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Suicide Screening in Primary Care: Use of an Electronic Screener to Assess Suicidality and Improve Provider Follow-Up for Adolescents

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A B S T R A C T

Purpose: The purpose of this study was to assess the feasibility of using an existing computer decision support system to screen adolescent patients for suicidality and provide follow-up guidance to clinicians in a primary care setting. Predictors of patient endorsement of suicidality and provider documentation of follow-up were examined.

Methods: A prospective cohort study was conducted to examine the implementation of a CDSS that screened adolescent patients for suicidality and provided follow-up recommendations to providers. The intervention was implemented for patients aged 12–20 years in two primary care clinics in Indianapolis, Indiana.

Results: The sample included 2,134 adolescent patients (51% female; 60% black; mean age = 14.6 years [standard deviation = 2.1]). Just over 6% of patients screened positive for suicidality. A positive endorsement of suicidality was more common among patients who were female, depressed, and seen by an adolescent–medicine board-certified provider as opposed to general pediatric provider. Providers documented follow-up action for 83% of patients who screened positive for suicidality. Documentation of follow-up action was correlated with clinic site and Hispanic race. The majority of patients who endorsed suicidality (71%) were deemed not actively suicidal after assessment by their provider.

Conclusions: Incorporating adolescent suicide screening and provider follow-up guidance into an existing computer decision support system in primary care is feasible and well utilized by providers. Female gender and depressive symptoms are consistently associated with suicidality among adolescents, although not all suicidal adolescents are depressed. Universal use of a multi-item suicide screener that assesses recency might more effectively identify suicidal adolescents.

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IMPLICATIONS AND CONTRIBUTION

Computer decision support systems can be used effectively in primary care to screen adolescents for suicidality and provide follow-up recommendations for providers. Female gender, younger age, and depressive symptoms were associated with lifetime suicidality among adolescents, although not all suicidal adolescents reported depressive symptoms.

Conflicts of Interest: The authors have no conflicts to disclose.

Clinical Trials Registry: NCT02244138

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Suicide is the second leading cause of death among adolescents aged 10 to 19, with over 2,200 suicide-related deaths recorded in that age group in 2014 [1]. Moreover, the rate of adolescent suicide shows no signs of decreasing. From 2007 to 2015, the suicide rate among males aged 15 to 19 increased 31%, and among females, it doubled, reaching the highest rate recorded

for the period 1975–2015 [2]. In 2015, about 9% of high school students (grades 9–12) reported attempting suicide and about 3% reported having made an attempt that required medical intervention [3]. Other suicide-related behaviors such as suicidal ideation and making a plan to commit suicide are also increasingly prevalent among US adolescents. In 2015, over 17% of high school students reported having seriously considered attempting suicide and over 14% reported having made a plan to commit suicide [3].

Most adolescents visit a primary care provider at least once a year [4]. Although some adolescents are not engaged in primary care [5], the primary care visit represents an opportunity to conduct suicide screening and intervention for those who are. However, most primary care providers do not screen adolescents for suicide risk, perhaps because of suicide being a low base rate event [6,7], a lack of formal psychiatric training, and/or a general unacceptability of screening adolescent patients for suicide risk [6]. Regardless of the reason, as many as 83% of adolescent suicide attempters are not identified as such by their primary care providers [6]. One method of increasing rates of suicide risk screening among adolescents is to standardize the screening process. Interventions that introduce standardized suicide risk screening questions into already-existing electronic medical record questionnaires have demonstrated feasibility [8] and achieved increased rates of screening for, detection of, and referral for suicidality [9] among adolescent patient populations. Although several studies have examined the feasibility of suicide screening in primary care, none has examined how electronic suicide risk screening can also be used to inform specific provider follow-up actions.

Despite evidence that increased screening practices lead to increased rates of detection and treatment, recommendations for adolescent suicide screening in primary care are inconsistent. The American Academy of Pediatrics and the American Medical Association recommend annual suicide screening for adolescents in primary care [10–13]. The US Preventative Services Task Force, however, concluded that there is insufficient evidence to recommend universal screening for suicide risk among asymptomatic adolescents and adults [14]. The present study assesses the use of a computerized clinical decision support system (CDSS) to screen adolescents for suicide risk, deliver follow-up recommendations to the provider, and document actual provider follow-up actions in a primary care setting.

Methods

CHICA system overview

The Child Health Improvement through Computer Automation (CHICA) system is a CDSS that integrates electronic medical record (EMR) system data, previsit screening data, and correlative provider responses from previous visits to generate appropriate follow-up recommendations, tools, and provider prompts. When a patient checks into a clinic, the CHICA system automatically generates a previsit screener form (PSF) based on information in the patient's EMR including age, developmental stage, current and previous medical conditions, and known risk factors for morbidity. The PSF is administered on an electronic tablet and is completed before the provider encounter. It consists of two parts: (1) a form for the nurse to record vitals, height, and weight; and (2) a 20-item patient questionnaire on a variety

of health-related topics such as diet, depression, sexual behaviors, and substance use.

A provider worksheet (PWS) is generated based on patient responses to PSF items. Partially completed PSFs still generate a PWS. The PWS is printed and given to the provider for consultation during the encounter. It consists of six prompts, each identifying a health need based on patient responses to the PSF questionnaire or information in the EMR. The prompts are prioritized by the CHICA system based on national clinical guidelines and a decision analytic algorithm [15]. Each prompt consists of an explanation of the health need followed by corresponding action items, each with a checkbox, that allow the provider to document data, procedures, prescriptions, referrals, and other actions that might take place during the encounter. Figure 1 shows the provider prompt that is generated when a patient endorses suicidality. Providers may select more than one follow-up option for the suicide prompt; in fact, the first action ("high risk for suicide") is followed by an arrow to indicate that an additional follow-up action is warranted.

When a provider responds to worksheet prompts, the form is scanned and uploaded by clinic staff after the patient encounter. The CHICA system analyzes provider responses using optimal mark and character recognition to detect which action items were taken by the provider and then records the appropriate actions in a database. Together, the PSF and PWS provide screening and correlative follow-up options for providers. More detailed information about CHICA including rule processing, development of Arden rules, data storage, and implementation can be found in previous publications [16–19].

Study design and screening process

Adolescents aged 12–20 who presented to their pediatric primary care clinic for an annual (nonsick) or sick visit were selected to participate in the controlled trial. The suicide screening tool was implemented in two primary care federally qualified health center clinics that utilize CHICA and are part of an urban, Midwest county hospital system (Eskenazi Health). Providers were primarily trained in pediatrics, family medicine, and combined internal medicine and pediatrics, with some having completed subspecialty fellowship training in adolescent medicine. Many clinic visits occurred during adolescent-specific clinic times. Institutional review board approval was received from the local university.

Study variables

Suicide risk was assessed on the PSF using a single question based on American Academy of Pediatrics (AAP) and American Medical Association recommendations [10,11,13]: "Have you ever seriously thought about killing yourself, made a plan, or actually tried to kill yourself?" In addition to suicide risk, depression was also assessed as part of the PSF using the Patient Health Questionnaire-2 (PHQ-2) [20] as an initial screen. This instrument consists of two questions assessing anhedonia and depressed mood over the past 2 weeks. If the adolescent responded "yes" to one or both questions in the PHQ-2, the Patient Health Questionnaire-9 (PHQ-9), a longer nine-item screening tool for depression [21], was automatically administered. The PHQ-2 and PHQ-9 have sensitivities of 74% and 96% and specificities of 75% and 82%, respectively [20,21].

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