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High burden of mental illness and low utilization of care among school-going youth in Central Haiti: A window into the youth mental health treatment gap in a low-income country

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Abstract

Background—The mental health treatment gap for youth in low- and middle-income countries (LMICs) is substantial; strategies for redress are urgently needed to mitigate the serious health and social consequences of untreated mental illness in youth.

Aims—To estimate the burden of major depressive episode (MDE) and posttraumatic stress disorder (PTSD) as well as utilization of care among Haitian youth in order to describe the mental health treatment gap in a LMIC setting.

Methods—We estimated the point prevalence of MDE, PTSD, and subthreshold variants in a school-based sample of youth (*n*=120, ages 18–22) using a modified SCID-based interview and examined treatment utilization among those receiving one of these diagnoses. We assessed additional psychopathology with self-report measures to examine validity of study diagnostic assignments.

Results—The combined prevalence of full-syndrome or subthreshold MDE or PTSD was high (36.7%). A large majority of affected individuals (88.6%) had accessed no mental health services in the health sector and 36.4% had accessed no care of any kind in either the health or folk sectors in the past year.

Conclusions—Findings demonstrate a high mental health burden among Haiti's youth and that many youth with MDE and PTSD are not accessing mental health care.

Keywords

mental health treatment gap; low-income countries; youth; mental health burden; Haiti

Introduction

Mental and substance use disorders remain the leading health contributors to disability both globally and in low- and middle-income countries (LMICs) (IHME, 2016) but the majority of affected individuals in LMICs do not receive care for serious mental illness (Demyttenaere et al., 2004). For example, only one in 27 individuals with major depression in a LMIC receives minimally adequate treatment (Thornicroft et al., 2016). Although reasons underpinning the mental health treatment gap—the proportion of those with mental illness who do not receive care—are multi-factorial, developing and deploying strategies to expand access to quality mental health services are a focus for its redress (Becker & Kleinman, 2013). Strategies for improving care access across diverse regions and populations can be enhanced by understanding patterns of treatment utilization and particular barriers to care within demographics defined by age and local social context.

Mental disorders are also the greatest contributor to disability in youth worldwide (Gore et al., 2011), but the majority of affected youth do not receive care for their mental illness (Patton et al., 2012). Unfortunately, untreated mental disorders in youth carry the risk for serious downstream health and social consequences. For example, a longer duration of mental disorder in adolescence is among the strongest predictors of adult disorder (Patton et al., 2014). Moreover, adolescent mental illness is associated with poorer social and economic outcomes ten years later and greater risk for other non-communicable diseases (Ngo et al., 2013). Because early detection and treatment can reduce the chronicity and severity of the primary mental disorder and prevent secondary disorders (Ghio et al., 2014; McGorry et al., 2011; Patton et al., 2014), timely intervention for youth is critical for their future health and well-being. This treatment gap, moreover, is most pronounced in LMICs where an estimated 10–20% of adolescents have a mental disorder (Kieling et al., 2011; Patel et al., 2008). Barriers to care include health systems constraints relating to an inadequate mental health workforce and public sector budget allocation to meet needs, as well as a variety of factors that influence help-seeking for mental illness. For example, relevant cultural factors include local idioms of distress and explanatory models that render care-seeking in the health or folk sectors germane (e.g., Kleinman, 1980). Likewise, social structural factors, such as political and economic disenfranchisement, impede help-seeking (Farmer, 2010). Impacts of the latter—such as legal factors, unaffordable costs, and poor access to transportation—are more pronounced for youth (Patton et al., 2016). Understanding factors underpinning user demand and accessibility of services are salient to optimizing interventional approaches and targets to reduce the mental health treatment gap in LMICs.

The present study seeks to characterize the local mental health treatment gap among youth in Haiti, a low-income country in the Caribbean. In 2010, a major earthquake centered near Port-au-Prince resulted in devastating casualties, infrastructural damage, and displacement in Haiti. Given the elevated risk for depression and PTSD following humanitarian emergencies and disasters (Goldmann & Galea, 2014; Marquez, 2016) and the likely impacts of this "acute-on-chronic" event (Farmer, 2011) on mental health in the setting of longstanding social adversities (WHO, 2010; Raviola et al., 2012), we expected depression and PTSD to be prevalent among youth in Haiti's Central Plateau. Further, although rigorous epidemiologic data on mental disorders in Haiti are quite limited (cf. WHO, 2010), post-earthquake data from self-report or inventory assessments support a high burden of depression and posttraumatic stress disorder among youth (Blanc et al., 2014; Cénat & Derivois, 2014, 2015) and adults (Cerda et al., 2013) living in Port-au-Prince as well as prevalent depressive symptoms among adults in Haiti's Central Plateau (Wagenaar et al., 2012). Similar to the situation in other LMICs, accessibility to mental health services in Haiti has been severely constrained by resource shortfalls of all types and centralization of services in urban areas (WHO, 2010; WHO, 2011). Significant stigma towards mental illness also exists in Haiti, and there is little exposure to and endorsement of biomedical explanations of mental illness (Khoury et al., 2012; Wagenaar et al., 2013). Nonetheless, there is inadequate understanding about help-seeking for mental illness among Haitian youth to inform development of community-based mental health care in Central Haiti to serve them (Raviola et al., 2012).

The present study's aims are to 1) estimate the point prevalence of depression and PTSD among a community-based sample of secondary school youth in the Central Plateau of Haiti; 2) estimate 12-month utilization of health-system based care for mental health; and 3) describe the unmet need for mental health treatment in this sample. An empirical understanding of local mental health burden and associated unmet need can strategically inform further development of approaches for promoting the mental health of Haitian youth, and also has potential application for understanding and closing the mental health treatment gap for youth in other low-income settings.

Methods

Cross-sectional study data were collected during the baseline assessment phase of the Teacher-*Accompagnateur* Pilot Study (TAPS), a school-based pilot mental health intervention in Haiti's Central Plateau in October and November 2013 (Eustache et al., 2014; Eustache et al,. 2017b). The corresponding study protocols—including components presented here—were approved by both the Institutional Review Board (IRB) of the Harvard Faculty of Medicine and the *Zanmi Lasante* (ZL) Ethics Committee. Methods described here represent those most relevant to the present study's aims (see Eustache et al, 2017a for additional details about study procedures).

Study Sample

The study sample was drawn from four participating schools in Haiti's Central Plateau. Students meeting eligibility criteria (actively enrolled in a participating school, ages 18 to 22

years) were randomly selected within each school from school registers (n=33 to 41 per school). Across all schools, 145 eligible students were invited to participate and of these, 121 students were enrolled in the study and completed the assessment. Subsequently, one participant withdrew consent and requested that his/her study data be discarded, yielding a revised study sample of n=120. The response rate was 82.8% in total, and at least 78.0% in each school. Study participants received lunch but there was no monetary compensation for participation.

Procedures

After providing informed consent, participants responded to a battery of self-report psychosocial assessments and subsequently underwent a structured research interview. Assessments were in Haitian Creole at the students' respective schools. The self-report assessments were proctored by members of the study team and completed during a single day. Research interviews were conducted by (or co-facilitated with) clinician-investigators with local experience in diagnostic assessment of mental disorders. 85.8% of the interviews were completed within two days of the student's self-report assessment, and all interviews were completed within 15 days of the self-report assessment. Following the research interview and independently of the study, study participants were encouraged to undergo an onsite clinical interview with a mental health clinician to follow up on clinical concerns or questions and facilitate a path to care, if appropriate.

Assessments

With the exception of questions about healthcare utilization developed for this study, study psychosocial assessments were drawn from or adapted for use from existing measures (Table 1). Written self-report assessments were translated from English to Haitian Creole using an iterative process involving contributions by three or more members of the study team as follows (cf. Bhui et al., 2003): forward translation and independent back translation by two or more bilingual members of the study team, comparison for discrepancies by one or more native English-speaking investigators, and adjustments by one or more investigators to optimize idiomatic and readily comprehensible usage. Assessments were finalized after a piloting them with an independently selected sample of Haitian students (n=12).

Data Analyses

All statistical analyses were conducted in SPSS 23 (IBM Corp, 2015). Descriptive statistics were calculated as frequencies for categorical data and means with standard deviations for continuous variables. For all diagnostic categories corresponding 95% confidence intervals were calculated using the Wald method except when n 5, in which case the exact method was used. Chi-square tests were used to test for differences in prevalence by gender. In order to examine construct convergent validity of the DSM-based study diagnostic assignments, we used self-report data from the following assessments (as adapted for this study; Table 1): Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), Global School-based Health Survey (GSHS; WHO, 2013a, 2013b), Reaction of Adolescents to Traumatic Stress (RATS; Bean et al., 2004b), and Stressful Life Events Checklist (SLE; Bean et al., 2004a).

Data management—Raw self-report data were entered into an Excel file and verified. Missing data for the CES-D and RATS were handled as follows. We used mean imputation for observations missing 10% or fewer of responses and excluded observations missing greater than 10% of responses (n=9 and n=5, respectively for CES-D and RATS). Complete data were available for healthcare utilization analyses. All other deviations from the sample size of n=120 for individual items are noted in tables and text.

Interviews were completed by each respondent. Written ratings data recorded on the paper copies of the interview guides were entered into an Excel spreadsheet for analysis. In addition, we transcribed and translated all narrative responses as well as summary and margin notes recorded on the interview guides; these were also entered into a spreadsheet for review alongside numeric ratings. Our algorithm for diagnostic assignment handled missing data from the research interview as described below.

Procedures for study diagnostic assignment—We used data from interviews based on content adapted and abridged from the MDE and PTSD modules of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID; First et al., 2010) to make study diagnostic assignments. The interviewer's summary assessment was the primary basis for a diagnostic assignment as MDE or PTSD. Members of the study team also considered all written information recorded on the interview form about symptoms, presentation, and context—including any narrative data, margin notes, and summary ratings data—to reach consensus about diagnostic assignments. In addition to the standard SCID diagnostic summary rating questions in the respective MDE and PTSD modules, we added a second study-specific item asking the interviewer to affirm whether the diagnosis was present. This item allowed additional response options (e.g., to indicate that only partial criteria were met or a diagnosis could not be ascertained). The interviewer's summary assessment of the presence of a disorder in response to at least one of these items was required for a study diagnostic assignment as MDE or PTSD. In addition, we reviewed and considered interview margin and summary notes for contradictory or qualifying information.

Next we systematically reviewed all of these interview data—including written summary ratings, narrative responses, and margin notes recorded on the paper copies of the SCID-based interview guides—for evidence of subthreshold MDE or PTSD. We followed study operational criteria (described below and in Table 2) and reached consensus among three or more study investigators regarding presence of each these subthreshold diagnoses for each participant.

<u>Diagnostic assignments of subthreshold MDE:</u> When participants did not meet study criteria for MDE, we assigned a study diagnosis of subthreshold MDE to participants who nonetheless met either of the two sets of corresponding study criteria (Table 2). These criteria are based on guidance in SCID instructions that subthreshold diagnosis can be assigned when an individual is deemed likely to meet full criteria (First et al., 2002). We operationalized our 'conservative' criteria to assign a subthreshold diagnosis of MDE when Criteria A, B, and C were met, except for the presence of only 4 of the 5 required neurovegetative symptoms. In addition, we assigned a study diagnosis of subthreshold MDE when clinicians had given a rating of at least subthreshold for signs and symptoms of

Criteria A-C that would have, if all present, been consistent with full syndrome MDE (cf. Schnurr et al., 1993).

Diagnostic assignments of subthreshold PTSD: When participants did not meet study criteria for PTSD, we assigned a study diagnosis of subthreshold PTSD to participants who nonetheless met either of the two sets of corresponding study criteria (Table 2). Criteria sets were based on practices described in the literature. The first, which we termed "Subthreshold PTSD (Conservative)", was based on the approach described by Blanchard et al., (1994). We selected this approach given its established use (see Franklin et al., 2002; Brancu et al., 2016) and that it is conservative in requiring two full symptom clusters to be met (Cukor et al., 2010). The second, which we termed "Subthreshold PTSD (Broad)", is based on the approach described by Schnurr and colleagues (1993). This method allows for a subthreshold diagnosis to be assigned when signs and symptoms otherwise adequate to meet diagnostic criteria are present but do not reach threshold levels.

Validation of study diagnostic assignments—To assess the validity of study diagnostic assignments, we exmined convergent validity by examining between group differences (case vs. non-case) with respect to measures of depressed mood and trauma exposure generated by self-report assessments. First, internal consistency reliability for the CES-D and RATS was estimated with Cronbach's alpha. Wilcoxon-Mann-Whitney tests were used to compare 1) MDE cases versus non-cases and 2) MDE cases and/or subthreshold variants versus non-cases on CES-D- and GSHS-based measures of depressive symptomatology. A parallel set of Wilcoxon-Mann-Whitney tests were used to compare 1) PTSD cases versus PTSD non-cases and 2) PTSD cases and/or subthreshold variants versus non-cases on SLE and RATS measures of trauma exposure and PTSD-related symptomatology.

Assessment of the gap between identified mental health needs and care utilization—We used self-report responses concerning healthcare utilization to calculate the proportion of participants within each of these study diagnostic categories who had not accessed healthcare for any mental health problem in the past 12 months and who had also not accessed healthcare for any health problem during the same time period. We operationalized "unmet need" for mental health services as the former.

Results

Sociodemographic characteristics, healthcare utilization, and barriers to care

Table 3 displays a summary of socioeconomic characteristics and healthcare utilization among participants. The sample was two-thirds male with a mean age of 19.5 years. Socio-economic indicators consistent with poverty were notable for the prevalence of food insecurity and lack of indoor latrine as well as difficulty affording healthcare, medicines, or transportation to health services. For example, three-quarters of respondents reported having at least one day without any food over the preceding three months and one-quarter did not have a latrine in their home. Moreover, a majority of respondents (59.5%) reported difficulty paying for hospital or clinic-based care or difficulty paying for medicine (50.8%). Likewise,

nearly a quarter of participants reported difficulty paying for medicine from a healer or *houngan*.

Health services were only accessed by slightly over half the participants within the past year. During this timeframe, 55.0% of participants accessed either general or mental health care through the health system and an additional 4.2% accessed care only through the folk sector (i.e., by visiting healers or *houngans*); however, 40.8% of the sample did not access any of these kinds of care within the past 12 months (Table 4). Moreover, only 12.5% of participants had accessed mental health care through the health system and an additional 5.8% had addressed mental health problems with a healer or *houngan*. Thus, the majority of the participants (81.7%) had not accessed any specific mental health care in the past year.

Prevalence of MDE, PTSD, and subthreshold variants

Table 4 displays the one-month point prevalence estimates for MDE, PTSD, and their respective subthreshold variants. The prevalence of MDE was 7.5%; including participants with either MDE or MDE subthreshold variants increased the prevalence considerably to 25.8%. The prevalence of PTSD was 10.8%; the combined prevalence of PTSD and PTSD subthreshold variants was 20.8%. Overall, the one-month prevalence of either MDE or PTSD was 14.2% in our study sample; the prevalence of any one of the study diagnoses (MDE, PTSD, and/or a subthreshold variant) was high at 36.7%. We noted that 4.2% of the study participants had comorbid MDE and PTSD. Although we did not observe a gender difference for either PTSD or comorbid MDE and PTSD cases, we observed a marginally significant higher prevalence of MDE for females (15.0% females vs. 3.8% males; p=0.059).

Convergent Validity

Table 5 shows overall and group means for depressive symptomatology measured by the CES-D and GSHS questions across groups defined by diagnostic assignments relating to MDE. Also displayed are overall and group means for measures of stressful life events/ traumatic exposures and PTSD-related symptomatology, across groups defined by diagnostic assignments relating to PTSD. MDE cases had significantly higher levels of depressive symptomatology than non-cases. Similarly, the group comprising MDE case and subthreshold variants also had significantly higher depressive symptomatology than all others. Parallel analysis for PTSD showed similar results: PTSD cases had significantly higher stressful life event/traumatic exposures and PTSD-related symptomatology than non-cases. The group comprising PTSD cases and subthreshold PTSD variants also had significantly higher stressful life event/traumatic exposures and PTSD-related symptomatology than all others.

Utilization of healthcare across groups identified by mental health needs

Among participants with a diagnosis of subthreshold or full-syndrome MDE and/or PTSD, 88.6% (*n*=39) had not accessed healthcare for any mental health problem in the past 12 months; 43.2% (*n*=19) had not accessed healthcare for any mental or other health problem during the same time period (Figure 1); and 36.4% (*n*=16) had not accessed mental healthcare, other healthcare, or folk sector care over the same one-year period. Health service utilization patterns were similar among participants with full-syndrome MDE or

PTSD (no mental health utilization: 94.1%, *n*=16; no utilization for any health problem: 41.2%, *n*=7), MDE cases (no mental health utilization: 88.9%, *n*=8; no utilization for any health problem: 33.3%, *n*=3), PTSD cases (no mental health utilization: 100.0%, *n*=13; no utilization for any health problem: 46.2%, *n*=6), or not meeting at least subthreshold criteria (no mental health utilization: 86.8%, *n*=66; no utilization for any health problem: 46.1%, *n*=35).

Discussion

In this community-based sample of secondary school youth in Haiti's Central Plateau, the point-prevalence estimates of MDE and PTSD were 7.5% and 10.8%, respectively, with 14.2% affected by one or both of these disorders. Although the point prevalence of MDE in our sample was just slightly higher than the 5.3% 12-month prevalence of MDE in a community based sample among of 18–34 year old adults in developing countries (Kessler et al., 2010), the prevalence of PTSD was substantially higher than the 0.7–0.8% prevalence of PTSD reported among adults in low and middle income countries (Karam et al., 2014). Further, over one-third of our sample had at least subthreshold MDE and/or PTSD and, therefore, demonstrated clinically significant mental health treatment need. Diagnostic assignments based on the modified, abridged version of the SCID showed good convergent validity in comparisons based on several measures of symptomatology, including depression and PTSD screening tools and an assessment of stressful events/traumatic exposures.

We also found striking evidence of a large mental health treatment gap. Across diagnostic classifications, nearly 90% of participants in need of mental health treatment had not utilized services in the past year for the mental health problems we describe here. The magnitude of unmet need for Haitian youth identified in this study appears to be comparatively large (cf. Demyttenaere et al., 2004; Wang et al., 2007). This is unlikely to be attributable to lack of available mental health services since the participating schools were located in communities with ZL health centers offering mental health care. Nevertheless, participants endorsed difficulties with transportation as well as payment for care and medicine. Future exploration of these difficulties is warranted. Participant reports align with research indicating that accessibility of care is a key determinant of youth utilization (Ambresin et al., 2013; World Psychiatric Association et al., 2005). Attitudes about mental health treatment among Haitian youth may be important to explore, given research suggesting that adults in the Central Plateau prefer non-health system based care for mental disorders (Wagenaar et al., 2013). However, our data did not support that a substantial percentage of individuals with mental health needs who had not accessed mental health care through the health sector were accessing it through the folk sector instead.

Nearly half of participants with full or subthreshold MDE or PTSD who had not utilized health services for a mental health problem, had accessed general healthcare over the same one-year period. Like other rural Haitians (Keys et al., 2012), our participants may be presenting for general health services with somatic problems that could represent idioms of emotional distress. Hence, incorporation of screening and treatment for mental disorders into primary healthcare through collaborative care programs guided by the Mental Health Gap

Action Programme may improve case-finding and utilization of mental healthcare (Sharpe & Naylor, 2016; Wang et al., 2007; WHO, 2008).

There are a number of limitations of this study. School-based assessment in central Haiti excludes youth who do not attend school or reside elsewhere in Haiti and limits the generalizability of our findings. Our study sample of transitional age youth within a narrow age range, moreover, does not encompass younger adolescents who may encounter different mental health barriers and needs. Nonetheless, there is growing recognition of a need to focus on early identification of mental health problems and effective interventions for youth who are making the developmental transition to greater independence and adulthood (Patton et al., 2016; Wilens & Rosenbaum, 2013). Although a SCID interview is commonly considered to be a gold standard for research diagnostic assessment, there were limitations to its implementation in this setting. Our study diagnostic assignments could have resulted in misclassification due to the use of SCID-based interviews in a setting for which it was not developed. Moreover, our use of an abridged interview for MDE meant that we were unable to discern the impact of medical illness, bereavement, food insecurity, and poverty on symptoms. Finally, because SCID content aligns with nosologic constructs developed outside of Haiti, it may not have captured clinically significant psychopathology that is expressed or manifested differently in the Haitian cultural context (Farmer, 1992; WHO, 2010; Keys et al., 2012). However, other qualitative research has demonstrated evidence of overlap between symptoms of MDE and PTSD experienced in Haiti and corresponding diagnostic constructs measured by the SCID (Bolton et al., 2012; Rahill et al., 2015; Rasmussen et al., 2015). Our approach integrating interviewer clinical judgment— based on local diagnostic experience—into our procedure for study diagnostic assignment was intended to identify locally salient presentations of MDE and PTSD (cf. Bhui et al., 2003). Likewise, we included subthreshold variants of MDE and PTSD in our analyses so as to encompass a broader range of psychopathology than is reflected in SCID-generated full syndrome diagnoses. Our finding that groups defined by a study diagnostic assignment of MDE, PTSD, and subthreshold variants had greater levels of psychopathology as measured by standardized self-report assessments, supports the validity of these assignments. Finally, our cross-sectional study design does not illuminate possible temporal trends in prevalence, either relative to the 2010 earthquake or many chronic social adversities confronting Haitian youth.

Notwithstanding these limitations, our finding of prevalent MDE, PTSD, and clinically significant psychopathology in our study population warrants concern and action. The remediation of unmet burden of mental disease arguably requires broad intervention beyond the clinical domain given the myriad impacts of poverty on health (e.g., Farmer, 1992). Like Haitian youth, many youth residing in LMICs face harsh social vulnerabilities that increase risk for poor mental health (Patel et al., 2008; Lund et al., 2010), such as absence of caregivers, poor physical health and nutrition, and low levels of education (Walker et al., 2007; Kieling et al., 2011; Smith Fawzi et al., 2012)., Nonetheless, study findings underscore the importance of ensuring access to mental health services for youth in Haiti, and by extension, in other LMICs.

Conclusion

We observed a high prevalence of PTSD and substantial prevalence of MDE in this sample of secondary school youth in rural Haiti. Moreover, mental health care utilization was low among youth with clinically significant levels of MDE or PTSD symptomatology, suggesting a large mental health treatment gap for this population. This underscores the need to reduce barriers to help-seeking and increase human resources to provide mental health treatment for youth in Haiti and similar resource-limited settings.

Acknowledgments

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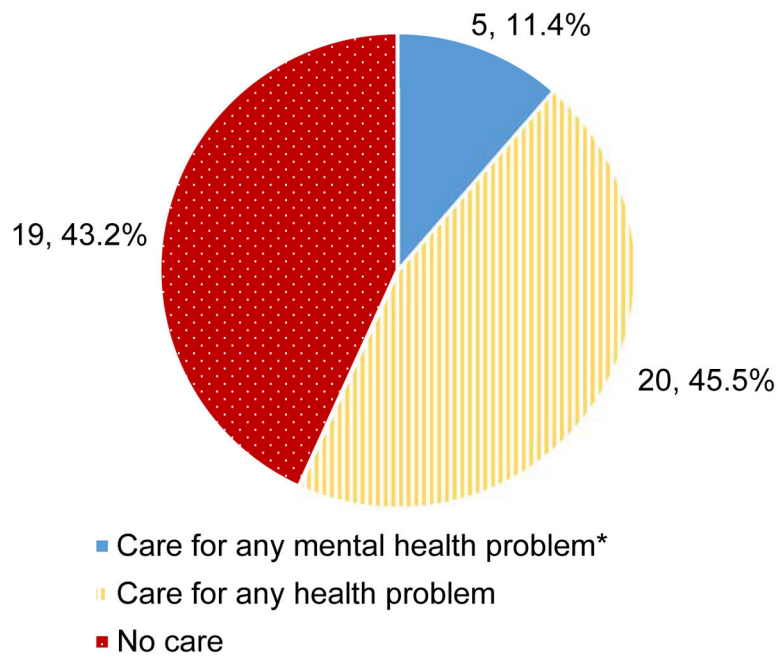
Figure 1.

Health-system based care use in the past year among participants with case or subthreshold MDE and/or PTSD, *n*=44.

*All participants above who indicated receiving care for a mental health problem also indicated receiving care for any health problem

Table 1

Measures used for assessment

Construct	Source measure and method of assessment	Description of measure, study-specific usage or adaptation, and psychometric properties
Sociodemographic characteristics	*Unstandardized measure/questions used in previous research in Haiti* (Smith Fawzi et al., 2003, 2012) *Self-report*	• Eight self-report items, based on previous assessments in Haiti • Questions assessed included housing (5 items), food security (2 items), and school attendance (1 item)
Health care utilization, barriers to care	*None; item content developed for this study* *Self-report*	• Past 12-month treatment utilization assessed with questions about health system-based care (e.g., comprising hospital, clinic, and community-based services) and folk sector care (e.g., from folk and religious) healers for general health and mental health problems • Lifetime health treatment utilization assessed with questions about health system-based care (e.g., comprising hospital, clinic, and community-based services) and folk sector care (e.g., from folk and religious) healers for mental health problems, only • Potential barriers to health care were assessed with 6 questions about difficulties with transport and affordability of treatment

Depressive symptoms	*Center for Epidemiologic Studies Depression Scale (CES-D)* (Radloff, 1977) *Self-report*	• Self-report 20-item Likert scale measuring depressive symptoms during the past week
		
		   – Has been used in a broad range of settings, including Haiti (Martsolf, 2004)
		
		   – Can be used as dimensional or categorical measure, although no cut point has been validated in Haiti
		
		Present study:
		
		• <u>Adaptation</u>: One of four reverse coded items ("I felt hopeful about the future") rewritten as "I have lost hope about the future" and scored without reverse coding
		
		• <u>Scoring</u>: Used dimensionally with a range of 0 to 60
		
		• <u>Psychometrics</u>: Internal consistency reliability (Cronbach's α = 0.86) comparable to other samples (Opoliner et al., 2013; Radloff, 1977)

Signs of mental distress and/or associated impairment	*Global School-based Health Survey (GSHS)* (World Health Organization, 2013a, 2013b) *Self-report*	• Self-report measure developed by the WHO to survey health risk and protective factors in schools
		
		   – Core and modular content allows some customization and adaptation to local context and priorities
		
		   – Had been implemented in 94 countries and translated into nearly 20 languages (Centers for Disease Control and Prevention, 2013) but not implemented in Haiti as of 2013
		
		Present study:
		
		• <u>Adaptation</u>: Selected 3 relevant Likert-style items as study proxies for worry, social impairment, and academic difficulties
		
		• <u>Scoring</u>: Each of these items scored individually on a 5-point scale from 1 ("Never") to 5 ("Always")

Construct	Source measure and method of assessment	Description of measure, study-specific usage or adaptation, and psychometric properties
Stressful life events/traumatic exposures	*Stressful Life Events (SLE) Checklist* (Bean et al., 2004b) *Self-report*	• Assesses number and type of stressful life events with items comprising 12 yes/no questions about past experience of family disruption, illnesses, accidents, disasters, war, and physical and sexual abuse • An open-ended question to add other kind of event not listed, but experienced as very frightening **Present study:** • <u>Scoring</u>: Sum of number of affirmative responses (possible range = 0–13), per scale author guidance
Post-traumatic Stress Disorder symptoms	*Reaction of Adolescents to Traumatic Stress (RATS)* (Bean et al., 2004a, 2006) *Self-report*	• Self-report 22-item measure assessing PTSD signs and symptoms corresponding to intrusion, avoidance, and hyperarousal dimensions based on DSM-IV-TR PTSD criteria B,C, & D **Present study**: • <u>Scoring</u>: 4-point Likert scale (1 "not", 2 "a little", 3 "much", 4 "very much"; scored dimensionally (possible range=22–88), per scale author guidelines • <u>Psychometrics</u>: Internal consistency reliability/ Cronbach's α= 0.88; comparable to other samples (Bean et al., 2006)
Major Depressive Episode (MDE), Post-traumatic Stress Disorder (PTSD), subthreshold MDE, subthreshold PTSD	*Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID)* (First et al., 2010) *Structured interview*	• Criterion based, structured diagnostic interview that generates a DSM-IV diagnosis • Some author guidance available on abridging content and generating subthreshold diagnoses (First et al., 2002 or accessible at www.scid4.org/info/guidelines.html) **Present study:** • Used abridged content from modules for MDE and PTSD, only, to generate study diagnostic assignments of MDE, subthreshold MDE, or no MDE and PTSD, subthreshold PTSD, or no PTSD • Skip-out procedures not implemented • Started with French language version (Ouellet, personal communication) • Retained French version of instructions to investigators • Translated questions for respondents into Haitian Creole, using backtranslation process (to English) to optimize equivalence with original version • <u>Modifications to MDE questions</u>: omitted items asking about substance use and general medical conditions as possible etiological factors, and items ascertaining postpartum onset, catatonic features, melancholic features, atypical features, and past MDE episodes • <u>Modifications to the PTSD questions</u>: omitted items about age of onset, full or partial remission, and past history; included specific question about 2010 earthquake as addition to standard SCID prompts for eliciting traumatic experiences • <u>Modifications to formatting</u>: Retained most of relevant original formatting except for removal of skip-out instructions • Added a study-specific SCID interview summary ratings sheet for interviewers to summarize information about presence of the disorder, record additional summary information about suicidal ideation and presentations that did not meet full threshold criteria, and indicate if diagnosis could not be ascertained <u>Scoring:</u>

Construct	Source measure and method of assessment	Description of measure, study-specific usage or adaptation, and psychometric properties
		• Interviewer rating of presence/absence of MDE and/or PTSD diagnosis was primary basis for study diagnostic assignment of MDE and PTSD
		• Modified scoring procedure used the additional data recorded on the SCID ratings form, including data from the individual SCID question ratings, study-specific ratings sheet, and written margin and summary notes
		1. Bereavement data were reviewed but not used as an exclusion criterion for MDE or subthreshold MDE
		• All assignments made by consensus among at least three team members after systematic review of interview data as follows:
		Eligibility for full-syndrome diagnostic assignment
		• MDE (or PTSD) rated as **present** by interviewer on SCID and/or on study-specific summary rating
		1. If only one of the SCID and study-specific summary ratings was recorded, team reaches consensus that margin notes do not clearly contradict a full-syndrome diagnosis
		2. If SCID and study-specific summary ratings both recorded and concordant, team reaches consensus that margin notes do not clearly contradict a full-syndrome diagnosis
		3. If SCID and study-specific summary ratings both recorded and discordant, team reaches consensus that margin notes best support a full-syndrome diagnosis
		Subthreshold PTSD and MDE diagnostic assignment
		• When participant did not meet criteria for either MDE or PSTD and
		• Participant met subthreshold criteria described in Table 2

Table 2

Study criteria for diagnostic assignment of subthreshold MDE and subthreshold PTSD among participants not meeting full-syndrome criteria

	Conservative	Broad
Subthreshold MDE	• Depression and/or anhedonia rated as present[1] • At least 4/9 Criterion A[2] signs and symptoms, in total, were rated as present • Criterion C (distress or impairment) was rated as present	• Depression and/or anhedonia were rated as subthreshold or present • At least 5/9 Criterion A signs and symptoms, in total, were rated as subthreshold or present • Criterion C (distress or impairment) was rated as subthreshold or present
Subthreshold PTSD	• A Criterion met for PTSD: both experience of traumatic event and response involving fear, helplessness, or horror were rated as present • B Criterion met for PTSD: at least one re-experiencing symptom rated as present • Either C or D Criterion met for PTSD: at least three avoidance/numbing (C) or two hyperarousal (D) symptoms rated as present • Clinically significant distress or impairment in social, occupational or other important areas of functioning (F Criterion) rated as present	• Both components of A Criterion (experience of traumatic event and response involving fear, helplessness, or horror) rated as subthreshold or present • At least one re-experiencing (B Criterion) symptom rated as subthreshold or present • At least three avoidance/numbing (C Criterion) or two hyperarousal (D Criterion) symptoms rated as subthreshold or present • Clinically significant distress or impairment in social, occupational or other important areas of functioning (F Criterion) rated as subthreshold or present

[1] *Present* refers to a rating of 3 on signs, symptoms, or criteria assessed during the SCID-based research interview, consistent with scoring on the SCID (First et al., 2010); likewise "subthreshold" refers to a rating of 2 on these criteria.

[2] Criteria referenced in the table refer to the DSM-IV-TR criteria rated in the SCID for MDE and PTSD, respectively (American Psychiatric Association, 2000; First et al., 2010).

Table 3

Student Sample Characteristics, *n*=120 unless otherwise indicated

Measure	*n* (%), unless otherwise specified
Socio-demographic	
Age in years, mean (SD)	19.5 (1.37)
Gender	
Male	80 (66.7%)
Female	40 (33.3%)
Days of school attended per week, on average, mean (SD), *n*=118	4.7 (1.34)
School	
Public	60 (50.0%)
Private	60 (50.0%)
Household economic status indicators	
Latrine at home	90 (75.0%)
Roofing on home, *n*=119	
Aluminum	77 (64.7%)
Thatched	2 (1.7%)
Concrete	30 (25.2%)
Other	10 (8.4%)
Number of meals per day, on average, mean (SD), *n*=106	2.2 (.63)
Days without any food, in last three months, *n*=113	
None	28 (24.8%)
One	22 (19.5%)
Two	13 (11.5%)
Three	7 (6.2%)
More than three	43 (38.1%)
Utilization and access to care	
Accessed care for any health problem	
Utilized general health care in past 12 months	63 (52.5%)
Accessed care for a mental health problem	
Utilized mental health care in lifetime	30 (25.0%)
Utilized mental health care in past 12 months	15 (12.5%)
Accessed care from a healer or houngan for any health problem	
Utilized healer or *houngan* for general health care in past 12 months	15 (12.5%)
Accessed care from a healer or houngan for a mental health problem	
Utilized healer or *houngan* for mental health care in lifetime	21 (17.5%)
Utilized healer or *houngan* for mental health care in past 12 months	9 (7.5%)
Reported difficulties with care access	
Have you ever had difficulty with transport to a health center or clinic?, *n*=117	51 (43.6%)
Do you ever have difficulty paying for your health care at a hospital or clinic?, *n*=116	69 (59.5%)
Do you ever have difficulty paying for medicine at a hospital, clinic, or pharmacy?	61 (50.8%)

Measure	*n* (%), unless otherwise specified
Do you ever have difficulty paying for your health care from a healer?	32 (26.7%)
Do you ever have difficulty paying for medicine from a healer?	29 (24.2%)

Table 4

One-month point prevalence estimates and 95% confidence intervals for MDE, PTSD, MDE and/or PTSD, and comorbid MDE and PTSD

	Overall, *n*=120	Male, *n*=80	Female, *n*=40	*p*
MDE case	7.5% (3.7–13.1%), *n*=9	3.8% (.8–10.6%), *n*=3	15.0% (6.3–28.1%), *n*=6	.059
MDE case or subthreshold	25.8% (18.6–34.1%), *n*=31	26.3% (17.5–36.5%), *n*=21	25.0% (13.4–39.7%), *n*=10	.88
PTSD case	10.8% (6.1%-17.2), *n*=13	10.0% (4.7–17.8%), *n*=8	12.5% (4.2–26.8%), *n*=5	.76
PTSD case or subthreshold	20.8% (14.2–28.7%), *n*=25	21.3% (13.3–31.0%), *n*=17	20.0% (9.7–34.0%), *n*=8	.87
MDE and/or PTSD case	14.2% (8.7–21.1%), *n*=17	10.0% (4.7–17.8%), *n*=8	22.5% (11.5–36.9%), *n*=9	.064
MDE and/or PTSD case or subthreshold	36.7% (28.4–45.5%), *n*=44	35.0% (25.1–45.8%), *n*=28	40.0% (25.8–55.5%), *n*=16	.59
Comorbidity (MDE and PTSD case)	4.2% (1.4–9.5%), *n*=5	3.8% (.8–10.6%), *n*=3	5.0% (.6–16.9%), *n*=2	1.00
Comorbidity (MDE and PTSD case or subthreshold)	10.0% (4.6–15.4%), *n*=12	12.5% (6.5–20.9%), *n*=10	5.0% (.6–16.9%), *n*=2	.33

Note. Wald method used for 95% confidence intervals except when *n* 5, in which case exact method was used. Significance testing with chi-square, except any cells had expected count <5, in which case Fisher's exact test was used.

Table 5

Convergent validity of MDE and PTSD diagnostic assignments.

MDE	Overall Mean (SD) (n=120, unless indicated)	MDE Case, Mean (SD) (n=9)	All others Mean (SD) (n=111, unless indicated)	Wilcoxon-Mann-Whitney z, p	MDE Case or Subthreshold, Mean (SD) (n=31, unless indicated)	All others Mean (SD) (n=89, unless indicated)	Wilcoxon-Mann-Whitney z, p
CES-D	22.75 (12.38) (n=111)	40.63 (11.86)	21.17 (11.16) (n=102)	z=3.77, p<.001	33.17 (11.20) (n=30)	18.89 (10.45) (n=81)	z=5.20, p<.001
GSHS Worry[a]	2.46 (1.08)	3.89 (0.33)	2.34 (1.04)	z=4.06, p<.001	3.19 (0.87)	2.20 (1.04)	z=4.37, p<.001
GSHS Social Impairment[b]	2.22 (1.05)	3.33 (1.12)	2.13 (0.99)	z=3.02, p=.003	2.87 (1.02)	1.99 (0.96)	z=3.94, p<.001
GSHS Academic Impairment[c]	2.76 (1.18) (n=119)	3.56 (0.88)	2.70 (1.19) (n=110)	z=2.18, p=.029	3.35 (0.91)	2.56 (1.20) (n=88)	z=3.44, p=.001
PTSD	Overall (n=120, unless indicated)	PTSD Case (n=13)	All others (n=107, unless indicated)	Wilcoxon-Mann-Whitney z, p	PTSD Case or Subthreshold (n=25)	All others (n=95, unless indicated)	Wilcoxon-Mann-Whitney z, p
SLE	5.43 (2.20)	7.00 (2.04)	5.24 (2.15)	z=2.58, p=.010	6.92 (1.93)	5.04 (2.11)	z=3.77, p<.001
RATS	47.77 (11.76) (n=115)	55.16 (9.62)	46.82 (11.72) (n=102)	z=2.44, p=.015	53.73 (8.37)	46.12 (12.07) (n=90)	z=3.11, p=.002

[a]During the past 12 months, how often have you been so worried about something that you could not sleep at night?

[b]During the past 12 months, how often have you felt lonely?

[c]During the past 12 months, how often have you had a hard time staying focused on your homework or other things you had to do?