



Original Investigation | Psychiatry

Clinical and Financial Outcomes Associated With a Workplace Mental Health Program Before and During the COVID-19 Pandemic

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Abstract

IMPORTANCE Investment in workplace wellness programs is increasing despite concerns about lack of clinical benefit and return on investment (ROI). In contrast, outcomes from workplace mental health programs, which treat mental health difficulties more directly, remain mostly unknown.

OBJECTIVE To determine whether participation in an employer-sponsored mental health benefit was associated with improvements in depression and anxiety, workplace productivity, and ROI as well as to examine factors associated with clinical improvement.

DESIGN, SETTING, AND PARTICIPANTS This cohort study included participants in a US workplace mental health program implemented by 66 employers across 40 states from January 1, 2018, to January 1, 2021. Participants were employees who enrolled in the mental health benefit program and had at least moderate anxiety or depression, at least 1 appointment, and at least 2 outcome assessments.

INTERVENTION A digital platform that screened individuals for common mental health conditions and provided access to self-guided digital content, care navigation, and video and in-person psychotherapy and/or medication management.

MAIN OUTCOMES AND MEASURES Primary outcomes were the Patient Health Questionnaire-9 for depression (range, 0-27) score and the Generalized Anxiety Disorder 7-item scale (range, 0-21) score. The ROI was calculated by comparing the cost of treatment to salary costs for time out of the workplace due to mental health symptoms, measured with the Sheehan Disability Scale. Data were collected through 6 months of follow-up and analyzed using mixed-effects regression.

RESULTS A total of 1132 participants (520 of 724 who reported gender [71.8%] were female; mean [SD] age, 32.9 [8.8] years) were included. Participants reported improvements from pretreatment to posttreatment in depression ($b = -6.34$; 95% CI, -6.76 to -5.91 ; Cohen $d = -1.11$; 95% CI, -1.18 to -1.03) and anxiety ($b = -6.28$; 95% CI, -6.77 to -5.91 ; Cohen $d = -1.21$; 95% CI, -1.30 to -1.13). Symptom change per log-day of treatment was similar post-COVID-19 vs pre-COVID-19 for depression ($b = 0.14$; 95% CI, -0.10 to 0.38) and anxiety ($b = 0.08$; 95% CI, -0.22 to 0.38). Workplace salary savings at 6 months at the federal median wage was US \$3440 (95% CI, \$2730-\$4151) with positive ROI across all wage groups.

CONCLUSIONS AND RELEVANCE Results of this cohort study suggest that an employer-sponsored workplace mental health program was associated with large clinical effect sizes for employees and positive financial ROI for employers.

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Key Points

Question Is participation in a comprehensive employer-sponsored mental health benefit associated with reduced symptoms for employees and positive financial return on investment for employers?

Findings In this cohort study of 1132 employees participating in a workplace mental health program from 66 employers in the US, participants reported reduced symptoms of depression and anxiety. The program provided a positive return on investment for all salaries above the federal minimum wage.

Meaning Results of this study suggest that employer-sponsored, evidence-based workplace mental health programs can be beneficial for both employers and employees.

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

Introduction

In the past few decades, the number of employers offering wellness benefits has increased considerably. A Centers for Disease Control and Prevention survey found, in 2017, that 92% of companies with more than 500 employees had some form of wellness program.¹ The increasing adoption of these programs is partly owing to tax breaks available to companies who offer these benefits and a genuine interest in reducing health care–related costs, increasing productivity and improving employee well-being.² Large randomized peer-reviewed studies have suggested that employee wellness programs improve health-related behavior (eg, daily step count) but do not deliver improvement in clinical outcomes, health care spending, or health care use.^{3,4} An understanding of the types of mental health programming associated with improved employee wellness and the conditions under which they have the most utility may lead to scalable initiatives with population-level outcomes.

However, workplace wellness programs vary in design, scope, and intensity. Researchers have identified some components commonly present in successful programs, including educational interventions, supportive company culture and policies, reduced barriers to access, and systematic health risk assessments with tailored follow-up.⁵ Such programs typically target modifiable risk factors of disease including nutrition, physical activity, and smoking cessation, and may deliver a measurable return on investment (ROI) only over a long period. At present, whether workplace wellness programs focused on physical health have delivered benefits to both employers and employees is unclear.

Workplace mental health programs that provide treatment for employee mental health difficulties may help close this gap. Mental illness is the leading cause of disability worldwide.⁶ Consequently, employers face a high financial burden of mental illness via measures of productivity and absenteeism. To the extent that workplace mental health programs reduce the burden of mental illness, they may generate an ROI that provides for their widespread and sustained implementation. To date, few workplace mental health programs have reported clinical improvement,^{7,8} and only 1 intervention has demonstrated both clinical and financial ROI.⁹ Despite their potential to deliver both clinical and financial benefits, outcomes associated with workplace mental health programs remain mostly unknown.

The sustainability of workplace mental health programs may be enhanced by identifying when and for whom mental health programming is most effective. Program effectiveness may vary depending on individual characteristics such as age and gender (participant self-reported identity),¹⁰ disease characteristics such as symptom severity or case complexity,^{11,12} and environmental characteristics associated with or that sustain mental health difficulties. Recently, the COVID-19 pandemic has led to increases in depression and anxiety due to a range of chronic and relatively immutable environmental factors (routine disruption, social isolation, and financial difficulties), resulting in a surge in demand for mental health care.¹³ Whether mental health care is equally effective in these conditions remains unknown.

In this study, we evaluated an employer-sponsored mental health program incorporating several evidence-based components, including a digital mental health screening platform, telephone and video appointments with care navigators who helped members find care matched to their needs, internet-based cognitive behavioral therapy resources, free or low-cost access to video or in-person psychotherapy and medication management, and a symptom tracking framework to support measurement-based care. We investigated the primary outcomes of clinical improvement in depression and anxiety symptoms, tested dose-response associations for each treatment component, and examined factors associated with clinical improvement including the COVID-19 pandemic. We also examined the secondary outcomes of increased time in the workplace, employee retention, and financial ROI.

Methods

This cohort study was categorized by the Yale Institutional Review Board as not human participant research and was therefore exempt from approval and the need for informed patient consent. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline for observational studies.

Platform

This study used data from an employer-sponsored online mental health benefit (Spring Health; Spring Care Inc). The program was implemented by 66 employers across 40 states in the US and was available to 282 960 eligible participants from January 1, 2018, through January 1, 2021. Employees were notified of their eligibility by their employer via email and on-site events and enrolled online for free.

Program Design

The platform first invited participants to identify common mental health difficulties that have been bothering them (eg, stress, anxiety, sleeping, eating, or relationship difficulties) from a predetermined list. Depending on the issues that the participant identified, additional self-report questionnaires were triggered (eMethods 1 in the Supplement). All participants completed the Patient Health Questionnaire-9 for depression (PHQ-9; range, 0-27)^{14,15} and the Sheehan Disability Scale¹⁶ for functional impairment. Screening results were shared with the participant's care team via the electronic medical record. Follow-up assessments were completed at regular intervals chosen by participants with the default being every 2 weeks. Data were collected through 6 months of follow-up.

After taking an assessment, participants could schedule appointments with members of their care team, consisting of a care navigator, a therapist, and a medication manager. Participants who were deemed by their care team to need more intensive services were referred outside the online mental health benefit program by their clinicians. All care navigators were licensed masters degree-level mental health clinicians. All therapists had masters-level or doctoral-level licenses. All medication managers were medical doctors or doctors of osteopathic medicine. All 228 participating health care clinicians had at least 3 years of experience postsupervision before becoming a part of the network. In March 2020, due to the COVID-19 pandemic, in-person treatment was paused and care appointments were delivered via video, except when medically necessary.

Cost Sharing

To reduce financial barriers to accessing care, participants were able to book an unlimited number of free appointments with their care navigator. They could also schedule appointments with a program therapist and/or medication manager, the cost of which was either covered by their employer for all visits, a limited number of visits, as an in-network benefit via the participant's insurance, or paid for by the participant, depending on the benefit design offered by the employer.

Inclusion Criteria

Participants were included if they were at least age 18 years, had a baseline PHQ-9 or Generalized Anxiety Disorder 7-item scale (GAD-7; range, 0-21) score above clinical cutoff points (PHQ-9 \geq 10 or GAD-7 \geq 10),^{14,15,17,18} had at least 1 therapy appointment with an online therapist from the employer-sponsored mental health benefit, and completed at least 2 PHQ-9 or GAD-7 questionnaires during the 3-year period between January 1, 2018, and January 1, 2021. Baseline assessments were defined as an assessment less than 2 weeks before an individual's first therapy appointment. Final assessments were defined as an individual's latest assessment that occurred less than 6 months after their first assessment and less than 1 month after an appointment. An episode of care was defined as the time from the first assessment to the last appointment that happened within 6 months of the

first assessment. Of 282 960 people eligible for the benefit, 20 351 enrolled in the program, resulting in a 7.19% enrollment rate. Of enrolled participants, 1132 met criteria for having at least 1 therapy session, 2 assessments, and a score above the cutpoint on the PHQ-9 or GAD-7.

Measures

Depression and Anxiety

The PHQ-9 and GAD-7 scores were the primary outcomes of this study. The PHQ-9 and GAD-7 are validated instruments for screening and diagnosing depression and anxiety.^{15,18} They were used to calculate symptom change (continuous outcomes), reliable improvement¹⁹ (5-point decrease in the PHQ-9²⁰ and 4-point decrease in the GAD-7²¹), and reliable improvement with recovery (both reliable improvement and ending in the subclinical range, corresponding to a score <10).¹⁵

Time spent back in the workplace was measured using the Sheehan Disability Scale. This scale is a self-report measure of family, work, and social functional impairment due to emotional symptoms.¹⁶

Dose-Response Associations

To determine which treatment components were factors associated with overall change, the log-number of therapy and medication sessions in the previous month were added as time-varying covariates to the clinical outcome models. Use of care navigation (no/yes) was expected to lead to a more rapid trajectory of improvement and was added as a main outcome and care navigation × time interaction.

Factors Associated With Clinical Improvement

To identify participants with the strongest response to a given dose of treatment, a set of covariates and covariate × time interactions were added to the dose-response models. Time-invariant covariates were age, gender, number of positive screenings, and participant demographic characteristics. Age, gender, and demographic characteristics were provided on optional previsit questionnaires and coded as “declined to answer” if the participant did not complete the questionnaire. The main outcome of the COVID-19 pandemic was modeled with a time-varying indicator variable capturing whether the observation was pre-COVID-19 lockdown or post-COVID-19 lockdown. The association between the pandemic and participant trajectories was modeled with a piecewise log-linear model (coded as 0 prepandemic) and the log-days of treatment that occurred postlockdowns and was interpreted as the deviation from the main association of log-time that occurred during COVID-19 lockdowns. Additionally, an exploratory model was developed using a machine learning approach, elastic net regression.²² Reliable improvement was used as the outcome, and candidate variables included sum scores and item scores for baseline questionnaires, number of positive screenings, and demographic variables (eMethods 2 in the [Supplement](#)).

Employer cost of care for all participants was calculated based on outpatient fee-for-service rates (eMethods 3 in the [Supplement](#)). Savings in 6 months were calculated using the changes in missed days per week and unproductive days per week estimated by the clinical outcome models and applying the following formula: (changes in absenteeism + changes in unproductive days) × number of work weeks in 6 months × daily salary.

Employer break-even cost was calculated as the dollar amount per employee per month that equals the dollar amount generated from increased productivity and decreased absenteeism. The enrollment rate (the number of employees who enrolled in the benefit, whether or not they engaged in care) and rate of engagement in care (number of employees who completed at least 1 episode of care) are also reported.

Employee Retention

To test whether platform use was associated with differential retention, group differences in retention rates were calculated between employees who enrolled in the program and those who did

not (eMethods 4 in the [Supplement](#)). This analysis was limited to 3 employers whose retention data were provided in an adequate form for this analysis.

Statistical Analysis

Mixed-effects models were used to accommodate the multilevel data structure. Repeated observations (level 1) were nested within participants (level 2), and random intercepts and time effects were included at level 2. An identity link was used for continuous outcomes (depression, anxiety), a Poisson model with a log link for count data (productivity), and a logit link for categorical outcomes (reliable change, reliable recovery). Clinical rates of improvement were estimated using log-days in treatment as a level 1 covariate. Overall clinical outcomes were calculated using the delta method to estimate total change at 1 week posttreatment (84 days for depression, 85 days for anxiety). Cohen *d* effect sizes were calculated by dividing the overall effect size by the end point SD with commonly used thresholds to categorize effects as small ($d < 0.50$), medium ($d < 0.8$), and large ($d > 0.8$).²³ Reliable improvement and recovery were estimated using participant-specific random-effects models and treatment durations. Mean time to remission was calculated by the number of days needed to achieve a PHQ-9 score less than or equal to 5. All statistical tests were 2-sided with statistical significance set at a levels of .05. All analyses were conducted in R, version 4.1.2 (R Foundation for Statistical Computing).

Results

Sample Characteristics

Participant Characteristics

A total of 1132 participants (mean [SD] age at enrollment, 32.9 [8.8] years; 515 of 721 who reported gender information [71.8%] were female; and 415 of 720 who reported demographic information [57.8%] were White) were included (**Table 1**). Race and ethnicity are reported as a single measure to enable readers to gauge the generalizability of the current findings to the US population as a whole given known differences in mental health care use across racial and ethnic categories. Participants screened positive for a mean (SD) of 2.7 (1.3) mental health conditions and attended a mean (SD) of 5.6 (4.5) therapy sessions, with 86.8% (983 of 1132) attending at least 1 care navigator appointment and 30.0% (339 of 1132) attending at least 1 medication management appointment. For those who attended a medication appointment, the mean (SD) number of appointments was 2.1 (1.3). The median times to first available appointment were 1.2 days (IQR, 1.0-2.0 days) for psychotherapy and 1.0 days (IQR, 1.0-1.2 days) for medication management.

Employer Characteristics

Employers consisted of 66 businesses from 40 states in the US. Company sizes ranged from commercial small businesses (<750 employees) to jumbo enterprises (>35 000 employees), with the median being a commercial large company (3001-5000 employees). There was a wide range of industries, with the most representation from software companies, business services, financial services, and manufacturing.

Overall Clinical Outcomes

At baseline, participants had moderate to severe scores for both the PHQ-9 (mean [SD], 14.75 [3.9]) and GAD-7 (mean [SD], 14.27 [3.2]). PHQ-9 scores decreased with each log-day in treatment ($b = -1.43$; $P < .001$) (**Table 2** and **Figure**), for a total decrease over treatment of 6.34 points (95% CI, -6.76 to -5.91), corresponding to a large effect size ($d = -1.11$; 95% CI, -1.18 to -1.03). Results of mixed-effects logistic regression models (eResults 1 in the [Supplement](#)) indicated that 69.3% (626 of 903) of participants reliably improved and 58.0% (524 of 903) achieved both reliable improvement and remission. Mean (SD) time to remission was 5.9 (5.0) weeks. Similarly, GAD-7 scores decreased with each log-day in treatment ($b = -1.41$; $P < .001$), resulting in a total reduction of 6.28 points (95%

Table 1. Baseline Sociodemographic Characteristics and Positive Screenings for Each Mental Health Condition^a

Sample characteristic	No. (%)
Participants (N = 1132)	
Age, y (n = 1102) ^b	
18-26	264 (24.0)
27-35	499 (45.3)
36-45	223 (20.2)
46-55	86 (7.8)
56-65	30 (2.7)
Gender (N = 1132)	
Female	520 (71.8)
Male	191 (26.4)
Nonbinary	13 (1.8)
Declined to answer	408 (NA)
Race and ethnicity (N = 1132) ^c	
Asian	104 (14.3)
Black	85 (11.7)
Latinx/Hispanic	75 (10.3)
White	419 (57.7)
Other	43 (5.9)
Declined to answer	406 (NA)
Mental health condition screen positive result rate (N = 1132) ^d	
Depression	911 (80.5)
Anxiety	840 (74.2)
ADHD	443 (39.1)
Eating disorder	363 (32.1)
PTSD	260 (23.0)
Alcohol use disorder	137 (12.1)
Bipolar disorder	59 (5.2)
Postpartum depression	24 (2.1)
Clinical care (N = 1132)	
Psychotherapy sessions, mean (SD)	5.6 (4.5)
At least 1 medication management session	339 (30.0)
At least 1 medication management session, mean No. (SD)	2.1 (1.3)
At least 1 care navigator session	983 (86.8)
Length of episode of care, mean (SD), d	77.1 (52.5)
Employer size (N = 66)	
Commercial small (<750 employees)	7 (11)
Commercial medium (751 to 3000 employees)	18 (27)
Commercial large (3001 to 5000 employees)	33 (50)
Enterprise small (5001 to 15 000 employees)	3 (5)
Enterprise medium (15 001 to 35 000 employees)	4 (6)
Jumbo (>35 000 employees)	1 (2)
Employer industry	
Software	22 (33)
Business services	10 (15)
Financial services	8 (12)
Manufacturing	7 (11)
Retail	6 (9)
Media and internet	4 (6)
Health care services	3 (5)
Nonprofit organizations	3 (5)
Education	2 (3)

(continued)

Table 1. Baseline Sociodemographic Characteristics and Positive Screenings for Each Mental Health Condition^a (continued)

Sample characteristic	No. (%)
Hospitality	2 (3)
Insurance	2 (3)
Real estate	2 (3)
Law firms and legal services	1 (2)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; PTSD, posttraumatic stress disorder.

^a The population size varies across characteristics because the demographic questionnaire was optional. The full questionnaire was skipped by 421 of 1132 participants, with specific items skipped by several additional participants.

^b Thirty participants declined to indicate age.

^c Race and ethnicity were entered in a free-text entry form. A coding script was developed to classify participants into categories. The other category was assigned to individuals whose response did not align with any given category. Participants who did not provide any response were classified as "declined to answer."

^d All patients had to test positive for either depression or anxiety at baseline to be included.

CI, -6.77 to -5.91), corresponding to a large effect size ($d = -1.21$; 95% CI, -1.30 to -1.13). Reliable improvement was observed for 68.7% of participants (575 of 837) and both reliable improvement and remission for 60.5% of participants (506 of 837). Mean (SD) time to remission for GAD-7 was 6.0 (4.9) weeks.

Dose-Response Associations

Log-number of therapy sessions and medication sessions in the past month were significantly associated with lower scores for both the PHQ-9 and GAD-7 (therapy: PHQ-9, $b = -0.95$; $P < .001$ and GAD-7, $b = -0.89$; $P < .001$; medication: PHQ-9, $b = -1.13$; $P = .002$ and GAD-7, $b = -1.15$; $P = .002$) (Table 2), indicating a positive dose-response association.

Factors Associated With Clinical Improvement

A significant age \times log-days in treatment interaction indicated that each additional year of age was associated with more rapid depression symptom reduction, corresponding to a small difference by the end of treatment within the bounds of the data (eg, for a person 10 years older than the sample mean, Cohen $d = -0.12$; 95% CI, -0.21 to -0.04). For GAD-7, the finding was not statistically significant. Rates of improvement during the COVID-19 pandemic were not significantly different than prepandemic rates for either depression or anxiety. Elastic net regression models did not explain reliable improvement above the base rate for either depression or anxiety (eResults 2, eFigure 1 and eFigure 2 in the Supplement).

Time Back in the Workplace

Log-days in treatment were associated with fewer missed days (incidence rate ratio = 0.94; 95% CI, 0.93-0.95) and fewer unproductive days (incidence rate ratio = 0.94; 95% CI, 0.92-0.95), corresponding to total posttreatment outcomes of missing 0.32 fewer days per week and being unproductive for 0.64 fewer days per week. A supplemental retention analysis (eResults 3 in the Supplement) found that participants who enrolled in the program had 1.6 times the odds (95% CI, 1.3-1.9) of being retained as an employee than those who did not.

Employer Cost of Care

The median cost of care for participants with clinically significant depression or anxiety at baseline was \$740 (IQR, \$420-1065). Six-month salary savings for an employee at the federal median wage was \$3440 (95% CI, \$2730 to \$4151) and ranged from \$1442 for employees at the federal minimum wage to \$19 125 for employees making at least \$200 000 per year (Table 3).

Employer Break-Even Cost

Accounting for costs of all enrolled employees, employers were estimated to break even based on workplace productivity alone across all salary levels and participation rates (Table 4). In the most conservative case in which the mean annual salary was equal to the federal minimum wage and the participation rate was 0.4%, employers were estimated to break even at a per-employee per-month cost of \$0.96.

Discussion

Results of this cohort study found that an employer-sponsored mental health program was associated with large clinical improvements in depression and anxiety, fewer missed days of work, higher employee retention, and a positive financial ROI across all employee salary levels. Existing workplace mental health intervention research has focused on short-term, universal interventions²⁴ to reduce stress²⁵ and depression²⁶ and provide better management for employees with active mental illness.²⁷ Few studies have evaluated longer-term opt-in mental health programs, and those

Table 2. Clinical Outcomes, Dose-Response Effect Sizes, and Final Estimation Values

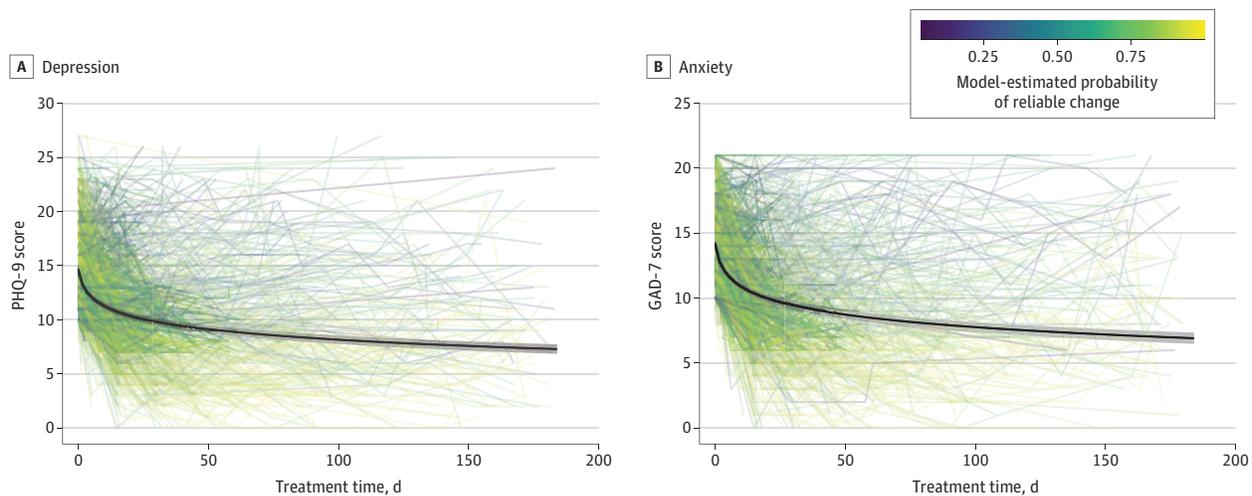
Variable	Depression (PHQ-9)						Anxiety (GAD-7)					
	Overall clinical outcomes model		Dose-response model		Final estimation model		Overall clinical outcomes model		Dose-response model		Final estimation model	
	Estimate (SE)	P value	Estimate (SE)	P value	Estimate (SE)	P value	Estimate (SE)	P value	Estimate (SE)	P value	Estimate (SE)	P value
Clinical outcome												
Intercept	14.75 (0.13)	<.001	14.25 (0.38)	<.001	14.04 (0.51)	<.001	14.27 (0.12)	<.001	13.67 (0.34)	<.001	13.78 (0.61)	<.001
Log-days in treatment	-1.43 (0.05)	<.001	-1.00 (0.16)	<.001	-1.01 (0.22)	<.001	-1.41 (0.05)	<.001	-1.16 (0.15)	<.001	-1.36 (0.27)	<.001
Dose response												
Log-number of medication appointments in the past mo	NA	NA	-1.13 (0.36)	.002	-1.25 (0.36)	<.001	NA	NA	-1.15 (0.38)	.002	-1.53 (0.42)	<.001
Log-number of therapy appointments in the last mo	NA	NA	-0.95 (0.19)	<.001	-0.85 (0.19)	<.001	NA	NA	-0.89 (0.19)	<.001	-0.75 (0.23)	.001
Used care navigation [Reference = No]	NA	NA	0.62 (0.41)	.13	0.44 (0.39)	.26	NA	NA	0.73 (0.36)	.04	0.55 (0.45)	.23
Used care navigation × log-days in treatment	NA	NA	-0.19 (0.16)	.25	-0.15 (0.16)	.36	NA	NA	-0.02 (0.16)	.92	0.12 (0.20)	.55
Final estimation models												
No. of positive screenings at baseline	NA	NA	NA	NA	1.14 (0.11)	<.001	NA	NA	NA	NA	0.41 (0.13)	.002
Measured during COVID-19 [Reference = No]	NA	NA	NA	NA	0.68 (0.25)	.01	NA	NA	NA	NA	0.62 (0.34)	.06
Log-days in treatment during COVID-19	NA	NA	NA	NA	0.14 (0.12)	.25	NA	NA	NA	NA	0.08 (0.15)	.57
Age in 10-y increments	NA	NA	NA	NA	0.16 (0.14)	.27	NA	NA	NA	NA	0.02 (0.17)	.89
Female gender	NA	NA	NA	NA	-0.01 (0.36)	.99	NA	NA	NA	NA	-0.07 (0.40)	.86
Gender (declined to answer)	NA	NA	NA	NA	-0.06 (0.38)	.87	NA	NA	NA	NA	-0.06 (0.42)	.89
Nonbinary gender	NA	NA	NA	NA	0.20 (1.15)	.86	NA	NA	NA	NA	-0.03 (1.23)	.98
No. of positive screens × log-days	NA	NA	NA	NA	-0.02 (0.04)	.64	NA	NA	NA	NA	0.08 (0.05)	.14
Age in 10-y increments × log-days	NA	NA	NA	NA	-0.16 (0.06)	.01	NA	NA	NA	NA	-0.12 (0.07)	.09
Female gender [Reference = male] × log-days	NA	NA	NA	NA	-0.24 (0.15)	.10	NA	NA	NA	NA	-0.13 (0.16)	.43
Nonbinary gender [Reference = male] × log-days	NA	NA	NA	NA	-0.20 (0.14)	.16	NA	NA	NA	NA	-0.15 (0.46)	.75
Declined to answer gender [Reference = male] × log-days	NA	NA	NA	NA	0.10 (0.44)	.82	NA	NA	NA	NA	-0.01 (0.17)	.96

Abbreviations: GAD-7, Generalized Anxiety Disorder questionnaire for anxiety; NA, not applicable; PHQ-9, Patient Health Questionnaire-9 for depression.

studies usually evaluated clinical outcomes alone.^{7,8} To fill this gap, the current study evaluated clinical and financial outcomes of an opt-in mental health program that provided regular screening, care navigation, and outpatient psychotherapy and medication management. Notably, the findings suggest that employer-sponsored comprehensive mental health programming may be associated with a reduced burden of mental illness on the employee while providing financial ROI to the employer.

Participants reported clinical improvement in symptoms of both anxiety and depression. After treatment, 69.3% of participants showed reliable improvement for depression and 68.7% showed improvement for anxiety. Effect sizes were larger than those found in recent meta-analyses of psychotherapy (for depression, $d = 1.11$ in the current study vs $d = 0.77$ in meta-analysis²⁸; for anxiety, $d = 1.21$ in the current study vs $d = 0.76$ in meta-analysis²⁹). The rates for both reliable improvement and recovery of 58% for depression and 60.5% for anxiety were substantially higher than the 43% rates found in meta-analyses of psychotherapy³⁰ and the medication response rate found, for example, in the large scale STAR*D (Sequential Treatment Alternatives to Relieve Depression) medication trial.^{31,32} Although this was an observational study and benchmarking may be imperfect because of study-specific selection bias, the current study found dose-response associations for both psychotherapy and medication management sessions, suggesting that participant improvement was

Figure. Trajectories of Depression and Anxiety Over the Course of Treatment



Thick black line represents the model-estimated average trajectory over the course of treatment with 95% CIs in the shaded area around the black line. Thin colored lines represent each patient's observed data. Because not all patients provided data at the end of treatment, reliable change at 1 week posttreatment was estimated with mixed-

effects logistic regression, which assigned each patient a probability of having achieved reliable change (yellow) or not (purple). GAD-7 indicates Generalized Anxiety Disorder questionnaire for anxiety; PHQ-9, Patient Health Questionnaire-9 for depression.

Table 3. Estimated Salary Savings From Increased Time in Workplace During a 6-Month Period, in US Dollars^a

Annual salary	Cost of care, \$	Salary savings in 6 mo (95% CI)
15 080	740	1442 (1144-1740)
25 000	740	2391 (1897-2884)
35 977	740	3440 (2730-4151)
50 000	740	4781 (3794-5769)
63 179	740	6042 (4794-7289)
75 000	740	7172 (5691-8653)
100 000	740	9563 (7588-11 537)
125 000	740	11 953 (9485-14 422)
150 000	740	14 344 (11 382-17 306)
200 000	740	19 125 (15 176-23 075)

^a Calculation is based on estimated workplace productivity savings per person and subtracting median cost of care. Some salary values are represented here due to their national relevance in the US: \$15 080 is the federal minimum wage; \$35 977 is the federal median wage; and \$63 179 is the federal median household income.

owing to treatment usage and not simply to the passage of time. Notably, the pandemic was not associated with reduced treatment effectiveness, as participant trajectories of recovery were similar before and after the onset of the pandemic. Each year of age was associated with more rapid symptom improvements during treatment, although effect sizes were large for all ages represented in the sample. Otherwise, neither traditional nor machine learning models identified participant characteristics associated with differential recovery rates. These results suggest that participants with a broad range of demographic and clinical characteristics experienced similar benefits, although the possibility that more informative variables or more complexly defined subgroups of participants had differential improvement rates cannot be ruled out.³³

One possible reason that participant outcome measures were higher than benchmark comparisons may have been the use of an ensemble of evidence-based care components. Whereas meta-analytic comparisons typically examined a single modality of treatment, the current program used screening, care navigation, access to psychotherapy and medication management, and clinical implementations of measurement-based care systems to monitor outcomes. Although not part of the study design, it is possible that the additive and interactive multiple care components were factors in the higher measures of clinical outcomes than any single intervention, suggesting that a flexible and multifaceted set of evidence-based care strategies may be important to the success of workplace mental health programs.

In addition to clinical outcomes, functional outcomes also improved. By the end of treatment, participants missed fewer days at work and reported higher productivity. This outcome may be expected, considering that depression and anxiety are estimated to cost the global economy 1.15 trillion USD annually, with one-third of that cost attributed to loss of workplace productivity.³⁴ The association of treatment with productivity gains compares favorably with the relatively low cost of appointments and became apparent within a short period, as the mean care episode was only 7 weeks in duration. Moreover, ROI was favorable at every income stratum including the federal minimum wage, highlighting that access to high-quality mental health care may be a financially viable benefit for all US employees.

Strengths and Limitations

The current study had several strengths. The study sample was heterogeneous. Participants were drawn from 66 employers across several industries in 40 US states. The study population was racially and ethnically diverse, with 42% being non-White. Participants were not compensated for participation. Comorbidity rates at baseline were similar to the general outpatient population.^{35,36} Together, these factors suggest that the outcomes may be generalizable to other employers in the US.

Table 4. Cost Per Employee Per Month at Which an Employer Will Break Even, in US Dollars^a

Annual salary	Rate of engagement in care, %							
	0.4	0.8	1.2	2	3	5	10	20
15 080	0.96	1.93	2.89	4.81	7.22	12.04	24.07	48.14
25 000	1.6	3.19	4.79	7.98	11.97	19.95	39.91	79.81
35 977	2.3	4.59	6.89	11.49	17.23	28.71	57.43	114.85
50 000	3.19	6.38	9.58	15.96	23.94	39.91	79.81	159.62
63 179	4.03	8.07	12.1	20.17	30.25	50.42	100.85	201.7
75 000	4.79	9.58	14.37	23.94	35.92	59.86	119.72	239.43
100 000	6.38	12.77	19.15	31.92	47.89	79.81	159.62	319.25
125 000	7.98	15.96	23.94	39.91	59.86	99.76	199.53	399.06
150 000	9.58	19.15	28.73	47.89	71.83	119.72	239.43	478.87
200 000	12.77	25.54	38.31	63.85	95.77	159.62	319.25	638.49

^a Calculation is based on workplace productivity savings alone after implementing the program across all employees. Engagement in care was defined as having at least 1 appointment, at least 2 assessments and being on or above the 10-point threshold on either the Patient Health Questionnaire-9 for depression or the Generalized Anxiety

Disorder questionnaire for anxiety. Some salary values are represented here due to their national relevance in the United States: \$15 080 was the federal minimum wage; \$35 977 was the federal median wage; and \$63 179 was the federal median household income.

Study limitations included that the study design cannot determine causality between improvements and the care provided. Although effect sizes were higher compared with benchmarks, subtle differences in the sampling strategy such as the ease of access to care may have increased the mean reversion effect sizes compared with what is typical in controlled trials. All assessments were self-reported for measurement-based care, raising the possibility of socially desirable responding.

Conclusions

In this cohort study evaluating an employer-sponsored mental health program, participants reported significant reductions in depression and anxiety symptoms and increased time in the workplace. The program delivered a positive ROI even when employees were compensated at the federal minimum wage. Together, these findings suggest that employer-sponsored workplace mental health programs may be beneficial for both employers and employees.

ARTICLE INFORMATION

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Biohaven Pharmaceuticals Medical Sciences; EpiVario Inc; RBNC Therapeutics Inc; Terran Biosciences Inc; Tempero Bio Inc; being an inventor on 9 patents (patent numbers 5447948, 8778979, 9592207; patent application numbers 15379013, 61973961, 62444552, 62719935, 63/125,181; and USPTO docket number Y0087.70116US00); being an editor of *Biological Psychiatry* and receiving research support from AstraZeneca Pharmaceuticals and Novartis (both provide drugs for research related to NIAAA grant "Center for Translational Neuroscience of Alcoholism [CTNA-4]*"). Dr Chekroud reported holding equity in Spring Care; Carbon Health Technologies Inc; Wheel Health Inc; Parallel Technologies Inc; Healthie Inc; and UnitedHealthcare; being the lead inventor on 3 patent submissions relating to treatment for major depressive disorder (US Patent and Trademark Office docket number Y0087.70116US00 and provisional application numbers 62/491 660 and 62/629 041); having done paid consultancy for Fortress Biotech about antidepressant drug development; and providing unpaid advisory services to health care technology startups. No other disclosures were reported.

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SUPPLEMENT.

eMethods 1. Detailed Platform Methodology

eMethods 2. Elastic Net Regression

eMethods 3. Productivity-Related Savings

eMethods 4. Employee Retention

eResults 1. Results of Mixed-Effects Logistic Regression Models

eResults 2. Results of Elastic Net Model

eResults 3. Results of Employee Retention Analysis

eFigure 1. Variable Importances Extracted From Elastic Net Algorithm Trained on Patients With Depression

eFigure 2. Variable Importances Extracted From Elastic Net Algorithm Trained on Patients With Anxiety