Screening for HIV-related PTSD: Sensitivity and specificity of the 17-item Posttraumatic Stress Diagnostic Scale (PDS) in identifying HIV-related PTSD among a South African sample

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Abstract

Objectives: The identification of HIV-positive patients who exhibit criteria for Post traumatic Stress Disorder (PTSD) and related trauma symptomatology is of clinical importance in the maintenance of their overall wellbeing. This study assessed the sensitivity and specificity of the 17-item Post traumatic Stress Diagnostic Scale (PDS), a self-report instrument, in the detection of HIV-related PTSD. An adapted version of the PTSD module of the Composite International Diagnostic Interview (CIDI) served as the gold standard. **Method:** 85 HIV-positive patients diagnosed with HIV within the year preceding data collection were recruited by means of convenience sampling from three HIV clinics within primary health care facilities in the Boland region of South Africa. **Results:** A significant association was found between the 17-item PDS and the adapted PTSD module of the CIDI. A ROC curve analysis indicated that the 17-item PDS correctly discriminated between PTSD caseness and non-caseness 74.9% of the time. Moreover, a PDS cut-off point of ≥ 15 yielded adequate sensitivity (68%) and 1-specificity (65%). The 17-item PDS demonstrated a PPV of 76.0% and a NPV of 56.7%. **Conclusion:** The 17-item PDS can be used as a brief screening measure for the detection of HIV-related PTSD among HIV-positive patients in South Africa.

Key Words: ROC analysis; Posttraumatic Stress Diagnostic Scale (PDS); Composite International Diagnostic Interview (CIDI); South Africa

Introduction

The most recent global HIV prevalence and incidence data suggest that over 33 million individuals worldwide are currently living with HIV. In 2007 alone, an estimated 2.5 million persons globally were newly infected with the HI virus while over 2 million individuals succumbed to AIDS.[1] Sub-Saharan Africa remains most seriously affected by the disease, with an estimated 22.5 million HIV-positive adults and children residing in this region, and approximately 1.7 million adults and children newly infected in 2007. By the end of 2007, over 1.6 million AIDS-related deaths had occurred in the region.[1] HIV prevalence and incidence data for South Africa indicate that HIV is considered a generalized epidemic in this country[2,3,4], with the largest number of HIV infections in the world.[1] The overall prevalence of HIV in South Africa is estimated at 10.8%,

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and among individuals aged between 15 to 49 years the prevalence is estimated at 16.2%. Furthermore, the HIV incidence rate for those aged two years and older has been estimated at 2.7%.[5] By the end of 2005 an estimated 320 000 deaths occurred in South Africa as a result of HIV/AIDS.[6]

Several studies have reported that discovering that one is HIV-positive is psychologically distressing.[7,8] Typical reactions to being diagnosed as HIV-positive include feelings of shock, numbness and disbelief, and subsequently, anxiety and anger.[9] Furthermore, HIV-positive individuals have reported that on being diagnosed as HIV-positive, they experienced feelings of sadness, hopelessness, helplessness, despair, blame, disappointment, and guilt.[7,8] It has been argued that posttraumatic stress may be a natural consequence of learning that one is HIV positive, to the extent that PTSD may be common among persons living with HIV.[10,11,12]

The Diagnostic and Statistical Manual of Mental Disorders (DSM)13 included the event of being diagnosed with a life-threatening illness as a qualifying trauma that could result in symptoms of PTSD or PTSD caseness.[13,14] As a result, there has recently been an increase in studies that have explored PTSD in response to being diagnosed as HIV-positive or being HIV-positive.[10,15,16,17] Results from these studies have indicated that the prevalence of PTSD in response to a diagnosis of HIV or being HIV-positive is high. Depending on the method of assessment, it has been found to range between 15% and 64%.[10,11,17,18]

Assessment of PTSD

Assessment of psychopathology, including PTSD, has generally taken two main forms: self-report instruments and clinician-administered interviews. Self-report measures offer a number of advantages over structured clinical interviews in that they are generally brief, easy to administer and require relatively less training. As such, brief self-administered instruments have been used to assess HIV-related PTSD and PTSD symptomatology, e.g. the 17-item Posttraumatic Stress Diagnostic Scale (PDS)[17] and the Impact of Event Scale (IES).[16] The IES, however, only assesses intrusion and avoidance cluster symptoms but not hyper-arousal cluster symptoms. Thus, the IES does not correspond to the 17 symptom criteria for PTSD in either the DSM-III-R or the DSM-IV and therefore fails to provide data that correspond with the diagnostic criteria for PTSD. The 17-item PDS, on the other hand, assesses each of the 17 DSM-IV PTSD symptoms and simultaneously provides a measure of PTSD symptom severity.

The psychometric properties of brief screening measures such as the 17-item PDS have not been documented among HIV-positive samples with the receipt of an HIV positive diagnosis considered as the traumatic stressor. The present study compared the 17-item PDS with an adapted version of the PTSD module of the Composite International Diagnostic Interview (CIDI). The aim of the study was to determine an optimal cut-off score on the PDS that would yield the optimal combination of sensitivity and specificity in detecting PTSD caseness among recently diagnosed HIV-positive persons.

Method

Participants

Eighty five patients diagnosed with HIV within the year preceding data collection were recruited by means of convenience sampling from three HIV clinics within primary health care facilities in the Boland region. The clinics provided treatment for HIV infection, including anti-retroviral treatment (ARVs) to patients. The following inclusion criteria were applied: (a) at the time of data collection, all participants had received their HIV-positive diagnosis within the year preceding the study, (b) all participants had been diagnosed with HIV for more than one month so as to exclude the possibility of Acute Stress Disorder, and to minimize recall bias, (c) only participants aged 18 years of age and older were included in the study, (d) participants were able to understand either spoken English or Afrikaans, (e) participants were physically and psychologically capable of engaging in an interview and completing a battery of self-report instruments. Exclusion criteria included participants who indicated that they had been diagnosed with bipolar disorder, schizophrenia or related psychotic disorders. Of the 85 participants that completed the clinical interview, 83 completed the PDS.

Subjects and Procedures

Patients who had been diagnosed with HIV within the year preceding data collection were informed of the study by medical doctors, nurses, or counselors at the HIV units. Patients who agreed to take part in the present study were asked to sign an informed consent form. The clinical interview was conducted in English or Afrikaans, and the self-report measures were available in English, Afrikaans, and Xhosa. Upon completion of the clinical interview, each participant received a supermarket voucher as an honorarium. Approval to conduct the study was granted by the Stellenbosch University Faculty of Health Sciences Ethics Committee. Subsequently, the Departments of Health of the West Coast and Winelands Region and the City of Cape Town approved access to the HIV units within the Boland region.

The CIDI[19] is a fully structured interview that assesses both the symptoms of mental disorders and determines whether diagnostic criteria have been met, based on both DSM-IV and ICD-10 diagnostic criteria. Excellent reliability and adequate validity have been demonstrated by the CIDI[20], which was designed to be administered by interviewers with no clinical training.[21] The PTSD module of the CIDI has been used in studies of HIV-positive individuals[22], persons who have experienced mild traumatic brain injuries[23], and survivors of political conflict.[24] The CIDI has previously been used in studies conducted in South Africa. For example, in the South Africa Stress and Health Study (SASH), the instrument was used to assess both the lifetime and 12-month prevalence of mental disorders among a nationally representative sample of adults.[25] Additionally, the PTSD module of the CIDI was used to determine the lifetime prevalence of traumas among the aforementioned sample.[26]

This study used an adapted version of the PTSD module of CIDI to determine the prevalence of PTSD and PTSD-symptoms associated with being diagnosed as HIV-positive and/or being HIV-positive. This module was compiled as an exploratory measure by Freeman and colleagues[27] and assumes that receiving a diagnosis of being HIV-positive and/or being HIV-

positive reflects the DSM-IV's A1 criterion. The module is introduced to the participant by the interviewer with the following statement: ''I am now going to ask you some questions around your reactions to hearing that you were HIV-positive and to being HIV-positive''. The questions which follow this statement reflect the DSM-IV criteria for PTSD, for example, ''After hearing that you were HIV-positive did you keep remembering that you were positive even when you didn't want to?'', ''After hearing that you were HIV-positive did you feel unusually irritable or lose your temper a lot more than is usual for you?'', ''Did you avoid places or people or activities that might have reminded you that you were HIV-positive?'', and ''Have the problems which we have been talking about ever kept you from going to a party, social event or meeting?'' If the participant has endorsed the criteria for DSM-IV PTSD, he or she qualified for a diagnosis of HIV-related PTSD.

The Posttraumatic Stress Diagnostic Scale (PDS) devised by Foa and colleagues is a widely used, psychometrically reliable and valid self-report measure for assessing PTSD and PTSD symptom severity.[28] The PDS assesses the 17 symptoms of PTSD according to the DSM-IV diagnostic criteria for PTSD (five re-experiencing symptoms, seven avoidance symptoms, and five hyperarousal symptoms). For each item, participants rate on a 4-point scale the extent to which each symptom has bothered them in the past month, with '0' indicating 'not at all or only one time', '1' indicating 'once a week or once in a while', '2' indicating 'two to four times a week or half the time', and '3' indicating 'five or more times per week or almost always'.[28] The instrument requires the respondent to report the degree to which each symptom had bothered them in the past week. In the present study, participants were asked to respond to each item as it related to their HIV diagnosis.[10,17]

The total symptom severity score ranges from 0-51, with higher scores indicating greater levels of PTSD symptom severity. The total symptom severity score is obtained by summing the ratings of the individual's responses to the 17 items. According to Foa[28], the cut-off scores for the symptom severity rating categories are as follows: ≤ 10 indicates 'mild', $20 \geq \chi \geq 11$ indicates 'moderate', $35 \geq \chi \geq 21$ indicates 'moderate to severe', and ≥ 36 indicates 'severe'. Normative data for the PDS were determined by administering the PDS to 248 participants who had either experienced trauma or who were at elevated risk of experiencing trauma, for example, individuals from fire and police stations, and rehabilitation homes.[28] The internal consistency for total symptom severity of the above-mentioned sample was 0.92. Internal consistency (Cronbach's α) for the symptom severity of the PTSD subscales was as follows: (a) 0.78 for the re-experiencing subscale, (b) 0.84 for the avoidance subscale, and (c) 0.84 for the arousal subscale. The performance of the PDS was assessed in relation to a standardised diagnostic interview, the SCID-PTSD module.[29] The PDS was found to provide adequate diagnostic agreement with the SCID, with 82% agreement determined between the measures. Furthermore, good sensitivity and specificity was established of 0.89 and 0.75, respectively.[28] To the best of our knowledge, the PDS has not been used for South Africa but was used to identify PTSD among Somali refugees living in Uganda.[30]

Data Analyses
Data were analysed using the SPSS 15.0 software package (SPSS Inc., Chicago, IL). Descriptive statistics were computed to describe the sample, and a non-parametric receiver operating characteristic (ROC) curve, as described by Zweig and Campbell[31], was computed to examine the ability of the PDS to discriminate between PTSD caseness and non-caseness. The adapted PTSD module of the CIDI constituted the gold standard. The area under the curve (AUC) was examined to assess the overall ability of the PDS to detect caseness. Sensitivity and specificity values were computed to determine the cut-off point that would maximize the number of true positive and true negative predictions. Once the appropriate cut-off point was identified, a Chi-square test was computed to examine the association between CIDI and PDS predictions. Phi and Cramer's V was then calculated to assess the strength of the association. The positive predictive value (PPV) and negative predictive value (NPV) of the PDS were also calculated.

Results
The mean age of the sample was 33 years (M = 32.8, SD = 7.6), with a range of 19 years to 56 years. Over half of the participants (56.5%) had received their HIV-positive diagnosis 9 months to 1 year before the study, and a fifth (20%) had received their HIV-positive diagnosis 6 to 9 months before the study. The majority of the participants (87.1%) identified themselves as Black, and 12.9% identified themselves as mixed race (Coloured). The sample consisted predominantly of females (75.3%), with males constituting 24.7% of the sample. Half of the sample (50.6%) indicated that their annual family income was less than R5000, indicating that these participants were poor. The majority of participants were receiving lay counselling for their HIV status (75.3%), although the counselling they received consisted mainly of information-giving.

Analysis of the ROC curve (Fig. 1) showed that the PDS discriminated between PTSD caseness and non-caseness

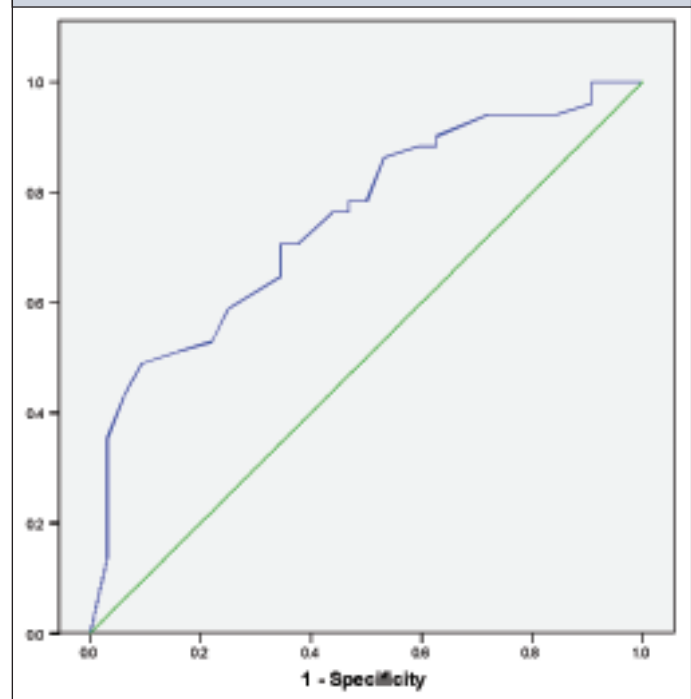**Figure1: ROC curve for PDS using the CIDI as the gold standard**

Table I: ROC curve co-ordinates for the PDS using the CIDI as the gold standard		
Cut-off point	Sensitivity	Specificity
-1.0000	.000	.000
1.0000	.137	.031
2.5000	.176	.031
3.5000	.275	.031
4.5000	.353	.031
5.5000	.431	.063
6.5000	.490	.094
8.0000	.510	.156
9.5000	.529	.219
10.5000	.588	.250
11.5000	.647	.344
12.5000	.667	.344
14.5000	.675	.344
15.0000	.686	.344
16.5000	.706	.375
17.5000	.765	.438
18.5000	.765	.469
19.5000	.784	.469
20.5000	.784	.500
21.5000	.863	.531
23.0000	.882	.594
25.5000	.882	.625
28.5000	.902	.625
31.0000	.941	.719
32.5000	.941	.844
33.5000	.961	.906
35.5000	.980	.906
37.5000	1.000	.906
39.0000	1.000	.938
42.5000	1.000	.969
46.0000	1.000	1.000

74.9% of the time (AUC = 0.74, 95% CI = 0.64–0.85, p < 0.001). An examination of sensitivity and specificity values for each possible cut-off point (Table I) showed that a PDS cut-off point of ≥ 15 yielded adequate sensitivity (0.68) and 1-specificity (0.65). A Chi-square analysis indicated a significant association between the CIDI and the PDS [χ^2 (1) = 9.22, p < 0.01], and the Phi and Cramer's V test showed that the association was robust (V = 0.33, p < 0.01) (Table II). Finally, the PDS demonstrated a positive predictive value (PPV) of 76.0% and a negative predictive value (NPV) of 56.7%.

Table II: Chi-square analysis							
		PDS					
	Variable†	PTSD	No PTSD	Total	χ^2	df	p
CIDI	PTSD	21 (25.3)	11 (13.2)	32 (39.7)	9.22	1	0.00*
	No PTSD	16 (19.2)	35 (42.1)	51 (60.3)			
	Total	37 (44.5)	46 (55.4)	83 (100)			

†f(%);*p < 0.01

Discussion

Diagnosing PTSD among patients living with HIV is fraught with conceptual, methodological, and assessment difficulties, including the definition of the actual traumatic stressor. The PDS has been used extensively among various samples of traumatised individuals but this research represents the first attempt to test its utility among South African patients living with HIV. The main finding of our study is that the PDS has an acceptable ability to be used as a screening instrument for this purpose, as it is able, with an acceptable degree of accuracy, to discriminate between patients who do and do not meet the diagnostic criteria for PTSD. The measure is able to correctly identify true cases of PTSD 68% of the time, and correctly identify true non-cases 65% of the time. The definition of a cut-off score of ≥ 15 on the PDS established optimal sensitivity and specificity estimates. However, all optimum cut-off scores for PTSD among the sample, observed in the ROC curves, were somewhat lower than the generally accepted cut-off scores among other samples.[32] The cut-off score of 15 yielded a PPV of 76%, indicating that 76% of true cases of PTSD scored above 15 on the PDS. Conversely, this cut-off point of 15 yielded a negative predictive value NPV of 57%, indicating that 57% of true non-cases of PTSD scored below 15.

The diagnosis of PTSD among patients living with HIV is challenging because of the lack of a single specific traumatic event which is necessary for the diagnosis. For screening purposes, a high sensitivity and NPV are more important than a high specificity and PPV. In our study, the PDS had a sensitivity of almost 68% and NPV of 57 % indicating that if used as a screening measure it will correctly identify 68% of patients living with AIDS and correctly identify 57% of non-cases. While this proportion is not optimal, it provides a quick guide that may assist in identifying persons who could benefit follow-up assessment and referral for treatment for PTSD-like symptoms.

For diagnostic purposes a high specificity and PPV are most important. The PPV of an assessment instrument depends, to some extent on the prevalence of PTSD among patients living with HIV and AIDS. There are nosological difficulties on this issue with regard to what the traumatic event is that provokes symptoms of shock, horror and helplessness (please see Kagee[33] for this discussion).

Due to the relatively high number of PTSD cases compared with non-cases in this study, the PPV is much higher than the NPV. Thus, one may be fairly confident that a patient scoring above the cut-off meets DSM-IV criteria for PTSD. When a patient scores below the cut-off, the likelihood that he or she has PTSD is more or less equal to that of not having PTSD. Thus just over half of the patients who were administered the CIDI did not fulfill criteria for PTSD. As such, simple administration of the PDS among this population as a way of determining caseness for PTSD is likely to be problematic. A lower cut-off score may be preferable, although this may lead to a larger number of false positives. A limitation of this study is the fact that more women than men participated in the study, which decreases the generalization of the results.

Conclusion

The 17-item PDS may be a useful proxy for assessment of PTSD symptoms among patients recently diagnosed with HIV, more specifically as a brief screening measure for the detection of HIV-related PTSD among HIV-positive patients in South Africa.

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