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The use of the brief symptom inventory among youth living with HIV: a scoping review

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Abstract

The brief symptom inventory (BSI), a 53-item measure that assesses psychological distress, is a popular tool for measuring mental health symptoms among youth living with HIV (YLH) in the United States (US); however, it has been used inconsistently with this population. This scoping review summarizes discrepancies in the use of the BSI to identify opportunities to improve systematism and make recommendations for clinicians and researchers, and highlights correlates of psychological distress among YLH as measured by the BSI. Databases searched included PsycINFO, PubMed, and CENTRAL. Eligible studies that assessed psychological distress using the BSI among YLH, were conducted in the US, and were written in English. Of the 237 articles identified, 57 were selected for inclusion. Studies investigated associations between BSI scores and several variables, including pre- versus post-highly active antiretroviral therapy (ART) era, ART adherence, sexual risk behavior, substance use, stigma, social support, self-efficacy, mode of HIV infection, and sexual orientation. There was variation in BSI elements used as outcome measures, sample age ranges, and reporting of mean scores and cutoff t-scores. 89.5% (n = 51) of studies did not report which BSI norms were used in their data analysis, and 68.4% of studies (n = 39) did not report the cut-off t-score value used. Variability in study objectives restricted this study to a scoping review rather than a meta-analysis. Generalizability to non-US settings is another limitation. More consistency in how the BSI is used among YLH is needed to accurately identify distress among YLH and provide tailored interventions to address their unique challenges.

Keywords

Adolescent. Psychological distress. Young people. Outcome assessment. Health care.

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Introduction

Youth living with HIV (YLH) are a population at high risk for psychological distress, including symptoms of depression and anxiety[1]. One of the most commonly used tools to measure mental health symptoms among YLH in the United States (US) is the brief symptom inventory (BSI), a 53-item self-report measure that identifies clinically significant psychological symptomatology. It addresses nine symptom dimensions: Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. From these subscales, three global indices of distress can be calculated: the global severity index (GSI), the positive symptom distress index (PSDI), and the positive symptom total (PST). The BSI takes about 8-10 min to complete, with an additional 2-5 min for administrative instructions. Participants respond to statements that correspond to each of the nine symptom dimensions by indicating how much a particular issue has distressed them in the last 7 days, on a 5-point Likert scale ranging from 0 ("not at all") to 4 ("extremely").

The BSI has been developed for both inpatient and outpatient use in adolescent and adult populations. Raw BSI scores are converted into standardized t-scores using scoring templates and plotted on appropriate profiles according to population-specific norm groups, from which clinically significant symptoms can be identified. The standard BSI cutoff t-score to define clinically significant psychological distress is $t \geq 63$. Four categories of population norms have been developed: Adult Psychiatric Outpatient, Adult Psychiatric Inpatient, Adult Nonpatient, and Adolescent Non-patient (from 13 to 19 years old). Each of these is further divided into norms for male and female patients[2].

The reliability, self-reported structure, brief assessment time, and accuracy of the BSI have made it a highly attractive measure for mental health in both clinical and research settings[3]. The measure has been shown to have high internal consistency reliability, test-retest reliability, convergent and discriminant validity, internal structure validity, and construct validity[2]. It has been validated as a tool for multidimensional symptom measurement in a variety of populations, including college students, cancer patients, chronic pain patients, people living with HIV, and hypertension patients.

Study rationale

The BSI was selected as the measure of interest in this study as it is one of the most common tools to assess psychological distress among YLH in the US. There is a particular need to assess how the BSI has been used among YLH, as they are a population that experiences a variety of unique mental health concerns[4]. For YLH, psychosocial distress may be further compounded by HIV-related stigma and the stress of managing a chronic illness during this vital developmental stage[1]. In turn, psychological distress among YLH has been associated with poor HIV treatment adherence, a risk factor for HIV transmission[5,6].

This review was initially prompted by researcher observations about inconsistencies in the use of the BSI amongst youth. In the literature, there is a high degree of variability in how the BSI is used and administered in YLH. This variability encompassed differences in the usage and reporting of age group categories, cutoff t-scores, subscales, and population-specific norms. There is also a lack of clarity as to whether the authors were using the BSI score as a continuous measure of psychological distress, or as a categorical variable that dichotomizes psychological distress according to a threshold of clinical significance (as intended).

Study objectives

The current study reviewed these inconsistencies to make recommendations for clinicians and researchers. In addition, key correlates of psychological distress among YLH are highlighted. Standardized, systematic use of the BSI is vital to accurately characterize the psychological distress of patients, provide a true standard of comparison to determine clinical significance, and maintain its validity as an instrument. For instance, findings of clinical significance may be invalid if BSI scores are normed against the inappropriate age group or patient population. This is especially critical due to the age- and population-specific mental health needs of adolescents and young adults. Given these observations, this review sought to summarize how the BSI has been used among YLH to identify opportunities to improve systematism and accuracy in the measurement of psychological distress.

Methods

Search strategy and selection criteria

For this review, PsycINFO, PubMed, and CENTRAL databases were searched, as these are among the most used databases in the fields of HIV treatment and prevention. Keywords and MeSH terms were used. Keywords categories used for searches included: (1) population descriptors (i.e., "adolescent" OR "youth"); (2) measure descriptors (i.e., "brief symptom inventory" OR "BSI"); and (3) disease terms (i.e., "HIV/AIDS" OR "HIV"). In terms of Boolean logic, within each of the keyword categories, keywords were searched with the "OR" function. Between each of the keyword categories, keywords were combined with the "AND" function. The searches were conducted in March 2021. Covidence review software was used for retrieval of search results, removal of duplicates, and the article screening process[7].

An initial screen for ineligible articles based on titles and abstracts was conducted by one reviewer (NR). This was followed by a full-text screening. Articles were eligible for inclusion if they: (1) were written in English; (2) had participants from 13 to 29 years old, inclusive, or a mean sample age within this range; (3) included participants with HIV; (4) used the BSI, including its total score (GSI) or subscales, to assess psychological distress among participants; and (5) were conducted in the US. The Centers for Disease Control and Prevention's (CDC) age range for adolescents and young adults with HIV is 13-24 years old. For this review, we chose to expand this age range to 13-29 years old after an initial literature search that showed a high number of studies aggregating adolescents with young adults up to age 29[8]. Articles were excluded if they: (1) were conducted outside the US; (2) did not include participants ages 13-29 with HIV; or (3) aggregated adolescent participants with participants from other age groups (e.g., the study grouped 18-39-year-olds together). No restriction was placed on the publication date or on the study design when assessing eligibility.

Data extraction

Extracted data included: study design; sample size; sample age; comparison group used; BSI-related study findings; BSI scale(s) used; BSI variable type; BSI norms used; and term(s) used to describe the sample. Data extraction was performed by two reviewers (NR and AS). For the BSI scale(s) used, we reported on which elements of the BSI measure were used (i.e., full BSI with all subscales and GSI; BSI-18 and GSI; Depression subscale only used, etc.). For BSI variable type, we reported on whether mean BSI scores were published, and whether cutoff t-scores to denote clinically significant BSI scores were published. If mean scores or cutoff t-scores were not provided, this was indicated. Similarly, if BSI sample norms were not given, this was also noted. For all studies included in this review (Supplementary Table 1), one or more authors of each article were contacted to clarify uncertainties about the use of BSI in their studies. However, no responses were received.

Results

Study selection

The flowchart in figure 1 describes the articles examined and excluded in the search. Initial database searches yielded 232 citations. Five additional records were identified by contacting study authors. After removing duplicates, 220 records were screened via titles and abstracts. Following this step, 60 records were screened via a full-text review, and 57 articles were selected for inclusion. Reasons for exclusion were that articles did not use the BSI (n = 2) or focused on adult populations (> 24 years old; n = 1).

Study characteristics

Supplementary Table 1 provides a summary of study characteristics for the 57 studies included in this review. The included studies were published between 1999 and 2020. In terms of study design, 48 studies were cross-sectional, five were randomized control trials, and four were longitudinal studies. Most studies (n = 50; 87.7%) did not use a comparison group in the study design or analysis. In addition, most studies did not explicitly state which BSI norms were used in their data analysis. Only six studies (10.5%) stated that adolescent non-patient norms were used.

Sample ages ranged from 12 to 29 years old. The most common discrete age classification was 16-24 years old (n = 13; 22.8%), followed by 12-24 years old (n = 9; 15.8%). Terms used to describe samples included: "teens"; "adolescents"; "adolescents living with perinatally acquired HIV"; "HIV-infected adolescents"; "HIV-infected youth"; "adolescents and young adults living

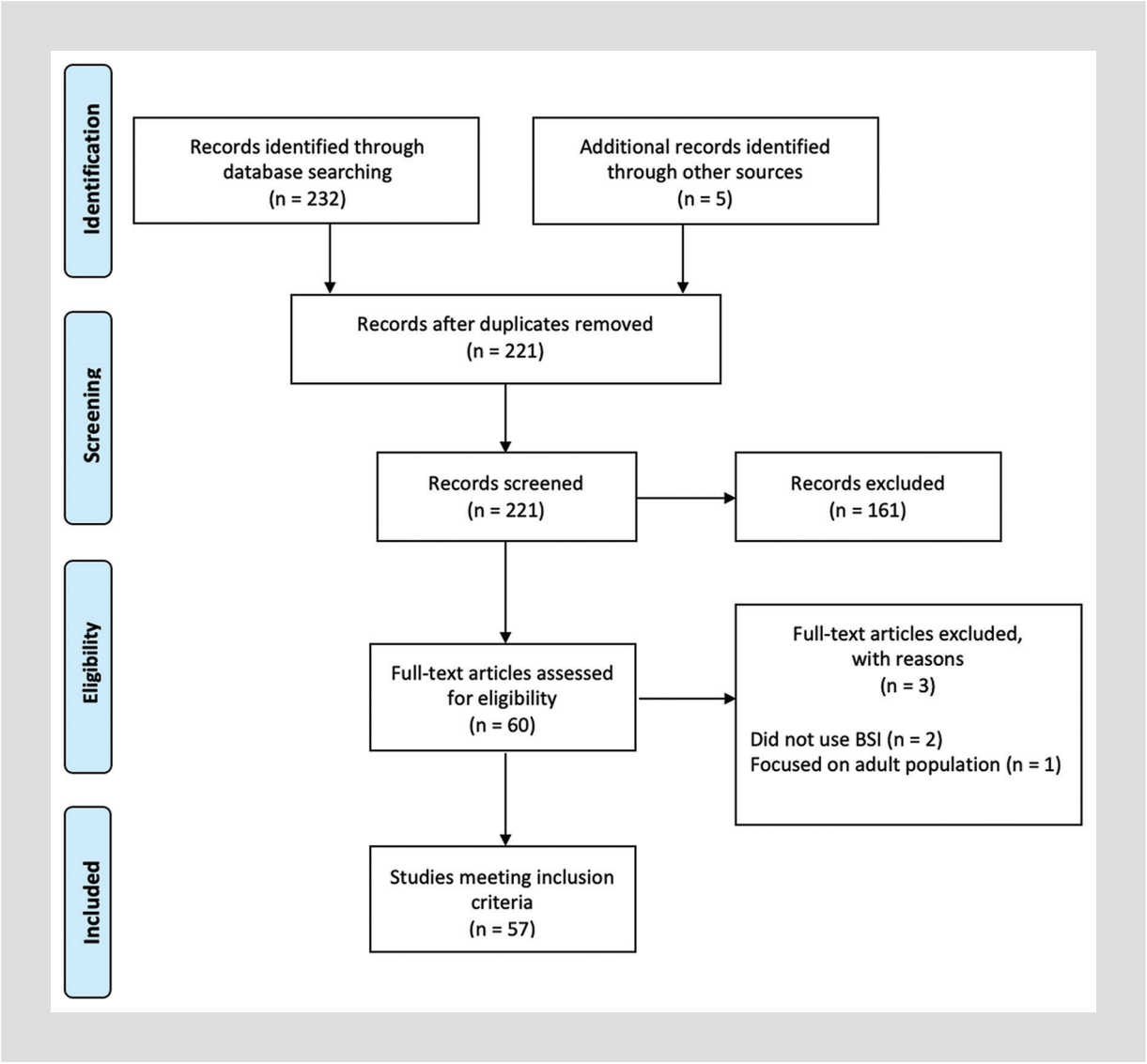

Figure 1. *Flowchart of search results. Adapted from PRISMA guidelines.*

with HIV"; "youth"; "YLH"; "youth newly diagnosed with HIV"; "HIV-positive youth"; "young persons"; "young people living with HIV"; "young adults"; "young men who have sex with men"; "HIV-positive young transgender women"; "male-to-female transgender youth"; "young men living with HIV/AIDS"; "young men"; "trans female youth"; "young males"; and "minors".

There was substantial variation in whether authors published mean scores or a cutoff t-score for the BSI, likely indicating inconsistencies in the usage of the BSI score as a continuous or categorical variable. Eight studies (14.0%) published both means and cutoff t-scores; 25 studies (43.9%) published means and no cutoff t-score; Nine studies (15.8%) published cutoff t-scores and no means; and 14 studies (24.6%) published neither means nor cutoff t-scores. One study (1.75%) published medians and cutoff t-scores. Moreover, there were inconsistencies in the reporting of an actual cutoff t-score value. The standard BSI cutoff t-score to define clinically significant psychological distress is $t \geq 63$, as per BSI manual guidelines[2]. However, only 18 articles (31.6%) state the cutoff t-scores used in their study.In addition, 3 of these studies (5.26%) used a cutoff score of $t \geq 65$ instead of $t \geq 63$.

Various elements of the BSI were used to measure psychological distress. Thirty-two studies (56.1%) used the full BSI with all subscales and the GSI, while seven studies (12.3%) used the shorter BSI-18 and the GSI. Eight studies (14.0%) used only the Depression subscale, and six studies (10.5%) used only the Depres-

sion and Anxiety subscales. Four studies (7.02%) used other combinations of GSI and BSI subscales: one used the GSI and the Depression subscale; one used the Anxiety, Obsessive-Compulsive, and Depression subscales; one used the Anxiety, Depression, and Hostility subscales and the GSI; and one used the Anxiety and Depression subscales together as a combined measure.

Study findings: Correlates of psychological distress

The prevalence of clinically significant psychological distress varied greatly throughout the study samples, from 10% to 74%. Studies investigated associations between BSI scores and a variety of variables, including pre- versus post-highly active antiretroviral therapy (ART) era, ART adherence, sexual risk behavior, substance use, stigma, social support, self-efficacy, mode of HIV infection, and sexual orientation.

Ten studies found that higher scores on the BSI and its subscales (including hostility, depression, anxiety, and somatization) were associated with higher levels of substance use-related variables. Six studies found higher BSI scores to be associated with greater sexual risk behavior[9-14]. Three studies found that behaviorally-infected participants had greater rates of psychological distress than perinatally-infected participants[15-17]. One study found that the BSI score was a modifier of the fraction of protected sex acts with all partners, and another study found that the BSI was a moderator of the relationship between partner type (main vs. casual) and condom use.

Seven studies found a negative association between psychological distress and ART adherence[13,16,18-22]. Four studies found higher BSI scores to be associated with higher viral loads or lower rates of viral suppression[1,23-25]. Two studies found higher BSI scores in post-ART cohorts compared to pre-ART cohorts[26,27].

Five studies found BSI scores, particularly anxiety and/or depression subscale scores, to be positively associated with levels of stigma[17,22,28-30]. Five studies found higher BSI scores to be associated with lower social support[1,25,31-33]. Four studies found a negative association between psychological distress and self-efficacy[25,33-35].

Two studies found that higher BSI scores were correlated with identifying as a sexual minority, compared to identifying as heterosexual[1,36]. Other variables associated with BSI score were: HIV status disclosure to acquaintances, self-esteem, health literacy, past pregnancy risk, and exposure to community violence. In contrast, several studies found that BSI had no association with: ART use, appointment adherence, HIV status, sexual partner type or risk status, self-efficiency, exposure to abuse, exposure to an HIV preventive intervention or level of disclosure.

Discussion

This review has highlighted several inconsistencies with respect to the utilization of the BSI in research studies involving YLH in the US. These issues include: (1) the lack of reporting of norms; (2) the lack of reporting of cutoff t-scores; (3) the varying range in sample ages; (4) the operationalization of BSI as a continuous or categorical variable; and (5) the use of specific BSI subscales. The review also summarizes key correlates of psychological distress among YLH as measured by the BSI.

The use of norms is critical as they define which threshold is considered clinically significant for a BSI score, depending on the age, patient population, and gender characteristics of the participant sample[2]. However, the majority of studies did not report the BSI norms used in their analysis, and only six studies reported the use of adolescent non-patient norms, as appropriate for the participant samples in this review. In addition, no studies stated whether gender-specific norms were used for their samples. In future uses of the BSI, researchers should report which norms were used in their data analysis and ensure that the norms used are appropriate for the demographics of their sample.

Similarly, most studies did not report their cutoff t-score values, which denote psychiatric distress of clinical significance. In addition, it is unclear why three of the studies used a cutoff score of $t \geq 65$ instead of $t \geq 63$, as per BSI manual guidelines. It is important for researchers to report their t-score values used, as well as detail any reasons for using a t-score that diverges from the manual's instructed standard of $t \geq 63$.

Although sample ages across all studies included in this review ranged from 12 to 29 years old, the BSI adolescent non-patient norms are only appropriate for individuals from 13 to 19 years old. The inclusion of participants with ages beyond this range may put into question the accuracy of these results, given that the BSI adolescent non-patient norms were not designed for use beyond that specific age range. This is particularly relevant given that the psychological profile and distress of a 12-year-old child may differ greatly from that of a 29-year-old adult, both of which are being

aggregated into one "adolescent non-patient" group to use a common set of norms for psychological distress.

For most studies in this review, it is unclear whether the BSI scores were operationalized as continuous or categorical variables. Studies did not consistently publish BSI mean scores or cutoff scores used in their analysis. Providing a mean score would indicate that the BSI score is a continuous variable, while including a cutoff score would indicate that it is a binary categorical variable. Although, several studies published both means and cutoff t-scores, one-quarter of the studies published neither means nor cutoff t-scores, offering little insight into how the variable is being operationalized. This lack of consensus over whether the BSI should be used as a continuous or categorical measure of psychological distress constitutes a significant inconsistency in how the measure is being applied throughout the HIV research field. Forthcoming studies that use the BSI must clarify this ambiguity, as well as justify any reasoning for its use as a continuous or categorical variable.

Several studies included in this review used BSI subscales and scores in ways not indicated by manual guidelines. The BSI contains nine subscales, with three summary scores to characterize overall psychological distress: (1) the global symptom inventory (GSI), (2) PSDI, and (3) PST. Alternatively, the BSI-18, an abbreviated version, uses three subscales to calculate a shortened GSI. While most studies used and reported on the BSI or BSI-18, certain studies extracted individual subscales, or several individual subscales, from the BSI without administering or using the entire measure. One study also created its measure of two subscales (Anxiety and Depression) combined. Neither of these approaches is recommended by the BSI manual, which instructs researchers to administer the entire BSI and use published summary scores (the GSI, PSDI, or PST). Moreover, evidence has shown that the BSI is better suited as a measure of general psychopathology, and that BSI subscales are ill-suited as measures of individual psychiatric constructs. One study found that the BSI had poor discriminant validity and limited convergent validity: few items uniquely measured the intended dimension, and the total BSI score was highly correlated with each dimension score[3]. As such, it has been suggested that for the BSI, the GSI should be used as an index of general psychopathology, rather than its individual subscales, which are of little utility when examined separately[3]. The study authors who created a combined measure of the Anxiety and Depression subscales stated that this was done because the independent effects of the two subscales had similar statistically significant relationships with their outcome of interest[37]. They combined individual Anxiety and Depression scores into a total score, and normed this predictor on its relative sample mean for analysis (Z-scores)[37]. Other researchers may have elected to extract individual BSI subscales to only examine a specific construct of interest, or to reduce the volume of survey material and the total assessment time required of participants. However, doing so limits the validity of the BSI measure, whose individual subscales have not been validated as independent measures. Measures designed to evaluate specific individual psychiatric outcomes (e.g., depression) may be better suited to assess these constructs than BSI subscales, which have been informally extracted from a measure only designed to evaluate overall psychological distress. In addition, not using the full BSI scale or the GSI neglects other dimensions of psychological distress likely being experienced by YLH.

This review contains limitations. First, given that this was a scoping review, it does not include a meta-analysis. However, we elected not to perform a meta-analysis due to the wide variability in the usage of the BSI. The purpose of this article, in part, was to demonstrate and explore this variability found in the extant literature. Second, given that publications were restricted to English-language research articles conducted in the US, this contributes to language and geographic bias and limits the generalizability of the findings in this review. Further research should be undertaken to assess the usage of the BSI for adolescents living with HIV globally. Nevertheless, this scoping review importantly documents and appraises the ways in which the BSI has been administered for YLH in the US, to improve the rigor and consistency of the methods with which the measure is used.

Conclusion

In sum, in future uses of the BSI, researchers are encouraged to report norms and cutoff t-scores used, restrict participants to sample age ranges as specified by the BSI manual, clarify whether the BSI score is being operationalized as a continuous or categorical variable, and show justification for why only certain subscales were used. Ultimately, more consistency in the use of measurement tools is needed to accurately screen and identify psychological distress among YLH

and facilitate the development of tailored interventions to address their unique challenges.

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Supplementary data

Supplementary data are available at *Aids Reviews* online (10.24875/AIDSRev.22000016). These data are provided by the corresponding author and published online for the benefit of the reader. The contents of supplementary data are the sole responsibility of the authors.

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Conflicts of interest

None.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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