Use of screening tools for depression in adolescents: An evidence-based systematic review

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Identification and treatment of adolescent depression are national health priorities. The estimated prevalence of depression in adolescents is 5.6%, although fewer than one-fourth of these individuals receive treatment. The purpose of this systematic review was to critically evaluate current evidence regarding use of a depression screening tool in the adolescent population. To achieve this goal, the author posed this PICO question: In adolescents aged 12-18 years (P), is the use of a screening tool for depression (I), compared with the usual standard of care (C), more accurate in detecting depression (O)? Results of this literature search, as well as screening recommendations and implications for practice, are presented here.

KEY WORDS: **mental health, depression, depressive disorder, adolescents, teens, screening**

Depression in adolescents is a growing health concern. Signs and symptoms (S/S) of depression in adolescents tend to be overlooked by parents and primary care practitioners (PCPs), including nurse practitioners, and are instead considered a normal part of growing up.[1] However, many adolescents do have clinical depression that is identifiable and treatable.[1] Some adolescents are at a greater risk for developing depression than others. Risk factors for depression in this age group are listed in *Table 1*.[2]

Common S/S of depression are listed in *Table 2*.[3] Adolescents may be particularly prone to experiencing sadness, hopelessness, poor sleep, decreased appetite or concentration, loss of pleasure in activities, irritability, anger, and social withdrawal.[4] In addition, adolescents with depression are at an increased risk for suicide.[1] Instead of seeking help from a healthcare practitioner, many adolescents with depression self-medicate by using alcohol or drugs and/or by participating in high-risk sexual behavior.[5]

The estimated prevalence of a major depressive disorder (MDD) in adolescents aged 13-18 is 5.6%,[6] with MDD being slightly more common in girls than in

Table 1. Risk factors for depression in adolescents[2]

- Acute or chronic health condition
- Difficulties with friends
- Family history of depression
- Low self-esteem
- Perceived lack of family or peer support
- Personal history of verbal, physical, or sexual abuse
- Recent increase in life stressors
- Recent trauma, including loss of a loved one
- Romantic difficulties or recent breakup
- Substance use/abuse

boys (5.9% vs 4.6%). The rate is higher in members of minorities.[7] Despite increased awareness about depression in teens, this mental disorder continues to go unrecognized and untreated.[7,8] About 75% of adolescents in the United States are seen routinely in a primary care setting, but only 16%-38% of PCPs correctly identify the presence of a mental health condition.[4]

The United States Preventive Services Task Force (USPSTF) recommends routine screening for depression in 12- to 18-year-olds in the primary care setting when appropriate mental health services, including confirmation of diagnosis, psychotherapy, and follow-up, are available.[6,9] The recommendation statement also includes depression screening for any child or teen with one or more of these four risk factors: parental depression, a co-morbid mental health condition, a chronic health problem, or recent experience of a negative life event.

The study

The purpose of this systematic review was to critically evaluate current evidence regarding use of depression screening tools in the adolescent population. The search focused on use of the Center for Epidemiological Studies Depression Scale for Children (CES-DC)[10] and the second revised Beck Depression Inventory (BDI-II).[11] Because of the paucity of such studies conducted in the primary care setting, the author included studies done in an emergency department (ED) or a school.

> The USPSTF recommends routine screening for depression in 12- to 18-year-olds in the primary care setting.

Method—

Formulating a PICO question. This PICO (P, Population; I, Intervention; C, Comparison; and O, Outcome) question was written to guide the search: In adolescents aged 12-18 years (P), is use of a screening tool for depression (I), compared with the usual standard of care (C), more accurate in detecting depression (O)? The author's goal in posing this PICO question was to determine whether enough evidence exists to support screening adolescents for depression using an appropriate screening tool. This PICO question itself facilitated the search strategy and guided the selection of key words.

Search strategy. The author searched multiple databases, including Medline, Cochrane Library, CINAHL, Eric, PsycINFO, Google Scholar, and the Agency for Healthcare Research and Quality. Key words were *mental health, depression, depressive disorder, adolescents, teens, screening, CES-DC,* and *Beck* or *BDI-II*. The author examined published and unpublished works and performed a complete hand search of reference lists of the systematic reviews and other relevant articles from 2005 to 2010. All articles examining use of a screening tool specific for depression in the adolescent population were included, regardless of whether the setting was a primary care practice, an ED, or a school. Thirteen studies met inclusion criteria. A 1999 study was added because it was one of the few conducted in a primary care setting.

Results—

The search revealed two systematic reviews on adolescent depression screening,[6,12] but no randomized controlled trials (RCTs). Five descriptive studies using the CES-DC or BDI-II were

identified.[13-17] Zuckerbrot et al[18] also published guidelines delineating identification, assessment, and initial management of depression in adolescents. Six studies using the designated screening tools had cross-sectional, predictive, or correlational designs.[5,19-23] *Table 3* lists the results and recommendations of these studies.[5,6,12-17,19-23]

Systematic reviews. The most robust systematic review was conducted by Williams et al[6] for the USPSTF. The search did not yield any data on health outcomes among screened versus unscreened populations or any studies examining the harms of screening. Although the literature was limited with regard to the use and accuracy of screening tools, several tools, including the Patient Health Questionnaire for Adolescents (PHQ-A),[24] the Beck Depression Inventory for Primary Care (BDI-PC),[25] and the CES-DC,[10] all performed well.

In their systematic review, Zuckerbrot and Jensen[12] aimed to determine existing evidence for the various methods used to identify adolescent depression in primary care and the identification practices that were in use at the time. The investigators concluded that self-report screening tools were available and that these tools had adequate psychometric properties and feasibility for use in primary care. They discussed two important findings: (1) self-report screening tools were more accurate than physician interviews in identifying depression; and (2) PCPs who relied on patients' presenting chief complaints to detect depression would miss many teens with depression or depressive symptoms. In addition, they found that, with regard to the usual standard of care, physicians who received additional training improved their ability to detect depression, but not to the same level as that achieved with self-report tools. Although the HEADDSS (home, education, activities, drugs, depression, safety, and sexuality) assessment[26] is widely used in adolescent health care, Zuckerbrot and Jensen[12] did not find any studies examining its effectiveness in detecting depression. In addition, they found no studies that combined three essential elements: a screening component, an intervention, and an assessment of patient outcomes at follow-up.

Table 2. Common signs and symptoms of depression[3]

- Anger
- Crying
- Fatigue or loss of energy
- Frequent headaches or stomachaches
- Insomnia or increased sleep
- Irritability
- Loss of interest in usual activities
- Poor concentration
- Recurring suicidal thoughts
- Restlessness
- Sadness
- Weight loss or weight gain

Overall findings showed that sex and drug behaviors predicted a higher likelihood of depressive S/S, especially among girls, but that depression did not predict high-risk behavior.

Randomized controlled trials. No RCTs examining the screening process for MDD in adolescents were identified in the search. Hallfors et al[5] used data from the National Longitudinal Study of Adolescent Health to determine whether gender-specific patterns of substance use and sexual behavior predicted depression or vice versa. They used the CES-DC to assess for depression. Overall findings showed that sex and drug behaviors predicted a higher likelihood of depressive S/S, especially among girls, but that

Table 3. Study results and recommendations[5,6,12-17,19-23]

Study and design	Major results and recommendations
Hallfors et al, 2005[5]: Predictive study using National Longitudinal Study of Adolescent Health	–Girls who participated in high-risk behaviors (substance abuse, sexual experimentation, or drinking alcohol) were 2-3 times more likely than girls who did not participate in these behaviors to be depressed 1 year later.
Williams et al, 2009[6]: Systematic review	–Found prevalence rates of depression in adolescents of 6%. –In two primary care studies, PHQ-A sensitivity was 73% and BDI-PC sensitivity was 91%. The CES-DC was not examined. –No studies examined the harms of screening.
Zuckerbrot & Jensen, 2006[12]: Systematic review	–Found prevalence rates of depression in adolescents of 11%. –BDI and PHQ-A were both tested for sensitivity and specificity. Both tools are reliable for use in practice. –Self-report screening tools better identified depression than did physician interviews.
Lazaratou et al, 2010[13]: Exploratory, descriptive	–No significant difference was found on total mean scores using the CES-DC in two different high schools; however, females had significantly higher mean scores than did males.
Rhee 2005[14]: Descriptive; cross-sectional analysis	–A cross-sectional analysis of 10 commonly reported symptoms, socioeconomic status, and depression scores was performed on a large sample of high school students. –HA was the most common complaint among whites (32%); American Indians had > complaints of MS pain (35%), feeling hot (14%), and chest pain (10%). Blacks reported more urinary S/S (4%). –HA and MS pain were consistently found to maintain strong significance in whites, regardless of family income or depressive S/S. –Depression scores were higher in black youths than in whites.
Robles-Pina et al, 2008[15]: Descriptive	Question 1: Hispanic females had higher prevalence rates of depression than did Hispanic males. Prevalence rates in this study were higher than national averages (26%-28%). Question 2: Hispanic students held back a grade in school who also had lower self-concept and a lower GPA had higher rates of depression than did students never held back.

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depression did not predict high-risk behavior.

Descriptive studies. Scott et al[21] used the BDI-II to ascertain the prevalence of depressive S/S in 351 adolescents presenting to an ED in the Midwest. Significant differences were noted among certain groups of patients: Trauma patients were more likely to refuse screening; patients presenting with a psychiatric diagnosis were more likely to be hospitalized; and patients with a previous history of a mental illness reported significantly more depressive S/S. Rutman et al[22] compared the CES-DC with a two-question screening tool in 121 adolescents presenting to an ED, and found that 37% had a positive screen on the CES-DC, with 21% being positive for suicidality, and 40% were positive on the two-question screen. Consistent with other reports, these researchers found higher rates of depressive symptoms in girls.

Lazaratou et al[13] aimed to clarify the prevalence of depressive S/S in high school students in Athens, Greece, and to evaluate risk factors for these S/S using the CES-DC. A total of 713 students aged 15-18 years were enrolled. Depressive S/S were found to be linked to gender (girls had higher scores than boys), school record (students with better records had lower scores), and the interaction of gender and grade (males had higher scores as they grew older).

Using a school-based sample of more than 20,000 adolescents in grades 7-12, Rhee[14] examined the race-specific prevalence of 10 physical symptoms (headache, stomachache, musculoskeletal pain, fatigue, sore

throat, dizziness, feeling hot, chest pain, painful urination, cold sweat) in adolescents and the extent to which socioeconomic status and depressive S/S explained racial differences in those symptoms using the CES-DC screening tool. Headache was the most common complaint in white students (32%). American Indians had greater complaints of musculoskeletal pain (35%), feeling hot (14%), and chest pain (10%), and blacks reported more urinary symptoms (4%). Differences between whites and blacks were significant for family income and depression. Overall depression scores were higher in blacks than in whites.

Robles-Pina et al[15] examined students held back one grade during the elementary school years (early school retention) as a predictor of depression in 191 Hispanic urban teens. No significant differences were found between males and females in self-concept, rate of retention, past feelings of sadness, or grade-point average (GPA). Females had higher mean scores on the CES-DC than did males, with the gender difference showing a low effect size. Thirty-six percent of Hispanic adolescents had CES-DC scores indicating moderate to severe depression. Adolescents retained in school had lower self-concept, greater past feelings of depression, a lower GPA, and higher rates of depression than did non-retained adolescents. All results were significant. The highest predictor of depression was lower self-concept.

Chisolm et al[16] used the CES-DC and the PHQ-A single-question tool for detecting adolescent depression, and observed

Table 3. (continued)

Study and design	Major results and recommendations
Chisholm et al, 2009[16]: Descriptive	–Prevalence rates for depression were 24% in this study, with 14% having suicidal thinking. –Only 16% of depressed youths screened in this study sought behavioral health services in the next 180 days.
Zuckerbrot et al, 2007[17]: Descriptive	–Low refusal rate for screening. Parents and patients were satisfied with screening process, relationship with provider, and time involved in screening (mean screening time, 4.6 min). –Burden to the provider was low, and at a 6-month follow-up, providers were "somewhat more comfortable" addressing adolescent depression and suicidal thoughts and more willing to maintain medications.
Perreira et al, 2005[19]: Correlational	–Statistics performed on the CES-DC were consistent with other studies and samples. The CES-DC appeared highly reliable within each of the 12 ethnogroups. –Full CES-DC predicted suicidal ideation better than did the five-item tool.
Phillips et al, 2006[20]: Multivariate correlational study	–The recommendation from this factor analysis was to remove the single item and readjust the CES-DC total cutoff score from 16 to 15.
Scott et al, 2006[21]: Cross-sectional survey with blinded chart review	–BDI-II mean scores were significantly different among psychiatry patients, medical patients, and trauma patients (P <.001). –Psychiatry patients' admission rates (44%) were significantly higher than those of patients with trauma (2%) or medical complaints (12%) (P <.001).
Rutman et al, 2008[22]: Cross-sectional study	–Compared 1- and 2-question screening tools with the CES-DC. Validated use of a 2-question screening tool as a rapid assessment of depression in a busy setting.
Winter et al, 1999[23]: Correlational	–Examined psychometric properties and effectiveness of the BDI-PC; useful and reliable tool for screening adolescents, with sensitivity and specificity of 91%.

AA, African American; BDI, Beck Depression Inventory; BDI-PC, Beck Depression Inventory-Primary Care; CES-DC, Center for Epidemiological Studies Depression Scale for Children; Dx, diagnosis; ED, emergency department; GPA, grade-point average; HA, headache; MS, musculoskeletal; PHQ-A, Patient Health Questionnaire for Adolescents; S/S, signs and symptoms.

Helpful resources

- USPSTF Screening Recommendations for MDD in Children and Adolescents
- AAP Task Force Statement on Mental Health
- NAPNAP Position Statement
- NIMH Information about Depression in Children and Adolescents
- Mayo Clinic Information about Teen Depression
- Bright Futures Link to the CES-DC Screening Tool
- GLAD-PC

AAP, American Academy of Pediatrics; GLAD-PC, Guidelines for Adolescent Depression - Primary Care; MDD; major depressive disorder; NAPNAP; National Association of Pediatric Nurse Practitioners; NIMH, National Institute of Mental Health; USPSTF, United States Preventive Services Task Force.

the use of mental health services following screening. In this population (N = 996), 24% screened positive for depression and 14% screened positive for suicidal thoughts. Only 16% of adolescents who screened positive for depression accessed mental healthcare services within the next 180 days (P <.01). However, adolescents who acknowledged having suicidal thoughts were 8 times more likely than those who screened negative for suicidal ideation to use behavioral health services. Overall findings showed that adolescents who were screened were more likely to seek physical or mental health services. One plausible explanation of this finding was that the screening process opened lines of communication between patients and practitioners.

Zuckerbrot et al[17] conducted the first and only study examining the feasibility and acceptability of screening for adolescent depression in primary care. Average time for completion of a pencil-and-paper screening tool was 4.6 minutes; the refusal rate for screening was low. Practitioners and parents reported greater satisfaction than dissatisfaction with the screening process. The time burden was not significant.

Winter et al[23] performed one of the few studies assessing screening for adolescent depression in the primary care setting using one of the most reliable screening tools, the BDI-PC. This report focused primarily on the BDI-PC's psychometric properties. Although the sample size was small (50 females and 50 males), recruitment of subjects was halted because the effect size was so large. Eighty-nine adolescents screened negative and 11 screened positive for MDD. The mean BDI-PC score of the 11 adolescents with positive screens was about 9 times higher than that of the 89 negatively screened teens.

Discussion—

Strengths and limitations of the evidence. Research on adolescent depression has increased over the past 10 years, but few studies have evaluated the screening process in primary care or the use of specific screening tools. The two systematic reviews discussed previously contain the strongest evidence available (Level 1), according to the Rating System for Levels of Evidence.[27] However, most of the research is Level VI—evidence from descriptive studies. Each study was also evaluated using the John Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal, with the quality of the scientific evidence ranking as high, good, or low with major flaws.[27] Studies included in this review were deemed of good quality.

Studies varied in terms of validity, reliability, and applicability. Most were not conducted in a primary care setting. All but one was conducted in the U.S., which increases generalizability of the results. Despite their limitations, all the studies helped answer the PICO question and helped provide evidence for practice guidelines for screening for adolescent depression by PCPs. Guidelines set forth in the USPSTF are supported by the National Institute of Mental Health (NIMH),[1,28] the American Academy of Pediatrics (AAP),[29] and the National Association of Pediatric Nurse Practitioners (NAPNAP).[3]

A critical examination of available research studies regarding screening processes for adolescent depression reveals several gaps. Few RCTs investigated the screening process in primary care settings, and only one study as-

sessed the feasibility of screening.[17] No studies examined all three critical elements—screening, treatment, and outcomes.

Two screening tools for primary care use. The BDI-II is a widely accepted instrument for outpatient screening, performs consistently, and is linked to *Diagnostic and Statistical Manual, Fourth Edition-Text Revision (DSM-IV-TR)* criteria.[30] However, several disadvantages hamper its use in the primary care setting. Use of the tool incurs a fee, and practitioners must have additional training to use it. The BDI-II has high item difficulty and may require additional assistance in completing it. It appears more appropriate for use in intervention studies examining various treatment options in adolescent depression. The BDI-PC, by contrast, is a self-report instrument designed for primary care use in patients aged 13 years or older.

The CES-DC has not been used consistently in studies reported before 2005. This tool has gained greater popularity and been used more frequently in research studies in the past few years. The CES-DC has been criticized for not being linked to *DSM-IV-TR* criteria.[13,29] On the plus side, this tool is readily available free of charge and does not require additional training for use. The CES-DC's reliability, validity, mean scores, and case rates of adolescent depression remain consistent across the literature. Therefore, the CES-DC is considered appropriate for use in screening adolescents for depression in the primary care setting.

Recommendations for practice

The USPSTF, in conjunction with the NIMH, has increased awareness of the need for screening for depression in adolescents and has made practitioners more aware of the prevalence of this mental illness in this population.[1,9] The AAP and NAPNAP have launched special tool kits and fellowship programs promoting screening for mental health problems in primary care.[3,29] Zuckerbrot et al[17] found that screening for depression in a primary care setting is quick, feasible, effective, and well accepted by patients and practitioners. Recommendations for practice include instituting a universal screening program for depression in adolescents aged 12-18 years when mental health services are available to aid in accuracy of the diagnosis, initiation of treatment, and follow-up.[9]

The CES-DC is free of charge and easy to use, and has adequate reliability and validity for use in primary care settings.

Primary care practices with available mental health support should begin screening adolescents annually for MDD at well- or acute-care visits. The CES-DC is free of charge and easy to use, and has adequate reliability and validity for use in primary care settings. Screening tools can be completed while patients are waiting to see their PCP. Partnering with a mental health practitioner to facilitate transitioning of adolescents from primary care depression screening to engagement in more in-depth psychiatry evaluation and treatment could enhance the clinical utility of this screening endeavor.

Conclusion

Early identification of depression in adolescents is a national health priority. PCPs, including primary care NPs, must learn to recognize the subtle S/S of this often-silent epidemic because most patients with undiagnosed depression present to their PCP first.[8] PCPs must be aware of the common S/S of depression and how these S/S vary in different age groups. Many parents dismiss these S/S as a normal part of growing up. PCPs must be aware of current recommendations for screening, as outlined in the USPSTF 2009 statement.

More research is needed regarding screening for depression in primary care settings. In particular, studies examining the feasibility of screening, identifying efficient procedures for completing the screening and referral processes, and further testing of screening tools would be beneficial. PCPs will then be able to translate these research findings into practice.

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