A Multidimensional Screen to help Clinicians Avoid Missed Diagnoses

Comprehensive Screening

The BHS (Behavioral Health Screen) is the screening tool delivered by the BH-Works browser-based web software. Initiated over a decade ago, the development of the BHS was motivated and guided by clinical training and experience in psychiatry and psychology, health science literature, and recommendations of national organizations such as the American Psychiatric Association, American Academy of Pediatrics, Substance Abuse and Mental Health Services Administration, and The Joint Commission.

A key design goal of the BHS was to provide a validated comprehensive yet efficient assessment of psychiatric disorders and associated areas of behavioral and psychosocial problems and risks. To accomplish this, the areas of assessment and number of questions were carefully chosen and prioritized with input from diverse clinicians, including physicians, nurses, social workers, and psychologists. Population prevalence and psychometric capability were considered, and relatively rare or difficult-to-screen for conditions such as bipolar disorder were excluded.

Screening Across 14 Domains

The core psychiatric domains of assessment are depression, anxiety, substance misuse, traumatic stress, eating disorders, psychosis, and suicidality. The BHS also measures psychosocial risk factors such as family environment, bullying, physical & sexual abuse, sexual behavior, gender identity, exercise, and safety. The questions for these 14 domains of assessment were derived from multiple sources. The psychiatric domain questions were directly mapped from the diagnostic criteria in the American Psychiatric Association Diagnostic and Statistical Manual, 4th Edition. The behavioral and psychosocial questions were developed from a combination of clinical expertise, focus groups, references to public domain assessment tools in these areas, and scientific judgment.

The original BHS questions have been repeatedly refined and validated in use for over a decade of experience and study in diverse clinical settings, including emergency departments, primary care practices, crisis centers, mobile teams, and schools in both urban and rural regions. In the last five years, newer questions have been carefully added to address areas of gender identity, military service status, bullying, cyber-bullying, and access to guns.

BHS and BH-Works have been validated at four levels:

Psychometric validation: the questions assessing the core psychiatric domains were directly mapped from DSM-IV (depression, anxiety, substance abuse, traumatic stress, and eating disorders) and further validated in comparison to standards across the age range such as the Beck Depression Inventory II, strong measurement dimensionality, and parameter invariance shown using Item Response Theory models [1, 2];

Operational validation: in diverse primary care and other medical office settings, shown to work with high efficiency and high clinician and staff utility and acceptance [3-5];

Clinical validation: doubled the rate of detection of critical problems such as severe depression and serious suicide risk, decreased emergency department referrals by 87% [4-6].

Patient validation: 98% positive ratings from patients on the value of asking these questions.
Highly Validated Through Multiple Collaborations

The clinical utility and value of the BHS tool in practice have been strongly endorsed by a series of evaluations and funding awards from prominent health care organizations. In 2007 HRSA supported testing of BH-Works in the Children’s Hospital of Philadelphia (CHOP) Emergency Department. In 2008 the Pennsylvania Department of Human Services (DHS) selected the BHS for their suicide prevention application to SAMHSA, and SAMHSA awarded funding. In 2010, The Joint Commission strongly commended CHOP for established use of the BHS in their ED. DHS expanded use of the BHS in 2010 and won another round of funding from SAMHSA. In 2014 DHS and the Delaware Department of Health both chose the BHS for expanded proposals to SAMHSA which were funded.

In 2015 CMS awarded a primary care behavioral health integration proposal in which BH-Works has a major role to the ‘atom Alliance’, a five-state network consisting of Indiana, Kentucky, Tennessee, Mississippi, and Alabama.

In these program efforts, multi-level systems relationships between providers, provider organizations, public health officials, government offices, community organizations, patients, and patient advocates have emerged as key resources. To model and work with these resources and opportunities, the Behavioral Health Ecosystem represents a concept for shared knowledge and effective communication. It is a guiding model for the generation of new knowledge and translation into practice, supported by the BH-Works Platform with three core components: Measurement, Care, and Analytics.

Research That Creates Actionable Knowledge

The deployment and clinical care use of BH-Works, now in 12 states and thousands of sites, generates a significant stream of scientifically valuable data. This BHS data, de-identified, continues to be analyzed and published in peer-reviewed journals. The BH-Works team is open to collaborations with health scientists interested in using this data. Recent publications are summarized below:

A paper by Jenkins et al., [6], found that depression and alcohol use were risk factors for suicidal ideation and attempts in youth engaging in non-suicidal self-injury.

In a paper by Shearer et al. [7], we found that bisexual females and those questioning their sexual identity exhibited higher rates of disordered eating symptoms than their lesbian and heterosexual peers. We also looked at mental health symptoms across lesbian, gay, bisexual and questioning (LGBQ) youth more broadly and found varying levels of symptoms across the LGBQ subgroups, especially for females [8].

A paper by Kodish et al. [9] found that verbal, physical, and cyber bullying were associated with suicidal ideation, and verbal bullying was uniquely related to suicide attempt.

A latent class analysis of pediatric emergency department data distinguished six groups that varied on level of suicide risk, with the most severe groups reporting higher levels of depression, traumatic distress, and substance abuse [10].

A similar latent class analysis of primary care data to better understand suicide risk showed that the domains of primary influence included substance use, sexual assault, same-sex behavior, and unsafe sex. The high-risk group was 11 times more likely to have made a suicide attempt, 5 times more likely to report a history of suicidal ideation and behavior, and 3 times more likely to report recent suicidal ideation and behavior. The authors conclude that risk behaviors and social stress contribute to the risk for suicide beyond depression and should be assessed during routine primary care visits with adolescents. They note that BHS screens can assist primary care providers in assessing for both psychiatric and social stress factors associated with youth suicide [11].
References

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