Train New Trainers Primary Care Psychiatry Fellowship—Optimizing Delivery of Behavioral Health Care Through Training for Primary Care Providers

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Objective: To expand and optimize the behavioral health workforce, it is necessary to improve primary care providers' (PCPs) overall knowledge and clinical skills in primary care–based psychiatry. Studies on the effects of postgraduate psychiatric education programs for PCPs on psychiatric knowledge are limited.

Methods: A total of 251 PCPs completed a 1-year fellowship. Data from program development and evaluation were analyzed for 4 fellowship years (2016–2019). Fellows were surveyed at baseline, midpoint, and postfellowship about mental health stigma, perceived competency, attitudes about psychiatry, satisfaction with current psychiatric knowledge, confidence and comfort to treat psychiatric illnesses, and program satisfaction. Psychiatric knowledge was evaluated at baseline, midpoint, and postfellowship.

Results: Large effects were noted on perceived competency/self-efficacy and confidence in the treatment of common psychiatric disorders encountered in primary care settings. Positive effects were observed on attitudes of mental health stigma, and even more robust effects were found with improvement in psychiatry clinical knowledge. Knowledge improved by 12% at postfellowship ($P < .0001$). Correlations of the degree of change in attitude with improved psychiatric literacy demonstrated significant relationships with reduction of stigma total score ($r = -0.2133$, $P = .0043$), increased willingness ($r = 0.1941$, $P = .0096$), and increased positive attitudes ($r = 0.1894$, $P = .0111$).

Conclusion: Innovative initiatives to improve and expand psychiatric knowledge and clinical skills among those who provide the most behavioral health care (PCPs) can have marked impacts on attitudes toward mental health care delivery, stigma, and competency/self-efficacy. Future studies are necessary to consider the impact of this program on clinical practice pattern outcomes on a larger scale.

Keywords: psychiatric knowledge, primary care providers, train new trainers, fellowship

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The annual prevalence of psychiatric disorders is approximately 25% in the United States with a lifetime prevalence of up to 50%.[1] These common disorders carry significant societal impact and cost.[2] In 2017, the World Health Organization estimated that mental and substance use disorders became the leading cause of disability worldwide, accounting for 23% of years lost.[3] Improving mental health is key for sustainable disease prevention and is one of the primary objectives put forth in Healthy People 2020. Notably, Healthy People 2020 includes a specific objective to increase depression screening by primary care providers (PCPs) because only 2.2% of adult primary care visits include screening for depression.[4,5] This is despite the fact that up to 40% of patients seen in primary care have active psychiatric problems.[6] When the need for specialty behavioral health services is identified, only about 50% of patients are able to access those services.[6,7] Because of this, up to 74% of mental health care is delivered in primary care settings.[8,9] Unfortunately, PCPs often believe their behavioral health training is inadequate,[10,11] with subsequent poor recognition and treatment resulting in 50 to 70% of episodes of major depressive disorder not being accurately diagnosed or treated in the primary care setting.[12] The 2011 Joint Commission listed suicide assessment as a National Patient Safety Goal for accredited hospitals, but a multistate review of more than 5000 deaths by suicide revealed that 50% of patients who died by suicide had seen their PCP within the last month; yet, only 25% had received a mental health diagnosis.[13]

There have been several strategies aimed at bridging the gap in mental health management within primary care settings. Examples include implementation of behavioral health

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screening tools[14] and collaborative care or other integrated approaches,[15,16] which have been shown to yield medical savings of more than 10% per patient.[17] Recent collaborative models, such as the Extension for Community Healthcare Outcomes (ECHO) Project, provide promising data for improving behavioral health care in primary care settings by providing multidisciplinary case review clinics using teleconferencing, which allows a wider coverage of large geographic areas. These efforts allow for high-level behavioral consultation and provides for experiential learning.[18] However, these important efforts do not directly target the psychiatric and behavioral health knowledge and clinical skill deficits commonly found among PCPs,[19,20] which are crucial for improving the mental health care of those seeking care in primary care settings.[21,22] Most primary care residency program directors are dissatisfied with the mental health training their residents receive,[23,24] and postgraduate psychiatric education program for PCPs is necessary.[25] PCPs themselves express concern about the lack of knowledge and necessary communication skills that are essential in the treatment of patients with mental health complaints.[26]

Optimizing psychiatric care requires improving PCP clinical knowledge and skills in primary care–based psychiatry, as well as attitudes and general approach toward patients with mental health concerns and mental health care delivery. Development and assessment of programs promoting psychiatric knowledge using data-driven approaches have been lacking, which is a major gap in our understanding and delivery of psychiatric care.[25] Here, we describe an innovative educational initiative designed to improve stigma and attitudes toward mental health in primary care settings, improve psychiatric clinical knowledge of PCPs, and enhance confidence in identifying, preventing, and managing commonly encountered primary care–based psychiatric disorders. This longitudinal training program was developed by the University of California Irvine (UCI) in collaboration with the University of California Davis (UCD) and called the UCI Train New Trainers (TNT) Primary Care Psychiatry Fellowship. The curriculum for this program was previously published.[27,28] Here, we describe the program and present preliminary data of program development and effect using a data-driven approach based on survey and questionnaire data collected over the first 4 years of the TNT program.

METHODS

Data from program development and evaluation were analyzed for 4 fellowship years (2016–2019). Overall, participant characteristics for the 2016 to 2019 cohorts (n = 251) are summarized in Table 1. The fellowship was marketed to health plans, county agencies, and other stakeholders that could benefit from such programming. This nonaccredited fellowship required completion of an application, which included practice information and stated reasons for the interest in the provision of primary care–based psychiatric care. The growth of the program heavily relied on word of mouth and achieved this by maintaining continued relationships and communications with graduates who would then promote the fellowship and act as local "trainers" within their respective geographical regions. Fellows were accepted into the fellowship if they were licensed health care practitioners (eg, MDs, DOs, NPs, and PAs), worked in primary care settings, and expressed interest in improving their psychiatric knowledge and skills. Over the past several years, numerous health plans and state funding served as a source for tuition scholarships. Only few (n = 15) applicants paid tuition "out-of-pocket" between 2016 and 2019, whereas the rest of the fellows were able to secure funding through scholarships or their employers. This study was deemed exempt by the UCI Institutional Review Board.

Program Description

The fellowship provides more than 50 hours of training outside of traditional clinic work hours. This includes two 2-day conferences with large-group lectures coupled with small-group discussion. Participants further engage in twice-monthly didactics through video conferencing and monthly mentorship sessions (telephonic or video conferencing) with TNT faculty. Individual providers were encouraged to ask their employers for protected learning time (1 hour) at noon and at 5:15 PM (PST) twice per month for the scheduled activities. This protected time was not uniformly guaranteed. The fellowship provides written materials[27] to supplement the lectures, conference workshops, and monthly distance learning and small-group mentorship sessions. The curriculum covers a wide range of behavioral health topics and skills relevant to primary care settings, including psychiatric interviewing, mental status examination, and management of psychiatric illnesses (eg, mood, anxiety, sleep, psychotic, substance misuse, somatic symptom, and personality disorders). Suicide risk assessment, pain medicine/psychiatry, fundamentals of psychopharmacology, cultural formulation, motivational interviewing, and cognitive behavioral therapy are also key parts of the curriculum.[29] Fellows receive training on how to teach PCPs in their geographical region. One unique feature of this program is the majority of the faculty involved in teaching and mentorship, including the directors of the TNT fellowship, are dually trained physicians in either internal medicine or family medicine *and* psychiatry (21/35 of current faculty). With this unique background, faculty are able to accurately understand the important differences between primary care and mental health care training, scope, and delivery of care, while providing practical instruction that is specifically targeted toward practice in busy primary care settings.

Program Development Evaluation

The following data were used for program evaluation: demographics (eg, age, sex, discipline, education, experience, and years of practice), psychiatric knowledge, attitude, and satisfaction surveys. Fellows were evaluated at baseline (at the time of enrollment or before the first day of active learning), midpoint (at the fellowship's annual conference that takes place in August), and postfellowship (fellows had 30 days to complete all evaluations from the last day of the fellowship).

Psychiatric Knowledge

For the assessment of psychiatric knowledge, we used an unvalidated multiple-choice examination that was developed by our faculty. Faculty submitted questions based on the content they deliver during the fellowship. These questions were aggregated by the core program faculty and reduced to a set of 50 questions. The total questions covered the following content areas: mood disorders, anxiety disorders, neurocognitive disorders, suicide risk assessment, personality disorders, substance use disorders, use of psychotropic medications, and psychotic disorders. Total correct items were aggregated for a total score.

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TABLE 1.
Fellowship Demographics (2016–2019)

2016–2019 (n = 251)	Frequency	Percent	Difference Among Program Years Chi-Square Test
Sex			χ^2 = 5.06, P = .536
F	177	70.52	
M	73	29.08	
Decline to state	1	0.40	
Ethnicity			χ^2 = 7.56, P = .272
Hispanic or Latino	32	12.75	
Not Hispanic or Latino	201	80.08	
Decline to state	16	6.37	
Missing	1	0.40	
Race			χ^2 = 27.98, P = .141
White	123	49.00	
Asian	67	26.69	
Black or African American	21	8.37	
American Indian/Alaska Native	4	1.59	
Native Hawaiian or Other Pacific Islander	1	0.40	
Others	11	4.38	
More than one race	6	2.39	
Decline to state	13	5.18	
Missing	11	4.38	
Race category			χ^2 = 18.29, P = .107
White	123	49.00	
Asian	67	26.69	
Black or African American	21	8.37	
Others (include multiple)	22	8.76	
Decline to state	13	5.18	
Missing	11	4.38	
Discipline			χ^2 = 19.62 P = .075
MD	121	48.21	
NP	73	29.08	
PA	32	12.75	
DO	22	8.76	
Others	3	1.20	
Specialty			χ^2 = 15.21, P = .230
Family medicine	165	65.74	
Internal medicine	33	13.15	
Pediatrics	14	5.58	
OB/Gyn	4	1.59	
Others	15	5.98	
Missing	20	7.97	
	Mean (SD)	**Min–Max**	**Difference Among Program Years One-Way ANOVA**
Average age (n = 237; missing = 14)	44.7 y (11.0)	27–75	F = 0.09 P = .964
Average years since degree (n = 205; missing = 46)	12.0 y (10.9)	0–46	F = 1.00, P = .368

After piloting the questions in the first year of the fellowship (2016), this test underwent several corrections, clarifications, and inclusion of new questions and topic areas. Owing to these changes, the data from 2016 were not used in these analyses. Three of the 4 years (2017, 2018, and 2019) had knowledge surveys with comparable questions (with minor linguistic corrections between 2017 and 2018) and total scores; thus, analyses for that instrument are based on those 2017 to 2019 cohorts. Owing to the developmental nature of the program, test administration methods were not standardized across all the cohorts. However, each fellow completed the same test before starting the program, at the midpoint conference, and at the conclusion of the program. In 2017 and 2018, administration of the knowledge examination at baseline and midpoint were in-person and proctored, whereas the final administration was completed remotely (nonproctored) and online using the REDCap[30] platform. In 2019, the baseline assessment was in-person and proctored, whereas midpoint and final assessments were completed remotely and online using the FlexiQuiz[31] platform. For all cohorts, the final assessment was completed remotely because all training sessions after the midpoint were taught remotely. Although originally fellows were allowed 60 minutes for completion of the test, this time amount was deemed excessive because no fellow required more than 45 minutes to complete the assessment. Therefore, time allotted for completion was reduced to 45 minutes when moving to an online platform in 2019 (there were no requests for additional time with this change).

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Attitude and Satisfaction

The Opening Minds Stigma Scale for Health Care Providers (OMS-HC) was used to assess stigma about mental health among PCPs.[29] The measure includes scales of attitudes about the provision of mental health services (stigma attitudes), stigma about one's own mental health needs (self-stigma disclosure), and the degree of social aspects of mental health stigma (social stigma). We also included the Physicians' Self-Efficacy Scale (PSES) designed to evaluate self-efficacy in treating depression.[32] This measure involves subscales assessing current competency in the provision of depression treatment (competency), impact of external/environmental/structural problems affecting appropriate provision of depression treatment (perceived barriers), and willingness for current practice change (willingness). These measures (ie, OMS-HC and PSES) have been previously used in medical provider populations, and their measurement validity has been reported.[29,32,33]

For the purpose of evaluating and considering fellows' satisfaction with current psychiatric knowledge, the confidence to treat various psychiatric illnesses, and satisfaction with the program, we included 26 questions from the Primary Health Center Provider Mental Health Questionnaire (PHCQ), a nonvalidated published survey that includes questions on perception of current psychiatric knowledge, comfort levels in treating mental health within primary care contexts, negative attitudes about mental health, the impact of mental health on practice, and the importance of addressing mental health.[34] In addition, we included 12 questions developed by the TNT faculty and the training team (referred to as Provider Experience Survey items [PES]) to assess comfort in assessing and managing specific mental health disorders (eg, depression, anxiety, substance use, psychotic symptoms, and somatization disorders), comfort in prescribing medications, and overall knowledge. Subscales for these measures were performed in a data-driven approach described in the Analyses section. Questions from the PHCQ and PES are provided in Table 2. Finally, assessment of program satisfaction was obtained from the continued medical education evaluations performed at the end of the fellowship. Two questions were included to suggest satisfaction: (1) "Overall, how satisfied were you with the fellowship?" Responses were given on a 0 to 5 scale ranging from dissatisfied to extremely satisfied. (2) "How likely are you to refer someone to the fellowship?" Responses were given on a 0 to 5 scale ranging from unlikely to certainly.

Analyses

Univariate descriptive statistics were calculated, by year, to characterize participants in terms of personal demographics, years of medical practice, and discipline/specialty. Chi-square tests for categorical variables and ANOVA for continuous variables were performed to test for cohort differences (ie, year) in sample characteristics.

PSES and OMS-HC responses were scored according to published item groupings, producing three factors from the PSES (competency, perceived barriers, and willingness) and four factors for the OMS-HC (stigma attitudes, self-stigma disclosure, social stigma, and the 15-item total score). For each of the nonvalidated measures (PHCQ and PES), exploratory factor analyses were performed with principal components extraction, orthogonal varimax rotation, and scree plots to derive subscales. For all derived factors, summary statistics were considered at baseline, midpoint, and postfellowship along with change scores.

To examine change in attitudes after completing the program, paired *t* tests and effect sizes were calculated comparing postfellowship scores with baseline score attitudes. Effect sizes were considered large at $d \geq 0.8$, medium when $0.5 \leq d < 0.8$, and small when $0.2 \leq d < 0.5$.[35] For the knowledge survey, a repeated-measures mixed-model analysis was performed to evaluate changes in the percent correct (out of 50 items) between baseline and midpoint, midpoint and postfellowship, and baseline and postfellowship.

The performance of individual test items from the knowledge survey was considered in a post hoc analysis. At baseline, questions in the low 25th percentile were categorized as poor accuracy, those >75th percentile as high accuracy, and average accuracy for those in the 25th percentile to 75th percentile. An effect size, Cohen's *h*, was calculated for each item (using postproportion correct versus preproportion correct). None of the items demonstrated a large effect size of 0.8 or higher. Using the suggested cutoffs of Cohen, the items were categorized into three groups: negligible ($h < 0.2$ including negative), small ($0.2 \leq h \leq 0.490$), and moderate ($0.490 < h < 0.8$).

Finally, we also evaluated the relationship between attitude factors and change with knowledge scores using Spearman's correlation coefficients. Correlation among baseline attitude scores and pre–post change in attitude scores with each baseline, postfellowship, and change percent correct scores of the knowledge examination was performed.

RESULTS

Participants

Enrollment and graduation in the program have steadily increased across the 4 years of the program, starting with 35 fellows in 2016, 47 in 2017, 57 in 2018, and 112 in 2019. No statistical differences were seen in the distributions of these characteristics among the yearly cohorts.

Factor Analyses

The PHCQ suggested three factors that together accounted for 52.3% of the total variance. Internal consistency correlations (ICC) among the items in the three factors were 0.7946, 0.7044, and 0.4010, respectively. The PES resulted with two factors (Table 2), accounting for 56.2% of the variance together along with a third, single-question factor. Owing to the low ICC of factor 2 ($\alpha = 0.3383$) compared with the high ICC of the full 11-item instrument ($\alpha = 0.81$), a total score of all 11 items was also evaluated. Table 2 provides a summary of instrument psychometrics and factor loadings.

Program Effects on Attitude

We observed significant effects on all scales. The OMS-HC showed small effects (ranging -0.12 to -0.33), indicating that although stigma attitudes were decreasing, these changes reflect a small effect (Fig. 1A). The PSES, however, showed significant and large effect size in competency and willingness, but significant small effects were noted for perceived barriers (Fig. 1B). On the PHCQ, large effects were noted for attitudes of competence/self-efficacy, but only small, although significant, effects were noted for positive and negative attitudes (Fig. 1C). Finally, large effects and significant effects were noted for all factors in the PES (Fig. 1D). Complete means and SDs are

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TABLE 2.
Exploratory Factor Analyses

	Factor*			Factor	Item Correlation With	Alpha When Deleted
	1	2	3	ICC	the Factor	From the Factor
Provider HCQ						
Factor 1 Positive attitude				**0.795**		
Patients' mental health needs affect their physical health concerns	**0.552**	0.074	−0.069		0.471	0.776
I feel it is important to address patients' mental health concerns	**0.585**	−0.107	0.320		0.539	0.767
Patients would benefit from regular mental health screens	**0.619**	−0.129	0.314		0.508	0.771
Patients should be able to overcome most of these problems on their own†	**0.521**	−0.069	−0.144		0.307	0.798
It is important that mental health be integrated with physical health	**0.698**	−0.204	0.277		0.608	0.758
Psychotherapy is a key component to mental health recovery	**0.592**	0.080	0.040		0.372	0.789
It is important to properly evaluate patients to ensure a correct diagnosis	**0.682**	−0.029	−0.108		0.585	0.761
It would be helpful to have a behaviorist as part of my health team	**0.641**	−0.034	−0.202		0.454	0.779
If patients' mental health needs were addressed, their physical health would improve	**0.692**	0.127	−0.326		0.515	0.770
Factor 2 Current competency				**0.704**		
I am comfortable talking to patients about mental health concerns	0.128	**0.702**	0.028		0.423	0.669
I feel that I am addressing all my patients' mental health needs	−0.200	**0.602**	0.154		0.500	0.648
I have had sufficient training in psychiatry concerns	−0.188	**0.662**	0.020		0.516	0.644
I know when to refer to a counselor and/or psychiatrist	0.273	**0.490**	0.079		0.410	0.672
I am adequately managing depression in my patients	−0.107	**0.642**	−0.105		0.477	0.655
I am comfortable continuing psychotropic medications started by another provider	−0.101	**0.691**	0.128		0.341	0.716
I know what to do if a patient tells me they are suicidal	0.194	**0.432**	0.327		0.348	0.688
Factor 3 Negative attitude/interference				**0.401**		
My patients' mental health needs are too time consuming for me to address	−0.030	−0.268	**−0.449**		0.317	na
I frequently run behind/late due to patients' mental health needs	<0.001	−0.123	**−0.470**		0.317	na
Eigenvalue	4.055	2.727	1.544			
Variance explained by factors (total = 52.25%)	26.35%	19.04%	6.86%			
Provider Experience Survey						
Factor 1 Confidence to treat						
I feel confident in treating patients who have mental illness	**0.868**	0.056	0.096	**0.877**	0.780	0.844
I feel comfortable prescribing psychiatric medications	**0.843**	−0.009	0.124		0.745	0.848
I feel comfortable treating substance misuse–related disorders	**0.703**	0.028	−0.019		0.617	0.865
I feel comfortable treating depression	**0.754**	−0.4091	−0.065		0.603	0.867
I feel comfortable treating anxiety disorders	**0.821**	−0.286	−0.008		0.713	0.853
I feel comfortable treating patients who have psychotic disorder	**0.703**	0.448	−0.060		0.615	0.865
I feel comfortable treating patients who have somatization disorder	**0.608**	0.494	−0.210		0.548	0.874
Factor 2 Knowledge						
I would be more satisfied as primary care provider if I was more confident in training those with mental illness†	−0.045	**0.537**	−0.162	**0.388**	0.264	0.606
I am satisfied with my overall knowledge base in the area of psychiatry	0.292	**0.703**	0.096		0.431	0.181
I received adequate psychiatric training during my formal training	0.480	**0.482**	0.069		0.429	0.148
Factor 3 (single item)						
The treatment of those who have psychiatric illness is complicated†	0.043	**−0.335**	**0.967**	**na**		
Eigenvalue	4.804	1.376	1.013			
Variance explained by factors (total = 65.38%)	43.67%	12.50%	9.21%			
11-item total self-efficacy	—	—	—	**0.812**		

*Rotated factor loadings using orthogonal varimax from the principal component factor; bold values show highest factor loading.

†Reverse scored.

HCQ indicates Health Center Provider Mental Health Questionnaire; ICC, internal consistency correlation.

presented for all measures (factors along with total scores) for each assessment point in Table 3.

Program Effects on Psychiatric Knowledge

Repeated-measures analysis of the percent of correct answers on the knowledge score yielded significant improvement across the entire year (mean difference = 11.8%, t = 15.76, $P < .0001$) and from both baseline to midpoint (mean difference = 7.6%, t = 10.6, $P < .0001$) and midpoint to postfellowship (mean difference = 4.23%, t = 5.59, $P < .0001$). This translates to an average improvement from 60.5 to 72.4% (Fig. 2). Performance on the psychiatric knowledge examination did not differ across the 3 years of these data (2017–2019), and the trajectory of change was not statistically different by year.

The descriptive ad hoc analyses of the performance of the individual knowledge test questions suggested that at baseline, 13 questions were considered poor accuracy, 12 were considered high accuracy (indicating 84% or more answered the given question correctly at baseline), and 25 were considered average accuracy. Overall, most questions yielded small-to-moderate

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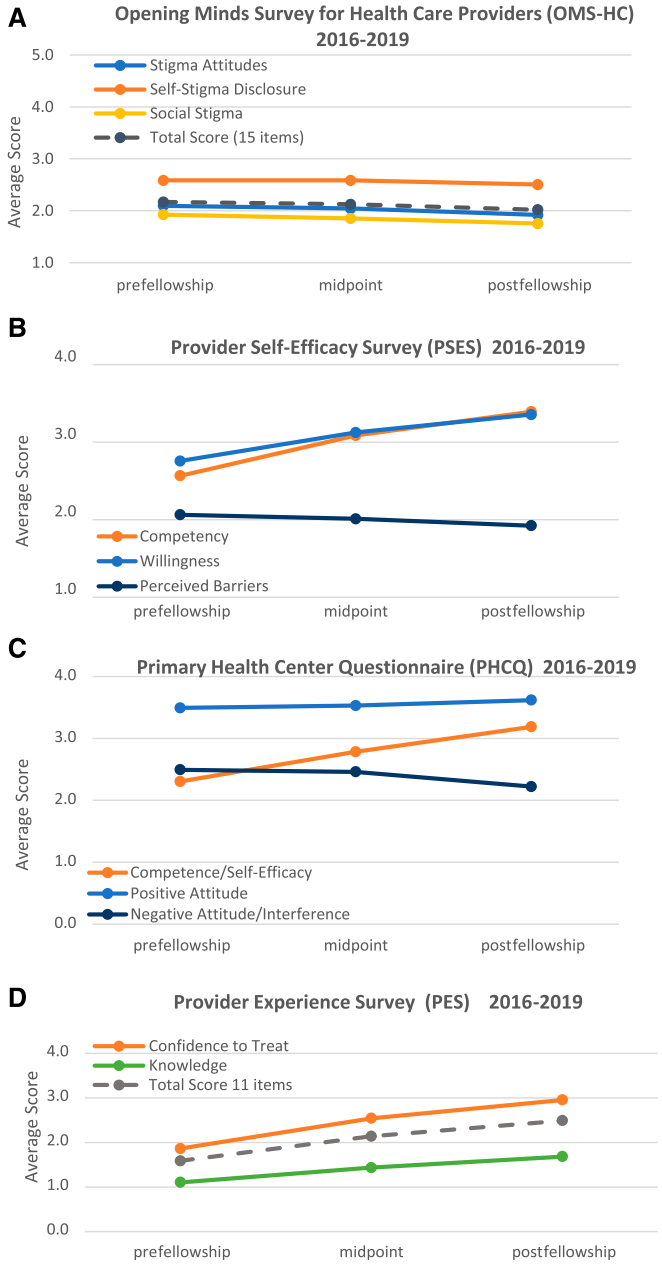

FIGURE 1. Attitude measures change over the 1-year fellowship (data from 2016 to 2019). A, Change in OMS-HC average score. B, Change in PSES average score. C, Change in PHCQ average score. D, Change in PES average score. OMS-HC indicates Opening Minds Stigma Scale for Health Care; PES, Provider Experience Survey; PHCQ, Primary Health Center Provider Mental Health Questionnaire; PSES, Physicians' Self-Efficacy Scale.

effect sizes (Cohen's *h* range −0.06 to 0.69). Based on Cohen's *h* effect sizes, 11 questions considered with a moderate effect size, 15 with a small effect size, and 24 with negligible effect sizes. Questions showing low or average accuracy at baseline with the most significant improvement over the fellowship were those covering content areas related to neurocognitive disorders (eg, TBI, dementia, and delirium) along with questions on mood disorder management (eg, major depressive disorders and anxiety disorders), use of antidepressants for mood management, and suicide considerations. There were three questions that were categorized with the lowest accuracy at baseline with least change over the fellowship, and these included more complicated presentations of mood disorders.

Relationship Between Psychiatric Knowledge and Attitudes

Baseline knowledge and attitude data were available for 213 participants from years 2017 to 2019, and 183 participants completed data at both baseline and postfellowship assessments. At baseline, knowledge examination scores (percent correct) were significantly inversely correlated with total stigma scores (r = −0.2492, P = .0002), and specifically stigma attitudes (r = −0.1678, P = .014) and social stigma (r = −0.3268, P < .0001), such that improved knowledge was associated with decreased stigma. A modest correlation was seen between baseline performance on the knowledge examination and self-reported baseline self-efficacy in depression management (r = 0.2250, P = .0009), positive attitudes about mental health treatment (r = 0.2468, P = .0003), and confidence to treat mental health disorders (r = 0.1720, P = .0117). Among the baseline measures, both increased total stigma (r = 0.1670, P = .0242) and increased negative attitudes (r = 0.1572, P = .0335) were correlated with increased change in knowledge (increase in percent correct answers). Among 179 fellows who had both sets of change scores, correlations of the degree of change in attitude with improved psychiatric literacy demonstrated a significant relationship between reduction of stigma total score (r = −0.2133, P = .0043) and stigma attitude factor (r = −0.1501, P = .0455), as well as increased willingness (r = 0.1941, P = .0096) and increased positive attitudes (r = 0.1894, P = .0111). Overall, even when statistical significance was reached, the degree of correlations was small (most below 0.3), and these were not corrected for multiple comparisons.

Program Satisfaction

Program satisfaction was extremely high across all years. Based on 199 returned evaluations (accounting for 79% of the sample of the 251 total fellows), 95% (n = 190) reported satisfaction or extreme satisfaction with the fellowship, and 84% (n = 168) reported that they would likely or certainly refer others to this program. Only 3% reported dissatisfaction (n = 6), and 1.5% (n = 3) reported that they were unlikely to refer to this program.

DISCUSSION

There is a substantial training gap in psychiatric knowledge and mental health care delivery among those working in the primary care setting.[22,36] This has led to largely substandard care and increased morbidity and mortality for those with severe mental illness.[12,37] The UCI Train New Trainers (TNT) Primary Care Psychiatry Fellowship is a multifaceted educational program designed to improve PCP psychiatric knowledge on the most common mental health disorders seen in primary care and general medical clinical settings. This training program squarely addresses the gap in training and is specifically aimed to enhance confidence in identifying, preventing, and managing commonly encountered primary care–based psychiatric disorders. Data from the first 4 years of this program show significant improvements in both fellow attitude and knowledge from baseline to immediately after the 1-year fellowship on nearly all measures and factors considered.

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TABLE 3.
Descriptive Measures (Factors Along With Total Scores)

Measure	Assessment Point	*n*	Mean	SD	Min	Max	Sig Mean Diff Pre to Mid	Sig Mean Diff Pre to Post	Effect Size Pre to Mid	Effect Size Pre to Post
OMS-HC (higher scores reflect more stigma)										
Stigma attitudes	Pre	246	2.095	0.547	1.00	4.00	$P = .205$	$P < .0001$	−0.088	−0.327
	Mid	239	2.045	0.598	1.00	5.00				
	Post	235	1.919	0.528	1.00	5.00				
Self-stigma disclosure	Pre	246	2.585	0.652	1.00	4.75	$P = .882$	$P = .050$	0.001	−0.124
	Mid	239	2.586	0.690	1.00	4.75				
	Post	235	2.503	0.663	1.00	4.50				
Social stigma	Pre	246	1.926	0.499	1.00	3.20	$P = .017$	$P < .0001$	−0.149	−0.326
	Mid	239	1.851	0.506	1.00	3.20				
	Post	235	1.754	0.554	1.00	3.40				
Total score (15 items)	Pre	246	2.168	0.423	1.07	3.27	$P = .075$	$P < .0001$	−0.010	−0.342
	Mid	239	2.125	0.450	1.00	3.67				
	Post	235	2.020	0.445	1.07	3.73				
PSES—depression management										
Competency	Pre	248	2.567	0.613	1.00	4.00	$P < .0001$	$P < .0001$	0.866	1.463
	Mid	239	3.086	0.586	1.25	4.00				
	Post	235	3.394	0.514	1.25	4.00				
Perceived barriers	Pre	247	2.064	0.450	1.00	3.00	$P < .0001$	$P < .0001$	−0.122	−0.321
	Mid	239	2.012	0.402	1.00	3.00				
	Post	235	1.922	0.430	1.00	3.00				
Willingness	Pre	246	2.757	0.772	1.00	4.00	$P < .0001$	$P < .0001$	0.497	0.869
	Mid	239	3.126	0.707	1.00	4.00				
	Post	235	3.357	0.598	1.00	4.00				
PHCQ										
Competence/self-efficacy	Pre	248	2.303	0.471	0.670	3.71	$P < .0001$	$P < .0001$	1.003	1.934
	Mid	240	2.783	0.485	1.29	4.00				
	Post	235	3.186	0.442	2.00	4.00				
Positive attitude	Pre	248	3.491	0.342	2.11	4.00	$P = .048$	$P < .0001$	0.111	0.383
	Mid	240	3.529	0.333	2.00	4.00				
	Post	235	3.617	0.313	2.00	4.00				
Negative attitude/interference	Pre	248	2.494	0.798	0.00	4.00	$P = .285$	$P < .0001$	−0.043	−0.338
	Mid	239	2.460	0.760	1.00	4.00				
	Post	235	2.221	0.818	0.00	4.00				
PES										
Confidence to treat	Pre	248	1.865	0.631	0.00	4.00	$P < .0001$	$P < .0001$	1.162	1.863
	Mid	242	2.545	0.535	0.14	4.00				
	Post	236	2.956	0.536	0.14	4.00				
Knowledge	Pre	248	1.108	0.481	0.00	2.75	$P < .0001$	$P < .0001$	0.671	1.195
	Mid	242	1.437	0.500	0.00	3.00				
	Post	236	1.686	0.487	0.25	3.50				
Total self-efficacy	Pre	248	1.589	0.492	0.09	3.27	$P < .0001$	$P < .0001$	1.177	1.935
	Mid	242	2.141	0.446	0.36	3.27				
	Post	236	2.493	0.442	0.36	3.82				

PES indicates Provider Experience Survey; PHCQ, Primary Health Center Provider Mental Health Questionnaire; PSES, Physicians' Self-Efficacy Scale.

The improvement in attitude was largely in the following domains: questions assessing self-efficacy, confidence, and perceived competency and willingness. The effect on stigma perceived barriers was markedly smaller than effects on competency and self-efficacy. These improvements are worthy of further study by the training program. Psychiatric knowledge as measured by examination scores significantly improved by 12% on average over the years. Evaluation of specific questions revealed that the strongest change was in questions covering depression management, suicide, dementia, personality disorders, and substance abuse. Taken together, the data-driven approach for the post hoc evaluation for performance of individual items suggests that many of the questions were not well posed to evaluate knowledge change over time. Post hoc assessment revealed that nearly half (24 items) of the questions in the knowledge assessment tool were performing poorly or showing minimal change over the fellowship with negligible effect sizes. Of these 24, 3 had low (<48%) baseline accuracy, 10 were average, and 11 were high (>84%) baseline accuracy. Only six items showed low baseline accuracy with a moderate effect size over the fellowship. Of note, these data were derived from a previously nonvalidated measure, which was then used for improving the construction of this knowledge survey for the assessment of future fellowship cohorts. Future program

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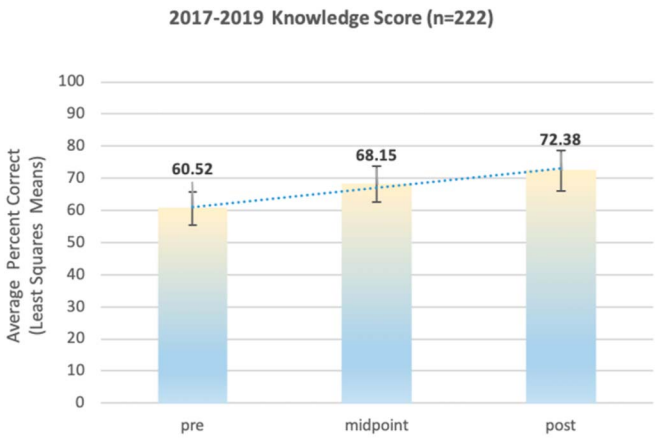

	Difference in LS Means	SE	t	Pr > |t|	Effect size *d*
baseline to midpoint	7.63	0.3603	-10.6	<.0001	0.711
midpoint to final	4.23	0.3782	-5.59	<.0001	0.375
baseline to final	11.86	0.3764	-15.76	<.0001	1.06

FIGURE 2. Change in psychiatric knowledge evaluation performance across the fellowship duration.

evaluation will require the use of a validated and appropriately constructed knowledge measure. Nonetheless, post hoc correlations revealed multiple relationships between knowledge and attitude factors, suggesting a link between psychiatric fund of knowledge and attitudes about mental health.

Previous work also suggested a link between provider attitudes and stigma with poor mental health treatment of patients.[38–40] Providers endorsing higher levels of stigma may change their practice in subtle ways, such as being less likely to refer to a specialist or refill prescriptions.[38] Randomized controlled trials have shown that psychiatric education can improve attitudes and stigma related to mental illness.[41] Nonetheless, there is frequent disagreement regarding what educational content is necessary for PCPs to appropriately manage patients with mental health concerns in the outpatient primary care setting.[25] The UCI TNT program was designed and implemented by dual-boarded physicians in primary care and psychiatry. The program involves training in prevention, assessment, and provision of care within the clinical structure and competing demands of the PCP environment. Key components for successful programs were identified, including a longitudinal program with continued educational interactions, a continuous relationship between teacher–learner, interactive participation, and clinical relevance.[25] Based on these recommendations, the UCI TNT program was designed as a 1-year longitudinal program with multiple formats of educational interactions (eg, two weekend conferences, monthly large-group didactics, and monthly mentorship) using educational materials specifically developed by physicians who are dually trained in general medicine and psychiatry.

The purpose of a data-driven program assessment and evaluation was to help inform future program development and growth. The following are recommended based on these data: (1) The knowledge measurement is used to consider change in overall psychiatric knowledge. However, the assessment tool was not validated, and the administration methods (eg, online versus in-person, proctored versus not proctored, and time allotted) were not standardized across all assessment points, and this is an identified weakness of this study. Using population-specific (ie, PCP) and validated measures for psychiatric knowledge is required for a more nuanced understanding of program impact on psychiatric knowledge. In addition, effective management of mental health in primary care requires clinicians to acquire and develop a vocabulary and communication style along with clinical repertoire that can increase the effectiveness of clinical interaction. The UCI TNT program includes experiential learning components and techniques (eg, motivational interviewing) that hone in on these skills. Future program evaluations may consider including measures and tools designed to assess skills gained in addition to knowledge attained. (2) Program growth and continued quality assurance requires ongoing program assessment. This program experienced remarkable growth within a relatively short period, yet the data remained remarkably consistent across all years. Consistent data across all fellowship years demonstrate that the changes implemented in accommodating larger fellowship cohorts (eg, growing the faculty, refreshing content, and changes in speakers) did not affect the quality or effectiveness of the learning experience. To achieve a sustained level of program satisfaction and effect, this program heavily invested in program assessment and development. Data were annually evaluated and directed decisions on programing and other logistics (eg, timing of lectures and content order). Adequately responding to data trends on a regular basis increases the likelihood of quality control while scaling the program.

There are several strengths to this study. First, we presented data from four consecutive years of PCP participants involved in a longitudinal, primary care behavioral health program. This study included available and validated measures, along with additional questions assessing and measures evaluating attitudes and knowledge. A data-driven approach was used to evaluate program effectiveness. In addition, effect sizes were computed and informed data interpretation to provide distinction between statistical significance and "clinical" significance. There are several concerns and weaknesses to this study. This study did not consider the impact of practice type (eg, private practice and solo/group) and location (eg, rural, urban, and academic) because these were not actively collected over the years, and future programs are encouraged to record this information. The measurements available for evaluating attitude change are limited and have incomplete psychometric validation, yet the data-driven approach allowed for confirmatory factor analyses and for additional data on measurement validity and accuracy. This study also used a nonvalidated knowledge evaluation. Future work will use the current knowledge examination and data for continued program improvement with the intention of continued use in future cohorts and years. Program effectiveness can also be evaluated by the impact of or change in practice parameters (eg, increased mental health screening, improving diagnostic accuracy, and prescription/treatment of mental health). It is necessary to ensure that the skills and clinical knowledge acquired in the fellowship, when put in practice, have a positive impact on all stakeholders involved, including patients, the PCP, and the overall system, with a minimal negative impact on practice logistics, clinical operations, and

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preexisting time constraints. Future studies to include such specifics in the assessment design will be of high yield.

In summary, there is an increasing need for additional psychiatric education programs designed specifically for PCPs, the first line of mental health care. This study provides initial evidence for the positive effects of a 1-year educational initiative designed specifically for PCPs with strong effects observed on attitudes toward mental health and improvement in competency and self-efficacy. There was also a 12% improvement in the knowledge score, which was associated with improved attitudes.

Lessons for Practice

- The University of California Irvine (UCI)Train New Trainers (TNT) Primary Care Psychiatry Fellowship can enhance confidence in identifying and managing commonly encountered primary care–based psychiatric disorders, including in underserved settings.
- Training of primary care providers can improve their self-efficacy, perceived competency, and willingness to manage psychiatric disorders in primary care settings.
- There was also a 12% improvement in psychiatric knowledge, which was associated with improved attitudes.
- Further refinement of psychiatric knowledge assessment is needed for better consideration of program effectiveness and impact. Additional studies should include the assessment of clinical skills gained, clinical practice outcomes, and the impact on all stakeholders (patients, providers, and health care system).

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