

ORIGINAL RESEARCH

Examining Variations in Action Plan Quality Among Adults With Type 2 Diabetes in Primary Care

Pernille H. Kjaer, BS, Lawrence Fisher, PhD, Michael B. Potter, MD, Mansi Dedhia, MPH, José Parra, BS, Niels Ejlskjær, MD, PhD, Søren Skovlund, MSc, and Danielle Hessler, PhD

Introduction: Collaborative goal setting and action-planning are key elements of self-management support for people with type 2 diabetes mellitus (T2DM), however little is known regarding action plan quality or correlation of quality in primary T2DM care.

Methods: T2DM patients from 12 primary care sites participated in either: Connection to Health (CTH; 6 practices), consisting of a health survey followed by collaborative action planning, or Enhanced Engagement CTH (EE-CTH; 6 practices), including additional training in relationship building promoting patient engagement. Action plan quality was rated using an adapted version of the Goal-Setting Evaluation Tool for Diabetes (GET-D) (dual coding of 20%, inter-rater reliability [IRR] >80%). Associations with patient characteristics were examined using generalized linear mixed models adjusting for clustering by clinic and intervention arm.

Results: With a mean score \pm standard deviation (SD) of 14.62 ± 3.87 on a 0 to 20 scale ($n = 725$), overall action plan quality was moderate-high. Higher health literacy ($\beta = 1.184$, 95% CI, 0.326–2.041; $P = .007$), and having no social risks ($\beta = 0.416$; 95% CI, 0.062–0.770; $P = .021$) were associated with higher action plan quality, whereas sex, age, language, education level, depression, stress, and health distress were unrelated to quality (P value not significant). Higher quality was associated with greater patient confidence in the plan ($\beta = 0.050$; 95% CI, 0.016–0.084, $P = .004$).

Conclusions: Although there was a considerable difference in action plan quality ratings, ratings did not systematically differ based on most patient demographic or mental health measures. Results suggest that action planning should be tailored to health literacy and social risks. Further research should examine associations between quality and longer-term clinical outcomes. (J Am Board Fam Med 2021;34:608–617.)

Keywords: Chronic Disease, Disease Management, Health Literacy, Health Surveys, Patient Participation, Patient-Centered Care, Patient-Reported Outcome Measures, Primary Health Care, Self-Management, Type 2 Diabetes Mellitus

Introduction

Diabetes management is complex and relies heavily on developing patients' self-management skills since less than 1% of the patient's time is spent with a

health care professional.¹ The Patient-Centered Medical Home (PCMH) and Chronic Care Model (CCM) provide complementary frameworks that highlight the importance of active, personalized Self-Management Support (SMS) to improve patient outcomes.^{2–6} Up to 95% of the variation in diabetes outcomes result from disease-related behaviors that require self-management.⁷ A person with diabetes (PWD) must learn to attend to a healthy diet, regular exercise, and an often complex medication regime, while simultaneously coping with common diabetes and non-diabetes-related stresses and psychological comorbidities, such as depression symptoms.^{8–10} Self-management support (SMS) is a necessary part of diabetes care,^{4,11} with collaborative goal setting and specific short-term

This article was externally peer reviewed.
Submitted 10 June 2020; revised 20 November 2020; accepted 22 November 2020.

From the Department of Endocrinology, Aalborg University Hospital, Denmark (PHK, NE); Department of Clinical Medicine, Aalborg University, Denmark (PHK, NE, SS); Department of Family and Community Medicine, University of California-San Francisco, USA (PHK, LF, MBP, MD, JP, DH); Steno Diabetes Center North Denmark, Aalborg University Hospital (NE, SS).

Funding: This research was funded by NIH Grant DK108039. Lundbeck Foundation grant.

Conflict of interest: None.

Corresponding author: Pernille Horsted Kjaer, BS, UCSF Box 0900, San Francisco, CA 94143 (E-mail: p.horsted@rn.dk).

action-planning serving as key elements of SMS and key tenets of primary care quality improvement.^{1,4,12-14} Primary care-based programs focused on goal setting and action planning have been linked in multiple studies with improved outcomes for diabetes, including decreases in HbA1c and increases in medication-taking and positive lifestyle changes.¹⁵⁻¹⁸ Although goal setting and action planning have been viewed favorably by clinicians in primary care,¹⁹ little is known about the quality of action plans created. This current gap in our knowledge constrains building knowledge around how best to identify important action plan components and where greater support or tailoring of care is needed.

To be effective, SMS can not be a “1-size-fits-all” approach.²⁰ To deliver person-centered care the provider needs to be aware of the patient’s greater daily life context and goals in conjunction with treatment plans.^{8,21} This includes how they are feeling (eg, diabetes distress and depression), their cognitive capacities, as well as social risks (eg, food, housing), and other life circumstances that can affect their capacity to engage in action-planning and behavior change.^{14,22} Validated patient-reported outcome (PRO) measures provide a systematic way to collect this information, and when used appropriately, have been shown to increase the focus on the PWD in clinical consultations and act as a decision support tool for clinicians.²¹ Understanding the extent to which patient characteristics and aspects of their life context are associated with action-planning can help identify crucial indicators for the provider to attend to before or while building these plans with individual patients to strengthen SMS delivery. For example, if depression symptoms are associated with low-quality action planning, then addressing depression either before or as part of the action planning process may be important. If low health literacy is associated with low-quality action plans, the approach to action planning may need to be adjusted for the patient to benefit from it.²³

Connection to Health (CTH) and enhanced engagement CTH (EE-CTH) are 2 versions of an electronic tool created to facilitate SMS at the point of care in underserved or under-resourced primary care settings, to develop effective patient-centered action plans, and associated with decreasing in HbA1c in previous research.¹⁵ The program collects a comprehensive set of PROs through a health survey and guides providers and the PWD through a process of reviewing the PRO data, goal setting, and collaborative action planning. The action plans focus

on a goal collaboratively selected by the PWD and their health care provider.¹

The aims of the current study were to (1) assess the quality of action plans created in primary diabetes care across twelve Community Health Centers (CHCs) and to assess the extent to which these differ based on patient demographic factors (sex, age, language, race, educational level, and health literacy) and PROs related to life context (depression symptoms, general life stress, health-distress, and social risk factors (eg, food insecurity); and (2) examine the associations between action plan quality, patient demographic factors, and PROs with PWDs’ perceived confidence in carrying out their action plan.

Methods

Design

This study includes PROs and action plans created in type 2 diabetes mellitus (T2DM) primary care visits as part of a 12-month 2-arm, pragmatic, cluster-randomized controlled trial designed to estimate the effect of implementing 2 versions of the CTH electronic program (CTH and EE-CTH), in CHCs. Both programs included an assessment of patient characteristics and PROs followed by either a focus on management-change action planning (CTH) or enhanced engagement (EE-CTH) action planning.

Sample

Twelve primary care CHCs in the San Francisco Bay Area were cluster randomized into the 2 arms of the study (6 practices each). Randomization was based on health system membership and T2DM panel size using a balancing criterion; with 1 randomization solution selected at random from the array of balanced randomization solutions.²⁴⁻²⁸ Twelve clinical sites were enrolled from 5 safety-net health systems within the San Francisco Bay Area Collaborative Research Network²⁹ (10 sites from 4 federally qualified health centers and 2 sites from 1 county health system). The clinics were responsible for the enrollment of eligible patients and the delivery of the CTH/EE-CTH programs using existing staff and providers with workflows modified as needed by the clinics to include the program elements. Patients were 18 years or older, diagnosed with T2DM, and receiving care at the clinic for 12 months or more before enrollment, and able

to read in English or Spanish (greater than a sixth-grade level). The program was available in English and Spanish. Exclusion criteria included those with severe mental or cognitive disorders. Data for this study were collected between 2017 to 2020 and analyzed from 2019 to 2020.

Procedure

The CTH program guides patients and health care providers through multiple steps: (1) the PWD completes an electronic health survey that assesses 15 areas of self-management and contextual circumstances that may impact self-management (Figure 1), and identifies possible self-management problems; (2) based on the reviewed survey results, the PWD prioritizes 1 to 2 areas they want to discuss with their health care provider; (3) the health care provider review the results with the PWD; and (4) in collaboration, the PWD and health care provider selects a goal from a list of the identified self-management problems or a custom goal and create a detailed action plan (Figure 2). The electronic action plan is structured with written prompts and free text space to guide the provider and PWD through steps of action planning, including goal selection, brainstorming actions (what the PWD will do), selecting and creating a detailed plan for 1 action (when, how often, where), barriers to acting on the plan, and confidence in carrying out the plan.

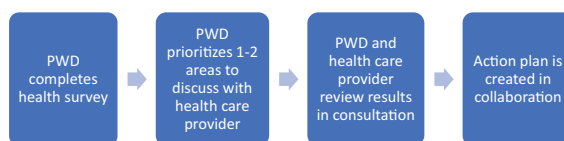
As a part of the study design, practices selected a subset of 2 to 5 health care providers who would participate in a 6-hour training program that included an introduction to SMS and a group-

Figure 1. Self-management Problems Used as Goals in Action Plans.



Figure 2. Outline of the Connection to Health Steps.

Abbreviation: PWD; person with diabetes.



based, live tutorial on how to use the CTH system. Providers in EE-CTH received the same training as well as additional training in engagement and relationship-building skills. The protocol was approved by the University of California, San Francisco Institutional Review Board (15-17033).

Measures

Health Survey

The patient health survey captures key patient demographic factors, including age, sex, educational level, race and language (English or Spanish), and 15 areas of behavioral self-management or life context. Given the focus on factors from an individual’s life context that may influence their action plan quality, the following areas were selected. Health literacy was measured by the single screener item “How confident are you filling out medical forms by yourself?” on a 5-point scale ranging from “not at all confident” to “extremely confident.”³⁰

Mental health measures included depression symptoms,^{31,32} health distress,^{33,34} and general life stress.³⁵ Depression symptoms were assessed using the Patient Health Questionnaire-8 (PHQ-8; omitting the suicidal ideation item) with a score range of 0 to 24 (elevated symptoms noted by scores of 10 or greater).^{31,32} Health-related distress was measured using a modified version of the Diabetes Distress Scale 2-item screen (DDS-2): “How much of a problem have the following been for you over the past month?” (1) “Feeling overwhelmed by my health problems” and (2) “Feeling that I was failing to do what I should be doing to manage my health problem” on a 5-point scale ranging from “not a problem” (1) to “a very serious problem” (5) (elevated symptoms noted by mean scores of 2 or greater).^{33,34} General life stress was assessed with the single item: “In the past week, have you been under a lot of stress due to a major change or event or from a stressful situation (for example, family, work, or financial problems)?” using a yes/no response option.³⁵

Finally, social risks were measured by 6 items (yes/no) developed in previous work using the following question: “Are you experiencing any of the following?” (1) “Running out of food before having enough money or food stamps to buy more,” (2) “Problems paying bills, like electric, gas, water, or phone bills,” (3) “Not having enough money to pay for bus fare or access to reliable transportation to medical appointments,” (4) “Unstable housing including eviction, foreclosure, homelessness or staying with friends/family,” (5) “Have you been hit, slapped, kicked, or physically hurt by someone in the past year?”, and 6) “Do you feel safe where you live?”^{36–38} Additional behavioral measures of the health survey included: diet,^{39–41} physical activity,⁴² medication adherence,^{43–45} tobacco use,^{46,47} and alcohol consumption.^{48,49} These were included as action plan goals areas but not as predictors of action plan quality.

Confidence in carrying out the action plan was measured on a scale of 0 to 10 after action plan completion, with low scores indicating low confidence in carrying out the plan and high scores indicating high confidence.^{13,14} In the current study, efforts were made to assure that each patient had a minimum level of confidence in their plan before it was completed. Providers were encouraged, but not required, to continue working on each action plan with patients until a confidence level of ≥ 8 was reached.

Action Plan Quality

Text from action plans was electronically captured by the CTH/EECTH system and coded by members of the research team using an adapted version of the previously validated Goal-Setting Evaluation Tool for Diabetes (GET-D). GET-D is a coding system that enables reliable and valid ratings of the quality of written goals and action plans.⁵⁰ To characterize inter-rater reliability (IRR), 20% of action plans were dual coded to reach an IRR of $> 80\%$. See Table 2 for the 8 coding elements and scoring. One aspect of the GET-D, whether the action plan is feasible for the patient to carry out or not,⁵⁰ was omitted because of its potential subjectivity.

Data Analysis

Descriptive statistics were computed to document score distributions. Tests of association between the dimensions of action plan quality and patient

and practice level variables were initially examined in unadjusted analyses including Pearson’s and Spearman’s correlations for continuous and ordinal variables, respectively. To adjust for clustering by clinic and intervention arm, the same associations were then calculated using Generalized Linear Mixed Models (GLMM) with a random effect for clinic and intervention arm. Data were analyzed using SPSS v.26 software (IBM, Armonk, NY).

Results

Across the 12 clinical sites, 725 patients completed the health survey and made an action plan in consultation with a health care provider ($n = 382$ for CTH and $n = 343$ for EE-CTH). Patient participants were on average $55.6 (\pm 12.0)$ years of age, 59.7% were female and 41.0% had not completed high school. The majority identified themselves as Latinx (70.5%); 56.4% completed the assessment in Spanish with the remaining in English. The health survey indicated elevated symptoms of depression (PHQ score of ≥ 10) in 15.8% of the patients and 46.3% reported having ≥ 1 social risk factor. Patient characteristics are presented in Table 1 with group differences noted where the differences reached statistical significance.

Thirty-seven health care providers across the 12 clinical sites delivered the action planning protocol as part of CTH or EECTH. Providers were a mix of health educators (24.3%), patient navigators (18.9%), medical assistants (18.9%), volunteers (16.2%), nurses (10.8%), dietitians (8.1%), and physicians (2.7%). There was no difference in action plan quality by provider role, except for relatively lower quality action planning by patient navigators compared with all others (all comparisons $P < .005$).

Quality of Action Plans in Primary Diabetes Care

Overall, the quality of action plans assessed by the GET-D across clinics was moderately-high with a mean score \pm SD of 14.62 ± 3.87 on a 0 to 20 quality scale. While all action plans identified a diabetes management goal, the greatest variability occurred around action plan specificity and plan details (eg, frequency, locations; Table 2). Most action plans focused on different aspects of diet (41.9%) or physical activity (30.2%); a smaller number of patients made action plans focusing on weight

Table 1. Patient Characteristics

Characteristic	N	n (%)	Mean ± SD
Age, years	715		55.6 ± 12.0
Sex (% female)	725	433 (59.7)	
Education	725		
Less than high school		297 (41.0)	
High school or higher		428 (59.0)	
Race and ethnicity ^{1*}	725		
Latinx		511 (70.5)	
Non-Latinx white		64 (8.8)	
Black or African American		55 (7.6)	
Asian		43 (5.9)	
Native Hawaiian or Other Pacific Islander		12 (1.7)	
Native American or Alaska Native		4 (0.4)	
Multi-racial		36 (5.0)	
Primary language (% Spanish, remaining English)	725	409 (56.4)	
Health literacy (confidence in filling out medical forms?) *	724		
Not at all confident		109 (15.1)	
A little bit		99 (13.7)	
Somewhat		135 (18.6)	
Quite a lot		146 (20.2)	
Extremely confident		235 (32.5)	
Depression			
PHQ-8 score	724		3.23 ± 5.76
Elevated depression symptoms (PHQ-8 ≥ 10)	711	112 (15.8)	
Health distress*	721	452 (62.7)	
General life stress*	723	342 (47.3)	
Social risks (≥ 1)	725	336 (46.3)	
Food insecurity	723	144 (19.9)	
Inability to pay bills	723	196 (27.1)	
Difficulty with transportation to medical appointments	723	100 (13.8)	
Unstable housing	723	74 (10.2)	
Physical abuse in the last year	725	24 (3.3)	
Feel unsafe where living*	725	80 (11.0)	

SD, standard deviation; PHQ-8, Patient Health Questionnaire-8.

*These are significantly different in the two intervention arms: Connection to Health (CTH) and Enhanced Engagement-CTH (EE-CTH) at a significance of $P < .05$.

Table 2. Goalsetting Evaluation Tool for Diabetes (GET-D)⁵⁰

Elements in the GET-D	Points	Mean ± SD
1. Is the goal a diabetes-related self-management task?	1.00	1.00 (0.00)
2. Does the goal identify a specific time frame for achieving the goal?	3.00	3.00 (0.00)
3. Is the action plan related to the stated goal?	1.00	0.72 (0.45)
4. Does the plan identify a single specific action?	3.00	2.52 (1.10)
5. Does the plan identify how often the action will take place?	3.00	2.03 (1.40)
6. Does the plan identify a location for the action?	3.00	1.36 (1.49)
7. Does the plan identify the time it will take place?	3.00	1.44 (1.50)
8. Does the plan identify how the action will be monitored?	3.00	2.73 (0.86)

SD, standard deviation.

(8.0%), taking medications (6.1%), and general life stress (4.8%) (Figure 3). Mean action plan quality across the 12 clinics ranged from 12.39 ± 3.71 to 16.97 ± 2.84 . Statistically, significantly higher quality plans were created in clinics using the CTH program with a mean quality of 15.10 ± 3.73 compared with 14.10 ± 3.96 in clinics using the EE-CTH program ($t(723)=3.49, P=.001$). Given the statistically significant between-group difference, we adjusted all GLMMs to control for intervention conditions (CTH and EE-CTH).

Patient Characteristics Associated with Action Plan Quality

Lower patient health literacy was significantly associated with lower action plan quality ($P=.007$): individuals who endorsed having the most difficulty around health literacy had a mean score and SD of 13.62 ± 3.85 compared with those who expressed no difficulty with a mean score of 14.63 ± 3.88 . The presence of social risks was also related to action plan quality ($P=.021$); individuals who reported having at least 1 social risk had a mean (S.D.) quality score of 14.37 ± 3.94 versus 14.84 ± 3.81 for those with no social risks. Among the individual social risks, only physical abuse, endorsed by 3.3% of the sample, reached statistical significance (Table 3). Other life contextual variables examined, including depression symptoms, general life stress, and health-distress were all unrelated to action plan quality. Patient demographic factors (age, sex, language, education

level) also were unrelated to action plan quality, except for race. Individuals who identified as multi-racial or Native Hawaiian/Pacific Islander received lower action plan quality scores compared with individuals identifying as Latinx ($P=.045$ and 0.057 respectively), though the sample size for both groups was small ($n = 36$ and 12 respectively). Furthermore, there was no association between action plan quality and the self-management area targeted for change, for example, diet, physical activity, or stress ($r_s = -0.002, P=.954$). Nor was there a pattern of significant interactions between the intervention arm (CTH vs EE-CTH) and patient characteristics or life contextual variables.

Action Plan Quality and Patient-Reported Confidence in Carrying Out the Plan

On average, patients had high confidence in carrying out their plans with a mean confidence level of 8.56 ± 1.58 on a scale of 0 to 10. The patient's confidence in carrying out their action plans was positively related to the quality of the action plan ($n = 725, \beta = 0.050$, standard error [SE]=0.018, 95% CI, 0.016–0.084, $P=.004$). Confidence level was also related to race: identifying as non-Latinx white was associated with relatively lower confidence of 8.28 ± 1.50 in carrying out the plan ($\beta = -0.310$, 95% CI, 0.599–0.020; $P=.036$) compared with Latinx with a mean confidence of 8.59 ± 1.62 . Confidence level was not significantly associated

Figure 3. Most Prevalently Selected Self-Management Areas; (n = 725).

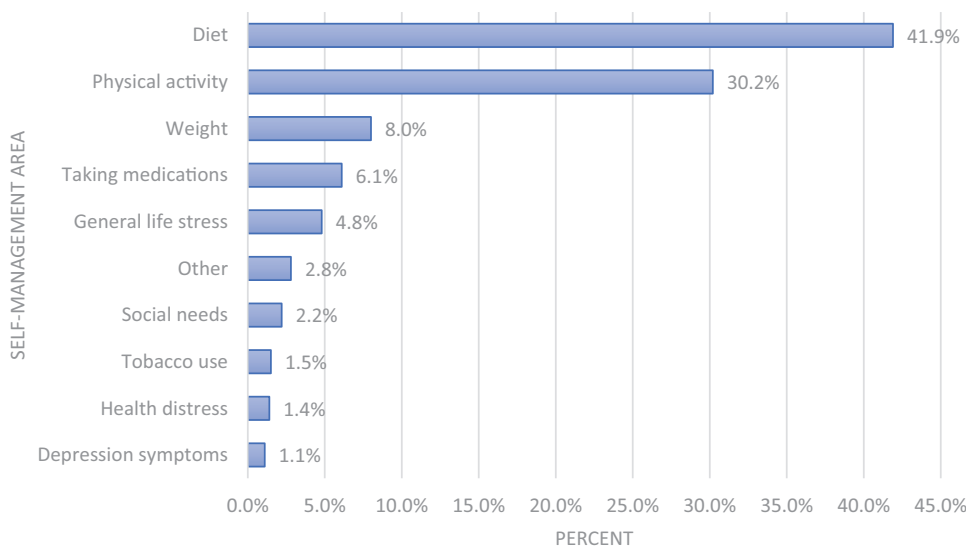


Table 3. Associations Between Action Plan Quality and Patient Characteristics. Analyzed Using Generalized Linear Mixed Models With Random Effect for Clinic, Adjusting for Intervention Arm

Characteristic	N	β	SE	95% CI	P Value
Age, years	715	-0.006	0.012	-0.029 to 0.016	.597
Sex	725	-0.187	0.308	-0.790 to 0.416	.543
Education (binary)	725	-0.258	0.336	-0.916 to 0.401	.444
Race (compared to Latinx) ¹					
Non-Latinx white	725	-0.127	0.669	-1.437 to 1.184	.850
Black or African American	725	0.191	0.765	-1.308 to 1.689	.803
Asian	725	-0.275	0.577	-1.407 to 0.856	.634
Native Hawaiian or Other Pacific Islander	725	-1.889	0.993	-3.834 to 0.056	.057
Native American or Alaska Native	725	-0.980	0.936	-2.815 to 0.854	.295
Multi-racial	725	-1.531	0.764	-3.028 to -0.035	.045
Language	725	0.006	0.442	-0.859 to 0.871	.990
Health literacy (Confidence in filling out medical forms? compared to "Not at all confident")					
"Extremely confident"	724	1.184	0.438	0.326 to 2.041	.007
"Quite confident"	724	1.016	0.429	0.176 to 1.856	.018
"Somewhat confident"	724	1.005	0.467	0.090 to 1.920	.031
"A little bit confident"	724	1.115	0.464	0.205 to 2.025	.016
Depression (PHQ-8 score)	724	-0.029	0.024	-0.077 to 0.018	.225
Health distress (binary)	721	-0.226	0.275	-0.766 to 0.313	.411
General life stress	723	0.208	0.266	-0.313 to 0.613	.434
Social risks (≥ 1)	725	0.416	0.181	0.062 to 0.770	.021
Food insecurity	723	0.424	0.266	0.096 to 0.945	.110
Inability to pay bills	723	0.352	0.212	-0.063 to 0.767	.096
Lack of transportation	723	0.351	0.567	-0.759 to 1.462	.535
Unstable housing	723	0.651	0.385	-0.139 to 1.368	.110
Physical abuse	725	2.302	0.987	0.367 to 5.439	.020
Unsafe at home	725	-0.296	0.638	-1.545 to 0.953	.642

CI, confidence interval; PHQ-8, Patient Health Questionnaire-8.

with any other demographic or patient-reported index.

Discussion

While action planning is a cornerstone of primary care frameworks including the PCMH and CCM²⁻⁶ and associated with improved diabetes outcomes,¹⁵⁻¹⁸ little work to date has examined either objective ratings of action plans in primary care or correlates of action plan quality to inform efforts in improving our quality of care and driving change. This study examined the assessed quality of action plans using the GET-D in the context of a pragmatic trial with adults with T2DM in CHC settings using an electronic program to support SMS. Findings indicate that, overall, the action plans created were of moderate to high quality, and that select patient life contextual factors are linked with quality. Patient health literacy is linked

with higher quality action plans. This suggests that individuals with lower health literacy may need additional support from the health care setting to create viable action plans. Multiple studies have focused on the need to address low health literacy in primary care. A study from 2011 examined different approaches and created a toolkit for primary care practitioners.⁵¹ Likewise, individuals who endorsed social risks had on average action plans of lower quality. These individuals may be navigating several competing life stressors or experiencing challenges prioritizing disease management changes within this context. Under a recent National Academy of Medicine report, we suggest that collaborative action planning may need to be tailored or adjusted to take an individual's social risks and context into account.^{23,52}

Even though efforts were made in the present study to assure that each patient had a minimum

level of confidence in their plan before it was completed, there was still considerable variation in patient-reported confidence. Higher confidence is positively associated with the quality of the action plan. Previous literature has focused on the importance of perceived confidence as a potential indicator of future behavior change.^{14,19} Future longitudinal work should examine whether higher confidence leads to greater success in goal achievement.

We find that the quality of action plans is not associated with age, sex, language (English or Spanish), or educational level. This suggests that this type of goal setting and action planning can be implemented across diverse patient groups with no apparent difference in the quality of the implementation. There is, however, a significant association between quality and race, in which individuals identifying as Native Hawaiian/Pacific Islander or multi-racial have relatively lower action plan quality scores. Given the mixed nature of the multi-racial sample and the relatively small sample size of each, we are unable to examine this finding further based on a specific racial group. Furthermore, there is no relationship between action plan quality and symptoms of depression, health distress, or general life stress, suggesting that individuals experiencing these characteristics can engage in creating moderate to high-quality action plans despite their distress. In line with previous work, we note that most action plans focus on diet, weight loss, or physical activity¹. However, no association between the type of action plan target and quality of action plan is seen; nor is there a systematic association between action plan quality and provider role (eg, medical assistant). These findings suggest that high-quality action plans can be collaboratively developed between PWD and a variety of different types of providers and across a variety of action plan targets or goals.

A statistically significant, modestly higher level of action plan quality is seen in CTH compared with EE-CTH, although this difference is not related to any subsequent study findings. As clinics had the freedom to select the patients they wished to work with, the statistically significant group differences are not unexpected. The differences in action plan quality between CTH and EE-CTH may have in part been due to the group differences in relevant patient characteristics, in which the patients selected for EE-CTH had on average lower

health literacy and more patients identified as multi-racial. In addition, the GET-D rating system itself may have played a role: the ratings tend to emphasize specific behavior change actions (time, location, duration, etc), with much less emphasis on issues of engagement and motivational barriers. These findings highlight the potential need for broadening the concept of action plan quality to include engagement, motivation, and confidence in carrying out the plan.

Study limitations include the restriction to CHC's serving a multi-ethnic English or Spanish speaking safety net population in 1 geographic area, which may limit generalizability to other primary care settings. It also was not possible to link action plan quality with specific provider characteristics, nor additional characteristics of the clinic. This would be valuable to explore in future studies. Finally, further work is needed to examine the associations between action plan quality and subsequent clinical outcomes, which will be the subject of a future report.

Conclusion

Results of this study provide a window into assessing the quality of action planning for diabetes in primary care and point to patient characteristics associated with quality that can guide future SMS efforts tailored to individual patient contexts. Overall, both the CTH and EE-CTH programs enabled health care providers to develop moderate to high-quality action plans with their patients with type 2 diabetes. Higher health literacy, having no social risks, and identifying as multi-racial are significantly related to higher quality action plans. This finding suggests a potential benefit to tailoring the action planning process according to health literacy, social risks, and racial context. Higher quality action plans also are associated with greater patient confidence in carrying out the action plan, underlining the potential value of a comprehensive patient-centered approach to action planning. Further research is needed to establish the relationship between action plan quality and diabetes management change as well as longer-term clinical outcomes.

We wish to acknowledge all participating clinical sites - including healthcare providers and leaders as well as all participating patients. We want to acknowledge the San Francisco Bay Area

Collaborative Research Network (SF Bay CRN, sfbaycrn.org) for support and assistance with clinical site recruitment and engagement in the study. This work was supported by a grant from the Lundbeck Foundation to the Innovation Centre Denmark, Silicon Valley to fund the Danish American Research Exchange for Pernille Kjaer at the Department of Family Medicine at the University of California, San Francisco.

To see this article online, please go to: <http://jabfm.org/content/34/3/608.full>.

References

- Hessler DM, Fisher L, Bowyer V, et al. Self-management support for chronic disease in primary care: frequency of patient self-management problems and patient-reported priorities, and alignment with ultimate behavior goal selection. *BMC Fam Pract* 2019;20:120120.
- Wagner EH, Austin BT, Von Korff M. Improving outcomes in chronic illness. *Manag Care Q* 1996;4:12–25.
- Wagner EH, Austin BT, Von Korff M. Organizing care for patients with chronic illness. *Milbank Q* 1996;74:511–44.
- Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness. *JAMA* 2002;288:1775–9.
- Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness: the chronic care model, Part 2. *JAMA* 2002;288:1909–14.
- Berenson RA, Hammons T, Gans DN, et al. A house is not a home: keeping patients at the center of practice redesign. *Health Aff (Millwood)* 2008;27:1219–30.
- Tuerk PW, Mueller M, Egede LE. Estimating physician effects on glycemic control in the treatment of diabetes: methods, effects sizes, and implications for treatment policy. *Diabetes Care* 2008;31:869–73.
- Young-Hyman D, Groot M, de Hill-Briggs F, et al. Psychosocial care for people with diabetes: a position statement of the American diabetes association. *Diabetes Care* 2016;39:2126–40.
- Fisher L, Skaff MM, Mullan JT, Arean P, Glasgow R, Masharani U. A longitudinal study of affective and anxiety disorders, depressive affect and diabetes distress in adults with Type 2 diabetes. *Diabet Med J Med* 2008;25:1096–101.
- Fisher L, Mullan JT, Arean P, Glasgow RE, Hessler D, Masharani U. Diabetes distress but not clinical depression or depressive symptoms is associated with glycemic control in both cross-sectional and longitudinal analyses. *Diabetes Care* 2010;33:23–8.
- Funnell MM, Tang TS, Anderson RM. From DSME to DSMS: developing empowerment-based diabetes self-management support. *Diabetes Spectrum* 2007; 20: 221–6. doi:.
- Naik AD, Hundt NE, Vaughan EM, et al. Effect of telephone-delivered collaborative goal setting and behavioral activation vs enhanced usual care for depression among adults with uncontrolled diabetes: a randomized clinical trial. *JAMA Netw Open* 2019;2:e198634.
- DeWalt DA, Davis TC, Wallace AS, et al. Goal setting in diabetes self-management: taking the baby steps to success. *Patient Educ Couns* 2009;77:218–23.
- Bodenheimer T, Davis C, Holman H. Helping patients adopt healthier behaviors. *Clin Diabetes* 2007;25:66–70.
- Dickinson WP, Dickinson LM, Jortberg BT, et al. A cluster randomized trial comparing strategies for translating self-management support into primary care practices. *J Am Board Fam Med J Am Board Fam Med* 2019;32:341–52.
- Thom DH, Willard-Grace R, Hessler D, et al. The impact of health coaching on medication adherence in patients with poorly controlled diabetes, hypertension, and/or hyperlipidemia: a randomized controlled trial. *J Am Board Fam Med* 2015;28:38–45.
- Thom DH, Ghorob A, Hessler D, Vore DD, Chen E, Bodenheimer TA. Impact of peer health coaching on glycemic control in low-income patients with diabetes: a randomized controlled trial. *Ann Fam Med* 2013;11:137–44.
- Chen R-Y, Huang L-C, Su C-T, et al. Effectiveness of short-term health coaching on diabetes control and self-management efficacy: a quasi-experimental trial. *Front Public Health* 2019;7:314.
- MacGregor K, Handley M, Wong S, et al. Behavior-change action plans in primary care: a feasibility study of clinicians. *J Am Board Fam Med* 2006;19:215–23.
- Riley KM, Glasgow RE, Eakin EG. Resources for health: a social-ecological intervention for supporting self-management of chronic conditions. *J Health Psychol* 2001;6:693–705.
- Skovlund SE, Lichtenberg TH, Hessler D, Ejskjaer N. Can the routine use of patient-reported outcome measures improve the delivery of person-centered diabetes care? a review of recent developments and a case study. *Curr Diab Rep* 2019;19:84.
- Fisher L, Hessler D, Masharani U, Strycker L. Impact of baseline patient characteristics on interventions to reduce diabetes distress: the role of personal conscientiousness and diabetes self-efficacy. *Diabet Med J Med* 2014;31:739–46.
- Hessler D, Bowyer V, Gold R, Shields-Zeeman L, Cottrell E, Gottlieb LM. Bringing social context into diabetes care: intervening on social risks versus providing contextualized care. *Curr Diab Rep* 2019;19:30. doi:10.1007/s11892-019-1149-y
- Glynn RJ, Brookhart MA, Stedman M, Avorn J, Solomon DH. Design of cluster-randomized trials of quality improvement interventions aimed at medical care providers. *Med Care* 2007;45:S38–43.
- Raab GM, Butcher I. Balance in cluster randomized trials. *Statist Med* 2001;20:351–65.

26. Kraschnewski JL, Keyserling TC, Bangdiwala SI, et al. Optimized probability sampling of study sites to improve generalizability in a multisite intervention trial. *Prev Chronic Dis* 2010;7:A10.
27. Moulton LH. Covariate-based constrained randomization of group-randomized trials. *Clin Trials Lond Trials* 2004;1:297–305.
28. Chaudhary MA, Moulton LH. A SAS macro for constrained randomization of group-randomized designs. *Comput Methods Programs Biomed* 2006; 83:205–10.
29. San Francisco Bay Area Collaborative Research Network (SFBayCRN). CTSI Research Consultation. Available from: <https://consult.ucsf.edu/sfbaycrn>. Accessed April 20, 2020.
30. Wallace LS, Rogers ES, Roskos SE, Holiday DB, Weiss BD. Brief report: screening items to identify patients with limited health literacy skills. *J Gen Intern Med* 2006;21:874–7.
31. Kroenke K, Spitzer RL, Williams JBW. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care* 2003;41:1284–92.
32. Kroenke K, Strine TW, Spitzer RL, Williams JBW, Berry JT, Mokdad AH. The PHQ-8 as a measure of current depression in the general population. *J Affect Disord* 2009;114:163–73.
33. Polonsky WH, Fisher L, Earles J, et al. Assessing psychosocial distress in diabetes: development of the diabetes distress scale. *Diabetes Care* 2005;28:626–31.
34. Fisher L, Glasgow RE, Mullan JT, Skaff MM, Polonsky WH. Development of a brief diabetes distress screening instrument. *Ann Fam Med* 2008;6:246–52.
35. Pearlman LI, Lieberman MA, Menaghan EG, Mullan JT. The stress process. *J Health Soc Behav* 1981;22:337–56.
36. Gottlieb LM, Hessler D, Long D, et al. Effects of social needs screening and in-person service navigation on child health: a randomized clinical trial. *JAMA Pediatr* 2016;170:e162521.
37. Gottlieb L, Hessler D, Long D, Amaya A, Adler N. A randomized trial on screening for social determinants of health: the iScreen study. *Pediatrics* 2014; 134:e1611–18.
38. Gottlieb LM, Adler NE, Wing H, et al. Effects of in-person assistance vs personalized written resources about social services on household social risks and child and caregiver health: a randomized clinical trial. *JAMA Netw Open* 2020;3:e200701.
39. Centers for Disease Control and Prevention. What We Eat in America, NHANES 2005–2006: Usual nutrient intakes from food and water compared to 1997 Dietary Reference Intakes for Vitamin D, Calcium, Phosphorus, and Magnesium. Available from: https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/0506/usual_nutrient_intake_vitD_ca_phos_mg_2005-06.pdf. Accessed April 3, 2020.
40. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care* 2000;23:943–50.
41. Jilcott SB, Keyserling TC, Samuel-Hodge CD, Johnston LF, Gross MD, Ammerman AS. Validation of a brief dietary assessment to guide counseling for cardiovascular disease risk reduction in an underserved population. *J Am Diet Assoc* 2007;107:246–55.
42. Craig CL, Marshall AL, Sjöström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003;35:1381–95.
43. Bender BG, Bartlett SJ, Rand CS, Turner C, Wamboldt FS, Zhang L. Impact of interview mode on accuracy of child and parent report of adherence with asthma-controller medication. *Pediatrics* 2007;120:e471–77.
44. Bender BG, Rankin A, Tran ZV, Wamboldt FS. Brief-interval telephone surveys of medication adherence and asthma symptoms in the Childhood Asthma Management Program Continuation Study. *Ann Allergy Asthma Immunol Off Publ Am Coll Allergy Asthma Immunol* 2008;101:382–6.
45. Horne R, Weinman J. Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *J Psychosom Res* 1999;47:555–67.
46. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System State Questionnaire. Available from: <https://www.cdc.gov/brfss/questionnaires/pdf-ques/2004brfss.pdf>.
47. Ory MG, Jordan PJ, Bazzarre T. The Behavior Change Consortium: setting the stage for a new century of health behavior-change research. *Health Educ Res* 2002;17:500–11.
48. Health.gov. 2015–2020 Dietary Guidelines. Available from: <https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/guidelines/>. Accessed April 3, 2020.
49. Dawson DA, Grant BF, Li T-K. Quantifying the risks associated with exceeding recommended drinking limits. *Alcohol Clin Exp Res* 2005;29:902–8.
50. Teal CR, Haidet P, Balasubramanyam AS, Rodriguez E, Naik AD. Measuring the quality of Patients' goals and action plans: development and validation of a novel tool. *BMC Med Inform Decis Mak* 2012;12:152.
51. DeWalt DA, Brouckson KA, Hawk V, et al. Developing and testing the health literacy universal precautions toolkit. *Nurs Outlook* 2011;59:85–94.
52. National Academies. Integrating Social Needs Care into the Delivery of Health Care to Improve the Nation's Health. Available from: <https://www.nationalacademies.org/our-work/integrating-social-needs-care-into-the-delivery-of-health-care-to-improve-the-nations-health>. Accessed April 16, 2020.