Implementation of Adolescent Depression Care Guidelines into the Electronic Health Record at a

Rural Pediatric Primary Care Clinic

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Abstract

Background: Healthcare providers are encouraged to prepare their practice to effectively manage the care of mild to moderate adolescent depression. Cost-effective screening, diagnostic, and newly developed pediatric primary care depression management guidelines have been established. To integrate guidelines into practice, primary care providers (PCPs) must document effectively to ensure a complete treatment plan is in place in the patient's electronic health record (EHR).

Intervention: Elements from a flowsheet were implemented into the EHR to promote thorough assessment and documentation of care delivered to adolescents with depression.

Methods: An initial chart review was completed on patients diagnosed with depression. An updated depression template was implemented within the EHR for six weeks. A follow-up chart review was completed post-intervention to determine if documentation of elements from the adolescent depression guidelines improved after the EHR update. Pre-intervention and post-intervention surveys were delivered to PCP's to understand their perspective on adolescent depression management.

Outcomes: The chart review revealed that baseline PHQ-9 screenings were documented in 91% (n=43) of the charts reviewed in the pre-intervention timeframe. Only 78% (n=7) of the charts reviewed during post-intervention included PHQ-9 screenings. Early intervention treatment options documented in the pre-intervention timeframe included education 100% (n=47), medication prescriptions 53% (n=25), and psychotherapy referrals 18% (n=18). During post-intervention, education 100% (n=9), medication prescriptions 78% (7), and psychotherapy referrals 22% (n=7) were documented by the PCPs.

Recommendation: The quality improvement project focused heavily on documentation completed over a one year pre-intervention timeframe compared to a six-week post-intervention timeframe. Further evaluation and chart review over the next year will provide a more adequate comparison of documentation within primary care practice.

Keywords: adolescent depression, electronic health record, pediatric primary care, follow-up

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Since becoming a national leading health indicator, access to behavioral health treatment

in America continues to be of high priority (Office of Disease Prevention and Health Promotion

[ODPHP], 2018). Behavioral health support in childhood and adolescence is vital to growth and

development. Adolescence is a time of challenges and transition to independence before entering

adulthood. Psychosocial development of the adolescent includes focusing thoughts in regards to

the future, exploration of personal identity, adjustment to physical appearance, and examination

of internal and external experiences, and values within peer relationships (Hay, Levin, Deterding,

& Abzug, 2016). Characteristics of the adolescent mood and behavior are linked to their brain

development. Supporting adolescents by identifying their needs at well-visits and when moods or

behaviors change will benefit their overall physical and mental health outcomes.

Background and Significance

Only 15% to 25% of children with psychiatric disorders receive the specialty care they

need (Tyler et al., 2017). Depression is diagnosed in 3.2% of the pediatric population aged 3-17

years, which reflects approximately 1.9 million children (Centers for Disease Control and

Prevention [CDC], 2018). Additionally, 12.8% of adolescent children aged 12-17years have had

at least one depressive episode (National Institute of Mental Health [NIMH], 2017). According

to Healthy People 2020 midcourse review, "Between 2007 and 2013, the suicide rate has

increased and adolescents with a major depressive episode have also increased and have moved

away from the baseline and 2020 target" (Healthy People 2020 as cited in Office of Disease

Prevention and Health Promotion [ODPHP], 2014, p. 2-3).

United States (U.S.) Department of Health and Human Services (DHHS) (2017) reported depression symptoms among high school students in California were at 32% compared with 31% in the U.S. The National Institute of Mental Health (NIMH) (2017) reported "60.1% of adolescents with major depressive episode did not receive treatment whereas 2.4% received medication only, 19.6% were seen by a health professional only, and 17.9% were seen by a health professional and treated with medication in 2017" (p. 7). O'Conner et al. (2016) reported 40% of US adolescents prescribed an antidepressant by a healthcare provider did not receive any follow-up care in the three months follow the prescription and 68% did not receive follow up or reassessment of depression symptoms in the three months following initial diagnosis (O'Conner et al., 2016).

To decrease the number of acute emergency department visits, primary care providers are encouraged to be knowledgeable regarding adolescent depression treatment and management clinical guidelines (Costello et al., 2019). Upon completion of patient safety plans in one urban pediatric psychiatry clinic, the utilization of clinical support tools within the EHR assisted PCPs in the management of care as a method to improve adherence to clinical guidelines. The support tools include updated templates, condition-specific order sets, and alerts or reminders to update a patient's behavioral health status (Reyes-Portillo, Lake, Kleinman, & Gould, 2018). Investment in high quality treatment and developing transparent policies about EHR documentation of depressive symptoms and diagnoses were one recommendation to improve adolescent depression outcomes (Farley et al. 2020).

Depression Treatment Recommendations

The American Academy of Pediatrics (AAP) has released recommendations for the assessment and treatment of mild to moderate adolescent depression in the primary care setting

by PCPs (Cheung et al., 2018). The recommendations include active support or monitoring for six to eight weeks after initial assessment reveals mild to moderate depression. If depressive symptomology persists despite a period of active support, primary care management can issue a referral to a mental health specialist or initiate medication and psychotherapy, monitor for symptoms, and consider on-going mental health consultation. The cycle of treatment will continue to be reassessed as needed, along with ongoing evaluations of safety (Cheung et al., 2018).

Guidelines for the assessment and treatment of adolescent depression in primary care call for early intervention and primary care management of adolescent depression. Primary care providers are encouraged to seek education, training, and form support systems to increase confidence and comfort adolescent depression in care delivery (Zuckerbrot et al., 2018). Factors affecting treatment adherence by patients include medication side effects, difficulty getting prescriptions filled, cost of treatment, low social support, lack of access, and negative attitudes toward treatment (Stafford et al., 2019). In providing care for an adolescent population, it is important to understand the best approach to provide access and build connections between healthcare providers and patients.

Internal Evidence

Rural Health Pediatric Clinic in Eastern Sierra Region of California

In a rural California town, 3.5% of approximately 1050 adolescent's ages 11-17 years old have limited access to psychiatric specialty providers offering cognitive behavioral therapy (McEvoy, 2019). As of October 2018, a newly implemented electronic health record (EHR) at the Rural Health Pediatric Clinic (RHC) has impacted the ability to obtain specific data related to depression screening, diagnosis, and treatment.

Depression Screening Process

Following the America Academy of Pediatrics (AAP) preventive pediatric health care recommendations, adolescents in the rural California clinic over age 12 years old are routinely screened at every health visit for depression using the Patient Health Questionnaire (PHQ-9). The PHQ-9 Questionnaire is composed of nine integrated questions adapted from the Diagnostic and Statistical Manual of Mental Disorders (DSM-V), 5th edition (DSM-V as cited in The Reach Institute, 2018). The PHQ-9 is a validated screening tool used specifically to screen and assess the severity of the depressive symptomology (Kroenke, Spitzer, & Williams, 2001). Results of the PHQ-9 screening assist the primary care provider to determine the immediacy of care needs and will support decision making when developing a treatment plan for each patient.

Usual Care Treatment of Depression

Currently, usual care for patients with a positive PHQ-9 screening or diagnosis of depression involves subsequent appointments based on the needs of the child or adolescent. Early intervention treatment is currently a provider specific decision without an active policy at the rural health clinic to guide practitioners in the treatment of depression. Primary care providers will order referrals for complex mental health services per need, begin active monitoring and support, and begin medication therapy.

There are currently 13 mental health care providers within a thirty minute drive of the Eastern Sierra community. Many of the behavioral health resources provided within the Eastern Sierra mountain area are limited to income or need-based services and do not always meet the needs of the children or adolescents who could benefit from psychotherapy services especially cognitive behavioral therapy (McEvoy, 2019). A certified pediatric nurse provider from the rural

health clinic offers primary care services at a school based clinic for patients and collaborates with the school based counseling services provided by a counseling internship program.

Behavioral Health Service Gap

Behavioral health access is one problem translating to various settings across the country. This creates difficulty in connecting patients to referrals with mental health specialty providers. Primary care providers are often the first contact for patients with a newly diagnosed depressive disorder. In one urban pediatric psychiatry clinic, the utilization of clinical support tools within the EHR was used as a method to improve adherence to clinic guidelines. The support tools include updated templates, condition-specific order sets, and alerts or reminders to update a patient's behavioral health status (Reyes-Portillo, Lake, Kleinman, & Gould, 2018). In a large pediatric care network, 20% of charts reviewed from patients with elevated depression screening lacked documentation of a follow-up response by their PCPs. Therefore, it is imperative to streamline documentation of depressive symptoms and diagnoses to meet adolescent behavioral health needs (Farley et al. 2020).

As a result of this gap in services, PCPs in the rural eastern sierra region have decided to also explore online-based or technology-based services to better monitor the patients within their clinics and documentation of the guidelines for adolescent depression in primary care (GLAD-PC) assessment and treatment recommendations within the EHR to improve primary care provider adherence to clinical guidelines is the first step in improving care for adolescent patients with depressive symptomology.

PICOT Question

In an effort to improve the assessment and treatment of adolescents with depressive symptomology, the following PICOT question has been developed in order to search the

literature for current evidence: In the (P) pediatric primary care setting, will implementation of (I) GLAP-PC elements into the EHR compared to (C) usual care increase (O) provider adherence to EBP recommendations over a 6-week timeframe?

Evidence Synthesis

Arizona State University's (ASUs) online library provides access to several health sciences databases. To research components of the PICOT question, three databases were used to explore literature. Cumulative Index to Nursing and Allied Health Literature (CINAHL), PUBMED, and PsycInfo were among the three databases searched. Settings prior to each search were set to obtain publications released from June 2018 to April 2020 as this is the timeframe after GLAD-PC recommendations were released. Articles were to be peer-reviewed, written in the English language and if possible, the research study was to be conducted within the U.S.

Adolescent depression in pediatric primary care was the focus of each search. Key terms searched included: adolescent depression, electronic health record, pediatric primary care, and follow-up. Of the three search engines, 10 articles were extracted from 110 articles based upon relevance to primary care, utilization of integrated behavioral health or collaborative care, and review of the electronic health record. Appendix A, reveals in chronological order, two randomized controlled trials, two quality improvement projects, and six retrospective reviews of adolescent primary care practices that were critically appraised to provide evidence for this Doctor of Nursing Practice (DNP) project.

Critical appraisal and synthesis of the evidence supported the integration of the PHQ-9 as the most frequently used screening tool in all studies except for two (Appendix B). Of the two studies that did not use the PHQ-9, Bai et al. (2018) chose the Center for Epidemiologic Studies Depression Scale (CED- S) as the screening tool in their study. There was no specific screening

tool mentioned in the Yang et al. (2019) study as it was based on patient navigation and care collaboration. Instead a survey was used to determine provider's perceptions of their system as no specific screening tool was identified.

There were positive outcomes to utilization of collaborative care approaches, educational methods, and EHR interventions to support the uptake of screening and in some instances, management of adolescent depression. Strengths of the studies appraised identified six to twelve month project timeframes within primary care settings and the use of validated screening tools. Limitations of the studies include majority of sample sizes were of specific ethnicity and lack for formality of when PHQ-9s were obtained at initial visits and follow-up.

All of the evidence used to support the DNP project included adolescent's ages within the 12-18 year range and had both male and female participants. Post-intervention data collection within the studies was completed at six to twelve month intervals.

Theory Application

To advance nursing scholarship and research, theoretical and implementation frameworks assist in connecting concepts, guiding nursing practice as evidence is searched, appraised, disseminated, and provide an outline for further research. Nursing theorist Ida Jean Orlando developed the *Nursing Process Discipline Theory*, which encourages nurses to meet patients where they are and provide immediate intervention (Orlando as cited in Nursing-theory, 2016). To better understand the process of implementing evidence-based practice (EBP) recommendations into primary care, the Model for Improvement and Plan-Do-Study-Act (PDSA) framework illustrate the interventions within the project (Institute for Healthcare Improvement [IHI], n.d.).

Nursing Theory

Nursing Process Discipline Theory

The function of professional nursing, presenting behavior, immediate reaction, nursing process discipline, and improvement are concepts of the Orlando's Nursing Process Discipline Theory (Orlando as cited in Nursing-theory, 2016) (Appendix C). Evidenced-based practice recommendations are updated to encourage universal screening at all well child visits. This aligns with the role of the nurse within Orlando's model by encouraging PCPs to find and meet the patient's immediate needs as a function of professional nursing. A thorough assessment assists the nurse in determining depression severity as the presenting behavior is relative to the patient's symptoms. Utilization of the GLAD-PC recommendations and care protocols or algorithms, supports the nurse's immediate care management plans. Upon determining pathways of care related to the patient, the nursing process discipline supports the nurse in a collaborative approach with the patient to discover treatment modalities and enact a plan to improve the patient's current situation. In the context of adolescent depression, this includes the treatment and planning interventions such as education, medication, psychotherapy, and continued follow-up until the patient's status is improved.

Innovation Model

Model for Improvement

The Institute for Healthcare Improvement (IHI) developed the Model for Improvement ([IHI], n.d.). The *Model for Improvement (MFI)* is based on the work of W. Edwards Deming 1982 System of Profound Knowledge and released by the associates in process improvement (Committee on Practice and Ambulatory Medicine, n.d.). The model begins with three fundamental questions: 1. What are we trying to accomplish?, 2.How will we know that a change is an improvement?, and 3. What change can we make that will result in improvement? (IHI,

n.d.) Foundational concepts include forming the team, setting aims, establishing measures, selecting changes, and testing changes through the plan-do-study-act (PDSA) cycle (Appendix D).

Methods

Protecting Patient and Provider Privacy

Arizona State University's (ASU) internal review board (IRB) reviewed and approved this quality improvement project and administrative support from the rural Californian clinical site was received. The PCPs at the rural health clinic included two pediatric nurse practitioners, two pediatricians, and one family medicine physician. Supportive staff within the practice included medical assistants (MAs) and nurses. The clinic is part of a non-profit health network. Updating the EHR, has been a goal for the PCPs within the organization to improve decision making and tracking of higher risk patients receiving treatment.

To protect the privacy of patients and providers during the project period, de-identified data was collected from the advanced practice health care providers at the pediatric clinic and from the EHR that is used by the primary care pediatric practice. The pre-intervention chart data collection included the medical records of 81 adolescents who presented to primary care for symptoms of depression and anxiety. Of the 81 adolescents, 47 charts were reviewed as these adolescents were diagnosed with depression only and without other mental health conditions, including attention deficit hyperactivity disorder (ADHD) and anxiety. Post-intervention data collection was obtained over six weeks from 23 medical records. Of the 23 patients, only nine were diagnosed with depression only, without other mental health conditions. Due to the clinical site located in a small rural community, demographic information on participants was not obtained in this project to protect patient privacy.

Project Design

All data that was collected was used to analyze the uptake of adolescent depression care guidelines by the advance practice healthcare providers after the implementation of enhanced EHR capabilities and an educational session. Chart reviews were completed within the facility on a password protected computer. The charts were obtained based on the ICD-10 codes for anxiety and depression. A chart review data collection tool, developed for this project, did not document identifying information. The purpose of the chart review tool was to determine if the medical record contained elements of the GLAD-PC recommendations at each office visit. Information from the chart review could potentially educate primary care providers to recognize gaps in the delivery of adolescent depression care within this clinic.

The DNP student designed an educational intervention specific to implementing GLAD-PC recommendations within an EHR system and provided education regarding the DNP project and GLAD-PC recommendations to the primary care providers and staff at the clinic. An educational protocol was developed to support healthcare providers as they gained knowledge and skills in order to meet ongoing health care needs of adolescents with depressive symptomology. The EHR was adapted to include an enhancement of the current EHR template to include questions obtained from the DSM V diagnostic depression criteria, clinical indicators to support treatment modalities, and a recommended plan of care template based on pre-selected elements from the assessment.

A survey was sent to the pediatric PCPs before and after the EHR intervention template change to better understand primary care provider perceptions about clinic processes currently in place supporting care and management of adolescents diagnosed with depression. The initial survey was handed out at an employee staff meeting and completed surveys were returned in a

lockbox held in the provider's office. The post-intervention survey was sent through an email containing a link from an internet-based survey website. Survey Monkey™ has the ability to make survey responses anonymous by not sharing the participant's names, emails, or IP addresses in their responses.

Practice Processes and System Changes

Implementation of GLAD-PC diagnostic assessment templates within the EHR was the first step in transforming the care for adolescents with depression in this practice. Prior to recruiting healthcare providers and delivering the educational intervention, the DNP student provided input to develop an updated EHR documentation process, developed a care management workflow, and helped to connect the clinic with access to referral resources. Elements from the GLAD-PC guidelines and the data collection tool were introduced to the clinicians in a brief educational discussion of the newly designed charting method. Once the EHR templates were implemented, the DNP student was available over the next six weeks to assist in trouble shooting and educating clinicians concerning the GLAD-PC guidelines, as needed.

Timeline for DNP Project Implementation

Implementation of the DNP project began after IRB approval with a four-step process. Within the planning phases, recruitment of participants for the project was obtained during a scheduled meeting in the pediatric primary care office. A script was provided to introduce the project and each potential advanced practice provider participant was provided with a consent letter and given the option to participate. Completion of the pre-intervention survey indicated willingness to participate. A chart review to obtain baseline EHR documentation currently

recorded by pediatric PCPs related to assessment of adolescents with depressive symptomology was completed.

On October 1st, 2018, the facility had begun using a new EHR system. The 81 pre-intervention charts reviewed were from office visits beginning October 1st, 2018 until October 21st, 2019. Of the 81 charts, 47 were further identified as having been diagnosed exclusively with depression. The chart review contained documentation from all of the primary care providers within the pediatric primary care clinic. Elements from the GLAD-PC recommendations were used to support newly enhanced EHR templates. The templates were approved by primary care providers and implemented with help of the information technology (IT) department. Following the implementation of the updated templates, data collection via the adolescent depression chart review tool was completed over six weeks.

Two months after the educational intervention and the implementation of the new EHR templates reflecting GLAD-PC guidelines, an anonymous post-evaluation survey was provided for participants to complete. Pediatric primary care provider data was analyzed as a group, not by the individual. Descriptive statistical analysis has been completed on the pre- and post-intervention surveys obtained from PCPs within the rural pediatric health clinic.

Budget

There was no funding obtained to implement this DNP project. The cost to the practice included time for the IT technician, IT nurse, front-office staff, medical assistants (MAs), and providers to attend the educational intervention and the time to review and develop the template with the student, and also the time providers took to complete the surveys. The SurveyMonkey™ program used to send surveys to providers was funded by the DNP student at a five dollar per month subscription.

Results

All data was analyzed using Intellectus Statistics™ to determine the effectiveness of the education intervention and the EHR template enhancement. Summary statistics were calculated for each interval and ratio variable, and frequencies and percentages were calculated for each nominal variable split by each testing period.

Frequencies and Percentages

Pre-intervention (pre-test) data collection on 47 charts was completed using the chart review tool. The chart review revealed that, the PHQ-9 depression screening tool was documented in 91% ($n = 43$) of office visits. The post-intervention (post-test) phase was after the educational session and EHR template implementation. Chart reviews using the chart review tool were completed one week after the project completed. The PHQ-9 depression screening tool was documented in 78% ($n = 7$) of the 23 post-test office visits. From the pre-test chart review, the most frequently observed category of depression severity was mild ($n = 10$, 29%). For the posttest chart review, the most frequently observed category of depression severity was mild ($n = 4$, 57%). Frequencies and percentages are presented in Table 3 (Appendix E).

PHQ-9

The charts were reviewed to determine if a PHQ-9 screen was documented within each of the charts of those patients diagnosed with adolescent depression comparing the pre-intervention chart review with the post intervention chart review. The result of the two-tailed independent samples *t*-test was not significant based on an alpha value of 0.05, $t(47) = 0.39$, $p = .696$. This finding suggests the mean number of PHQ-9 Screenings was not significantly different between the Pretest and Posttest. The results are presented in Table 4 (Appendix F).

Depression Severity

Depression severity is assessed as mild, moderate, moderately severe, and severe. For pretest, the most frequently observed category of depression severity was mild ($n = 10$, 23%). For Posttest, the most frequently observed category of depression severity was mild ($n = 4$, 44%). Overall pretest and posttest data showed the most frequently observed depression severity was mild (33.3%), followed by severe (26.2%), moderately severe (21.4%), and moderate (19%). The results are presented in a graph (Appendix G).

Early Intervention Treatment

Within the GLAD-PC recommendations, three early intervention treatment elements include education, psychotherapy referrals, and medication prescribed within the initial visit of a patient who is newly diagnosed with mild to moderate depression. Charts were reviewed to pre- and post-intervention to determine what treatment modalities were offered in the early intervention office visit note.

Giving education about depression was documented by primary care provider clinical notes on anticipatory guidance in charts of patients diagnosed with depression, pre-test ($n = 47$, 100%) and post-test, (n=9, 100%). From the chart review completed during pre-test data collection, medication was prescribed in 53% of patients diagnosed with depression ($n = 25$). From post-test data collection, medication was prescribed in 78% of the nine patients diagnosed with depression ($n = 7$). From the chart review completed during pre-test data collection, referrals to psychiatry or psychology were recommended in 59% of patients diagnosed with depression ($n = 26$). From the chart review completed during post-test data collection, referrals were recommended in 12% of patients diagnosed with depression ($n = 2$). The results are presented in Table 4 (Appendix G).

Qualitative Survey Responses

The posttest surveys were distributed to all providers but less than half were completed. Due to the limited data within the surveys, the data reported is expressed from the suggestions written by the PCPs for the open-ended survey questions. When asked to describe two or three barriers that providers have had providing care to adolescent patients diagnosed with depression, participants identified "a need for education regarding anticipatory guidance" and "more behavioral health resources." In post-test surveys, the participant responses identified "the need for more local referral resources" and "it (the EHR template) makes it easier to chart- I don't forget to discuss things during visits." Qualitative participant pre-survey results from the primary care providers identified, "a need for education regarding anticipatory guidance" and "more behavioral health resources." Qualitative results from the survey are presented in Table 5 (Appendix H).

Primary care providers (n=2) who participated in the post-survey were asked, if the current method of documentation better allowed them to follow GLAD-PC recommendations and the results showed one provider "somewhat agreed" and another provider "agreed". In the post-intervention survey, two respondents agreed that the documentation method allowed them to follow GLAD-PC recommendations. The enhanced EHR templates for documenting the assessment and treatment of adolescent depression are one aspect of care the providers can continue to use. Further evaluation over the next year, will provide a more in-depth assessment and documentation of the assessment and treatment within this primary care practice. The results are presented in Table 5 (Appendix I).

Discussion

Documentation within the EHR can help providers determine gaps and assess overall health of the population they serve. The results from PHQ-9 screening data analysis show PHQ-9

screenings are being completed within the range of 78% to 91% of office visits. The decrease in post-intervention PHQ-9 documentation can be attributed to PHQ-9 screening tools not being uploaded into the EHR or if screening was completed, it was not documented in the designated template. An initial plan was to add the PHQ-9 to the vital signs section of the EHR but this could not be completed at the time of EHR enhancement. There was a decrease in PHQ-9 screens documented after EHR depression template introduction and education intervention.

With the majority of adolescent depression patients diagnosed within the mild depression category, it is promising that all of the patients despite the severity of their depression are receiving a form of psychoeducation. The second highest depression severity identified overall was moderately severe and severe, which aligns with rate of early intervention treatment modalities prescribed or recommended, such as medication and psychotherapy referral orders which were provided ordered in 78% of adolescents diagnosed with depression in the post-test timeframe.

The newly designed EHR depression template included a way for providers to document anticipatory guidance because it was built into the system. Therefore, the need for anticipatory guidance education occurred and was met as evidenced by a posttest quote stating the new EHR "makes charting easier by not forgetting to discuss things during visits." Though the EHR depression template included elements from the GLAD-PC recommendations, there is still a perceived need for more behavioral health services by primary care providers.

Limitations

Limitations found in this quality improvement project include the unequal comparison of pretest and posttest chart review time periods. Specifically, the pretest timeframe included data from chart reviews of patients with depression seen over an entire year. Data collection was

conducted over a six week time period after the introduction of the new EHR template and the

primary care educational session. The pediatric primary clinic had an EHR depression and

anxiety template in place prior to the intervention but it was not specific to the elements of the

GLAD-PC recommendations and was not identical to the EHR template used at post-test. Only

elements were that were congruent were analyzed. The pre-test PHQ-9 screening obtained from

the first chart review was not specific to the GLAD-PC guidelines of the assessment that should

occur at annual well visits. The charts provided for chart review were ones obtained from IT and

were specific to the ICD-10 diagnosis of depression. The office visits were often specific chief

complaint regarding adolescent depression. Therefore, a longer period for post-test chart review

should be completed to determine the rate of PHQ-9 screenings documented at annual well visits

by the providers.

Conclusion

Implications for Healthcare Providers

To obtain high-quality, coordinated care, behavioral health integration is becoming a

recommendation for all pediatric primary care clinics. Updated EHR systems improve the ability

for healthcare organizations to meet integrated patient-centered care goals (Agency for

Healthcare Research and Quality, n.d.). Primary care clinicians who manage adolescent

depression should pursue additional training regarding screening and diagnosis of the disorder.

Practice and systems changes are encouraged to be completed throughout the organization. This

includes front office staff training related to the importance of inputting screening within the

EHR, continued improvements to EHR documentation, and implementation of automated

tracking systems which could assist in overall behavioral health referrals within the facility

(Cheung et al., 2018). Evidence also recommends establishing linkages with mental health

services within the facility, within the general local area, or establishing connections to

telemedicine in behavioral health providers are only available at a distance (Cheung et al., 2018).

Updating the EHR is one step in improving the management of adolescent depression in primary

care by preparing clinical practice with convenient ways to document adherence to evidence

based guidelines. However, more work has to be done to connect rural primary care practices

with certified behavioral health specialists when more severe cases of adolescent depression are

identified.

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Appendix A

Table 1

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
Wright et al. (2016). The costs and cost-effectiveness of collaborative care for adolescents with depression in primary care settings **Country:** U.S. **Funding:** NS **Bias:** NS	Collaborative care intervention model	RCT **Purpose:** Evaluate costs and cost-effectiveness of a collaborative care model for tx of MDD in PC.	PC N=101 (IG=50) (uc=51)	IV: usual care DV: ROAD CC intervention	Cost and QALYs	STATA, Vers. 12 STATACorp, LP	Mean incremental CE ratio was $18239 (95% CI, dominant to $24408)	**LOE**: level I **Strengths:** RCT, 12 month collaborative care intervention. **limitations:** sample white race, single NW PC Out of pocket payees excluded from study. **Conclusions:** CCI is cost effective method to tx Adol depression.

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Bai et al. (2018). Reducing Health Risk Behaviors and Improving Depression in Adolescents: A Randomized Controlled Trial in Primary Care Clinics **Country:** U.S. **Funding:** NS **Bias:** NS	Integrated care model	**Design:** RCT **Purpose:** To decrease and prevent HRB in adolescents selected for depression, and to determine whether this approach would have benefits on HRBs and depression levels.	N = 187 Urban PC	**IV:** UC **DV1:** BHI	HRBI	Stata Vers. 14 Multi-level mixed-effects t-tests χ^2 test	**AR:** 6mos IV: 89% DV1:88% 12 mo IV:61% DV1: 65% DepSym: decreased	**Level of Evidence**: LOE I **Strengths:** Sample size 187, 12 months follow-up **Weaknesses:** Urban, Hispanic/Latino community, participation rate low. **Conclusions:** Links between HRBs and depressive sx support monitoring for HRBs and depression in PC to allow for effective intervention.

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Simon et al. (2018) Predicting Suicide Attempts and Suicide deaths following outpatient visits using electronic health record. **Country**: US **Funding:** unknown **Bias**: NS	LASSO	**Design:** Retrospective review **Purpose**: To develop and validate models using EHR to predict suicide attempt and suicide death following an outpatient visit.	SA: N= 24,233 SD: N=1240 **Demographics:** M age: 46 f: 62% **Setting:** Primary care Mental health primary care	IV: SA SD DV1: Hx previous MH disturbances i.e., Prior SA, MH & SUD dx, medical dx, psychiatric medications dispensed. DV2: post-MH OV DV2: post-PC OV	1^0: PHQ-9 (ninth question) 2^0: LASSO	GLMNET (27) FOREACH (28) packages for the R statistical package Vers. 3.4.0	Risk scores in top 5% accounted for 43% of SA and 48% SD.	**Level of Evidence**: LOE II **Strengths:** Large sample size, EHR data from seven health symptoms, multiple **Weaknesses:** Evidence open to adults >18yo. Not specific to adolescent population. **Conclusions:** Prediction models incorporating both health record data and responses to self-report questionnaires substantially outperform existing suicide risk prediction tools.

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Yang et al. (2019). PCP utilization and satisfaction with a health system navigation program for adolescents with BH needs. **Country:** U.S.	Integrated BH model	**Design:** Quality improvement **Purpose:** Evaluate PCP adoption of BH navigation program	Primary Care Eligible PCPS N = 411 Referring PCPs N= 290 PCP Demographics: f- 72% Pediatricians – 56% >10years practice – 62% **Patient demographics:** Pts. Referred N= 3912 f- 60% white – 43% Asian – 28% M age – 15.24 **Setting:** 36 Bay area, California PC **Inclusion:** Referral eligibility	IV: PCC DV1: HSNP	Surveys DV1: OD - referrals (dates, reasons, referring PCPS), and PII DV2: Demographics, BH dx, Referrals with HSNP DV3: PCP demographics	Descriptive statistics SAS Enterprise 5.1 and STATA 14.1	90% PCPs rated communication with HSNP above average or excellent. 91% agreed HSNP enhanced their practice	**Level of Evidence:** LOE II **Strengths:** Decent Sample size, evaluation at 12Mo and 2.5 Yrs. **limitations:** Pt. outcomes, HSNP turnover during **Conclusions:** Study reflects a need for BH navigation services

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Harder et al. (2019) Improving adolescent depression screening in Pediatric Primary Care **Country:** U.S. Funding: VDH **Bias:** ns	IHI's Collaborative Model for Achieving Breakthrough Improvement PDSA	**Design:** QI **Purpose:** 1.) Increase adolescent depression screening at health supervision visits to at least 95%, and 2.) increase initial plans of care among those screening positive to at least 95%.	**Sample:** N = 39 CHAMP PC practices N = 1772 patients **Setting:** Champ Network PC in Vt.	IV: PCPs DV1: Screening method DV2: education	Chart review PHQ-9 MHPRI	Stata, version 15	improvement in depression screening at all 17 practices, from 34% to 97% over 7 months. Participating practices had 3.5 times greater odds (95% confidence interval [CI], 1.14−10.98, P = .03) of being screened for depression and 37.5 times greater odds (95% CI, 7.67−183.48, P < .0005) of being screened with a validated tool than adolescents at control practices, accounting for patient characteristics	**Level of Evidence**: LOE V **Strengths:** Validated tools, sustainable assessment, randomly sampled larger medical record review. **Limitations**: convenience sampling, no participation for family medicine. **Conclusions:** Significant within practice increases in adolescent depression screening after a QI learning collaborative, as well as in comparison with control practices 1 year later.

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Fallucco et al. (2019) Impact of Experiential Training With Standardized Patients on Screening and Diagnosis of Adolescent Depression in Primary Care **Country**: USA **Funding**: SAMSHA Grant # 5U79SM059939-04 **Bias:** NS	NS	**Design**: retrospective review **Purpose:** examine the long-term impact of PCP training with standardized patients on screening and diagnosis of adolescent depression in PC.	**Sample:** N= 25 PCPs **Setting:** Florida PC 14 different practices in the 2-year study period	IV: PCPs doing well-visits DV1: Training	outcome data continuously over a 12-month period before and a 12-month period after intervention rather than at several discrete points in time. Furthermore, outcome indices were measured objectively through medical record and billing record review	Descriptive summaries of frequencies and percentages. GLIMMIX procedure in SAS Windows Version 9.4	Depression screening rate increased significantly after training from 51% to 80% of adolescents seen at well-visits	**LOE:** Level V **Strengths** Use of validated screening tools. **Limitations** Pre-post study design limits the ability to draw causal conclusions study measured only one treatment option, prescription rates of antidepressant medication Use of billing codes to measure depression screening. **Conclusion** Participating PCPs more likely to screen for and diagnose adolescent depression in the 12 months after training

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Thompson et al. (2019) Collaborative Care for Depression of Adults and Adolescents: Measuring the Effectiveness of Screening and Treatment Uptake. **Country:** U.S.	Collaborative care model	**Design:** Retrospective review **Purpose:** Identify any screening and tx disparities along the axes f gender, race, ethnicity, and age cohorts.	**Sample:** Eligible patients N= 25,369 Adol eligible for PHQ9 N = 196 (12%) Adol screened N= 203 (20%) **Demographics:** M age = (20%, N=4912) 12 ±25 F: N= 15,966, (63%) **Setting:** Urban PC clinics (network 10 clinics)	IV: usual care Adol depression management D1: Collaborative care team D2 PHQ-2 and PHQ-9 EHR prompt	Validated Screening tool PHQ-9 Eligibility algorithm demographics	Data R, version 3.5.1	Adol associated with disproportion ate PHQ-9 screenings and with tx. Disengageme nt PHQ-9 screening rose from 7% to 80%.	**LOE**: Level IV **Strengths** Large network and team intervention, validated tools, **Limitations** Selection bias (healthier patients likelier to use patient care) Data extraction may be incomplete if providers did not register screening. f/u PHQ-9 scores were inconsistent and not standard in collaborative care workflow. **Conclusion** Intervention shows promise in expanding access to care & reducing disparities. > access to psychotherapies and tx modalities may improve tx. Integration of screening in EHR effective.

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Farly et al. (2020) Identification and Management of Adolescent Depression in a Large Pediatric Care Network. **Country**: USA **Funding:** Intervention grant CFDA 93.767 Study: not associated with grant. **Bias**: NS	collaborative care	**Design:** retrospective study **Purpose:** PC Adole depression identification and f/u care when elevated symptoms were identified.	N= 10,713 Demographics: F: N= 5323 Setting: Large pediatric network PC .	IV: Well child visits D1: PHQ-9 screening	codebook for chart review PHQ-9	Descriptive statistics.	Approximately, One quarter of screens were elevated (6.7% mild, 19.2% moderate to severe) Over one year: 40% screened in mild range received f/u care.	**Level of Evidence:** LOE V **Strengths:** Large sample Validated tools **Limitations:** Screens at 16 year well child **Conclusions:** Adol depression screening feasible across diverse PC sites. Most patients with elevated scores were not already receiving behavioral health services, suggesting screening identified previously undetected concerns. Gaps in follow-up care demonstrate the need for greater investment in primary care–based behavioral health services to support high-quality treatment and ultimately decrease the burden of adolescent depression.

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Valleley et al. (2020) Demonstrating the Impact of Colocated Behavioral Health in Pediatric Primary Care. **Country** Canada **Funding** NS **Bias** NS	colocated model	**Design:** retrospective review Method Patient Chart review **Purpose:** To provide demonstration data for colocated BH services within the pediatric medical home	**Sample:** N = 694 (new patients) **Demographics:** M age: 9.2yrs. **Setting:** Michigan, Nebraska, and Pennsylvania participated in this study. One urban, three suburban, and five rural clinics comprised the sample.	IV: PC DV1: Level 4–Close Collaboration with Some System Integration collocated care	Site Self-Assessment Evaluation Tool (SSAES): 18 items rated on a 10-point Likert scale and measures BH provider at each site completed the SSAET CGI-I 7-point Likert Clinicians collected at the beginning of each session parent and/or patient CGI ratings (CBCL-PRF) Parents completed the CBCL Chart review	IBM SPSS Version 22 software Although multiple tests were evaluated, as an exploratory analysis, a conventional alpha level of .05 was used to indicate statistical Significance.	Across all sites, 85% of referred patients attended their first appointment, and 84% of Patients showed improvement over a 6-month period.	**LOE:** Level V **Strengths:** Large sample size, well designed, validated testing tools. **Limitations:** Access to services cannot be fully addressed with this data. Data were not available for the number of patients that were referred but failed to schedule an initial appointment. Demographics not available re: race/ethnicity **Conclusion:** first to provide outcome data demonstrating the effectiveness of the colocated model for delivering BH services in primary care. Data provide information on the relationship between patient outcomes and adherence to recommendations delivered during colocated BH treatment. High attendance rates at initial appointment and overall improvement ratings were observed, suggesting the colocated BH model is a feasible model to improve access and outcomes in pediatric BH services

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Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
Chowdhury & Champion (2020) **Country** US **Funding** **Bias**	Donabedian model Plan-Do-Study-Act (PDSA)	**Design:** Retrospective chart review **Purpose** Assess outcomes of depression screening among adolescents accessing pediatric primary care-based Services. Findings will contribute to development of clinical protocols for depression screening and intervention in primary care settings.	**Sample:** N =600 **Setting:** Pediatric primary care based clinic in the Southwestern United States.	IV1: PC usual care DV1: PHQ-9 screening	Depressive symptoms PHQ-9 : screening BDI-II : baseline, 8/16 week follow up Peer violence CTS-2 :screening, 8/16 week follow up Participant satisfaction CSQ-8: screening Qualitative feedback 8 weeks Self-reporting RedCAP survey	Statistical Package for the Social Sciences (SPSS version 24.0) for descriptive statistical data analyses	82.5% of those with PHQ-9 scores >5 were not currently receiving tx. Referrals by physicians (45.8%) and NPs (42.9%) were equivalent with more referrals for adolescents with moderate-severe depression. NPs provided more counseling than physicians among adolescents with mild to moderate depression.	**LOE:** Level V **Strengths:** Decent sample size, validated screening tool. **Limitations:** limited documentation of the MH referrals and follow up. PHQ-9 assessments were only available for the well adolescent encounters, as the PHQ-9 was not administered at sports physicals or other episodic visits. Conclusions/Feasibility: Adolescent MH necessitates an enhanced continuum of care. PC-based interventions provided by PNPs are imperative to address adolescent MH needs. Findings provide practical means to incorporate protocols for depression PC-based MH access. **Practice implications:** Future study for comparison of methods (phone/text reminder, follow up appointment, online resource reminder, telehealth), indicated to enhance follow-up care for adol experiencing depression.

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Appendix B

Table 2

Synthesis Table

Study	Wright et al.	Bai et al.	Simon et al.	Yang et al.	Harder et al.	Fallucco et al.	Thompson et al.	Farly et al.	Valleley et al.	Chowdhury & Champion
Year	2016	2018	2018	2019	2019	2019	2019	2020	2020	2020
Study Design	RCT	RCT	Review	QI	QI	Review	Review	Review	Review	Review
N	101	187	SA: 24,233 SD: 1240	290	PCP: 39 Patients: 1772	PCPs @ training: 25 Adolescents: 7,108	203	10,713	694	600
Setting	U.S.	U.S	U.S	U.S	U.S	U.S	U.S	U.S	U.S	U.S
Primary care	X	X	X	X	X	X	X	X	X	X
Intervention										
EHR review	X	X	X	X	X	X	X	X	X	X
EHR update							X	X		
Collaborative care	X	X		X			X	X	X	X
Usual care	X	X			X				X	
Length of project period	12 months	12 months	Review: 90 days before the visit, within 1 year before, and within 5 years before.	11 months	7 months	2 years	14 months	2.5 years	6 months	3 months

Study	Wright et al.	Bai et al.	Simon et al.	Yang et al.	Harder et al.	Fallucco et al.	Thompson et al.	Farly et al.	Valleley et al.	Chowdhury & Champion.
Additional education				X	X	X		X		
Parent Education	**X**	X								
F/U interval	6 month 12 month	6 month 12 months		12 months 2.5 years	12 months	12 months		12 months		
Demographics										
AgR	13-17 years	M age: 16.06	M age: 46	Practicing PCPS 5-15yrs	Adolescent	M age: 14.3	12-17	16yo Wellchild visits	1-18 years	12–18 years
m/f	28/73	80/107	F 62%	81/209	Not stated	3675/3433		5390/5323	402/292	49.5%/50.5%
Measurement tools	QALYs Child Depression Rating Scale – revised PHQ-9 SCARED	(CES-D)	PHQ-9 (ninth question) LASSO	Survey	MHPRI scores PHQ-9 screening	PHQ-9	PHQ-9	PHQ-9	PHQ-9	PHQ-9
Outcomes										
improvement	+	+/-	+	+	+	+	+		+	+

AgR- age range, **CES-D-** Center for Epidemiologic Studies Depression Scale **EHR** – electronic health record, **f-** female, **LASSO-** least absolute shrinkage and selection operator, **m-** male, **MHPRI-** Mental Health Practice Readiness Inventory **N-** population sample, **PHQ-9-** patient health questionnaire, **PCP-** primary care provider, **QALYs-** quality adjusted life years**, QI-** quality improvement, **RCT-** randomized control trial, **SA-** suicide attempt, **SCARED** – The screen for child anxiety related disorders**, SD-** suicide death, **U.S.-** United States,
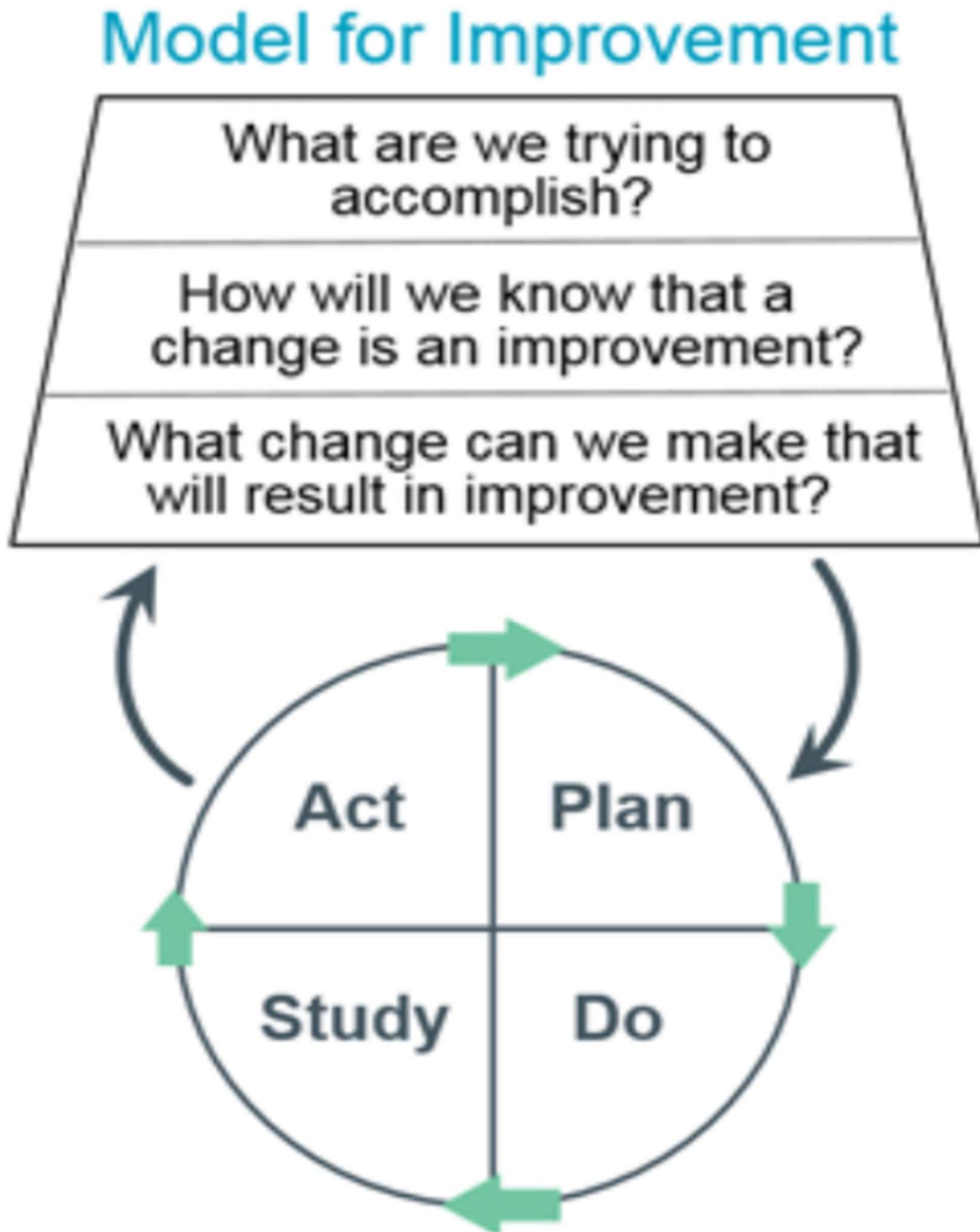
Appendix C

Figure 1

Orlando's Nursing Process Discipline Theory

Appendix D

Figure 2

Model for Improvement

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Appendix E

Table 3

Chart Review elements completed during pre- and post-intervention

Variable	Pre-test	Post-test
PhQ_9_Complete		
Y	43 (91%)	7 (78%)
N	3 (6%)	2 (22%)
Refused screening	1 (2%)	0 (0%)
Education		
Y	47 (100%)	9 (100%)
Medication		
Y	25 (53%)	7 (78%)
N	22 (47%)	2 (22%)
Referral		
N	18 (41%)	7 (78%)
Y	26 (59%)	2 (22%)

Appendix F

Table 4

Two-Tailed Independent Samples t-Test for PHQ_9_Score by Testing Period

Variable	Posttest		Pretest		t	p	d
	M	SD	M	SD			
PHQ_9_Score	13.29	7.72	12.12	7.21	0.39	.696	0.16

Note. N = 49. Degrees of Freedom for the *t*-statistic = 47. *d* represents Cohen's *d*.

Appendix G

Graph 1

Depression Severity
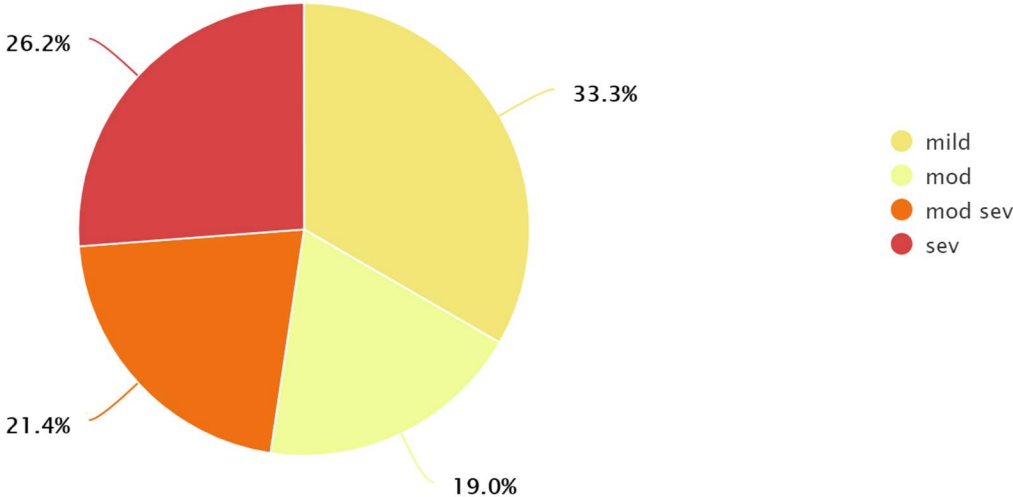
Appendix H

Table 5

Qualitative Survey Results

Pre-test Questions and Responses

Question 14: What are two or three barriers you have had providing care to adolescent patients diagnosed with depression?
- Guidance tool for anticipator guidelines
- Scope of practice regarding medication for depression
- Guidance for follow-up

Question 15: How has the implementation of GLAD-PC recommendations into the EHR benefited your practice?
- Make it easier to document
- Provide guidance for appointments and follow up

Post-test Questions and Responses

Question 14: What are two or three barriers you have had providing care to adolescent patients diagnosed with depression?
- Lack of referral providers is primary barrier
- Lack of mental health services

Question 15: How has the implementation of GLAD-PC recommendations into the EHR benefited your practice?

- It makes charting easier- I don't forget to discuss things during visits.

Appendix I

Table 6

Survey Results

Variable	Pretest N(%)	Posttest N(%)
Your current method of documentation allows you to follow GLAD-PC recommendations?		
3	1 (50%)	0 (0%)
5	1 (50%)	2 (100%)
Your current method of documentation is efficient.		
4	2 (100%)	1 (50%)
5	0 (0%)	1 (50%)
Your current method of documentation is user friendly.		
4	1 (50%)	0 (0%)
5	1 (50%)	2 (100%)
Process changes to the EHR will benefit the clinical management of my patients		
2	0 (0%)	1 (50%)
5	2 (100%)	1 (50%)
In your experience, utilization of case management supports your practice		
0	0 (0%)	1 (50%)
2	1 (50%)	0 (0%)
5	1 (50%)	1 (50%)
My referral process allows me to efficiently contact other agencies.		
2	1 (50%)	1 (50%)
3	1 (50%)	0 (0%)
4	0 (0%)	1 (50%)
Your current documentation allows you to quickly obtain data from recent office visits?		
4	1 (50%)	0 (0%)
5	1 (50%)	2 (100%)
Contacting Case management is easy for you		
1	1 (50%)	0 (0%)
2	0 (0%)	1 (50%)
3	0 (0%)	1 (50%)
4	1 (50%)	0 (0%)
A flowsheet will benefit clinical management of my patients.		
2	0 (0%)	1 (50%)
3	0 (0%)	1 (50%)
5	2 (100%)	0 (0%)

The process to make referrals is straight forward.

2	1 (50%)	0 (0%)
3	1 (50%)	0 (0%)
4	0 (0%)	1 (50%)
5	0 (0%)	1 (50%)

Case management in your practice is well-utilized

1	1 (50%)	1 (50%)
2	1 (50%)	0 (0%)
4	0 (0%)	1 (50%)

My referral process uses closed-loop communication

3	2 (100%)	2 (100)
5	0 (0%)	0 (0%)

The referral process is typically updated within the electronic health record for the duration of acute management of my patients.

2	1 (50%)	0 (0%)
3	0 (0%)	2 (100)
4	1 (50%)	0 (0%)

Key: 0: No answer, 1: *Disagree, 2: Somewhat Disagree, 3: Neither Agree nor Disagree, 4. Somewhat Agree, 5. Agree*

Note. Due to rounding errors, column wise percentages may not equal 100%.