

Prevalence and correlates of 30-day suicidal ideation and intent: Results of the South African National Student Mental Health Survey

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Background. Although suicide prevention is recognised as a priority among university students in South Africa (SA), it is unclear what proportion of students require urgent indicated interventions and what the characteristics are of these students.

Objective. To assess the prevalence and sociodemographic correlates of 30-day suicidal ideation, frequency of ideation and self-reported intention to act on ideation in the next year among a national sample of SA university students.

Methods. Self-report cross-sectional data were collected online from students ($N=28\,268$) at 17 universities across SA as part of the national student mental health survey. Students reported suicidal ideation in the past 30 days, frequency of ideation and intention to act on ideation in the next year. Data were weighted within institutions by gender and population group, and across the four main types of universities (historically white, historically disadvantaged, technical and distance learning) to correct for response rate discrepancies. Prevalence was estimated with these weighted in the total sample and across types of universities. Poisson regression with robust error variances was used to investigate associations of sociodemographic characteristics with ideation and intention to act on suicidal ideation. Results are reported as relative risks (RRs) with design-based 95% confidence intervals (CIs).

Results. Thirty-day prevalence of suicidal ideation was 24.4% (standard error (SE) 0.3), with 2.1% (SE 0.1) and 4.1% (SE 0.1), respectively, reporting suicidal ideation all/almost all the time, or most of the time. A total of 1.5% (SE 0.1) of respondents reported being very likely to act on their suicidal ideation, while 3.9% (SE 0.2) were somewhat likely, 8.7% (SE 0.2) were not very likely and 85.8 (SE 0.5) either reported no suicidal ideation or that they were not at all likely to act on this ideation. Risk of suicidal ideation with high intent in the total sample was elevated among females (RR 1.9, 95% CI 1.3 - 2.7) and gender non-conforming students (RR 4.3, 95% CI 1.4 - 13.0) relative to males, black African students compared with white students (RR 3.6, 95% CI 1.9 - 7.1), students whose parents did not progress to secondary school compared with students whose parents had a university education (RR 1.6, 95% CI 1.0 - 2.5) and sexual minority students compared with heterosexual students (RR 1.9, 95% CI 1.3 - 2.6). Among students with 30-day ideation (controlling for frequency of ideation), only two of these predictors of high intent remained significant: identifying as black African (RR 2.7, 95% CI 1.4 - 5.1), and having parents with less than secondary education (RR 1.5, 95% CI 1.0 - 2.1).

Conclusion. Scalable suicide prevention interventions are needed to reach the large number of SA students who report suicidal ideation with intent.

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Suicide is the second leading cause of death among young people aged 15 - 29 years worldwide, with as many as one-third of all suicides occurring among adolescents.^[1,2] There is also growing awareness globally of the high rates of suicidal behaviour among university students, with one study of 13 984 first-year students across 19 universities in 8 countries reporting 12-month prevalence estimates for suicidal ideation, plan and attempt of 17.2%, 8.8% and 1.0%, respectively.^[3] A systematic review of epidemiological studies among university students found pooled 12-month prevalence estimates of 10.6% (95% CI 9.1 - 12.3%) for suicidal ideation, 3.0% (95% CI 2.1 - 4.0%) for a plan and 1.2% (95% CI 0.8 - 1.6%) for an attempt.^[4] First onset of suicidal ideation and behaviour is typically during late adolescence when many young people transition into higher education.^[5] University campuses are therefore potentially

good sites for early identification and targeted interventions for young people at risk of suicidal behaviour. Much of what is known about the epidemiology of suicidal behaviour among students comes from high-income Western countries, with comparatively little good-quality data from countries in Africa.^[4,6] Reliable epidemiological data are needed to plan evidence-based suicide prevention programmes and establish priorities for student mental health, especially in resource-constrained environments such as Africa.

Suicidal ideation (defined by the Centers for Disease Control and Prevention in the USA as 'thoughts of engaging in suicide-related behaviour'^[7]) is an important focus of suicide prevention, and is a widely used, albeit crude, indicator of the number of individuals at risk of suicide.^[8,9] Yet most individuals who think about suicide do not transition to engaging in fatal or non-fatal suicidal behaviour.^[10]

Furthermore, it may not be developmentally inappropriate for young adults, who are thinking about their place in the world and engaging with existential issues such as the level of control and autonomy they have over their own lives, to contemplate dying or even taking their own lives, without necessarily being at risk of acting on these thoughts.^[11] In student populations, suicidal ideation may therefore be a very poor indication of risk of future suicidal behaviour. As a result, studies that only assess ideation are likely to overestimate the number of students in need of intervention. Other dimensions of suicidal ideation, such as frequency of suicidal ideation and intention to act on these thoughts, provide more accurate indications of the number of students at risk of suicidal behaviour and in need of interventions.^[10,12]

The mental health of university students has become an increasingly prominent issue in South Africa (SA), especially since the 'Fees Must Fall' protests in 2017,^[13] during which students disrupted learning on university campuses across the country to draw attention to, among other things, their demands to decolonise higher education, abolish tuition fees and provide resources to support the mental health of students.^[14,15] The media have subsequently focused much more attention than previously on student suicides,^[16] and some SA academics have suggested that suicidal behaviour has reached epidemic proportions on university campuses.^[17] One study of first-year students from two SA universities reported 12-month prevalence estimates for suicidal ideation of 40.9%,^[18] while another survey reported 2-week prevalence estimates of 24.5%.^[19] But no studies have reported accurate estimates of the proportion of SA students who have suicidal ideation and intend to act on these thoughts. It therefore remains unclear what proportion of students require immediate interventions and how best scarce financial resources should be directed to targeted suicide prevention interventions. It is equally unclear if there are specific groups of universities and/or specific groups of students that require more urgent attention.

SA's political history of racial segregation and differential spending on education has resulted in four distinct kinds of universities with different resource endowments and different demographic compositions. Prior to the country's transition to democracy in 1994, several universities were set aside for white students, now collectively referred to as historically white institutions (HWIs). HWIs still enjoy the benefits of wealth and infrastructure accrued during apartheid-era segregation, and are typically better resourced than the historically disadvantaged institutions (HDIs). HDIs were previously established for black students and mostly located in rural settings and former homelands (i.e. geographic regions set aside by the apartheid government for black African inhabitants to keep them from living in the urban areas reserved for whites).^[20] Since 2004, the government has also created seven 'Universities of Technology' (UTs), which are primarily focused on vocational education.^[21] SA is also home to one of the world's largest distance learning universities (DLUs), which has an enrolment of approximately 370 000 undergraduate students, including some SA citizens living outside the country, many of whom are studying part time and are older than students enrolled at residential universities. It is, however, unclear if students in these diverse environments are all equally at risk of suicide. Socioeconomic factors (including education, poverty and income inequality) are strongly associated with suicide risk, which suggests that we expect to see differences in suicidality across the various kinds of educational institutions in SA, with higher prevalence in less well-resourced settings.^[22,23]

The aim of the present study is to establish the need for suicide prevention interventions by estimating the 30-day prevalence of suicidal ideation, frequency of ideation and self-reported intention to act on

ideation in the next year among a national sample of undergraduate university students ($N=28\,268$) from 19 universities across the country. In addition, we investigate differences in these dimensions across different types of universities in SA and explore sociodemographic correlates of suicidal ideation and intent. We focused on 30-day prevalence of suicidal ideation (i.e. current suicidal ideation) given the research that this dimension of suicidality is strongly associated with transition to suicidal behaviour among adolescents,^[24,25] and given our aim to quantify the number of students at imminent risk of engaging in suicidal behaviour. The data presented were collected in a SA Medical Research Council (SAMRC)-funded National Student Mental Health Survey as part of the ongoing work of the World Health Organization World Mental Health Surveys International College Student Initiative (WMH-ICS).^[26]

Methods

We used data from the SA National Student Mental Health Survey to: (i) estimate 30-day prevalence of suicidal ideation, frequency of ideation and intention to act on ideation in the total sample of students from all universities; (ii) explore whether ideation and intention to act differ across universities; and (iii) explore associations of sociodemographic factors with these indicators of 30-day suicidality. Subsequent reports will examine lifetime prevalence and course of suicidal ideation and behaviours.

Procedure

All 26 public (i.e. partially state-funded) universities in SA were invited to participate in the survey, of which 17 agreed and sent out emails inviting all their undergraduate students to complete an anonymous online survey. Data were collected between April 2020 and October 2020.

Measures

The survey obtained the following information:

Sociodemographic characteristics: Participants reported their age, gender, population group, sexual orientation, parents' level of education and whether they were full-time or part-time students. In terms of gender, students self-identified as female, male or gender non-conforming (i.e. gender fluid, non-binary, etc.). For population group we used the categories in government policies and the official population census (i.e. black African, coloured, white, Asian and 'other'). We used these population groupings to explore disparities in mental health that may have resulted from the country's history of racial segregation. Our use of these terms does not imply any assumptions about biological differences between these groups. Given the distributions in the sample, we distinguished three broad groups: black African, black other (i.e. coloured, Asian and other non-white) and white. For sexual orientation, we followed the American Psychiatric Association style guidelines and used the terms 'heterosexual' (i.e. students who report no same sex attraction) or 'sexual minority groups' (i.e. lesbian, gay, bisexual, asexual or questioning). Four broad categories of parent education were distinguished: less than secondary education (which included parents who either had no education or did not complete high school), completion of secondary education, some education beyond secondary school but less than graduating from a university, and university graduation (including those whose parents had professional degrees).

Suicidal ideation and intent: Suicidal ideation was assessed using a modified version of the Columbia Suicidal Severity Rating Scale (C-SSRS), which has demonstrated good convergent and divergent validity with other multi-informant suicidal ideation and behaviour

scales used with adolescents, as well as showing high sensitivity and specificity for suicidal behaviour classifications compared with other behaviour scales and clinician evaluation.^[27] We assessed passive suicidal ideation (i.e. 'did you ever in your life wish you were dead or would go to sleep and never wake up?') and active suicidal ideation ('did you ever in your life have thoughts of killing yourself?'). Students who endorsed either of these items were then asked if these had occurred in the preceding 30 days and if so, how frequently these thoughts occurred (all or almost all of the time; most of the time; some of the time; a little of the time; none of the time), and perceived intent to act on suicidal ideation in the following 12 months (i.e. 'in the next 12 months, what is the likelihood that you will act on those thoughts of killing yourself?' – very likely; somewhat likely; not very likely; not at all likely). For the purposes of our analysis, students who indicated that they were very likely to act on their ideation were defined as having 'high intent to act', while those who indicated being 'very' or 'somewhat' likely to act were defined as having 'some intent to act'.

Data analysis

Data were weighted within institutions using standard calibration methods^[28] to adjust for differences between survey respondents and the population on the cross-classification of gender, population group and academic year of study. The population data used for this purpose were made available by university officials. A second weight was then used to adjust for differences in the survey response rates between institutions. The latter weights ranged from a high of 7.6 for Mangosuthu University of Technology to a low of 0.4 for Rhodes University (see appendix Table 1, <https://www.samedical.org/file/1978>). All analyses were carried out using these doubly weighted data. Prevalence estimates were calculated with standard errors (SEs) for the total sample and across the four different types of institutions. Multivariate Poisson regression models with robust error variances^[29] were then used to determine the associations of sociodemographic variables with binary outcomes for each dimension of suicidality considered and for frequency of ideation (treated as a continuous variable). Poisson regression coefficients were exponentiated and are reported as relative risks (RRs) with 95% confidence intervals (CIs). All significance tests were evaluated using 0.05-level two-sided design-based tests.

Ethics

Ethical approval was obtained from the Health Science Research Ethics Committee of Stellenbosch University (re. no. N13/10/149) and institutional permission was obtained from all participating universities. Participation in the study was entirely voluntary and participants provided informed consent electronically prior to completing the survey. Information about crisis and student counselling services was provided to all participants. Data were anonymised, and de-identified data were securely stored on a password-protected cloud-based server.

Results

Sample characteristics

A total of 28 516 students completed the survey and provided information about the name of the university they attended (see appendix Table 1 and Table 2). The sample consisted of students from eight HWIs, four HDIs, four UTs and one DLU. The overall survey response rate was 3.5%, ranging from a high of 10.5% at Rhodes University and a low of 0.6% at Mangosuthu University of Technology. This response rate is slightly lower than typically observed in similar student surveys internationally, although broadly aligned with response rates in postal surveys. Differences were found

in the sociodemographic profiles of students across the four types of institutions (see appendix Table 2).

Prevalence and frequency of suicidal ideation

The 30-day prevalence and frequency of suicidal ideation in the total sample and by type of institution are shown in Table 1. A total of 24.4% (SE 0.3) of students reported suicidal ideation in the preceding 30 days, with statistically significant differences across institutions ($\chi^2(3)=263.6, p<0.05$) ranging from highs of 30.3% (SE 0.8) at HWIs and 29.4% (SE 1.6) at UTs, to a low of 21.1% (SE 0.4) at the DLU. In terms of frequency of suicidal ideation, in the total sample, 2.1% (SE 0.1) reported thinking about suicide all/almost all the time, while the proportion who thought about suicide most, some and little of the time were 4.1% (SE 0.1), 7.2% (SE 0.2) and 10.9% (SE 0.3), respectively. Students at UTs reported the highest frequency of suicidal ideation, with 4.3% (SE 0.8) thinking about suicide all/almost all the time, and 5.4% (SE 0.6) most of the time. At the other end of the spectrum, the frequency of suicidal ideation was lowest at the DLU, with 1.5% (SE 0.1) thinking about suicide all/almost all the time, and 3.2% (SE 0.2) most of the time.

Perceived intent to act on suicidal ideation

Table 2 shows the perceived intent to act on suicidal ideation in the next year in the total sample, the subset of respondents with any 30-day suicide ideation, and frequency of 30-day ideation. In the total sample, 1.5% (SE 0.1) reported being very likely to act on their suicidal ideation, while 3.9% (SE 0.2) were somewhat likely, 8.7% (SE 0.2) were not very likely and 85.8% (SE 0.5) were not at all likely. Among students with suicidal ideation in the preceding 30 days, 33.7% (SE 3.0) reported being very likely to act on their thoughts, while 29.1% (SE 3.2), 24.2% (SE 2.7) and 13.0% (SE 2.3) reported being somewhat likely, not very likely and not at all likely to act on their ideation, respectively.

As shown in Table 2, the proportion of students very likely or somewhat likely to act on their suicidal ideation was markedly higher among those who reported more frequent ideation compared with those with less frequent ideation. Among students who reported suicidal ideation all/almost all of the time in the past 30 days, as many as 33.7% (SE 3.0) said they were very likely to act on these thoughts compared with 9.2% (SE 1.2) of those with ideation most of the time, 3.1% (SE 0.5) among those with ideation some of the time and 2.0% (SE 0.3) among those with ideation little of the time. Similarly, the proportion of students reporting that they were somewhat likely to act on their suicidal ideation was 29.1% (SE 3.2) among those with ideation all/almost all the time, 33.8% (SE 2.6) among those with ideation most of the time, but only 17.8% (SE 1.2) among those with ideation some of the time and 5.8% (SE 0.7) among those with ideation little of the time. By comparison, among students who said they were not at all likely to act on their thoughts, only 13.0% (SE 2.3) reported ideation all/almost all the time, 21.7% (SE 1.9) most of the time, 34.6% (SE 2.0) some of the time and 59.8% (SE 1.8) among those with ideation little of the time.

Sociodemographic correlates of suicidal ideation and intent

The results of the regression analysis to identify sociodemographic risk factors for high levels of intent to act on suicidal ideation among the total sample are shown in Table 3. Age, gender, population group, parents' level of education and sexual orientation were all identified as risk factors for high intent in the total sample. No elevated risk was observed for student registration status (i.e. part time or full time) or year of study. Risk of high intent was

Table 1. 30-day prevalence and frequency of suicide ideation in the total sample and by type of institution (N=28 268)*

Suicide ideation	Total, % (SE)	HWI, % (SE)	HDI, % (SE)	UT, % (SE)	Distance, % (SE)	$\chi^2_{(3)^a}$
Any	24.4 (0.3)	30.3 (0.8)	23.0 (0.9)	29.4 (1.6)	21.1 (0.4)	263.6
Frequency						
All/almost all the time	2.1 (0.1)	2.9 (0.3)	2.1 (0.4)	4.3 (0.8)	1.5 (0.1)	103.7
Most	4.1 (0.1)	5.3 (0.3)	4.5 (0.4)	5.4 (0.6)	3.2 (0.2)	161.0
Some	7.2 (0.2)	8.8 (0.5)	5.7 (0.6)	7.3 (0.9)	6.8 (0.2)	160.0
Little	10.9 (0.3)	13.3 (0.6)	10.7 (0.8)	12.3 (1.8)	9.6 (0.3)	-
<i>n</i>	28 268	6 238	2 497	750	18 783	-

SE = standard error; HWI = historically white institution; HDI = historically disadvantaged institution; UT = University of Technology.

*Data are weighted to adjust for within-university differences in response rates by the cross-classification of student gender, race and year in university (first year v. others) and for between-university differences in the overall response rate. Prevalence estimates are for either active ideation (i.e. 'thoughts of killing yourself') or passive ideation (i.e. 'wish you were dead or would go to sleep and never wake up'). Standard errors were generated using the design-based Taylor series linearisation method.

^a χ^2 tests for 'most' and 'some' of the time are nested, so that the test for 'most' includes either 'all/almost all' or 'most' v. all others (i.e. either 'some', 'a little', or 'none' of the time) and the test for 'some' includes either 'all/almost all', 'most', or 'some' v. all others.

Table 2. Perceived likelihood of acting on suicidal thoughts in the next year in the total sample, the subset of respondents with any 30-day suicide ideation, and by frequency of 30-day ideation (N=28 268)*

Likelihood	Total sample, % (SE)	Total, % (SE)	All or almost all, % (SE)	Most, % (SE)	Some, % (SE)	Little, % (SE)
Very likely	1.5 (0.1)	6.3 (0.3)	33.7 (3.0)	9.2 (1.2)	3.1 (0.5)	2.0 (0.3)
Somewhat	3.9 (0.2)	16.1 (0.8)	29.1 (3.2)	33.8 (2.6)	17.8 (1.2)	5.8 (0.7)
Not very	8.7 (0.2)	35.8 (0.9)	24.2 (2.7)	35.3 (2.2)	44.5 (1.9)	32.4 (1.4)
Not at all	85.8 (0.5)	41.9 (1.0)	13.0 (2.3)	21.7 (1.9)	34.6 (2.0)	59.8 (1.8)
<i>n</i>	28 268	7 182	600	1 169	2,167	3,246

SE = standard error.

*Data are weighted to adjust for within-university differences in response rates by the cross-classification of student gender, race, and year in university (first year v. others) and for between-university differences in the overall response rate. Prevalence estimates are for either active ideation (i.e. 'thoughts of killing yourself') or passive ideation (i.e. 'wish you were dead or would go to sleep and never wake up'). Standard errors were generated using the design-based Taylor series linearisation method.

significantly lower among students >30 years old compared with those <20 years old (RR 0.2, 95% CI 0.1 - 0.4). Compared with males, risk of high intent was elevated among female (RR 1.9, 95% CI 1.3 - 2.7) and gender non-conforming students (RR 4.3, 95% CI 1.4 - 13.0), as well as among black African students compared with white students (RR 3.6, 95% CI 1.9 - 7.1), students whose parents did not progress to secondary school compared with students whose parents had a university education (RR 1.6, 95% CI 1.0 - 2.5) and sexual minority students compared with heterosexual students (RR 1.9, 95% CI 1.3 - 2.6).

In the total sample, risk of any ideation (irrespective of frequency or intent) was associated with age, gender, population group, parents' level of education and sexual orientation, but not with registration status or year of registration. Compared with students <20 years old, those aged 26 - 30 years and those >30 years were respectively 0.7 (95% CI 0.7 - 0.8) and 0.5 (95% CI 0.4 - 0.5) times less likely to experience ideation. Compared with males, female (RR 1.4, 95% CI 1.3 - 1.5) and gender non-conforming students (RR 1.9, 95% CI 1.6 - 2.3) were at elevated risk of ideation. Although black African students were not at increased risk of ideation relative to white students, those identifying as 'black other' showed marginally elevated risk (RR 1.1, 95% CI 1.0 - 1.2). Compared with students whose parents had completed higher education, risk of ideation was elevated for those whose parents had less than secondary education (RR 1.1, 95% CI 1.0 - 1.2), had completed secondary education (RR 1.1, 95% CI 1.0 - 1.1) and had some post-secondary education (RR 1.1, 95% CI 1.0 - 1.2). Sexual minority students were 1.5 (95% CI 1.4 - 1.6) times more likely than heterosexual students to report any ideation.

In the total sample, frequency of ideation was associated with gender, population group and sexual orientation. Female students, compared with males, were more likely to report more frequent

ideation (RR 1.1, 95% CI 1.0 - 1.1). Compared with white students, black African students were more likely to report more frequent ideation (RR 1.1, 95% CI 1.1 - 1.2), and sexual minority students were more likely to report frequent ideation compared with students identifying as heterosexual (RR 1.1, 95% CI 1.0 - 1.1).

Frequent ideation among ideators was associated with age, gender, population group and sexual orientation, but not with age or parents' level of education. Female ideators were 1.2 (95% CI 1.0 - 1.4) times more likely than males to report frequent ideation. Compared with ideators who identified as white, black African students were 1.5 (95% CI 1.2 - 1.9) times more likely to report frequent ideation. Finally, sexual minority ideators were 1.3 (95% CI 1.1 - 1.5) times more likely than heterosexual students to report frequent ideation.

Among ideators, any intention to act on suicidal ideation (controlling for frequency of ideation) was associated with age, gender, population group and sexual orientation, but not with parents' level of education, student status or year of registration. Ideators aged ≥30 years were 0.9 (95% CI 0.8 - 1.0) times more likely than those <20 years to report intention to act, while gender non-conforming students were 1.3 (95% CI 1.1 - 1.5) times more likely than male students, black African students were 1.2 (95% CI 1.1 - 1.4) times more likely than white students, and sexual minority students were 1.1 (95% CI 1.1 - 1.2) times more likely than heterosexual students to report intention.

Among ideators, high intent to act on suicidal ideation (controlling for frequency of ideation) was only associated with population group and parents' level of education. Black students with 30-day suicidal ideation were 2.7 (95% CI 1.4 - 5.1) times more likely than their white counterparts to report high intent to act on their thoughts. Similarly, students with suicidal ideation whose parents had less than secondary education were 1.5 (95% CI 1.0 - 2.1) times more likely to report high intent compared with ideators whose parents had tertiary education.

Table 3. Associations of sociodemographic and student status characteristics with self-reportedly being very like to act on suicidal thought in the next year in the total sample, decomposed through 30-day suicide ideation and overall perceived intent (N=28 268)

Characteristic	High intent/total sample		Any ideation/total sample		Frequency of ideation/any ideation		Any intent/any ideation, controlling for frequency of ideation [†]		Intensity of intent/any intent, controlling for frequency of ideation [‡]		High intent/any intent, controlling for frequency of ideation [§]	
	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI
Age												
17 - 19	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
20 - 22	1.4	1.0 - 2.1	1.1	1.0 - 1.2	1.0	1.0 - 1.1	1.1*	1.1 - 1.1	1.0*	1.0 - 1.0	1.1	0.8 - 1.7
23 - 25	1.4	0.9 - 2.3	1.0	0.9 - 1.1	1.0	1.0 - 1.1	1.0*	1.0 - 1.1	1.0*	1.0 - 1.0	1.2	0.8 - 1.9
26 - 30	0.9	0.6 - 1.4	0.8*	0.7 - 0.9	1.0	0.9 - 1.0	1.1*	0.9 - 1.0	1.0	1.0 - 1.0	1.1	0.7 - 1.7
≥31	0.2*	0.1 - 0.5	0.5*	0.4 - 0.5	1.0	0.9 - 1.0	0.9*	0.9 - 1.0	0.9*	0.9 - 1.0	0.6*	0.3 - 1.2
c ₄	46.7*		237.0*		13.3*		12.3*		12.8*		6.5	
Gender												
Female	2.0*	1.4 - 2.8	1.5*	1.4 - 1.6	1.1*	1.0 - 1.1	1.1*	1.1 - 1.1	1.0	1.0 - 1.0	1.0	0.8 - 1.4
Male	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
Gender non-conforming	4.0*	1.4 - 11.5	2.0*	1.6 - 2.5	1.1	0.9 - 1.2	1.3*	1.2 - 1.3	0.9*	0.9 - 1.0	1.3	0.6 - 3.1
c ₂	18.9*		126.5*		6.8*		8.0*		0.7		0.5	
Population group												
Black African	4.7*	2.5 - 8.9	1.0	0.9 - 1.1	1.1*	1.1 - 1.2	1.2*	1.2 - 1.2	1.2*	1.1 - 1.2	2.8*	1.5 - 5.2
White	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
Black other	1.9	0.8 - 4.4	1.1	1.0 - 1.3	1.1	1.0 - 1.1	1.1*	1.0 - 1.1	1.0	1.0 - 1.0	1.2	0.5 - 2.6
c ₂	29.3*		18.1*		23.6*		23.3*		57.3*		20.1*	
Parent education												
Less than secondary	1.6*	1.0 - 2.4	1.1*	1.0 - 1.2	1.0	1.0 - 1.1	1.0	1.0 - 1.0	1.1*	1.1 - 1.1	1.5*	1.1 - 2.1
Secondary graduate	1.2	0.9 - 1.8	1.0*	1.0 - 1.1	1.0	1.0 - 1.1	1.0*	1.0 - 1.0	1.0*	1.0 - 1.1	1.2	0.9 - 1.7
Some post-secondary	1.0	0.6 - 1.4	1.1*	1.0 - 1.2	1.0	0.9 - 1.0	1.1*	1.1 - 1.1	1.0*	1.0 - 1.0	0.9	0.6 - 1.3
University graduate	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
c ₃	7.4		8.9*		5.4		4.7		9.3*		9.3*	
Sexual orientation												
Heterosexual	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
Sexual minority group	1.8*	1.3 - 2.5	1.5*	1.4 - 1.6	1.1*	1.0 - 1.1	1.1*	1.1 - 1.1	1.0*	1.0 - 1.1	1.0	0.8 - 1.4
c ₂₁	14.8*		162.7*		19.7*		14.4*		4.4*		0.1	
Student status												
Part-time degree	1.0	0.7 - 1.3	1.0	0.9 - 1.0	1.0	0.9 - 1.0	1.0*	0.9 - 1.0	1.0*	1.0 - 1.0	1.2	0.9 - 1.6
Full-time degree	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
c ₁	0.0		1.6		3.6		1.1		2.4		2.4	
Student year												
1st year	1.0	0.7 - 1.4	1.0	0.9 - 1.1	1.0	0.9 - 1.0	1.0	1.0 - 1.0	1.0	1.0 - 1.0	1.1	0.8 - 1.4
All other	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
c ₁	0.0		0.1		1.7		0.2		0.0		0.6	
n	28 268		28 268		7 182		7 182		4 727		4 727	

RR = relative risk; CI = confidence interval.

*Significant at 0.05 level, two-sided test.

[†]Controlling for frequency of ideation: RR=1.3*; 95% CI=1.3 - 1.3); p=0.0.

[‡]Controlling for frequency of ideation: RR= 0.9*; 95% CI=0.9 - 0.9); p<0.001.

[§]Controlling for frequency of ideation: RR=1.9*; 95% CI=1.6 - 2.2); p<0.001.

Discussion

This study is the first of its kind to assess 30-day prevalence of suicidal ideation, frequency of ideation, and intent to act on ideation in the next 12 months in a large national sample of university students from across many universities in SA. Almost a quarter of students (24.4%) reported suicidal ideation in the preceding 30 days, with as many as 6.2% thinking about suicide all or most of the time. These estimates are markedly higher than the 12-month prevalence of 9.1% for suicidal ideation among the general population reported in the SA Stress and Health Study.^[31,32]

There were significant variations in prevalence estimates across the different kinds of universities, with suicidal ideation being more prevalent in HWIs and UTs and lowest in the DLU. More than 60% of students with 30-day ideation reported some intention to act on their suicidal ideation, with 33.7% of ideators being very likely and 29.1% being somewhat likely to act on their suicidal ideation within the next year. Unsurprisingly, students with more frequent suicidal ideation reported higher intent to act on these thoughts in the following year. There appear to be distinct groups of students at elevated risk of suicidal ideation and high levels of intent to act on these thoughts.

Increased risk for suicidal ideation in the preceding 30 days and high intent to act on these thoughts was associated with younger age, identifying as female or gender non-conforming, black African, lower levels of parental education and sexual minorities.

It is noteworthy that 1.5% of students reported suicidal ideation in the past 30 days with high intent to act on these thoughts in the next year, and 3.9% reported ideation with some intent to act. These prevalence estimates provide a much more accurate indication of the number of students at risk of suicide compared with crude prevalence estimates of ideation. Although students who report any intention to act on their suicidal ideation are a small proportion of the total student body (5.4%), this proportion still amounts to a significant number of students who require urgent indicated suicide prevention interventions, and supports the assertion that suicide prevention interventions should be a priority on SA university campuses. It seems unlikely, given the large number of students in need of interventions and the significant resource constraints in the country, that conventional one-on-one treatment approaches delivered by mental health professionals will be a financially feasible mode of intervention.^[33] Alternative scalable interventions are needed, which might include group interventions and/or the use of digital technologies. While there is evidence to support the use of group interventions to treat common mental disorders among university students,^[34-36] there is a lack of evidence to support the use of group therapy as an indicated intervention for suicidal university students.^[37]

Testing the feasibility, acceptability and effectiveness of group suicide prevention interventions for students reporting ideation with intent seems to be an important research priority in SA, particularly given that 79% of suicides occur in low- and middle-income countries where resource constraints make individual interventions unaffordable and where group interventions might be a more cost-effective way to curb suicides.^[1,2] Digital technologies are also a potentially cost-effective way to scale up access to mental healthcare, and there is emerging evidence that app-based interventions might be effective for suicide prevention among adolescents.^[38] There is also evidence that some students in SA find digital mental health interventions acceptable and satisfying,^[39] suggesting that digital technologies could be an effective way to deliver suicide prevention interventions to SA students, although more research is needed to verify whether these findings are generalisable to large groups of students in different settings. While digital interventions might be appealing (because they offer anonymity, convenience, access and affordability), there are significant problems associated with poor sustained engagement with digital interventions, which may make them unsuitable for use with high-risk groups, such as suicidal students. A potential solution may be to use web-based video conferencing platforms to deliver synchronous group interventions for suicide prevention. Pilot studies in this area (using online group therapy to reduce symptoms of depression and anxiety among students in SA) have had promising results,^[39] suggesting that this mode of intervention might be a feasible way to deliver acceptable, accessible and cost-effective indicated suicide prevention interventions.

Our data suggest that suicide risk is not equally distributed across universities in SA, and that HWIs and UTs may require more attention than the HDIs and DLU. The reasons for this disparity are not clear, and this requires more research. The higher prevalence estimates observed at the UTs may be related to the fact that UTs have much higher numbers of black African students (which is a significant risk factor for suicidal ideation and intent, as our data show) compared with the other institutions. It is a little more difficult to speculate about why the prevalence estimates for both ideation and intent are elevated at HWIs, and it may be related to institutional culture and the dynamics of transformation, which

have left some students feeling alienated within these institutions. It will be important in subsequent studies to investigate more closely whether there are differences in sociodemographic risk factors across the various kinds of institutions, as this could impact the design and delivery of interventions.

Several sociodemographic factors were consistently associated with 30-day suicidal ideation, frequent ideation and higher levels of intent to act on suicidal ideation, suggesting that there may be distinct populations at elevated risk. Our data suggest that population-level interventions to reach students with ideation and high intent in the general student population should target younger, female, gender non-conforming, first generation (i.e. students whose parents did not attend university) and sexual minority students. This is, however, not particularly helpful since most students fit into at least one of these categories. Risk of high intent among ideators was significantly elevated for black African students and students whose parents did not progress to secondary education, highlighting the vulnerability of this group of students, the need for indicated secondary interventions for these students and the need for research to understand the reasons for this elevated risk.

Limitations

This study has several limitations, including the use of non-probability sampling, a reliance on self-report measures, and the fact that 9 universities in the country did not participate in the study. Our reliance on a convenience sample together with the relatively low and quite variable response rates across institutions limit the generalisability of results, although we have attempted to correct for this to the extent possible by weighting the data.

Conclusion

Quantifying the proportion of students with recent suicidal ideation and intent to act on these thoughts, provides a good indication of the number of students who urgently need indicated suicide prevention interventions. Data collected as part of the SA National Student Mental Health Survey suggest that a substantial number of SA students require urgent indicated suicide prevention interventions (approximately 5.4% of undergraduates who report any intention to act on their ideation), providing sound evidence that suicide prevention should be a priority at SA universities and highlighting the need for novel scalable interventions to meet this large need. Research is needed to understand the reason for the elevated risk observed among some groups of students, most notably females, gender non-conforming, black, first-generation and sexual minority students in SA.

Data and datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Author contributions. RCK conceptualised the study and the data analysis plan, was responsible for overseeing the data analysis and data interpretation, and drafted the initial manuscript. MJK was responsible for data analysis. JB was responsible for study implementation, manuscript drafting and data interpretation. XH contributed to project management, data interpretation and manuscript writing and editing. DJS contributed to study conceptualisation, data interpretation, and manuscript writing and editing.

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Conflicts of interest. In the past 3 years, RCK was a consultant for Datastat, Inc., Holmusk, RallyPoint Networks, Inc. and Sage Therapeutics. He has stock options in Mirah, PYM and Roga Sciences. The authors confirm that there are no other conflicts to declare.

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