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Cultural concepts of distress and psychiatric disorders: literature review and research recommendations for global mental health epidemiology

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Background Burgeoning global mental health endeavors have renewed debates about cultural applicability of psychiatric categories. This study's goal is to review strengths and limitations of literature comparing psychiatric categories with cultural concepts of distress (CCD) such as cultural syndromes, culture-bound syndromes, and idioms of distress.

Methods The Systematic Assessment of Quality in Observational Research (SAQOR) was adapted based on cultural psychiatry principles to develop a Cultural Psychiatry Epidemiology version (SAQOR-CPE), which was used to rate quality of quantitative studies comparing CCD and psychiatric categories. A meta-analysis was performed for each psychiatric category.

Results Forty-five studies met inclusion criteria, with 18 782 unique participants. Primary objectives of the studies included comparing CCD and psychiatric disorders (51%), assessing risk factors for CCD (18%) and instrument validation (16%). Only 27% of studies met SAQOR-CPE criteria for medium quality, with the remainder low or very low quality. Only 29% of studies employed representative samples, 53% used validated outcome measures, 44% included function assessments and 44% controlled for confounding. Meta-analyses for anxiety, depression, PTSD and somatization revealed high heterogeneity ($I^2 > 75\%$). Only general psychological distress had low heterogeneity ($I^2 = 8\%$) with a summary effect odds ratio of 5.39 (95% CI 4.71-6.17). Associations between CCD and psychiatric disorders were influenced by methodological issues, such as validation designs ($\beta = 16.27$, 95%CI 12.75-19.79) and use of CCD multi-item checklists ($\beta = 6.10$, 95%CI 1.89-10.31). Higher quality studies demonstrated weaker associations of CCD and psychiatric disorders.

Conclusions Cultural concepts of distress are not inherently unamenable to epidemiological study. However, poor study quality impedes

conceptual advancement and service application. With improved study design and reporting using guidelines such as the SAQOR-CPE, CCD research can enhance detection of mental health problems, reduce cultural biases in diagnostic criteria and increase cultural salience of intervention trial outcomes.

Keywords Culture, developing countries, epidemiologic methods, global mental health, mental disorders, meta-analysis

Introduction

In 1904 Emile Kraepelin initiated the field of comparative psychiatry (vergleichende Psychiatrie) through investigation of dementia praecox in Java, and he later documented psychiatric presentations among Native Americans, African Americans and Latin Americans.[1] A century later, active debate continues regarding the role of culture in mental disorders and the cross-cultural applicability of biomedical psychiatric diagnoses.[2] Methodological limitations in cross-cultural psychiatric epidemiology have been cited as a primary reason why cultural differences have not translated into re-evaluating psychiatric concepts and treatment practices.[3,4] For example, cultural differences in schizophrenia outcomes, which have been identified in three successive studies,[5–10] have done little to alter conceptualizations or treatment of the disorder, and this is in part due to methodological problems in the cross-national studies.[3,11–13] These studies, along with World Health Organization (WHO) World Mental Health Surveys,[14] are typified by application of Western culturally developed biomedical psychiatric diagnoses that lack inclusion of cultural concepts of distress (CCD). To date there have not been large-scale cross-national global mental health epidemiology studies incorporating CCD. To address this gap in the research, a review of the literature on CCD was undertaken to examine the types of studies conducted, the methodological approaches and the association of CCD with psychiatric disorders. The goal is to identify best practices in cross-cultural psychiatric epidemiology to improve research on CCD and encourage application to mental health services.

The term 'cultural concept of distress' is a new addition to the Diagnostic and Statistical Manual of Mental Disorders (DSM) series with the publication of DSM-5: '*Cultural Concepts of Distress* refers to ways that cultural groups experience, understand, and communicate suffering, behavioral problems, or troubling thoughts and emotions'.[15] The term is a recent advance in the history of attempts to categorize psychological distress with demonstrable cultural influence that lacks one-to-one unity with biomedical psychiatric diagnoses (see Box 1 for exemplar CCD.) The attempt to label CCD dates back to Pow Meng Yap's research in Hong Kong in the 1950–60s.[16] Yap employed the term 'culture-bound depersonalization syndrome' to describe koro, a 'state of acute anxiety with partial depersonalization' associated with fear of the penis retracting into the body. The term 'culture-bound syndrome' has been used in cross-cultural psychiatry since and was included in the DSM-IV.[17]

However, the term culture-bound syndrome has been associated with numerous limitations: findings of similar patterns of distress in disparate cultural settings, lack of cohesive symptom presentation characterizing a syndrome, and wide diversity in aetiological attributions, vulnerability groups and symptoms that influence cultural labels.[18–22] Moreover, the combination of medical anthropology research, which documents the social construction of psychiatric disorders,[23] with innovations in gene-by-environment and social neuroscience research, which illustrate that culture and biology are not neatly divisible categories,[24–28] demonstrates that all psychological distress is culture bound. To acknowledge this, the DSM-5 includes text that 'all forms of distress are locally shaped, including the DSM disorders'.[15] Due to dissatisfaction with the term culture-bound syndrome, researchers have proposed other labels such as 'idioms of distress', 'popular category of distress', 'cultural syndrome' and 'explanatory model'.[29–33] The term 'cultural concept of distress' is an attempt to aggregate these different concepts without implying cultural exclusivity.

There has been a tension in cultural psychiatry about comparing CCD with psychiatric disorders. Because CCD often incorporate culturally salient aetiological models, vulnerability expectations, wide-ranging associated symptoms and a mixture of lay and local professional attributions systems, comparison with psychiatric diagnoses has been criticized as forcing homogeneity onto CCD and losing key aspects of aetiology and vulnerability that are not incorporated in most psychiatric diagnoses.[20,21,34] However, there is a growing body of epidemiology literature comparing CCD with psychiatric disorders for a variety of goals, such as validating psychiatric disorders against CCD, identifying vulnerable groups based on CCD status and identifying forms of distress and impairment not captured by psychiatric disorders.

The goal of this review is to explore the methodological approaches of these epidemiological studies of CCD and psychiatric disorders, to identify limitations in the approaches and best practices for future work. We sought to develop specific criteria for evaluating

Box 1. Examples of Cultural Concepts of Distress (CCD)

Nervios-related conditions—In the Americas, nervios (nerves)-related conditions among Latino populations are the most commonly described CCD.[126] Nervios starts with 'a persistent idea that 'is stuck to one's mind' ('idea pegada a la mente'), and these 'particular idea[s]...invade the mind and accumulate... Affected individuals think so much about the ideas that the ideas 'get stuck' to the brain'.[94] Among Mexicans with nervios, 40% endorsed having an idea stuck to their mind. In nervios, feelings of humiliation lead to the slow deterioration of one's mind, nerves and spirit and 'may even cause death, if adequate help is not timely received'.[127] The spectrum of nervios follows a gradient of behavioural control.[80] One end of the spectrum begins with socially acceptable nervousness: ser una persona nerviosa (being a nervous person). Padecer de los nervios (suffering from nerves) is more serious. Ataques de nervios (attacks of nerves) have greater severity and are characterized by social stressors triggering loss of behavioural control, dissociation, violent acts toward oneself or others, anger and somatic distress.[128] Severe nerve illness can lead to loco (madness). Nervios (nerves), padecer de nervios (suffering from nerves) and ataques de nervios (nerve attacks) have been studied in clinical samples in large-scale Latino representative community studies in Puerto Rico and the USA.[70,71] Ataques de nervios overlap with some symptoms of panic attacks and panic disorder. However, they are distinct from panic attacks because of the centrality of interpersonal disputes in triggering episodes, dissociative features and an experience of relief among some individuals after an ataque.[80,132] These nervios-related conditions are associated with unexplained neurological complaints, physical health problems and functional impairment independent of association with psychiatric disorders.

Dhat—Dhat syndrome has been studied in South Asia and is rooted in Ayurvedic traditions about bodily production of semen as representing an end-product of energy demanding metabolism: 40 meals create 1 drop of blood, 40 drops of blood create 1 drop of semen.[43] Dhat is recognized by a whitish discharge in urine assumed to be semen. Although sexually transmitted infections may be a source of such discharge, dhat sufferers do not appear to have greater frequency of STIs.[69] Dhat sufferers do appear to have high rates of psychosexual dysfunction including premature ejaculation and erectile dysfunction: 42% of men with dhat had premature ejaculation in one study in India.[64] Young males appear to be the most frequent demographic group presenting with dhat. Dhat has corollaries in Chinese medicine and European and American history with accounts of weakness, physical illness and mental illness related to the loss of semen.[43,77]

Koro—Koro was one of the first cultural concepts discussed in transcultural psychiatry literature.[16] Koro epidemics have been reported in South Asia, and case reports have been reported throughout the world. Fear of the penis retracting into the body among men and retraction of breasts among women is a central feature. The majority of reported cases are among men.

Brain fag—Brain fag has been studied for a half-century in Western Africa. The condition is characterized by distress from thinking too much, with students being a vulnerable population.[86] The experience includes headaches and an experience of a worm crawling in the head. This is similar to the Nigerian cultural concept of distress, ode ori:[84] the disorder ode ori (hunter in the head) affects the brain under the anterior fontanelle where the iye (senses) control mental functions through okun (strings) that project throughout the body and provide direct linkages among the brain, eyes, ears and heart.

Khyal attacks and 'wind'-related illnesses—The substance qi, (cf chi, chi'i, khí, khii, rlung, khyal) is associated with wind flow and wind balance. Wind-related illnesses are commonly described in East Asian populations including Tibetans, Cambodians, Vietnamese, Chinese and Mongolians.[73,77,78,129,130] Shenjing shuairuo (neurological weakness, neurasthenia), studied by Kleinman in the 1970s and 80s, is associated with weakness, fatigue and social distress mediated by an alteration in qi.[77] Yadargaa, a nervous fatigue described in Mongolia, is similarly viewed as an alteration in khii flow and balance.[78] In the Vietnamese CCD 'hit by wind', shifts in ambient temperature, especially gusts of cold air, are associated with a range of physical complaints, traumatic memories, thinking too much, epilepsy and stroke.[73] Similarly, in China, nerve weakness is associated with a fear of cold because it worsens nerve weakness.[77] Among Cambodians, the wind-like substance khyal can be experienced as an attack associated with palpitations, asphyxia and dizziness.[130] Khyal attacks can lead to rupture of blood vessels in the neck and spinning of the brain.

Kufungisisa—The experience of thinking too much (Shona: kufungisisa) is associated with general psychological distress and common mental disorders in Zimbabwe. Thinking too much is considered both a symptom of distress and a cause of other physical and psychological health problems: thinking too much can cause pain and feelings of physical pressure on the heart.[54]

Hwa-Byung—Heat and fire are important elements in East Asian ethnopsychology. The condition hwa-byung (fire illness resulting from chronic accumulated anger) in Korea occurs when haan (a mixture of sorrow, regret, hatred, revenge and perseverance) builds up to create a pushing sensation in the chest, resulting in the inability to appropriately control one's anger.[85] Hwa-byung affects middle-aged women in Korea who have experienced years of interpersonal conflict, typically in the context of an abusive marital relationship.

epidemiological studies based on cultural psychiatry principles. With the expansion of global mental health research and scaling up of services,[35–38] it is an ideal time to evaluate if and how CCD can be incorporated into community and clinical epidemiology to reduce suffering. Our review is divided into the following sections: identification of studies comparing CCD and psychiatric disorders; description of study objectives and methods including ranking epidemiological quality of these studies; examining summary effect sizes and sources of heterogeneity when comparing CCD and psychiatric disorders; and concluding with recommendations for incorporating CCD in global mental health research and services.

Methods

Informational sources

To identify literature on CCD we searched MEDLINE/PubMed, applying the following keywords: 'culture-bound' or 'culture bound' or 'idiom of distress' or 'idioms of distress'. To assure inclusion of popularly studied CCD, we combined the above search with a search of CCD listed in the DSM-5 glossary: 'nervios' or 'dhat' or 'khyal' or 'kufungisisa' or 'maladi moun' or 'shenjing shuairou' or 'susto' or 'taijin kyofusho'). We limited psychiatric outcomes to common mental disorders (operationalized here as depression, anxiety-related conditions including posttraumatic stress disorder (PTSD) and panic disorder, and somatization-related conditions) because of their significant burden of disease, the breadth of research on CCD and common mental disorders, and feasibility of assessing common mental disorders through self-report. In contrast, psychosis-related conditions have shown poor reliability and low detection through self-report cross-culturally.[39,40] In our preliminary searches for substance use disorders, eating disorders and developmental disorders, we identified a limited number of studies precluding synthesis of findings. The psychiatric disorder search terms thus included the following: 'depression' or 'depression, postpartum' or 'PTSD' or 'stress disorders, post-traumatic' or 'fatigue syndrome, chronic' or 'fatigue' or 'anxiety disorders' or 'anxiety' or 'panic disorder' or 'panic attack' or 'somatoform disorders' or 'somatic complaints'. Searches were limited to English-language peer-reviewed journal publications. In addition, reference sections of previous reviews on culture-bound syndromes were searched,[41–48] and reference sections of articles identified in the search were used to locate additional articles. The initial searches was performed in November 2012 and repeated for new references in March 2013 and September 2013.

Data collection

To extract relevant data, all studies identified through searches were read and evaluated for inclusion by the first author. Inclusion criteria comprised English language, prevalence data for a psychiatric category, prevalence data for a CCD, odds ratios with 95% confidence intervals for association of CCD and psychiatric category or data presented in a manner enabling construction of a two-by-two comparison of psychiatric classification and CCD. Exclusion criteria were case studies and articles lacking original quantitative data. Extracted data included world region, country, study population (including current country of residence for refugee and immigrant populations), researcher label for CCD (e.g. idiom of distress, culture-bound syndrome, cultural syndrome, cultural somatic symptom), language of term, English translation of term, research objective of the study, sample size, sample description, sample origin (clinical, community or school), age group of sample, representative vs convenience or other sample, inclusion and description of control or comparison group, symptom/syndrome description, assessment method for CCD (self-labelling with single-item term, labelling based on a multi-item self-report instrument score, labelling by healthcare provider including traditional healers and clinical providers, labelling from key informant in community), symptom severity assessment, type of symptoms (subjective self-report, externally observable or mixed), CCD prevalence (lifetime, current or unclear), age of onset, duration of current episode, psychiatric diagnostic instrument, administration format of psychiatric instrument (e.g. clinician administered, researcher administered, self-report), validation of instrument in study population, assessment of functioning and impairment, aetiology/perceived cause of CCD, vulnerability factors and risk group for CCD, protective factors against CCD, inclusion of follow-up assessment, percentage lost to follow-up, reasons lost to follow-up, current or prior treatment status, description of study treatment, assessment of psychiatric comorbidities, assessment of biological comorbidities and potential confounds.

Quality assessment

To assess quality, we chose the Systematic Assessment of Quality in Observational Research (SAQOR), which has been developed for assessing quality in observational studies[49] and has been used to rate global mental health research conducted across cultural settings.[50] SAQOR includes six domains: Sample, Control/Comparison Group, Quality of Exposure/Outcome Measurements, Follow-Up, Distorting Influences and Reporting Data. Each domain contains multiple criteria. For this study, the results section describes modification of SAQOR to develop a version for Cultural Psychiatry Epidemiology (SAQOR-CPE).

Meta-analyses

Odds ratios were extracted or calculated from quantitative studies to determine the likelihood of a specific psychiatric category given the presence of a specific

CCD. Two-by-two tables were constructed for all quantitative papers that included data for categorical outcomes of CCD (yes vs no) and psychiatric categories (yes vs no). If studies only included mean scores on symptom scales without providing information on categorical cut-offs, these studies were not included in the meta-analysis. In the two-by-two tables, CCD were considered the independent variable and psychiatric categories were considered the dependent variable.

Odds ratios (OR), 95% confidence intervals, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for all studies in the meta-analysis. If a study contained an empty field in the two-by-two table, then individual study outcomes (OR, sensitivity, specificity, PPV and NPV) were not calculated; however, the participants were included in the meta-analysis summary calculations. Sensitivity was calculated as the proportion of persons positive for both the CCD and the psychiatric category, among all persons with CCD. Specificity was calculated as the proportion of persons negative for the CCD and negative for the psychiatric category, among all persons negative for the CCD. Positive predictive value was calculated as the proportion of participants positive for both the CCD and psychiatric category, among all participants positive for the psychiatric category. Negative predictive value was calculated as the proportion of participants negative for both the CCD and the psychiatric category, among all persons negative for the psychiatric category.

Heterogeneity for summary effect sizes was calculated with the Q statistic. The statistic was calculated by summing the squared deviations of each study's effect estimated from the overall effect estimate; each study was weighted by its inverse variance.[51] I^2 is another measure of heterogeneity calculated by dividing the difference of the Q statistic and its degrees of freedom by the Q statistic and multiplying this by 100.[51] Low values (e.g. $<25\%$) suggest low heterogeneity whereas $I^2 > 75\%$ suggests high heterogeneity with study characteristics and methods influencing the associations.

Generalized estimating equations (GEE) were used to assess the influence of study design on effect sizes. GEE is one method that can account for the clustering of multiple comparisons within a single study.[52] The odds ratio for each study was used as the dependent variable. Independent variables included world region (Americas, Africa, Asia), researcher label ('culture-bound…', 'idiom…', 'popular…', other '…syndrome' and other label), study objective (compare CCD and psychiatric disorder, instrument validation study, assessment of risk factors for psychological distress, and other), sample size (<100, 100–499 and $\geqslant 500$ participants) recruitment site (clinical, community or school-based settings), representativeness of sample (representative sample vs all other recruitment forms), CCD type (four groups were created based on greatest number of participants: nervios-related studies, 10 820 participants; dhat studies, 863 participants; hwa-byung studies, 3087 participants; and all other cultural concepts of distress, 4012 participants), CCD-self report (participant endorsed CCD vs studies in which the CCD was attributed to the participant by the researcher, a clinician, or a key informant), assessment method for CCD [categorized into four groups: (i) self-report single item binary categorical endorsement (e.g. yes vs no for 'Have you ever had an ataque de nervios?'); (ii) self-report multi-symptom instrument score (e.g. mean scale above a cut-off for number of symptoms to meet criteria as a proxy for ataques de nervios, such as symptoms of blinding, fainting and paralysis with symptoms beginning after a troubling experience[53]); (iii) clinical diagnosis (e.g. clinician making a diagnosis of dhat or hwa-byung based on specific clinical guidelines); or (iv) other third party labelling (e.g. binary categorical label of CCD provided by someone other than participant or clinician; this was usually done by key informants in the community or parents)], prevalence of CCD (lifetime, current/point or unclear), psychiatric categories (classified in five groups: general psychological distress, all anxiety disorders, mood disorders, somatoform disorders and other disorders), controlling for comorbidity (control through inclusion/exclusion criteria or through statistical analysis vs no control for comorbidity) and SAQOR-CPE overall ranking score (very low quality, low quality, medium quality, or high quality). Only analyses with OR outcomes were entered into the GEE. This led to inclusion of 79 comparisons drawn from 26 studies because some studies had multiple comparisons.

Results

Study characteristics

Through the search terms, 211 citations were identified; 12 studies were added from reviews and references lists. Of the total of 223 studies evaluated, 45[53–97] included quantitative data on both cultural concepts of distress and psychiatric categories (see Figure 1). Ten studies were conducted in Africa, 18 in the Americas and 17 in Asia (see Table 1a, b, c). The most common CCD were nervios-related conditions, comprising 30% of studies. Nine studies (20%) included children, and the remainder only had adult participants. Studies with participants under 18 years of age were predominantly nervios-related conditions, as well as dhat among adolescent boys. Sixteen (35%) of the studies used the label 'culture-bound'; nine studies (20%) used 'idiom of distress'; and 23 studies had comparison of CCD with psychiatric disorders as a primary objective. For eight studies, the primary goal was to evaluate association with a risk factor

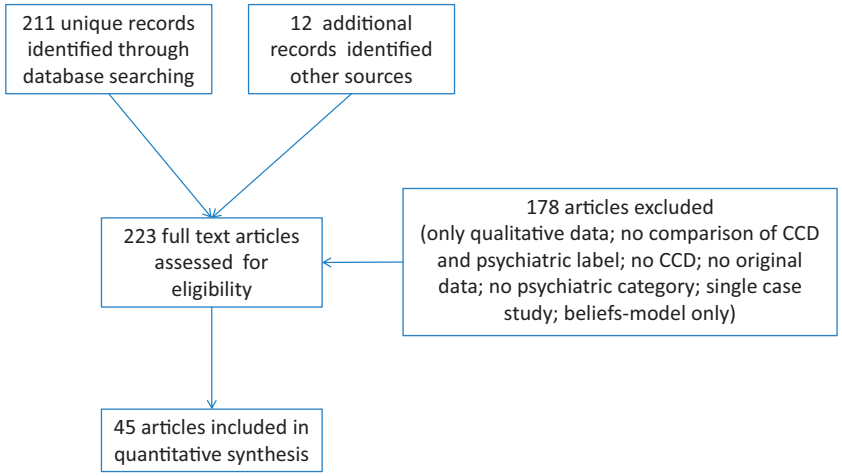

Figure 1 PRISMA diagram showing selection of studies for inclusion in systematic review of cultural concepts of distress (CCD) and psychiatric disorders

or vulnerable group. Seven studies had instrument adaptation and validation as the primary goal.

Quality ratings: SAQOR-CPE

We reviewed the studies to identify types of data commonly reported, and we drew upon broader CCD literature to consider key aspects of CCD relevant to quantitative studies that could influence or confound associations between CCD and psychiatric disorder. These issues were incorporated into the Systematic Assessment of Quality in Observational Research (SAQOR)[98] to develop a modified version for Cultural Psychiatry Epidemiology (CPE): the SAQOR-CPE. Table 2 lists the seven categories and their criteria. Table 3 includes the quality scoring for individual studies in the review. Below we describe each category and criterion.

Sample

The Sample category and each of its original five criteria were retained.

Representative refers to studies that can be generalized to a population of interest. Cultural Psychiatry Epidemiology (CPE) studies should use the same epidemiological principles as standard health studies. It is especially crucial that CPE studies have a clear definition of the cultural group of interest to which findings can be applied. For example, ataque de nervios findings from Puerto Rico may not be generalizable to Guatemalans, Cubans or Bolivians in their home countries or after immigration. An exemplar study is the investigation of ataques de nervios in the National Latino and Asian American Study, in which outcomes are presented separately for Puerto Ricans, Cubans, Mexicans and other Latinos, revealing group differences.[71] Less than one-third of the studies (29%) in this review used culturally appropriate representative sampling.

Source refers to how cases are identified. Authors should clearly state if self-labelling, clinician diagnosis or other key informant identification was used to enroll a participant as either CCD or non-CCD. If an individual other than the participant assigned the label, then the degree of concordance between the external label and the self-label should be reported. A study to validate a postpartum depression measure in the Democratic Republic of Congo provides a good example of this: of 91 women identified with a CCD by key informants, only 41 (45%) self-endorsed the CCD label; of 42 women identified by key informants as not having the CCD, only 20 (48%) self-endorsed not having the CCD.[56] This illustrates that using key informants in this setting to identify cases and make generalizations is no better than randomly assigning a group of women to CCD vs not-CCD status. In all, 44 studies reported CCD source.

Method refers to the process of recruiting participants. In cross-cultural research, recruitment method may bias prevalence rates and association with risk factors. For example, if key informants are used, they may be less likely to identify high-status individuals in the community who have CCD. Stigma may lead to CCD non-disclosure despite experiencing suffering. A study of Darfuri refugees in Chad used United Nations High Commissioner for Refugees (UNHCR) registration to randomly select participants; because caseness (ie CCD status) was not a criteria in the sampling frame, potential participants were approached without prior knowledge of CCD status, thus reducing potential bias in endorsement.[93] A total of 43 studies provided some information on recruitment methods.

Sample size and power calculation: studies need to be adequately powered to detect differences between groups in exposures, psychiatric disorders or other factors. Prior studies done with similar populations can be used to estimate prevalence of a CCD. If

Table 1a Studies conducted in Africa, meeting inclusion criteria for comparison of cultural concepts of distress and psychiatric categories

Reference	Rasmussen 2011[93]	Bass 2008[56]	Makanjuola 1987[84]	Ola 2011[86]	Betancourt 2009[57]
Country	Chad	Democratic Republic of Congo	Nigeria	Nigeria	Uganda
Cultural concept of distress	Hozun (deep sadness), majnun (madness)	Maladi ya souci (syndrome of worry)	Ode-ori (hunter in the head)	Brain fag	Ma lwor (anxiety), kwo maraca (conduct disorder), par (mood disorder), two tam (mood disorder), kumu ('holding one's cheek in the hand'—mood disorder)
Terminology	Idioms of distress	Local syndrome	Culture-bound disorder	Culture-bound syndrome; indigenous psychopathologies	Local syndrome
Research objective	Create a culturally-appropriate measure of distress and evaluate psychometric properties of factor structure and external criterion validity	Determine existence of post-partum depression syndrome; adapt and validate instruments	Identify chief complaints and psychiatric symptoms among patients with a culture-bound syndrome	Factoral validation and reliability of brain fag scale	Evaluating reliability and validity of mental health measure
Recruitment	Community	Clinical	Clinical	School	Community
Sample	Adult: 848 Darfuris in refugee camp	Adult: 133 women attending maternity clinic identified by key informants	Adult: 30 psychiatric patients	Child: 234 students age 11-20 years	Child: 166 war-affected youth in internal displacement camp in northern Uganda
Assessment method	Self-report multi-symptom inventory	Single-item key informant and self-report	Traditional healer	Self-report multi-symptom inventory	Single-item key informant, parent and self-report
Prevalence	Unclear	Unclear	Current	Unclear	Unclear
Comparison group	Unclear—no information regarding participants without hozun or majnun, only mean scale scores	Yes—sample included key-informant negative cases and women not endorsing syndrome	No—all patients had ode ori labels	Unclear—no information of participants with no brain fag, only mean BFSS scores provided	Yes —sample included KI-negative, parent-report negative, and self-report negative cases
Psychiatric categories	Depression, PTSD	Depression, post-partum depression	All major psychiatric categories	Anxiety	Anxiety, depression, conduct problems
Instruments, validation	BSI, PCL-C, not validated	EPDS, HSCL, not validated	PSE, no validation information provided	BFSS, STAI validated in Nigeria	APAI, locally developed scale
Functioning	WHO-DAS	Local syndromes	Not reported	Peer relationships	Not reported

(continued)

Table 1a Continued

Reference	Ertl 2010[68]	Bolton 2004[60]	Abas 1997[54]	Patel 1995[88]	Patel 1997[89]
Country	Uganda	Uganda	Zimbabwe	Zimbabwe	Zimbabwe
Cultural concept of distress	Spirit possession	Yo'kwekyawa (local depression syndrome)	Kusuwisia (deep sadness); kufungisisa (thinking too much)	Spiritual illness: chivanhu, mudzimu, mamhepo, zvishri	Mental problems
Terminology	Indigenous expressions of psychological distress	Local syndrome	Explanatory model	Spiritual distress	Indigenous concept of psychosocial distress
Research objective	Validate PTSD Instrument	Assess prevalence of depression using local instruments	Assess prevalence of common mental disorders and elicit explanatory models	Evaluate frequency of spiritual models of illness and association with mental disorders	Evaluate relationship between structured psychiatric diagnosis and primary care (traditional and biomedical) provider identification
Recruitment	Community	Community	Community	Clinical	Clinical
Sample	Child: 504 war-affected youth in Northern Uganda	Adult: 67 adults identified by key informants and self as suffering from syndrome	Adult: 172 women from townships	Adult: 302 primary care attendees	Adult: 302 primary care attendees
Assessment method	Self-report multi-symptom inventory	Single-item key informant and self-report	Single-item self-report	Clinician and self-report multi-symptom ratings	Clinician attribution (primary care and traditional healer)
Prevalence	Unclear	Unclear	Current	Current	Current
Comparison group	Unclear —only SPS mean scores provided	Yes—key informant and self-rating positive and negative cases	No—explanatory models not assessed among PSE negative participants	Yes—half of sample did not endorse spiritual aetiology	Yes—participants not classified by primary care worker or healer as having a mental problem
Psychiatric categories	Depression, PTSD	Depression	Psychological distress	General psychological distress	General psychological distress
Instruments, validation	HSCL, PDS, SPS, CAPS not validated	Lay interview with DSM-IV MDD criteria, not validated	PSE, SSMD has validation psychometrics	CISR, SSQ, SRQ, transcultural equivalence information provided	SSQ, CISR transcultural equivalence information provided
Functioning	Local scale	Local scale	Not reported	Not reported	WHO Quality of Life

(continued)

Table 1b Studies conducted in the Americas, meeting inclusion criteria for comparison of cultural concepts of distress and psychiatric categories

Reference	Salgado de Snyder 2000[94]	Pedersen 2008[90]	Guarnaccia 1993[70]	Guarnaccia 2005[72]	Lopez 2011[83]
Country	Mexico	Peru	Puerto Rico	Puerto Rico	Puerto Rico and USA
Cultural concept of distress	Nervios (nerves)	Llaki (grief), susto (fright), piensa-mientuwan (worrying memories), tutal piensamientuwan (excess of worrying memories)	Ataque de nervios (attack of nerves)	Ataque de nervios (attack of nerves)	Ataque de nervios (attack of nerves)
Terminology	Culturally-interpreted syndrome	Culture-bound trauma-related disorders; local idioms of distress	Popular category of distress	Cultural syndrome	Cultural idiom of distress
Research objective	Prevalence, comorbidity with mood and anxiety disorders, and associated symptoms	Map indigenous construction of emotions in response to political violence	Association with disaster and social characteristics	Prevalence and psychiatric correlates among children	Association between ataques and somatic complaints among Puerto Rican youth
Recruitment	Community, representative	Community, only persons with high GHQ and HSCL scores	Community, representative	Clinical and community, representative	Community, representative
Sample	Adult: 942 community residents	Adult: 144 screened from community	Adult: 912 community sample	Child: 1892 community and 761 clinical	Child: 1138 community sample
Assessment method	Single-item self-report (nervios ever vs never)	Single-item self-report (idioms currently yes vs no)	Single-item self-report (ataque de nervios ever vs never)	Single-item parent and self-report (ataque de nervios ever vs never)	Single-item parent and self-report (ataque de nervios ever vs never)
Prevalence	Lifetime	Point prevalence	Lifetime	Lifetime	Lifetime
Comparison group	Yes—adults not endorsing nervios	Yes—participants denying fright idioms	Yes—participants denying ataque de nervios episodes	Yes—participants denying ataque de nervios episodes	Yes—participants without parent or self-report of ataque de nervios
Psychiatric categories	Anxiety, depression	Anxiety, depression, PTSD	All major psychiatric categories	All major psychiatric categories	Somatic complaints (headache)
Instruments, validation	CIDI, validated in Spanish	GHQ and HSCL not validated for this population	DIS, validated Puerto Rican version	DISC, validated Puerto Rican version	DISC, validated Puerto Rican version
Functioning	Not reported	Not reported	DIS	GAS	Assessed 'limited activities'

(continued)

Table 1b Continued

Reference	Guarnaccia 2010[71]	Interian 2005[131]	Keough 2009[76]	Lewis-Fernandez 2002[80]	Lewis-Fernandez 2010[132]
Country	USA	USA	USA	USA	USA
Cultural concept of distress	Ataque de nervios (attack of nerves)	Ataque de nervios (attack of nerves)	Ataque de nervios (attack of nerves)	Ataque de nervios (attack of nerves)	Ataque de nervios (attack of nerves)
Terminology	Idiom of distress	Culturally sanctioned expression of distress	Culture-bound syndrome	Popular syndrome	Cultural idioms of distress
Research objective	Evaluate ataque de nervios as marker of social and psychiatric vulnerability	Evaluate the association of unexplained neurological symptoms with ataques	Determine prevalence of ataque-related symptoms across cultural groups	Evaluate phenomenological differences among ataque, panic attacks and panic disorder	To evaluate association among PTSD, dissociation and cultural idioms of distress
Recruitment	Community, representative	Clinical	School	Clinical	Clinical
Sample	Adult: 2554 Latino Americans	Adult: 95 Hispanic patients and 32 European American patients	Adult: 342 university students (200 Caucasian, 58 African American, 50 Hispanic)	Adult: 60 Hispanic patients presenting to anxiety disorders clinic with self-report of ataque de nervios	Adult: 230 Latina outpatients
Assessment method	Single-item self-report (ataque de nervios ever vs never)	Self-report multi-symptom inventory	Self-report multi-symptom inventory	Self-report multi-symptom inventory	Single-item self-report
Prevalence	Lifetime	Not reported	Not reported	Not reported	Lifetime
Comparison group	Yes—participants denying ataque de nervios	Yes—patients not meeting criteria for ataque based on multi-item checklist	Yes—participants scoring below cutoff on ataque de nervios checklist	Yes—all patients self-reported ataque de nervios, but only 32 met 8-symptom criteria	Yes—patients not endorsing ataque de nervios
Psychiatric categories	All major psychiatric categories	Anxiety, panic, depression, unexplained neurological complaints	Panic	Panic	PTSD
Instruments, validation	CIDI, validated for population	PRIME-MD, Ataque checklist, CIDI validated	PAQ-R, no validation reported	SCID, validated	SCID, validated
Functioning	CIDI	Not reported	Not reported	Not reported	Not reported

(continued)

Table 1b Continued

Reference	Liebowitz 1994[64], Salman 1998[77]	Caplan 2010[61]	Livinas 2010[82]	Alcantara 2012[55]	Caspi 1998[62]
Country	USA	UnSA	USA	USA	USA
Cultural concept of distress	Ataque de nervios (attack of nerves)	Coraje (rage), nervios (nerves), susto (fright)	Nervios (nerves)	Padecer de nervios (state of suffering from nerves)	Bebatchet (deep worrying sadness), chkuɔt (lost mind)
Terminology	Popular illness category	Idioms of distress	Culture-bound syndrome	Culture-bound syndrome	Culturally defined symptoms
Research objective	Relationship between ataques and comorbid psychiatric disorders	Detection of distress among Latinos not meeting criteria for depression	Compare performance on Adolescent Nervios Scale between Latinos and non-Latinos	Association with acculturation beyond value of traditional measures of anxiety sensitivity	Association of child loss with mental health and function impairment
Recruitment	Clinical	Clinical	School	School	Community
Sample	Adult: 156 Hispanic patients presenting to anxiety disorders clinic	Adult: 52 patients in psychiatry OPD	Child: 534 middle school students (307 Latino, 227 Non-Latino)	Adult: 82 mothers of Mexican origin	Adults: 161 parents
Assessment method	Single-item self-report	Single-item self-report	Self-report multi-symptom inventory	Single-item self-report	Single-item self-report
Prevalence	Lifetime	Past month	Unclear	Lifetime	Past week
Comparison group	Yes – patients who did not endorse *ataque de nervios*	Yes – patients with and without self-labeled symptoms	Unclear – participants with no symptoms, only mean scores provided	Yes – mothers who did not have padecer de nervios	Yes – Parents without Bebatchet or chkuɔt
Psychiatric categories	Anxiety, panic, depression	Depression	Anxiety, depression, anger	Psychological distress	PTSD
Instruments, validation	Clinician diagnosis	PHQ-9, validated	BYI-Anxiety, BYI-Depression, BYI-Anger, English language validations	BSI, Spanish BSI validation	Harvard Trauma Questionnaire, validation not reported
Functioning	Not reported	PHQ-9 function question	School functioning adjustment	Not reported	Select functioning items

(continued)

Table 1b Continued

Reference	Hinton 2003[73]	Hinton 2011[133]	D'Avanzo 1998[66]
Country	USA	USA	USA and Europe
Cultural concept of distress	Trúng gió (hit by wind)	Worry attacks	Khoucherang (thinking too much)
Terminology	Cultural syndrome	None	Culture-bound syndrome
Research objective	Phenomenologically characterize 'hit by the wind'.	Determine role of cultural model of worry in PTSD severity	Evaluate frequency of depression, anxiety and CBS between USA and France for Cambodian refugees
Recruitment	Clinical	Clinical	Community
Sample	Adult: 60 Vietnamese patients with PTSD	Adult: 130 Cambodian patients (94 with PTSD, 36 without PTSD)	Adult: 155 Cambodian women in France and USA
Assessment method	Single-item self-report	Self-report multi-symptom inventory	Unclear
Prevalence	Prior month	Prior month	Unclear
Comparison group	Yes—patients with PTSD and without panic	Yes—patients without PTSD	Unclear
Psychiatric categories	Panic, PTSD	PTSD	Depression and anxiety
Instruments, validation	Clinical interview with DSM-IV	PCL-C	HSCL, validated in Khmer
Functioning	In-depth interviews	Not reported	Not reported

Table 1c Studies conducted in Asia, meeting inclusion criteria for comparison of cultural concepts of distress and psychiatric categories

Reference	Hinton 2012[74]	Kleinman 1982[77]	Bhatia 1991[59]	Chadda 1990[64]	Chadda 1995[63]
Country	Cambodia	China and Taiwan	India	India	India
Cultural concept of distress	Cambodian somatic syndromes, khyal attacks (wind attacks), thinking too much	Shenjing shuairuo (neurasthenia, neurological weakness)	Dhat (semen loss in urine)	Dhat (semen loss in urine)	Dhat (semen loss in urine)
Terminology	Cultural syndrome and culturally emphasized somatic complaints	Bioculturally patterned illness; somatization	Culture-bound sex neurosis	Culture-bound sex neurosis	Culture-bound neurotic disorder
Research objective	Needs assessment of trauma-affected population using culturally-sensitive instrument	Relation of somatization, depression, and neurasthenia with cultural context	Psychiatric diagnosis, presenting symptoms and treatment response among those with Dhat	Psychiatric and STI diagnoses among persons with Dhat	Illness behaviour among persons with Dhat
Recruitment	Community	Clinical	Clinical	Clinical	Clinical
Sample	Adult: 139 adults identified by human rights group	Adult: 100 Chinese and 51 Taiwanese patients diagnosed with neurasthenia	Adult: 114 men presenting to psychiatry OPD with psychosexual complaints	Adult: 52 men self-presenting to psychiatry OPD with passage of dhat in urine	Adult: 100 patients presenting to psychiatry OPD
Assessment method	Self-report multi-symptom inventory	Clinician	Clinician	Single-item self-report	Single-item self-report
Prevalence	Unclear	Lifetime	Current	Current	Current
Comparison group	Unclear—only SPS mean scores provided	No—all patients had neurasthenia diagnoses	Yes—men with sexual complaints without dhat	No—all patients reported dhat	Yes—denial of dhat complaint
Psychiatric categories	PTSD	Anxiety, depression, somatization, chronic pain	Depression	Anxiety, depression	Anxiety (GAD, panic, OCD), depression, somatoform disorders
Instruments, validation	HTQ, PCL-C, CSSI; PCL-C clinically validated in Khmer	Clinician diagnoses	HAM-D	Clinical interview	Clinical interview with DSM-III-R criteria
Functioning	Perceived limitations related to health status	Clinical interview	Not reported	Not reported	Not reported

(continued)

Table 1c Continued

Reference	Dhivak 2007[67]	Gautham 2008[69]	Perme 2005[91]	Singh 1985[96]	Bhatia 1999[58]
Country	India	India	India	India	India
Cultural concept of distress	Dhat (semen loss in urine)	Dhat (semen loss in urine)	Dhat (semen loss in urine)	Dhat (semen loss in urine)	Dhat (semen loss in urine), koro (genital retraction)
Terminology	Culture-bound syndrome	Culture-bound syndrome	Culture-bound syndrome	Commonly recognized clinical entity in defined culture	Culture-bound syndrome
Research objective	Prevalence of depression among persons with dhat	Male sexual health concerns evaluated from biomedical, anthropological and psychiatric frameworks	Compare dhat and non-dhat patients on illness beliefs and somatization	Among males with potency disorders, assess cultural illness and psychiatric disorders	Sociodemographics and psychiatric comorbidity among persons with CBS
Recruitment	Clinical	Clinical	Clinical	Clinical	Clinical
Sample	Adult: 30 patients presenting to psychiatry OPD with complaint of semen loss in urine	Adult: 366 men presenting to OPDs with sexual/genital complaints	Adult: 61 patients presenting to OPD without mood or anxiety disorders	Adult: 50 consecutive patients in psychiatry OPD with sexual dysfunction complaint	Adult: 60 adults presenting to psychiatry OPD with psychosexual complaints
Assessment method	Clinician	Single-item self-report	Clinician	Clinician	Single-item self-report
Prevalence	Current	Current	Unclear	Current	Unclear
Comparison group	No—all patients diagnosed with dhat	Yes—dhat negative men included	Yes—participants not meeting clinical criteria for dhat	Yes—patients not clinically diagnosed with dhat	Yes—patients without dhat or koro
Psychiatric categories	Depression	Psychological distress	Somatization, fatigue	Anxiety, depression, fatigue, psychotic depression	Anxiety, depression
Instruments, validation	HAM-D	GHQ, validation information not provided	SSI, CFS, validation not reported	ADI, validation not reported	Clinical interview
Functioning	Not reported	Not reported	Not reported	Not reported	Not reported

(continued)

Table 1c Continued

Reference	Weaver 2011[97]	Kohrt 2004[78]	Kohrt 2005[79]	Min 2010[85]	Park 2001[87]
Country	India	Mongolia	Nepal	South Korea	South Korea
Cultural Concept of Distress	Tension	Yadargaa (nervous fatigue)	Jham-jham (paraesthesia)	Hwa-byung ('fire/projection of [accumulated] anger into the body')	Hwa-byung ('fire/projection of [accumulated] anger into the body')
Terminology	Idiom used to express stress	Culturally appropriate indicator of distress	Somatization	Culture-bound syndrome	Culture-bound syndrome
Research objective	Connection among diabetes, mental health and social roles	Prevalence of yadargaa and its association with socioeconomic changes	To evaluate the role of physical comorbidities in somatic presentation of depression	Compare comorbidity of HB with other psychiatric disorders	Prevalence of HB, identify differentiating symptoms and evaluate associated SES factors
Recruitment	Clinical	Community	Community, representative	Clinical	Community
Sample	Adult: 33 women with type 2 diabetes	Adult: 193 adults in rural and urban settings	Adult: 316 adults in rural setting	Adult: 280 psychiatric patients	Adult: 2807 women age 41-65 years
Assessment method	Self-report multi-symptom inventory	Single-item self-report	Single-item self-report	Clinician	Self-report multi-symptom inventory
Prevalence	Current (2 weeks)	Current	Current (2 weeks)	Unclear	Unclear
Comparison group	Yes—participants scoring below threshold on Tension scale	Yes—participants not endorsing yardargaa	Yes—participants not endorsing jham-jham	Yes—patients not meeting clinician ratings for hwa-byung	Yes—sample not endorsing Hwa-byung symptoms
Psychiatric categories	General psychological distress	Anxiety, depression, somatization, chronic fatigue	Anxiety, depression, general psychological distress	Depression, anxiety	Depression
Instruments, validation	HSCL, Tension scale, not clinically validated	CDI, SCL-90, not validated	BAI, BDI, GHQ, all instruments validated in Nepali	Hwa-byung Diagnostic Criteria and Hwa-byung scale, Korean SCID	Hwa-byung Symptom Questionnaire, no validation information
Functioning	Role fulfilment	Not reported	Not reported	Not reported	Not reported

(continued)

Table 1c Continued

Reference	Choy 2008[65]	Phan 2004[92]
Country	South Korea and USA	Vietnam/Australia
Cultural concept of distress	Taijin kyofusho (fear of interpersonal relations—Japanese), taein kong po (fear of interpersonal relations—Korean)	lo âu sợ hãi (anxiety), phiền não tâm thần (depression), xáo trộn tâm thần và thể xác (somatization)
Terminology	East Asian syndrome	Indigenous idioms of distress
Research objective	Assess specificity of cultural symptoms in a cross-cultural comparison	Develop and validate an ethnographically derived measure of anxiety, depression and somatization
Recruitment	Clinical	Clinical
Sample	Adult: 64 patients in Korea and 181 patients in USA with SAD and no other diagnoses	Adult: 185 patients from psychiatry OPD and primary care
Assessment method	Self-report multi-symptom inventory	Self-report multi-symptom inventory
Prevalence	Unclear	Current
Comparison group	Yes—patients with SAD and low scores on TKS inventory	Yes—patients scoring below threshold on PVPS
Psychiatric categories	Social anxiety disorder	Anxiety, depression, somatization
Instruments, validation	TKS Questionnaire, BDI II Korean validation	PVPS, DIS, and naturalist diagnosis, Vietnamese HSCL validated
Functioning	Sheehan Disability Scale	Not reported

ADI, Amritsar Depressive Inventory; APAI, Acholi Psychosocial Assessment Inventory; BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; BFSS, Brain Fag Symptom Scale; BSI, Brief Symptom Inventory; BYI, Beck Youth Inventory; CBT, Cognitive Behavioural Therapy; CDI, Chinese Depression Inventory; CFS, Chalder Fatigue Scale; CIDI, Composite International Diagnostic Inventory; CISR, Clinical Interview Schedule-Revised; CSSI, Cambodian Somatic Symptom and Syndrome Inventory; DIS, Diagnostic Interview Schedule; DISC, Diagnostic Interview Schedule for Children; DSM, Diagnostic and Statistical Manual of Mental Disorders; EPDS, Edinburgh Postnatal Depression Screen; GAD, Generalized Anxiety Disorder; GHQ, General Health Questionnaire; HAM-D, Hamilton Depression Rating Scale); HSCL, Hopkins Symptom Checklist; HTQ, Harvard Trauma Questionnaire; KI, Key Informant; MDD, Major Depressive Disorder; NLAAS, National Latino Asian American Study; OCD, Obsessive Compulsive Disorder);OPD, Outpatient Department; PAQ-R, Panic Attack Questionnaire-Revised; PCL-C, Posttraumatic Stress Checklist; PDS, Posttraumatic Diagnostic Scale; PHQ-9, Patient Health Questionnaire; PSE, Present State Examination; PRIME-MD, Primary Care Evaluation of Mental Disorders; PVPS, Phan Vietnamese Psychiatric Scale; SAD, Social Anxiety Disorder; SCID, Structured Clinical Interview for DSM; SCL-90, Somatic Checklist-90 item; SPS, Spirit Possession Scale; SRQ, Self-Reporting Questionnaire; SSI, Somatization Screening Index; SSQ, Shona Symptom Questionnaire; STAI, State Trait Anxiety Inventory; TKS, Taijin Kyofu Sho.

Table 2 Systematic Assessment of Quality in Observational Research—Cultural Psychiatry Epidemiology (SAQOR-CPE) adaptation and scoring criteria

	SAQOR original Description	Cultural Psychiatry Epidemiology (CPE) modifications	SAQOR-CPE modified evaluation
SAMPLE			
Representative	The study sample is representative of the source population	The sample should employ cultural categories (e.g. ethnicity labels) salient to participants and represent the diversity of subgroups potentially affected by CCD	Yes = representative sample with salient cultural groups and inclusion of culturally identified vulnerable groups; No = convenience and other non-representative samples, or categorization is not culturally salient
Source	The study must include a clear description of where the sample was drawn from. Study participants may be selected from the target population (all individuals to whom the results of the study could be applied), the source population (a defined subset of the target population from which participants are selected), or from a pool of eligible subjects (a clearly defined and counted group selected from the source population)	The study should clearly state whether persons with CCD were included because of self-labelling, being labelled by a clinician or being labelled by some other key informant. If the source is clinician- or key informant-identified, then the discrepancy between other- and self-labelling should be reported.	Yes = clearly defined group to which generalizations could be drawn (e.g. population, subgroup or patients); for CCD, clearly defined group of self-endorsing idiom or clinician-/key informant-assigned criteria; differences between self- and other-labelling should be reported; No = select or biased group not generalizable beyond research study (e.g. CCD based on research criteria only, such as number of somatic complaints, but not generalizable to application of CCD outside study contexts)
Method	The method of participant recruitment/selection must be given	Recruitment processes in clinical or community settings should be reported because public vs private settings may impact on endorsement of CCD. Potential biases related to stigmatizing aspects of CCD should be considered in recruitment method. For key informant-identified participants, potential biases should be addressed such as not wanting to label individuals in positions of power as suffering from CCD, especially if key informants are known to the community	Yes = method of recruitment reported, potential biases in CCD endorsement from recruitment method should be discussed; number of persons approached and number consenting or refusing should be included; No = recruitment method not described or no acknowledgement of recruitment approach and CCD endorsement bias
Size	The authors should describe how the sample size was determined and adequacy of sample size to address research question	Sample sizes ideally should be based on power calculations with prevalence estimates. For commonly researched CCD such as nervios-related conditions, dhat and hwa-byung, prevalence estimates in clinical and community settings are available. For novel CCD studies, key informants and primary care clinicians could be used to grossly estimate prevalence in order to determine if CCD are rare or common in the target group	Yes = power calculation for sample size included or ethnographic prevalence estimate based on key informants; No = no rationale given for sample size
Inclusion/ exclusion criteria	All inclusion and exclusion criteria should be explicitly described unambiguously and applied equally to all groups	Inclusion/exclusion criteria should be addressed in three domains: cultural group, CCD and psychiatric disorder. If CCD are being investigated in a particular group, then the cultural inclusion/exclusion should be clear, e.g. self-labelling, primary language, location of residence. For CCD, inclusion and exclusion criteria should refer to self-endorsement, current or prior episodes, duration of CCD required for inclusion and comorbidity with other CCD. For psychiatric disorders, clear inclusion and exclusion criteria especially regarding substance use disorders, psychotic disorders and cognitive disorders should be described	Yes = defined criteria, e.g. inclusion age, spoken language, ethnicity etc. CCD current vs ever, duration, etc. Exclusion of psychosis, cognitive impairment, substance misuse; No = unknown criteria for cultural group inclusion, unknown psychiatric or physical comorbidity, unknown prior episodes of CCD

(continued)

Table 2 Continued

	SAQOR original Description	Cultural Psychiatry Epidemiology (CPE) modifications	SAQOR-CPE modified evaluation
CONTROL/COMPARISON GROUP			
Inclusion	Unless it is a descriptive study or case report/series, control group must be included	To draw conclusions about association of CCD with psychiatric disorders, physical health problems, traumatic exposures, socioeconomic vulnerability etc., it is crucial to have a control group which does not endorse the CCD. Then comparisons can be made regarding greater or lesser likelihood among those with CCD	Yes = representative community sample with persons not endorsing CCD or clinical or community sample with matched participants not endorsing CCD; No = lack of comparison group
Identifiable	Is there a clear distinction between the groups in the study? Are the same variables considered in the control group as in the exposed group(s)?	Control/comparison groups should be clearly distinguished based on CCD status. Lifetime CCD experience is generally straightforward. However, when only current CCD are assessed, controls may include participants with recent CCD episodes that concluded before the study target period	Yes = control of confounds such as other disorders in cases and controls; clear distinction between lifetime or current CCD; No = comparison groups where confounds or prior CCD are not controlled
Source	Control group should be drawn from the same population as the exposed group(s)	The source for controls in the community or clinic should come from comparable populations based on cultural/ethnic/linguistic group, health status, age, residence etc. Recruitment strategies should be the same for controls to minimize impact of recruitment method of biasing endorsement	Yes = cases and controls drawn from comparable social groups andsimilar context (e.g. community or clinic), using the same recruitment method; No = lack of reporting about control source or differences in source that increase risk of bias
Matched or randomize	For matched studies, matching criteria are given. For randomized studies, randomization method is described	To identify key features that distinguish persons with CCD from those who do not endorse the CCD, matching and other strategies may be used. If used, the matching criteria and analytic process should be described in detail. Matching criteria should be relevant to the CCD	Yes = matching criteria (e.g. propensity score matching or selection process); No = no matching or randomization procedure used or described
Statistical control	Groups selected for comparison are as similar as possible in all characteristics except for their exposure status	Statistical analyses should control for as many potential confounds as possible, with special attention to confounds that could influence CCD endorsement, such as years in a new country for immigrants and refugees, language proficiency, ethnic group and region of residence	Yes = control for confounds or other criteria when comparing between groups;No = bivariate comparisons that do not include potential confounds
CULTURAL CONCEPTS OF DISTRESS (CCD)			
CCD categorical	Not applicable	Participants should be classifiable as CCD and non-CCD groups based on current or lifetime prevalence, clinician diagnoses or key informant opinions. Researcher-defined criteria (e.g. symptom cutoff scores) alone are insufficient to capture culturally significant implications of CCD status	Yes = self-report for (current or lifetime) CCD endorsed or denied; No = unable to assess from data whether persons endorse CCD or deny (only proxies used)
CCD prevalence	Not applicable	CCD classification time period should be clearly defined. Is lifetime or current prevalence used? If current prevalence, then what is the time period: 1 week, 2 weeks, 1 month etc.?	Yes = lifetime or current prevalence is reported, and period of current prevalence is specified; No = unclear prevalence reporting

(continued)

Table 2 Continued

	SAQOR original Description	Cultural Psychiatry Epidemiology (CPE) modifications	SAQOR-CPE modified evaluation
CCD label type	Not applicable	The type of CCD should be described with qualitative information, as well as quantitative information if possible. For example, is CCD attribution based on single objective or subjective symptoms, or co-occurring symptoms, certain types of exposures and presumed causes or specific vulnerability groups? Labels such as symptom-based CCD, syndrome-based CCD, aetiology-based CCD or mixed may be applicable in some studies. When possible, if a CCD is based on a presumed exposure, the type and timing of the exposure should be reported	Yes = qualitative or quantitative information is provided based on how CCD is classified, e.g. symptom, syndrome, aetiology or mixed; No = unclear why participants endorse CCD label
CCD severity	Not applicable	Severity information should be provided, e.g. frequency of attacks or episodes, number of symptoms, intensity of episodes or symptoms, or degree of impairment associated with CCD. Severity information allows for comparisons of mildly or severely affected individuals and the association with other variables.	Yes = severity assessed through frequency, severity, number of associated symptoms or functioning; No = unclear how severe; unclear association with impairment
CCD course	Not applicable	Information regarding CCD course prevents spurious associations or misinterpretation of findings of psychiatric associations. CCD age of onset, duration of most recent episode and presence of episodic or chronic symptoms should be included. Information regarding timing of psychiatric symptoms should be included to determine whether CCD precedes, co-occurs with, follows or is independent of psychiatric disorders	Yes = age of onset, duration of episode, number of episodes, and timing with psychiatric diagnosis; No = Unclear whether current or prior episode is detected in study, unclear duration, unclear chronic vs episodic course
MEASUREMENT QUALITY			
Exposure	How did the authors ascertain that the cases/exposed group had indeed been exposed to the variable of interest?	Most CCDs are associated with a presumed stressful exposure, in the form of chronic or episodic threats. Information should be collected on the types and timing of exposure and temporal relationship of the CCD to the exposure. Exposures should be recorded among both CCD and non-CCD participants.	Yes = information is provided regarding chronic or episodic exposures presumed to associate with CCD; No = no information on exposures reported
Outcomes	Tools/methods used to measure the outcome of interest are clearly defined; tools/methods used are sufficient to answer the study question(s); In clinical studies, the outcome assessor was blind to the group exposure status; Medical chart reviews; blood tests; neurological/physical examination; independent assessment by more than one investigator	For cross-cultural research, validity of the psychiatric assessment in the culture of interest should be recorded. If validated in the population of interest, psychometrics such as sensitivity, specificity and positive and negative predictive values should be reported. If the instrument is not validated, then transcultural translation[108,134] and cross-cultural equivalence determination[109] should be described.	Yes = psychiatric instruments validated for use with study population and psychometrics reported; transcultural translation and cross-cultural equivalence reported; No = lack of validated instruments, e.g. only use translation back translation

(continued)

Table 2 Continued

	SAQOR original Description	Cultural Psychiatry Epidemiology (CPE) modifications	SAQOR-CPE modified evaluation
Functional outcomes	Not applicable	Culturally salient assessment of impaired functioning should be reported. It should be determined whether a CCD is associated with impaired functioning or lack of role fulfilment. Without reporting impaired functioning, social performance labels may be incorrectly labelled as CCD	Yes = measure of functioning, ideally with quantitative association with CCD; No = no measure of functioning or impairment reported
FOLLOW-UP			
Participants lost to follow-up	Does the study state how many participants were not followed up?	The attrition and follow-up rates should be reported at all time points	Yes = include number; No = not include % lost to follow-up
Explanations for lost to follow-up	Was the explanation provided as to why participants could not or would not complete the study? For example, participants moved, gave wrong phone number, did not call back, lost interest in the study etc.	Reason for attrition should be reported if available, e.g. lack of participant transportation, death of participant, dissatisfaction with treatment	Yes = reason included; No = reason not included
CCD change	Not applicable	A major limitation in current CCD literature is failure to report change in CCD status at follow-up studies or at post-intervention assessments. All studies with multiple time points should include assessment of CCD at successive assessments. This allows evaluation of whether CCD and psychiatric disorders occur and resolve in comparable or disparate trajectories	Yes = CCD assessed at each time point in the study, including post-intervention if applicable; No = follow-up study or treatment evaluation study that does not include information on CCD status
DISTORTING INFLUENCES			
Psychiatric comorbidity	The authors explain how they dealt with depression (or other psychiatric comorbidities) in their analysis of the outcomes: did they take it into account as one of the major confounders?	Comorbidity among psychiatric disorders is high. Studies should account for psychiatric comorbidities when assessing associations between CCDs and psychiatric disorders. This can be done through inclusion/exclusion criteria, statistical controls or both. Studies in which only one psychiatric disorder is investigated do not allow adequate assessment of comorbidity. Commonly neglected comorbidities are substance misuse and psychotic disorders	Yes = control for psychiatric comorbidities through inclusion/exclusion or statistical analysis; No = only one disorder investigated; inclusion/exclusion criteria unclear; only bivariate analyses are used
Treatment	The authors explain how they dealt with other psychotropic drugs (and other treatment) participants may have been taking: did they control for them in the analysis of outcomes?	Treatment (both biomedical and traditional) will influence current episodes of CCD. Current or prior psychiatric treatment may impact psychiatric status. Treatment status therefore may confound associations between CCD and psychiatric diagnoses. Current and prior treatment should be included, especially psychiatric care and traditional healing intended to resolve CCD	Yes = treatment status known and controlled in analyses or selection; No = no information provided on current or prior treatment

(continued)

Table 2 Continued

	SAQOR original Description	Cultural Psychiatry Epidemiology (CPE) modifications	SAQOR-CPE modified evaluation
Physical comorbidity	Not applicable	Physical health may be a significant contributor to both CCD and psychiatric disorders. Physical health problems such as micronutrient deficiencies, anaemia, infections and reproductive health problems may underlie CCD and psychiatric complaints. Potential physical health problems that could lead to CCD symptoms should be investigated and controlled for in analyses	Yes = potential physical health confounds addressed and reported through inclusion criteria or statistical analyses; No = no information provided on current or prior physical health
Other confounds	The possible presence of confounding factors is one of the principal reasons why observational studies are not more highly rated as a source of evidence. The report of the study should indicate which potential confounders have been considered, and how they have been assessed or allowed for in the analysis	In cross-cultural research, other potential confounds include degree of acculturation for immigrants and refugees, level of language proficiency to engage with different cultural groups, lifetime access or lack of access to healthcare, educational level, degree of exposure to internet and other information technologies etc.	Yes = control for distorting influences in selection or analysis; No = no confounds proposed
REPORTING OF DATA			
Missing data	The authors explain how the missing data were addressed and how dealt with during the analysis. Authors indicated numbers of participants with missing data for each variable of interest. For example, the outcomes are provided for some but not all of the participants, or the data are provided for some but not all of the variables	Missing data should be reported in standard epidemiological formats. If approaches are taken to correct missing data (such as imputation), then biases for missing data should be evaluated. For example, if missing data are more common among participants with lower linguistic proficiency, then a common imputation technique could introduce bias by generalization based on high linguistic proficiency respondents	Yes = amount of missing data and how addressed are reported; No = no discussion of missing data
Presentation	Data are clearly and accurately presented. Confidence intervals are included where appropriate. All data numbers add up. No cases are counted more than once. There is no confusion in regard to any data presented	Data should be presented to all comparison between CCD participants and non-CCD controls. Dichotomous CCD endorsement (% with lifetime dhat vs those with no lifetime dhat) should be clearly presented	Yes = 95% CI, odds ratios for CCD and variables of interest, sensitivity and specificity for validation or associations are included; No = lack of clear presentation to judge CCD and non-CCD participants

Table 3 Systematic Assessment of Quality in Observational Research-Cultural Psychiatry Epidemiology (SAQOR-CPE) ratings

	Abas 1997[54]	Alcantara 2012[55]	Bass 2008[56]	Betancourt 2009[57]	Bhatia 1991[59]	Bhatia 1999[58]	Bolton 2004[60]	Caplan 2010[61]	Caspi 1998[62]	Chadda 1990[64]	Chadda 1995[63]	Choy 2008[65]	D'Avanzo 1998[66]	Dhikav 2007[67]	Ertl 2010[68]	Gautham 2008[69]	Guarnaccia 1993[70]
Sample																	
Representative	Y	N	N	N	N	N	Y	N	Y	N	N	N	N	N	Y	N	Y
Source	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Method	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
Size	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
Inclusion/ Exclusion	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
Summary	**A**	**A**	**A**	**A**	**A**	**I**	**A**	**A**	**A**	**A**	**A**	**A**	**I**	**I**	**A**	**A**	**A**
Comparison group																	
Inclusion	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y
Identifiable	N/A	Y	Y	Y	Y	N	Y	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y	Y
Source	N/A	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	N/A	N	N/A	Y	Y	Y
Matched or randomized	N/A	N	N	N	N	N	N	N	N	N/A	N	N/A	N	N/A	N	N	N
Statistical control	N/A	Y	Y	Y	N	N	N	Y	Y	N/A	N	N/A	N	N/A	Y	Y	Y
Summary	**I**	**A**	**A**	**A**	**A**	**I**	**A**	**A**	**A**	**I**	**A**	**I**	**I**	**I**	**A**	**A**	**A**
Cultural Concept of Distress																	
CCD Categorical	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y
CCD Prevalence	Y	Y	N	N	Y	N	N	Y	Y	Y	Y	N	N	Y	N	Y	Y
CCD Label Type	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y
CCD Severity	N	N	Y	Y	N	N	N	N	N	Y	N	Y	N	N	Y	Y	Y
CCD Course	Y	N	N	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	Y
Summary	**A**	**A**	**A**	**A**	**A**	**I**	**I**	**A**	**A**	**A**	**A**	**I**	**I**	**A**	**I**	**A**	**A**

(continued)

Table 3 Continued

	Abas 1997[54]	Alcantara 2012[55]	Bass 2008[56]	Betancourt 2009[57]	Bhatia 1991[59]	Bhatia 1999[58]	Bolton 2004[60]	Caplan 2010[61]	Caspi 1998[62]	Chadda 1990[64]	Chadda 1995[63]	Choy 2008[65]	D'Avanzo 1998[66]	Dhikav 2007[67]	Ertl 2010[68]	Gautham 2008[69]	Guarnaccia 1993[70]
Measure quality																	
Exposure measure	Y	Y	Y	N	Y	N	N	Y	Y	N	Y	N	Y	N	Y	Y	Y
Outcome measure	Y	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	N	N	Y
Functioning	N	N	Y	Y	N	N	Y	Y	Y	N	N	Y	N	N	Y	N	Y
Summary	**A**	**A**	**A**	**I**	**A**	**I**	**I**	**A**	**A**	**I**	**I**	**A**	**A**	**I**	**A**	**I**	**A**
Follow-up																	
Percentage lost	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N	N/A	N/A	N/A	N	N/A	N/A	N/A
Reason lost	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N	N/A	N/A	N/A	N	N/A	N/A	N/A
Change in CCD	N/A	N/A	N/A	N/A	N	N/A	N/A	N/A	N/A	N	N/A	N/A	N/A	N	N/A	N/A	N/A
Summary	**N/A**	**N/A**	**N/A**	**N/A**	**I**	**N/A**	**N/A**	**N/A**	**N/A**	**I**	**N/A**	**N/A**	**N/A**	**I**	**N/A**	**N/A**	**N/A**
Distorting influences																	
Psychological comorbidities	N	N	N	Y	N	Y	N	N	N	N	Y	Y	N	N	Y	N	Y
Physical comorbidities	N	N	N	N	Y	Y	N	N	N	Y	N	N	N	N	N	Y	N
Treatment status	N	N	N	N	Y	N	N	Y	Y	N	N	N	N	N	N	N	Y
Other confounds	N	N	N	Y	N	N	N	Y	Y	N	N	N	N	N	N	Y	Y
Summary	**I**	**I**	**I**	**A**	**A**	**A**	**I**	**A**	**A**	**I**	**I**	**I**	**I**	**I**	**I**	**A**	**A**
Data																	
Missing data	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Clarity/accuracy of data	N	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	N	N	Y	Y	Y
Summary	**I**	**A**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**
SAQOR-CPE quality	**L**	**M**	**L**	**L**	**M**	**VL**	**VL**	**M**	**M**	**VL**	**L**	**VL**	**VL**	**VL**	**L**	**L**	**M**

(continued)

Table 3 Continued

	Guarnaccia 2005[72]	Guarnaccia 2010[71]	Hinton 2003[73]	Hinton 2011[75]	Hinton 2012[74]	Interian 2005[53]	Keough 2009[76]	Kleinman 1982[77]	Kohrt 2004[78]	Kohrt 2005[79]	Lewis – Fernandez 2002[80]	Lewis – Fernandez 2010[132]	Liebowitz 1994[81] (Salman 1998)	Livinas 2010[82]	Lopez 2011[83]	Makanjuola 1987[84]
Sample																
Representative	Y	Y	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N
Source	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Method	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Power calculation	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Inclusion criteria	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Summary	**A**	**I**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**
Comparison group																
Control inclusion	Y	Y	U	Y	U	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N
Identifiable	Y	Y	N/A	Y	N/A	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N/A
Source	Y	Y	N/A	Y	N/A	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N/A
Matched or randomized	N	N	N/A	N	N/A	N	N	N	N	N	N	N	N	N	N	N/A
Statistical control	Y	Y	N/A	Y	N/A	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N/A
Summary	**A**	**A**	**I**	**A**	**I**	**A**	**A**	**I**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**I**
Cultural Concept of Distress																
CCD Categorical	Y	Y	Y	N	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N
CCD Prevalence	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y
CCD Label Type	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
CCD Severity	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	N
CCD Course	N	N	Y	N	N	N	N	Y	Y	Y	Y	N	N	N	N	Y
Summary	**A**	**A**	**A**	**A**	**I**	**I**	**I**	**A**	**A**	**A**	**A**	**A**	**A**	**I**	**A**	**A**

(continued)

Table 3 Continued

	Guarnaccia 2005[72]	Guarnaccia 2010[71]	Hinton 2003[73]	Hinton 2011[75]	Hinton 2012[74]	Interian 2005[53]	Keough 2009[76]	Kleinman 1982[77]	Kohrt 2004[78]	Kohrt 2005[79]	Lewis – Fernandez 2002[80]	Lewis – Fernandez 2010[132]	Liebowitz 1994[81] (Salman 1998)	Livinas 2010[82]	Lopez 2011[83]	Makanjuola 1987[84]
Measure quality																
Exposure measure	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y
Outcome measure	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N
Functioning	Y	Y	Y	N	Y	N	N	Y	N	N	N	Y	N	Y	Y	N
Summary	**A**	**A**	**I**	**A**	**A**	**A**	**I**	**A**	**I**	**A**	**A**	**A**	**I**	**A**	**A**	**I**
Follow-up																
Percentage lost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y
Reason lost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y
Change in CCD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y
Summary	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**A**
Distorting influences																
Psychological comorbidities	Y	Y	N	N	N	N	N	Y	Y	Y	U	Y	N	N	Y	Y
Physical comorbidities	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
Treatment status	N	Y	Y	N	N	N	N	Y	N	N	U	N	N	N	N	N
Other confounds	N	Y	Y	Y	Y	N	N	Y	Y	N	U	Y	N	Y	Y	N
Summary	**I**	**A**	**A**	**I**	**I**	**I**	**I**	**A**	**A**	**A**	**U**	**A**	**I**	**I**	**A**	**I**
Data																
Missing data	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Clarity/accuracy of data	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Summary	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**
SAQOR-CPE quality	**L**	**L**	**L**	**L**	**L**	**L**	**VL**	**M**	**L**	**M**	**L**	**M**	**L**	**L**	**M**	**L**

Table 3 Continued

	Min 2010[85]	Ola 2011[86]	Park 2001[87]	Patel 1995[88]	Patel 1997[89]	Pedersen 2008[90]	Perme 2005[91]	Phan 2004[92]	Rasmussen 2011[93]	Salgado de Snyder 2000[94]	Singh 1985[96]	Weaver 2011[97]	Number (%) of studies
Sample													
Representative	N	N	Y	N	N	Y	N	N	Y	Y	N	N	12 (29%)
Source	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	44 (98%)
Method	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	43 (96%)
Power calculation	N	N	N	N	N	N	N	N	N	N	N	N	1 (2%)
Inclusion criteria	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	42 (93%)
Summary	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	41 (91%)
Comparison group													
Control inclusion	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	36 (80%)
Identifiable	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	35 (78%)
Source	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	35 (78%)
Matched or randomized	N	N	N	N	N	N	N	N/A	N	N	N	N	0 (0%)
Statistical control	Y	N	Y	N	N	N	N	N/A	N	N	N	N	22 (49%)
Summary	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**I**	**A**	**A**	**A**	**A**	34 (76%)
Cultural Concept of Distress													
CCD Categorical	N	N	N	Y	Y	Y	N	Y	N	N	Y	N	27 (60%)
CCD Prevalence	N	N	N	Y	Y	Y	N	Y	N	Y	Y	Y	29 (64%)
CCD Label Type	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	37 (82%)
CCD Severity	Y	N	N	Y	Y	Y	N	Y	Y	N	N	Y	25 (56%)
CCD Course	N	N	N	Y	Y	N	N	N	N	N	Y	N	14 (31%)
Summary	**I**	**I**	**I**	**A**	**A**	**A**	**I**	**A**	**I**	**I**	**A**	**A**	30 (67%)
Measure quality													
Exposure measure	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	Y	32 (71%)
Outcome measure	Y	Y	N	N	N	N	N	Y	N	Y	N	N	24 (53%)
Functioning	N	Y	N	N	Y	N	N	Y	N	N	N	Y	20 (44%)
Summary	**I**	**A**	**I**	**I**	**A**	**I**	**I**	**A**	**I**	**A**	**I**	**A**	26 (58%)

(continued)

Table 3 Continued

	Min 2010[85]	Ola 2011[86]	Park 2001[87]	Patel 1995[88]	Patel 1997[89]	Pedersen 2008[90]	Perme 2005[91]	Phan 2004[92]	Rasmussen 2011[93]	Salgado de Snyder 2000[94]	Singh 1985[96]	Weaver 2011[97]	Number (%) of studies
Follow-up													
Percentage lost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	4 (9%)
Reason lost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	4 (9%)
Change in CCD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	3 (7%)
Summary	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**A**	**N/A**	**N/A**	**N/A**	**N/A**	3 (7%)
Distorting influences													
Psychiatric comorbidities	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	N	22 (49%)
Physical comorbidities	N	N	N	N	N	N	N	N	N	Y	N	N	6 (13%)
Treatment status	N	N	N	N	N	N	N	N	N	N	N	N	7 (16%)
Other confounds	Y	N	N	Y	Y	N	Y	Y	Y	Y	N	Y	22 (49%)
Summary	**A**	**I**	**I**	**A**	**A**	**I**	**I**	**A**	**A**	**A**	**I**	**I**	20 (44%)
Data													
Missing data	N	N	N	N	N	N	N	N	N	N	N	N	1 (2%)
Clarity/accuracy of data	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	37 (82%)
Summary	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	**I**	1 (2%)
SAQOR-CPE Quality	**L**	**L**	**VL**	**L**	**M**	**L**	**VL**	**M**	**L**	**M**	**L**	**L**	M (12), L (24), VL (9)

SAQOR-CPE (Cultural Psychiatry Epidemiology) ratings adapted from SAQOR developed by Ross *et al.* 2011. Adapted scoring criteria: Sample: 'Adequate', if ⩾3 'Yes'; control/comparison group: 'Adequate', if ⩾3 'Yes'; Cultural Concept of Distress: 'Adequate', if ⩾3 'Yes'; Quality of measures: 'Adequate', if ⩾2'Yes'; follow-up: 'Adequate' if change in CCD reported; distorting influences: 'Adequate', if ⩾2'Yes'; data reporting: 'Adequate', if both 'Yes'; SAQOR Quality: High (H) if 'Adequate' for all 7 categories, Moderate (M) if 'Adequate' for 5-6 categories, Low (L) if 'Adequate' for 3-4categories;,Very Low (VL) if 'Adequate' for 0-2 categories. Abbreviations: A, Adequate; I, Inadequate; N, no; N/A, not applicable); U, Unclear; Y, Yes.

novel CCD are investigated, primary care workers, traditional healers or other key informants could be used to grossly judge whether a CCD is common or infrequent. Of note, if multiple sites are used, controlling for clustering needs to be considered in calculations; local variation in terminology and social composition may affect CCD endorsement. Only one study used a power calculation, which was based on estimates of receiving quality care and not based on CCD prevalence.[69]

Inclusion/exclusion criteria are crucial for any epidemiological study, to minimize confounds and to have internally comparable participants. For cultural psychiatry, three domains of inclusion/exclusion criteria are important: (i) cultural group, (ii) psychiatric conditions and (iii) CCD. Defining a cultural group could be based on self-labelled ethnicity, linguistic proficiency, years living in particular region or other culturally salient group identifiers. Common psychiatric exclusion criteria are substance use disorders, psychotic disorders or cognitive impairment. One study of nervios in Mexico used the Composite International Diagnostic Interview (CIDI) to exclude participants with substance use disorders and physical injuries that produce nervios.[94] A total of 42 studies reported some form of inclusion/exclusion criteria.

Control/Comparison Group

All criteria for this category were retained for the SAQOR-CPE.

Inclusion refers to the presence of a comparison group. For the majority of research objectives in cultural epidemiology studies, a comparison group is needed to test inferences. For example, rate of depression among persons without a CCD is important to determine whether a CCD increases depression risk. In a study of a somatic CCD in Nepal, auditory hallucinations were reported by one-fifth of CCD sufferers; however, the control group reported an equally high prevalence of auditory hallucinations.[99] In a validation study of the Hopkins Symptom Checklist (HSCL) in Rwanda, a CCD did not differentiate between persons with and without anhedonia,[100] thus demonstrating that this CCD was not appropriate to selectively identify persons with that feature of depression. A total of 36 studies included non-CCD participants.

Identifiable refers to use of a strategy to clearly differentiate cases from controls. This is generally straightforward when lifetime prevalence is assessed through self-labelling. However, when assessing current episodes, there should be a clear time period to identify cases and controls. For example, if 2-week prevalence is used, is a control with no lifetime episodes comparable to a control with an episode that ended 3 weeks ago? All but 1 study including a comparison provided information regarding how the non-CCD group was identified.

Source refers to cases and controls drawn from similar populations. If cases are selected from a psychiatric clinic and controls are drawn from other medical clinics, this biases the CCD group to have greater prevalence of psychiatric conditions. Community representative samples are ideal to assure the same source.[71,72,79,93,101]. Only one study lacked information on source of control participants.

Matching and randomization may be used in some studies to optimize similarities between groups. For example, if a researcher is trying to identify family-related protective factors against ataque de nervios, then matching based on economic status, educational status and residential region in recruitment or statistical techniques such as propensity score matching would be helpful. Matching could be used to control for issues related to language proficiency[55] or years of residence in a new country that may confound endorsement of a CCD. One study employed a matching process.

Statistical control refers to using multivariable models to control for issues that may confound relationships between CCD and psychiatric disorders such as socioeconomic status, other psychiatric comorbidities and stressful exposures. A study of dhat found an association with psychological distress (General Health Questionnaire caseness) when statistically controlling for age, district of residence and marital status, all of which were independently associated with dhat.[69] In the multivariable analysis, only psychological caseness and region of residence independently associated with dhat. A total of 22 studies included some form of multivariable analysis.

Cultural Concept of Distress

CCD is a category added to the SAQOR for cultural psychiatry studies.

CCD categorical classification refers to the presentation of data on who does and does not endorse a CCD as a dichotomous variable, ideally through self-endorsement by participants; 27 (60%) of the studies included a categorical response by participants regarding whether they did or did not endorse having the CCD. The remainder used either clinically-assigned labels of a CCD or a proxy measure, such as having somatic complaints.

CCD prevalence refers to obtaining data on lifetime and/or current prevalence: if current prevalence, then the time period should be specified; 10 (22%) studies assessed lifetime prevalence and 19 (41%) assessed current CCD, such as in the past 2 weeks or past month and 17 (37%) were unclear regarding time frame and whether the time range matched with the timing of the psychiatric disorder. For example, some studies did not include assessment period and others used vague language, such as 'recent' episodes.

CCD label type should describe whether the CCD is attributed according to a single symptom, a constellation of symptoms, a certain type of exposure or being

part of a vulnerable group. In many cases, CCD may reflect a combination of the above. A study in Mongolia[78] used the Explanatory Model Interview Catalogue (EMIC)[31,32] to collect this information. In a study of women in Zimbabwe, explanatory models were collected and revealed that kufungisisa was both a symptom of distress and a cause of health problems.[54] A total of 37 studies included information on label type.

CCD severity refers to measurement of the frequency, number of associated symptoms or degree of impairment associated with a CCD. For example, two individuals may both endorse lifetime ataques de nervios but one individual may have weekly episodes whereas the other has them every few years. This would impact the association with psychiatric categories; 27 studies included severity information.

CCD course refers to the age of onset, duration of episodes, timing of episodes and chronicity of experience, with special attention to overlapping periods with psychiatric symptoms. For example, the mean age of onset of dhat in one study was 21.6 years among men.[59] Knowing this could help readers of the study consider potential psychosocial erectile dysfunction versus age- or diabetes-related dysfunction. Studying onset of ataque de nervios revealed that the episodes typically preceded depression and anxiety symptoms,[70] which is helpful information for screening and prevention. Only 14 studies included course information.

Measurement Quality

The Measurement Quality category of the SAQOR includes exposure and outcome measures. An additional category for functioning was based on the CCD literature.

Exposure is important for CCD because explanatory models typically associate certain types of experiences with invoking CCD. For example, family, financial, health and political stressors are strongly associated with jham-jham paresthesia in rural Nepal.[79] However, work and academic stressors are not risk factors for jham-jham. This contrasts with brain fag in Nigeria, in which academic stress is assumed to be one of the main precipitants.[86,102] Orthostatic hypotension is not assumed by the lay American public to be a trigger for PTSD, but Hinton and colleagues have shown that this sensation mediates post-traumatic psychiatric sequelae among Cambodians.[103-106] Therefore, assessing dizziness and orthostatic hypotension triggers is crucial to a culturally salient study of khyal attacks. A total of 32 studies included information on exposures.

Psychiatric outcome measures require special attention in cross-cultural research. If an instrument has not been validated in the local context, results are difficult to interpret.[107] Lack of association between CCD and the psychiatric measure may be due to using a non-validated instrument rather than cultural-exclusivity of the distress; 24 studies used instruments validated for the cultural group, and some provided psychometric properties for the instrument in that population.[54,61,66,79,92] When instruments have not been validated, then significant detail should be provided on how instruments underwent transcultural translation to achieve cross-cultural equivalence.[108,109]

Functional outcome was added as an additional criterion for measurement quality. Early debates in culture-bound syndrome research raised questions about distinguishing between abnormal behaviours related to cultural performance vs abnormal behaviours associated with impairment in multiple domains of life.[110–112] Bolton and colleagues have developed rapid, feasible approaches to create functional impairment measures.[113] Their approach makes it easy to assess whether persons with CCD are more likely to have impaired role fulfilment. Other studies in our review used standard functioning measures such as the WHO Disability Assessment Schedule (WHODAS) and the Sheehan Disability Scale. A total of 20 studies reported some form of functioning assessment.

Follow-Up

The Follow-Up category includes percentage lost to follow-up and reasons lost to follow-up. We added change in CCD prevalence. Four studies included a follow-up assessment.

Percentage lost to follow-up is standard reporting for longitudinal studies. In a Nigerian study, 57% of patients with ode ori participated in a 1-year follow-up evaluation.[84]

Wherever possible,*Reasons for loss to follow-up* should be elicited and reported to inform interpretation of results, highlight potential biases, and help shape future longitudinal studies of CCD. In a study of dhat, follow-up rates were much lower among patients receiving counselling compared with patients receiving medication; this suggested that participants were dissatisfied with psychotherapeutic interventions and dropped out.[59]

We added *CCD change at follow-up* as an additional criterion. In the CCD literature we reviewed, a major shortcoming was lack of CCD documentation at follow-up. In treatment studies of dhat and hwa-byung, CCD was not evaluated post treatment.[59,114,115] Among Cambodian refugees with 'thinking too much,' 58% of patients in California received sedatives whereas 20% did in Massachusetts; however, no information was provided regarding which group showed better outcomes.[116] The absence of information on resolution of CCD during mental health treatment is a major gap in the existing literature. In studies in Nigeria and China, CCD did not resolve after psychotropic medication despite improvement in psychiatric disorders.[77,84] In contrast, studies of culturally adapted psychotherapy treatments showed improvement for ataque de nervios among Latinas and khyal attacks among Cambodian refugees.[75,106] A study with pharmacotherapy showed improvement of khyal attacks, 'thinking a lot' and several other idioms among Cambodian refugees as measured by effect sizes.[135] Measuring CCD in longitudinal observational

and treatment studies is crucial to determine whether CCD worsen, resolve with or are independent of psychiatric symptoms trajectories.

Distorting Influences

Distorting Influences in the original SAQOR focused on distorting influences related to maternal depression.[98] We modified the distorting influences category for factors that commonly confound cultural psychiatry epidemiology studies.

Psychiatric comorbidities: because of the high rate of comorbidity among psychiatric disorders, it is possible that associations between CCD and a target psychiatric disorder are the result of another condition. For example, PTSD and depression are often comorbid. If CCD have significant associations with PTSD, it may be that the associations are better explained by associations with depression. Controlling for comorbidities through selection criteria and analysis is crucial. In a study of social phobia and taijin-kyofu-sho (TKS), a CCD in Japan and Korea, the researchers excluded persons with major depressive disorders, bipolar affective disorder, psychosis and substance misuse to assure that associations between TKS and social phobia were not the result of mutual associations with other disorders.[65] In a study of a fatigue CCD in Mongolia, yadargaa associated significantly with a scale for chronic fatigue syndrome in bivariate analysis. However, when other psychiatric conditions were entered into the analysis, yadargaa associated significantly with depression but the association with chronic fatigue syndrome was no longer significant.[78] A study in Uganda among war-affected youth stands out in the CCD literature because multiple CCD were addressed in the same population.[57] This allowed for testing CCD comorbidities in addition to psychiatric comorbidities. Half of the studies include psychiatric comorbidity information.

Physical health comorbidities also impact associations between CCD and psychiatric diagnoses. Investigators of dhat often account for physical comorbidities, especially sexually transmitted infections (STIs), in their analyses.[59,64,69] Including STIs among both dhat cases and controls revealed that STIs were not associated with dhat; instead, psychological distress differed between the groups.[69] Controlling for possible physical pathologies led to the finding in Nepal that a somatic complaint of paraesthesia, which was strongly associated with depression, was not the result of psychosomatization but a consequence of physical health problems, commonly B_{12} deficiency.[79] Six studies included information on physical comorbidities.

Treatment status is a potential confound. If participants are receiving biomedical or traditional treatments, this may influence psychiatric disorders, CCD or both. Seven studies included information on treatment status. Other confounds include linguistic proficiency differences which may influence endorsement of CCD. One study reported that missing data were significantly more common among persons with low English proficiency.[55] A total of 22 studies included other potential confounds.

Reporting of Data

In the Reporting of Data category, the SAQOR requires that all studies include information on missing data.

Missing data were repoted by only one study.[55]

Clarity and accuracy of data refers to use of confidence intervals, multivariable analyses, and tables and figures that are easily interpreted. A total of 37 studies presented data clearly. Other studies inconsistently identified CCD vs non-CCD groups; for example, they did not clarify which participants were included in analyses or included figures that did not clarify CCD association with psychiatric measures in quantitative comparisons.

Meta-analyses for likelihood of a psychiatric classification given presence of a cultural concept of distress

Meta-analyses were conducted with psychiatric conditions as the outcome (see Table 4 and Figures 2–6). The results should be interpreted as the odds that an individual has a given psychiatric disorder given endorsement of a CCD. For example, among persons who endorse dhat, ataque de nervios, susto or other CCD, there is an 8-fold greater odds of experiencing bivariate depression compared with persons who do not endorse a CCD. The level of heterogeneity, not surprisingly, was significant for most of the outcomes: all anxiety disorders ($Q = 13.75$, $df = 28$, $P < .05$), panic ($Q = 2.43$, $df = 8$, $P < .05$), PTSD ($Q = 0.10$, $df = 2$, $P < .05$), depression ($Q = 6.15$, $df = 19$, $P < .05$), somatoform disorders ($Q = 0.67$, $df = 6$, $P < .05$), and general anxiety ($Q = 8.70$, $df = 16$, $P < .10$). Converting Q statistics to I^2 to account for small numbers of studies, all summary effects had heterogeneity percentages greater than 75%. Only general psychological distress had a non-significant test of heterogeneity, ($Q = 7.41$, $df = 8$, $P = 0.5$), with $I^2 = 8\%$ suggesting that associations of general psychological distress with CCD are generally homogeneous with limited variance attributable to between-study characteristics.

Potential sources of between-study variation in association of cultural concepts of distress with psychiatric categories

Given the high heterogeneity among the studies, we used generalized estimating equations (GEE) to determine the association of study design with strength of odd ratios between CCD and psychiatric categories (see Table 5). We conducted 13 bivariate analyses of study characteristics with strengths of odds ratios between CCD and psychiatric disorders. Variables significant in bivariate analyses were entered into the multivariable analysis. In the multivariable analysis,

Table 4 Meta-analysis for odds of meeting criteria for a psychiatric category among persons endorsing a cultural concept of distress

Psychiatric category	Cultural Concept of Distress	Number of studies	Unique participants	Odds ratio	95% CI	Heterogeneity Q (I^2)	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Depression	Coraje, dhat, hwa-byung, jham-jham, koro, shenjing shuairuo, nervios-related labels, ode ori, phiền não tâm thần, susto, yadargaa, yo'kwekyawa	20	9032	7.55	6.69—8.52	6.15 (>75%)	0.61	0.78	0.41	0.88
General anxiety	Dhat, fright idioms, hwa-byung, jham-jham, koro, lo âu sợ hãi, shenjing shuairuo, nervios-related labels, ode-ori, worry attacks, yadargaa	16	8211	5.06	4.48—5.70	8.70 (>75%)	0.58	0.88	0.48	0.85
Panic	Dhat, nervios-related labels, trúng gió	9	6158	4.48	3.77—5.32	2.43 (>75%)	0.30	0.91	0.37	0.89
PTSD	Fright idioms, nervios-related labels, trúng gió, worry attacks	4	1246	10.10	7.51—13.57	0.10 (>75%)	0.58	0.88	0.64	0.85
All anxiety	Dhat, fright idioms, hwa-byung, jham-jham, koro, lo âu sợ hãi, shenjing shuairuo, nervios-related labels, ode-ori, worry attacks, taein kong po, taijin kyofu sho, trúng gió, yadargaa	22	9731	6.12	5.49—6.83	13.75 (>75%)	0.50	0.86	0.53	0.85
General psychological distress	Dhat, jham-jham, kufungisisa, kusuwisia, mental problem, nervios-related labels, spiritual problems, tension	9	6658	5.39	4.71—6.17	7.41 (8%)	0.50	0.88	0.54	0.87
Somatoform disorders	Dhat, shenjing shuairuo, nervios-related labels, xáo trộn tâm thần và thể xác, yadargaa	7	3268	2.68	2.18—3.28	0.67 (>75%)	0.37	0.82	0.28	0.87

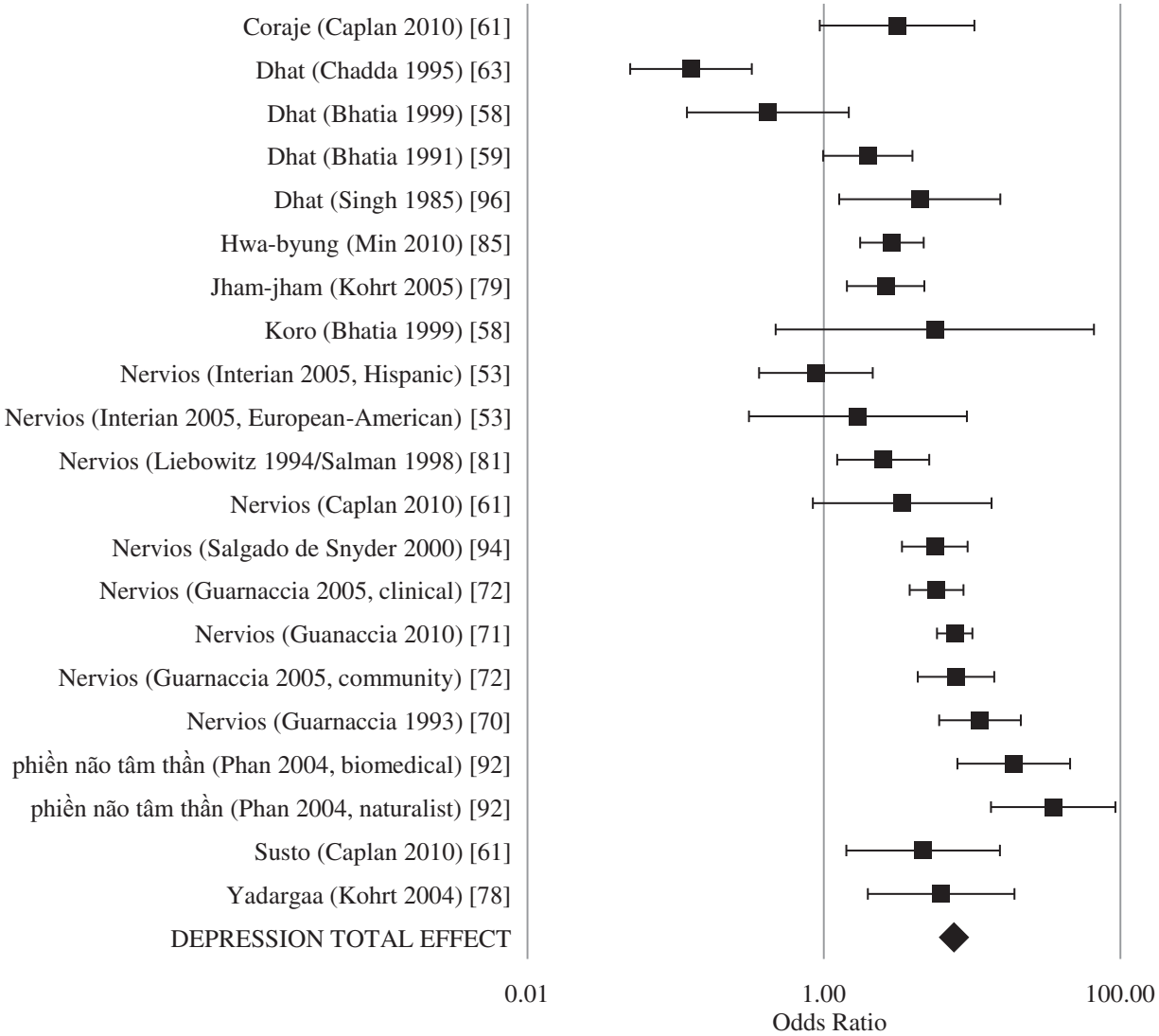

Figure 2 Meta-analysis with forest plot for odds of having depression given presence of cultural concepts of distress (CCD); n = 9032, odds ratio = 7.55 (95% confidence interval, 6.69–8.52)

studies conducted in the Americas had greater ORs than those conducted in Africa or Asia; studies labelled as 'culture-bound' had greater ORs than any of the other labels; validation studies had ORs 16 points greater than studies in which the objective was to compare CCD with psychiatric disorders; greater sample sizes were associated with greater ORs; self-report multi-item checklists had 6 points greater ORs than dichotomous categorical self-report scores, and medium quality SAQOR-CPE rankings were 7 points below ORs of very low quality studies.

Discussion

Within the growing body of literature comparing cultural concepts of distress (CCD) and psychiatric disorders, there is a wide range of quality and epidemiological rigor. Twelve (27%) of the studies had medium quality based on the Systematic Assessment of Quality in Observational Research–Cultural Psychiatry Epidemiology (SAQOR-CPE) ranking system. The remainder were of low or very low quality. Studies lack both basic criteria for epidemiological reporting (e.g. representative samples, prevalence parameters, missing data frequency and management, and controlling for potential confounds) and key aspects of CCD reporting (e.g. differentiation among symptoms, syndromes, and aetiological models; operationalization of cultural and ethnic groups to generalize findings; assessment of confounders; and severity and course of distress).

Making generalizations based on summary effects from meta-analysis is impeded by the high degree of heterogeneity in all but one of the analyses. The high degree of heterogeneity is not surprising given the

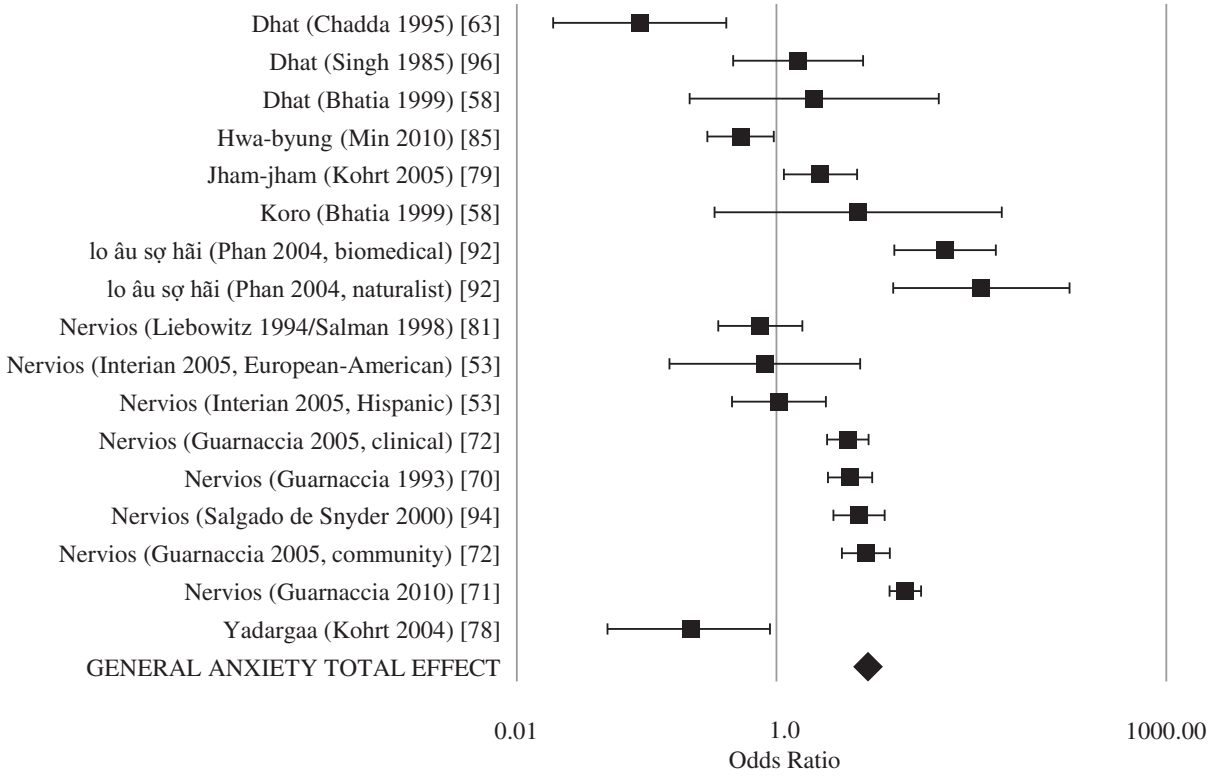

Figure 3 Meta-analysis with forest plot for odds of having general anxiety given presence of cultural concepts of distress (CCD); n = 8211, odds ratio = 5.06 (95% confidence interval, 4.48–5.70)

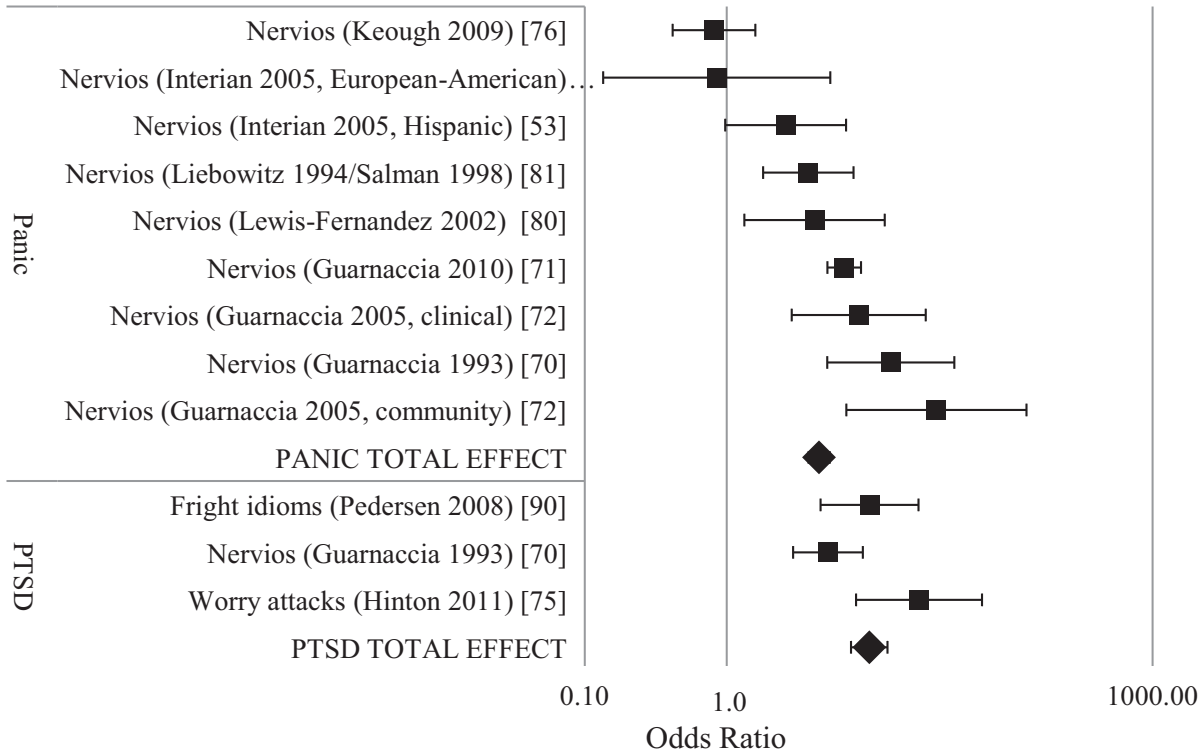

Figure 4 Meta-analysis with forest plot for odds of having panic attacks/disorder or PTSD given presence of cultural concepts of distress (CCD); panic attacks/disorder, n = 6158, odds ratio = 4.48 (95% confidence interval, 3.77–5.32); post-traumatic stress disorder (PTSD), n = 1246, odds ratio = 10.10 (95% confidence interval, 7.51–13.57)

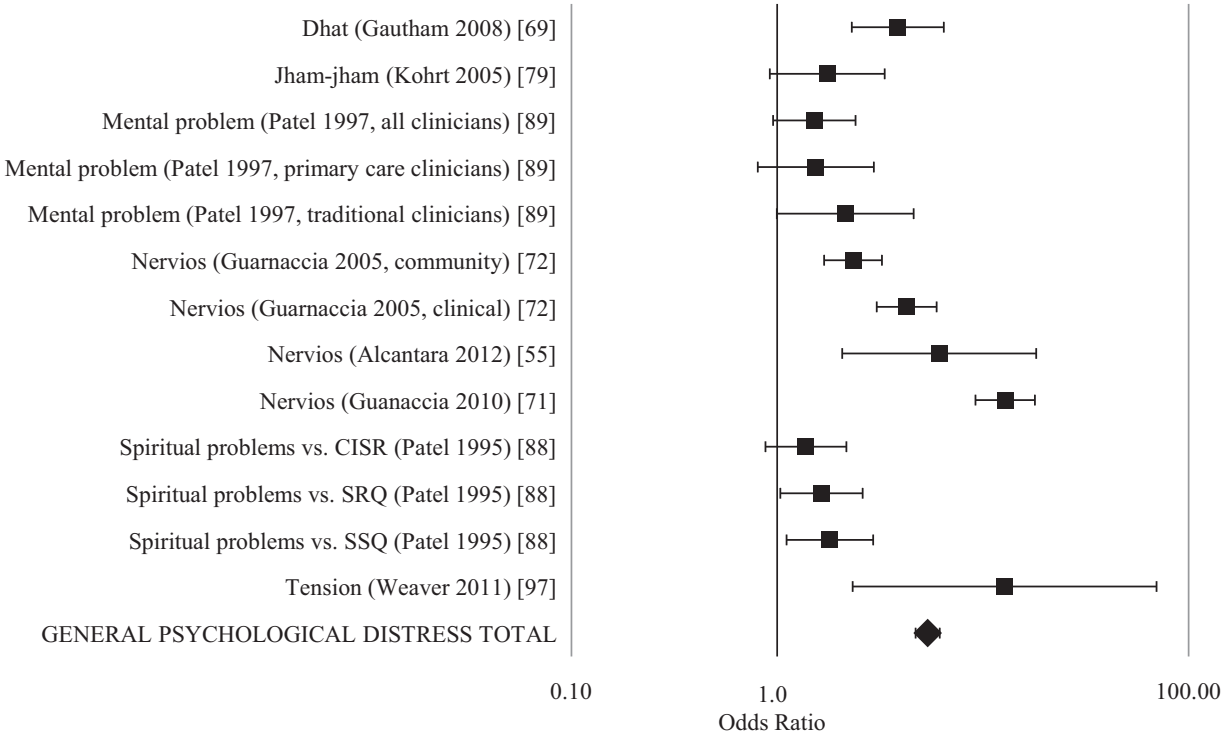

Figure 5 Meta-analysis with forest plot for odds of having general psychological distress given presence of cultural concepts of distress (CCD); n = 6658, odds ratio = 5.39 (95% confidence interval, 4.71–6.17)

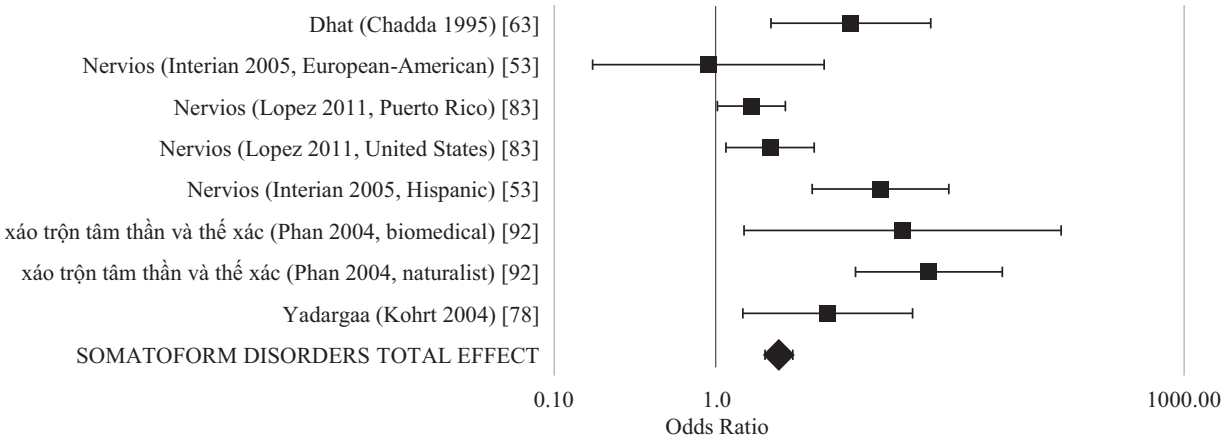

Figure 6 Meta-analysis with forest plot for odds of having somatoform disorders given presence of cultural concepts of distress (CCD); n = 3268, odds ratio = 2.68 (95% confidence interval, 2.18–3.28)

wide range of quality and methodological approaches among the studies. Studies conducted in the Americas were more likely to show an association of CCD with psychiatric disorders. This may represent acculturation issues among the populations studied because most of the participants were immigrants in the USA. Phan and colleagues suggested that CCD were strongly associated with psychiatric disorders among Vietnamese immigrants in Australia because of acculturation effects that reframe understandings of mental health and disorder.[92]

We were surprised to find that studies in which the researcher referred to the CCD as 'culture-bound' had stronger associations between the CCD and psychiatric disorders than all other labels. This was counter-intuitive given that 'culture-bound' implies a distinction from psychiatric nosology. However, we found that labels such as 'culture-bound' or 'idioms of distress' were not applied systematically. The same CCD, e.g. ataques de nervios, was described as a culture-bound syndrome, idiom of distress, and popular category by different researchers. Moreover, the

Table 5 Generalized estimating equation for association of study design variables with magnitude of odds ratio between psychiatric category and cultural concept of distress

Variable		Study comparisons, *N* (%)	Bivariate regression coefficient (95% CI)	Multivariable regression coefficient (95% CI)
World region	Americas	44 (55.7%)	Ref.	Ref.
	Africa	7 (8.9%)	-4.14 (−5.91, −2.36)***	−8.23 (−13.38, −3.18)**
	Asia	28 (35.4%)	2.17 (−5.97, 10.31)	−5.44 (−10.26, −0.62)*
Researcher label	'Culture-bound . . .'	15 (19.0%)	Ref.	Ref.
	'Idiom . . .'	21 (26.6%)	7.85 (−1.30, 17.01)	−4.67 (−7.63, −1.70)**
	'Popular . . .'	9 (11.4%)	2.08 (−1.00, 5.17)	−3.44 (−6.86, −0.01)*
	Other '. . . syndrome'	13 (16.5%)	3.25 (1.23, 5.27)**	−4.59 (−8.76, −0.41)*
	Other label	21 (26.6%)	0.37 (−2.01, 2.74)	−4.54 (−7.86, −1.23)**
Study objective	Compare CCD and psychiatric disorder	47 (59.5%)	Ref.	Ref.
	Validation	7 (8.9%)	17.65 (9.11, 26.18)***	16.27 (12.75, 19.79)***
	Assess risk factors	17 (21.5%)	2.26 (−0.24, 4.75)	−1.62 (−3.57, 0.33)
	Other	8 (10.1%)	−1.67 (−3.72, 0.38)	−5.08 (−8.61, −1.55)**
Sample size	1-99	20 (25.3%)	Ref.	Ref.
	100-499	34 (43.0%)	3.42 (−3.55, 10.39)	−2.13 (−4.68, 0.42)
	⩾ 500	25 (31.6%)	3.03 (1.42, 4.64)***	6.92 (2.66, 11.17)**
Recruitment site	Clinical	48 (60.8%)	Ref.	
	Community	29 (36.7%)	−0.12 (−5.68, 5.44)	
	School	2 (2.5%)	−2.72 (−9.01, 3.58)	
Representative	No	50 (63.3%)	Ref.	
	Yes	29 (36.7%)	0.40 (−4.70, 5.51)	
Cultural concept of distress category	*Nervios*-related labels	40 (50.6%)	Ref.	Ref.
	Dhat	10 (12.7%)	−2.99 (−4.84, −1.15)	−0.15 (−7.72, 7.42)
	Hwa-byung	2 (2.5%)	−3.52 (−5.26, −1.78)***	8.02 (−0.04, 16.10)
	Other labels	27 (34.2%)	3.86 (−4.26, 11.98)**	3.58 (−2.73, 9.89)
CCD self-eport	No	19 (24.1%)	Ref.	
	Yes	60 (75.9%)	2.29 (−2.44, 7.03)	
Assessment method for cultural concept of distress	Single-item sel- report	40 (50.6%)	Ref.	Ref.
	Self-report multi-item scale score	18 (22.8%)	7.51 (−4.69, 19.70)	6.10 (1.89, 10.31)**
	Clinician diagnosis	8 (10.1%)	−2.28 (−3.82, −0.73)++	0.48 (−1.93, 2.89)
	Other labelled (parent, key informant)	13 (16.5%)	1.59 (−1.21, 4.39)	−2.81 (−5.90, 0.28)

(continued)

Table 5 Continued

Variable		Study comparisons, *N* (%)	Bivariate regression coefficient (95% CI)	Multivariable regression coefficient (95% CI)
Prevalence	Lifetime	30 (38.0%)	Ref.	Ref.
	Current	33 (41.8%)	1.68 (−5.34, 8.70)	6.65 (−0.87, 14.17)
	Unclear	16 (20.3%)	−3.78 (−5.20, −2.36)***	−6.31 (−13.00, 0.37)
Psychiatric category	General psychological distress	13 (16.5%)	Ref.	
	Anxiety disorders	30 (38.0%)	2.76 (−1.87, 7.38)	
	Mood disorders	21 (26.6%)	2.18 (−2.69, 7.05)	
	Somatic disorders	8 (10.1%)	4.65 (−2.44, 11.74)	
	Psychotic and other disorders	7 (8.9%)	−1.87 (−4.14, 0.39)	
Controlled for comorbidity	Not controlled	27 (34.2%)	Ref.	
	Controlled	52 (65.8%)	−4.56 (−13.06, 3.93)	
SAQOR-CPE ranking	Very Low	5 (6.3%)	Ref.	Ref.
	Low	48 (60.8%)	2.28 (0.22, 4.33)*	−5.04 (−10.14, 0.06)
	Medium	26 (32.9%)	6.35 (−1.69, 14.40)	−7.47 (−12.63, −2.30)**

$N = 79$ comparisons; number of studies 26. Only items with significant bivariate associations were included in the multivariable model.
*$P < .05$; **$P < .01$; ***$P < .001$.

category labels for CCD change between studies even within single research teams. Therefore, we do not suggest that comparing studies based on the label used is an informative lens and may lead to potentially spurious associations.

The finding that validation studies were most likely to show an association between CCD and psychiatric disorders is expected, given that in validation studies researchers likely try to identify the CCD that are most similar to a psychiatric category. Furthermore, there is high likelihood of a publication bias in validation studies with negative findings less likely to be published (it is rare to read a published negative validation study). The same publication bias may not hold for studies comparing CCD and psychiatric disorders that have negative findings, as this would still be theoretically significant for culture-bound suppositions. Multi-item checklists for CCD assessment were associated with stronger associations between CCD and psychiatric disorders. This is consistent with checklists operating more similarly to psychiatric diagnostic criteria. Studies in which single items are used for CCD endorsement likely enable greater diversity of manifestations and framings.

The final noteworthy finding of our review is that medium quality studies had weaker associations between CCD and psychiatric disorders than very low quality studies (no high quality studies were identified in this review). This raises a crucial issue: we do not hypothesize that greater epidemiological rigor will foster stronger associations between CCD and psychiatric disorders. The converse is equally likely: more rigorous and culturally appropriate studies (as recognized by higher SAQOR-CPE rankings) may represent studies that describe CCD more accurately and thus capture the uniqueness from psychiatric categories. For example, studies than controlled for psychiatric and physical health comorbidities had weaker associations than those not controlling for comorbidity. One of the most important quality issues was better documentation of CCD course and timing in association with psychiatric disorders. Future studies that closely document course and use longitudinal designs in well-contextualized community settings will shed new light on the experience and meaning of CCD and their association psychiatric pathological categories. Emulating the work of pioneers in psychiatric epidemiology, such as Alexander Leighton who followed a rural population in Canada over decades to understand life trajectories of mental illness, can help inform future studies.[28,117,118]

Limitations

The objective of this review was to provide an overview of the quality of epidemiological studies comparing CCD and psychiatric disorders. Whereas the issues highlighted here and the recommendations provided can be used to strengthen the epidemiological rigor of CCD studies, we caution against generalizing the

findings beyond the literature identified here. We limited our initial search of the literature to PubMed/MEDLINE and English-language publications. All of studies were coded by the first author; future reviews should include multiple coders with inter-rater reliability metrics. Future research also should incorporate databases such as PsycInfo, which may include more rigorous psychological studies, and Web of Science, which will capture social science and medical anthropological journals not indexed in PubMed. Inclusion of books and book chapters would also bolster the social science representation. Ultimately, to make broad claims about the association of CCD and psychiatric disorders, access to investigators' original data would be most helpful because many of the shortcomings reported here may reflect what is reported rather than what is collected. We hope that the adaptation of the SAQOR-CPE can be applied to broader searches and to the design of future cultural psychiatric epidemiology studies.

Applications to global mental health

The DSM-5 and other publications have provided recommendations for the application of CCD to improve clinical care.[15,119] CCD also can be applied to improve research and public health interventions in global mental health, with special attention to low resource settings:

(i) CCD can be used to enhance screening and detection of mental health problems. – The CCD literature demonstrates an overlap with psychiatric disorders as well as identification of populations with emotional, behavioral, or cognitive problems with significant impairment that may not be captured by psychiatric diagnoses. The single summary effect with low heterogeneity in our analyses was the comparison of CCD and general psychological distress: persons with any CCD have five-fold greater odds of having general psychological distress than persons not endorsing CCD. Furthermore, in order for global mental health not to be limited to treating only disorders recognized by Western biomedical psychiatry, it will be crucial to consider how scaling up services can also address CCD. CCD feasibly can be incorporated into psychiatric screeners such as the PHQ-9 through the addition of a limited number of questions. Among Latinas, the addition of CCD identifies distress not captured by standard PHQ-9 implementation.[61] In Zimbabwe, the Shona Symptom Questionnaire adequately captures common mental disorders including postpartum distress and has the benefit of including idioms that represent key concerns of both local patient populations and traditional healers.[89,120]

(ii) CCD are key to assessing treatments and interventions in global mental health. – One of the major shortcomings of the current literature was the lack of CCD in treatment studies. If interventions reduce psychiatric symptoms but do not impact CCD, then individuals will be likely to continue treatment seeking and report functional impairment. In order for interventions to be used and sustained they will need to demonstrate that local concerns and CCD also are improved. Cultural adaptation of psychotherapy is a promising area to address CCD as well as psychiatric problems. Culturally adapted CBT has positive outcomes for ataque de nervios and a number of Southeast Asian CCD[75,106,121-124] as did treatment with SSRIs.[135] Whereas psychotherapy as practiced in hospital settings in India does not appear culturally compelling for treatment of dhat,[59,67,69] clinical trials of SSRIs would be ideal because they can improve not only psychological distress but also reduce premature ejaculation and other complaints associated with dhat.

(iii) CCD can highlight vulnerable populations for public health measures and secondary prevention initiatives. – Despite variable associations of CCD with psychiatric disorders, they are consistently associated with identifying vulnerable populations. CCD are a marker of risk groups and may indicate a prodrome to psychiatric disorders. Public health and non-clinical psychosocial interventions should be investigated with CCD-endorsing populations as a possible avenue of mental health promotion and disorder prevention.

(iv) Cross-cultural comparison studies of CCD can help illuminate biases and limitations in psychiatric categories. – One study in our review demonstrated that offense-avoidance symptoms are common among Americans with social phobia similar to Koreans with *TKS*.[65] This draws attention to therapeutic needs to address offense-avoidance in American social phobia patients, as well as the need to potentially add these to DSM criteria as symptoms of interest (current TKS features are limited to 'culture-related diagnostic issues' in DSM-5, p.205[15]). Similarly, cross-cultural comparisons of ataque de nervios demonstrate that interpersonal-distress induced anxiety and loss of control are also observable among European Americans and are not synonymous with panic disorder.[76] Therefore, the therapeutic need to address aspects of ataques in non-Latino populations could be considered. A number of studies demonstrated that some symptom requirements in psychiatric disorders may lead to exclusion of treatment for distressed persons from other cultural groups. For example, requiring that panic attacks be unprovoked would exclude Cambodian patients

for whom catastrophic cognitions related to orthostatic hypotension and ethnophysiological expectations of khyal trigger attacks.[125] Ultimately, cross-national studies that include a range of CCD features as well as psychiatric diagnoses are needed to reduce cultural bias in psychiatric nosology and help address unmet needs in both high-income and low- and middle-income settings.

Conclusions

Despite claims that cultural concepts of distress are not amenable to epidemiological study, our literature review demonstrated a range of important contributions of CCD epidemiological studies to detection of mental health problems, evaluation of interventions, identification of vulnerable groups, and identification of cultural biases in psychiatric diagnostic criteria. The literature, however, suffers from a lack of epidemiological rigor and lack of comprehensive data collection about key issues in CCD. Tools such as the SAQOR-CPE are needed to systematically evaluate this literature and establish guidelines for research design and reporting for global mental health studies. Ultimately, combining the strengths of psychiatric epidemiology and cultural psychiatry will foster equitable, feasible, and effective global mental health services.

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KEY MESSAGES

- Epidemiology studies of cultural concepts of distress can improve global mental health services through improved detection of psychological distress, identification of risk groups and assessment of culturally salient intervention outcomes.
- The literature on cultural concepts of distress and psychiatric disorders is characterized by low epidemiological rigor (e.g. unclear prevalence reporting, use of non-validated instruments and lack of control for confounding) and lack of reporting key facets of explanatory models (e.g. aetiological attributions, course and severity of distress, and association with impaired functioning).
- Treatment and intervention studies including both psychiatric disorders and cultural concepts of distress demonstrate independent changes in these outcomes. Future global mental health intervention research should include both psychiatric outcomes and cultural concepts of distress to assure that culturally salient indicators of distress also resolve in treatment trials.

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