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Primary Care Providers' Initial Treatment Decisions and Antidepressant Prescribing for Adolescent Depression

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Abstract

OBJECTIVE—Adolescent depression is a serious and undertreated public health problem. Nonetheless, pediatric primary care providers (PCPs) may have low rates of antidepressant prescribing due to structural and training barriers. We examined the impact of symptom severity and provider characteristics on initial depression treatment decisions in a setting with fewer structural barriers, an integrated behavioral health network.

METHOD—We administered a cross sectional survey to 58 PCPs within a large pediatric practice network. We compared PCP reports of initial treatment decisions in response to two vignettes describing depressed adolescents with either moderate or severe symptoms. We measured PCP depression knowledge, attitudes toward addressing psychosocial concerns, demographics, and practice characteristics.

RESULTS—Few PCPs (25% for moderate, 32% for severe) recommended an antidepressant. Compared with treatment recommendations for moderate depression, severe depression was associated with a greater likelihood of child psychiatry referral (OR 5.50[95% CI 2.47-12.2] $p < .001$). Depression severity did not affect the likelihood of antidepressant recommendation (OR 1.58[95% CI 0.80-3.11] $p = .19$). Antidepressants were more likely to be recommended by PCPs with greater depression knowledge (OR 1.72[95% CI 1.14-2.59] $p = .009$) and access to an on-site mental health provider (OR 5.13[95% CI 1.24-21.2] $p = .02$) and less likely to be recommended by PCPs who reported higher provider burden when addressing psychosocial concerns (OR 0.85[95% CI 0.75-0.98] $p = .02$).

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Conflict of Interest

There are no known conflicts of interest for any author.

CONCLUSION—PCPs infrequently recommended antidepressants for adolescents, regardless of depression severity. Continued PCP support through experiential training, accounting for provider burden when addressing psychosocial concerns, and co-management with mental health providers may increase PCPs' antidepressant prescribing.

Keywords

primary health care; depressive disorder; adolescent; antidepressant agents; physician's practice patterns

Adolescent depression is a serious public health problem which is under-recognized as well as undertreated.¹ The primary care setting may be a key place where adolescent mental health concerns can be addressed. Most adolescents have a usual place of health care,² and up to one-third of adolescents presenting to primary care have an emotional problem, with 14% screening positive for depression.^{3, 4} Furthermore adolescents with mental health problems more frequently visit their primary care provider (PCP) than do adolescents without mental health problems.⁵ Understanding how PCPs make treatment decisions for depressed adolescents and identifying the factors that influence these decisions may help increase the initiation of depression treatment in the primary care setting.

Current PCP guidelines for adolescent depression recommend active support and monitoring (or watchful waiting) for mild depression, and cognitive behavioral therapy (CBT) and/or selective serotonin reuptake inhibitors (SSRIs) for moderate or severe depression.⁶⁻⁸ CBT is recommended for first-line treatment in the primary care setting,⁹ especially for moderate depression which may respond to CBT alone.^{7, 8} SSRIs, which show a greater benefit for lowering depressive symptoms for severely depressed teens compared with moderate or mildly depressed teens, are the first-line treatment for patients with a severe major depressive disorder diagnosis with or without psychotherapy.^{7, 10} A mental health consultation is also strongly encouraged for severely depressed teens.⁷ Of note, a recent systematic review and meta-analysis found limited evidence for the effectiveness of antidepressants in children and adolescents, especially at follow-up,¹¹ and there are a small number of trials with positive findings.¹²

However, many factors beyond treatment guidelines influence PCPs' treatment decisions for adolescent depression, such as structural barriers to care including poor access to mental health specialists, insurance barriers, and insufficient training in depression management.¹³ For families in many parts of the United States, access to specialty pediatric mental health care is characterized by long waits for appointments associated with an insufficient and poorly distributed mental health workforce, particularly child psychiatrists.¹⁴⁻¹⁶ Many pediatric PCPs lack training in the treatment of depression, and therefore, may lack confidence to prescribe antidepressants independently.¹⁷⁻¹⁹ Indeed, studies suggest that only one quarter of pediatric PCPs had recently independently prescribed an SSRI for an adolescent.^{17, 19} PCPs are particularly likely to refer patients to mental health specialists when symptoms are severe,^{20, 21} and due to discomfort with prescribing antidepressants,^{17, 18, 22} may prefer to refer a more severely depressed adolescent to child psychiatry for medication management as opposed to initiating medication themselves.

While prior studies have examined PCP treatment decisions for adolescent depression, in many cases structural barriers may have dominated PCP decision-making, reducing the ability to study other PCP-level factors that influence treatment decisions for depressed adolescents. For this reason, we sought to examine this issue in a practice environment with fewer structural barriers due to frequent access to on-site mental health therapists, PCP training in depression diagnosis and management, and communication between PCPs and mental health providers through an integrated electronic health record. The current work addresses this gap by examining PCP beliefs about adolescent depression treatment in a setting with few structural barriers, allowing a clearer perspective on the impact of PCP characteristics and beliefs on their intentions.

We examined PCPs' initial treatment decisions using adolescent depression scenarios, assessing the impact of depression severity and other related factors on these treatment decisions. These other factors were exploratory due to limited research in this area. We hypothesized that PCPs would be sensitive to the severity of adolescent depression, and would alter treatment decisions based on the clinical information available in structured vignettes. We also hypothesized that PCPs with better knowledge of depression and more positive attitudes toward managing psychosocial problems would be more likely to prescribe antidepressants.

METHODS

Study Participants and Setting

We conducted a cross sectional survey of primary care providers' (PCPs') initial treatment decisions for adolescent depression and factors influencing these decisions as part of a larger study on adolescent depression in the primary care setting. PCPs included pediatricians (MD/DO), pediatric nurse practitioners (CRNP) and physician assistants (PA) employed by a large pediatric practice network (serving about 46,000 adolescents) in the greater Pittsburgh, Pennsylvania area. This pediatric practice network has an integrated behavioral health model with routine depression screening of all 15-17 year olds at well-child visits (using a self-completed Patient Health Questionnaire-9 Modified).²³ Within this network, mental health therapists are located on-site or in neighboring pediatric practices to improve access to care. Mental health therapists are all licensed therapists (LCSW, LSW, LPC or LMFT) who have had at least 3 years of experience practicing outside of the network and attend twice monthly educational conferences. They also have access to a senior licensed clinical social worker for supervision. Some practices have a care coordinator who facilitates care, but typically referrals are made directly by the PCP via a referral form. Therapists prioritize access; routine new patients are typically seen within 7 days, although wait times vary depending on location. Behavioral health protocols based on diagnosis and severity are used by mental health therapists to facilitate access to child psychiatrists (who are also co-located within a network pediatric practice or in a local affiliated behavioral health practice) or to connect patients with other community mental health resources. An integrated electronic health record is used to facilitate communication between PCPs and mental health specialists. PCPs in this network had opportunities to attend a practice network-hosted series

of four 2-hour presentations on the evaluation and management of common mental health conditions, including depression, within the past year.

We recruited PCPs from this practice network as these PCPs have access to depression education and are likely to face fewer access barriers to treatment for their patients (e.g., not knowing a child mental health provider accepting patients, patient not being able to get an appointment with a child mental health provider), enabling us to focus on PCP-related factors in the decision process. The study was approved by the institutional review board at the University of Pittsburgh as well as the University of Pittsburgh CTSI pediatric practice-based research network, Pediatric PittNet.

Data Collection

Paper surveys were distributed to 143 PCPs: 56 were distributed in person at a practice network meeting, and 87 were mailed to network PCPs who had not attended the meeting. The 93-item survey was completed anonymously, took approximately 15 minutes to complete, and assessed respondent demographics, practice characteristics, beliefs about antidepressants and suicide risk, depression knowledge, psychosocial beliefs, treatment decision making, factors influencing treatment decisions, and perceived barriers to care. Fifty-eight surveys were returned for a survey response rate of 41%, which is consistent with the response rate for other PCP surveys on depression treatment (13- 63%).^{19, 20} Response rates by provider type were estimated due to 6 unavailable provider types. These were 33% for MD/DOs, 62% for CRNPs, and 38% for PAs. Participants received a prepaid debit card worth \$25 for survey completion.

Measures

Depression Decision Making Vignettes—To assess treatment decisions, we composed two vignettes depicting moderate and severe adolescent depression (Appendix 1). Each clinical scenario described a non-suicidal, depressed, adolescent girl who met DSM-IV criteria for major depressive disorder, but differed in symptom severity (e.g., school functioning). Patient Health Questionnaire-9²³ (PHQ-9) scores were provided for each adolescent (PHQ-9=15 for moderate and PHQ-9=20 for severe). The instrument provided instructions for interpreting PHQ-9 scores. After reviewing the vignette, respondents were instructed to rate their likelihood of using five different treatment options (1) watchful waiting, defined as follow up visits with the PCP but not prescribing medication or referring for therapy or to psychiatry, 2) prescribing antidepressants, 3) referral for therapy/ counseling such as cognitive behavioral therapy, 4) referral to a child psychiatrist for medication management, or 5) referral for immediate crisis management or hospitalization) for a patient similar to the one depicted in the vignette. Respondents indicated their likelihood of recommending each treatment option on a 4-point Likert scale ranging from 1 'highly unlikely' to 4 'highly likely'.

Factors Influencing Treatment Decisions List—PCPs were asked to rate how important a variety of factors identified from the literature^{19, 24, 25} and expert consultation were in influencing an initial teen depression treatment decision (e.g., likelihood of treatment adherence, adolescent's preferences; see Table 3). PCPs provided importance

ratings for each of the factors in response to both the moderate and severe depression vignettes. Response options ranged from 1 ‘unimportant’ to 5 ‘very important’.

Depression Knowledge Scale (DKS)—The DKS, based on the Agency for Healthcare Research and Quality practice guidelines for adult depression, asks PCPs to what extent they agree with a series of twelve factual questions regarding the diagnosis and management of depression.²⁶ The face validity of the scale was confirmed by a panel of expert clinicians,²⁶ and the scale scores are responsive to a PCP quality improvement intervention.²⁷ To ensure the scale was applicable to the treatment of adolescent depression, we modified two questions (changed the appropriate length of an antidepressant trial from 4-6 weeks to 4-8 weeks; changed the referent for an item stating that medications and psychotherapy are efficacious from “elderly adults as well as non-elderly” to “in adolescents as well as adults”) and removed one question (regarding timing of antidepressant discontinuation). Response options ranged from 1 ‘definitely false’ to 5 ‘definitely true’. ‘Mostly’ and ‘definitely’ responses were combined in order to score each item correct or incorrect, and the total score was calculated as the percent correct divided by ten (range 0-10). An additional question not part of the DKS score assessed, using the same scale, the degree to which PCPs agreed with the statement, “antidepressants increase the risk of suicide in adolescents.”

Physician Belief Scale (PBS): Belief and Feeling Subscale, Burden Subscale—The modified 14-item PBS measures psychosocial beliefs and attitudes, including beliefs about PCP capacity and willingness to effectively manage psychosocial problems, and perceptions of provider burden associated with addressing psychosocial problems, (Cronbach's α of 0.81 for original scale,²⁸ 0.76 in this sample). It has been validated for pediatric PCPs, and predicted pediatric PCPs' use of the DSM-IV and identification of psychosocial problems.²⁸ Item response options range from 1 ‘disagree’ to 5 ‘agree’. Items are summed to create a PBS total score, ranging from 14-70. Factor analysis has identified two subscales: the Belief and Feeling Subscale (Cronbach's α of 0.76 for original scale, 0.62 in this sample; range, 8-40 with a higher score representing more negative attitudes toward addressing psychosocial concerns) with items such as, “I focus on organic disease because I cannot treat psychosocial problems” and the Burden Subscale (Cronbach's α of 0.75 for original scale, 0.74 in this sample; range, 6-30 with a higher score representing more feelings of burden) with items such as “patients will become more dependent on me if I raise psychological concerns”.²⁸

Statistical Analysis

Our primary outcomes were the initial treatment decisions for adolescent depression. Secondary outcomes were PCPs' importance ratings of a list of factors that may influence treatment decisions. Descriptive statistics were used to calculate the percentage of PCPs who were ‘likely’ or ‘highly likely’ to recommend each treatment option, and the percentage who rated each potentially influential factor as ‘important’ or ‘very important’ when making an initial treatment decision for moderate and for severe adolescent depression. McNemar's test was used to evaluate paired differences in the proportion of PCPs who were likely or highly likely to recommend a treatment option for moderate versus severe depression and to

evaluate paired differences of PCPs who rated each influential factor as ‘important’ or ‘very important’ for moderate versus severe depression.

Generalized estimating equations for repeated measures logistic regression were used to predict the initial treatment decision for treatment options with sufficient variability for both the moderate depression and severe depression vignettes. Each model included the within-subject, repeated-measure severity factor (moderate or severe depression), and two to three additional variables that were statistically significant at the $p < .10$ level in preliminary univariate analyses. Twenty predictors (listed in Table 1 in addition to attendance at behavioral health education sessions) were examined in univariate analyses and considered for inclusion in the three models based on strength of statistical significance. All analyses were conducted using SPSS Version 19 except GEE models which were performed in STATA Version 7.

RESULTS

PCP Characteristics and Knowledge

The 58 PCPs who responded were predominantly female, White, had a mean age of 46 years ($SD = 11$), and averaged 95 patient visits per week ($SD = 31$) (Table 1). PCP provider type seemed to roughly represent that of the provider network with some overrepresentation of nurse practitioners. Out of the total survey sample subtracting 6 participants whose provider data were not available, 69% were MD/DOs, 25% were CRNPs, 6% were PAs, as compared to the provider network which was 80% MD/DOs, 15% CRNPs, and 5% PAs. The majority reported having an on-site mental health provider ($n=38$), being located in a suburban setting ($n=35$), typically reviewing depression screens before adolescent well child visits ($n=38$) and having half or fewer of their patients as Medicaid-enrollees ($n=52$). A third ($n=19$) reported having a care coordinator embedded within their practice. Ten percent ($n=6$) had attended all 4 depression-related training sessions offered in the prior year by the integrated behavioral health network, a third ($n=20$) had attended 3 sessions, 19% ($n=11$) had attended 2 sessions, 9% ($n=5$) had attended 1 session, and 28% ($n=16$) attended none. Provider participants reported using a variety of strategies to treat a depressed adolescent in the past six months: 31% ($n=18$) had recommended watchful waiting, 48% ($n=28$) had prescribed antidepressants, 98% ($n=57$) had referred to therapy, 83% ($n=47$) had referred to child psychiatry, and 50% ($n=29$) had referred for immediate crisis management or hospitalization. The mean Depression Knowledge Scale (DKS) score was 6.4 ($SD = 1.9$), with PCPs answering about two thirds of knowledge questions correctly, and the PBS mean score was 27.4 ($SD = 6.4$). Two-thirds of PCPs ($n=37$) did not believe antidepressants increase suicide risk, a quarter ($n=15$) believed antidepressants increased suicide risk, and 10% ($n=6$) did not know.

Initial Treatment Decisions

PCPs’ treatment decisions were sensitive to the severity of depression (Table 2). PCPs were significantly more “likely” or “highly likely” to recommend watchful waiting for moderate depression than for severe depression (18% vs. 4%, $p = .02$). Significantly fewer PCPs recommended child psychiatry for medication management for moderate depression than for

severe depression (61% vs. 88%, $p < .001$). No PCP recommended crisis management for moderate depression, and 49% recommended crisis management for severe depression ($p < .001$). There was no significant difference between the proportion of PCPs likely to prescribe antidepressants to a moderately depressed adolescent compared to a severely depressed adolescent (25% vs. 32%, $p = .29$), nor was there a significant difference in the proportion recommending therapy for moderate and severe depression (100% vs. 98%, $p = 1.0$).

Factors influencing PCP treatment decisions for depressed teens were relatively consistent across moderately and severely depressed teens (Table 3), with adolescent substance abuse, quality of family support, and functioning in school and extracurricular activities being those factors that were rated as “important” or “highly important” by the greatest number of PCPs.

Predictors of Treatment Decisions

In adjusted models predicting treatment decisions, severe depression, relative to moderate depression, was associated with a significantly decreased likelihood of recommending watchful waiting (OR 0.16 [95% CI 0.03-0.69] $p = .02$) and an increased likelihood of referring to child psychiatry (OR 5.50 [95% CI 2.47-12.2] $p < .001$) (Table 4). In contrast, severity of depression was not a significant predictor of antidepressant prescribing (OR 1.58 [95% CI 0.80-3.11] $p = .19$). For antidepressant prescribing, significantly associated predictors included greater depression knowledge (OR 1.72 [95% CI 1.14-2.59] $p = .009$) and the presence of an on-site mental health provider (OR 5.13 [95% CI 1.24-21.2] $p = .02$). A higher perception of burden addressing psychosocial problems was associated with a significantly decreased likelihood of prescribing antidepressants (OR 0.85 [95% CI 0.75-0.98] $p = .02$). Table 4 provides the results of multivariate analyses of additional treatment decisions. Of note, opinions about antidepressants and suicide risk were not found to be statistically significant predictors of treatment decisions.

DISCUSSION

Current guidelines advise PCPs to initiate evidence-based treatments for teen depression, such as prescribing psychotropic medications for major depressive disorder without comorbidities, referring for psychotherapies like CBT, and considering mental health consultation in cases of increased severity.⁷ We found that PCPs working within an integrated behavioral health system with ready access to mental health professionals almost unanimously recommended therapy for both moderate and severe adolescent depression, but were often reluctant to prescribe an antidepressant, regardless of depression severity. Contrary to our hypothesis, the severity of depression did not influence a PCP's reported likelihood that they would prescribe antidepressants for major depressive disorder. Furthermore, similar to what has been reported in studies of PCPs working in settings without integrated behavioral health care,^{17, 19, 20} PCPs in our sample also appear to prefer referring patients to child psychiatrists rather than prescribing antidepressant medications to depressed teens.

Comparable to findings in prior studies, PCPs reported that they would be likely to refer a child with severe depression to a child psychiatrist,^{20, 25, 29} but only one third said they would prescribe an antidepressant for severe depression.²⁰ PCPs may prefer for a child

psychiatrist to initiate medication²² for severe depression due to guidelines recommending mental health referral in severe cases. However, severity did not seem to completely guide treatment decisions, as low rates of initiating medication and high rates of referral to child psychiatry were also reported for teens with moderate depression. This is consistent with prior studies that have found that, despite current guidelines, almost a quarter of PCPs would never consider initiating an antidepressant for teen depression.²² In many communities, the national shortage of child psychiatrists¹⁶ limits the number available to initiate medication for depressed adolescents, often requiring more PCPs to initiate appropriate antidepressant treatment, especially in cases of less severe depression.³⁰ The comparable rates of PCPs who appear willing to initiate antidepressant treatment in our sample of PCPs who are working in a system with integrated behavioral health care and enhanced access to child psychiatrists suggest that PCP willingness to initiate antidepressants with depressed adolescents may be as greatly influenced by factors other than structural barriers such as difficulty accessing child psychiatrists.

Our findings suggest three such modifiable factors: depression knowledge, feelings of burden addressing psychosocial problems, and the presence of an on-site mental health therapist. Pediatric PCPs have reported feeling uncomfortable managing adolescent depression and having inadequate training to do so.^{17, 19, 20} Our results suggest that greater knowledge about teen depression, such as that discussed in the 2009 American Academy of Pediatrics Policy Statement – The Future of Pediatrics: Mental Health Competencies for Pediatric Primary Care,³¹ might contribute greater willingness of pediatric PCPs to prescribe an antidepressant for a depressed adolescent. Experiential learning with standardized patients, which improves PCP diagnosis and knowledge of adolescent depression,³² might be one promising approach to achieving this.

In contrast to prior studies which found no link between PCP burden and antidepressant prescribing,^{20, 28} we found that PCPs who had a greater sense of burden associated with addressing psychosocial problems were less likely to prescribe antidepressants. Such burdens may include concerns about time constraints and efficiency, as well as emotional fatigue. Depressed adolescents are more likely to schedule and come in for a primary care visit if they believe that PCPs are interested in more than just their physical problems.³³ PCPs' feelings of burden in dealing with patients' psychosocial problems have the potential of not only affecting their treatment of patients, but if perceived by adolescents and families during an office visit, could diminish the willingness of adolescents to engage in ongoing treatment for psychosocial problems such as depression.

Prior studies have found that PCPs whose patients are without access to mental health specialists are more likely to prescribe antidepressants.^{14, 17} In our sample of providers in a system with integrated behavioral mental health care, we found that an on-site mental health provider was associated with a greater likelihood to prescribe an antidepressant. Also, prior research shows that about 60% of PCPs will recommend therapy for childhood depression¹⁷ and 50% of PCPs will refer for mental health services for children with emotional problems even when a quarter of the PCPs have mental health therapists available.^{17, 21} This is in contrast to our study as almost all PCPs would refer a depressed adolescent to a therapist. We speculate that such integrated behavioral health care, comparable to many of the

collaborative care models endorsed by a number of national organizations,^{30, 31, 34} may increase PCPs' awareness of mental health issues, and enhance PCPs' comfort in prescribing antidepressant medications to teens who are more likely to have the opportunity to see specialty mental health clinicians for concurrent therapy, help to monitor symptoms and response to medications, and provide consultation. For example, the presence of an on-site therapist can facilitate the recommended close monitoring following antidepressant initiation,³⁵ and the shared electronic medical record can facilitate communication regarding patient functioning and progress, both of which may be helpful in increasing PCP comfort in initiating antidepressants in the aftermath of the FDA black box warning.³⁶

PCPs in our sample identified factors such as family history of depression, the presence of comorbidities, and family support, as factors that most influence their decisions regarding treatment for adolescent depression, consistent with findings in other studies.²¹ The influence of these factors on PCP decision-making were comparable for both moderate and severe depression, indicating that PCPs are considering the broader psychosocial context when considering their approach to treatment of depressed teens, consistent with the recommendations of professional societies.^{6, 8} We note, however, that fewer than half of the PCPs indicated that parent or teen preferences play a substantial role in influencing their treatment decisions, despite evidence that incorporating adolescent and parent preferences improves treatment adherence.³⁷ Incorporating such shared-decision making into a busy PCP practice can be challenging particularly in situations such as adolescent depression where the process involves not only the adolescent and the PCP, but also the parent(s). Further efforts to develop tools to enhance the process could facilitate the use of shared-decision making in routine primary care encounters.

Limitations

Our findings must be interpreted in the context of the limitations of our study. Our survey was conducted with a relatively small sample size of PCPs in a single group with integrated behavioral health, and may not be representative of other pediatric primary care sites. Because of the small sample size, we recognize there may be other factors influencing treatment decisions which we did not have power to detect, and it would be useful to replicate our study in a larger sample. For example, provider type (MD/DO, CRNP, PA) was not matched to survey results in order to preserve anonymity due to the small number of providers other than MDs/DOs. While examining this group of PCPs embedded in a resource-rich, supportive system allows us to better identify factors other than those structural barriers related to accessing specialty mental health care, providers in different systems are likely to encounter more challenges connecting with specialized depression care for their patients, and may be less knowledgeable about teen depression treatment. Also we are unable to draw firm conclusions about the effects of structural barriers on treatment decisions without a comparison group of PCPs who are in non-resource rich sites. While our survey response rate is comparable to that obtained in similar studies, we do not know how survey respondents differed from non-respondents or to what extent response bias may have influenced our findings. Finally, we used vignettes to assess how PCPs approach treating depressed adolescents, and we do not know to what extent self-reported behavior is consistent with PCPs' actual clinical behavior. To avoid diagnostic uncertainty, the vignettes

used were developed based on comprehensive DSM-IV depression criteria and PHQ-9 score and did not include demographic variability. In typical patient encounters, due to time constraints, PCPs may obtain less diagnostic information about depressive symptomatology. PCPs have to consider other patient factors such as SES, family support, and the adolescent's own strengths and difficulties when making treatment decisions. Vignettes were based on depressive symptoms in an adolescent girl, and given that depressive symptoms may vary between girls and boys,³⁸ current findings may not generalize to adolescent boys or younger, pre-adolescent children. Future studies should also include vignettes with varied presentations of depressed adolescents to primary care and consider counterbalancing vignettes by presenting a severe vignette first to some respondents and a moderate vignette first to others, and also varying gender and age.

CONCLUSIONS

Our study provides useful information to the field at a time of medical home growth,³⁰ when there are increased efforts to more systematically integrate behavioral health in primary care practices. Our sample of pediatric PCPs with improved access to mental health therapists recommended therapy for depressed adolescents at very high rates, but their willingness to prescribe antidepressants appeared comparable to that seen in populations of PCPs not practicing in systems with integrated behavioral health care, and their willingness to prescribe did not appear sensitive to adolescent depression severity. Given the national shortage of child psychiatrists, efforts to increase the number of depressed adolescents who receive guideline concordant pharmacologic care will require PCPs to increase the appropriate prescribing of such psychotropic medications to depressed adolescents. Further efforts are needed to develop and effectively disseminate interventions such as depression specific training through experiential learning that can help support PCPs in their knowledge of and comfort with treating adolescent depression. In addition, further attention is needed to better understand and develop interventions to effectively address a provider's feelings of burden regarding addressing psychosocial problems.

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Appendix 1

The vignette for moderate depression is shown below:

“DJ is a 15 year-old female who has no history of mental illness but now has a PHQ-9 score of 15 during a well-child visit. Her mother reports that DJ has been moody for the last two months and has gained some weight due to overeating. DJ tells you that she hasn't been getting along with her friends as well as she used to, and that she often feels tired even though she is sleeping more than usual. Her grades have slipped from B's to C's and one D, but she hasn't missed any school and is still involved on the track team. She denies any thoughts of suicide.”

The vignette for severe depression is shown below:

“KP is a 15 year-old female who has no history of mental illness but now has a PHQ-9 score of 20 during a well-child visit. KP tells you that she has been feeling “worse and worse” over the past two months. When questioned she becomes tearful and tells you that she feels empty ‘like a robot with no happiness’. Her mother reports that KP used to enjoy music and play in a band with friends, but now she never even picks up her guitar. Her mother has noticed that she doesn't seem to have ‘much energy’, and during the exam you note that her actions seem slow and lethargic. KP reports insomnia, has been having a hard time concentrating during class, and has missed a week of school this month because she didn't ‘feel like going’. When you ask her about thoughts of suicide, she tells you she sometimes thinks of death, but insists ‘I would never kill myself. It would hurt my family too much.’”

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TABLE 1

PCP^a Demographics and Practice Characteristics (N=58)

	N (%)	M (SD)
Respondent Characteristics		
Gender, female	39 (67)	
Age		46 (11)
Race		
White	55 (95)	
Asian/Pacific Islander	3 (5)	
Year graduated medical/nursing school ^b		
Prior to 1985	13 (23)	
1985-1993	15 (27)	
1994-2001	13 (23)	
After 2001	15 (27)	
Total Patients seen per week		95 (31)
Adolescent caseload		
1-25%	34 (60)	
26-50%	20 (35)	
51-75%	3 (5)	
Percent Visits PHQ-9 ^c is Reviewed In Advance		
0%	3 (5)	
1-50%	11 (19)	
51-75%	6 (10)	
76-100%	38 (66)	
Think Antidepressants Increase Suicide Risk ^d	15 (26)	
Percent Visits Speak to...	Teen Alone	Parent Alone
0%	0 (0)	7(12)
1-25%	10 (17)	41 (71)
26-50%	4 (7)	4 (7)
51-75%	16 (28)	3 (5)
76-100%	28 (48)	3 (5)
		Teen-Parent Together
		0 (0)
		0 (0)
		5 (9)
		10 (17)
		43 (74)
Practice Characteristics		
On-site mental health provider presence ^e	38 (66)	
Care coordinator presence	19 (33)	
Total PCPs in Office		
0-4	15 (26)	
5-9	28 (48)	
10-14	15 (26)	
Total PCPs who see Adolescents in Office ^f		
0-4	14 (25)	

	N (%)	M (SD)
5-9	29 (50)	
10-14	14 (25)	
Setting		
Urban	10 (17)	
Suburban	35 (60)	
Rural	13 (22)	
Percent Patients on Medicaid ^f		
1-50%	52 (91)	
51-100%	5 (9)	
Respondent Measures		
Physician Belief Scale Total Score ^g		27.4 (6.4)
Feeling Subscale Score		12.2 (3.0)
Burden Subscale Score		15.2 (4.5)
Depression Knowledge Scale ^h		6.4 (1.9)

^a Primary care provider.

^b 2 missing responses.

^c Patient Health Questionnaire 9 depression screen.

^d Think statement “antidepressants increase the risk of suicide in adolescents” is mostly or definitely true.

^e Mental health provider present in PCP's office versus a neighboring office.

^f 1 missing response.

^g A higher score (range 14-70) associated with a more negative attitude toward treating psychosocial problems. Feeling subscale (range 8-40) measures negative attitudes on ability to effectively address psychosocial problems. Burden subscale (range 6-30) measures feelings of burden associated with increased time, decreased efficiency, and personal emotional burden of addressing psychosocial problems.

^h Range 0-10, measures extent to which PCPs agree with correct knowledge questions on depression diagnosis and management.

TABLE 2

Percentage of PCPs^a who were Likely or Highly Likely to Recommend Each Initial Treatment Option for Adolescent Depression Vignettes (*N*=58)

Likely or Highly Likely to Recommend	Moderate Depression N (%)	Severe Depression N (%)	<i>P</i>
Watchful Waiting ^{b, c}	10 (18)	2 (4)	.02
Prescribing Antidepressants ^b	14 (25)	18 (32)	.29
Therapy Referral ^d	58 (100)	57 (98)	1.00
Child Psychiatrist Referral for Medication ^{e, f}	34 (61)	50 (88)	<.001
Immediate Crisis Management/Hospitalization ^b	0 (0)	28 (49)	<.001

Differences between PCPs' likelihood to recommend treatment options in moderate vs. severe depression were analyzed with the McNemar's test or with an exact test where indicated.

^aPrimary care provider.

^b1 missing response.

^cDefined as a series of follow up visits with the PCP but not prescribing medication or referring for therapy or to psychiatry.

^dTherapy/counseling such as cognitive behavioral therapy.

^eReferral to a child psychiatrist for medication management.

^f2 missing responses.

TABLE 3

Percentage of PCPs^a who Rated Possible Influential Factors as Important or Very Important to Making Treatment Decisions for Adolescent Depression (N=57)

Factor	Moderate Depression N (%)	Severe Depression N (%)
Substance Use	54 (95)	53 (93)
Quality of Family Support	46 (81)	46 (81)
Functioning in School/Extracurriculars	44 (77)	47 (83)
Family History of Depression ^b	43 (77)	42 (75)
Likelihood to Adhere to Treatment	43 (75)	39 (68)
Comorbid Conditions	41 (72)	43 (75)
Parent's Understanding of Depression	39 (68)	36 (63)
Quality of PCP Relationship with Family	38 (67)	37 (65)
Teen's Preference for Treatment	32 (56)	24 (42)*
Parent's Preference for Treatment	31 (54)	23 (40)*
Parent's Perception about Antidepressants	25 (45)	23 (40)
Teen's Understanding of Depression	25 (44)	28 (49)
Parent's Perception about Mental Health System	24 (42)	24 (42)
Parent's Experience with Mental Health System	23 (40)	21 (38)
Parent's Experience with Antidepressants	21 (37)	22 (39)
Higher Priority Medical Problems	20 (35)	14 (25)
Age ^c	9 (16)	11 (20)
PCP Time Constraints	9 (16)	5 (9)
Gender ^b	5 (9)	8 (14)
Parent's Education Level	4 (7)	5 (9)
Race/Ethnicity ^b	0 (0)	1 (2)

Differences between PCPs' beliefs about the importance of factors in moderate vs. severe depression were analyzed with McNemar's test.

^aPrimary care provider.

^b1 missing response.

^c2 missing responses.

* $p < .05$.

TABLE 4

Adjusted Predictors of PCP^a Initial Treatment Decision Outcomes for Adolescent Depression Vignettes^b
(N=58)

	Watchful Waiting ^{c,d}			Prescribing Antidepressants ^e			Child Psychiatry Referral for Medication ^{e,f}		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
PCP Gender									
Male		-			-		1		
Female		-			-		1.60	(0.48-5.38)	.45
Year graduated									.04
<1985		-			-		1		
1985-1993		-			-		5.63	(1.16-27.4)	.03
1994-2001		-			-		2.68	(0.58-12.3)	.21
>2001		-			-		13.0	(1.95-86.3)	.008
Severity									
Moderate	1			1			1		
Severe	0.16	(0.03-0.69)	.02	1.58	(0.80-3.11)	.19	5.50	(2.47-12.2)	<.001
On-site MH ^g provider									
No		-		1			-		
Yes		-		5.13	(1.24-21.2)	.02	-		
Depression Knowledge ^h		-		1.72	(1.14-2.59)	.009	-		
Physician Burden ⁱ		-		0.85	(0.75-0.98)	.02	-		
Patients on Medicaid									
1-50%	1			-			-		
50-100%	5.68	(0.98-33.0)	.05	-			-		

Watchful Waiting model: 1 severity, 2 Medicaid Patients; Antidepressant model: 1 severity, 2 on-site provider, 3 DKS, 4 PBS; Child Psychiatry model: 1 Age of PCP, 2 Gender of PCP, 3 severity

^aPrimary care provider.

^bPCPs were likely or highly likely to recommend each treatment option. GEE with repeated measures logistic regression models used for analysis. Each model includes only the data listed:

^c2 missing values.

^dDefined as a series of follow up visits with the PCP but not prescribing medication or referring for therapy or to psychiatry.

^e3 missing values.

^fReferral to a child psychiatrist for medication management.

^gmental health

^hRange 0-10, measures extent to which PCPs agree with correct knowledge questions on depression diagnosis and management

ⁱBurden subscale (range 6-30, higher score representing more feelings of burden) measures feelings of burden associated with increased time, decreased efficiency, and personal emotional burden of addressing psychosocial problems.