

Lifetime mental disorders and suicidal behaviour in South Africa

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Abstract

Background: There is relatively little data on the relationship between lifetime mental disorders and suicidal behaviour in low and middle income countries. This study examines the relationship between lifetime mental disorders, and subsequent suicide ideation, plans, and suicide attempts in South Africa. **Method:** A national survey of 4185 South African adults was conducted using the World Health Organization Composite International Diagnostic Interview (CIDI) to generate psychiatric diagnoses and suicidal behaviour. Bivariate, multivariate and discrete-time survival analyses were employed to investigate the associations between mental disorders and subsequent suicide ideation, plans, and attempts. **Results:** Sixty-one percent of people who seriously considered killing themselves at some point in their lifetime reported having a prior DSM-IV disorder. Mental disorders predict the onset of suicidal ideation, but have weaker effects in predicting suicide plans or attempts. After controlling for comorbid mental disorders, PTSD was the strongest predictor of suicidal ideation and attempts. There is a relationship between number of mental disorders and suicidal behaviour, with comorbidity having significantly sub-additive effects. **Conclusion:** Consistent with data from the developed world, mental disorders are strong predictors of suicidal behaviour, and these associations are more often explained by the prediction of ideation, rather than the prediction of attempts amongst ideators. This suggests some universality of the relevant mechanisms underlying the genesis of suicidal thoughts, and the progression to suicide attempts.

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Introduction

Suicidal behaviour is among the leading causes of death and disease burden around the world.¹ The World Health Organization (WHO) estimates that in 2002 alone, approximately 877,000 deaths worldwide were due to suicide², making it an important worldwide public health concern in both the developed and developing world. Although there is an abundance of epidemiological research on the prevalence of suicide from the developed world^{3,4}, limited data exists from less developed countries. However, recently data from a nationally representative sample in South

Africa revealed comparable estimated lifetime prevalence of suicide ideation (9.1 %), plans (3.8%), and attempts (2.9%) to more developed countries.⁵

Although the etiology of suicide is not well-understood, numerous studies in developed countries have found that mental disorders, particularly depressive disorders, are one of the strongest risk factors for suicide attempts and suicide deaths.⁶ This risk has also shown to decline after treatment and recovery.⁷ Nevertheless, as most studies have considered only one disorder, it is not exactly clear which mental disorders predict suicidal behaviours. For example, findings on the role of panic disorder in predicting suicide attempts are altered when controlling for a range of comorbid disorders.^{8,9} To obtain a better understanding of the direct relationship between mental disorders and suicidal behaviour, studies accounting for the effects of co-occurring mental disorders are essential.

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The relationship between prior mental disorders and subsequent suicide has been primarily studied in the developed world^{4,10}, with little data from low and middle income countries.¹¹ It is possible that in developing countries different predictors of suicide ideation genesis and progression may be in operation.^{12,13} The development of adequate screening, prevention and intervention tools in such countries would benefit from a more in depth understanding of mental disorders as a risk factor for suicide.

There are also few data on the extent to which the associations between mental disorders and suicide attempts are mediated by suicide ideation and plans. The few studies that have investigated these issues suggest that mental disorders predict the onset of suicide ideation, but may have weaker effects in predicting suicide plans or attempts among people with suicide ideation.^{4,14,15} A clearer understanding of successful interventions and treatment would be achieved by mapping the relationships between identified mental disorders and progressive stages of suicide ideation – however, there is very little data to draw from in this area from the developing world.

Existing data from the South African Stress and Health Study (SASH) investigating the prevalence and correlates of suicide behaviour reveal that having a mental disorder is a risk factor for a lifetime suicide attempt. Respondents with at least one DSM-IV disorder were four times (95% CI 2.6–6.2) more likely to attempt suicide than those with no disorder.⁵ Respondents with three or more disorders were eight times more likely to attempt suicide (OR=8.3, 95% CI 4.8–14.2) and to develop suicidal ideation (OR=8.3, 95% CI 4.3–15.8) than were respondents with no psychiatric disorder. Here we extend that work by exploring the effects of co-occurring disorders in more detail, and by delineating the significant associations established through the mediators of suicide ideation.

Method

The South African Stress and Health (SASH) study¹⁶ was undertaken as part of the World Mental Health Survey¹⁷ to investigate the prevalence of mental disorders in the South African context. The survey was conducted between January 2002 and June 2004. The rationale and survey methods have been detailed previously¹⁶ and are briefly summarized here. Ethical approval was provided by the University of Michigan, Harvard Medical School, and by a single project assurance of compliance from the Medical University of South Africa that was approved by the National Institute of Mental Health.

The study population included South Africans who resided in both households and hostels and were a minimum of 18 years old. The sample excluded those individuals living in institutions (including hospitals, prisons, mental health institutions and military bases). The sample was selected using a multi-stage area probability sample design. The first stage involved selecting a stratified probability sample of primary sampling areas equivalent to counties in the US or the UK based on the 2001 South African Census of Enumeration Areas (EAs). The EAs were sampled with probabilities proportionate to

population size. Second, within each EA a random sample of 5 households was selected and finally the third stage consisted of a random sub-selection of a single adult responded in each selected sample housing unit.

Up to three attempts were made to contact each respondent selected to participate. The overall response rate was 85% and the final sample consisted of 4351 individuals. The SASH interviewers received intensive training for one week in centralized group sessions. The face-to-face interviews lasted approximately three and a half hours, although a number of interviews required more than one visit to complete. The interviews were conducted in one of several local languages.

Measures

A modified version of the World Mental Health Composite International Diagnostic Interview (WMH-CIDI), a fully structured diagnostic interview administered by trained lay interviewers was used to assess lifetime and 12-month DSM-IV disorders.¹⁸ These DSM-IV disorders included anxiety disorders (panic disorder, agoraphobia, social phobia, generalized anxiety disorder and posttraumatic stress disorder), mood disorders (major depressive disorder), substance use disorders (alcohol and drug abuse and dependence), and disorders associated with impulse control (intermittent explosive disorder (IED)).

Suicidal behaviours were assessed using the Suicidality Module of the CIDI.¹⁸ This module includes an assessment of the lifetime occurrence and age-of-onset of suicide ideation, plans, and attempts. We considered five dated lifetime history outcomes in a series of nested survival analyses (see below for analysis methods): (i) suicide ideation in the total sample; (ii) suicide attempt in the total sample; (iii) suicide plan among respondents with ideation; (iv) suicide attempt among those with a plan; and (v) suicide attempt among those with ideation in the absence of a plan (impulsive attempt).

Analysis of Data

Prevalence of temporally prior mental disorders among respondents with each of the five outcomes was estimated using cross-tabulations. Temporal priorities of mental disorders were examined using individual-level retrospective age-of-onset reports. Predictive associations between temporally prior mental disorders and subsequent suicidal behaviours were estimated using discrete-time survival models with person-years as the unit of analysis. Mental disorders were treated as time-varying covariates in these models. Survival coefficients were exponentiated to generate odds-ratios (ORs) and their standard errors for ease of interpretation.

The survival models included bivariate models in which only one mental disorder was considered at a time as well as multivariable models that included all mental disorders simultaneously to predict each outcome. We also estimated a series of models that allowed for multiplicative interactions among comorbid disorders. We began with a model that included summary dummy predictor variables for total number of comorbid disorders experienced by each respondent (e.g., separate dummy predictor variables to distinguish respondents with exactly two

disorders and exactly three or more disorders). Standard errors of prevalence estimates and survival coefficients were estimated with the Taylor series method¹⁹ using SUDAAN software²⁰ to adjust for the weighting and clustering of the NCS-R sample design. Multivariate significance was evaluated with Wald χ^2 tests based on design-corrected coefficient variance-covariance matrices. All significance tests were evaluated using .05-level two-sided tests.

Results

Prevalence of temporally primary disorders among those with suicidal behaviours

Sixty-one percent of the total sample that reported suicidal ideation also reported having a prior lifetime DSM-IV disorder. History of any mental disorder was even higher among respondents who went on to make a suicide plan (64.0%) and to make a suicide attempt (70.3%). (Table I)

Associations of temporally primary DSM-IV/CIDI disorders with suicide attempts

Bi-variate survival models revealed that with the exception of agoraphobia, all the remaining nine mental disorders investigated in the SASH study were significantly associated with increased odds of the subsequent first onset of a suicide attempt. ORs for the specific disorders range from a

low of 2.7 (IED) to a high of 7.2 (PTSD) (Table II). The bivariate ORs associated with broad classes of disorder were similar: 3.7 for any anxiety disorder; 3.3 for any mood disorder; 3.3 for any impulse-control disorder; and 4.8 for any substance use disorder. The bivariate OR associated with having any disorder was also relatively high (4.5).

These ORs all decrease in additive multivariable models that test the unique associations between disorders and suicide attempt, where only major depression (OR=1.8), social phobia (OR=3.3), panic disorder (OR=4.7), and PTSD (OR=4.9) remain statistically significant. A simple interactive multivariate model was also considered in which predictors included the 9 dummy variables for individual types of disorders plus additional dummy variables for number of disorders (e.g., a dummy variable for respondents who had exactly two prior lifetime disorders, a separate dummy variable for respondents with exactly three such disorders, etc.). The ORs for individual disorders in this interactive model can be interpreted as the relative-odds of a subsequent suicide attempt among respondents with a history of a pure disorder (i.e., only this one disorder) versus those with no disorders. This more complex model shows that all disorders are significantly associated with suicide attempts (ORs in the range 3.1-7.3), with PTSD (OR=8.5), panic disorder (OR=7.3) and social phobia (OR=6.9) having the strongest associations.

Table I: Prevalence of Lifetime DSM-IV Disorders Among Adults with Suicidal Behaviour

	Among total sample						Among Ideators						Among total sample					
	Attempt			No attempt			Plan			No plan			Ideation			No ideation		
	N2	%3	SE	N2	%3	SE	N2	%3	SE	N2	%3	SE	N2	%3	SE	N2	%3	SE
Panic Disorder	9	6.8	2.4	48	1.1	0.2	11	6.4	2.0	8	2.7	1.3	19	4.2	1.0	38	0.9	0.2
GAD	20	14.1	3.2	147	3.3	0.4	27	17.4	3.2	18	7.9	2.6	45	11.8	2.1	122	2.8	0.3
Social Phobia	17	13.0	4.3	99	2.5	0.4	16	9.2	3.2	21	7.7	1.8	37	8.3	1.7	79	2.3	0.4
Post-Traumatic Disorder	14	8.8	2.6	77	2.1	0.3	15	7.7	2.1	11	6.4	2.5	26	6.9	2.0	65	1.8	0.3
Agoraphobia	26	15.4	2.9	409	9.7	0.6	31	16.4	3.8	40	13.4	2.8	71	14.7	2.1	364	9.3	0.6
Any Anxiety Disorder	59	39.4	4.6	658	15.7	0.8	67	37.8	4.7	70	27.3	3.6	137	31.7	2.9	580	14.8	0.7
Major Depression	38	27.1	4.0	401	9.3	0.7	44	26.1	3.6	52	21.8	3.3	96	23.6	2.1	343	8.4	0.7
Dysthymia	1	1.8	1.7	0	0.0	0.0	1	1.4	1.3	0	0.0	0.0	1	0.6	0.6	0	0.0	0.0
Any Mood	38	27.1	4.0	401	9.3	0.7	44	26.1	3.6	52	21.8	3.3	96	23.6	2.1	343	8.4	0.7
IED	14	11.0	3.3	93	2.8	0.4	15	11.4	3.2	21	12.3	3.0	36	11.9	2.6	71	2.1	0.4
Any Impulse	14	11.0	3.3	72	2.9	0.4	15	11.4	3.2	16	9.8	2.9	36	11.9	2.6	55	2.4	0.4
Alcohol Abuse or Dependence	38	29.9	3.7	397	10.8	0.8	45	29.1	5.2	44	23.0	4.9	89	25.5	3.7	346	9.9	0.7
Drug Abuse or Dependence	15	13.0	3.0	124	3.6	0.4	25	19.0	5.1	6	3.8	1.7	31	10.1	2.1	108	3.3	0.4
Any Substance Disorder	41	32.3	4.0	464	12.8	0.9	52	34.3	5.8	46	24.3	4.9	98	28.5	3.5	407	11.8	0.8
Any Disorder	95	70.3	4.5	1221	29.8	1.2	107	64.0	4.1	129	58.9	4.6	236	61.0	3.0	1080	28.0	1.1
Exactly 1	42	30.0	3.9	803	19.0	0.8	39	20.9	3.2	72	33.3	4.0	111	28.1	2.8	734	18.5	0.8
Exactly 2	24	18.8	4.5	296	7.4	0.5	32	20.2	3.6	30	14.3	2.7	62	16.7	2.1	258	6.9	0.5
3 or more	29	21.5	4.4	122	3.4	0.6	36	23.0	5.5	27	11.4	2.9	63	16.2	3.2	88	2.7	0.4
(N)1	(140)			(4175)			(171)			(223)			(394)			(3921)		

¹ Number of cases with the outcome variable

² Numerator N. Number of cases with the LT disorder among cases with the outcome variable. Columns with "Yes" in the headers represents cases with the dx among those with the outcome, and columns with "No" represents among those without the outcome

³ % represents the percentage of people with the DSM-IV disorder among the cases with the outcome variable indicated in the column header. For example: the first cell is the % of those with Panic disorders among those with attempts

Table II. Multivariate Associations Between Lifetime Suicide Attempts and Lifetime DSM-IV disorders

	Response variable: Lifetime Suicide Attempt among total sample=4315			
	Bivariate models with each disorder in separate model ¹		Multivariable models with all disorders in the same model ¹	
	OR (95% CI)	Chi square	OR (95% CI)	Chi square
Panic Disorder	6.9* (2.4-20.2)*	13.1(<.001)*	4.7* (1.5-14.3)*	7.4(0.006)*
General Anxiety Disorder	4.6* (2.0-10.8)*	12.9(<.001)*	2.2 (0.7-6.2)	2.1(0.15)
Social Phobia	5.7* (2.6-12.3)*	20.6(<.001)*	3.3* (1.3-8.7)*	6.1(0.014)*
Post-traumatic Stress	7.2* (3.1-16.5)*	22.7(<.001)*	4.9* (2.1-11.7)*	13.7(<.001)*
Agoraphobia	1.5 (0.8-2.8)	1.9(0.16)	1.1 (0.6-2.0)	0.1(0.72)
Any Anxiety Disorder	3.7* (2.3-5.9)*	32.0(<.001)*		
Major Depressive Disorder	3.3* (1.9-5.6)*	20.3(<.001)*	1.8* (1.1-3.2)*	4.8(0.029)*
Any Mood Disorder	3.3* (1.9-5.6)*	20.3(<.001)*		
IED	2.7* (1.1-6.9)*	4.4(0.035)*	1.5 (0.5-4.4)	0.5(0.49)
Any Impulse Disorder	2.7* (1.1-6.9)*	4.4(0.035)*		
Alcohol abuse or dependence	3.6* (2.0-6.4)*	19.8(<.001)*	2.0 (0.9-4.3)	2.9(0.09)
drug abuse or dependence	4.5* (2.2-9.0)*	18.8(<.001)*	2.4 (0.9-6.2)	3.5(0.06)
Any Substance Disorder	3.7* (2.2-6.1)*	26.6(<.001)*		
Any Disorder	4.5* (2.9-6.8)*	50.0(<.001)*		
Overall Group Effect Chisquare ²				162.8(<.001)*

* Significant at the .05 level, two-sided test. Highlighted rows indicates the disorder specified in the row was not included in the model.
¹ Models are all in survival framework and all control for age, age-squared, sex, cohorts, and int categories. Int categories have cut-off points of 1-5,6-10,11-15,...,70-75 up to largest int available in dataset
² Group effect chi square is for the multi-df tests to assess any difference between all the # of disorder dummies, while the individual chi-squares only tests yes vs no for each

Associations of number of comorbid disorders with suicide attempts

The association between psychiatric comorbidity and suicide attempts was examined by estimating a model in which the only substantive predictors were dummy variables for the number of disorders temporally prior to the first suicide attempt. A strong positive association was found between these predictors and subsequent suicide attempt, with ORs ranging from a low of 3.7 for one disorder, 6.1 for two, and 8.8 for three (compared to respondents with no disorders). (Table III). The effects of additional disorders were, however sub-additive, with additional disorders having diminishing effects, with a prevalence of suicide attempts of 30.0% in those with 1 disorder, 18.8% with two and 21.5% with three disorders attempted suicide. In order words, the relative-odds of suicide attempts increase at a decreasing rate as the numbers of comorbid disorders increase.

Models investigating the co-morbidities of lifetime suicidality with lifetime DSM-IV mental disorders and number of disorders revealed that the most predictive associations were with suicide ideation, but many mental disorders and comorbidity patterns also predicted suicide attempt (Table IV). Only PTSD (OR= 5.3, CI 1.6-7.5) and substance abuse or dependence (OR=5.2, CI 2.2-12.1) predicted a suicide plan among ideators. Interestingly, when numbers of other co-morbid disorders was controlled for, ORs for exactly two disorders and for three or more disorders were significantly less than 1.0 in predicting suicide ideation, and the OR for three or more disorders was significantly less than 1.0 in predicting suicide attempt (Table IV). This sub-additive comorbidity involving numbers of disorders was not found in predicting plans among ideators, where ORs for exactly 2 and 3 or more disorders were closer to 1.0 and not significant. An

examination of the predictive associations of individual disorders reveals that PTSD was amongst the strongest predictors of suicide attempts (OR=8.6), but was less predictive for suicide ideation (OR=4.4). The most significant predictors of suicide ideation were IED (OR=6.4) and panic disorder (OR=6.1), after controlling for number of comorbid disorders. (Table IV).

Discussion

The results of the present study advance our understanding about suicidal behaviour in South Africa in a number of ways. To begin with, 61% of South Africans who seriously considered killing themselves and 70% who actually made a suicide attempt were found to have a prior mental disorder. Bivariate analyses revealed that individuals suffering from any one of the 9 mental

Table III. Comorbidities of Lifetime Suicide Attempts with number of Lifetime DSM-IV disorders

	Response variable: Lifetime Attempt among total sample=4315	
	Bivariate model including main effects of number of disorders ¹	
	OR (95% CI)	Chi-square
1 Disorder	3.7* (2.3-5.8)*	31.8(<.001)*
2 Disorders	6.1* (3.0-12.6)*	25.4(<.001)*
3 or more Disorders	8.8* (4.2-18.2)*	35.4(<.001)*
Overall Group Effect Chisquare for number of disorders ²		63.8(<.001)*

Table IV. Association Between Lifetime Suicidal Behaviour and Lifetime DSM-IV Mental Disorders Accounting for Number of Comorbid Disorders¹

	Suicide Attempt among Total Sample		Suicide Plan among Ideators		Suicide Ideation among Total Sample	
	OR (95% CI)	Chi square	OR (95% CI)	Chi square	OR (95% CI)	Chi square
Panic Disorder	7.3* (2.0-26.6)*	9.5(0.002)*	1.6 (0.4-6.8)	0.4(0.54)	6.1* (2.7-14.0)*	19.0(<.001)*
General Anxiety Disorder	4.5* (1.3-15.7)*	5.8(0.016)*	2.4 (1.0-5.9)	3.8(0.05)	4.7* (2.3-9.4)*	19.3(<.001)*
Social Phobia	6.9* (2.5-18.7)*	14.8(<.001)*	1.3 (0.5-3.4)	0.4(0.54)	3.5* (1.7-7.1)*	12.0(<.001)*
Post-traumatic Stress	8.5* (3.1-23.6)*	17.5(<.001)*	5.3* (1.6-17.5)*	7.9(0.005)*	4.4* (1.5-13.3)*	7.2(0.007)*
Agoraphobia	1.6 (0.9-2.7)	2.8(0.10)	1.7 (0.7-4.1)	1.7(0.19)	1.7* (1.0-2.8)*	4.3(0.038)*
Major Depressive Disorder	3.1* (1.6-5.7)*	12.7(<.001)*	1.3 (0.8-2.4)	1.0(0.32)	3.5* (2.0-6.2)*	19.2(<.001)*
IED	2.2 (0.6-7.8)	1.6(0.21)	1.2 (0.5-2.9)	0.3(0.62)	6.4* (3.7-11.2)*	44.3(<.001)*
Alcohol abuse or dependence	3.4* (1.6-7.1)*	10.9(<.001)*	1.7 (0.8-3.4)	1.9(0.17)	3.5* (2.2-5.5)*	28.8(<.001)*
drug abuse or dependence	4.3* (1.5-12.1)*	7.7(0.006)*	5.2* (2.2-12.1)*	14.8(<.001)*	2.4* (1.2-4.7)*	5.9(0.015)*
Exactly 2 Disorders	0.5 (0.1-1.4)	1.8(0.18)	0.7 (0.3-1.5)	0.8(0.38)	0.4* (0.2-0.8)*	6.6(0.010)*
3 or more Disorders	0.1* (0.0-0.5)*	7.9(0.005)*	0.3 (0.1-1.0)	3.8(0.05)	0.2* (0.0-0.6)*	7.7(0.006)*
Overall Group Effect Chisquare for disorders ²		46.3(<.001)*		27.8(0.001)*		113.6(<.001)*
Overall Group Effect Chisquare for number of other disorders ³		8.2(0.016)*		4.5(0.11)		8.0(0.019)*
(N) ⁴	(4315)		(394)		(4315)	

* Significant at the .05 level, two-sided test
¹ each column represents a separate multivariate model in survival framework, with all rows as predictors controlling for age, age², sex, cohorts, int categories. Outcome variable indicated in each column header
² Group effect chi square is for the multi-df tests to assess any difference between all the disorders, while the individual chi-squares only tests yes vs no for each disorder
³ Group effect chi-square is for the multi-df tests to assess any difference between all the # of disorder dummies, while the individual chi-squares only tests yes vs no for each
⁴ Denominator sample size of the models

disorders investigated in the present study predicted suicide attempts. This finding was consistent with previous studies from clinical settings^{21,22} and autopsy studies^{23,24} revealing that the vast majority of suicide attempters had a diagnosable mental disorder. However, the South African findings were slightly lower in comparison to the results from the National Comorbidity study in the United States where 66% of respondents who seriously considered killing themselves and 80% who actually made a suicide attempt were found to have a prior mental disorder.²⁵

Analysis that controlled for the confounding effects of other mental disorders showed that the effect of each individual mental disorder was lower than in a bivariate analysis, but almost always statistically significant. These findings may reflect the common factors that many disorders exhibit including distress and functional impairment, and their links to an escape model of suicide.²⁶ After controlling for other mental disorders as confounders, the present study revealed that PTSD was the strongest predictor of suicide ideation and attempts. Previous studies have reported that depression was often the strongest psychiatric risk factor for suicide.²⁵ The association with PTSD has been previously reported^{27,28} and may be particularly relevant in a country with a high prevalence of trauma, such as South Africa.²⁹

Finally, the present study reveals that the presence of multiple disorders is associated with an increase in subsequent suicide attempt. This finding is consistent with a previous literature revealing that adults who had attempted suicide reported more than one mental disorder.^{13,30} However, more

complex models reveal that the relationship between number of mental disorders and suicidal behaviour is not a linear progression, but rather that each additional disorder has a diminishing role. This effect in the interactive model was significantly different for unplanned suicidal attempt and suicidal ideation for individuals with exactly two disorders. It can be postulated that multi-morbidity is correlated with elevated levels of distress, impairment, and disease burden as indicated by previous studies conducted in the developed world.^{26,31} Similar to previous studies high levels of comorbidity may represent elevated—and perhaps intolerable—levels of distress and impairment, which some people may ultimately attempt to escape via suicide. Support for this model is provided by Nock et al.¹⁴ who report that the relation between multi-morbidity and suicidal behaviours is mediated by high levels of aversive emotional arousal.

Several important limitations should be emphasized when interpreting these results. First, the data are based on retrospective self-reports of the occurrence of the mental disorder and timing of suicidal behaviour – so that systematic recall bias may be present.³² Nevertheless systematic reviews have suggested that people can recall past experiences with sufficient accuracy to provide valuable information.^{33,34} It has also been shown that retrospective data are especially useful when prospective data are not available.³⁵ Nonetheless, it is important to be cautious when interpreting the results because recall bias almost certainly exists to some extent in the retrospective reports. Second, although the data examined a

wide range of mental disorders, several disorders known to be linked to suicidal behaviours were not included, most notably non-affective psychosis and personality disorders. Third, we did not examine some independent factors, such as genetic predisposition or stressful life events, which may increase the severity or chronicity of each disorder.

Conclusion

Despite limitations, the result of the present study provides further insight into the relationship between psychiatric disorders and suicidal behaviour in South Africa. It is hoped that these data can aid in the development of appropriate preventive interventions for those South Africans more at risk for suicide. Programmes in developed countries have emphasized the importance of comorbidity and analogous programs are necessary in South Africa.

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