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Assessing the factorial structure and measurement invariance of PTSD by gender and ethnic groups in Sri Lanka: An analysis of the modified Harvard Trauma Questionnaire (HTQ)

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ABSTRACT

The Harvard Trauma Questionnaire (HTQ) remains the most widely used screening measure for post-traumatic stress disorder (PTSD) in the refugee and post-conflict field. The present study is the first to test the factorial structure and measurement invariance of the HTQ according to DSM-5 criteria across gender and ethnic groups in the ethnically diverse society of post-conflict Sri Lanka. The survey sample included 5136 participants (86% response rate) followed up 12 months after a baseline nationally representative survey undertaken in Sri Lanka in 2014. Exposure to conflict-related traumatic experiences (TEs) generating a trauma count (TC), and symptoms of PTSD were assessed using a modified version of the HTQ adapted to the local context. The final analytic sample included 4260 participants after excluding records with missing data on key variables. We conducted Multigroup Confirmatory Factor Analysis (MG-CFA) to test the four-factor (DSM-5 consistent) and three-factor (DSM-IV-TR) models of PTSD, then assessing measurement invariance of the four factor model by gender and ethnic groups. The three-factor and four-factor DSM-5 model each produced a good fit across the sample as a whole. In addition, there was configural, metric, and scalar invariance for the four-factor model both by gender and ethnicity. The trauma count was directly associated with each of the symptom domains of the four factor model. Our findings provide support for the capacity of the modified HTQ to measure the DSM5 construct of PTSD across gender and key ethnic groupings in Sri Lanka. Confirmation of our findings in other cultures will be important.

1. Introduction

Post-traumatic stress disorder (PTSD) remains the key mental health outcome assessed in clinical and epidemiological studies conducted amongst populations exposed to mass conflict and displacement (Steel et al., 2009). By far the majority of studies conducted across a diversity of cultures and contexts report high rates of PTSD (Atwoli, Platt, Williams, Stein, & Koenen, 2015; Stein et al., 2014). The most widely used measure for assessing PTSD symptoms in conflict-affected societies is the Harvard Trauma Questionnaire (HTQ), a measure based on the criteria of PTSD defined over 35 years ago by the third edition of the Diagnostic and Statistical Manual (DSM-III) of the American Psychiatric Association (Mollica et al., 1992). It is timely therefore to examine whether the HTQ items for PTSD conform to the newly revised structure of the category formulated in DSM5, an issue we investigate in a large, nationally representative population sample in Sri Lanka. We also examine the consistency or measurement invariance of the HTQ by gender and main ethnic groupings (Sinhalese, Tamil) in Sri Lanka.

Originally developed and validated amongst Cambodian and other Indochinese populations (Mollica et al., 1992), the 16-item PTSD assessment section of the HTQ has been applied across diverse groups including in Asia (Fawzi et al., 1997; Lhewa, Banu, Rosenfeld, & Keller, 2007; Mollica et al., 1992), the former Yugoslavia (Jakobsen, Thoresen, & Johansen, 2011; Oruc et al., 2008), the Middle East (Shoeb, Weinstein, & Mollica, 2007), and Sub-Saharan Africa (de Fouchier et al., 2012), based on translations and adaptations in these settings (Kleijn, Hovens, & Rodenburg, 2001). Nevertheless, in keeping with all measures of this type, questions remain as to whether the HTQ can be validly compared across trauma-affected populations from different cultural and linguistic

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backgrounds, that is, whether the measure performs in an equivalent manner across these diverse contexts.

To date, conventional psychometric testing of the HTQ (Jakobsen et al., 2011; Oruc et al., 2008; Silove et al., 2007) has attested to the robustness of the measure (Hollifield et al., 2002). Although initially based on DSM-III (American Psychiatric Association, 1980), the HTQ subsequently was found to conform to the three-factor structure (re-experiencing, avoidance/numbing, and arousal) of DSM-IV-TR (Fawzi et al., 1997; Oruc et al., 2008). At the same time, alternative factorial structures have been identified (a 3-factor numbing, 4-factor dysphoria, 4-factor dysphoric/arousal, and a 4-factor arousal-intrusion model) consistent with studies involving other measures assessing PTSD applied across a range of trauma exposed populations (Michalopoulos et al., 2015; Palmieri, Marshall, & Schell, 2007; Rasmussen, Smith, & Keller, 2007; Shevlin & Elklit, 2012; Vinson & Chang, 2012).

Re-evaluating the HTQ has become of contemporary importance given the extensive revision of the PTSD construct in DSM5, including its constituent domains and range of included symptoms. The most striking change is the introduction of a fourth symptom domain of persistent negative alterations in cognitions and mood (NACM), resulting in the segregation of symptoms of internal and external avoidance which now are allocated to separate domains (American Psychiatric Association, 2013), a modification that has attracted a degree of controversy (Friedman, 2013; Friedman, Resick, Bryant, & Brewin, 2010; Friedman et al., 2011; McNally, 2009). Whether these substantial changes affect the capacity of the HTQ to measure a common construct of PTSD across cultures remains to be examined, especially given some evidence that internal and external avoidance are less strongly endorsed in some societies, for example, in Cambodia (Fawzi et al., 1997), societies of the Middle East (Norris & Aroian, 2008), and indigenous populations of the Kalahari Desert (McCall & Resick, 2003). The only study to examine the DSM-5 factorial structure of PTSD in a culturally diverse population was carried out amongst refugees from a multiplicity of backgrounds attending a clinic in Switzerland (Schnyder et al., 2015). Approximately two thirds met criteria for DSM-IV PTSD, but only half fulfilled the DSM-5 definition, although the factorial structure was satisfactory for both classificatory systems. Apart from the ethnic diversity of the sample, variation in acculturation to the host society may influence how refugees respond to measures of this type in countries of resettlement. There is an evident need therefore to examine the structure and measurement invariance of DSM5 PTSD at a population level, ideally across a more constrained range of ethnic groups within countries exposed to conflict, a task we undertake in Sri Lanka.

Measurement invariance tests the level of consistency in the understanding and interpretation of a measure by persons that differ in sociodemographic characteristics (for example by gender) and/or are from different cultural, ethnic, and linguistic backgrounds (Rasmussen, Verkuilen, Ho, & Fan, 2015). Past studies of measurement invariance involving the HTQ have been restricted to small and non-representative samples, often comparing populations from countries that vary on a wide range of characteristics and living conditions (Rasmussen et al., 2015). In essence, the procedure provides an indication whether any variation in measurement between groups is attributable to measurement errors or to substantive differences. Put simply, measurement invariance implies that the construct being measured by an instrument is understood and responded to in an equivalent manner across two or more groups. If measurement variance is found, this means that there are fundamental quantitative and/or qualitative differences in the construct or the procedure being used to measure it across study groups, disparities that may be attributed to metric (differential item loadings on factorial solutions) or scalar variance (differential intercepts or response styles).

There are compelling reasons also to examine whether gender is a contributor to measurement variance, given consistent evidence that women report higher rates of PTSD than men (Stein et al., 2014). One possibility is that the disparity reflects a fundamental and universal difference in the way men and women react to or report symptoms following trauma. Such a conclusion cannot be deduced however given the limited number of studies that address this issue. A gender difference is suggested by a study undertaken in the Democratic Republic of Congo (DRC), where women reported a greater prevalence of intrusion and arousal symptoms relative to avoidance/numbing symptoms compared to men (Verelst, De Schryver, Broekaert, & Derluyn, 2014). As yet, however, there is a paucity of studies applying the more definitive test of assessing measurement invariance of the HTQ by gender in a culturally distinct population exposed to mass conflict.

The conventional first step in testing measurement invariance is to assess the configural component using multigroup confirmatory factor analysis (MGCFA), a method that determines whether the relationship between observed indicators (symptoms) and underlying latent factors is uniform across the designated subpopulations or groups (Steenkamp & Baumgartner, 1998). Metric invariance in turn assesses equivalence in factor loadings; that is, whether the pattern of item loadings on their respective latent factors are comparable across groups; finally, scalar invariance provides an index of equivalence of symptom severity based on factor means or thresholds (Cheung & Rensvold, 2002). In summary, configural invariance holds when the items of a particular instrument, exhibit the same pattern of factorial loadings across groups; metric invariance holds when a construct measured by an instrument, for example, the HTQ, is valid insofar as the symptom domains cohere around the construct itself across groups; and scalar invariance holds when there is evidence of uniformity in response style across groups with no extreme systematic variations in item scores.

Questions about the measurement invariance of the HTQ were raised by a recent US based study amongst asylum seekers originating from 81 countries (grouped as West Africans, Himalayans and Others). Although there was evidence of configural invariance, there was inadequate support for metric and scalar invariance (Rasmussen et al., 2015). Furthermore, confirmatory factor analysis (CFA) found differential factor loadings and high levels of cross-factorial correlations amongst geographic groupings based on the DSM-IV four-factor model. Consistent with other studies (Boal, Vaughan, Sims, & Miles, 2016), the aforementioned results cast some doubt on the universality of the structure of the PTSD construct or on the instrument used to measure it, although the lumping of diverse cultures into single geographic groupings limits the interpretation of the findings. Further work is needed, therefore, to test the measurement invariance of the HTQ in other post-conflict populations, particularly where the sample is sufficiently large to restrict the analysis to a limited number of well-defined ethnic groupings.

Establishing measurement invariance across ethnic and linguistic groups is important for both theoretical and practical reasons. There is a long legacy of debate focusing on the transcultural equivalence of mental health categories such as depression and PTSD (Kleinman, 2001; Summerfield, 1999). Critics of the notion of universality argue that diagnoses such as these are culture bound and do not necessarily correspond with concepts of suffering across diverse cultures. From a pragmatic perspective, even if an assumption of universality is adhered to, consideration needs to be given to the influence of culture, history, language, and religion in shaping understandings of mental disorder categories and the way individuals from different groups may respond to systematic inquiries into the symptoms that constitute a particular category. In relation to the HTQ, past studies have shown that measures of PTSD have yielded vastly different scores across diverse populations, raising