ORIGINAL ARTICLE

A suicide risk screening scale for HIV-infected persons in the immediate post-diagnosis period

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Background. The risk of suicidal tendencies in HIV-infected persons appears high and may parallel the increasing prevalence of suicidal behaviour in South Africa.
Objective. To construct a brief suicide risk screening scale (SRSS) as a self-administered instrument to screen for suicidal ideation in recently diagnosed HIV-infected persons.
Methods. An SRSS was developed, drawing 14 items from two established screening tests, and assessed using a sample of 150 HIV-infected consenting adults identified at a voluntary counselling and testing (VCT) clinic at an academic district level hospital in Durban, South Africa. Participants returned three weeks after their initial assessment for a re-assessment.
Results. The internal consistency of the SRSS was good (Cronbach's alpha, 0.87), and its sensitivity (81%) was higher than its specificity (47%). The findings suggest that, despite certain limitations, the SRSS may be a valuable screening tool for suicidal ideation at VCT clinics.
Conclusion. Screening for suicide risk and possible suicidal behaviour in HIV-positive persons may form a routine aspect of comprehensive patient care at VCT clinics to assist with effective prevention and treatment.

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Globally, suicide and HIV/AIDS remain two of the greatest healthcare issues, particularly in low- and middle-income countries where approximately 85% of suicides occur.[1-3] The World Health Organization (WHO) predicted that global suicide mortality will increase to 1.53 million per annum by the year 2020.[2] Suicide mortality rates have changed significantly in South Africa (SA) since apartheid, with differences evident across cities, races and gender.[4] SA has a relatively high 12-month prevalence of anxiety and mood disorders compared with other countries, which adds to the burden of suicide risk.[5] In 2007 the overall rates for suicide in SA were high (0.9/100 000),[6] and there is an increasing occurrence of suicide among youth and men, consistent with the international trend.[7] At least one suicide is committed every hour in SA, and 20 more unsuccessful attempts are made in the same time-span, with one-third of non-fatal attempts recorded among youth.[6-8]

The risk factors for suicide are diverse and inter-related, and may be particularly complex in HIV-infected individuals. One systematic literature review showed a high suicidal risk in persons with HIV: 19.7% were described as generally suicidal, 26.9% as having suicidal ideation and 9.4% completed suicides.[9] There is also a high rate of lifetime suicide risk associated with depression.[10] The prevalence of depression and anxiety in people living with HIV/AIDS is almost double that of HIV-negative individuals.[11]

There is growing evidence that this is true in SA and other African countries.[12,13] The risk of suicide appears to be increasing in the context of the HIV epidemic.[14,15] Several SA studies have documented a correlation between suicidality and HIV at different points in disease progression,[12,13-18] including the high prevalence of suicidal ideation among HIV-positive pregnant mothers.[16] In a recent study conducted among HIV-positive persons in SA, suicidal ideation increased over a 6-week period and was present in 24% of the HIV-positive participants following HIV counselling and testing.[17] This correlated with results of the WHO Multisite Intervention Study on Suicidal Behaviours (SUPRE-MISS) community survey, where the highest rates of lifetime suicidal thoughts and plans were found in Durban (25.4% and 15.6%, respectively).[17,19] Despite the introduction of antiretroviral therapy (ART), the suicide rate remains more than 3 times higher among HIV-positive persons than in the general population.[20] Although the international findings on the correlation between suicide and HIV/AIDS are diverse,[10] the results show compelling evidence to screen for suicide risk and intervene as early as possible.[9,10-12] Despite this, the assessment of suicide risk is not a routine aspect of HIV patient care in SA.

The lack of consistent definitions of suicidal behaviour across studies has led to confusion in the field of suicidology. Suicidality encompasses a range of suicidal behaviours, which in turn involve degrees of self-destruction that may be fatal or non-fatal. Suicidal ideation is defined as having the intent to commit suicide, wanting to take one's own life or thoughts about suicide without actually making plans to commit suicide. To prevent suicides, healthcare professionals need to understand the reasons why people have suicidal thoughts or display suicidal behaviour. While there are a number of psychometric, clinical and biological measures to detect suicide risk,[21-23] this risk in itself is difficult to measure and predict with high degrees of accuracy[23] because of its multifactorial and multidimensional nature.

Suicide risk can be assessed by a variety of self-report and interviewer-administered measures. Selecting a self-report and/or a structured-interview format to measure suicidal symptoms is a critical decision. For example, although interviewer-administered measures may allow for greater flexibility for conducting appropriate assessments of suicidal behaviour, these measures usually require more time and expense (for administration and training) than self-report measures. In contrast, self-report questionnaires may be inadequate for measuring suicidality in cognitively impaired or highly emotional individuals with concentration difficulties, although findings in this regard are mixed.[24,25] Although self-report measures are often used as screening tools, an adequate evaluation of suicidality should include both self-report and interviewer-administered measures.

Since its publication in 1974, Beck's Hopelessness Scale (BHS) has become an internationally-accepted and widely used measure in suicide prevention.[26] The scale has been extensively researched and validated as a measure to predict suicide and is still being used worldwide.[27,28] Although depression, hopelessness and suicide correlate closely, hopelessness was identified as one of the most important psychological, predictive and modifiable risk factors.[27,28] In this context, the aim of the present study was to construct a short, reliable and valid instrument with high screening and clinical utility with which to screen for suicide risk in recently diagnosed HIV-infected persons at a voluntary counselling and testing (VCT) clinic in Durban. This was intended to identify individuals whose suicidal ideation was severe enough to warrant treatment and suicide prevention.

Methods

Participants and setting

The sample consisted of 150 HIV-infected adults, presenting for the first time to be tested for HIV at a VCT clinic in an academic district-level hospital in Durban. All participants who tested HIV-positive following VCT were informed about the study by the resident VCT counsellor. Participants who consented voluntarily were enrolled in the study and were asked to complete the suicide risk screening scale (SRSS) and the SUPRE-MISS instrument at baseline and three weeks later. The study was approved by the Biomedical Research Ethics Committee of the University of KwaZulu-Natal (BF202/09) and permission to conduct the study was granted by the relevant health institution.

Instruments

Two well-known and extensively used scales were utilised to assess aspects of suicidality in various population groups, *viz.* the BHS and the Beck Depression Inventory (BDI). Although these items do not directly assess suicidal behaviour, they measure hopelessness and immediate suicide risk. The BHS contains 20 true/false items (11 negatively and 9 positively phrased), with the severity of hopelessness (an indirect indicator of suicide risk) calculated by adding the scores for the 20 items. The total scores range from 0 (no hopelessness) to 20 (maximum level of hopelessness). The BDI, developed as a standardised measurement to assess the grades and severity of depression in order to monitor the change over time, contains 21 behavioural manifestations (items) of depression, which

Table 1. Suicide risk screening scale

This questionnaire consists of 14 statements (sentences). Please read the statements carefully one by one and answer them. If the statement describes your attitude for the past week, including now, write 'T' in the block provided. If the statement is false for you, write 'F' in the block.

Item	Statement	T or F
V1	I might as well give up because there's nothing I can do about making things better for myself	
V2	I can't imagine what my life would be like in 10 years	
V3	My future seems dark to me	
V4	I just don't get the breaks, and there's no reason to believe that I will in the future	
V5	All I can see ahead of me is unpleasantness rather than pleasantness	
V6	I don't expect to get what I really want	
V7	Things just won't work out the way I want them to	
V8	I never get what I want, so it's foolish to want anything	
V9	It is very unlikely that I would get any real satisfaction in the future	
V10	The future seems vague and uncertain to me	
V11	There's no use in really trying to get something I want because I probably won't get it	
V12	I have thoughts of killing myself, but I would not carry it out	
V13	I would like to kill myself	
V14	I would like to kill myself if I had the chance	

describe the symptoms from low to high. The items are scored individually from 0 to 3; these are added to obtain a total score of 0 - 63. A value <9 represents no or minimal depression, 17 - 29 moderate depression and >30 severe depression. Co-morbid conditions have been found to affect specificity of severity ratings at both the low- and high-end scores.[27] Several researchers have used items from both scales to validate the use of shorter versions in specific populations.[27,29,30]

For the present study, 14 items were selected from these scales to construct the SRSS (Table 1). The 11 BHS items selected are negatively phrased questions that reflect expectations of failure or motivational components (items V2, V9, V11, V16, V17, V20) and future uncertainty or cognitive components (items V4, V7, V12, V14, V18). Item selection was based on patient responses in the related previous studies, by choosing those with the highest and lowest scores at the two time-points using the complete BHS and BDI.[17,18] What the components measure has been addressed in other research.[29,31]

Our rationale for item selection incorporated several additional considerations. Firstly, patients with extreme pessimism would endorse the negative items selected and thus be more likely to be scored to have a higher suicide risk.[29,30] Secondly, the item-size pool is underscored by a theoretical framework that the patients' perceived hopelessness about their situation and future could be linked to suicide risk. This stems from the premise that cognitions mainly centre around an uncertain future and the loss of perspective in finding solutions to problems, which lead to hopelessness and consequently to suicidal ideation or attempt.[26] In line with the BHS scoring, the items of the SRSS were scored: true = 1; false = 0.

In the absence of a gold standard, an instrument previously tested in the general population in Durban was used as a proxy: the community survey aspect of SUPRE-MISS, based on the European Parasuicide Study Interview Schedule, which had been applied in the WHO/EURO Multicentre Study on Suicidal Behaviour.[19] The following questions were asked: (*i*) 'Have you ever seriously thought about committing suicide?'; (*ii*) 'Have you ever made a plan for committing suicide?'; (*iii*) 'Have you ever attempted suicide?'. The SUPRE-MISS instruments were pilot-tested, translated into different languages and validated. Since the SUPRE-MISS instrument was deemed reliable to predict suicidal behaviour, it was used as the reference to test the validity of the SRSS.

Statistical analysis

SPSS version 10.0 was used for data analysis. Receiver operating characteristic (ROC) analyses were used to determine the sensitivity, specificity and optimal cut-off points of the SRSS to predict suicidal ideation. Inter-item characteristics, internal consistency, reliability and validity analyses were also performed.

Results

The mean age of participants at baseline was 33.5 years (standard deviation (SD) ±9.4). The cut-off points of the SRSS scores and their corresponding sensitivity and specificity values are shown in Table 2. A cut-off score of 4.5 (≥4 being a positive result) achieved 68% sensitivity and 64% specificity in predicting suicidal ideation and is therefore the recommended cut-off for the SRSS. In establishing cut-off points on the SRSS that would optimise sensitivity and specificity via ROC analysis, it was decided that, ideally, the test should be more sensitive than specific to identify as many probable suicidal patients as possible. Sensitivity is paramount to suicide prediction and was our rationale for maximising sensitivity in the present analysis. The area under the curve (AUC) in ROC analysis was 0.730 at baseline (95% CI 0.64 - 0.81) and 0.776 at three weeks (95% CI 0.68 - 0.87) (Figs 1 and 2, respectively).

Inter-item characteristics and internal consistency

Table 3 displays the corrected item-total correlation at baseline and three weeks later. The corrected item total was >0.30 for all items except for V2 ('I can't imagine what my

Table 2. SRSS cut-off points and corresponding sensitivity and specificity to predict suicidal ideation at baseline and at three weeks

Time-point	Cut-off	Sensitivity	Specificity
Baseline	-1.0000	1.000	1.000
	0.5000	1.000	0.914
	1.5000	0.947	0.774
	2.5000	0.912	0.624
	3.5000	0.807	0.527
	4.5000	0.684	0.355
	5.5000	0.632	0.301
	6.5000	0.579	0.258
	7.5000	0.526	0.204
	8.5000	0.439	0.161
	9.5000	0.368	0.129
	10.5000	0.281	0.108
	11.5000	0.175	0.000
	12.5000	0.053	0.000
	13.5000	0.035	0.000
	15.0000	0.000	0.000
Three weeks	2.5000	0.811	0.532
	3.5000	0.757	0.455
	4.5000	0.676	0.364
	5.5000	0.676	0.273
	6.5000	0.649	0.195
	7.5000	0.622	0.182
	8.5000	0.568	0.130
	9.5000	0.568	0.104
	10.5000	0.459	0.0091
	12.0000	0.405	0.000
	13.5000	0.351	0.000
	15.0000	0.000	0.000

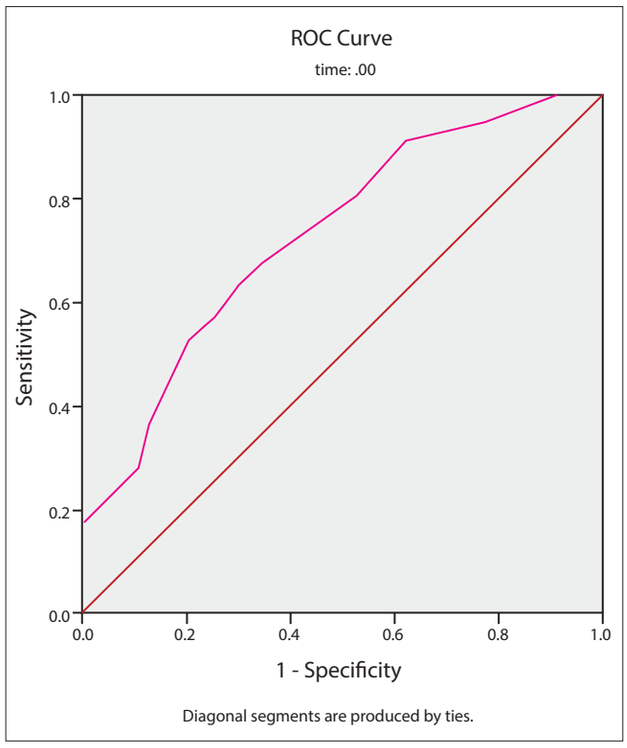

Fig. 1. ROC curve of SRSS scores for suicidal ideation immediately post-diagnosis (baseline) in HIV-infected adults.

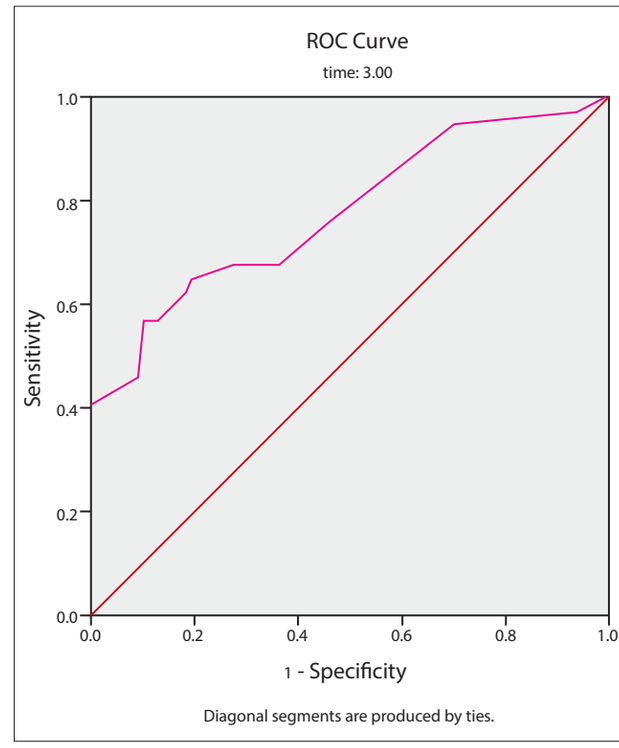

Fig. 2 ROC curve of SRSS scores for suicidal ideation three weeks post-diagnosis in HIV-infected adults.

Table 3. Corrected item-total correlations

	Baseline					Three weeks				
Item	Corrected item-total correlation	Cronbach's alpha*	Scale mean*	Mean	SD	Corrected item-total correlation	Cronbach's alpha*	Scale mean*	Mean	SD
V1	0.475	0.870	5.1333	0.3933	±0.49013	0.7300	0.919	5.1982	0.3964	±0.49137
V2	0.333	0.875	4.6667	0.8600	±0.34815	0.277	0.931	4.7297	0.8649	±0.34342
V3	0.567	0.865	5.0333	0.4933	±0.50163	0.669	0.921	5.0991	0.4955	±0.50225
V4	0.613	0.862	5.1400	0.3867	±0.48862	0.741	0.918	5.2072	0.3874	±0.48936
V5	0.612	0.862	5.0333	0.4933	±0.50163	0.701	0.920	5.1441	0.4505	±0.49980
V6	0.602	0.863	5.0400	0.4867	±0.50150	0.618	0.923	5.0991	0.4955	±0.50225
V7	0.619	0.862	5.0000	0.5267	±0.50096	0.573	0.924	5.0811	0.5135	±0.50208
V8	0.670	0.859	5.1533	0.3733	±0.48531	0.695	0.920	5.1892	0.4054	±0.49320
V9	0.624	0.861	5.0533	0.4733	±0.50096	0.740	0.918	5.1712	0.4234	±0.49634
V10	0.675	0.858	5.0733	0.4533	±0.49949	0.715	0.919	5.2162	0.3784	±0.48718
V11	0.605	0.862	5.1467	0.3800	±0.48701	0.802	0.916	5.2613	0.3333	±0.47354
V12	0.400	0.872	5.4000	0.1267	±0.33371	0.675	0.921	5.4414	0.1532	±0.36177
V13	0.318	0.875	5.4867	0.0400	±0.19662	0.675	0.921	5.4414	0.1532	±0.36177
V14	0.318	0.875	5.4867	0.0400	±0.19662	0.650	0.922	5.4505	0.1441	±0.35283

SD = standard deviation.

* If item is deleted.

life would be like in ten years'). This item had a corrected item-total correlation of 0.333 at baseline and 0.277 three weeks later. Due to its potential for ambiguity in some non-clinical samples, it has been described as an outlier; in other studies it represented one of the highest-scoring item responses at different time intervals.[13,17,18] This apparent discrepancy can be explained partially by considering various factors. For example, for some patients, being told that they have a positive HIV status can be an extremely stressful experience that constitutes a life crisis. For many, their psychological response can include the perception of 'a death image',[7] if they assume that they have been dealt

a death sentence. This, along with the myriad of possible other misconceptions, cognitive distortions, psychiatric and life-disruption complications, a shortage of healthcare resources and the fear of not being eligible for, or having access to ART,[1] makes it difficult for HIV-positive persons to visualise a long-term future.

The item-total correlations ranged from 0.318 to 0.675. At baseline, item V10 ('The future seems vague and uncertain to me') had the best corrected item total (0.675), while item V11 ('There's no use in really trying to get something I want because I probably won't get it') had the best corrected item total (0.802) at three weeks. The Cronbach's alpha for a deleted item showed that none of the items were problematic. The level of internal consistency for the SRSS was, therefore, acceptable for clinical purposes and was consistent with the findings of other studies.[27]

Reliability and validity

The overall Cronbach's alpha for the SRSS at baseline and three weeks was 0.874 and 0.915, respectively. To determine the validity of the SRSS, it was compared with the accepted instrument for SUPRE-MISS. Using a cut-off score of 4, the sensitivity for the SRSS at baseline was 81% with a positive predictive value of 48%, a specificity of 47% and a negative predictive value of 80%. At three weeks, the sensitivity was 79%, the specificity 55%, the positive predictive value 44%, and the negative predictive value 82%.

Discussion

This study demonstrated the potential utility of a simple screening tool to detect suicidality in HIV-infected individuals newly diagnosed through a VCT programme. Although the sensitivity and specificity of the SRSS were not very high (around 68%), these compared favourably with those obtained in other research.[26,29] Unlike other studies, where item 7 or the 4 items of the BHS were not administered individually, in our study the full version of the BHS was administered and the responses to the 20 items were used to deduce final scores.[29] Notably, there was a likelihood of a high level of false-positives through the use of the SRSS. The results indicate a good sensitivity at both time-periods and a comparatively low rate of false-positives. Further research and the incorporation of additional assessment items in the questionnaire are likely to have a more successful result in suicide prevention.

Equally important for screening instruments to be effective is the prevalence of risk within the population. It is well documented that SA – especially the city of Durban, where the research was conducted – has a high prevalence of HIV/AIDS, and a recent study showed that sero-positivity, age and gender were significantly associated with suicidal ideation.[17,18] It can therefore be concluded that the SRSS can be used, in conjunction with a clinical interview, as a valid screening instrument to assess for suicide risk in this setting. The use of a clinical interview, which remains the fundamental basis of suicide risk assessment, should incorporate an understanding of the patient's suicidal crisis from both an objective/descriptive as well as an experiential perspective.[23-25] The former includes objective patient data to assess suicide risk, a clinical (psychiatric/psychological) history and identification of overt suicidal manifestations and risk factors.[23-25] The latter perspective goes beyond delineation of clinical symptoms in an attempt to understand the patient's actual feelings, personal narrative, perspective, sustaining resources and beliefs about suicide.[23-25]

The assessment of hopelessness is extremely important in clinical practice, since high levels of hopelessness can lead to isolation and the inhibition to seek help timeously. Given this, VCT offers patients an option to be counselled and tested for the presence of HIV and, at the same time, provides an opportunity to identify any underlying level of hopelessness and suicide risk related to receiving a life-altering diagnosis of HIV-positivity.[17,18] The self-administered questionnaire can be completed while patients are awaiting their HIV test results. The questionnaire is easily scored and a risk assessment is performed with relative ease. A suicide intervention to be included in the post-test counselling is presently being evaluated, including re-administering the SRSS at the next clinical visit. This may decrease the rate of false-positives obtained.

Study limitations

The construction of the SRSS involved selecting items from two sub-scales, which were grouped and analysed as a single scale. The main limitation of this study was that there was no gold standard to use as a baseline reference within the context of the population studied. Furthermore, there was no reference to the participants' views on living with HIV, which can be part of a clinical interview; this should form the focus of further research.

Conclusion

Analyses have demonstrated the importance of brief scales with high clinical validity for assessing suicidal risk in daily clinic settings.[21,22] Our research shows that the SRSS can be a valuable screening tool for suicidality as part of a standard clinical interview and good clinical assessment in HIV/AIDS VCT clinics. Suicide risk assessment in patients seen at such clinics should be a routine aspect of comprehensive patient care, to assist with effective management and the prevention of possible suicidal behaviour. The SRSS is not intended as a stand-alone diagnostic tool to assess suicidal behaviour, but may be used as a triage tool to assist in the identification of high-risk patients.

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