the lifestyle changes for my health that I have made.**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
11.	**I know how to prevent problems with my health.**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
12.	**I am confident I can figure out solutions when new situations or problems arise with my health.**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A
13.	**I am confident that I can maintain lifestyle changes, like diet and exercise, even during times of stress.**	Strongly Disagree	Disagree	Agree	Strongly Agree	N/A

APPENDIX 2.2

Modified Clinician and Group version of the Consumer Assessment of Healthcare Providers and Systems (CG-CAHPS) Survey

1.	**In the last 12 months, how often did doctors and nurses at this clinic explain things in a way that was easy to understand?**	Never	Sometimes	Usually	Always
2.	**In the last 12 months, how often did doctors and nurses at this clinic <u>listen carefully</u> to you?**	Never	Sometimes	Usually	Always
3.	**In the last 12 months, how often did doctors and nurses at this clinic give you <u>easy to understand instructions</u> about taking care of these health problems or concerns?**	Never	Sometimes	Usually	Always
4.	**In the last 12 months, how often did doctors and nurses at this clinic seem to know the important information about your <u>medical history</u>?**	Never	Sometimes	Usually	Always
5.	**In the last 12 months, how often did doctors and nurses at this clinic show <u>respect</u> for what you had to say?**	Never	Sometimes	Usually	Always
6.	**In the last 12 months, how often did doctors and nurses at this clinic <u>spend enough</u> time with you?**	Never	Sometimes	Usually	Always

CHAPTER 3: FRONTLINE EXPERIENCES OF A PRACTICE REDESIGN TO IMPROVE SELF-MANAGEMENT OF OBESITY IN SAFETY NET CLINICS

3.1 ABSTRACT

Background

Low-income patients are among the most vulnerable to complications of chronic illnesses and safety net clinics may have limited resources to improve the quality of care. Expanding the support roles of medical assistants may be a viable option to improve patient self-management. We aimed to understand the barriers and facilitators to implementing this practice change to improve obesity management within three safety net clinics.

Methods

Interviewees were randomly chosen from three safety net clinics in northern California and held managerial, clinical, or staff roles. Interviews (n=21) were conducted during early implementation of practice redesign in spring 2012 and follow-up interviews were conducted six months later. The semi-structured interviews assessed individual experience of practice changes, patient care, and team development activities. Interviews were recorded, transcribed, then coded using ATLAS.ti.

Results

Individual experiences of program implementation varied by team member role and practice site. Medical assistants and non-physician clinicians were more likely to report barriers to change, including a lack of patient engagement and insufficient program resources. Respondents across roles were more likely to report patient engagement with the use of role modeling.

Discussion

The differing experiences of implementation by team member role underscore that stakeholders may perceive the same practice redesign very differently. Managerial support is important for change implementation in safety net practices. Multiple supporters may be needed for sustainability. Staff need sufficient time and resources to execute new roles to support obese patient self-management.

3.2 BACKGROUND

As the U.S. health care system has shifted its emphasis from episodic care to chronic illness care, the delivery of primary care has to be redesigned to more effectively meet the needs of patients receiving care in safety net clinics with resource constraints. (Coleman et al., 2009; Rothman & Wagner, 2003) The Chronic Care Model (CCM) developed by Wagner et.al. describes six different areas in which health care delivery can be modified in order to optimize care for chronically ill patients: delivery system design, self-management support, decision support, clinical information systems, health care organization, and community resources.(Coleman et al., 2009; Pearson et al., 2005) Most studies have evaluated the implementation of one or a few components of the CCM and those studies have mixed results about the relative effectiveness of CCM components in improving patient outcomes and quality of care.(Stroebel et al., 2005; Tsai et al., 2005; Wagner et al., 2001) Changes in delivery system design and self-management support, however, are most consistently associated with improvement in patient outcomes and quality of care compared to other CCM components.(Tsai et al., 2005)

We qualitatively compare the implementation of a primary care practice redesign across three safety net clinics in Northern California. Previous studies examined systematic changes to support patient self-management, including the use of health coaches and training of physicians to improve communication with their patients about goal-setting and behavior change. (Abramowitz, Flattery, Franses, & Berry, 2010; Bennett et al., 2009; Chen et al., 2010; Cifuentes, 2005; Levinson, Lesser, & Epstein, 2010b; Ngo, Hammer, & Bodenheimer, 2010) The participating clinics' leaders embarked on the practice redesign by training all staff and clinicians on motivational interviewing techniques to support goal-setting for physical activity

and weight loss. The intent was for clinicians and staff to use the communication techniques with obese patients, allowing patients to set their own health-related goals. As a part of the redesign, the clinics each implemented a pilot health coaching program, where participating patients were paired with a trained medical assistant to improve their physical activity and their physical health.

A quality improvement (QI) organization in the community provided technical assistance to the practice stakeholders to design and implement the practice redesign and health coaching program for obese patients. The practice redesign provided medical assistants with protected time to monitor patient progress each week through phone calls. These weekly phone calls also provided medical assistants with the opportunity to expand their role by providing additional care for patients. As health coaches, the medical assistants provided guidance and recommendations to patients on becoming physical active. The consultants recorded the staff training sessions to assist with the creation of a coaching handbook and utilized staff feedback to ensure that the program addressed staff concerns. Additionally, the QI organization assisted the practices with marketing the health coaching programs to patients, including developing and disseminating printed materials and buttons for staff to wear regularly. Prior to the implementation of the practice redesign and health coaching program, clinic staff underwent training, including sessions that emphasized: 1) benefits of exercise to combat obesity, including proper terminology to discuss obesity with patients; 2) resources for patients, including handouts, websites, and local places to visit; 3) agenda setting and goal setting with patients; 4) patient readiness to change and action plans; 5) techniques for motivational interviewing; 6) health coaching logistics; and 7) strategies and troubleshooting (i.e., tips and strategies for how to help patients to reach their goals).

The practice change was guided by principles of Bodenheimer's teamlet model of primary care because safety net physicians often do not have time fully address patient needs, especially when patients have chronic conditions.(T. Bodenheimer & Laing, 2007) The teamlet model of care employs other primary care staff to provide non-clinical services outside of the patient's visit with the physician, such as assistance with self-management skills. In a study by MacGregor et. al., safety net physicians reported a lack of time to work with patients on setting health goals and felt that other primary care team members could take on that role.(MacGregor et al., 2006) Working in tandem with physicians, the teamlet model entails an augmentation of medical assistant roles where medical assistants provide self-management support to patients through the use of motivational interviewing techniques, shared goal-setting, and regular telephone follow-up. Action plans, which have been associated with healthy behavior changes among patients, were used in conjunction with goal-setting.(Handley et al., 2006) For this study, all clinicians and staff were encouraged to bring up and discuss weight-related health issues with overweight and obese patients. If interested, patients could participate in a health coaching program where they would work with medical assistants to set physical activity-related goals. During the initial visit, the medical assistant and patient jointly developed an action plan that includes the patient's goal, steps to achieve their goal, the patient's level of confidence in the plan, and any barriers they may face in achieving their goal. The medical assistants called the patients weekly over an approximate 10-week period to monitor patient progress, offer encouragement, and revise goals, as needed. The health coaches also provided patients with community resources to help them identify opportunities to exercise.

The primary goal of this study was to understand the facilitators and barriers of implementing practice change within safety net clinics. We interviewed a sample of clinicians

and staff members from each clinic during the early implementation process and again six months later. The multiple interviews assessed how attitudes towards the practice change may change over time. The interviews included staff and clinicians from a wide range of roles in order to compare perspectives across clinic roles.

3.3 METHODS

3.3.1 Sampling

Initial contact with clinicians and staff members were made by practice leaders who circulated a staff memo regarding the interview study. Clinic leaders provided the research team with staff rosters for each clinic and categorized staff members by role: (1) administrator/manager, (2) physician or nurse practitioner, (3) medical assistant, (4) other non-physician clinician, such as a diabetes care manager or social worker. To prevent perceptions of being singled out for interviews, research staff contacted staff members in a random order until one interview was granted for each role at each of the three practices (see Figure 3.1). This study was approved by the Institutional Review Board (IRB#11-002771-AM-00007).

3.3.2 Data Collection

In-person and telephone semi-structured interviews were conducted during the early stages of implementing the practice redesign. Interviews each lasted between 30 and 60 minutes. As a token of appreciation, each participant was given a $10 gift card for each completed interview. The interviews covered the following topics: practice redesign and health coaching program implementation experiences, providing health care for overweight or obese patients, team development activities, and practice characteristics.

A total of 21 interviews were conducted, including 12 at baseline and nine at follow-up (see Table 3.1). For early implementation interviews, a total of 20 individuals were contacted for interviews and 12 individuals accepted and completed interviews (60 percent recruitment rate). Among non-participants, 75 percent of individuals did not respond to the recruitment email and 25 percent declined with specifying a reason. The recruitment rate differed by role, where physicians and nurse practitioners were the most difficult to recruit (44 percent recruitment rate). For the late implementation (six-month follow-up) interviews, there was a 75 percent recruitment rate of the early implementation respondents. The same interviewer conducted the baseline and follow-up interviews.

3.3.3. Data Analysis

All interviews were recorded and transcribed. The codebook was initially developed based on the key informant interview guide. Three researchers used qualitative research software ATLAS.ti to independently code two interviews each from a subset of three interviews (one from each clinic), so that each researcher was paired with each of the other two researchers to code the same transcript. The Qualitative Data Analysis Program's Coding Analysis Toolkit, web-based software compatible with ATLAS.ti, assessed intercoder reliability by comparing each of the pairs of coded transcripts and calculating kappa scores between coders. Due to low kappa scores, the researchers discussed coding discrepancies in order to reach consensus and then revised the codebook. The researchers continued discussions to reach consensus while coding, which improved kappa scores by 23 percent. ATLAS.ti was used to code the transcripts and then analyze patterns of practice change implementation for similarities and differences across clinics and across clinic team member roles. We focused on the major themes from within the interview

guide domains that related to facilitators and barriers to change, including team activities, patient needs, staff support for patients, and staff needs.

3.4 RESULTS

During baseline interviews, only two clinics (Clinics A and B) had begun the process of implementing the teamlet model. In contrast, Clinic C's leadership decided to extend the planning stages to have an opportunity to test their health coaching skills among staff members first (see Table 3.2). Respondents at Clinic C also expressed frustration that their clinic has not been able to tailor prior systematic changes to fit their clinic, which is smaller and geographically isolated from the other clinics. An administrator said, "We can [implement changes] fairly quickly…but when they try and roll it out to the other clinics that are bigger than us, it's not as successful…and then not only is [the change] shut down for [the other clinics], they shut us down." Staffing issues created uneven program implementation across sites throughout the implementation time period. The main practice changes included staff training on new approaches to patient care as previously described and protected work time for medical assistants to follow up with patients about their health goals. The perceived level of implementation of these changes often varied even within clinics, with particular disagreement about whether the allotment of protected time was sufficient for health coaching (see Table 3.3). Between the early and late implementation interviews, two of the clinics experienced major staffing shortages that directly impacted staff perceptions of the program and the program itself. The staff changes were most pronounced at one clinic, which saw the departure of a program champion, a clinic manager, and some health coaches. The other clinics experienced relatively minor staff changes. The integration of new staff members untrained in the health coaching model made it difficult

for the model to be sustained (see Table 3.2). For the follow-up interviews, participants' responses were generally briefer and the overall tones of many interviews indicated more tension. One clinician noted, "…and I think we are more and more stressed. I think all of us just try to get through a day, and I think it's been tough. I think the few moments we think about it [the practice change], it's great, and we say, 'oh yeah, we're going to try to talk about patient-centered [care]' but it hasn't been a focus. It just hasn't."

3.4.1 Team Activities

Early versus Late Implementation

The use of team activities such as team huddles was inconsistent across roles and clinics, during early and late implementation, which may have impacted the level of communication among team members to implement the redesign to improve the management of obesity. When comparing clinics, all respondents within one clinic described team huddles in positive terms, while respondents at the other two clinics identified some specific issues with team activities. However, two clinics identified some specific team issues with team activities. Respondents at one clinic described communication issues within their newest medical home team (which is one of two within the clinic). An administrator said, "They're so focused on doing things non-stop but they still cannot be efficient because they are not communicating or they're not being good team players. The [members of the other team] are very good team players and the other [team] isn't." The other clinic's respondents described the inconsistency of some team members attending team meetings. "Oh yes, [team huddles have] been extremely useful…there's only, there is a caveat and…it's not our entire team. Sometimes it's two-thirds of our team, sometimes it's half of our team because the providers, the PCPs are not there. ..it's a cultural issue…they're

not all present, so that's a little disappointing," said a manager. Within the same clinic, one physician commented, "To be honest with you, I don't attend very many huddles and the ones I have [attended] recently, I don't feel like I'm being told anything that is going to make a difference in my day."

Comparison by Roles

Across roles, medical assistants and managers tended to view team huddles as a valuable use of time, while not all physicians agreed because they felt that some meetings did not directly impact them. Most participants felt that clinicians and staff worked well together and that everyone felt free to communicate their opinions during staff meetings and other interactions. Multiple interviewees across clinics also mentioned a lack of clarity or communication about program goals, which may have also affected its implementation. While the leaders felt they were clear about the program intent and direction, the medical assistants and some other clinicians did not express the same views. One medical assistant said, "I was talking to one of the [physicians] the other day, so this is a ten-week program. After the ten weeks what do we do? Do we just leave these patients or do we help them get onto something?"

3.4.2 Patient Needs

Early versus Late Implementation

Interviewees consistently used the term "patient motivation" as an important component for medical assistants to provide extended patient care through health coaching during both interview time periods. In the early implementation interviews, participants expressed more confidence both in their ability to motivate patients and the potential for the change to be well-received among patients. Many staff indicated that physicians selected more highly motivated

patients to participate in health coaching, but did not mention any specific screening tools to measure patient motivation. A medical assistant shared, "The doctor will suggest [the health coaching program] if you want to lose weight but they only refer the patients that are a little bit more motivated than others. I think…it's about the motivation and [patients'] willingness to actually make a change in their own lifestyle."

During the late implementation period interviews, medical assistants expressed that some patients did not seem motivated to change their physical activity level. Another medical assistant said, "I think some patients didn't realize what the whole program entailed. I think initially they were initially motivated, but after a couple of weeks, they just lost their motivation." Some patients were initially excited about the program but eventually left the program due to reasons from decreased motivation to other major life changes. One physician said, "Several of my patients have had other life events happen. Their parents got sick. They had transportation problems. There was some other issues, so they just couldn't focus on it, but most patients, they're very open to the idea." Some medical assistants noted that some of the patients may not have actually been ready for behavior change from the beginning. One medical assistant said, "And Dr. […] would remind the group by saying, listen, you know, it's their goal, you know, it's their motivation basically. We're kind of just cheerleading the effort, but we cannot make them do stuff. So kind of letting go [of expecting patients to always meet their physical activity goals], I think that was another challenge." Across clinics and roles, interviewees reported that patients still weren't connecting their health behaviors to their overweight or obese status, which made it difficult to progress in the health coaching program.

Comparison by Roles

Most respondents across roles reported positive patient responses from the extended role of medical assistants, sometimes providing the intended support to help patients increase their physical activity. One medical assistant said, "I spoke to one of my patients the other day and he said he feels good that I call him every week and he's motivated to make sure he's doing something because he knows I'm going to call him the following week. So for some patients it's helping them move, knowing that somebody cares and knowing that somebody's going to call and check up on them to try to do what they signed up for or what they've agreed to do." Another coach noted that "…we're also offering social interaction, which a lot of our patients need, so they like that social interaction, also, that piece that someone's actually calling them to check on them and to see, you know, how they're doing." A number of coaches indicated that some patients looked forward to their scheduled phone visits, but mainly for social support rather than technical expertise. One physician noted, "What I heard from our medical assistants was that sometimes they felt that the patients just wanted to talk or chat…and [the medical assistants] would say 'it's so hard to get them back to what I'm calling them for'."

Staff and clinicians across roles frequently emphasized their sensitivity to overweight and obese patient concerns about their weight during both the early and late implementation periods. Initially, most participants expressed concern that the subject of obesity might be too delicate to broach during a regular appointment. A manager described an incident that made staff uncomfortable approaching patients: "[A] patient called me and complained about one of the staff and this is during a blood pressure check visit with a nurse and she called me very upset and said, 'The nurse told me that I am fat.' So that alone, I think, draws a wall right away…It got her very upset and she refused to see the person again. So…how do you present [the subject of weight] to patients that they will be more open to it without being offensive?" Staff and

clinicians' choice of words or actions during any point of interaction with obese patients can have unintended consequences. A medical assistant described her frustrating experiences of communicating with obese patients: "…I had this obese patient. She wasn't even obese, she was just a little bit overweight. I told her that I had to change the blood pressure cuff to a bigger cuff. She got offended because she thought I said she was overweight, that she was fat. I just said, we just need to get a bigger blood pressure cuff, we have to get the correct one for your arm, I didn't say she was [fat]. She took it the wrong way. They just think that everybody's calling them fat and stuff. It's not like that."

3.4.3 Staff Support for Patients

Early versus Late Implementation

From the beginning of the practice change and several months later, respondents' concerns were less about whether patients would accept increased services from medical assistants, but more about whether staff could relate to overweight or obese patients and support this change. One clinician expressed concern about how patients would receive advice about physical activity or counseling from physicians that did not appear to have or understand problems with weight management, stating, "I don't think any of our physicians here are obese. They're all pretty fit. Our patients are huge, some of them, so they don't feel like physicians can understand. The same thing happened with our fit group. My intern, she was very tall, thin, she said she's never had any weight problems in her life, and the patients would say, well, how would you know about us?"

Comparison by Roles

Although staff and clinicians were not asked to make lifestyle changes while serving as health coaches to their patients, interviewees that did so reported positive experiences. Staff members in all roles that shared their own weight-loss or exercise struggles with patients reported more positive relationships with patients and also felt they impacted the patient's attitude towards their own struggles with weight-loss or exercise. A medical assistant shared, "They see me at my 216 pounds that dropped down to my 149 pounds and it's not because I went to the gym every day for an hour a day. It was just simply watching what I ate, doing my meals in portions and yeah, exercising has a lot to do with it also, even if it's just a quick walk around the block. So I think for them to see it actually really happen…I think that it helps them be more determined." Another medical assistant mentioned, "…when I started the coaching program, I felt that I had to do something myself…so I started using the stairs instead of the elevators so that when I talk to these patients I don't tell them to do this and not doing it myself...I was talking to one of [the patients] the other day and she said I hope you are doing some exercising, too, because you're my model. I'm like, yeah, I'm doing [it]. I felt good about that one, I started something just from the coaching program, I was able to do something for myself, too." Clinic C delayed the implementation of the practice change to use that role model approach and give the staff a chance to practice the healthy behaviors and recommendations they might make to patients who are trying to meet health goals. An administrator said, "[Staff should] role model the behavior and…[have] anecdotes [about healthier behaviors] that they use for themselves and share a good recipe that's a low-fat recipe or [offer healthier food substitutions]."

3.4.4 Staff Needs

Early versus Late Implementation

Despite the local support for change, the lack of higher-level administrative support to implement change was an obstacle for the practice redesign across all three practice sites. Coincidentally, the launch of practice redesign coincided with an organizational policy decision that primary care physicians needed to have encounters with five additional patients per day. The additional patient care was thought to increase the pace of individual encounters for clinicians and increased the workload for medical assistants, complicating the implementation of the redesign changes. A manager said, "In fact, just recently…our expectations of the number of patients that are to be seen in one shift has gone up to ten patients in each shift…providers are already feeling the pressure of needing to see more patients. The [medical assistants] are feeling it, too. And so, all of this happened simultaneously, the implementation of this project, increasing number of providers visits, both of these major changes in our Internal Medicine services happened around at the same time. So it will be very interesting to see how, what is it needs to be done for us to be able to sustain?" Initially, clinic leaders and staff were generally supportive of the practice redesign to support obese patients' goal-setting. One clinician said, "Initially [the medical assistants] said you know, we have so much to do already, how are we going to fit this in? But…as they've been doing it, they find that it's not too much of a time commitment, so they're not complaining as much as they did initially."

By the late implementation interviews, the participating clinics endured significant clinician and staff turnover and frustration among remaining staff. Medical assistants at the two clinics which had begun the practice change resumed their previous roles, where they did not spend additional time with patients to work on goal-setting. Many participants shared their views

on how to approach future practice redesigns. One non-physician clinician said, "I think that if we were to do this again, somebody has to kind of keep people on track. Just like we intend to do the same thing with our patients, somebody has to do it for us and people feeling not overwhelmed or like, 'oh my God, I didn't do it' or 'oh God, I have to stay late and do this.'" Even during early implementation, health coaches did not always express having the resources they needed, such as sufficient time with patients or dedicated phone lines to use, although clinic leaders and physicians did not report awareness of these issues. Health coaches were given protected clinic time to contact their patients each week, but patients did not always answer the phone at the appointment time. Moreover, health coaches did not always have a direct number or voicemail for the patient to more easily return the call. Unanticipated staffing changes due to absences or coverage during times of high demand also meant that protected clinic time was frequently unavailable to staff.

Comparison by Roles

In contrast to the lack of administrative support, support from leaders within the clinic influenced the enthusiasm and support for change from staff and clinicians. Respondents at all three clinics described appreciation for the resources as well as the visible support from leaders. One medical assistant reported, "[The health coaching buttons are] a nice thing because sometimes when we're rooming the patients they actually see the button and then they start to ask questions, 'So what is a health coach?'…I tell them I'm the health coach. I can help you try to either get more exercise in or eat better and if you're interested go ahead and ask the doctor and if they are, they do bring it up to the doctors, too." A medical assistant at another clinic shared, "[Our clinic leader] joined the [health coaching] team, too, and [the leader is] doing [their] part and going to the meetings that [the leader] can. [The leader is] really supporting this

project." However, having an enthusiastic leader did not always translate into full staff support. One physician noted, "[Clinic leaders] have been supportive, but I think it's just been a lot of personal time constraints as to whether or not people can get [to meetings]." Moreover, the absence of the leader also impacted staff enthusiasm for change. One non-physician clinician mentioned, "[The clinic leader] was the one that really led this project. [The leader] shared with us the statistics about the benefits of increasing physical activity…[The leader] was really excited about it. I think that you kind of jump on the bandwagon as a staff member, but the problem is that [the leader] wasn't always there."

3.5 DISCUSSION

Implementing the teamlet model within these safety net clinics was met with some successes and challenges. One major challenge for all of the clinics was the constraint on time and resources for medical assistants, an issue which has also been reported in similar quality improvement studies within safety net clinics.(Ferrer, Mody-Bailey, Jaen, Gott, & Araujo, 2009; Ngo et al., 2010) There was insufficient protected time for medical assistants to coach their patients each week, partly because of the increase in productivity (in terms of patient volume) and in at least one clinic, also because of the lack of voicemails for patients to leave messages for their coaches. Since the primary care reimbursement system relies on productivity, this issue is likely to be a factor in any future primary care practice changes.(T. Bodenheimer & Laing, 2007) However, since the 2007 National Ambulatory Medical Care Survey indicated that over half of all office visits were for patients with at least one chronic condition, primary care clinics need to be able to effectively manage these patients efficiently. (Hsiao, Cherry, Beatty, & Rechsteiner, 2010) In addition to providing all of the necessary resources to facilitate communication between

health coaches and patients, one possible solution is to follow Bodenheimer's suggestion to build teamlets with one physician and two health coaches. This may compromise continuity of care, but will likely allow for patients to receive care as needed.(T. Bodenheimer & Laing, 2007)

Despite those constraints, one of the facilitators for change was leadership support for the teamlet model within the clinic. Previous studies have demonstrated the importance of program champions support from mid-level or top-level managers in order to carry out and support the practice change.(Berenson et al., 2008; Crespo & Shrewsberry, 2007; Ploeg, Davies, Edwards, Gifford, & Miller, 2007; Wang, Hyun, Harrison, Shortell, & Fraser, 2006) Respondents across the clinics described support from leaders within their clinics, although when the leadership was absent, the staff's enthusiasm for change also dissipated. In this situation, the clinic leaders played significant roles in supporting the practice change, to the point where the departure of one clinic's leader led the staff to revert to the original practice design. Future changes should ideally have more than one program champion to prevent the absence or departure of one to significantly hinder any progress.

Although not the focus of this study, another key factor that supported the clinic's transition to the teamlet model was the staff support for the patients through role modeling. In Ferrer et.al.'s randomized control trial, medical assistants who screened patients for risky health behaviors reported discomfort with their role in providing health information on subjects such as weight loss to patients when they didn't practice those healthy behaviors themselves.(Ferrer et al., 2009) The first two clinics that implemented the practice redesign found that patients tended to be more receptive to making physical activity goals and meeting them if their health coach had either previously or currently made their own physical activity goals as opposed to health coaches who had never experienced the need to make changes in their health behavior. A study

of health workers within community clinics has shown that this strategy of role modeling health behavior has been shown to be more effective than just discussing the behavior with patients.(Goh, 2012) Future studies can assess this type of strategy with the teamlet model, since there are multiple team members who may serve as role model(s) and specific clinical skills are not required.

These results were shared with the clinics for feedback and to ensure face validity, as well as to provide recommendations for training and resources. In general, suggestions included more guided training for staff and clinicians that continued during the early stages of practice change to allow for extended practice of health coaching techniques and opportunities for feedback about their coaching experiences. These training sessions would also include time for staff and clinicians to understand and sensitively address situations where overweight or obese patients may perceive staff members to be making judgments about their weight. Interviewees described structured training sessions prior to the practice change and the opportunity to discuss ongoing issues during regular staff meetings during the practice change, but a structured setting to address specific issues related to the practice change will likely yield more opportunities to fine-tune the changes.

This recommendation could also address the communication issues mentioned by interviewees, mainly regarding a lack of clarity on the overall goals and duration of the practice change. Across clinics, interviewees mentioned a lack of consistent staff attendance at team huddles and regular team meetings with the full team present, which likely contributed to communication issues among staff. Although staggered staff schedules and full clinic schedules may present obstacles to additional meetings that are fully attended, alternatives such as meeting

minutes or the use of a staff intranet message board could help to facilitate communication outside of the meeting time and to include those who miss the meetings.

One key resource is sufficient staff to support the practice change because it affects the implementation process in multiple ways. The program champions at each clinic helped to support changes and counteract the impact of administrative policy change to increase daily patient volume. However, it is recommended that each clinic have multiple program champions per site given the nature of busy schedules and staff turnover. If possible, having two medical assistants per physician or just pairing two medical assistants to coach each patient might help to alleviate the issues with allowing protected time for health coaching and having enough phones and voicemails for the health coaches.

There are some limitations to note in this study. The results may not necessarily reflect the views of all clinic staff and clinicians, although individuals were randomly selected across clinics to avoid potential bias from only getting opinions from those willing to participate and perspectives from a wide range of different roles are represented. A few follow-up interviews were not captured due to staffing changes and timing issues, but the majority of individuals were available for follow-up. Although it would have been ideal to have captured everyone's opinions at both time points, the interviews still included all three clinics and all types of roles. Moreover, the staffing issues themselves are indicative of some of the challenges with making changes within practices in safety net clinics.

3.6 CONCLUSION

The implementation of a teamlet model within safety net clinics to improve patient health may be feasible, but the composition of the teamlet may need to be modified for financial

sustainability. Given the high primary care demands at safety net clinics, it is important to find new ways to efficiently deliver care in a manner that is also effective for patients. Future change efforts should have support from different levels of management and staff, preferably championed by multiple people to aid the sustainability of the change in the face of staffing changes. The strategy to have health coaches serve as role models for patients may be a useful tool to improve patient health behaviors.

Figure 3.1 Sampling Frame

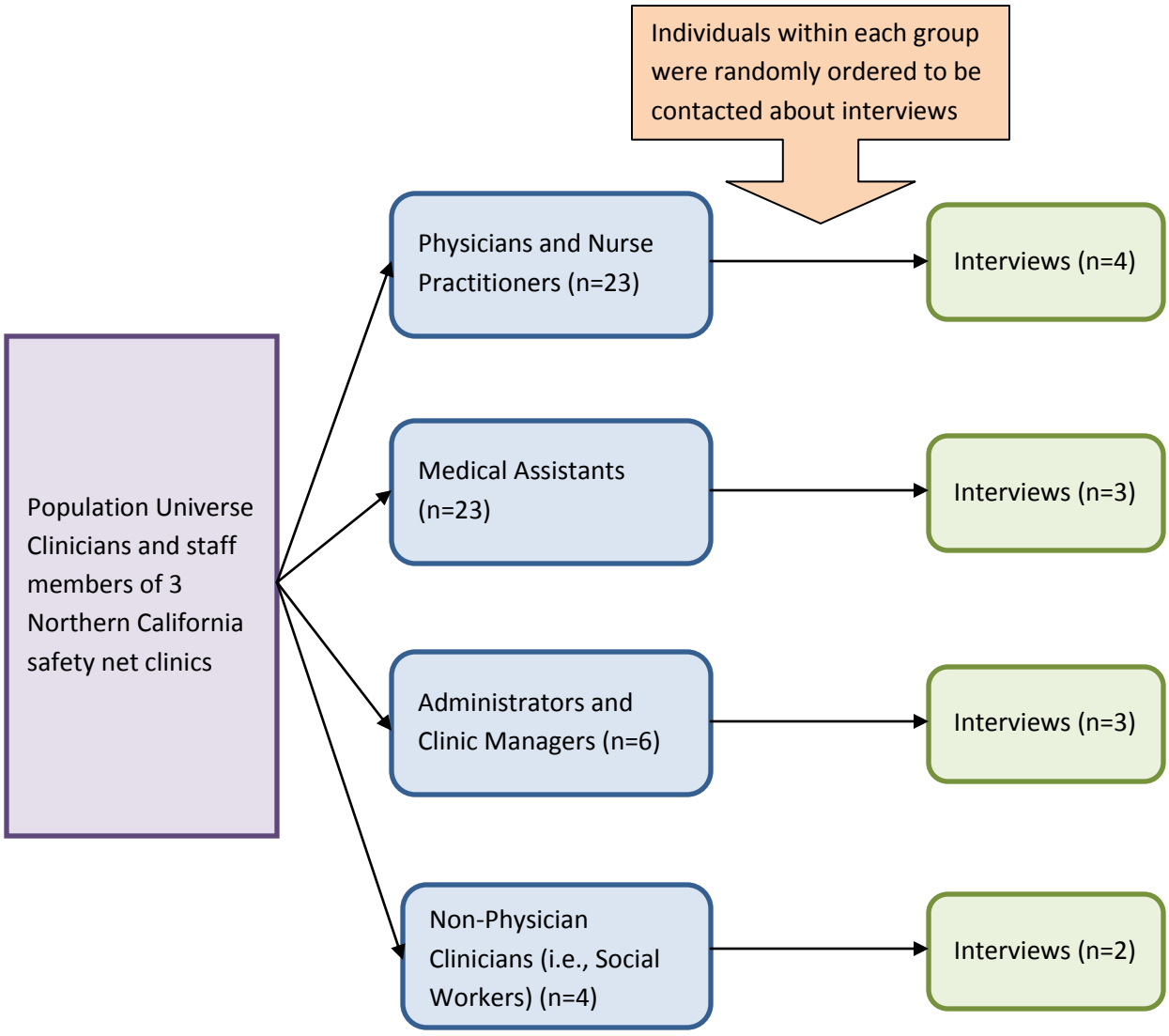

Table 3.1 Overall Staff and Clinician Population

Role	Overall Number of Employees	Total Number Interviewed	Baseline Recruitment Rate	Follow Up Recruitment Rate
Administrator/ Manager	6	3	100%	33%
Physician/ Nurse Practitioner	23	4	44%	100%
Medical Assistant/ Licensed Vocational Nurse	23	3	75%	67%
Other Non-Physician Clinician	4	2	75%	67%

Table 3.2 Program Implementation Changes by Clinic

	Clinic A	Clinic B	Clinic C
Medical assistants actively coaching patients each week			
Baseline	Yes	Yes	No
Follow Up	No	No	Yes*
Medical assistants trained as health coaches			
Baseline	Yes	Yes	No
Follow Up	Yes	Some	Yes
Program resources available for health coaches			
Baseline	Yes	Yes	No
Follow Up	Yes	Yes	Yes

**pilot program for staff, not patients*

Table 3.3 Experience of Program Implementation During Early and Late Intervention Phases

Program Detail	Implementation Phase	Examples
Protected time for health coaches to contact patients	*Early Implementation*: Although all respondents acknowledged that health coaches had protected time to coach patients, there was no consensus about whether it was actually available.	"So initially for me, I did have a protected time…but then now that more people are involved, not all of us can get protected time and just recently there have been a lot of staffing issues so now it's just we call them during downtime whether it's right after we get in from lunch or just even in between patients."
	Late Implementation: Interviewees described a lack of time to coach patients as a major barrier, whether it was due to staffing issues or an otherwise increased patient load.	"But, again, the issue is just the time to do it. I think that's the most frustrating for them[health coaches] is trying to find time in the midst of their busy day to get these things done and try to focus and then to make a phone call at different times when people may or not be there. It's been very hard for them finding time to make the phone or when they call, to find that their coachees, whether they're at home or whatnot."
Program resources for health coaches	*Early Implementation*: Respondents described the availability of training materials, but also the lack of other resources.	"That's one of our big obstacles right now that I've noticed…we haven't gotten a hold of our patients and when they call back we don't have a direct number to give them. There's no voice mail, so if we're not at our desk so it's really hard."
	Late Implementation: While resources such as a binder of reference materials were deemed helpful, others mentioned a lack of program incentives and sufficient coaches for patients.	"The binders were extremely helpful. I think the motivational training interviewing was extremely helpful and being able to use the action plan, I think, was extremely helpful because it made it more concise and it made it more specific. They could stick to the goals and they could stick to the conversation and the actions and the goals that the patient had."
Training for health coaches	*Early Implementation*: Respondents responded with mostly positive comments about the training available for staff, although some did not feel it was sufficient.	"We had different scenarios how you talk to a patient. We tried role-play with other staff during our meetings. We did have intense training about how to go about the whole thing and we had input and suggestions from other staff members before we started the program."
	Late Implementation: Respondents wanted more structured training and described a need for additional training sessions for new staff.	"Right now no amount of coaching is going on at our clinic because the other staff didn't want to do it, one of the staff moved, so there's just two of us. So I think they need to train more people, get more people into the program and see how much more we can help the patients that are really interested."

CHAPTER 4: IMPACT OF PATIENT ACTIVATION ON PATIENT CLINICAL OUTCOMES AFTER SAFETY NET CLINIC PRACTICE CHANGE TO IMPROVE PATIENT SELF-MANAGEMENT SUPPORT

4.1 ABSTRACT

Background

Since the needs of an aging, chronically ill population are not likely to be met by the current primary care delivery system, clinics are testing innovations to improve patient self-management skills to more efficiently provide care. Although self-management has shown effectiveness in improving patient outcomes, it is not clear whether this holds true in diverse populations. We examine the relationship between patient activation and patient blood pressure and weight over time among obese patients of safety net clinics.

Methods

Three safety net clinics implemented practice changes to help obese patients to improve their self-management skills. A random sample of these patients received questionnaires during the early implementation of the practice redesign and again six months later. The analytic sample only includes patients who responded to both questionnaires (n=137). These data were merged with three years of clinic administrative data on patient blood pressure and weight.

Results

There was a significant relationship between patient activation and all three outcomes: systolic blood pressure, diastolic blood pressure, and weight. Compared to individuals in the lowest level of activation, the most highly activated patients tended to have lower systolic and diastolic blood pressures, by 9.884 mmHg and 3.837 mm Hg, respectively ($p<0.001$), although

this difference was reduced in the presence of comorbidities. The most highly activated patients weighed an average of 2.108 pounds less ($p<0.01$) than those in the lowest level of activation, although the effect of comorbidities reduced this difference. Practice redesign was associated with a 1.033 mm Hg increase in diastolic blood pressure. The effect of practice redesign on patient activation created a net decrease in diastolic blood pressure for individuals in the two highest levels of activation and augmented the increase in diastolic blood pressure for individuals in activation level two, relative to activation level one.

Discussion

There was a significant relationship between patient activation and systolic blood pressure, diastolic blood pressure, and weight. The directions of these relationships varied by activation level and were moderated by the effect of comorbidities. Practice redesign only had a significant impact on diastolic blood pressure, perhaps because the redesign had only been in effect for a relatively short period of time.

Conclusion

The relationship between patient activation and clinical outcomes can be useful for patient self-management programs. The differential effect of comorbidities on patient activation is worth further exploration.

4.2 BACKGROUND

Primary care in the United States is facing a number of challenges: an aging population with chronic conditions, a shortage of primary care physicians, and a subpar reimbursement system.(Coleman et al., 2009; Rothman & Wagner, 2003) Many research studies have looked to Wagner's Chronic Care Model (CCM) to make systematic changes to the current primary care system to better address current needs.(Coleman et al., 2009; Hroscikoski, 2006; Pearson et al., 2005; Tsai et al., 2005) One of the more well-studied components of the CCM is patient self-management support, or providing patients with the skills to take a more active role in managing chronic conditions.(T Bodenheimer et al., 2002; Fowles et al., 2009; Rittenhouse et al., 2011; Shortell et al., 2009) To provide patients with self-management support, strategies have included the use of motivational interviewing by clinicians and team-based care using non-physician team members to extend the physician's role in patient care.(Abramowitz et al., 2010; Chen et al., 2010; Cifuentes, 2005; Levinson et al., 2010b; Ngo et al., 2010) These strategies have been linked to positive patient outcomes for conditions including depression, diabetes, and high blood pressure.(Rothman & Wagner, 2003; Tsai et al., 2005; Walsh et al., 2006)

Low-income patients are disproportionately affected by chronic conditions, meaning the safety net clinics that serve them must find cost-effective ways to provide primary care and chronic disease management. Poorly managed chronic conditions can lead to severe and costly health consequences.(Barr et al., 2003; T Bodenheimer et al., 2002) For example, uncontrolled high blood pressure can create arterial damage, blood clots, and excess strain on the circulatory system, which can then lead to emergencies including heart attacks, strokes, and kidney damage.(AHA) (2013) Many of these chronic conditions are linked to obesity, which itself increases health risks. Individuals considered overweight or obese have a greater risk for chronic

conditions such as diabetes, high blood pressure, and coronary heart disease.(Division of Nutrition, 2011) We surveyed patients at safety net clinics that were in the process of implementing self-management support strategies based on Bodenheimer's teamlet model.(T Bodenheimer et al., 2002) The clinics redesigned their practices by creating teamlets of one medical assistant per physician to improve the primary care of patients. The medical assistants focused on improving the physical activity levels of the patients through shared goal-setting and motivational interviewing techniques. The structured support system included regular phone calls from the medical assistants and the connection to clinic and community resources for physical activity. This type of self-management support is also intended to increase patient activation, or their belief in their ability to take charge of their own health.

This study explores the relationship between patient activation and clinical outcomes over time among low-income patients at these safety net clinics. Specifically, this study examines how well patient activation can predict systolic blood pressure, diastolic blood pressure, and weight (see Figure 4.1). Systolic and diastolic blood pressures are the primary outcomes of interest because changes as small as two mm Hg in blood pressure are linked to reduced risk for adverse events such as strokes and transient ischemic attacks.(Bennett et al., 2009; Walsh et al., 2006) Additionally, these three relationships will be compared before and after the implementation of practice changes in order to assess the effect of increased patient self-management support on patient activation and patient clinical outcomes.

4.3 METHODS

4.3.1 Sample Population

A random patient sample (n=393) was drawn from the three safety net clinics' administrative databases. Inclusion criteria were aimed at patients that were most likely to be exposed to clinical practice change due to regular visits (at least two in the past calendar year), likely to be targeted for health coaching [body mass index (BMI) of 30 to 34], and age 18 and over. Exclusion criteria included pregnancy in the last year, cancer, and uncontrolled diabetes (the sample does include those who are currently treating their diabetes). These conditions were excluded because of their likely impact on patient weight outside of a patient's control. Of the original sample of 393 patients, 8.4 percent of baseline questionnaires (n=33) were returned due to invalid addresses, resulting in an adjusted baseline response rate of 55 percent (n=198). Of the 189 baseline respondents who consented to a follow-up questionnaire, there was a response rate of 72 percent, yielding a total of 137 respondents for this study (see Figure 4.2).

4.3.2 Study Design

This survey merged two datasets together to better understand patient perceptions and outcomes in relation to the practice redesign. In addition to the information from patient questionnaires, clinic administrative data from a three year period (2010-2012) were also obtained for the sample population. These data included gender, age, clinic visit dates, weight, systolic blood pressure, and diastolic blood pressure. These data are from multiple years so there are several measures of weight, systolic blood pressure, and diastolic blood pressure.

The patient questionnaires assessed their perceptions about their clinic experiences and their health. Baseline questionnaires were mailed in three waves to eligible clinic patients during the early implementation period in April to June 2012. Six months later, follow-up

questionnaires were mailed to baseline respondents, also in three waves. For both baseline and follow-up questionnaires, the first mailing included a $10 gift card as a token of appreciation. Questionnaires were mailed in both English and Spanish languages, depending on patient preference. In order to maintain patient privacy, patients were assigned random identifiers which were then used to label the surveys, which the clinics mailed out themselves. However, in order to keep the survey results confidential from the clinic staff and clinicians, completed surveys were mailed directly to the researchers without any personal identifiers.

4.3.3 Measures

The patient questionnaire included questions about patient experiences with clinicians, exercise behavior, patient activation, general health, diet, chronic conditions, and demographic information. Spanish translations were already available for measures on patient experiences, patient activation, Medical Outcomes Study 12-Item Short Form Version 2 (SF-12v2), height, weight, diet, language preference and education.

4.3.4 Primary Predictor Variable

The Patient Activation Measure (PAM) was developed by Hibbard, et al., as a way to quantify patient activation and assign patients to four different levels of activation based upon their scores (see Appendix 2.1).(Hibbard & Mahoney, 2010; Hibbard et al., 2005; Hibbard et al., 2004) Patient activation has been associated with positive health behaviors such as aerobic exercise and receiving preventive cancer screenings, as well as more favorable emotional health.(Chubak et al., 2012; Greene & Hibbard, 2011; Munson et al., 2009) This 22-item measure has been validated in different populations and has been shown to be reliable (α=0.94).(Chubak et al., 2012; Hibbard et al., 2005; Hibbard et al., 2004; Munson et al., 2009) The levels of activation are similar to the Transtheoretical Model, in which individuals move

through different stages of change before changing a specific behavior, such as quitting smoking.(Johnson et al., 2008) Individuals are thought to move through these stages in order, although stages may change with time and stressful circumstances could even lower patient activation.(Chubak et al., 2012; Hibbard et al., 2004)

Patient activation was measured as a composite score on the PAM-13, which is the short form of the original PAM, but has been validated against the original 22-item scale.(Hibbard et al., 2005) The PAM-13 uses four Likert-scale responses for each question: strongly disagree, disagree, agree, and strongly agree. The responses are totaled to then categorize the overall responses into a 4-part ordinal variable, representing levels of activation. The lowest of level of activation indicates that an individual is a passive participant in health care decisions, just following what is prescribed by clinicians. The second level of activation is where an individual has the knowledge and confidence to take a more active role in their health care, but they have not yet acted on it. The third level of activation involves the patient playing an active role in making health care decisions with their clinicians. The highest level of activation describes a patient who has the knowledge and confidence to take action about their own health care, even during times of stress.(Hibbard et al., 2004)

Interaction Terms

Two interaction terms were created: one to represent the effect of the practice change on patient activation and the second to represent the effect of comorbidities on patient activation. The indicator variable for practice change was coded to represent the time of implementation of practice change for each clinic. Using information from staff and clinician interviews, as discussed in the previous chapter, the clinics each started the practice change at different time points over the three-year time period: 26 months, 27 months, and 31 months.

4.3.5 Primary Outcome Variables

Blood Pressure

The main outcome of interest is blood pressure, evaluated separately as systolic blood pressure and diastolic blood pressure. Systolic blood pressure measures arterial pressure as the heart is contracting (beating) to circulate blood throughout the body, while diastolic blood pressure measures arterial pressure while the heart is resting and filling with blood. Blood pressure is considered within a normal range if systolic blood pressure is less than 120 millimeters of mercury (mm Hg) and diastolic blood pressure is less than 80 mm Hg. The threshold for stage one high blood pressure is a systolic blood pressure of 140mm Hg or a diastolic blood pressure of 90mmHg. Blood pressure readings that are higher than normal but below this threshold are defined as pre-hypertension.

Blood pressure is considered an important outcome when assessing the effects of physical activity because even modest increases in physical activity levels have been shown to reduce systolic blood pressure (Duru, Sarkisian, Leng, & Mangione, 2010) and diastolic blood pressure.(Lara et al., 2008) Additionally, changes in blood pressure can be seen within six months of increased physical activity (Duru et al., 2010), so it is considered to be a clinical outcome that can change more quickly than other clinical outcomes. Patients had repeated measures of blood pressure over the study period; blood pressure was measured at every clinic visit. The use of repeated measures for blood pressure is important because blood pressure is variable over time and multiple observations help to determine individual blood pressure patterns. In an attempt at consistency of measurements, the regression models used the last blood pressure reading of each calendar year for each patient.

4.3.6 Secondary Outcome Variable

Weight

Weight is examined as a secondary outcome because it will be impacted by changes in physical activity. Since the sample population was selected within a specific range of BMI values, there will be more variability for weight measurements than BMI. Additionally, changes in weight are more likely than changes in BMI over a three-year period. Even small increases in physical activity can provide a modest reduction in weight, as demonstrated by employees in a research study who averaged a two-pound weight loss after year-long participation in 10-minute exercise breaks.(Lara et al., 2008) Like blood pressure, patient weight was measured during individual clinic visits. The regression models used the last weight measurement of each calendar year for each patient.

4.3.7 Control Variables

Patient Experiences. One recent study by Alexander, et al., also found that higher levels of activation were related to more highly rated relationships with personal care providers. This finding is important because patient self-management programs may need to begin with a stronger relationship between patient and provider.(Alexander et al., 2012) Patient experience with clinic staff and providers is important to help determine the nature of the patient's perceived relationship with providers. Although this is a subjective measure, it is the patient's view of the provider that can impact whether the patient is receptive to the provider's medical advice or whether the patient feels comfortable voicing their opinions. A series of questions were adapted from the Clinician and Group version of the Consumer Assessment of Healthcare Providers and Systems (CG-CAHPS) survey (see Appendix B) to assess provider communication skills.(Anastario et al., 2010; Browne et al., 2010) These responses to these questions were re-

scaled and summed to create a single composite measure, where higher scores indicated a more positively-rated provider communication skills. Patient trust in physicians and nurses is measured in a single-item question, which is a modified version of the short form of the Wake Forest Physician Trust scale.(Hall et al., 2002)

General Health. Patients were asked to rate their general health and also about any limitations to their daily activities due to emotional or physical health issues, which is from the SF-12v2, a measure that has been previously validated as a measure of overall health.(Jenkinson et al., 1997) Patients were also asked a question from the Ambulatory Care Experiences Survey that asked if they had ever received a diagnosis of eight different chronic conditions such as diabetes.(Rodriguez et al., 2007; Safran et al., 2006)

Demographics. The questionnaire also included questions about patient demographics, including level of education, race and ethnicity, and primary language spoken at home.

4.3.8 Data Analysis

The two datasets (questionnaire and clinical) were merged based on random identification numbers assigned to each individual. Multilevel models were estimated for each of the three outcomes using random intercepts. In order to assess the effect of the practice change on patient activation over time, an interaction term was included in each model to assess if main effects were significant. The predicted margins of each outcome were plotted against patient activation. Analyses were conducted on Stata 11.2 and graphs were plotted on Stata 12.

4.4 RESULTS

Overall, there were no significant differences between the baseline and follow-up respondents (see Table 4.1). The majority of respondents (69 percent) were female and the mean

age of respondents during the follow-up period was 50. Spanish-speaking Latinos were the largest racial/ethnic group represented (37 percent at baseline and 38 percent at follow-up). Of the different categories for educational background, the largest proportion (34 percent) of respondents had less than a high school education. More than 60 percent of respondents reported have at least two chronic conditions. Hypertension was one of the most commonly reported chronic conditions and although the proportion of hypertensive respondents dropped at follow-up, the difference was not statistically significant. The average patient activation score is four points lower at follow-up, but the difference is not statistically significant. At follow-up, larger proportions of respondents scored within the lower two levels of activation, but fewer scored within activation level three (see Table 4.2). These differences were not statistically significant. When comparing mean clinical outcomes for each year, there were small but statistically significant differences, primarily between the second and third years (see Table 4.2).

4.4.1 Systolic Blood Pressure

There was no significant effect of practice change on systolic blood pressure. However, there were significant differences between patient activation levels and systolic blood pressure. Relative to the lowest level of patient activation, individuals in activation level two averaged 7.904 mm Hg ($p<0.001$) lower systolic blood pressures, individuals in activation level three averaged 6.320 mm Hg ($p<0.001$) lower systolic blood pressures, and individuals in activation level four averaged 9.884 mm Hg ($p<0.001$) lower systolic blood pressures. Relative to Spanish-speaking Latinos, the average systolic blood pressure was 8.818 mm Hg higher among English-speaking Latinos ($p<0.01$), 8.463 mm Hg higher among non-Latino Whites ($p<0.05$), and 13.150 mm Hg higher among non-Latino non-Whites ($p<0.001$) (see Table 4.3). The only significant difference within levels of education was an average of 7.086 mm Hg lower systolic blood

pressure among those with at least a bachelor's degree relative to individuals with less than a high school education ($p<0.05$) (see Table 4.3).

The presence of comorbid conditions was related to a 0.970 mm Hg increase in systolic blood pressure ($p<0.01$). Accounting for the main effect of comorbidities, individuals who scored within the highest level of activation averaged a total increase of 3.431 mm Hg in systolic blood pressure for every comorbid condition due to the main effect of comorbidities and the interaction effect with activation level (see Table 4.3). Higher scores on the SF-12v2 for physical and mental health were associated with lower systolic blood pressure: 0.241 mm Hg lower for higher-rated physical health ($p<0.001$) and 0.097 mm Hg lower for higher-rated mental health ($p<0.01$) (see Table 4.3). A higher rating of provider communication skills was related to a 0.201 mm Hg increase in systolic blood pressure ($p<0.001$) (see Table 4.3).

Plotting predicted systolic blood pressure over time revealed different patterns among the four levels of activation (see Figure 4.3). With the exception of activation level two, there were general trends of increasing systolic blood pressure over the three-year time period. Individuals within activation level two tended to experience a decrease in systolic blood pressure over time. Further, those in the lowest level of activation (level one) maintained the highest average systolic blood pressure compared to the individuals in the other activation levels. By the second year, the confidence intervals for systolic blood pressures of individuals in activation level one were the only ones that did not overlap with the confidence intervals for systolic blood pressures of individuals in other groups (see Figure 4.3).

When examining systolic blood pressures in the presence of comorbid conditions, individuals with greater numbers of comorbidities had higher predicted systolic blood pressures (see Figure 4.3). Again, individuals in the lowest level of activation averaged the highest systolic

blood pressures compared to individuals in other activation levels, regardless of the number of comorbidities. The range of expected systolic blood pressures was lowest for those in the highest level of activation (level four). The average individual within the highest level of activation was predicted to have a systolic blood pressure of 120.777 mm Hg if they had no comorbidities and a systolic blood pressure of 121.935 mm Hg if they had seven comorbidities (see Figure 4.3). Those in the lowest level of activation (level one) had the highest predicted range of systolic blood pressures, from 133.309 mm Hg (without comorbidities) to 134.466 mm Hg (with seven comorbidities).

4.4.2 Diastolic Blood Pressure

There was a significant effect of practice redesign on diastolic blood pressure, where the implementation of the practice redesign was related to an average increase in diastolic blood pressure by 1.033 mm Hg ($p<0.05$) (see Table 4.3). The main effects of the patient activation measure were also statistically significant. Relative to those in the first (lowest) level of activation, individuals in the in the second and fourth activation levels averaged lower diastolic blood pressures (6.444 mm Hg and 3.837 mm Hg, respectively), while individuals in the third level of activation averaged 2.314 mm Hg higher diastolic blood pressures (see Table 4.3). Accounting for the interaction effect of practice redesign and patient activation level, individuals in activation level four were associated with an overall 6.233 mm Hg lower diastolic blood pressure than those in activation level one, the lowest level of activation (see Table 4.3). Individuals in activation level two were associated with a 3.132 mm Hg decrease in diastolic blood pressure, while those in activation level three were associated with a 2.083 mm Hg increase in diastolic blood pressure (see Table 4.3).

There were also significant racial and ethnic differences with diastolic blood pressure as well (see Table 4.3). Relative to Spanish-speaking Latinos, diastolic blood pressures were 6.749 mm Hg higher among English-speaking Latinos ($p<0.01$), 7.944 mm Hg higher among non-Latino Whites ($p<0.01$), and 7.916 mm Hg higher among non-Latino non-Whites ($p<0.01$). There was also an interaction effect between the patient activation level and comorbidities (see Table 4.3). The main effect of having comorbidities increased diastolic blood pressure by 0.757 mm Hg ($p<0.01$). After accounting for the interaction effect, individuals with comorbidities that scored in the third level of activation averaged 0.585 mm Hg lower diastolic blood pressure ($p<0.001$), while individuals in the fourth level of activation averaged 2.428 mm Hg higher diastolic blood pressure ($p<0.001$). Higher ratings of provider communication skills was associated with 0.094 mm Hg higher average diastolic blood pressure ($p<0.001$) (see Table 4.3).

There were two general patterns for diastolic blood pressure values across activation levels over time (see Figure 4.5). Individuals in the two lowest levels of activation shared a trend of increasing diastolic blood pressure over time, while those in the two highest levels of activation tended to have decreasing diastolic blood pressures over time. By the end of year one, the confidence intervals between these two groups no longer overlap (see Figure 4.5). Predicted diastolic blood pressures increased with additional comorbidities, with individuals in activation level two with the lowest range of diastolic blood pressures and individuals in activation level three with the highest range of diastolic blood pressures (see Figure 4.6). However, there was a fair amount of overlap in confidence intervals for all numbers of comorbid conditions, indicating no real difference across groups (see Figure 4.6). The average individual in activation level two was predicted to have a diastolic blood pressure of 69.483 mm Hg without any comorbidities and a diastolic blood pressure of 74.706 with seven comorbidities. The average individual in

activation level three was predicted to have a diastolic blood pressure of 78.204 mm Hg without any comorbidities and a diastolic blood pressure of 83.426 mm Hg with seven comorbidities.

4.4.3 Weight

Practice change had no statistically significant effect on individual weight. There were significant differences in weight among activation levels, where individuals in the second and fourth levels of activation weighed less (3.666 pounds and 2.108 pounds, respectively) than those in the first (lowest) level of activation (see Table 4.3). Females weighed an average of 27.090 pounds less than males ($p<0.001$). An increase in physical health score on the SF-12v2 was associated with slightly higher weight (0.123 pounds, $p<0.001$). However, a higher rating of provider communication skills was associated slightly lower weight (0.132 pounds, $p<0.05$) (see Table 4.3).

While there was no significant interaction effect between patient activation and practice redesign, there was an interaction effect between patient activation and comorbidities. The main effect of comorbid conditions was an associated 0.826 fewer pounds in weight. Accounting for the interaction effect, the individuals in activation level two averaged 0.332 more pounds ($p<0.01$) and individuals in activation level four averaged 0.45 more pounds ($p<0.001$) than those in activation level one (see Table 4.3).

When examining predicted weights over time, individuals in the two lowest levels of activation had decreasing weights over time, while individuals in activation level three were predicted to have increasing weights over time (see Figure 4.7). The predicted weights for individuals in the highest level of activation remained relatively constant over time, although the predicted weights were only higher than those in the second level of activation. The confidence intervals for all groups overlapped with each other, signifying very little actual differences

among activation levels (see Figure 4.7) Across activation levels, predicted weights decreased as the number of individual comorbid conditions increased (see Figure 4.8). Individuals who scored in activation level two had the lowest range of predicted weights, while individuals in activation levels one and three had the highest range of predicted weights. Within activation level two, individuals had predicted weights of 186 pounds without comorbidities and 180 pounds with seven comorbidities. Within activation levels one and three, individuals had predicted weights of 189 pounds without comorbidities and 184 pounds with seven comorbidities. However, confidence intervals for all groups overlapped again and indicated a lack of true differences among activation levels when comparing number of comorbidities (see Figure 4.8).

4.5 DISCUSSION

There was no statistically significant difference in mean activation scores from baseline to follow-up, which may be associated with the lack of a significant relationship between practice change and two of the three outcomes. This is also likely a result of the relatively short period of time that practice change was implemented. Similar to previous studies, higher activation levels were generally related to lower blood pressure.(Greene & Hibbard, 2011; Morisky, Bowler, & Finlay, 1982) However, the differences in systolic and diastolic blood pressure among activation levels varied in a nonlinear fashion. Individuals in activation level three were associated with a smaller magnitude of change in systolic blood pressure than individuals in activation levels two and four (relative to activation level one). Additionally, those in activation level three were associated with slightly higher diastolic blood pressures than individuals in the other levels of activation. There was an interaction effect between patient activation and practice redesign only for diastolic blood pressure. Studies have reported similar

findings of lower diastolic blood pressure after increased physical activity (Lara et al., 2008) or quality improvement interventions to improve self-management skills.(Walsh et al., 2006) The racial and ethnic differences in blood pressure in this study are similar to those reported in the literature.(Chatterji, Joo, & Lahiri, 2011)

For all three outcomes, there was a significant effect of comorbidities on patient activation. This interaction effect varied across activation levels, although individuals in the highest level of activation (with comorbidities) tended to have higher systolic blood pressures, higher diastolic blood pressures, and higher weights relative to individuals in the lowest level of activation (with comorbidities). The differences between these groups may be due to differences in the severity of their comorbidities, which was not included in the data. The varied relationship of activation to clinical outcomes when accounting for comorbidities could have implications for the use of patient activation to assess patients in self-management programs.

There are limitations with this study; the small sample size limits the statistical power to find significance in variable relationships. To address that, relationships significant at $p<0.10$ are also included to identify potential relationships that can be explored in future studies. Patients did not have their blood pressures or weights measured at the same times, although multiple measures were available for each individual over the three year period. Additionally, the last patient blood pressures and weights measured in each calendar year were used in order to establish some consistency in measurements. Other factors that could have influenced blood pressure, such as medication adherence, were unavailable and not included in the analysis.

4.6 CONCLUSION

Patient activation was related to systolic blood pressure, diastolic blood pressure, and weight within this low-income, largely Spanish-speaking Latino population. However, there were unexpected differences in the magnitudes and directions of these relationships when examined by activation level. The practice redesign's effect on only one of the three outcomes may be due to the relatively short amount of time that practice redesign was implemented; the changes may not have been sustained for a sufficient period to have a larger impact on patient outcomes. The impact of comorbidities on patient activation is worth further exploration to determine how best to use the patient activation measure in self-management programs.

Figure 4.1 Conceptual Model of Relationships Between Patient Activation and Patient Clinical Outcomes

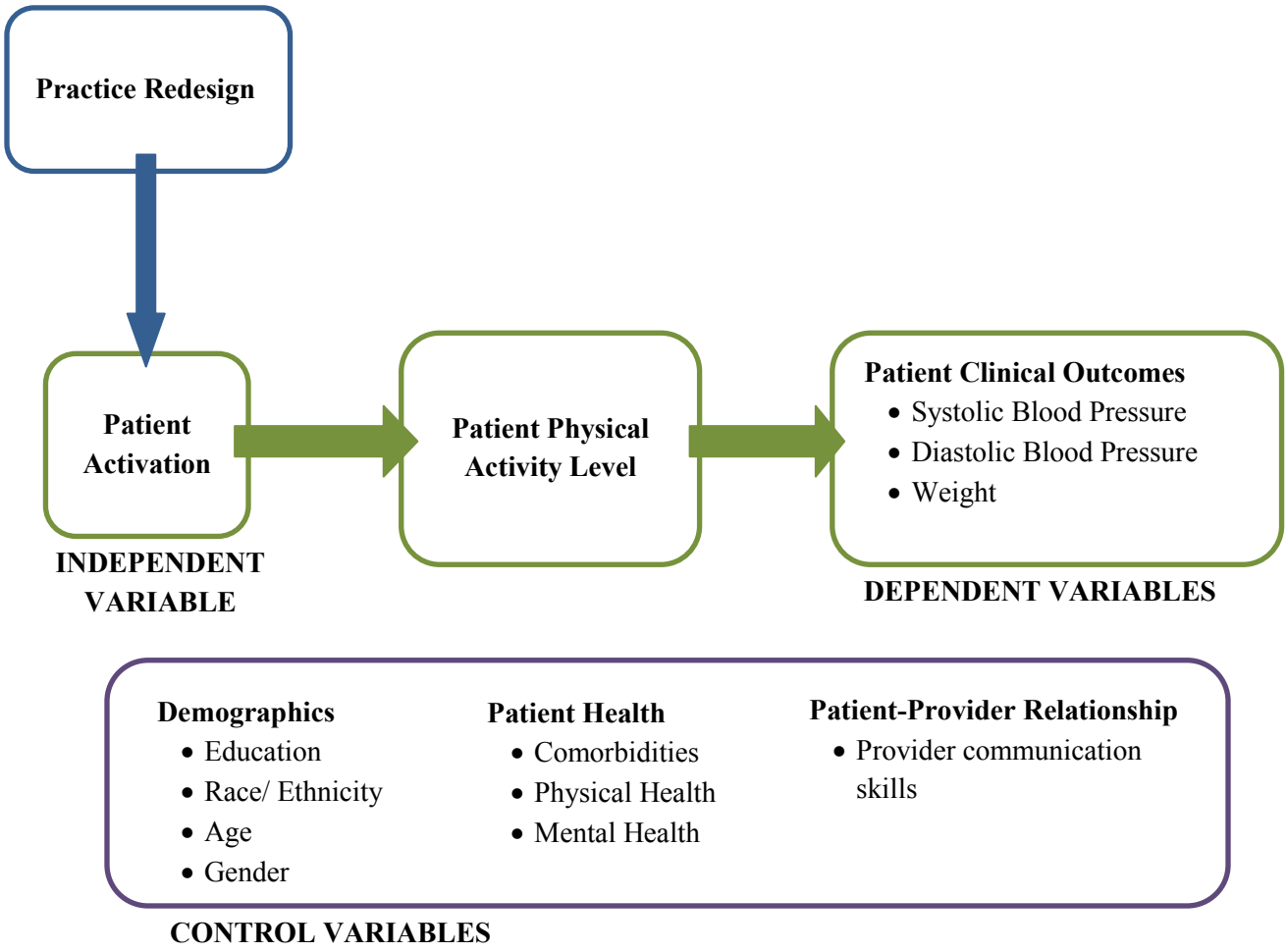

Figure 4.2 Sampling Frame

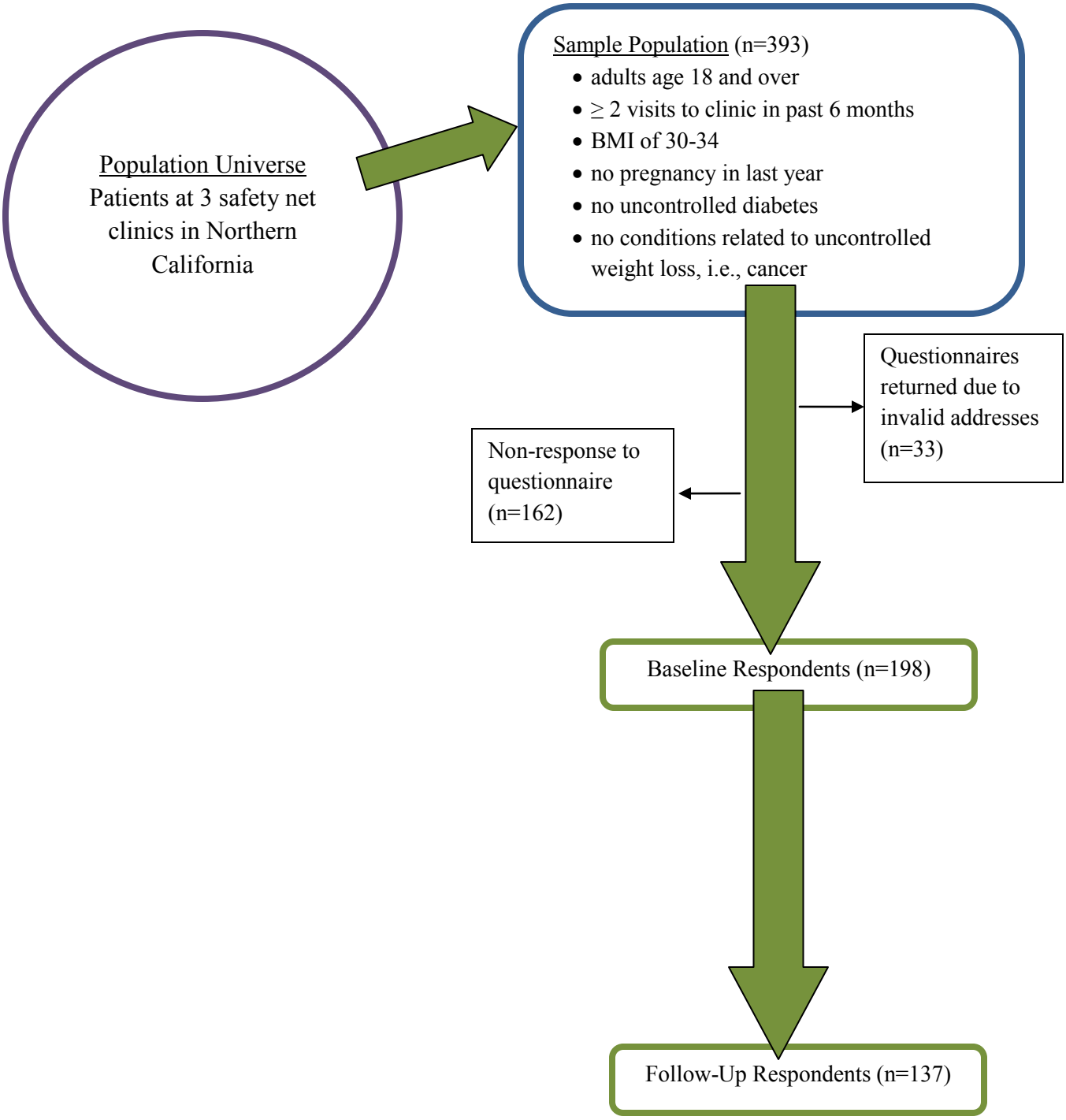

Figure 4.3

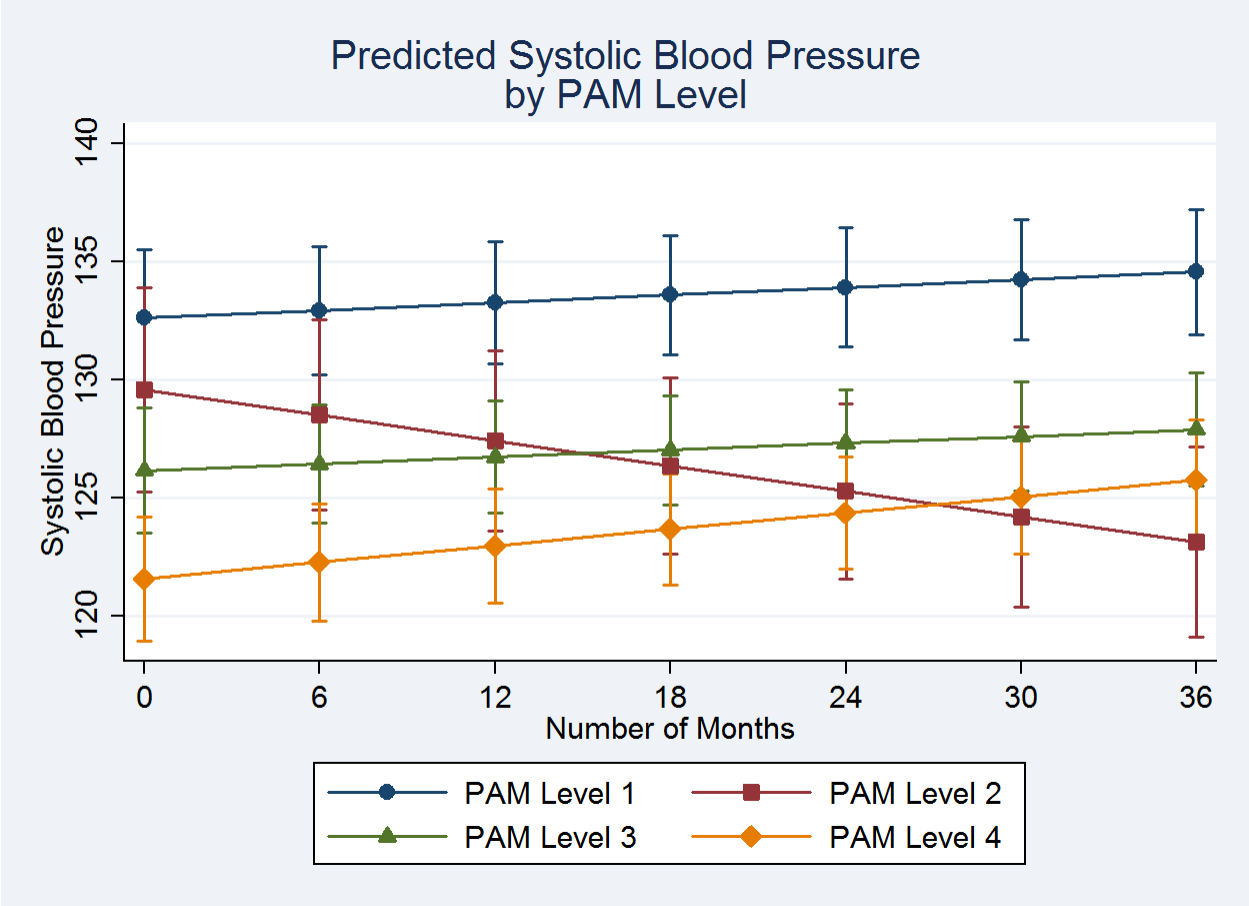
Predicted Systolic Blood Pressure
by PAM Level
Systolic Blood Pressure
120
125
130
135
140
0
6
12
18
24
30
36
Number of Months
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Figure 4.4

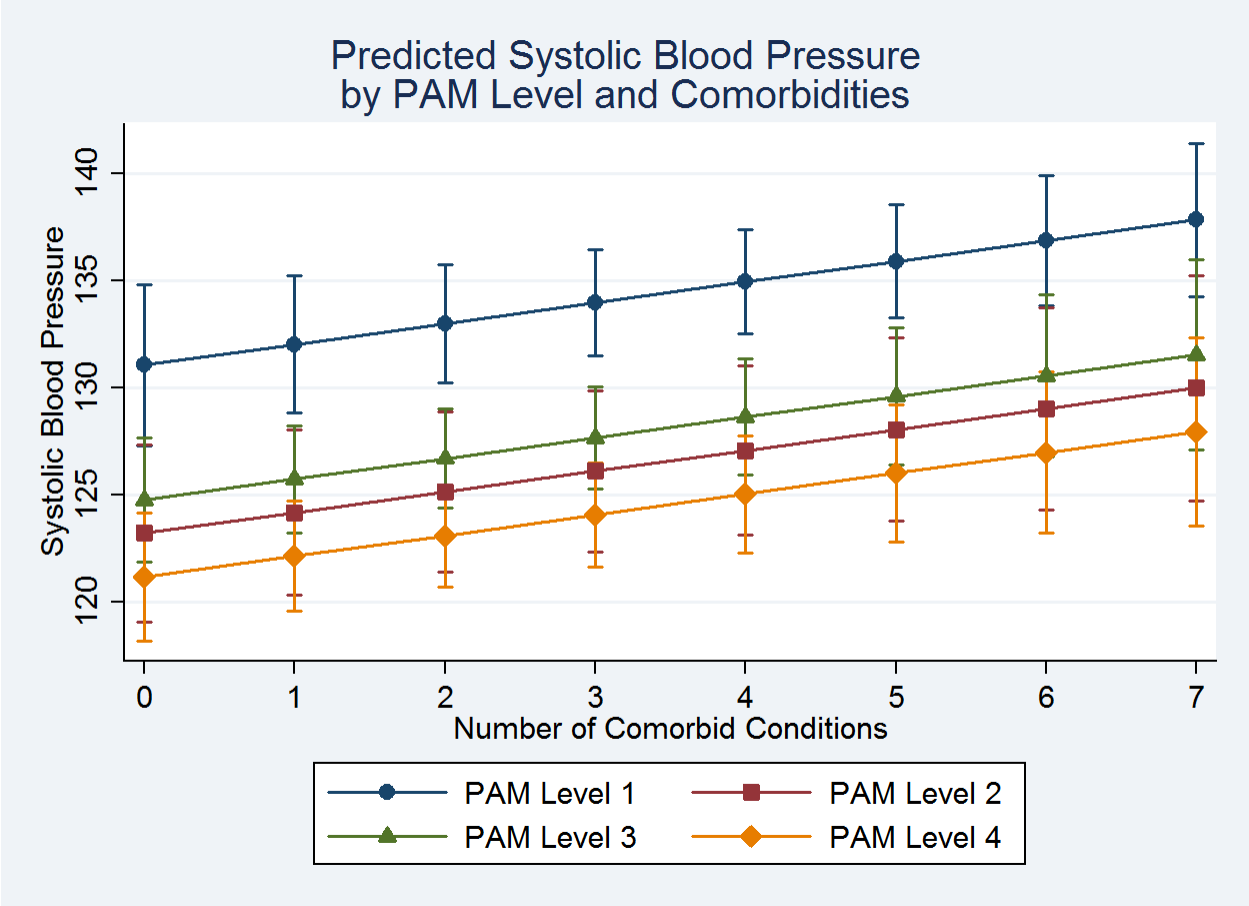
Predicted Systolic Blood Pressure
by PAM Level and Comorbidities
Systolic Blood Pressure
120
125
130
135
140
0
1
2
3
4
5
6
7
Number of Comorbid Conditions
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Figure 4.5

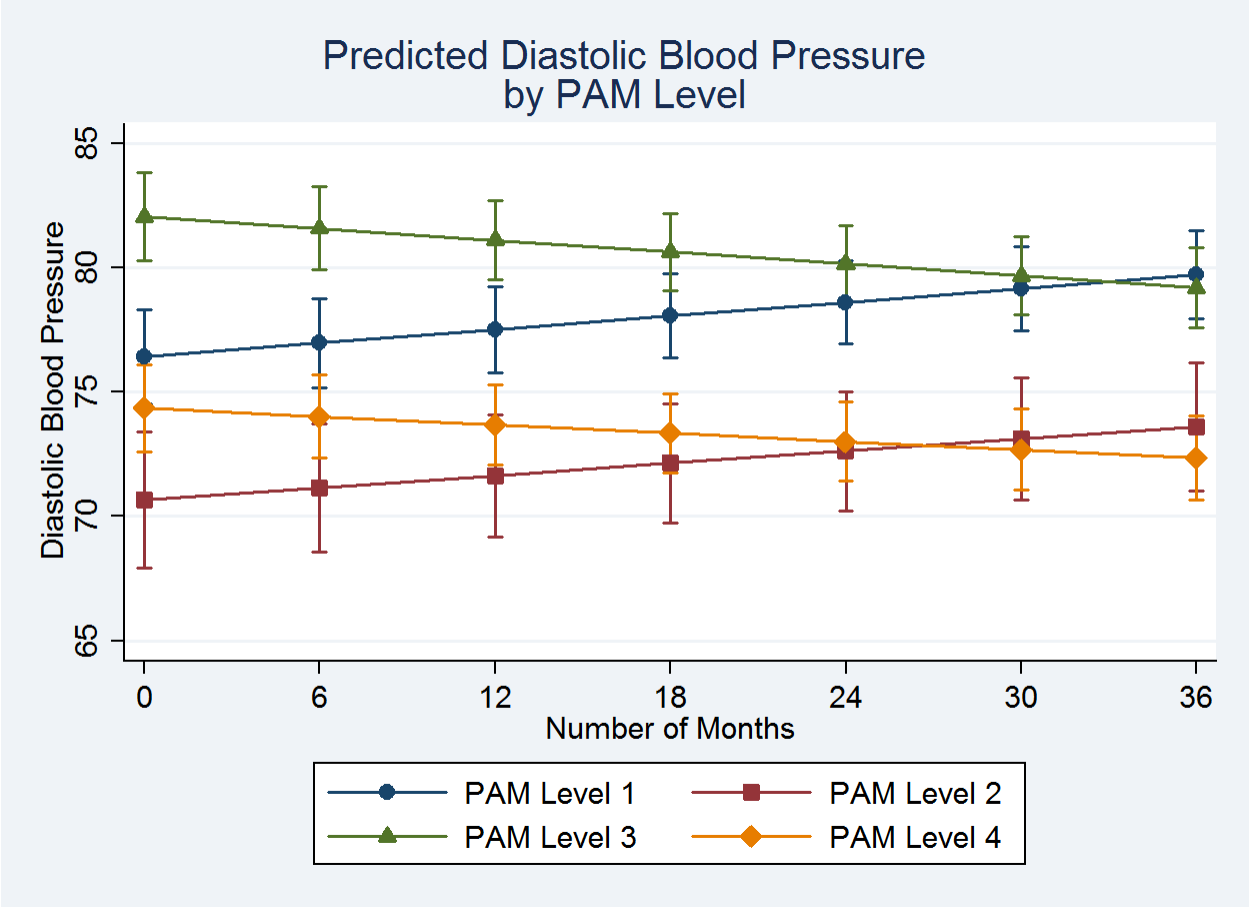
Predicted Diastolic Blood Pressure
by PAM Level
Diastolic Blood Pressure
65
70
75
80
85
0
6
12
18
24
30
36
Number of Months
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Figure 4.6

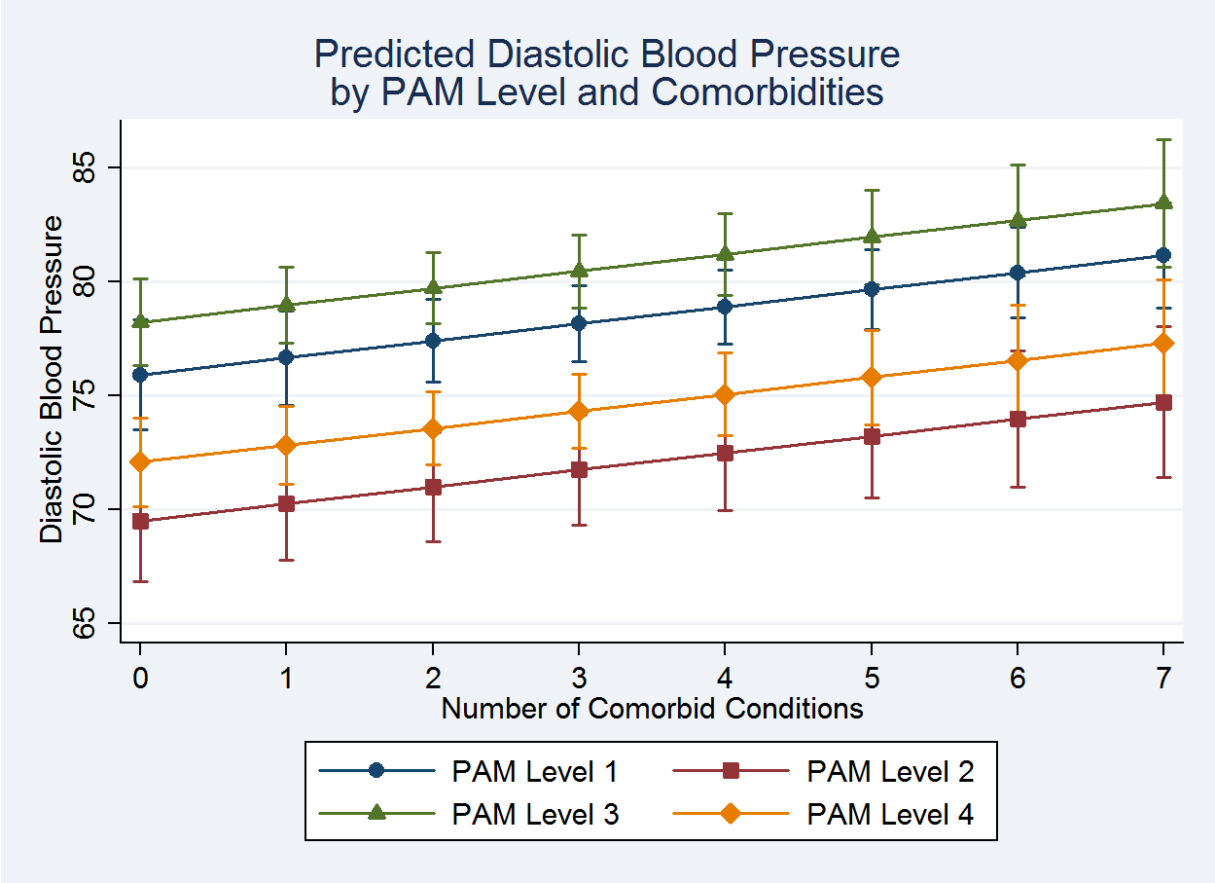
Predicted Diastolic Blood Pressure
by PAM Level and Comorbidities
Diastolic Blood Pressure
65
70
75
80
85
0
1
2
3
4
5
6
7
Number of Comorbid Conditions
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Figure 4.7

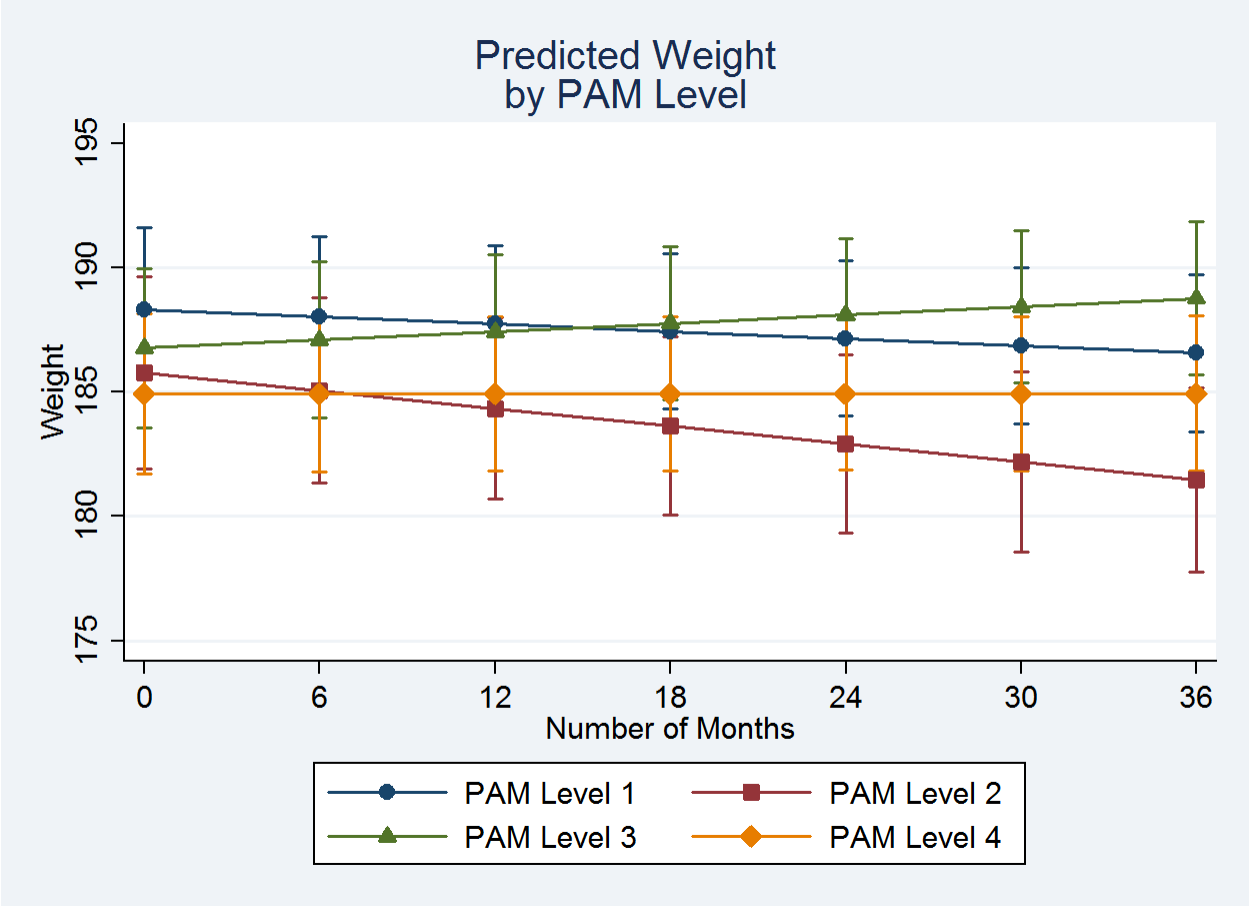
Predicted Weight
by PAM Level
Weight
175
180
185
190
195
0
6
12
18
24
30
36
Number of Months
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Figure 4.8

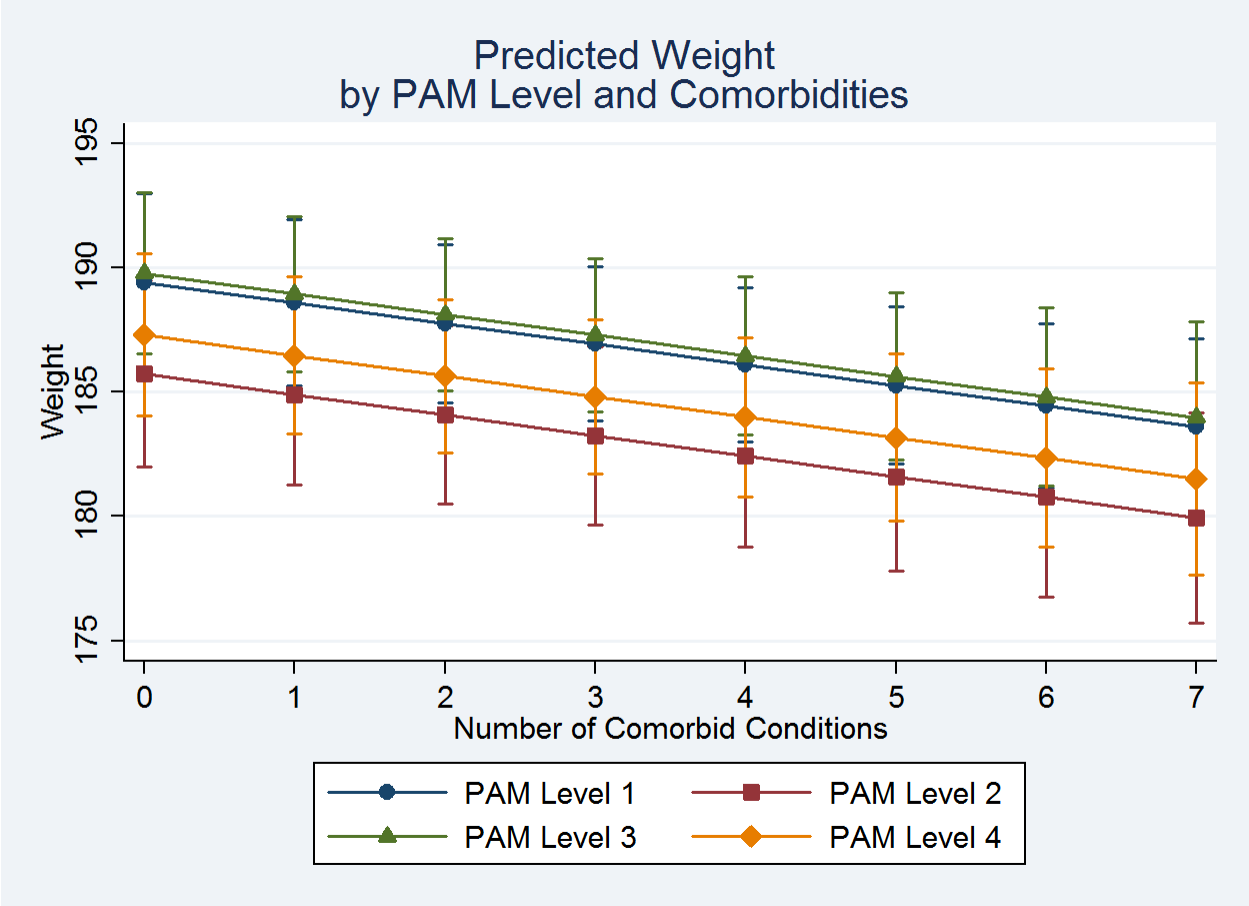
Predicted Weight
by PAM Level and Comorbidities
Weight
175
180
185
190
195
0
1
2
3
4
5
6
7
Number of Comorbid Conditions
PAM Level 1
PAM Level 2
PAM Level 3
PAM Level 4

Table 4.1 Patient Characteristics at Baseline and Follow-Up (N=137)

	BASELINE	FOLLOW-UP	P-VALUE
Clinic			0.84
A	30% (41)	28% (39)	
B	30% (41)	31% (41)	
C	40% (54)	40% (54)	
Length of time attended clinic			0.28
<6 months	5% (7)	5% (7)	
6 months – 1 year	5% (7)	4% (6)	
1 year – 3 years	48% (64)	34% (47)	
3 years – 5 years	22% (30)	26% (35)	
> 5 years	21% (29)	30% (41)	
Health coach at clinic			0.96
Yes, PCP	46% (63)	45% (61)	
Yes, MA	27% (37)	26% (35)	
Yes, multiple	2% (3)	2% (3)	
No	21% (29)	24% (33)	
Patient-clinician relationship (modified CG-CAHPS score 0-100)	88.4 (130)	87.6 (131)	0.67
Trust clinicians at clinic	80% (109)	82% (112)	0.20
DEMOGRAPHICS			
Female	69% (94)	69% (94)	
Age (years)	49 (137)	50 (137)	
Race/Ethnicity			0.88
Latino – Spanish speaking	37% (50)	38% (52)	
Latino – English speaking	28% (38)	29% (40)	
Non-Latino White	18% (24)	18% (25)	
Non-Latino Other	18% (25)	15% (20)	
Primary language at home			0.74
English	48% (66)	45% (61)	
Spanish	35% (48)	37% (50)	
Other	17% (23)	15% (21)	
Education			0.98
Less than high school	34% (46)	34% (47)	
High school graduate/ GED	26% (35)	23% (32)	
Some college	23% (32)	24% (33)	
College graduate or more	15% (20)	15% (20)	
Number of chronic conditions			1.00
0	12% (17)	12% (17)	
1	23% (31)	22% (30)	
2+	65% (89)	64% (88)	
Diabetes	39% (53)	39% (54)	0.82
Hypertension	47% (65)	39% (54)	0.22
High cholesterol	53% (72)	52% (71)	1.00
SF-12 Dimensions (mean score)			
Physical Component Summary Score	42 (132)	42 (134)	0.93
Mental Component Summary Score	42 (132)	41 (134)	0.50
PAM-13 (mean)	62 (131)	58 (133)	0.11
PAM Category			0.12
Level 1	18% (25)	26% (35)	
Level 2	8% (11)	13% (18)	
Level 3	34% (47)	24% (33)	
Level 4	35% (48)	34% (47)	

Table 4.2 Mean Patient Clinical Characteristics Over Time (N=137)

	Year 1 Mean (min, max)	Year 2 Mean (min)	Year 3 Mean (range)	Mean Differences
Systolic Blood Pressure	127.7 (100.0, 176.0)	127.2 (89.0, 193.0)	128.0 (87.0, 190.0)	†, ‡
Diastolic Blood Pressure	77.4 (51.0, 100.0)	76.6 (53.0,105.0)	76.4 (50.0, 103.0)	*, †, ‡
Weight	183.9 (148.0, 240.0)	185.2 (142.0, 269.0)	184.5 (133.0, 275.0)	*, †
BMI	32.2 (26.0, 38.0)	32.2 (27.0, 35.0)	32.1 (26.0, 38.0)	*, †, ‡

** difference between Year 1 and Year 2 means, p<0.05*

† difference between Year 2 and Year 3 means, p<0.05

‡ difference between Year 1 and Year 3 means, p<0.05

Table 4.3 Relationship Between Patient Activation and Clinical Outcomes Before and After Exposure to Practice Redesign (n=131)

	Systolic Blood Pressure β (SE)	Diastolic Blood Pressure β (SE)	Weight β (SE)
Fixed Effects			
Intercept	96.983 (6.649)	60.871 (4.421)	214.682 (6.969)
Practice redesign[a]	-0.249 (0.659)	**1.033**† **(0.406)**	0.130 (0.407)
PAM			
Level 1	*Ref*	*Ref*	*Ref*
Level 2	**-7.904**§ **(1.887)**	**-6.444**§ **(1.165)**	**-3.666**‡ **(1.182)**
Level 3	**-6.320**§ **(1.206)**	**2.314**‡ **(0.743)**	0.360 (0.741)
Level 4	**-9.884**§ **(1.237)**	**-3.837**§ **(0.763)**	**-2.108**‡ **(0.761)**
PAM*redesign			
Level 1 redesign*	*Ref*	*Ref*	*Ref*
Level 2 redesign*	0.786 (1.299)	**2.279**‡ **(0.798)**	-1.202 (0.795)
Level 3 redesign*	0.353 (1.002)	**-1.264**† **(0.617)**	1.005 (0.614)
Level 4 redesign*	0.226 (0.950)	**-3.429**§ **(0.584)**	-1.113* (0.577)
Race/ ethnicity			
Latino – Spanish speaking	*Ref*	*Ref*	*Ref*
Latino – English speaking	**8.818**‡ **(3.111)**	**6.749**‡ **(2.164)**	8.298* (4.644)
Non-Latino White	**8.463**† **(3.669)**	**7.944**‡ **(2.551)**	9.489* (5.399)
Non-Latino Other	**13.150**§ **(3.485)**	**7.916**‡ **(2.420)**	8.237 (5.150)
Education			
Less than high school	*Ref*	*Ref*	*Ref*
High school graduate/ GED	0.066 (3.155)	0.446 (2.193)	-0.557 (4.651)
Some college	-6.886* (3.519)	-2.592 (2.447)	8.211 (5.193)
4-year college degree or more	**-7.086**† **(3.550)**	-4.425* (2.468)	8.173 (5.331)
Age	**0.527**‡ **(0.102)**	0.039 (0.069)	-0.203* (0.107)
Female	-2.579 (2.280)	-3.101* (1.586)	**-27.090**§ **(3.387)**
Comorbidities (number)	**0.970**‡ **(0.404)**	**0.757**‡ **(0.250)**	**-0.826**‡ **(0.253)**
PAM*comorbidities			
*Level 1*comorbidities*	*Ref*	*Ref*	*Ref*
Level 2 comorbidities*	-0.668 (0.561)	0.337 (0.345)	**1.158**‡ **(0.349)**
Level 3 comorbidities*	0.570 (0.407)	**-1.342**§ **(0.251)**	0.193 (0.251)
Level 4 comorbidities*	**2.461**§ **(0.398)**	**1.671**§ **(0.245)**	**1.276**§ **(0.245)**
SF-12 Dimensions			
Physical Component Summary Score	**-0.241**§ **(0.041)**	0.043* (0.025)	**0.123**§ **(0.026)**
Mental Component Summary Score	**-0.097**‡ **(0.034)**	0.035* (0.021)	0.013 (0.021)
Provider communication skills (modified CG-CAHPS score)	**0.201**§ **(0.022)**	**0.094**§ **(0.013)**	**-0.132**† **(0.014)**
Random Effects			
Variance between patients	137.410 (18.202)	66.911 (8.996)	309.554 (39.995)
Variance within patients	77.073(1.522)	29.049 (0.574)	28.067 (0.559)
Model Fit Statistics			
LR test statistic	4444.32	4466.42	11117.58
P-value	0.00	0.00	0.00
AIC	38412.92	33321.67	32796.91

**p<0.10, †p<0.05, ‡p<0.01, §p<0.001*

[a]*practice redesign variable used as indicator variable for implementation of practice change, scored as 26 months for Clinic A, 27 months for Clinic B, and 31 months for Clinic C*

CHAPTER 5: CONCLUSION

5.1 SUMMARY OF FINDINGS

This dissertation explored the application of new innovations with the primary care system to improve self-management among obese patients. This research focused on safety net clinics in Northern California that served a large Spanish-speaking Latino population. These papers focused on the impact of the implementation of the teamlet model on staff, clinicians, and patients using qualitative and quantitative analyses. The findings are briefly summarized below.

The first paper found an association between patient activation and regular fruit and vegetable consumption, but did not have the expected relationship with regular physical activity in this population. The relationship between patient activation and physical activity was impacted by the effect of comorbidities, which may affect individual ability to be physically active. Additionally, patients may find it relative easier to change dietary habits compared to physical habits. For the safety net patient population, there may be additional obstacles to physical activity, from finding a safe place to exercise to securing childcare in order to find time for physical activity.(Barr-Anderson, AuYoung, Whitt-Glover, Glenn, & Yancey, 2011) Although the patient-provider relationship has a strong bivariate relationship with patient activation, it does not impact the relationship between patient activation and health behaviors when controlling for other factors.

The second paper found that the implementation of a teamlet model within safety net clinics to improve patient health may be feasible, but the composition of the teamlet may need to be modified for financial sustainability. Due to the limited number of medical assistants available for health coaching and the time constraints they faced, the teamlet model could function more

easily with two medical assistants per physician. Future change efforts should have support from different levels of management and staff, preferably championed by multiple people to aid the sustainability of the change in the face of staffing changes. Interestingly, medical assistants and physicians who related to patients through their own weight loss struggles or who started to increase their own physical activity reported more positive responses from patients. This type of role modeling was not intended to be a formal part of the health coaching, but may be an effective tool for similar interventions.

The third paper found relationships between patient activation and the clinical outcomes of systolic blood pressure, diastolic blood pressure, and weight. Although the relationships were generally in the expected direction of higher activation associated with better clinical outcomes, the trends were not linear from low to high patient activation. This may have been due to the effect of comorbidities on the direction of the relationships between patient activation and the clinical outcomes. However, the clinical practice redesign only had an effect on diastolic blood pressure, again with differential effects across activation levels, which may be related to the relatively short length of time the practice redesign was implemented.

5.2 STRENGTHS AND LIMITATIONS

The main strength of this research is its focus on the safety net clinic population and the inclusion of Spanish-speaking Latino patients to understand the relationships between patient activation and patient health behaviors and health outcomes. The PAM-13 in particular has not been well tested within this population, so these results will add to the existing literature despite the null findings. Interviewing clinic staff and clinicians using a random sample stratified by role was useful for avoiding potential response bias from only getting the perspectives from

individuals who volunteer to participate. Additionally, the use of follow-up interviews and inclusion of individuals from different roles helped to ensure a more thorough view of staff perceptions across time.

Although the small patient sample size was a limitation of the quantitative analyses, p-values significant at 0.10 were included to also note relationships that were approaching significance. The reliance of self-reported data from patients on measures such as patient activation and patient-provider communication was not a limitation in this context because the measure is intended to capture the patient's own perspective and not something objective. The use of self-reported data on measures such as physical activity and dietary habits could potentially exhibit social desirability bias, but the lack of skewness in the variable distributions reduce the likelihood of that bias.

5.3 IMPLICATIONS FOR FUTURE RESEARCH

This research has potential implications for the coming changes to the primary care system to meet the needs of more chronically ill patients that are also increasingly diverse. Increased patient engagement in their own health care may help to improve patient outcomes. Compared with previous studies, the PAM-13 had mixed results within this population. The relationships between activation and regular fruit and vegetable consumption, systolic blood pressure, diastolic blood pressure, and weight were similar to those found in previous studies. However, activation and regular physical activity did not have the expected relationship, particularly among the highly activated patients with comorbidities, which is worth exploring in a larger sample of a diverse population to see whether this difference still remains. The strong bivariate relationships between patient activation and the patient-provider relationship in this

population, where higher-rated provider communication skills and increased patient trust in the provider were associated with higher patient activation, were supported by the literature. Patient-provider communication skills were also associated with patient outcomes, endorsing the potential for sustained practice redesigns to enhance patient self-management through increased patient activation. Busy or small clinics that are considering the implementation of the teamlet model should ensure that they have the support of clinic leadership throughout the process. Due to frequent staff turnover, limited time and resources, it is important for primary care clinics to have the support of both higher-level administrators as well as multiple program champions for each site before embarking on similar types of practice change.

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