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Measuring Participant Effort in a Depression Prevention Trial: Who Engages in Problem-Solving Therapy?

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Abstract

Objective—To determine the acceptability of clinical interventions for depression prevention, identification of clinical characteristics associated with intervention engagement is needed. The purpose of this study is to describe levels and correlates of participant engagement in Problem Solving Therapy (PST) in adults 60 and older with subthreshold depression.

Methods—As part of a clinical trial to prevent depression among older adults with subthreshold depression, participants who were randomized to receive PST completed 6–8 sessions in which they learned skills to solve self-selected problems that were contributing to stress and reduced quality of life. To measure participants' engagement with PST, interventionists completed 3 scales that rated participants' level of participation in problem solving activities, understanding of the multistep process of PST, and between-session homework effort. Using logistic regression, we examined whether physical health, level of cognitive function, gait speed, and disability served as correlates of engagement in the PST intervention.

Results—Gait speed, a measure of physical and cognitive health, was significantly associated with engagement in PST. Participants who walked faster were more likely to engage with PST compared to participants who walked more slowly. No other baseline variables were significant correlates.

Conclusions—Older adults who walk more slowly may need alternative delivery methods to fully engage in PST. Gait speed reflects physical and cognitive health, and predicts frailty, disability, and psychomotor speed slowing. For these reasons, gait speed may be a marker for factors that will serve to predict poorer engagement in psychosocial interventions like PST.

Keywords

Depression prevention; elderly; problem-solving therapy; treatment engagement; gait speed

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INTRODUCTION

A number of randomized trials have shown that problem-solving therapy (PST) is an effective treatment for decreasing depression symptoms in participants with major depressive disorder.^{1–5} PST has high participation acceptance and satisfaction⁶ and has been adapted for depression treatment in various chronic disease contexts (stroke, cognitive impairment, cardiovascular disease, macular degeneration)⁷ and settings (outpatient clinics, primary care, and home health care).³ Emerging research suggests that PST is also an effective prevention strategy to reduce the incidence of major and subsyndromal depression among older adults at high risk for converting to the full clinical disorder.^{8–13}

The goal of PST is to help participants identify and solve problems that are contributing to stress and reduced quality of life. Components of PST include psychoeducation, active problem solving in sessions, and homework assignments where patients can apply problem-solving skills. Traditional PST has seven steps: defining a problem, generating solutions (brainstorming), evaluating solutions, comparing solutions, selecting a feasible solution, implementing the solution, and evaluating the outcome.¹⁴ Over the course of several sessions (average: 6–12 sessions over 12 weeks), PST can reduce learned helplessness and improve self-efficacy for coping with stressful life experiences. PST is adaptable to patients' needs and can address a wide range of physical and health-related stressors. Because older adults experience many stressors during everyday life related to medical illness, disability, and loss (among others), PST appears to be a practical and effective strategy for depression treatment and prevention. PST is also a good choice for decreasing depression symptoms because it incorporates behavioral activation by planning pleasurable activities and increasing the likelihood of experiencing positive reinforcement.

A systematic review of PST found that randomized controlled trials typically enroll white adults with at least 12 years of education.³ The homogeneity of previous samples is concerning: Although PST has been shown to be effective, special considerations may be required for racially diverse older adults as well as those with limited education and low socioeconomic status. Therefore, designing strategies to engage participants in PST requires an empirical understanding of the factors (personal, interpersonal, and contextual) that predict engagement. Identifying factors associated with engagement would also help inform clinicians regarding who may need additional motivation or support before starting PST.

We report here data relevant to these issues from an intervention development study of PST addressing indicated and selective prevention of depression and anxiety in older adults who reported subsyndromal depression and need for supportive services. The purpose of this report is to describe our methods for measuring participant engagement in PST and describe levels and correlates of participant engagement in PST, as rated by interventionists. We were particularly interested in whether engagement in PST varied by health status and if healthier adults were more (or less) likely to engage in the PST intervention.

METHODS

Depression-Agency Based Collaborative Study Protocol

We derived the data for this investigation from the Depression-Agency Based Collaborative (DEP-ABC), a prevention trial involving older adults recruited from aging services sites (home care agencies, senior housing, and senior centers) who met criteria for subthreshold depression and disability (as defined by needing supportive services from local aging agencies).¹⁵ The primary purpose of the DEP-ABC was to prevent incident episodes of major depression and generalized anxiety disorder (as defined by Primary Care Evaluation of Mental Disorders-Mini International Neuropsychiatric Interview criteria). Participants were randomized to receive either PST or enhanced usual care and were evaluated at baseline, directly after the intervention period, and then at 3-, 6-, 9-, and 12-month follow-up. The intervention arm involved six to eight sessions of PST delivered over the course of 12 weeks. Problems identified by participants could be interpersonal issues, health-related problems, or practical problems related to service needs, such as adequacy of services. Participants in the PST arm received booster sessions at 6 and 9 months after the end of the intervention. Therapists documented participants' problems (described in Results) and the strategies generated to address them after every session. Participants randomized to the enhanced usual care arm did not receive PST but were followed on the same assessment schedule; this arm was considered "enhanced" because participants were referred for medical care if they met criteria for depression or anxiety over follow-up.

Participants

Eligible participants were aged 60 years and older, met criteria for subsyndromal depression (Patient Health Questionnaire-9 score 1–9 with anhedonia or depressed mood rated at least 1), scored above 80 on the Modified Mini-Mental State Exam cognitive screen,¹⁶ and reported disability consistent with a need for aging services.¹⁵ Exclusion criteria involved current use of an antidepressant or regular use of anxiolytics (more than four times per week), major depressive episode or anxiety disorder in the past 12 months, bipolar disorder or schizophrenia, or drug or alcohol treatment in the past 12 months. A total of 112 participants provided consent, and 104 were randomized to either PST (N = 50) or enhanced usual care (N = 54). In this report, we focus on 48 DEP-ABC participants who were randomized to receive PST and for whom information regarding their participation level was available.

Assessing Engagement in PST

To evaluate participants' engagement with PST, interventionists completed three scales after every session of PST that rated participants' level of participation in PST. The *participation scale* required interventionists to rate the participant's effort and motivation for each therapy session. Responses ranged from 1 (none) to 6 (excellent). The *understanding of material scale* required interventionists to rate the level of understanding of the multistep process of PST demonstrated by the participant or the material presented during the session. Responses ranged from 1 (minimal understanding) to 3 (good understanding). The *homework effort scale* required interventionists to rate the level of effort/participation of homework material assigned from last session. Responses ranged from 1 (none) to 5 (excellent). For each scale

we classified participants into an engaged (1) or less engaged (0) group. This classification is shown in Table 1. We then summed participants' group membership (engaged or less engaged) across the three scales, with possible outcomes of 0, 1, 2, or 3. Because of the small sample size, we considered those who scored a 2 or 3 ($N = 32$; 67%) as "engaged in PST" and those who scored a 0 or 1 ($N = 16$; 33%) as "less engaged in PST." This dichotomy (engaged versus less engaged) served as our outcome variables in our logistic regression analysis.

Correlates of Engagement in PST—We examined health status variables we believed would be correlated with participants' engagement in PST. *Medical illness burden* was measured using the Cumulative Index Rating Scale for Geriatrics¹⁷ and was hypothesized to be associated with participants' ability to attend PST sessions. *Gait speed* was measured using the walking test from the Short Performance Physical Battery.¹⁸ Slowed gait speed reflects poor physical health and cognitive impairment and was hypothesized to interfere with use of behavioral activation techniques. *Cognitive function* was measured using the Repeatable Battery for the Assessment of Neuropsychological Status;¹⁹ low cognitive function was believed to interfere with interactive problem-solving exercises and between-session homework. *Activity limitations* and *participation restrictions* were measured using the two self-report scales of the Late-Life Function and Disability Instrument.²⁰ The first scale measures function (ability to engage in an activity), and the second scale measures disability (performance in an activity). Increased impairment in function and disability were hypothesized to be associated with decreased engagement in the PST intervention. Finally, *health service use* was measured using the Cornell Service Index.²¹ A greater need for aging services was hypothesized to interfere with participants' ability to attend and complete between-session homework because of responsibilities managing services.

Statistical Analyses

We compared baseline sociodemographic and health status variables between those who were more engaged in PST with those who were less engaged in PST using the t test for continuous variables and χ^2 statistics for categorical variables. For our main analysis we used a logistic regression model using demographics, medical illness burden, gait speed, level of cognitive function, disability, and health service use as correlates of engagement in the PST intervention (engaged versus less engaged). We used a modeling strategy whereby variables that were not significantly related to PST engagement were eliminated from the final model. We first fit each individual variable in a separate logistic model and included only the ones with $p < 0.10$ in the multivariate model. In the multivariate model, those that were not related to the outcome were eliminated ($p > 0.05$). We performed our analyses with SPSS, version 24.0 (Armonk, NY: IBM Corp).

RESULTS

Descriptive Statistics

Table 2 shows demographic and health characteristics of participants who were randomized to PST in the DEP-ABC trial. Participants were, on average, 77 years of age. The total sample was 20% men and 24% African American. Participants reported mild depression and

anxiety symptom burden, low to average cognitive function, and high medical illness burden. The Cornell scale showed that participants reported using, on average, four primary care services: primarily outpatient medical services (96%), laboratory/x-ray tests (74%), transportation assistance (60%), and personal home aide services (44%). Two significant group differences emerged at baseline between adults who were more engaged versus less engaged in PST. Participants who were more engaged in PST had lower Cumulative Index Rating Scale for Geriatrics scores and faster gait speed scores compared with participants who were less engaged in PST.

Intervention Engagement

Participants received, on average, 5.80 sessions (median: 6 sessions; standard deviation: 1.58) of PST across the 12-week intervention. Participants had a high level of impairment; difficulties in scheduling appointments because of hospitalizations, falls, and other health events impacted the number of PST sessions participants received. The most common problems identified during the first PST sessions included concerns about scheduling daily pleasant activities (22%), physical health problems (e.g., chronic pain, obesity/weight concerns, history of stroke, functional disability) (16%), concerns with relationships (16%), and loneliness (14%). Table 1 shows interventionists' ratings of participants' engagement in PST. The mean score for participation was 4.54 (scale: 1–6), indicating that, on average, participants participated in all intervention activities with good effort but needed significant prompting or structuring (rather than actively taking interest in and engaging in intervention activities independently). For the level of understanding PST material, the mean score was 2.67 (scale: 1–3), meaning that on average participants demonstrated understanding of most or all concepts; for example, the participant responded correctly to questions most of the time and could generate relevant personal examples when asked without prompts or hints from therapists. The mean score for homework effort was 3.97 (scale: 1–5), indicating that participants on average put good, consistent, adequate work in all homework areas.

Correlates of Intervention Engagement

Table 3 shows the logistic regression models that tested the relationship between participants' baseline health and their level of engagement with PST (engaged versus less engaged). Our univariate results indicate that less medical illness burden and faster gait speed were each related with greater engagement in PST. All other variables, including demographics, cognitive function, disability, and health service use, did not reach significance. Our multivariate results indicate that faster gait speed is significantly associated with being more engaged in our PST intervention.

DISCUSSION

Our results indicate that participants randomized to PST in the DEP-ABC trial participated in all intervention activities with good effort, had a good understanding of PST concepts, and demonstrated good, adequate work in all homework areas. Although these outcomes are indeed positive, they suggest there may be room for improving engagement in PST (see Table 1). Our regression analysis suggests that baseline gait speed is significantly correlated

with engagement in PST. Participants who walked more slowly were less likely to be engaged in our PST intervention.

These findings pose two important questions. Given the existing literature suggesting the efficacy of PST in preventing major depression in at-risk older adults, how do we optimally engage older adults who are less physically and cognitively healthy in a learning-based depression prevention intervention? And, should therapists consider physical performance and assess gait speed (a quick and reliable test of physical performance and frailty) when deciding to offer a prevention intervention like PST? These data suggest that older adults who walk slowly may need alternative delivery methods to fully engage in PST. A systematic review found that the average length of PST is 6–12 PST sessions across 12 weeks.³ One strategy to increase engagement is to alter the dose or intensity of PST and/or increase the number of booster sessions. Another strategy is to prioritize goals related to physical health before treatment and address how chronic pain, obesity, and/or physical limitations limit their ability to take care of themselves. Many DEP-ABC participants adopted physical health goals as the study progressed. Adults who are less physically healthy may be at-risk for dropping out of therapy and may need alternative ways to engage in PST such as over the phone, videophone, or the Internet. Finally, perhaps the motivational style of the therapist or the therapeutic alliance between participants and therapists should be considered.

Why might slow gait speed be a sign for poor engagement in psychosocial interventions like PST? Walking is a complex movement that requires the coordination of multiple organ systems, including the circulatory, respiratory, musculoskeletal, and nervous systems. The speed at which someone walks reflects the overall health of these organ systems.^{22–24} In the context of PST, someone who walks slowly may have an underlying disability that inhibits their ability to fully engage in interactive problem-solving exercises. Gait speed is also correlated with physical and cognitive health; slowed gait predicts frailty, disability, falls, functional dependence,^{24–26} psychomotor speed slowing, and poor executive dysfunction,²⁷ the latter two which are only minimally tested in the Repeatable Battery for the Assessment of Neuropsychological Status.

Our assessment of gait speed was the 4-meter walk test from the National Health and Aging Trends Study Expanded Short Performance Physical Battery (freely available from the National Institutes of Health Toolbox; www.nihtoolbox.org).¹⁸ The test takes less than 5 minutes to complete and is recommended for adults up to age 85. Participants complete one practice test and then two timed trials. Seconds and hundredths of seconds are recorded for time to walk 4 meters and converted to meters per second for scoring walking speed. Meters per second are then categorized using quartile cutoffs derived from Established Populations for Epidemiologic Studies of the Elderly. This community-based sample consists of approximately 5,000 persons ages 71 and older in 1988–1989 who were living at home and were able to complete the Established Populations for Epidemiologic Studies of the Elderly interview. These norms have been used in many studies that assess gait speed: 0 (did not/ unable to complete test), 1 (< 0.579 m/s), 2 (0.580–0.748 m/s), 3 (0.749–0.904 m/s), and 4 (> 0.904 m/s). Walking at least 1.14 m/s is the critical speed needed to cross a road safely,²⁸ and a decline of even 0.1 m/s is considered clinically significant and a risk factor for poor

outcomes.²³ A cutoff around 0.8 m/s predicts life expectancy for the median age and sex; gait speed faster than 1.0 m/s suggests better than average life expectancy.²³ DEP-ABC participants (who reported subsyndromal depressive symptoms and disability) walked slowly, with a mean of 0.63 m/s (domain score: 2). For these reasons we strongly encourage geriatric specialists to assess older adults' gait speed and develop pathways to access evidence-based interventions for those with slow and/or declining gait speed. A sudden decline in walking speed may indicate changes in other areas of functioning.

Limitations of the present study include the small sample size (N = 50). Given the number of variables tested in our univariate models, there is a greater likelihood of Type I error. We also do not have information from participants on their level of engagement with PST and whether participant reports are in concordance with therapists' perceptions. In addition, we do not have information about the alliance between participants and therapists, which may be an important predictor of engagement independent of participant characteristics. Nevertheless, this pilot study lays the groundwork for future randomized controlled trials to examine the feasibility and acceptability of a PST intervention tailored to meet the needs of older adults with subsyndromal depression and disability.

In conclusion, older adults with subsyndromal depression and disabilities requiring supportive services represent a vulnerable population of older adults. This study showed that older adults were less likely to engage in a learning-based psychosocial intervention, namely PST, if they had slowed gait speed. Gait speed may be a useful clinical indicator of older adults' ability to engage in PST. More research is needed to determine how to help vulnerable elders put forth adequate effort to maximize depression treatment with PST.

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TABLE 1

Interventionists' Rating Scales of Participants' Engagement in PST

Participation	Understanding of Material	Homework Effort
Circle the rating that matches the participant's participation (effort and motivation as perceived by you) for each therapy session.	Please rate the level of understanding demonstrated by the participant or the material presented during the session on the following scale:	Please rate the level of effort/participation of homework material assigned from last session:
1) None: Participant refused entire session or did not participate in any intervention activities in session.	1) Minimal understanding: Participant understood very few concepts, as demonstrated by response to therapists' questions and other in-session interactions. Participant seldom responded correctly to questions or generated relevant personal examples even after prompts or hints from therapist.	1) None: Participant did not put any effort into completing any of the assigned homework areas.
2) Poor: Participant refused or did not participate in at least half of session.	2) Some understanding: Participant demonstrated understanding of some but not all concepts. For example, he or she could respond correctly to questions or generate relevant personal examples only sometimes or only after prompts or hints from therapist.	2) Minimal: Made some or inconsistent effort in most or all areas.
3) Fair: Participant participated in most or all intervention activities but did not show maximal effort or required much encouragement to participate.	3) Good understanding: Participant demonstrated understanding of most or all concepts. For example, he or she responded correctly to questions most of the time and could generate relevant personal examples when asked without prompts or hints from therapist.	3) Fair: Good work in some key areas with minimal or not work in other areas.
4) Good: Participant participated in all intervention activities with good effort but needed significant prompting or structuring (rather than actively taking interest in and engaging in intervention activities independently).		4) Good: Good, consistent, adequate work in all homework areas.
5) Very good: Participant participated in all intervention activities with maximal effort but needed some prompting or structuring (rather than actively taking interest in and engaging in intervention activities independently).		5) Excellent: Participant made strong attempts in all homework areas, showed an ability to correctly and independently apply intervention principles without prompting, or adapt appropriately/effectively to changing circumstances.
6) Excellent: Participant participated in all intervention activities with maximal effort and actively took interest in and engaged in intervention activities.		
Average score (SD): 4.54 (0.83)	Average score (SD): 2.59 (0.43)	Average score (SD): 3.97 (0.81)

Notes: Rating scales were completed after each PST session. Dark gray: engaged in PST; light gray: less engaged in PST. SD: standard deviation.

TABLE 2

Baseline Characteristics (N = 50)

Variable	All Participants (N = 48)	Less Engaged (N = 16)	More Engaged (N = 32)	p ^a
Demographics				
Age, yr	76.78 (9.90)	73.92 (2.73)	77.76 (1.89)	0.26
Men, N (%)	10 (20.00)	4 (25.00)	6 (18.75)	0.44
African Americans, N (%)	12 (24.00)	3 (18.75)	7 (21.88)	0.56
Education, yr	13.32 (2.32)	13.25 (0.71)	13.36 (0.50)	0.90
Mental health				
Depression: PHQ-9	5.96 (2.34)	5.25 (0.67)	6.48 (0.47)	0.14
Anxiety: GAD-7	3.24 (2.94)	3.00 (0.66)	2.80 (0.46)	0.81
Physical health				
Medical illness burden: CIRS-G	11.00 (4.73)	13.00 (1.23)	10.32 (0.85)	0.08
Functional capacity: Gait speed	2.16 (1.40)	1.33 (0.39)	2.48 (0.27)	0.02
Cognition				
Cognitive performance: RBANS	91.20 (15.08)	88.67 (4.49)	91.84 (3.11)	0.57
Disability				
Activity limitations: LLFDI-CAT	-0.07 (0.70)	0.01 (0.19)	-0.14 (0.13)	0.53
Participation restrictions: LLFDI-CAT	0.70 (0.71)	-0.67 (0.17)	-0.75 (0.12)	0.71
Health service use: Cornell index	3.81 (1.35)	3.58 (0.40)	4.08 (0.28)	0.31

Notes: CIRS-G: Cumulative Illness Rating Scale for Geriatrics; GAD-7: Generalized Anxiety Disorder 7-item scale; LLFDI-CAT: The Late-Life Functional Disability Computer Adaptive Test; PHQ-9: Patient Health Questionnaire; RBANS: Repeatable Battery for the Assessment of Neuropsychological Status.

^a p Values are from t tests and χ^2 statistics.

TABLE 3

Logistic Regression Examining the Association between Baseline Health Characteristics and Engagement in PST (0 = Less Engaged; 1 = Engaged)

Variables	Wald χ^2	Odds Ratio	95% CI	p
<i>Univariate analyses^d</i>				
Age	1.05	1.03	0.97–1.10	0.31
Sex	0.25	0.69	0.16–2.92	0.62
Race	0.06	0.82	0.18–3.73	0.81
Education	0.08	0.96	0.74–1.26	0.79
Medical illness burden: CIRS-G	4.60	0.85	0.73–0.99	0.03
Functional capacity: gait speed	6.34	1.90	1.15–3.13	0.01
Cognitive performance: RBANS	0.47	1.02	0.97–1.06	0.50
Activity limitations: LLFDI-CAT	0.00	0.98	0.41–2.36	0.96
Participation restrictions: LLFDI-CAT	0.04	1.09	0.45–2.61	0.85
Health service use: Cornell Index	0.73	1.24	0.76–2.03	0.39
<i>Multivariate analyses^a</i>				
Medical illness burden: CIRS-G	2.78	0.87	0.74–1.02	0.10
Functional capacity: gait speed	4.56	1.75	1.05–2.93	0.03

Notes: CI: confidence interval; CIRS-G: Cumulative Illness Rating Scale for Geriatrics; LLFDI-CAT: The Late-Life Functional Disability Computer Adaptive Test; RBANS: Repeatable Battery for the Assessment of Neuropsychological Status.

^aDegrees of freedom: 1.