

Integrated Primary Medical-Behavioral Health Care for Adolescent and Young Adult Depression: Predictors of Service Use in the Youth Partners in Care Trial

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Abstract

Objectives Depression, a chronic and disabling condition, frequently has its first onset during adolescence, underscoring the value of early effective treatment and prevention. Integrated medical-behavioral health care provides one strategy for improving treatment access for adolescents and young adults (AYA). **Methods** This study examined predictors of accessing treatment in a multi-site randomized controlled trial evaluating an integrated collaborative care intervention aimed at improving access to evidence-based depression treatment through primary health care, compared with usual care. **Results** The integrated care intervention was able to overcome barriers to care associated with an initial reluctance to pursue active treatment and older age. Service use was low in both conditions among less acculturated/non-English-speaking families. **Conclusions** Results support the value of integrated medical-behavioral health care for improving rates of care. Findings highlight mechanisms by which integrated care may lead to improved rates of care and outcomes for AYA, an underserved and understudied group.

Key words: adolescents; depression; primary care.

Depression is prevalent among young people, estimated to affect between 15 and 20% of youths by age 18 (Lewinsohn, 2002). It has been recognized as a chronic, reoccurring condition that frequently first occurs during adolescence (Andrews, 2001). In naturalistic prospective studies of the course of depression, 10–20% of individuals who experience a major depressive episode go on to have chronic symptoms (Keller et al., 2013). A common course-related feature of chronic depression is age of onset. There appears to be an association between earlier age of onset and more lifetime depressive episodes, as well as other adverse outcomes such as greater long-term impairment,

increased likelihood of psychiatric comorbidity, and disrupted transition into adulthood (Copeland, Wolke, Shanahan, & Costello, 2015). Despite the association of early-onset depression with a reoccurring and more pernicious trajectory of symptoms, roughly 40% of American youths with depressive disorders receive no treatment of any kind and 66% receive no mental health treatment or specific treatment for depression (Avenevoli, Swendsen, He, Burstein, & Merikangas, 2015).

In pediatric psychology, one approach to addressing health and behavioral health disparities, such as barriers to treatment engagement among young people

with depression, is to improve access to mental health services through integration of mental health services within general primary care (Ader et al., 2015; Asarnow, Rozenman, Wiblin, & Zeltzer, 2015a; Asarnow, Kolko, Miranda, & Kazak, 2017; Kolko & Perrin, 2014; Stancin, Perrin, & Ramirez, 2009). This approach of improving access to behavioral health care through primary care has been emphasized in the current redesign of primary care as one strategy for achieving the triple aim of improving population health and patient experience of care while reducing costs (Ader et al., 2015). Integrated primary medical and behavioral health care, defined as the inclusion of behavioral health services as part of primary care using tightly integrated on-site teamwork (Heath, Wise, & Reynolds, 2013; McDaniel et al., 2014), represents an important opportunity to link young people to behavioral health care services (Asarnow, Kolko, Miranda, & Kazak, 2017; Asarnow et al., 2015a; Irwin, 2010; Kolko & Perrin, 2014; Stancin & Perrin, 2014; Weersing, 2010). Primary care is highly accessible in the United States, with approximately 90% of youth reporting contact with a primary care provider each year (Chevarley, 2003). However, most pediatricians do not feel comfortable assessing and providing treatment support for the majority of mental health conditions (Stein et al., 2008), highlighting the importance of improving access to mental health providers and/or consultation through primary care.

Given that the first onset of depression frequently occurs during adolescence, adolescence offers a critical period for intervention. As adolescents grow older and face new challenges and changes in how services are received (Callahan & Cooper, 2010; Fortuna, Robbins, & Halterman, 2009; Nicholson et al., 2009), promoting positive health behaviors such as fostering a sense of responsibility for one's own care and establishing relationships with providers early on can meaningfully influence well-being and functioning during the transition to adulthood and beyond (Irwin, 2010).

Although data for pediatric and emerging adult populations are limited relative to data on adults, there is support for integrating primary medical and mental health care for adolescents and young adults (AYA). Findings from the field indicate higher rates of care for mental health problems when that care is integrated with and/or co-located within primary care services (Kolko & Perrin, 2014; Stancin & Perrin, 2014), and that integrated primary medical-behavioral health care leads to improved behavioral health outcomes for children and adolescents (for review, Asarnow et al., 2015a). Thus, integrated primary medical-behavioral care is a promising service delivery strategy for AYA with behavioral health problems, particularly racial/ethnic minority individuals who often face mental

health disparities that hinder adequate treatment of depression symptoms (Elster et al., 2003), including difficulties engaging with needed services. For example, findings from epidemiological and other studies show that adults with limited English proficiency in the United States often do not seek out or obtain mental health services (Alegria et al., 2007; Sentell, Shumway, & Snowden, 2007; Weech-Maldonado et al., 2003), pointing to the importance of English-language comfort/dominance as a factor influencing service use. Further, Latino youth who are immigrants or are born to immigrant parents face difficulties that may contribute to having less access to care including higher rates of poverty (Fix, Zimmermann, & Passel, 2001; Hernandez, 2004), less likelihood of having insurance (Kaiser Commission on Medicaid and the Uninsured, 2000), and linguistic barriers to communication with service providers (Lessard & Ku, 2003). Integrated care interventions have been found to be effective in overcoming such barriers and are a potential mechanism for reducing mental health disparities (McGuire & Miranda, 2008; Miranda et al., 2003). However, within this service model, there remains a need to understand: (1) which barriers to treatment an integrated care model can effectively address, (2) what barriers to treatment require additional innovative approaches, and (3) the factors that facilitate and inhibit initiation of service use. The Youth Partners in Care (YPIC) trial (Asarnow et al., 2009; Asarnow et al., 2005) offers a unique opportunity to address these questions.

The YPIC trial was the first and largest randomized effectiveness trial to evaluate a quality improvement (QI) intervention that improved access to evidence-based depression care for AYA (ages 13–21 years) using a collaborative care model that integrated evidence-based depression care within primary care clinics (Asarnow et al., 2005). Collaborative care is an overarching term that refers to treatment guided by a treatment plan developed in collaboration with behavioral health and primary care clinicians, patients, and families (McDaniel et al., 2014). Recent data support the utility of the collaborative care model in addressing mental health problems among youth samples (for review, Asarnow et al., 2015a).

The QI intervention aimed to improve use of evidence-based treatments, reduce depression, and increase satisfaction with services. This was achieved by incorporating the following elements at each site: expert team leaders to adapt the intervention for the individual site; care managers who provided support for primary care physicians in assessment and management of participant's depression; training in evidence-based depression treatment (primarily cognitive behavioral therapy [CBT] and antidepressant medications) for care managers; and allowing participants and clinicians to select their preferred treatment

modality. Results from the YPIC study showed that the integrated care intervention compared with usual primary care enhanced by provider education about depression evaluation and treatment led to reduced depression, lower rates of severe depression, and improvements in quality of life and satisfaction with care (Asarnow et al. 2005; Asarnow et al., 2009). Moreover, rates of severe depression were significantly lower (10.9% vs. 45.2%, a 34% difference) among AYA receiving roughly guideline concordant care, defined as six or more psychotherapy visits or antidepressant medication use as determined by medication treatment algorithms (Wells, Tang, Carlson, & Asarnow, 2012). In particular, minority AYA appeared to benefit from enrollment in the QI condition. Black youth showed large reductions in depression symptoms and higher rates of continued service use at follow-up compared with other racial/ethnic groups of youth, and Latino youth reported greater satisfaction with care (Ngo et al., 2009).

Despite these promising results, a disappointment in the YPIC trial was that even with enhanced resources for integrated primary medical-behavioral health care, rates of treatment received were low (32% in the intervention group vs. 17% in controls). These findings underscore the necessity of better understanding the needs of AYA experiencing depression, as well as differential patterns of service use for depression across subgroups of AYA. Given that unfavorable health-related habits established at a young age (such as poor health care utilization) can persist into adulthood and diminish outcomes (Wysocki, Hough, Ward, & Green, 1992), facilitating early linkage to appropriate care serves the ultimate goal of mitigating long-term risk.

According to the Behavioral Model of Health Service Use (Anderson, 1995), factors that inhibit and/or promote service use are varied and can be categorized as predisposing (e.g., demographic characteristics and attitudes), enabling (e.g., logistical and structural variables such as income, insurance, childcare, transportation, resource availability), and need factors (e.g., severity level, impairment). In the literature, lower treatment rates have been found among ethnic minority populations (Avenevoli et al., 2015) and in less acculturated families (Brach, Fraser, & Paez, 2005; Weech-Maldonado et al., 2003). We also see this pattern for patients with lower need, as evidenced by fewer depressive symptoms (Avenevoli et al., 2015), fewer comorbid mental health conditions (Sourander, Helstela, Ristkari, Helenius, & Phia, 2001), and absence of a comorbid physical disorder (Richardson, Russo, Lozano, McCauley, & Katon, 2008). Systematic reviews of the literature concerning service use among a variety of populations, including primary care patients and individuals with depression, support these findings (Clement et al., 2015).

While we expect to see similar patterns of association in the present investigation as seen in the literature, analyses within the YPIC sample provide unique opportunities to address some understudied issues. First, comparisons across the QI and usual care (UC) conditions allow examination of the degree to which the QI intervention is able to overcome barriers to accessing care. Second, the sample includes AYA, an understudied age-group that experiences unique developmental changes and challenges and demonstrates low rates of care (Lansing & Berg, 2014; Park, Scott, Adams, Brindis, & Irwin, 2014). Third, the YPIC sample includes a relatively large number of racial/ethnic minority participants, predominately composed of Latino AYA, providing an opportunity to evaluate predictors of service use in a sample with a large proportion of minority AYA.

In regards to development, we hypothesize that younger age (corresponding with greater parental involvement/responsibility for care; Wysocki et al., 2009) and satisfaction with health care (which can be influenced by changes in availability of resources and provider relationships that might occur in response to “aging out” of certain programs; Nicholson et al., 2009) will predict a greater likelihood of service use. In regards to culture, having a parent who is an immigrant, speaking a language other than English at home, and viewing depression as stigmatizing (which has been shown to be culturally influenced; Turner, Jensen-Doss, & Heffer, 2015) are hypothesized to predict less service use. Research supports that the mechanisms by which the QI intervention facilitates care improves treatment uptake among underserved AYA (Lieberman, Adalist-Estrin, Erinle, & Sloan, 2006). Thus, we expect barriers that are pertinent to AYA and racial/ethnic minority individuals to be mitigated by the QI intervention, as evidenced by statistical interaction between predictor variables and intervention condition.

Method

This study involves secondary analyses of data from the YPIC trial. Patient assent and parent consent were required for participants aged <18 years, and patient consent was required for those >18 years. Institutional review boards of all participating organizations approved the study. As detailed descriptions of methods are available elsewhere, we provide an overview here emphasizing methods relevant to the aims of this study (for additional information, see Asarnow et al., 2005, 2009).

Participants

Participants were drawn from patients attending six primary health care sites affiliated with five diverse health care organizations purposely selected to include

managed care, public sector, and academic medical centers. Study eligibility was determined by in-clinic screenings using brief questionnaires completed by consecutive patients during primary care visits. AYA were eligible for inclusion if: (1) the participant endorsed screening items assessing presence of major depression or dysthymia in the past month from the 12-month Composite International Diagnostic Interview (CIDI-12) (World Health Organization, 1997) modified slightly to conform to diagnostic criteria for adolescents, in addition to a total Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977) score ≥ 16 , or (2) CES-D score ≥ 24 . Exclusion criteria were minimal and designed to include most clinic patients. They included: (1) medical provider not in study, (2) sibling already enrolled in study, (3) youth not English speaking, and (4) parent not English or Spanish speaking. Approximately 36% of the AYA approached for screening were found to be ineligible, 4.4% of which were excluded owing to the youth's lack of English language proficiency. Other primary reasons that AYA were found to be ineligible for screening were that: (1) youth had already been screened ($n = 696$), (2) primary care provider not in study ($n = 652$), (3) youth was outside the eligible age range ($n = 588$), and (4) a sibling was enrolled in the study ($n = 25$).

The YPIC sample included 418 AYA who completed baseline (i.e., pretreatment) assessments and were subsequently randomly assigned to the QI intervention or enhanced UC. Randomization was implemented using a computerized random number generator, stratified by site and by provider within site, with assignments concealed from assessment staff. Because the primary focus of this study was on whether youths initiated treatment during the intervention period, outcomes for the present study were assessed at 6 months postintervention time point. This visit was completed by 344 AYA (82%) with no significant difference in completion by intervention condition.

The sample was predominately female (78%), with 87% reporting belonging to a racial/ethnic minority group (see Table I). Over half of the sample spoke a language other than English at home (64.3%), of which 89.6% were Spanish speakers.

Intervention Conditions

Enhanced UC

UC was enhanced by providing all primary care clinicians with training and educational materials on depression evaluation and treatment, as well as delivery of culturally competent care tailored to the cultural context of each AYA and their family. Treatment was available in English or Spanish depending on patient and family language preference. The training reviewed medication management based on the Texas Medication Algorithms

for Major Depressive Disorder, emphasizing certain selective serotonin reuptake inhibitors as the first choice (Hughes et al., 1999). Providers had usual access to treatments for all patients, but study-trained care managers were available only to patients randomized to QI. UC generally involved referral for specialty mental health care and could include primary care management with medication and primary care counseling.

QI Intervention

The QI intervention was modeled on the adult Partners in Care study (Wells et al., 2000). In addition to the training and resources described above for the UC condition, the QI intervention included: (1) expert practice leaders at each site who adapted and oversaw the implementation of the intervention at the site, and (2) care managers at the sites who provided manualized CBT for depression (Asarnow et al., 2005) and supported primary care clinicians with patient evaluation, education, treatment initiation and follow-up, and linkage to needed services. Care managers were psychotherapists with master's or PhD level degrees in the fields of mental health (MSW, dual MSW and RN degree, MFT, MA in Psychology, or PhD in Psychology). All care managers were provided with training in the study CBT, treatment manuals, and ongoing consultation and supervision. The study CBT includes an overview session, three four-session modules focused on activities and social skills, cognition, and communication and problem-solving, and a final session on relapse prevention. If participants randomized to the QI condition were receiving other treatment when enrolled in the study, they continued to be followed by the care manager to ensure that treatment needs were being met, enhance coordination of primary care and specialty mental health care, and adjust services if youths were not responding to the care they received. This approach was viewed as consistent with a collaborative integrated care model with behavioral health care included as part of the primary care treatment plan. Care managers were available to follow patients for 6 months to coordinate care, assist with treatment, and provide CBT as needed. The study provided training, written manuals, and consultation to support model fidelity, including case consultation to care managers on CBT and other aspects of the care manager role. Treatment was delivered in either English or Spanish depending on the patient's preference. The study paid for care managers' time, which was available without co-pay.

Baseline Predictor Measures

Predisposing Factors

Demographics. Adolescents were asked to report basic demographic information including age, gender, race and ethnicity, languages spoken at home, estimated

Table I. Demographic Characteristics of the Study Sample

Characteristic	No. (%)		
	Total (N=418)	Quality improvement (n=211)	Usual care (n=207)
Female	326 (78.0)	166 (78.7)	160 (77.3)
Age, mean (SD)	17.2 (2.1)	17.3 (2.1)	17.1 (2.1)
Race/ethnicity			
Black	56 (13.4)	29 (13.7)	27 (13.0)
Hispanic/Latino	234 (56.0)	121 (57.4)	113 (54.6)
Mixed	57 (13.6)	27 (12.8)	30 (14.5)
White	53 (12.7)	23 (10.9)	30 (14.5)
Other	13 (3.1)	7 (3.3)	6 (2.9)
At least 1 parent employed	370 (88.5)	186 (88.2)	184 (88.9)
Language other than English spoken at home	269 (64.3)	141 (66.8)	128 (61.8)

family income, insurance information, highest level of parental education, and parental immigration status during the baseline assessment.

Enabling Factors

Perceived Stigma of Depression. Five items adapted from the Partners in Care study (Wells et al., 2000) were used to assess participant's views of depression as stigmatizing. Participants were asked to rate how much peer relationships would suffer (on a scale from one ("A Lot") to four ("None")) if friends thought that the participant was diagnosed with depression, asthma, HIV/AIDS, or received mental health services. A dichotomous variable was then derived to represent if the participant rated depression (coded one) or another condition/receiving mental health services (coded zero) as most stigmatizing (Jaycox et al., 2006). **Treatment Preferences.** Treatment preferences were assessed using an item adapted from the Partners in Care Study (Dwight-Johnson, Sherbourne, Liao, & Wells, 2000). This question presented the recovery rates for each treatment modality and asked participants to indicate preference for one of three treatment options for depression. From these choices, treatment preference variables were derived for watchful waiting, medication, and psychotherapy. **Prior Mental Health Treatment.** Patient response on the Service Assessment for Children and Adolescents (SACA; Stiffman et al., 2000), adapted slightly for our primary care population (Asarnow et al., 2005), was used to dichotomously code the presence versus absence of any mental health treatment during the previous 6 months. This measure has shown strong reliability of parent and youth reports on presence versus absence of mental health treatment, psychotherapy, and medication ($\kappa = .72-.93$; Asarnow et al., 2011) and test-retest reliability ($\kappa = .86$ for any treatment in the past 12 months; Horwitz et al., 2001).

Need Factors

Major Depression and dysthymia symptoms and diagnoses were obtained using the Mood Disorders

module of the CIDI-12, a well-established diagnostic tool with good psychometric properties (World Health Organization, 1997). The *Anxiety* subscale of the Brief Symptom Inventory was used to assess anxiety symptoms. Each of the six items that comprise the subscale are rated on a 5-point Likert scale and totaled for a dimensional score. The subscale has been shown to have high internal consistency ($\alpha = .81$) and retest reliability ($r = .79$) (Derogatis & Melisaratos 1983; Derogatis & Savitz, 2000), and showed strong internal consistency in the study sample ($\alpha = 0.80$). *Posttraumatic Stress Disorder (PTSD)* was assessed using the four-item Primary Care PTSD Screen (Prins et al., 2004), a measure that compared with structured diagnostic interviews shows excellent sensitivity (.91) and specificity (.84) for classifying PTSD status (Kimerling, Trafton, & Nguyen, 2006). *Attention problems* were assessed via the Attention Problems subscale score derived from participant self-report on the parallel Youth Self-Report (Achenbach, 1991; Achenbach & Rescorla, 2001) and Young Adult Self-Report (Achenbach & Rescorla, 2001) for youths ages 13–17 and 18–21, respectively. There is extensive support for the psychometric adequacy of these measures (Achenbach, 1991; Achenbach & Rescorla, 2001). *Mental health-related functioning* was assessed using the Short Form Health Survey (SF-12; Ware, Kosinski, & Keller, 1994) which includes subscales assessing role limitations owing to emotional problems and a mental health summary scale. The SF-12 has strong psychometric support (Ware et al., 1994) and showed fair internal consistency in the present sample ($\alpha = .76$).

Outcome

Mental Health Treatment. Our outcome variable was receipt of mental health services in the past 6 months, derived from patient response on the SACA (Stiffman et al., 2000). Participants were asked to indicate if they had received services from a mental health specialist in the past 6 months, including visits to a psychologist, psychiatrist, social worker, or counselor.

Responses were dichotomously coded yes/no. Reliability, as indexed by cross-informant agreement, is good for this measure ($\kappa = .72-.93$) (Asarnow et al., 2011).

Statistical Analyses

Statistical analyses were run using SPSS 24, and plots of significant interactions were generated using Stata 14. Our data analytic plan proceeded as follows. First, we screened for possible interactions of unmodifiable demographic variables (i.e., age, gender, race/ethnicity) with intervention condition; specifically, for each of the possible independent variables, we ran an individual logistic regression with mental health treatment received (yes/no) as the outcome including the variable, intervention condition, and the interaction of the variable and intervention condition, controlling for site. If the interaction was not significant ($p < .05$), we removed the interaction and examined the main effect of the covariate. Next, we ran a parallel set of logistic regression models to test for possible interactions of predisposing, enabling, and need factors with intervention condition, controlling for the main effects and interactions with the unmodifiable demographic variables identified in the first phase. Finally, we used a best subsets algorithm to identify the subset of variables that best predicted mental health service use. In line with other research in the field, we adopted the convention of including all interactions and main effects that are associated with the outcome at a p -value of $\leq .10$. In determining which variables to include in the best subsets procedure, we opted to take a data-driven and conservative approach. However, in an attempt to not be overly stringent (and thus reducing the generalizability of our findings), we included predictors that showed trend level of association with service use. We evaluated model fit using several criteria including the Akaike Information Criterion (AIC; Akaike, 1973) and Mallows' C_p (Mallows, 1973). The best fitting model was defined as the model demonstrating the lowest AIC value and Mallows' C_p most similar to the number of predictors in the model, while accounting for the most amount of variance.

Nonresponse weights were constructed and applied in analyses to increase the likelihood that the results represented unbiased estimates for the original YPIC sample (Asarnow et al., 2005). Weighted and unweighted analyses yielded similar results; exceptions to this are noted in the results.

Results

Moderator Analyses: Interactions With Intervention Condition

As predicted and reported previously (Asarnow et al., 2005), there was a significantly increased treatment

rate among AYA in the QI condition compared with the UC condition. In the individual logistic regression models of each variable and its interaction with intervention condition, significant moderators emerged as follows: (1) older age (within the 13–21 age range) was associated with lower treatment rates in the UC but not the QI condition ($p < .0001$) (Figure 1); (2) a preference for watchful waiting over active treatment was associated with lower treatment rates in the UC but not the QI condition ($p = .019$) (Figure 2); (3) when English was the primary language spoken at home, treatment rates were higher in the QI condition but when another language was spoken at home, treatment rates were similar across conditions ($p = .023$) (Figure 3). This effect escaped statistical significance in the unweighted analyses ($p = .06$). All other findings were the same in weighted and unweighted analyses.

Predictors of Mental Health Treatment Use: Bivariate Predictors

Table II presents all significant associations between treatment use and predictor variables that did not significantly interact with intervention status, controlling for nonmodifiable demographic variables (i.e., study site, gender, race/ethnicity, and age). Because age significantly interacted with treatment condition, we also included this interaction as a covariate. Treatment was significantly more likely among AYA with low levels of perceived depression-related stigma, previous mental health treatment, and higher levels of need as indicated by higher rates of depression diagnoses (Major Depressive Disorder or dysthymia), suicidality, positive PTSD screens, higher levels of anxiety and attention problems, and lower self-reported mental health (Mental Health Index-5) and mental health-related functioning (SF-12). There were no other discrepancies between weighted and unweighted bivariate analyses. The following variables were tested but were not significantly associated with the outcome (all p -values $> .20$): study site, ethnicity, gender, parental education level, parent immigration status, satisfaction with mental health care, insurance status, substance use, externalizing problems, and eating disorders symptoms. Results were similar in weighted and unweighted analyses, with the exception that speaking English at home (vs. another language) was significantly associated with increased treatment rates in the unweighted analyses (odds ratio = 0.298, $p = .002$).

Joint Model: Best Subsets Procedure

We used a best subsets algorithm (which accounts for multiple comparisons) to identify the set of variables that best predicted service use in our sample. All significant interactions and predictors associated with the

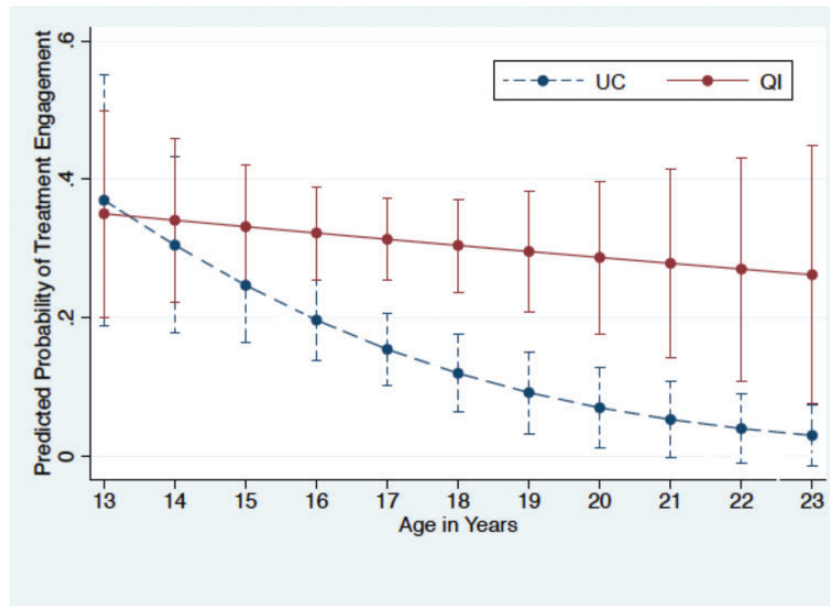


Figure 1. Predicted probability of service use across the age range by intervention condition.

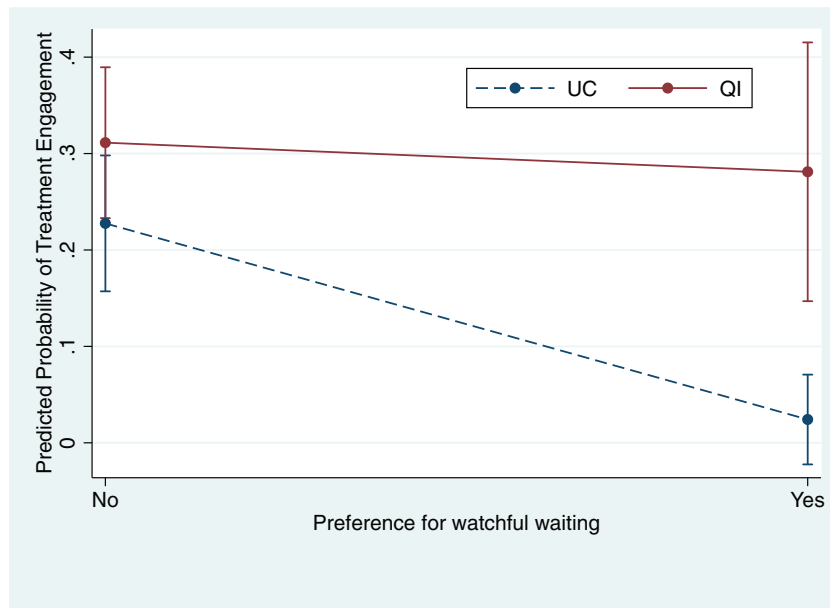


Figure 2. Predicted probability of service use for adolescents and young adults who endorse a preference for watchful waiting versus active treatment by intervention condition.

outcome at a p -value $< .10$ were included in the algorithm. Our final model ($adjusted R^2 = 0.208$) included the following variables: interaction of intervention condition with age; interaction of intervention condition with preference for active treatment versus not; interaction of intervention and language use; conditional effects of age, preference for active treatment, and language use; and main effects of view of depression as stigmatizing, overall mental health, functioning problems/low

mental health-related quality of life (SF-12), and history of previous mental health treatment. This model represents the best fitting and most unbiased model that accounted for the greatest amount of variance. The mean Variance Inflation Factor (VIF) of all predictors entered into the model was equal to 1.54 and individual VIF values ranged from 1.02 to 3.15, indicating no significant multicollinearity between predictors. Weighted and unweighted models did not differ meaningfully.

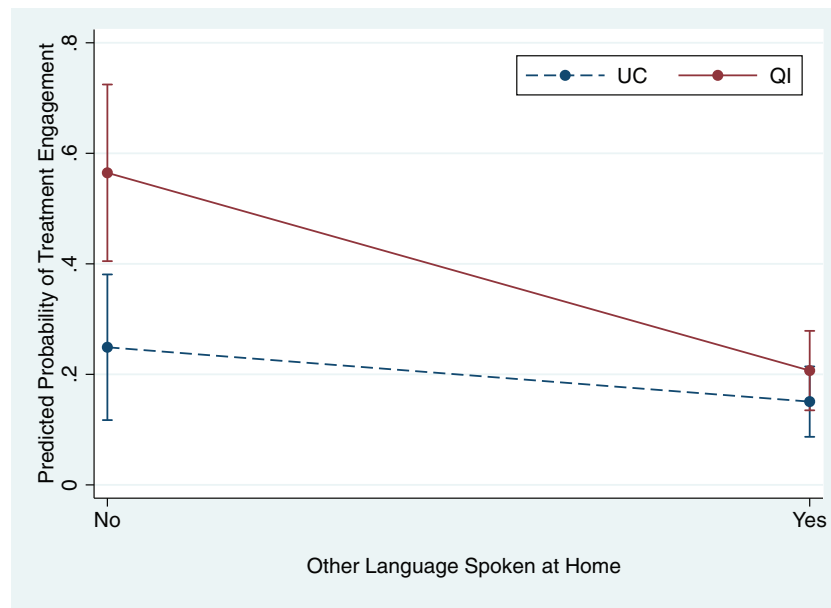


Figure 3. Predicted probability of service use for adolescents and young adults who speak a language other than English at home versus only English by intervention condition.

Table II. Significant Results of Weighted Logistic Regression Predicting Service Use From Predisposing, Enabling, and Need Factors, Controlling for Unmodifiable Demographic Variables (i.e., Intervention Condition, Study Site, Gender, Race/Ethnicity, Age, and Age by Intervention Condition Interaction)

Variable	Odds ratio	<i>p</i> -value	Odds ratio 95% CI	
			Lower	Upper
Predisposing factors				
View of depression as most stigmatizing problem	0.597	.045	0.361	0.988
Enabling factors				
Previous treatment for mental health problems	5.00	<.0001	2.83	8.81
Need factors				
CIDI MDD or dysthymia diagnosis	2.68	<.0001	1.64	4.40
Suicidality	1.41	.005	1.11	1.80
Positive PTSD screen	1.94	.01	1.17	3.21
BSI anxiety subscale total score	1.06	.022	1.01	1.12
Attention problems	1.10	.005	1.03	1.18
SF-12 Mental Health Summary Score	0.947	<.0001	0.926	0.969
MHI-5 Score	0.935	.01	0.888	0.984

Note: CI = confidence interval; CIDI = Composite International Diagnostic Interview; MDD = Major Depressive Disorder; PTSD = Posttraumatic Stress Disorder; BSI = Brief Symptom Inventory; SF-12 = Short Form Health Survey; MHI = Mental Health Index.

Discussion

This study examined predictors of mental health treatment in the largest extant trial to evaluate an integrated model for improving access to evidence-based depression care in adolescent and emerging adult primary care patients (Asarnow et al., 2009; Asarnow et al., 2005), a critical issue given the high morbidity and mortality and low treatment rates for AYA with depression. Integrating mental health care within primary care provides one strategy for increasing treatment rates and has been increasingly incentivized in the U.S. health care system owing to recognition of the potential of integrated medical-behavioral primary

health care for defragmenting care and achieving the triple aim of improving health, the quality and experience of care, and reducing costs (Asarnow et al., 2015b; Miller, 2015).

Major findings from this study are as follows. We identified three variables that differentially predicted service use across conditions, highlighting mechanisms through which integrated care interventions may lead to improved rates of care and health/behavioral health benefits. First, we found that while treatment rates declined with increasing age under the UC condition, this decline in treatment rates with age was slower and nonsignificant in the intervention condition. This

finding points to the value of integrated care approaches for addressing low rates of care in older AYA (Furstenberg, 2006; Park et al., 2014; Paul et al., 2009). To our knowledge, this study is the first to report on the effect of an integrated care intervention for reducing the age-related decline in service utilization often seen in older AYA. This decline may be attributable to changes in parental involvement in an adolescent's mental health care, with parents taking a less active role with older adolescents/young adults, in contrast to the active role parents often play in obtaining services for younger children (Pescosolido, Garner, & Lubell, 1998). The QI intervention, in which care was made to be more accessible, was able to mitigate the negative influence of age on rates of service use. It is possible that the intervention made it easier for older adolescents who face more academic demands and often have to navigate the health system with less support from their parents to access treatment services. It is also possible that the QI intervention overcame age-related individual characteristics that have been found to influence service use. For example, as adolescents grow older they exhibit a greater tendency to be secretive about their health behaviors (Main et al., 2015) and be more responsive to models of care that forefront shared decision making (Bejarano et al., 2015). Thus, the QI intervention, which emphasized integrated and collaborative medical-behavioral primary care, may have fostered a more open, empowering patient-provider relationship that promoted increased use of needed services.

Second, while AYA in the UC condition tended to be less likely to receive care when they expressed a preference for watchful waiting over active depression treatment, the QI intervention was associated with similar treatment rates for AYA with initial preferences for both watchful waiting and active treatment. Attitudes toward help-seeking have been found to be potent predictors of service utilization (McKay, Pennington, Lynn, & McCadam, 2001), and some studies suggest that attitudes may be influenced by race/ethnicity (Dwight-Johnson et al., 2000; Yeates et al., 2002). The success of the QI intervention in overcoming the barrier of initial reluctance for active treatment was likely owing to the emphasis on psychoeducation regarding depression, depression treatment options, and the emphasis on patient choice of preferred treatment options (e.g., psychotherapy, medication, watchful waiting/care manager follow-up). This psychoeducation aimed to present depressive symptoms as a frequent and "normal" response to stress and encouraged providers to collaborate with patients to consider an optimal treatment plan for alleviating their stress and symptoms. This was intended to decrease stigma associated with depression and increase the likelihood that AYA would seek treatment, while

also increasing the accessibility of treatment through integrated, co-located, and coordinated services. The present data support the efficacy of this approach for reducing the deleterious impact of initial reluctance to pursue treatment.

Lastly, while the intervention was associated with significantly improved treatment rates among AYA who spoke English at home, the intervention had minimal effects on treatment uptake among families who spoke another language at home. The language use variable was strongly associated with parents being immigrants to the United States and can be viewed as an indicator of lower levels of acculturation. Most AYA who spoke another language at home endorsed Hispanic-Latino ethnicity and sensitivity analyses revealed that results held within the Hispanic-Latino subgroup. This low rate of service use among AYA with non-English-speaking parents or bilingual parents is consistent with findings from epidemiological, and other studies showing that adults with limited English proficiency in the United States often do not seek out or obtain mental health services (Alegria et al., 2007; Sentell et al., 2007; Weech-Maldonado et al., 2003). It is of note that the effect of language on service use is often attributed in part to the limited availability of bilingual clinicians (Bernal & Castro, 1994). However, Spanish-speaking clinicians were available in the YPIC study, extensive training on cultural factors aimed at enhancing clinician cultural sensitivity was provided, and telephone outreach was used when patients were unable to attend the clinics. Our findings, therefore, underscore the challenges and need for novel strategies to identify and address other factors that may be deterring service use among less acculturated families (Becker Herbst, Margolis, Millar, Muther, & Talmi, 2016).

Tests of main effects of variables that did not significantly interact with treatment condition revealed additional variables that significantly predicted service use, and the joint model identified the subset of variables that represented the most robust predictors. In line with findings in the field, AYA who did not access mental health treatment were likely to view depression as highly stigmatizing (predisposing factor), have no mental health treatment at baseline (enabling factor), demonstrate a lesser degree of need as reflected by lower rates of depressive disorders, suicidality, PTSD, general anxiety symptoms, attention problems, and mental health-related functioning/impairment (need factors). Of note, as seen in previous research (Jaycox et al., 2006; Wichstrom, Belsky, Jozefiak, Sourander, & Berg-Nielson, 2014), prior mental health treatment emerged as a significant enabling variable. It appeared to be associated with the greatest fold increase in likelihood of receiving services and was included in the joint model. One possibility is that this is attributable

to increased familiarity with pathways to care (Moses, 2011) and continued treatment during the intervention period. Furthermore, systems-level analysis of service use has shown that positive experiences with treatment systems influence future orientations to treatment seeking (Pescosolido, 1992). The large majority of AYA in this sample who reported previous mental health care at baseline rated these services as satisfactory or highly satisfactory, perhaps increasing propensity to continue and/or seek additional care (Moses, 2011). These findings are also consistent with other work demonstrating that brief emergency interventions that provide suicidal adolescents with exposure to high-quality mental health care lead to improved linkage to mental health services (Asarnow et al., 2011; Ougrin, Tranah, Stahl, Moran, & Asarnow, 2015; Rotheram-Borus, Piacentini, Cantwell, Bellin, & Song, 2002; Spirito, Boergers, Donaldson, Bishop, & Lewander, 2002).

The present study should be viewed in the context of several limitations. First, this study aimed to evaluate predictors of receiving treatment under two different approaches to behavioral health service delivery: the QI integrated collaborative care approach compared with usual primary care, where medication treatment was available but AYA were generally referred to specialty care for psychotherapy. In line with this goal, we made several decisions regarding our data analytic approach including coding our outcome dichotomously and focusing on whether youths received treatment during the 6-month intervention period. Future research is needed to examine variables related to dosage, quality of treatment, and longer term treatment patterns under different care delivery approaches. Second, the YPIC care model may be challenging to implement and not feasible in some settings. Notably, similar to some Health Maintenance Organizations and Accountable Care Organizations, behavioral health care was offered with no additional charge, reducing financial barriers to care. Third, as data were initially collected, there have been several large-scale policy shifts, which may have affected barriers to care (e.g., ability of AYA to stay on parents' insurance), although the QI intervention is consistent with the current emphasis on integrating behavioral health and primary care (Asarnow et al., 2015b; Asarnow et al., 2017). For instance, the health policy change that allows young adults to remain on their parents' health insurance may help to address the low rate of care among older youths that was observed in this sample under the UC condition. Finally, from a demographic perspective, while our sample included a large number of ethnic minorities, most of these individuals endorsed Hispanic-Latino ethnicity. We are not able to determine whether these results are unique to Latinos or would generalize to other racial/ethnic groups. Finally, AYA who did not speak English were

excluded from the study, potentially representing a less acculturated subsample. We are not certain if the impact of the QI intervention would be different if this subsample were included.

Clinical Implications and Future Directions

This study provides important information to guide service delivery for AYA. Specifically, study results clarify predictors of receiving treatment (a necessary precondition for receiving effective treatment) under two treatment approaches: (1) an integrated collaborative care approach that aimed to improve access to evidence-based depression care, or (2) usual primary care. Our results indicate that AYA with the highest levels of need for mental health services are most likely to link to needed care, an encouraging point from the perspective of population health. Moreover, the YPIC integrated primary medical-behavioral health care program was able to overcome barriers to care associated with predisposing factors such as an initial reluctance to obtain active treatment and older age, leading to some AYA receiving needed treatment who might otherwise choose to go without care. Consistent with the whole systems approach in pediatric psychology and current trends toward integrated care models, our results indicate that the YPIC integrated care model was able to overcome some barriers to accessing care such as older age and an initial preference not to pursue treatment. Favorable findings support the promise of integrated care models for increasing rates of needed mental health care. Other findings regarding language use, and by proxy, help-seeking behaviors of Latino families, indicate the need to address issues more specific to racial/ethnic minorities. This may constitute further study of engagement strategies, or better understanding the factors that contribute to lesser service use in these populations. The YPIC-integrated care model featured collaborative care with a care manager/clinician to address behavioral health needs, a shared mental/behavioral health-medical treatment plan, co-located medical and behavioral health services, telephone outreach, a registry, and mental health consultant (usually a psychologist) to support evidence-based care and decision making. While this study provided a needed demonstration project, alternative less extensive models may yield similar improvements (Asarnow et al., 2015b; Asarnow, Kolko, Miranda, & Kazak, 2017).

Collectively, findings indicate that further research is needed to clarify: (1) whether similar findings would be obtained in other care settings or other service delivery models that have become increasingly common since the passage of health care reform legislation (e.g., Patient Centered Medical Homes), (2) the power of different intervention components for improving treatment rates, (3) further variables that may

influence how AYA access and receive mental health care to better understand patterns of help-seeking and identify targets for interventions that might promote positive health behaviors (e.g., seeking depression treatment) that mitigate lifetime risk (Perrin, Anderson, & Van Cleave, 2014), and (4) innovative approaches to engaging AYA from less acculturated families in needed treatment. The present findings also highlight the need to examine cultural variables as they relate to treatment engagement. In particular, examining how the acculturative process (which includes dynamics such as language acquisition, experiences of discrimination, stigma, and intergenerational conflict) impacts the decisions racial/ethnic minority families make about mental health treatment is warranted.

Conclusions

Integrated medical-behavioral primary care offers one strategy for addressing the problem of unmet need for behavioral health care among AYA. Study results highlight the value of collaborative integrated care interventions for overcoming barriers to care associated with an initial reluctance to pursue active treatment and older age. Results point to the need for monitoring and outreach for AYA without prior mental health treatment, for including measures of functional impairment to be maximally effective in identifying AYA who may require services, and for promoting engagement efforts among less acculturated families (i.e., where English is not the primary language spoken at home), as these AYA are less likely to receive care under both integrated care and usual primary care conditions.

A major contribution of the present study is that findings help inform ways to improve access to and use of behavioral health care, which is particularly important given recent increased focus on integrated medical-behavioral primary care. Understanding the factors that contribute to service use during the critical period of the lifespan when adolescents begin to transition into adulthood may improve the field of pediatric psychology's ability to promote healthy outcomes and reduce long-term morbidity owing to chronic mental health conditions.

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Prevention. She has also consulted on quality improvement and interventions for depression and suicidal/self-harm behavior.

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