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Suicide screening in schools, primary care and emergency departments

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Abstract

Purpose of review—Every year, suicide claims the lives of tens of thousands of young people worldwide. Despite its high prevalence and known risk factors, suicidality is often undetected. Early identification of suicide risk may be an important method of mitigating this public health crisis. Screening youth for suicide may be a critical step in suicide prevention. This paper reviews suicide screening in three different settings: schools, primary care clinics and emergency departments (EDs).

Recent findings—Unrecognized and thus untreated suicidality leads to substantial morbidity and mortality. With the onus of detection falling on nonmental health professionals, brief screening tools can be used to initiate more in-depth evaluations. Nonetheless, there are serious complexities and implications of screening all children and adolescents for suicide. Recent studies show that managing positive screens is a monumental challenge, including the problem of false positives and the burden subsequently posed on systems of care. Furthermore, nearly 60% of youth in need of mental health services do not receive the care they need, even after suicide attempt. Schools, primary care clinics and EDs are logical settings where screening that leads to intervention can be initiated.

Summary—Valid, brief and easy-to-administer screening tools can be utilized to detect risk of suicide in children and adolescents. Targeted suicide screening in schools, and universal suicide screening in primary care clinics and EDs may be the most effective way to recognize and prevent self-harm. These settings must be equipped to manage youth who screen positive with effective and timely interventions. Most importantly, the impact of suicide screening in various settings needs to be further assessed.

Keywords

emergency department; pediatric; primary care; schools; screening; suicide

Introduction

Every year, suicide claims the lives of tens of thousands of young people worldwide. In the United States alone, over 1 million children and adolescents attempt suicide; an even greater number of youth are preoccupied with suicidal thoughts [1,2,3*]. Despite its high prevalence and known risk factors, suicidal behavior in many children and adolescents is often undetected by parents, teachers and healthcare providers.

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Most primary care clinicians (PCCs) and emergency department (ED) clinicians do not routinely screen for suicide risk [4–7]. Studies have revealed that as many as 83% of suicide attempters are not identified as a danger to themselves by healthcare providers, even when examined by PCCs in the months before their attempt [6,7]. Moreover, evidence exists that few attempters receive care, even after a suicide attempt [3*].

Unrecognized, and therefore untreated, mental health problems in children and adolescents can lead to school dysfunction, troubled familial and peer relationships, adult psychopathology and an overall poorer quality of life [2,8]. Early identification of mental health problems such as depression followed by symptom relief is a key component to prevention and treatment of suicidal behavior [2,9**,10]. Using validated instruments, screening youth at risk for suicidality can be an effective way of detecting and managing suicide risk.

With suicide prevention as a national priority [1,11–14,15•], early intervention programs, such as suicide screening, are gradually being integrated into schools, primary care clinics and EDs. This review will focus on screening in these three settings. Screening tool studies from 2007 through 2009 will be discussed. Reviews of suicide-screening tools developed before 2007 are published elsewhere [16,17]. For the purpose of this review, the term ‘suicidality’ will be defined as any type of thought or action related to taking one's own life, ranging from passive thoughts of killing oneself to actual lethal attempts.

Fundamentals of screening

Initiating screening of any disease or condition is appropriate and recommended if the condition causes significant morbidity or mortality, can be effectively treated, prevalence is not too rare and earlier detection is critical [18]. Suicide risk meets these conditions, assuming effective treatments exist for depression, which is thought to be present in 50–79% of youth suicide attempts [10,19,20,21*]. Effective screening instruments are brief, easy to administer and must have proven and acceptable sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV). Ultimately, the goal of screening is to identify those who have the condition of interest (true positives) from those who do not have the condition (true negatives). Sensitivity is a measure of the instrument's ability to correctly identify the true positives (e.g. at risk for suicidality). Specificity is the tool's ability to identify the people who do not have the condition (e.g. not currently at risk for suicidality). PPV is the probability that the person who screened positive truly had the condition. NPV is the probability that the person who screened negative did not have the condition. These are critical measures that should inform screening tool selection [16,18].

False positives

Inevitably, screening for a condition or disorder results in false positives (people who screen positive but do not actually have the condition) and false negatives (people who are thought to be without the condition, but actually have it). When implementing a screening program, these outcomes must be considered. In the case of suicide risk, it is prudent to ‘cast a wider net’; meaning that the instrument will result in some false positives, in the service of detecting all true cases. Sensitivity in suicide screening is, therefore, more important than specificity. If an error is to be made, falsely labeling someone as positive is of less consequence than falsely labeling someone as ‘negative’. Although the effects of false positive screens can and should be minimized for patients, the effects on the system-of-care can be great and costly and should not be underestimated. For example, valuable mental health resources can be overtaxed by false positives, leaving patients at true risk without available care. This is precisely why screening is only the initial step in a longer process of evaluation [16,18]. A screening test alone is not diagnostic of the condition; it is a quick snapshot that requires a more indepth

examination. Just as a positive mammogram must be followed by a biopsy, a positive screening test for suicide risk must be followed by a more careful and thoughtful examination [18].

Universal and targeted screening

Two main approaches to screening are discussed. Universal screening involves administering a test to a population regardless of individual risk factors or symptomatic presentation in order to classify individuals as likely or not likely having a particular condition or disorder (e.g. screening all pregnant women for group B streptococcus; screening the entire senior class of a high school for suicide). The other approach is targeted screening, in which the test is applied only to individuals manifesting particular symptoms or risk factors (e.g. screening patients with hypertension for diabetes; screening people with substance abuse for suicide risk).

Suicide and depression

The focus of this review is screening for suicide risk; nevertheless, the discussion would be remiss without the mention of depression. Although these terms are not interchangeable, and more than 20% of suicidal behavior occurs in people without a diagnosable depression [10, 19,20,21*], the two conditions are, most often, inextricably related. However, although a screening tool for depression or other mood disorders would be lax without screening for suicidality, the opposite does not apply. One can have a brief screen for suicide that does not assess for depression, depending on the goal of the screening. In addition, 'mental health screening' is also not synonymous with suicide screening. Studies that focus on mental health screening will be discussed only if they had a significant suicide-screening component.

Screening in schools

With so many children and adolescents at risk for suicidality, the school system is a logical venue to detect youth at risk. School suicide prevention efforts have focused on service trainings, suicide awareness curricula and suicide-screening efforts [22–25]; yet, less than 10% of American schools offer mental health services [26]. The following research highlights the differences and challenges between universal screening of all students and screening selected at-risk populations.

Columbia Suicide Screen

The leading screening tool used in school settings is the Columbia Suicide Screen (CSS), an 11-item self-report measure embedded in a general health questionnaire that investigates lifetime suicide attempts, suicidal ideation, negative mood and substance abuse issues [27]. As part of the Columbia University TeenScreen program, this widely used tool was validated using the National Institute of Mental Health Diagnostic Interview Schedule for Children, IV (NIMH DISC-IV) [28] with a sensitivity of 0.75, a specificity of 0.83, a PPV of 0.16 and an NPV of 0.99 [27]. Recently, the CSS has demonstrated a lower rate of false positives as well as a higher sensitivity when compared with referrals by school professionals in identifying students at risk for suicide; however, it is important to note that teachers, who may be more sensitive to identifying problems in students, were not included in this study [29*].

Overall, research using the CSS suggests that screening can identify suicide risk in children whose thoughts and behaviors may have gone otherwise undetected [29*,30]. Nevertheless, research from the CSS highlights the difficulties of universal suicide screening. As an advantage, the NPV of the screen is high, meaning that most of the adolescents who screen negative are not at risk for suicide; however, as a disadvantage, the PPV is low (16%) [27]. For example, close to 30% of the students taking the test will screen positive yet only 16% will be true positives. That leaves a great number of falsely identified cases. Consequently, schools implementing this program will have a high rate of false positives, which may impose a large

burden on limited mental health resources. Schools utilizing universal screening programs should be prepared for the potential influx of mental health referrals and requests for resources.

Suicide Risk Screen

Hallfors *et al.* [31] further highlight the burden of universal screening in settings not equipped to manage positive screens. Using the Suicide Risk Screen (SRS), a 20-item tool validated on 'at-risk' students [32] (87–100% sensitivity and 54–60% specificity), in a 'real-world' high school setting, 29% of the screened students were deemed at risk for suicide [31]. The staff responsible for following up on the positive results became overwhelmed with the numbers of referrals; 31% of positive screens did not receive follow-up interviews and follow-up was never conducted within the proposed 1-week timeframe. These results point to the paramount importance of having resources available for appropriate follow-up of positive screens. In addition, staff considerations, such as training, level of enthusiasm, turnover and budgeting need to be considered prior to screening efforts. As for consistency of findings, similar rates of suicide risk were detected utilizing the SRS in South African schools [33].

DISC-IV

Nemeroff *et al.* [34*] trained mental health professionals to administer the Voice DISC-IV, in middle and high schools ($n = 23$). Of the 530 administered DISCs, 72% of students were rated as at risk for a mental illness, three-quarters of whom had never been in mental health treatment before. Of those students screening positive on the DISC, 28% endorsed suicide symptoms. Compliance with follow-up was much improved by use of this tool; 82% of parents with a child deemed to be at risk agreed to make a follow-up appointment and 65% of the children who screened positive had an evaluation by a health or mental healthcare professional within 2 weeks. Compared with other studies, the resulting compliance with mental health follow-up was impressive.

Other models of suicide screening

Screening tools are often only one aspect of a larger prevention program, such as the Signs of Suicide program (SOS), which asks the students to self-administer the Columbia Depression Scale (CDS) [25,35] and seek out treatment according to the results. However, how many students seek out treatment after completing the screening is unknown. Other tools are created for school-based health centers, like the Rapid Assessment for Adolescent Preventive Services (RAAPS). Currently, there is no published psychometric data available for further evaluation of this tool [36].

Suicide screening in schools remains somewhat controversial [37]. Weighing the costs of managing false positives with the benefits of capturing youth truly at risk is critical and complex. If a school system is interested in universal screening, there must be a solid, feasible plan to train staff in timely management of positive screens, with timely input from mental health professionals. No outcome data on the impact of suicide screening in schools were found.

Suicide screening in primary care settings

PCCs are often the de-facto principal mental healthcare provider for children and adolescents, including those at risk for suicide. More than 70% of adolescents visit a physician at least once every year [6]. Many adolescents prefer to see their PCC for emotional problems, as there is less stigma and more accessibility, resulting in over half of depressed adolescents being treated by their PCC [38**]. Most adolescent suicide attempters are not recognized as suicidal by their PCC [7] and some have even contacted a medical provider shortly before exhibiting suicidal behavior [39]. Prevention of suicide and other risky behaviors may be best accomplished through routine and systematic screening for suicide risk factors, including alcohol use [40].

Assessment of suicide and suicide attempts in adolescents is an anxiety-provoking area for PCCs, who lack formal psychiatric training. Shain [41**] provides an excellent summary for PCCs on the public health impact of adolescent suicide, specific risk factors, interviewing techniques and the presentations of mood disorders with treatment-specific management options. Academic psychiatry should assist in training PCCs to recognize depression and suicide risk [42].

Screening for depression in primary care

As suicide is closely associated with depression, screening for depression is often a focus of suicide prevention in primary care settings. The US Preventive Services Task Force (USPSTF) [15*] recently recommended that adolescents (12–18 years of age) be screened for major depressive disorder when adequate systems are in place to ensure accurate diagnosis, treatment and follow-up. Zuckerbrot *et al.* [43] found that instituting a universal depression screen in pediatric practices was feasible and acceptable in three primary care practices using the CDS. Guidelines for Adolescent Depression in Primary Care (GLAD-PC) [44] state that systematic assessment with depression-specific questions seems to provide the best identification of depression. Results from the GLAD-PC underscore that the current practice of reliance on adolescent or parental chief complaints and standard physician interview underidentifies adolescent depression [45,46,47*]. Additionally, an identification program in primary care when combined with high-quality depression treatment yields better outcomes than treatment as usual [48]. The USPSTF found insufficient evidence to include a recommendation for screening children ages 7–11 years of age for major depressive disorder; yet, suicidality is more prevalent in this age group than previously suggested [49].

Follow-up and intervention

Identifying youth at risk for suicide in primary care is not without limitations. Sixty percent of children identified by a pediatrician as needing mental health follow-up did not receive it [9**]. Although the majority of PCCs think it is within their purview to screen for mental health problems, in one survey, less than one-third consider it their responsibility to treat, with the exception of ADHD [50*]. Even when psychosocial problems are identified by PCCs, choosing effective treatments remains unclear [51]. Often children are given psychopharmacologic treatment, inadequate counseling and referrals to mental health specialists that are not completed. Interestingly, a recent study by Hacker *et al.* [52] found that a pediatrician's mental health referral was associated with a significant improvement on follow-up scores of the Pediatric Symptom Checklist [53], even when more than three-quarters of the patients did not utilize the mental health services, which may have been due to pediatrician counseling between primary care visits. Continued collaborative efforts between primary and mental health teams are needed to provide comprehensive follow-up to positive screens.

PCCs are well situated to universally screen for suicide, given their longer term relationships with patients. PCCs will need to probe further with patients who screen positive; preferably without their parents in the examination room to better ensure frank discussions. PCCs will need to have intervention plans to follow-up with true positive cases. Although such screening makes intuitive sense, there are no outcome studies proving the effectiveness of screening in this venue. The impact of screening in primary care settings needs further assessment.

Screening in the emergency department

Another promising venue for identifying youth at risk for suicidality is the ED, which is uniquely situated to screen for several reasons. First, the ED screens routinely for public health concerns outside of the presenting complaint (e.g. immunization status, tuberculosis exposure, alcohol use). Next, it has been shown that ED patients are a vulnerable population with a higher

risk for developing psychiatric sequelae [9**,54,55] and screening is more efficient in high-risk populations [18]. Moreover, for many youths, the ED serves as their only contact with a healthcare provider who can intervene or refer to outside resources [9**,14,54,56]. Lastly, pediatric ED visits for mental health concerns are increasing at a faster rate than ED visits related to other medical illnesses [9**,55,57], such as asthma [9**].

In 2006, the American Academy of Pediatrics and the American College of Emergency Physicians issued a statement calling for validated screening tools for mental health emergencies, such as suicidality [14]. Unrecognized suicidality in the ED is associated with substantial morbidity, mortality and increased healthcare utilization and costs [4,58*,59,60]. ED staff who are not trained in mental health are increasingly given the responsibility of triaging children and adolescents with mental health problems to crisis intervention and appropriate follow-up treatments [9**,56,61]. Despite the importance of recognizing suicidality in the ED setting, only 24% of the pediatric hospitals in the United States have mental health specialty services available, on-site in the ED [62].

Risk of Suicide Questionnaire

In 2001, the Risk of Suicide Questionnaire (RSQ) was developed to assist ED triage nurses in rapidly assessing mental health patients [63]. The four-item tool has good sensitivity (0.98), low specificity (0.37), good NPV (0.97) and a fair PPV (0.55). It takes less than 2 min for a triage nurse to administer with an endorsement of any answer to one of the four questions considered a positive screen. The RSQ was created in conjunction with a risk of suicide clinical practice guideline [64]. Patients who screened positive were searched and given a ‘sitter’ until further ED evaluation could be performed. The RSQ is being used to screen pediatric patients domestically and abroad and has been translated into Spanish [65]. A recent study using the RSQ with both adult and adolescent patients resulted in satisfactory reliability and validity [66]. Related nursing education programs to guide nurses in recognition of suicide risk factors are being developed [56].

The RSQ is currently being revalidated and expanded to include medical patients in a multisite study currently being conducted in several children's hospitals; results and psychometric properties will be reported in the coming year.

Behavioral health screening

Pailler and Fein [67] report on a computerized behavioral health screening (BHS) developed to be integrated into the workflow of ED nursing staff. They compared the clinician identification of mental illness among ED medical patients and the presence or absence of mental health referral at discharge in a pre/post exploration of their screening intervention. Although they tried to make this ‘standard of care’ practice, even with reminders, nursing staff only utilized the tool 26% of the time. Outcome results have not yet been reported. Beebe *et al.* [68] compared paper and computer risk factor assessments and found no evidence to recommend one over the other; however, youth reported higher suicide risk when answering paper questions.

Exploring the characteristics of patients presenting with a range of suicidality, Asarnow *et al.* [21*] examined ideators, single and repeat attempter (ages 10–18 years) in two disparate EDs with a battery of assessments to measure suicide risk, psychopathology, service utilization, stigma, family measures, stress and sociodemographics. A single item from the Youth Risk Behavior Survey (YRBS), ‘During the past 12 months, how many times did you actually attempt suicide?’ [3*] was used to classify suicide risk. Higher levels of clinical symptoms, stressors and service utilization predicted a continuum of suicide risk from ideator to repeat attempter. The core clinical features of the patients from the two diversely populated EDs were

found to be similar, suggesting that training programs could be developed for broader audiences of ED clinicians.

In a survey study [5], pediatric ED physicians reported screening only 10% of their patients for mental health concerns, usually prompted by the presenting complaint. This low number was ascribed to the lack of time, screening tools and education. When screening is performed, depression (83%), suicidality (76%) and substance abuse (68%) were the top three conditions screened. Results of this study suggested that many ED physicians overlook subtle presentations of risk factors for mental health concerns and choose to further evaluate only those patients with the most overt symptoms. The majority of respondents reported inadequate mental health training, and therefore felt less confident in their ability to identify a mental health problem. Most of the physicians surveyed (88%), believed that a valid screening tool would improve their ability to detect pediatric mental health concerns [5].

Brief measures of suicidality are feasible for use in the ED [63], where time is critical [5,69]. Further mental health evaluation of all positive screens will be necessary prior to intervention, as false positives are inevitable. The follow-up will need to be flexible, and vary in length from a few probing questions to a full mental health evaluation. Interventions for true positive cases will need to fit within the timeframe of an ED visit, as once the patient is discharged, follow-up services are unlikely to be utilized [70].

Screening medical patients

Most of the research on suicide in children and adolescents has focused on psychiatric patients resulting in well established risk factors [2,21,59,71]. However, the prevalence of suicidality in medically ill children is unknown, particularly for children presenting to a primary care office or an ED. It is common for mental health concerns to present as somatic complaints [9,21,72,73]. Increased rates of suicidal ideation are found in pediatric epilepsy [74], adult survivors of childhood cancer [75] and in adults with medical diagnoses also common in childhood such as asthma [76] and pulmonary disease [77]. Previous studies indicate that chronic physical illness is a risk factor for suicide in adults [78,79] and adolescents [80] with variability by particular diagnoses. Increased risk of completed suicide has also been found in adults with cancer [81], Huntington's disease, [82], spinal cord injuries and systemic lupus erythematosus [83]. There are currently no suicide-screening tools available for pediatric use that have been validated on a general medical population.

Conclusion

Suicide risk in children and adolescents is too often undetected. Screening youth at risk for suicidality with highly sensitive, validated instruments is imperative for healthcare settings nationwide. Without available mental health specialists, the onus of screening will fall on nonmental health clinicians. Screening tools that can guide them in the rapid and accurate detection of suicide risk are essential. In evaluating tools, choosing a targeted condition is important (e.g. do we screen for depression or suicidality?) as well as the population to be screened (do we screen everyone or only those at high risk?).

In the absence of outcome data on the impact of screening, we would argue from a public health perspective that screening the most vulnerable and, therefore, highest risk youth is the most efficient approach to detect suicidality. Moreover, vulnerable populations should include pediatric medical patients, for whom very little research on suicidality exists. In addition, given a review of suicidality in children under 12 [49], we believe screening for suicide should be conducted in at-risk youth starting at the age of 10; and as low as age 8, if the child is presenting to a healthcare provider for a mental health problem.

In the school setting, universal screening with the current tools available produces a great number of false positives, which can burden scarce mental health resources. For this reason, universal screening is recommended only when the screening is part of a larger suicide prevention program or when the school system is prepared with a cogent plan to evaluate all positive screens in a timely manner. In the absence of such a program, targeted screening of students at greatest risk (e.g. students who seek help, have high absenteeism, or a history of PTSD, suicide attempts, substance or alcohol abuse) is highly recommended.

Screening for suicide risk (including depression) is feasible and appropriate in settings such as primary care clinics, where longer term care is assumed, and mental health is inextricably tied to physical health outcomes. The ED setting is even more suitable for managing imminent risks such as suicidality. Again, the screening tool should be used to initiate a more in-depth evaluation of each patient that screens positive, as false positives are likely with the type of brief screening tool that can fit within an ED timeframe. Because depression is so closely tied with suicide risk, depression screening is also suggested if the ED is resourced to manage the positive screens. With follow-up rates so poor, interventions that occur before the patient leaves the ED are necessary. Both primary care and ED clinicians are in key positions to screen their patients; additional training to recognize depression and suicidality may be necessary. These settings must be better resourced to manage positive screens and effectively intervene to heal the minds of suffering youth.

Although screening at-risk populations is the most efficient way to search for positive screens, there are many youths who do not exhibit typical warning signs and are, therefore, overlooked [30]. Thus, it is crucial for parents, teachers and all healthcare providers to be proactive and look for warning signs with all children and adolescents. Skeptics say ‘they won’t tell you’; but for a great number of children and adolescents, one would be surprised at how much they will tell if providers take the time to ask the difficult questions.

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References and recommended reading

Papers of particular interest, published within the annual period of review, have been highlighted as:

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Additional references related to this topic can also be found in the Current World Literature section in this issue (p. 688).

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