Published in final edited form as:

Patient Educ Couns. 2017 March ; 100(3): 449–455. doi:10.1016/j.pec.2016.09.019.

Decision-making and goal-setting in chronic disease management: Baseline findings of a randomized controlled trial[☆]

Shreya Kangovi, MD, MS^{a,*}, Nandita Mitra, PhD^c, Robyn A. Smith^a, Raina Kulkarni^b, Lindsey Turr, MSW^a, Hairong Huo, PhD^a, Karen Glanz, MPH, PhD^{c,d}, David Grande, MPA, MD^a, and Judith A. Long, MD^{a,e}

^aPerelman School of Medicine, University of Pennsylvania, Division of General Internal Medicine, Philadelphia, PA 19104, United States

^bPenn Center for Community Health Workers, Penn Medicine, Philadelphia, PA 19104, United States

^cPerelman School of Medicine, University of Pennsylvania, Department of Biostatistics and Epidemiology, Philadelphia, PA 19104, United States

^dPerelman School of Nursing, University of Pennsylvania, Philadelphia, PA 19104, United States

^eCenter for Health Equity Research and Promotion, Corporal Michael J. Crescenz, VA, Philadelphia, PA 19104, United States

Abstract

Objective—Growing interest in collaborative goal-setting has raised questions. First, are patients making the ‘right choices’ from a biomedical perspective? Second, are patients and providers setting goals of appropriate difficulty? Finally, what types of support will patients need to accomplish their goals? We analyzed goals and action plans from a trial of collaborative goal-setting among 302 residents of a high-poverty urban region who had multiple chronic conditions.

Methods—Patients used a low-literacy aid to prioritize one of their chronic conditions and then set a goal for that condition with their primary care provider. Patients created patient-driven action plans for reaching these goals.

Results—Patients chose to focus on conditions that were in poor control and set ambitious chronic disease management goals. The mean goal weight loss –16.8lbs (SD 19.5), goal HbA1C reduction was –1.3% (SD 1.7%) and goal blood pressure reduction was –9.8 mmHg (SD 19.2 mmHg). Patient-driven action plans spanned domains including health behavior (58.9%) and psychosocial (23.5%).

[☆]Clinical trials registration [ClinicalTrials.gov](https://clinicaltrials.gov) Identifier: NCT01900470.

*Corresponding author at: Perelman School of Medicine, University of Pennsylvania, Division of General Internal Medicine, 1233 Blockley Hall, 423 Guardian Drive, Philadelphia, PA 19104, United States. kangovi@mail.med.upenn.edu (S. Kangovi).

Contributors

N/A.

Prior presentations

The contents of this paper were presented as an oral presentation at the Society for General Internal Medicine National Meeting in Hollywood, Florida on May 11th, 2016.

Conclusions—High-risk, low-SES patients identified high priority conditions, set ambitious goals and generate individualized action plans for chronic disease management.

Practice implications—Practices may require flexible personnel who can support patients using a blend of coaching, social support and navigation.

Keywords

Patient-centered care; Chronic disease management; Vulnerable populations

1. Introduction

Patients of low socioeconomic status (SES) are less likely to receive patient-centered care: [1,2] providers tend to communicate with these patients in a narrowly biomedical, physician-dominated manner [3] characterized by low patient involvement in decision-making [4]. This lack of engagement can lead to mistrust, decisional conflict [5] and low adherence [2,6], particularly in the context of chronic disease management which requires a sustained patient-provider partnership and an active patient role in health behavior change [7].

Collaborative goal-setting is a structured form of patient engagement in which patient and provider discuss and agree on a health goal [8,9]. When applied to chronic disease management, goal-setting can have three distinct stages: first, patients use decision aids to choose a chronic disease (e.g. diabetes) or behavior (e.g. increasing physical activity) that they would like to focus on. Next, providers help patients to set a measurable goal for their chosen condition [8]. Finally, patients create concrete action plans for achieving this goal. Collaborative goal-setting has been shown to improve a number of chronic disease behaviors [10–14] and outcomes [15–19] and is now required by the National Committee for Quality Assurance Patient-Centered Medical Home recognition standards [20].

This growing interest has raised several unanswered questions about using collaborative goal-setting as a strategy for chronic disease management among low-SES patients. First, providers may feel reluctant to cede any decision-making to patients – particularly those with low education or health literacy – for fear that patients’ decisions may deviate from what providers would advise based on the biomedical perspective [21]. Few prior studies [13] have explored whether these concerns are justified. In one prior study [13], patients with diabetes used an interactive CD-ROM to assess their physical activity and diet, and then set behavior change goals. It appeared that patients did make the “right” decisions, choosing to work on a behavior for which they were at greatest risk. A second question relates to goal difficulty; a large body of goal-setting literature demonstrates the importance of setting goals that are challenging, yet attainable [22]. Very few studies [8] have examined the difficulty of chronic disease management goals to understand whether patients and providers are able to strike this balance. Finally, in most prior studies, action planning has been facilitated by providers or computerized programs focusing on narrow domains such as dietary change [23], physical activity [24] or recommended diabetes care [25]. Few prior studies [26] have asked patients to create action plans based on what *they think* will help them to reach chronic disease management goals. As a result, current approaches to collaborative goal-setting may not be as patient-centered as intended.

In this paper, we describe baseline findings from a randomized controlled trial of collaborative goal-setting versus collaborative goal-setting plus six months of support from a community health worker delivering the evidence-based IMPaCT intervention [27–29]. Our prior studies suggested that low-SES patients with multiple chronic conditions felt overwhelmed by their comorbidities and thought that they would do better if they focused on controlling one condition at a time [27]. Therefore, in this trial, patients used a low-literacy visual aid to choose one of their multiple chronic conditions to focus on during the study period. Patients then collaboratively set a chronic disease management goal for their chosen condition with their primary care provider. Patients randomized to a community health worker created patient-driven action plans to help them achieve their goals.

The objectives of this paper are to address critical knowledge gaps around collaborative goal-setting for chronic disease management. In particular, we sought to answer the following questions: if low-SES patients with multiple chronic conditions are encouraged to prioritize one of their conditions, which do they pick? How difficult are the chronic disease management goals patients set with their providers? What action plans do patients create for reaching these goals?

2. Methods

This study describes the baseline findings of a two-armed, single-blinded randomized controlled trial (ClinicalTrials.gov Identifier: NCT01900470) approved by the Institutional Review Board of the University of Pennsylvania.

2.1. Study setting and participants

Patients were recruited from two urban academic adult internal medicine clinics between July 11th, 2013 and October 15th, 2014 at which time the pre-specified sample size target was reached. Eligible patients: (1) had 1 visit in a study clinic during the prior year and an upcoming appointment; (2) lived in a high-poverty 5-ZIP code region in Philadelphia; (3) were diagnosed with 2 or more of the following chronic diseases: hypertension, diabetes, obesity, asthma/COPD with tobacco dependence. These diagnoses were defined using EMR ICD-9CM codes from the year prior to study enrollment, or in the case of obesity, by a Body Mass Index (BMI) of 30 or greater. Patients were excluded if they: (1) had previously worked with a community health worker or (2) lacked capacity to provide informed consent. During the study time period, Penn Medicine adopted the IMPaCT community health worker program as part of its system-wide population health management strategy for uninsured or publicly insured patients. In order to be consistent with inclusion criteria that were used at other sites across the health system, on April 30th, 2014, the study team added the following inclusion criteria: uninsured or publicly insured.

2.2. Patient enrollment

Research assistants (RAs) received a weekly list of patients meeting inclusion criteria and called patients with upcoming primary care appointments to explain the study and confirm eligibility (Fig. 1). When interested patients arrived to their scheduled primary care visit, the RA obtained written informed consent and initiated study procedures.

2.3. Procedures

2.3.1. Collaborative goal-setting—RAs used a 2-min script to explain a low-literacy visual aid designed to help patients choose a chronic disease to focus on during the study (Fig. 2). The aid listed patients' chronic diseases and current level of control for each disease. It also described evidence-based health behaviors proven to benefit each chronic disease; this information was designed to inform patient choice, rather than to prescribe these specific strategies. Acknowledging the importance and difficulty of *maintaining* control of conditions, we allowed patients to choose any of their conditions, even those that were under control.

Patients brought the aid with them into the exam room and reviewed their choice with their primary care provider. The provider then helped the patient to set a chronic disease management goal for their chosen condition: a systolic blood pressure goal for hypertension, HbA1c goal for diabetes, weight goal for obesity, or smoking cessation for asthma/COPD and tobacco dependence. Patients and providers were allowed to set a maintenance goal (same as their baseline value). Any patients choosing to focus on tobacco dependence were asked to set a goal of complete cessation because we planned to monitor success with measurements of urine anabasine; these measurements are more reliable with cessation, not reduction [30]. The goal-setting discussion between patients and providers – which took about 3–5 minutes to perform – took place during scheduled primary care appointments, with no extra dedicated time. This decision was made in order to test the feasibility of the goal-setting process in a real-world, busy practice environment.

Primary care providers at study clinics underwent a 60-min training session on collaborative goal-setting, which reviewed principles of goal-setting theory [31], including the importance of setting realistic goals.

2.3.2. Baseline assessment and randomization—After setting a goal with providers, patients completed a brief baseline assessment with the RA. RAs recorded height, weight, blood pressure and HbA1C measured by clinic staff during the primary care visit. RAs then notified a member of the study team not involved with outcomes assessment, who assigned each patient to one of two study arms from a computer-generated randomization algorithm [32]. Patients randomized to collaborative goal-setting alone received usual care in accordance with guidelines at each site. Patients randomized to receive community health worker support met with their community health worker immediately after enrollment.

2.3.3. Creating action plans with the community health worker—Community health workers conducted an in-depth semi-structured interview anchored on the open-ended question: *“What will you need in order to reach the health goal you set with your doctor?”* Patients could answer broadly and were not limited to select the evidence-based strategies presented in the goal-setting decision aid (Fig. 2). Community health workers and patients used this conversation to create individualized action plans for reaching their chronic disease management goal.

2.4. Measures

RAs collected the following baseline data: age [33], gender [33], race [33], ethnicity [33], employment [33], severity of illness (ACG score) [34], household income and size [33], unmet or delayed need for medical care [35], number of emergency room visits and hospital admissions in the prior twelve months [35], and usual source of care [35]. The baseline questionnaire also included the SF-12 survey [36], the Patient Activation Measure (which assessed patients' confidence in managing their health) [37], the ENRICH Social Support Instrument [38], the Single-Item Literacy Screen [39], the Trauma History Questionnaire [40], a Single-Item Drug Screening [41], a Single-Item Alcohol Screening [42], perceived stress [43], and questions assessing homelessness and food insecurity [44]. In addition, the baseline questionnaire included an assessment of commitment and self-efficacy for achieving the collaboratively chronic disease management goal [45]. For patients assigned to community health worker support, community health workers documented action plans and detailed encounter notes.

2.5. Analysis of baseline data

The goals of the analysis are to: (1) describe the chronic disease that patients chose to focus on and examine associations between baseline characteristics and chronic disease choice, (2) describe the difficulty of chronic disease management goals relative to baseline values, and (3) describe the types of action plans that patients and community health workers created for reaching these chronic disease management goals.

We performed bivariate analyses using χ^2 tests for categorical variables and t tests and the Wilcoxon rank sum test for continuous variables. We created logistic regression models to determine associations of baseline characteristics with choice of each chronic condition during collaborative goal-setting. Four models were created, one for each condition; for instance, the first model was restricted to patients with diabetes and had the binary outcome of choosing diabetes as their focal condition (yes/no). For each of these logistic regression models, we included predictors that had a bivariate association with the outcome using $p < 0.20$ as the threshold.

3. Results

Of the 524 eligible patients screened, 302 (57.6%) provided written consent and were randomized. Those who declined were older than participants (65.3 vs. 56.3 $p < 0.0001$). The most common reasons for declining were: (1) being too busy (54, 24.3%); (2) not wanting to participate in any research (26, 11.7%); (3) not having enough time on the day of their scheduled clinic visit for study enrollment (28, 12.6%), and 4) not wanting a community health worker (21, 9.5%).

The mean age of the cohort was 56.3 (SD 13.1) years, 75.5% were female, 94.7% were black, 55.6% had an annual household income less than \$15,000 and 96.3% had a history of a traumatic event on the 24-item Trauma History Questionnaire (Table 1). Participants had an average of 1.9 (SD 4.4) emergency room visits and 0.9 (SD 2.6) hospital admissions in the prior 12 months.

Participants had an average of 2.5 of the eligibility chronic conditions: 279 (92.4%) had a diagnosis of hypertension; 235 (77.8%) were obese; 175 (58.0%) had a diagnosis of diabetes and 55 (18.2%) had tobacco dependence with asthma/COPD (Fig. 3).

3.1. Choice of chronic condition

The most popular choice of condition to focus on during the study was obesity (chosen by 62.1% of obese patients), followed by tobacco dependence (chosen by 56.4% of smokers), diabetes (chosen by 42.3% of patients with diabetes) and hypertension (chosen by 18.3% of patients with hypertension) (Fig. 3).

Patients who chose to work on their obesity had a BMI of 39.7 versus other obese patients who had a mean BMI of 38.1 ($p=0.17$). Patients who chose to work on diabetes had a higher mean HbA1C than other diabetic patients (8.9% vs. 7.0, $p<0.0001$). Patients who chose to quit smoking used on average 9.3 cigarettes per day versus 10.8 for smokers who chose not to quit ($p=0.94$). Patients who chose to work on their hypertension had a higher baseline systolic blood pressure than other hypertensive patients (143.8 mmHg vs. 129.6, $p<0.0001$).

Multivariable models also revealed associations between patients' baseline characteristics and their choice of chronic disease (Fig. 4). The choice of obesity as a focal condition was inversely associated with poor control of other conditions – elevations in systolic blood pressure (OR 0.78, 95% CI 0.66, 0.93) and HbA1c (OR 0.79, 95% CI 0.66, 0.95) – suggesting that patients weighed relative control of their conditions as they made prioritization decisions.

Other models revealed a similar pattern: patients weighed relative control of their conditions and chose to focus on those in poorer control. The choice of diabetes as a focal condition was associated with elevated HbA1c (OR 1.7, 95% CI 1.35, 2.2) and inversely associated with elevated BMI (0.92, 95% CI 0.87, 0.96). The choice of tobacco cessation was inversely associated with elevated HbA1C (OR 0.63, 95% CI 0.41, 0.98). The choice of hypertension was associated with baseline systolic blood pressure (1.05, 95% CI 1.32, 1.97) and age (OR 1.4, 95% CI 1.10, 1.86), and inversely associated with elevated HbA1c (0.60, 95% CI 0.44, 0.83).

3.2. Difficulty of goals

The mean weight loss goal for patients focusing on obesity was -16.8 pounds (SD 19.5), mean goal HbA1C reduction was -1.3% (SD 1.7%), and mean goal blood pressure reduction was -9.8 mmHg (SD 19.2 mmHg). Patients focusing on tobacco were assigned a cessation goal for measurement reasons.

Patients' self-rated commitment to achieving these goals was high: 4.9 (SD 3.0) on the Kanfer goal commitment scale ranging from 3 to 24, where 3 is highly committed. Patients' self-efficacy for goal achievement was also high: 3.8 (2.4) on the Kanfer self-efficacy scale ranging from 3 to 16, where 3 indicates the highest level of self-efficacy.

3.3. Action plans

Patients and community health workers created an average of 4.59 (SD 1.9) action plans for reaching chronic disease management goals. These action plans most commonly related to health behavior change (e.g. “start a weight-loss contest with my overweight daughters”) (58.9%) and psychosocial issues (e.g. “join a recreation center to help me cope with my brother’s death”) (23.5%). Fewer action plans related to health system navigation (e.g. “meet with pharmacist for medication teaching”) (8.5%), resources for daily life (e.g. “find low-income housing”) (8.0%), and medical issues (e.g. “talk to doctor about foot pain that limits my exercise”) (1.2%).

4. Discussion and conclusion

4.1. Discussion

We conducted this study in order to answer three key questions about collaborative goal-setting. First, are patients making the ‘right choices’ from a biomedical perspective? Second, how difficult are the goals that patients and providers are setting? Finally, what types of support will patients need to accomplish their goals? This study has three main findings that answered these questions and may inform the use of collaborative-goal setting as a strategy for chronic disease management among low-SES patients.

First, patients chose to work on conditions that were in poor control. They appeared to weigh relative control of their multiple conditions and made choices that were rational from a biomedical perspective, even though they were not explicitly asked to do so. This may be reassuring to providers who may worry about patients making irrational choices or ‘taking the easiest route’.

Second, patients and providers set chronic disease management goals that were ambitious compared to reports of what can be achieved with behavioral interventions. For instance, a recent meta-analysis of 37 studies of behavioral interventions for obesity found a mean weight loss of –6.2 pounds (95% CI –7.9, 22124.6) at 12 months [46]; in our study, high-risk patients and providers aimed for a –16.8 pound weight loss in 6 months. A meta-analysis of lifestyle interventions for diabetes control found an average HbA1c reduction of –0.29% (95% CI –0.61, 0.03%), at 6 months [47]. In our study, the average HbA1c reduction goal was –1.3%. Finally, a meta-analysis of lifestyle interventions for blood pressure reduction found an average systolic blood pressure reduction of –6.74 mmHg (95% CI: –8.25, –5.23) [48]; the systolic blood pressure reduction goal in our study was –9.8 mmHg.

Despite these discrepancies, patients in our study had high commitment and self-efficacy for achieving their chronic disease management goals. These findings may reflect a phenomenon of goal-setting exuberance [31]: individuals may be more likely to set ambitious goals at the outset of an endeavor, before they have the experience of trying to reach the goal and the attendant feedback of how difficult the goal may be [22,31]. This exuberance would suggest that providers need to encourage patients to set more realistic goals, or revise their goals on an ongoing basis. However, the final randomized controlled trial results – which will measure goal attainment (yes/no) as well as incremental

improvements towards the goal – are needed to understand whether such ambitious goals were motivating or self-defeating.

Third, when community health workers asked patients the open-ended question, “*What will you need to do in order to reach the health goal you set with your doctor?*” the answers were mostly non-clinical. Even health system navigation – e.g. obtaining appointments or referrals – was a relatively infrequent topic of patient-driven action plans (8.5%). This is interesting given that patient navigation and care coordination are central to many programs aimed at this population. Our findings suggest that when given the flexibility to do so, patients think broadly about the actions they will need to take in order to achieve chronic disease management goals, and may require support *beyond* the traditional domains of navigation and resource referral.

This study has several limitations. First, a conceptual issue is whether asking patients to select a disease is the best starting point. An alternate approach might be to ask patients their overall health goals (e.g. “I would like to be able to play with my grandchildren without feeling short of breath”) and then work with providers to select a disease or health behaviors that best help achieve that goal. The benefits of having patients select a disease *a priori* are that it requires less time and influence from busy provider who might be more prescriptive than collaborative given time constraints and the complexity of the decision. A second limitation of this study is that patients choosing to work on their tobacco dependence were asked to set a complete cessation goal. This goal may have dissuaded heavy smokers, and could explain why smokers who chose to work on tobacco dependence smoked slightly, though not significantly, less than those who were unwilling to quit. Third, while community health workers were open-ended in asking patients about their action-plans, patients may have been influenced by the prompts on the goal-setting decision aid and fact that community health workers were facilitating the conversation. Fourth, although this study suggests that our approach to collaborative goal-setting and action planning was feasible in a real-world practice, the final randomized controlled trial results are needed to evaluate effectiveness of this approach. Finally, this trial was designed to compare whether the community health worker support adds more collaborative goal-setting with the primary care provider. Since there is no placebo control arm, we will not be able to determine the effect of collaborative goal-setting versus usual care.

4.2. Conclusion

Helping high-risk patients achieve better control of their chronic conditions is a major goal of the health care system. Our study shows that when high-risk, low-SES patients are engaged in collaborative goal setting – they are able to self-identify high priority conditions, set ambitious goals and generate creative and individualized action plans. These lessons underscore the importance of engaging low-SES patients in the management of their chronic conditions and should reassure providers that these patients can handle being in the driver’s seat.

4.3. Practice implications

This article describes use of collaborative goal-setting among a very high-risk population: predominantly minority, low-income patients with multiple chronic conditions, high rates of trauma and significant hospital utilization. Patients were able to use a low-literacy visual aid to rationally prioritize one of their multiple chronic conditions, and collaboratively set challenging chronic disease management goals with their providers in a busy primary care clinic. Patients created action plans for reaching these goals that spanned domains suggesting that practices may require flexible personnel who can support patients using a blend of coaching, social support and navigation.

Acknowledgments

Funders

This work was supported by a grant from the University of Pennsylvania Institute for Translational Medicine and Therapeutics.

References

1. Verlinde E, De Laender N, De Maesschalck S, Deveugele M, Willems S. The social gradient in doctor-patient communication. *Int J Equity Health*. 2012; 11:12. [PubMed: 22409902]
2. Willems S, DeMaesschalck S, Deveugele M, Derese A, De Maeseneer J. Socioeconomic status of the patient and doctor-patient communication: does it make a difference. *Patient Educ Couns*. 2005; 56:139–146. [PubMed: 15653242]
3. Roter DL, Stewart M, Putnam SM, Lipkin M Jr, Stiles W, Inui TS. Communication patterns of primary care physicians. *JAMA*. 1997; 277:350–356. [PubMed: 9002500]
4. Kaplan SH, Gandek B, Greenfield S, Rogers W, Ware JE. Patient and visit characteristics related to physicians' participatory decision-making style: results from the Medical Outcomes Study. *Med Care*. 1995; 33:1176–1187. [PubMed: 7500658]
5. Kangovi S, Barg FK, Carter T, et al. Challenges faced by patients with low socioeconomic status during the post-hospital transition. *J Gen Intern Med*. 2014; 29:283–289. [PubMed: 23918162]
6. Kangovi S, Barg FK, Carter T, et al. Challenges faced by patients with low socioeconomic status during the post-hospital transition. *J Gen Intern Med*. 2014; 29(2):283–289. doi: <http://dx.doi.org/10.1007/s11606-013-2571-5> Epub 2013 Aug 6. [PubMed: 23918162]
7. Montori VM, Gafni A, Charles C. A shared treatment decision-making approach between patients with chronic conditions and their clinicians: the case of diabetes. *Health Expect*. 2006; 9:25–36. [PubMed: 16436159]
8. Bodenheimer T, Handley MA. Goal-setting for behavior change in primary care: an exploration and status report. *Patient Educ Couns*. 2009; 76:174–180. [PubMed: 19560895]
9. Stretcher VJSG, Kok GJ, Latham GP, Glasgow R, DeVellis B, et al. Goal setting as a strategy for health behavior change. *Health Educ Q*. 1995; 22:190–200. [PubMed: 7622387]
10. Schafer LC, Glasgow RE, McCaul KD. Increasing the adherence of diabetic adolescents. *J Behav Med*. 1982; 5:353–362. [PubMed: 7131549]
11. Epstein LH, Wing RR, Koeske R, Ossip D, Beck S. A comparison of lifestyle change and programmed aerobic exercise on weight and fitness changes in obese children. *Behav Ther*. 1982; 13:651–665.
12. Martin JE, Dubbert PM, Katell AD, et al. Behavioral-control of exercise in sedentary adults – studies 1 through 6. *J Consult Clin Psychol*. 1984; 52:795–811. [PubMed: 6501665]
13. Estabrooks PA, Nelson CC, Xu S, et al. The frequency and behavioral outcomes of goal choices in the self-management of diabetes. *Diabetes Educ*. 2005; 31:391–400. [PubMed: 15919639]

14. Patrick K, Calfas KJ, Norman GJ, et al. Randomized controlled trial of a primary care and home-based intervention for physical activity and nutrition behaviors – PACE+ for adolescents. *Arch Pediatr Adolesc Med.* 2006; 160:128–136. [PubMed: 16461867]
15. Naik AD, Kallen MA, Walder A, Street RL Jr. Improving hypertension control in diabetes mellitus: the effects of collaborative and proactive health communication. *Circulation.* 2008; 117:1361–1368. [PubMed: 18316489]
16. Naik AD, Palmer N, Petersen NJ, et al. Comparative effectiveness of goal setting in diabetes mellitus group clinics: randomized clinical trial. *Arch Intern Med.* 2011; 171:453–459. [PubMed: 21403042]
17. Glasgow RE, Toobert DJ. Brief, computer-assisted diabetes dietary self-management counseling: effects on behavior, physiologic outcomes, and quality of life. *Med Care.* 2000; 38:1062–1073. [PubMed: 11078048]
18. Baron P, Watters RG. Effects of goal-setting and of goal levels on weight-loss induced by self-monitoring. *Int Rev Appl Psychol.* 1982; 31:369–382.
19. Alexy B. Goal setting and health risk reduction. *Nurs Res.* 1985; 34:283–288. [PubMed: 3850489]
20. 2011. (Accessed at <http://www.ncqa.org/Programs/Recognition/PatientCenteredMedicalHomePCMH.aspx>.)
21. Brown EJ, Kangovi S, Sha C, et al. Exploring the patient and staff experience with the process of primary care. *Ann Fam Med.* 2015; 13:347–353. [PubMed: 26195680]
22. Locke EA, Latham GP. Building a practically useful theory of goal setting and task motivation. A 35-year odyssey. *Am Psychol.* 2002; 57:705–717. [PubMed: 12237980]
23. Glasgow RE, Toobert DJ, Hampson SE. Effects of a brief office-based intervention to facilitate diabetes dietary self-management. *Diabetes Care.* 1996; 19:835–842. [PubMed: 8842601]
24. Calfas KJ, Sallis JF, Zabinski MF, et al. Preliminary evaluation of a multicomponent program for nutrition and physical activity change in primary care: PACE+ for adults. *Prev Med.* 2002; 34:153–161. [PubMed: 11817910]
25. Goldberg HI, Lessler DS, Mertens K, Eytan TA, Cheadle AD. Self-management support in a web-based medical record: a pilot randomized controlled trial. *Jt. Comm. J Qual Saf.* 2004; 30:629–635. 589.
26. Handley M, MacGregor K, Schillinger D, Sharifi C, Wong S, Bodenheimer T. Using action plans to help primary care patients adopt healthy behaviors: a descriptive study. *J Am Board Fam Med.* 2006; 19:224–231. [PubMed: 16672675]
27. Kangovi SC, Charles T, Smith D, Glanz RA, Long K, Grande JA. Towards a scalable, patient-centered community health worker model: adapting the IMPaCT intervention for use in the outpatient setting. *Popul. Health Manage.* 2016 in press.
28. Kangovi S, Mitra N, Grande D, et al. Patient-centered community health worker intervention to improve posthospital outcomes: a randomized clinical trial. *JAMA Intern Med.* 2014; 174:535–543. [PubMed: 24515422]
29. Kangovi S, Grande D, Carter T, et al. The use of participatory action research to design a patient-centered community health worker care transitions intervention. *HealthCare.* 2014; 2:136–144. [PubMed: 26250382]
30. Benowitz NL, Bernert JT, Caraballo RS, Holiday DB, Wang J. Optimal serum cotinine levels for distinguishing cigarette smokers and nonsmokers within different racial/ethnic groups in the United States between 1999 and 2004. *Am J Epidemiol.* 2009; 169:236–248. [PubMed: 19019851]
31. Locke EA, Latham GP. New developments in goal setting and task performance.
32. Piantadosi S. Block Stratified Randomization Windows Version 6.0. 2010
33. Behavioral Risk Factor Surveillance System. 2012. <http://www.cdc.gov/Brfss.2012>. Accessed at.
34. Weiner JP, Starfield BH, Steinwachs DM, Mumford LM. Development and application of a population-oriented measure of ambulatory care case-mix. *Med Care.* 1991; 29:452–472. [PubMed: 1902278]
35. Health Tracking Household Survey. Inter-University Consortium for Political and Social Research. 2007

36. Maruish, ME., Kosinski, M. A Guide to the Development of Certified Short Form Interpretation and Reporting Capabilities. Quality Metric Inc; Lincoln, RI: 2009.
37. Hibbard JH, Stockard J, Mahoney ER, Tusler M. Development of the Patient Activation Measure (PAM): conceptualizing and measuring activation in patients and consumers. *Health Serv Res.* 2004; 39:1005–1026. [PubMed: 15230939]
38. Mitchell PH, Powell L, Blumenthal J, et al. A short social support measure for patients recovering from myocardial infarction: the ENRICH Social Support Inventory. *J Cardiopulm Rehabil.* 2003; 23:398–403. [PubMed: 14646785]
39. Morris NS, MacLean CD, Chew LD, Littenberg B. The Single Item Literacy Screener: evaluation of a brief instrument to identify limited reading ability, *BMC Fam. Pract.* 2006; 7:21.
40. Hooper LM, Stockton P, Krupnick JL, Green BL. Development, use, and psychometric properties of the trauma history questionnaire. *J Loss Trauma.* 2011; 16:258–283.
41. Smith PC, Schmidt SM, Allensworth-Davies D, Saitz R. A single-question screening test for drug use in primary care. *Arch Intern Med.* 2010; 170:1155–1160. [PubMed: 20625025]
42. Smith PC, Schmidt SM, Allensworth-Davies D, Saitz R. Primary care validation of a single-question alcohol screening test. *J Gen Intern Med.* 2009; 24:783–788. [PubMed: 19247718]
43. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav.* 1983; 24:385–396. [PubMed: 6668417]
44. Gelberg L, Gallagher TC, Andersen RM, Koegel P. Competing priorities as a barrier to medical care among homeless adults in Los Angeles. *Am J Public Health.* 1997; 87:217–220. [PubMed: 9103100]
45. Kanfer R, Ackerman PL. Motivation and cognitive-abilities – an integrative aptitude treatment interaction approach to skill acquisition. *J Appl Psychol.* 1989; 74:657–690.
46. Hartmann-Boyce J, Johns DJ, Jebb SA, Aveyard P. Effect of behavioural techniques and delivery mode on effectiveness of weight management: systematic review, meta-analysis and meta-regression. *Obes Rev.* 2014; 15:598–609. [PubMed: 24636238]
47. Terranova CO, Brakenridge CL, Lawler SP, Eakin EG, Reeves MM. Effectiveness of lifestyle-based weight loss interventions for adults with type 2 diabetes: a systematic review and meta-analysis. *Diabetes Obes Metab.* 2015; 17:371–378. [PubMed: 25523815]
48. Saneei P, Salehi-Abargouei A, Esmailzadeh A, Azadbakht L. Influence of Dietary Approaches to Stop Hypertension (DASH) diet on blood pressure: a systematic review and meta-analysis on randomized controlled trials. *Nutr Metab Cardiovasc Dis.* 2014; 24:1253–1261. [PubMed: 25149893]

Fig. 1.
Study Procedures.

Mrs. Jones has tobacco dependence, hypertension and diabetes:

- She reads about behaviors that are proven to help with each of her conditions.
- She has been smoking more since the recent murder of her son and doesn't think she can set a quit date now. She's already started the DASH diet and feels good about maintaining her blood pressure. But she does want to meet a nutritionist and commit to taking her insulin.
- Mrs. Jones explains to her PCP that she would like to work on her diabetes. They set a goal to lower her HbA1C from 9.5% to 8.5% over 6 months.

My Health Goals		
I want to focus on my:	Working on this condition means doing things like:	By 6 months from now I will:
Smoking 10 cpd Last visit 15cpd Today	<ul style="list-style-type: none"> ♦ Write down all the reasons why you want to quit ♦ Set a quit date ♦ Tell your friends, family, and coworkers that you plan to quit, and ask for their help ♦ Use stop-smoking gum, pills, patch, nasal spray, or lozenge. ♦ Get rid of cigarettes from your home, car, and work 	Quit Smoking
Blood Pressure 165 Last visit 130 Today	<ul style="list-style-type: none"> ♦ Eat less salt (avoid canned foods and eat out less) ♦ Talk to your doctor about starting blood pressure medication or be stricter about taking your meds ♦ Lose weight ♦ Exercise at least 30 minutes a day ♦ Go on the DASH Diet (lots of fruits and vegetables, less meat) 	Get my Systolic Blood Pressure to OR ☐ Maintain STOP If > 130mmHg
Diabetes 9.2% Last visit 9.5% Today	<ul style="list-style-type: none"> ♦ Exercise for at least 150 minutes a week ♦ Talk with your doctor about medications or insulin treatment or be stricter about taking your meds ♦ Meet with a nutritionist 	Get my Hemoglobin A1C to 8.5% OR ☐ Maintain STOP If > 7.0%
Weight Last visit Today	<ul style="list-style-type: none"> ♦ Meet with a nutritionist and plan a low cal diet ♦ Keep a food diary ♦ Start a program like Weight Watchers ♦ Decrease your "Screen Time" ♦ Start a weight-loss contest with friends and coworkers ♦ Exercise for at least 30-60 minutes per day ♦ Weight loss surgery 	Get my Weight to OR ☐ Maintain STOP If > 200lb

© Penn Center for Community Health Workers

Fig. 2.
Collaborative goal-setting aid.

Fig. 3.
Prevalence, choice and baseline control.

Fig. 4.

Association between baseline characteristics and choice of condition.

Table 1

Baseline characteristics.

	Overall (n=302)	Goal-setting alone (n=152)	Goal-setting plus CHW (n=150)	P value
Female	228 (75.5)	113 (74.3)	115 (76.7)	0.64
African American	286 (94.7)	144 (94.7)	142 (94.7)	0.98
Hispanic	8 (2.7)	4 (2.7)	4 (2.8)	0.28
Employed	42 (14.0)	12 (8.0)	30 (20.1)	0.002
Household Income <15 K *	135 (55.6)	72 (58.5)	63 (52.5)	0.34
Trauma History †	290 (96.3)	144 (94.7)	146 (98.0)	0.13
Low Social Support	59 (19.6)	30 (19.7)	29 (19.5)	0.95
Public insurance	248 (82.1)	128 (84.2)	120 (80.0)	0.34
Delayed Health Need	115 (38.5)	56 (37.1)	59 (39.9)	0.62
Unmet Health Need	46 (15.4)	22 (14.6)	24 (16.2)	0.69
Lack of basic needs	90 (29.8)	48 (31.6)	42 (28.0)	0.50
Alcohol overuse	64 (21.4)	33 (22.0)	31 (20.8)	0.80
Drug use	34 (11.3)	14 (9.3)	20 (13.4)	0.26
Age, y	56.3 (13.1)	56.1 (12.6)	56.6 (13.6)	0.69
Self-rated health				
Mental Component	44.8 (13.2)	45.1 (13.3)	44.5 (14.8)	0.71
Physical Component	35.7 (11.4)	34.8 (11.1)	36.5 (11.8)	0.19
Patient Activation Measure	60.9 (13.5)	61.8 (13.7)	60.0 (13.1)	0.34
Perceived stress	5.9 (3.8)	5.8 (3.9)	5.9 (3.7)	0.82
Health Literacy	2.2 (1.3)	2.2 (1.3)	2.1 (1.3)	0.56
ER visits in prior 12 mos	1.9 (4.4)	2.1 (4.2)	1.7 (4.5)	0.31
Admissions in prior 12 mos	0.9 (2.6)	1.0 (2.7)	0.8 (2.4)	0.21
Severity of illness	3.6 (0.8)	3.6 (0.8)	3.5 (0.8)	0.21

Values are expressed as n (percentage) or mean $\pm$ SD unless otherwise indicated. Scales from 1 to 100 unless otherwise indicated.

*

For all variables, there is <5% missing data, except for Household Income which has 19.5% missing data.

Scales:

Trauma: Any item endorsed on the 24-item Trauma History Questionnaire which assesses a range of trauma events in three areas: (a) crime-related events (e.g., robbery, mugging), (b) general disaster and trauma (e.g., injury, disaster, witnessing death), and (c) unwanted physical and sexual experiences.

Basic Needs: Shelter, food, wash, bathroom, transportation, telephone. Scores ranged from 4 to 16, score ≥ 5 threshold for some difficulty.

Perceived stress: measured on scale of 0 (low) to 16 (high).

Health literacy: measured on a scale of 5 (low) to 1 (high).

Severity of illness: measured by ACG score of 0 (low) to 5 (high).