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Novel Health Information Technology to Aid Provider Recognition and Treatment of Major Depressive Disorder and Posttraumatic Stress Disorder in Primary Care

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Abstract

Background: Millions of traumatized refugees worldwide have resettled in the United States. For one of the largest, the Cambodian community, having their mental health needs met has been a continuing challenge. A multicomponent health information technology screening tool was designed to aid provider recognition and treatment of major depressive disorder and posttraumatic stress disorder (PTSD) in the primary care setting.

Methods: In a clustered randomized controlled trial, 18 primary care providers were randomized to receive access to a multicomponent health information technology mental health screening intervention, or to a minimal intervention control group; 390 Cambodian American patients empaneled to participating providers were assigned to the providers' randomized group.

Results: Electronic screening revealed that 65% of patients screened positive for depression and 34% screened positive for PTSD. Multilevel mixed effects logistic models, accounting for clustering structure, indicated that providers in the intervention were more likely to diagnose depression [odds ratio (OR), 6.5; 95% confidence interval (CI), 1.48–28.79; P=0.013] and PTSD (OR, 23.3; 95% CI, 2.99–151.62; P=0.002) among those diagnosed during screening, relative

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to the control group. Providers in the intervention were more likely to provide evidence-based guideline (OR, 4.02; 95% CI, 1.01–16.06; *P*=0.049) and trauma-informed (OR, 15.8; 95% CI, 3.47–71.6; *P*<0.001) care in unadjusted models, relative to the control group. Guideline care, but not trauma-informed care, was associated with decreased depression at 12 weeks in both study groups (*P*=0.003), and neither was associated with PTSD outcomes at 12 weeks.

Conclusions: This innovative approach offers the potential for training primary care providers to diagnose and treat traumatized patients, the majority of whom seek mental health care in primary care (ClinicalTrials.gov number, NCT03191929).

Keywords

health information technology; primary care; limited english proficiency; Cambodian refugees; depression; PTSD

Patients with mental health concerns generate massive health care consumption and place a significant burden on health care systems, particularly in primary care.[1] Although primary care most often serves as the initial gateway for treatment,[2] physicians recognize only about half of the depressed patients who present for care.[2–4] This lack of recognition is likely the result of several complex factors, including competing priorities of other medical conditions and primary care physicians' time pressures.[4,5]

The underdiagnosis and undertreatment of depression is exacerbated when patients encounter language-related communication barriers.[6–8] Approximately 54 million people in the United States speak a language other than English at home, and over 21 million have limited English-language skills.[9] Language barriers often affect the 2.5 million Southeast Asian (including Cambodian) refugees living in the United States,[10] many of whom have suffered war-related trauma and are at high risk for depression and posttraumatic stress disorder (PTSD).[11,12]

Research suggests that multicomponent interventions may be more successful than single-component interventions for improving mental health outcomes in primary care.[13,14] Advances in health information technology (health-IT) make it possible to develop multifaceted interventions that include provider training, screening and notification, and clinical decision support, which may be more effective than any single intervention alone.[14,15]

In a clustered randomized, controlled trial in the primary care setting, we assessed the potential of using a multicomponent health-IT intervention to train medical providers how to provide culturally tailored, trauma-informed mental health care, and to improve the screening, diagnosis, and initiation of treatment for depression and PTSD among limited English-language proficient patients.[16] The software engineering and technology used in this study are well established (eg, web-based tutorials, and iPad-delivered screening instruments), but the application for mental health screening and treatment for limited English-language proficient patients is novel. Specifically, we tested the following three hypotheses:

1. The appropriate clinical detection of depression and/or PTSD for limited English-language proficient patients in primary care will be higher in the intervention group compared with a minimal intervention control group.
2. Provider initiation of evidence-based guideline mental health treatment and trauma-informed care will be higher in the intervention group compared with a minimal intervention control group.
3. Patient outcomes at 12 weeks postindex visit for depression and/or PTSD will be improved in the intervention group compared with a minimal intervention control group.

METHODS

Participants and Recruitment

Medical providers and patients were recruited from 2 federally qualified health centers/community (FQHC) clinics (within multiple sites) located in Long Beach, CA, between October 2013 and March 2015.[16] All 18 eligible medical providers consented to participate in the study. Following a cluster randomized controlled trial design, providers were randomized in a 1:1 ratio either to receive training particular to the health-IT intervention (N = 10) or to receive training on generally providing culturally competent care (N = 8). The greatest variability in terms of provider and patient characteristics was determined to be across clinics, not within clinics; thus, to minimize the effect of site variability on study outcomes, randomization of the providers occurred within clinic when possible. The study design was a single-blind study—only study patients were blinded to their study group assignment.

On average, providers had 14.8 years (SD, 10.6 y) experience working in primary care. More than half of the providers (57.9%) were over the age of 41 years, 66.7% were female, 50.0% were non-Hispanic white, with the remainder of Asian/Pacific Islander (37.8%) or Hispanic/Hispanic mixed (22.2%) ethnicity. The majority of providers specialized in family medicine (88.8%), and 2 providers' specialty was in general internal medicine (11.2%). Approximately 83.3% of the providers spoke Spanish as a second language to English, and 2 providers (11.2%) were fluent in Khmer (the official language of Cambodia).

Cambodian American patients who were over the age of 18, and empaneled to the medical providers enrolled in the study, were identified through the clinic's medical records and invited to participate in the study during regularly scheduled or walk-in appointments. Patients with severe visual or hearing impairments and/or severe life-threatening illness were excluded. A total of 531 individual patients were approached to participate in the study. Of these, 390 patients were enrolled into study; 272 patients into the intervention arm and 118 patients into the minimal intervention control condition (Fig. 1, consort diagram).[16] All study protocols were approved by the University's Institutional Review Board.

Study Treatment Groups

Multicomponent Health-IT Mental Health Intervention—The intervention involved three components. The first component included medical providers completing an online

tutorial on how to provide culturally competent, trauma-informed mental health care to the Southeast Asian population, particularly for individuals who may have experienced extreme war trauma. This interactive, 3-hour, web-based tutorial was developed and adapted from a paper based and CD-ROM "toolkit" previously developed by the Harvard Program in Refugee Trauma (HPRT).[17] The second component involved screening all patients just before their appointment with their physician using 2 culturally adapted instruments for depression and PTSD (see the Measures section for detailed description of the instruments and scoring), which were administered using an iPad. Patient responses were recorded for each item and a composite score for depression and PTSD was computed immediately. Providers in the intervention group received a printed notification of positive and/or negative mental health screening results before the patient visit. Finally, the third component of the health-IT intervention involved giving medical provider access to evidence-based clinical algorithms and guidelines through a web-based mobile application. Clinical decision support was based upon an 11-point diagnosis and treatment algorithm that included easy navigation and access to short, "bite-size" pieces of information.[18]

Minimal Intervention Control Condition—Medical providers randomized to this condition completed an online tutorial about providing culturally competent care developed by the Office of Minority Health, US Department of Health and Human Services Website, as well as received general information about the history of the migration of Southeast Asians to the United States and resources for culturally appropriate health education materials for Southeast Asian patients. All patients were screened using the same multimedia, interactive computer program described in the prior section; however, medical providers randomized to the control group only received notification of patients' scores if patients evidenced symptoms of being at risk of harm to themselves or others. Otherwise, scores were not shared, and providers offered usual care. More details about the rationale and study protocol are reported in Biegler et al.[16]

Measures

The measures reported on in this manuscript were derived from 3 primary sources: (1) the electronic mental health screening tool, (2) paper surveys administered at baseline and 12 weeks, and (3) the patient electronic/paper medical record.

Electronic Mental Health Screening Tool—A bilingual Khmer research assistant screened patients for depression and PTSD using an iPad that administered the screening tools in patients' preferred language at baseline and the 12-week follow-up assessment.

Major Depressive Disorder—Depression was assessed using the 15-item depression subscale of the Hopkins Symptom Checklist (HSC).[19] Participants rated on a 4 point scale (1, not at all; 4, extremely) the extent to which they experienced depression symptoms within the past week. Items were averaged to create a composite depression score, ranging from 1 to 4. Scores > 1.75 were used to create a cut-off to indicate the presence of a major depressive disorder. Mollica and colleagues reported a sensitivity and specificity for detecting major depressive disorder of 93.2% and 91.2%, respectively in a recent study of trauma-exposed primary care patients.[20]

PTSD—PTSD was assessed using the 40-item Harvard Trauma Questionnaire (HTQ). Patients rated on a 4 point scale (1, not at all; 4, extremely) the extent to which they experienced PTSD symptoms within the past week. Items were averaged to create a composite PTSD score, ranging from 1 to 4, and scores > 2.5 were used to create a cut-off to indicate the presence of PTSD. The HTQ has been shown to demonstrate good validity across languages and cultural contexts,[20–24] with a recent study reporting sensitivity at 100% and specificity at 93.9%.[20]

Medical Records—At 12 weeks following patients' initial screening visits, patients' electronic/paper medical records were abstracted to determine the extent to which providers followed guideline care for the initiation of treatment and trauma-informed care.[25,26]

Initiation of Evidence-Based Guideline Care—Providers received credit for having initiated evidence-based guideline care if ≥ 1 the following indicators were noted in patients' medical records: (1) pharmacotherapy discussion and prescription, (2) watchful waiting, with supportive psychological counseling, and/or (3) referral to a mental health specialist.[25,27] The initiation of evidence-based guideline care was coded as present (1) or absent (0).

Initiation of Trauma-informed Care—As the intervention was designed to train providers in administering appropriate care to address experiences of war and trauma among Cambodian refugees, we also examined the extent to which providers initiated trauma-informed care. The initiation of trauma-informed care was defined as the presence of ≥ 1 of the following indicators in patient' s medical records: (1) conducted a risk assessment of patients' depression or PTSD status (eg, discussed with patients their scores on the screener and/or how they were feeling), (2) discussed the trauma story with the patient, (3) asked patients if they wanted to improve their well-being, and/or (4) assessed psychiatric symptoms. The initiation of trauma-informed care was coded as present (1) or absent (0).

Analyses

Baseline characteristics of the study population were summarized with descriptive statistics. χ^2 tests and *t* tests were used to test for significant differences at baseline across intervention groups.

Multilevel mixed effects logistic models were used to model the binary outcomes. Multilevel mixed effects linear regression models with provider random effects were used to model continuous outcomes. All models included random effects for provider to account for the clustering structure. Unlike multivariate and repeated measures analysis of variance, mixed effects models are well-suited to handle unbalanced designs.[28] Data analysis was carried out using the statistical software package STATA/SE 14. *P*-values <0.05 were considered statistically significant.

Missing data at follow-up was handled using multiple imputation by chained equations (MICE).[29,30] Five imputations were performed as suggested by Rubin.[30] MICE is used when missing values occur in > 1 variable, such as in this case if there was missing data in the depression and PTSD scores at follow-up.

RESULTS

Most of the sample self-reported having seen their primary care doctor for > 1 year: 35.7% reported seeing their provider for <1 year, 54.4% reported seeing their provider for one to <5 years, and 9.9% reported seeing their provider for ≥ 5 years. Table 1 shows the baseline characteristics of the sample. As shown, patients in the control group had higher levels of education and were older than those in the intervention. In addition, more patients screened positive for depression and PTSD in the intervention group (73% and 38%, respectively) compared with those in the control group (depression, 50%; PTSD, 23%).

Hypothesis 1 was tested by examining the degree to which there was a successful match between results of the screening tool and a potential diagnosis by the provider. Specifically, scores on the presence or absence of a depression and/or PTSD diagnosis in the medical record for each patient were compared with each patient's computed depression and PTSD screening score (presence or absence of a major depressive disorder) to determine whether there was a match, thereby determining the extent to which the health-IT intervention impacted providers' clinical detection of depression and/or PTSD. Table 2 shows the results of the unadjusted models, and models adjusting for education, sex, and age. In addition, we include a model with sample size restricted to only those who were positively identified at screening. The findings suggest that in unadjusted models for depression, the intervention group had 2.6 times greater odds of having a matched diagnosis by their provider than those in the control group (P=0.007). In adjusted models, the relationship remained significant (P=0.014). This effect also remained among the subgroup of patients positively identified with depression during screening; there were 6.5 higher odds in the intervention group of having a matching diagnosis by their provider compared to the control group (P=0.013). Approximately 81% were diagnosed with depression by their providers in the treatment group, whereas only 33% were diagnosed by their providers in the control group.

In unadjusted and adjusted models for PTSD, there was no significant effect of the intervention in the match of diagnosis made by the provider and the results of the screening. Specifically, there were 79% matches in the control group, and 83% matches in the intervention group. However, among the subgroup of patients who had positive PTSD results during screening, there were significantly higher odds of receiving a positive PTSD diagnosis by their provider in the intervention group than in the control group (P=0.013). Only 11% in the control group were positively diagnosed by their provider, whereas 74% were positively diagnosed by their provider in the intervention group.

Hypothesis 2 was tested by examining the degree to which evidence-based guideline care and trauma-informed care were initiated by the provider for patients who screened positive for either depression or PTSD. The models adjust for PTSD screening result and for other covariates (education, sex, and age). Those that screened positive for PTSD at baseline also screened positive for depression at baseline, hence the models did not adjust for positive screening for depression at baseline. As shown in the Table 3, those that were in the intervention group had 4 times higher odds of being provided with evidence-based guideline care than those in the control group (P = 0.049). This was particularly beneficial for those positively identified with PTSD and depression during screening. Those who were screened

positive for PTSD at baseline had 3.2 higher odds of being provided with evidence-based guideline care as compared with those who were screened positive for depression only ($P < 0.001$). In adjusted models, covariates were not significantly associated with the outcome. Post hoc analyses suggested that patients who were seen by intervention trained providers were significantly more likely to initiate a prescription (44% vs. 14%, $P < 0.001$), or provide watchful waiting, with supportive psychological counseling (2.6% vs. 0%, $P = 0.008$) compared with providers in the control group. There was no significant group difference in the rate of referral to a mental health specialist (23% vs. 20%, $P = 0.44$).

Furthermore, those who were in the intervention group had almost 16 times higher odds of being provided with trauma-informed care than those in the control group ($P < 0.001$). In addition, those who were identified with PTSD and depression during screening had 5 times higher odds of receiving trauma informed compared with those who were screened with depression only ($P = 0.001$). In adjusted models, covariates were not significantly associated with the outcome.

Hypothesis 3 was tested by examining the change in screening tool depression and PTSD scores at 12-week follow-up compared with baseline. As shown in the Table 4, the findings suggested an overall reduction of depression and PTSD scores in the sample. There was an average reduction of 0.24 ± 0.6 (Mean ± SD) points in depression scores in the intervention group and of 0.23 ± 0.4 in the control group. PTSD scores were reduced on average by 0.13 ± 0.5 points in the intervention group and by 0.10 ± 0.4 in the control group.

Additional analyses examined the extent to which care was associated with improvement in mental health. Receiving evidence-based guideline care was significantly associated with a lower depression score at follow-up. Specifically, those who received guideline care had an estimated reduction of 0.17 points in their depression score at follow-up when compared with their depression score at baseline ($P = 0.003$). However, receiving guideline care was not significantly associated with changes in PTSD scores, and receiving trauma-informed care was neither associated with changes in depression nor PTSD scores. Conclusions from complete-case analyses (not shown) were no different from conclusions reached using imputed models.

DISCUSSION

The US Preventative Task Force recommends screening adults for depression in the primary care setting when staff-assisted depression management programs are available.[31] In our study, a multicomponent health-IT intervention, compared against a minimal intervention control group, was effective in increasing provider detection of depression (all patients) and PTSD (among those who screened positive only), and in the initiation of evidence-based guideline care (only in the unadjusted model) and trauma-informed care among limited English-language proficient patients being seen in primary care. The initiation of guideline care was associated with a significant reduction of depressive symptoms irrespective of study arm.

Prior research has suggested that short-term therapies may not be as effective for populations who have suffered severe trauma. Our findings suggest that despite having a low income and low literacy, screening with provider notification can improve provider recognition of a mental health concern and facilitate access to evidence-based care. In turn, the receipt of guideline care can be effective for addressing depressive symptomology. It may be the intervention was less effective for addressing PTSD symptomology, perhaps due to providers generally being less familiar with diagnosing and treating PTSD. In particular, providers may not have felt comfortable or had enough experience eliciting the trauma story, a key therapeutic component for effectively addressing trauma.[32] Although one might conclude that primary care clinicians should be encouraged to rely on depression guidelines that emphasize mental health referral as a valid option for most patients,[33] given the high reluctance of patients, particularly those from racially/ethnically diverse backgrounds, to consider specialized mental health care, encouraging physicians to learn to gather the trauma narrative is important.

Limitations of the study include baseline differences in depression and PTSD prevalence between the study groups that may limit comparability. Randomization was performed at the level of the provider, and then patients were recruited and assigned to their providers' study arm. There was an assumption that the differences between patients nested within one provider over the other would be minimal.[34] It is likely, however, that the study underestimates the impact of the provider influence on the outcomes of interest in this study. An additional limitation is that many of the patients had symptoms of both depression and PTSD. Often the treatment of depressive symptoms takes precedent in the diagnosis and treatment pathway, and treating depression may help reduce some PTSD symptoms (eg, poor sleep and nightmares). However, the treatment of depression will not always resolve some of the unique symptoms associated with PTSD, such as dissociative symptoms, flashbacks, and intrusive thoughts. These symptoms need specific therapies related to the trauma story, such as narrative and exposure therapy.[35,36] In addition, the current study as designed did not allow us to examine how clinic-level or provider-level differences (eg, the quality of the care provided either by the primary care physician or the specialist if the patient was referred after the initial baseline provider visit) may have impacted the study findings. There can be variability in the quality of mental health care provided both by primary care providers and specialists, due to differences in training, experience, and approach, which would impact the effectiveness of treatment and mental health outcomes. Finally, except for in cases where the patient evidenced symptoms of being at risk of harm to themselves or others, scores were not shared with providers, contributing to a potential ethical dilemma as to the extent to which research procedures should influence clinical practice within the context of an ongoing research study. Newer research designs, such as pragmatic stepped wedge cluster randomized trial,[37] may offer researchers more flexibility in testing health services interventions.

CONCLUSIONS

Over the past decade, there has been a national shift, reaching the highest levels of government (eg, US Department of Defense), towards prioritizing use of screening protocols to improve the detection and treatment of mental illness. As the nation becomes more

racially/ethnically and linguistically diverse, overcoming language barriers in mental health care settings is essential to delivering high-quality mental health care for racial/ethnic minority populations. The rapid advancement of digital technology in health care delivery warrants considerations of health equity among low income, limited English proficient, marginalized patient populations, who are vulnerable to health and health care access disparities resulting from the digital divide. Although this study focused on health-IT intervention to providers who care for limited-English proficient Cambodian patients seeking health care through the FQHC system, the findings have implications for incorporating mental health-IT into the standard of care in primary care medicine, both for provider training and the provision of health services. Health-IT can be used to leverage already existing health care technology infrastructures for delivering culturally appropriate training and care to both to providers and patients. Furthermore, this technology has the potential to be adapted and utilized for any group of limited English-language proficient patients, regardless of their native language, if care is taken to ensure all instruments are culturally and linguistically appropriate. Thus, as systems develop to serve increasingly diverse patient populations across the United States, policy makers, stakeholders, and researchers have a unique and timely opportunity to spearhead health-IT programs that promote health equity and inclusivity.

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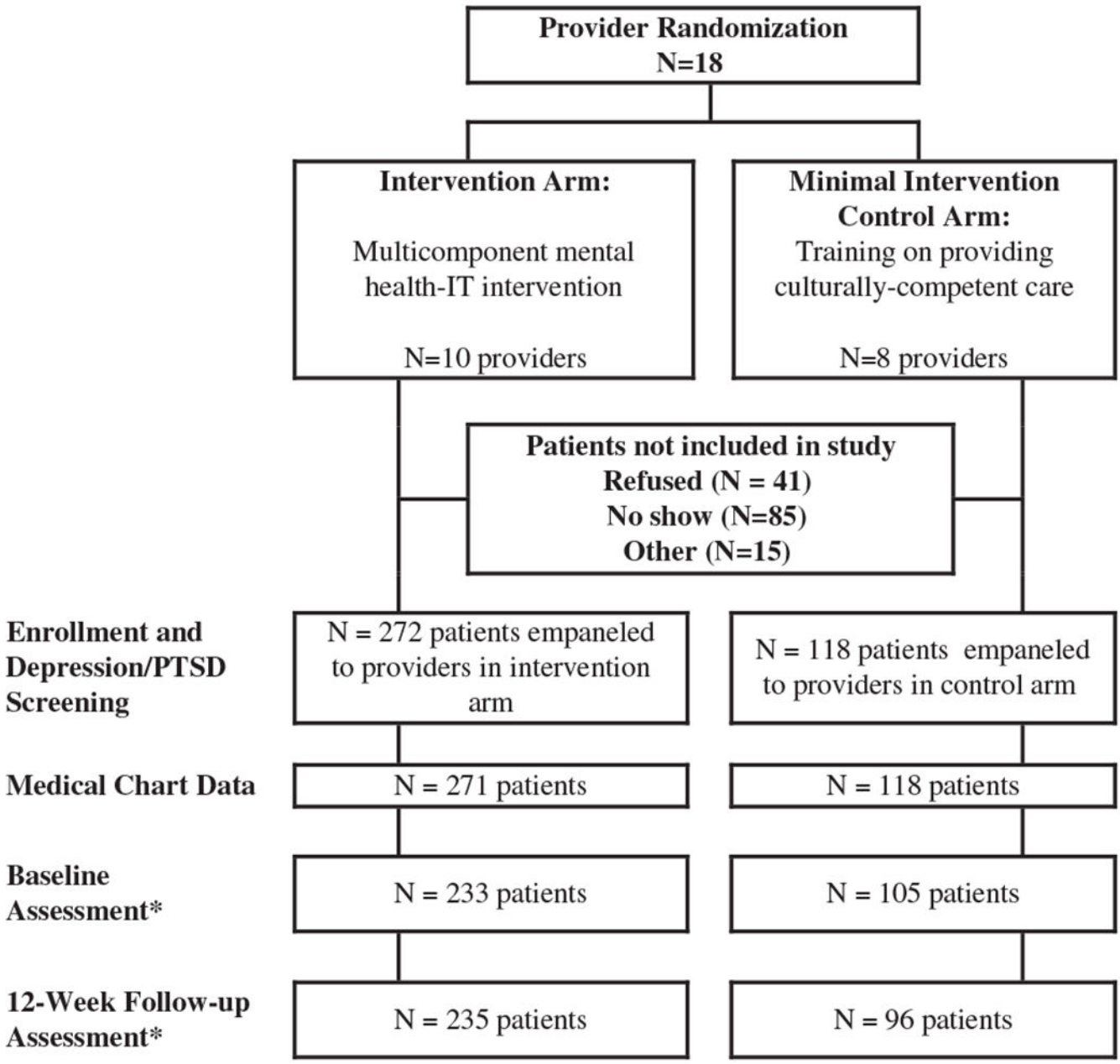

FIGURE 1.

Consort diagram of patient sample. Not all patients completed both baseline and 12-week follow-up assessments; 310 patients completed longitudinal assessment data (intervention N = 218; control N = 92). Health-IT indicates health information technology; PTSD, posttraumatic stress disorder.

TABLE 1.

Patient Baseline Demographic Characteristics and Baseline Depression and PTSD Scores (N = 390)

	Intervention [n (%)]	Control [n (%)]	*P*
Sex			0.221
Female	181 (66.3)	70 (59.8)	
Male	92 (33.7)	47 (40.2)	
Education			0.003
No education (y)	58 (25.2)	9 (8.9)	
≤8	58 (25.2)	29 (28.7)	
≥9	114 (49.6)	63 (62.4)	
US born			0.405
Yes	17 (7.4)	5 (4.9)	
No	214 (92.6)	97 (95.1)	
Depression screening diagnosis			<0.001
Yes	198 (72.5)	58 (49.6)	
No	75 (27.5)	59 (50.4)	
PTSD screening diagnosis			0.004
Yes	104 (38.1)	27 (23.1)	
No	169 (61.9)	90 (76.9)	
Age [mean (SD)]	58.7 (13.5)	52.8 (12.4)	<0.001
Depression score [mean (SD)]	2.3 (0.7)	2.0 (0.7)	<0.001
PTSD score [mean (SD)]	2.2 (0.7)	1.9 (0.7)	<0.001

Missing data were observed for education (15%), US born status (14%), and age (19%).

PTSD indicates posttraumatic stress disorder.

TABLE 2.

Multilevel Mixed Effects Logistic Models for Positive Match of Provider Diagnosis During Study Time and Screening Results at Baseline

	Unadjusted Model (N = 390)		Adjusted Model (N = 318)		Subsample: Positive Depression at Baseline (N = 221)	
	OR (95% CI)	***P***	**OR (95% CI)**	***P***	**OR (95% CI)**	***P***
Depression						
Intervention group	2.55 (1.30–5.01)	0.007	2.86 (1.24–6.59)	0.014	6.5 (1.48–28.79)	0.013
Female	—	—	0.85 (0.47–1.54)	0.587	—	—
Age	—	—	0.98 (0.96–1.00)	0.094	—	—
Education (y)						
1–8	—	—	1.41 (0.61–3.30)	0.425	—	—
≥9	—	—	1.02 (0.48–2.19)	0.954	—	—
	N=390		**N=318**		**N=116**	
	OR (95% CI)	***P***	**OR (95% CI)**	***P***	**OR (95% CI)**	***P***
PTSD						
Intervention group	1.34 (0.77–2.32)	0.303	1.69 (0.90–3.16)	0.104	23.3 (2.99–151.62)	0.002
Female	—	—	0.67 (0.35–1.27)	0.217	—	—
Age	—	—	0.97 (0.74–3.29)	0.245	—	—
Education (y)						
1–8	—	—	1.18 (0.54–2.59)	0.674	—	—
≥9	—	—	1.56 (0.74–3.29)	0.245	—	—

CI indicates confidence interval; PTSD, posttraumatic stress disorder; OR, odds ratio.

TABLE 3.

Multilevel Mixed Effects Logistic Models for Receiving Evidence-based Guideline Care and Trauma-informed Care (n=255)*

	Unadjusted Model (N = 255)		Adjusted Model (N = 221)	
	OR (95% CI)	***P***	**OR (95% CI)**	***P***
Evidence-based guideline care				
Intervention group	4.02 (1.01–16.06)	0.049	3.79 (0.93–15.44)	0.063
PTSD positive screening	3.15 (1.77–5.59)	<0.001	2.61 (1.40–4.85)	0.002
Female	—	—	1.35 (0.66–2.77)	0.408
Age	—	—	0.98 (0.96–1.01)	0.303
Education (y)				
1–8	—	—	1.19 (0.49–2.85)	0.700
≥9	—	—	0.76 (0.34–1.69)	0.501
Trauma-informed care				
Intervention group	15.8 (3.47–71.60)	<0.001	20.0 (4.74–84.27)	<0.001
PTSD positive screening	5.45 (1.97–15.04)	0.001	5.26 (1.72–16.1)	0.004
Female	—	—	1.08 (0.34–3.44)	0.893
Age	—	—	0.99 (0.95–1.04)	0.835
Education (y)				
1–8	—	—	1.99 (0.40–9.99)	0.405
≥9	—	—	1.07 (0.26–4.43)	0.928

All patients who were positive for PTSD were observed to also be positive for depression.

*The sample for this model includes only those who were positive for depression or PTSD at baseline.

CI indicates confidence interval; OR, odds ratio; PTSD, posttraumatic stress disorder.

TABLE 4.

Multilevel Mixed Effects Models for the Difference in Depression and PTSD Scores, Defined as Follow-up Minus Baseline Score

	Est (95% CI)	*P*
Difference in depression score (N = 390)		
Adjusted for guideline care		
Intervention group	0.09 (−0.07 to o.24)	0.28
Guideline care	0.17 (0.06–0.29)	0.003
Baseline depression score	−0.4 (−0.48 to −0.31)	<0.001
Adjusted for trauma-informed care		
Intervention group	0.09 (−0.06 to 0.25)	0.24
Trauma-informed care	0.06 (−0.09 to 0.21)	0.42
Baseline depression score	−0.34 (−0.44 to −0.28)	<0.001
Difference in PTSD score (N = 390)		
Adjusted for guideline care		
Intervention group	0.05 (−0.09 to 0.19)	0.48
Guideline care	0.05 (−0.07 to 0.16)	0.45
Baseline PTSD score	−0.29 (−0.37 to −0.21)	<0.001
Adjusted for trauma-informed care		
Intervention group	0.07 (−0.07 to 0.21)	0.35
Trauma-informed care	−0.04 (−0.9 to 0.12)	0.63
Baseline PTSD score	−0.27 (−0.36 to −0.19)	<0.001

There were 16% missing observations at follow-up. Multiple imputation by chained equations was used to perform 5 imputations to create 5 different datasets. Estimates were combined to obtain the overall model results. Models adjust for having received guideline care or trauma-informed care, and baseline scores. In imputed datasets, there was an average reduction of 0.22 ± 0.6 points in depression scores in the intervention group and a reduction of 0.20 ± 0.6 in the control group. There was an average reduction of 0.26 ± 0.6 points in PTSD scores in the intervention group and a reduction of 0.20 ± 0.5 in the control group. Although in all cases those in the intervention group had larger observed reductions in their depression and PTSD scores at follow-up, these differences were not statistically significant.

CI indicates confidence interval; OR, odds ratio; PTSD, posttraumatic stress disorder.