



**Association between childhood adversities and long-term suicidality among South Africans: Results from the South African Stress and Health Study**

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2013-004644
Article Type:	Research
Date Submitted by the Author:	09-Dec-2013
Complete List of Authors:	Bruwer, Belinda; Stellenbosch University, Psychiatry Govender, Ravi; Stellenbosch University, Psychiatry Bishop, Melanie; Stellenbosch University, Psychiatry Williams, David; Harvard University, Human Development and Health Stein, Dan; University of Cape Town, Psychiatry and mental health Seedat, Soraya; Stellenbosch University, Psychiatry
<b>Primary Subject Heading</b>:	Mental health
Secondary Subject Heading:	Mental health
Keywords:	MENTAL HEALTH, Child & adolescent psychiatry < PSYCHIATRY, Adult psychiatry < PSYCHIATRY, PSYCHIATRY, Suicide & self-harm < PSYCHIATRY

SCHOLARONE™  
Manuscripts

only

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## Association between childhood adversities and long-term suicidality among South Africans: Results from the South African Stress and Health Study

Belinda Bruwer\*<sup>a</sup>, Ravi Govender<sup>a</sup>, Melanie Bishop<sup>a</sup>, David R Williams<sup>b</sup>, Dan J Stein<sup>c</sup>, Soraya Seedat<sup>a</sup>

<sup>a</sup> Department of Psychiatry, Stellenbosch University, PO Box 19063, Tygerberg, 7505, Republic of South Africa.

<sup>b</sup> Department of Society, Human Development and Health, Harvard School of Public Health, and Department of African and African American Studies, Harvard University. Department of Society, Human Development and Health, 677 Huntington Avenue, 6<sup>th</sup> floor, Boston, MA 02115, United States of America

<sup>c</sup> Department of Psychiatry and Mental Health, University of Cape Town, Groote Schuur Hospital (J2), Anzio Road, Observatory, 7925, Cape Town, Republic of South Africa

\*Corresponding author: Department of Psychiatry, University of Stellenbosch, PO Box 19063, Tygerberg, 7505, Republic of South Africa.

Tel nr: +27219404467. Fax nr: +27219404543, [bbruwer@sun.ac.za](mailto:bbruwer@sun.ac.za)

Keywords: Childhood adversities, suicidal ideation, suicidal attempts, suicide, suicidal behaviour

Word count: 4615

## ABSTRACT

### Objective:

Suicide and suicidal behaviours are significant public health problems and a leading cause of death worldwide and in South Africa. We examined the association between childhood adversities and suicidal behaviour over the life course.

### Methods:

A national probability sample of 4,351 South African adult participants (aged 18 years and older) in the South African Stress and Health (SASH) study was interviewed, as part of the World Mental Health Survey initiative. Respondents provided socio-demographic and diagnostic information, as well as an account of suicide-related thoughts and behaviours. Outcomes were defined as suicide attempts and suicidal ideation in the total sample, and suicide plans and attempts among ideators. Childhood adversities included physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness and financial adversity. The association between suicidality and childhood adversities was examined using discrete-time survival models.

### Results:

More than a third of respondents with suicidal behaviour experienced at least 1 childhood adversity, with physical abuse, parental death and parental divorce the most prevalent adversities. Physical abuse, sexual abuse and parental divorce were identified as significant risk markers for lifetime suicide attempts, while physical abuse and parental divorce were significantly correlated with suicidal ideation. Two or more childhood adversities were associated with a 2-fold higher risk of lifetime suicide attempts. Sexual abuse (OR=9.3, childhood, parental divorce (OR=3.1)

1  
2  
3 and physical abuse (OR=2.2) had the strongest associations with lifetime suicide attempts. The  
4  
5 effect of childhood adversities on suicidal tendencies varied over the *life course*. For example,  
6  
7 sexual abuse was significantly associated with suicide attempts during childhood and teen years,  
8  
9 but not during young and later adulthood.  
10  
11

### 12 13 14 **Conclusions:**

15  
16 Childhood adversities, especially sexual abuse, physical abuse and parental divorce are important  
17  
18 risk factors for the onset and persistence of suicidal behaviour, with this risk greatest in childhood  
19  
20 and adolescence. The risk for suicidal behaviour was greatest in childhood and adolescence.  
21  
22 Suicidal risk in childhood and adolescence was significantly associated with the following  
23  
24 childhood adversities: sexual abuse, physical abuse and parental divorce.  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## Strengths and limitations

- These findings extend previous work done in other developing countries that have found childhood adversities to be a significant risk factor for suicidality (20; 57; 58; 59).
- Recall bias might have impacted on the accuracy of recall of childhood adversities.
- Variables such as culture, ethnicity and mental status at the time of the interview might have influenced the recall and reporting of suicidal behaviour.
- Owing to the cross-sectional design, details regarding childhood adversities and suicidal incidents were not assessed. Some of the participants might have been scared to tell the interviewers about their suicidal behaviours. Stigma associated with mental health may have also played a role in reporting suicidal tendencies. The status of the participant's mental health, the role of ethnicity, culture and generational factors may have also contributed to the under-reporting of suicidality.
- The survey was conducted in adults living in households and hostel quarters thus the findings are not generalizable to homeless and institutionalized persons who were not included in the survey.
- The CIDI instrument which was used in this study is a lay-administered instrument which does not include an assessment of several key DSM-IV diagnoses (such as bipolar disorder and psychosis), are associated with elevated rates of suicidality. As a result, some participants with suicidality may have not have been diagnosed with a disorder.

- In view of the large confidence intervals and small sample sizes for some of these analyses caution is required in drawing conclusions.
- We did not control for other unmeasured causes of childhood adversities and suicidality, or protective (resiliency) factors that may have contributed to the associations observed in these data.

For peer review only

## INTRODUCTION

Suicide and suicidal behaviour are significant public health problems. Suicide is one of the leading causes of death worldwide with almost 1 million people committing suicide each year (1). This figure is likely to grow to approximately 1.2 million suicides in 2020 (2). In South Africa, the annual rate of suicide is high (3; 4) mirroring international trends (5). So, too, are rates of suicidal behaviour with an estimated prevalence of 9.1% for lifetime suicidal ideation and 2.9% for suicide attempts among South Africans according to the South African Stress and Health Survey (SASH) (6).

Despite the enormity of the problem, the aetiology of suicidal behaviour is not fully understood. There are controversies in the literature regarding prior psychiatric disorder and risk for suicide attempts. While some authors have argued that pre-existing disorder is an important risk factor (7-11), others have argued that suicide attempts are not necessarily associated with prior psychopathology (12). Genetic factors also play an important role in suicidal behaviour (13-16). While there is stronger evidence pointing towards environmental or experiential factors (17; 18) such as exposure to childhood adversities (19-28). Recent multi-level country data from the World Mental Health Surveys (WMHS) initiative has allowed for cross-national comparisons of suicidality. The WMHS investigated the association between childhood adversities and suicidal behaviour (20), the persistence of suicidality over time, and the extent to which associations between childhood trauma and suicidality changed over the life course. The WMHS found a dose-response relationship between the number of adversities and suicidal behaviour. Sexual abuse and physical abuse were the strongest risk factors for both the onset and persistence of suicidal behaviours, with the risk for suicidality greatest during childhood (age 4-12 years) and adolescence (age 13-19 years) (20).

1  
2  
3 Numerous studies have examined the link between childhood sexual abuse and suicidality (29-  
4 41). All of these authors have found that exposure to childhood sexual abuse increases the risk  
5 for mental disorders, including suicidality. Furthermore, the majority of studies that have focused  
6 on the link between childhood physical abuse and suicidality have found that exposure to  
7 childhood physical abuse increases the risk for suicidality (42; 43). There also appears to be an  
8 association between the number of childhood adversities experienced and the later suicidal  
9 behaviour (24; 44; 23; 21)

10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21 Exposure to early life stress is prevalent among South Africans. In one sample of South African  
22 rural youth, the prevalence of physical and sexual abuse was shown to be very high with 94.4%  
23 of males exposed to physical abuse and 39.1% of females to sexual abuse (45). More than a  
24 quarter of adults who were interviewed endorsed exposure to childhood adversity (parental  
25 death, parental separation or parental divorce) in the SASH study (46). Significantly more  
26 females were prone to be victims of domestic violence than men (46). Women also reported  
27 twice as many suicidal attempts than the male participants in the SASH study (9).

### 38 **Objective**

39  
40 We report in more detail on data from a South African dataset gathered as part of the World  
41 Mental Health Surveys, which allowed for comparison with data from the overall cross-national  
42 sample. This data are particularly interesting as South Africa is a middle income African country  
43 with high rates of violent trauma exposure. The present study aimed to examine the relationship  
44 between the type and frequency of childhood adversity exposure to suicidal behaviour over the  
45 life trajectory of South Africans, given that there are no published nationally representative data  
46 that may be useful in informing both clinical practice and policy.



## METHODS

### Sample

Data for the SASH Study were collected between January 2002 and June 2004. WMH surveys were carried out in 21 countries which included Nigeria and South Africa (46). For detailed information on study methods see Williams et al., 2004 (46). The research protocol for the SASH study was approved by the Human Subjects Committee of the University of Michigan, by Harvard Medical School ethics committee and by a single project assurance of compliance from the Medical University of South Africa (MEDUNSA), and by the National Institute of Mental Health. It was a national probability sample of 4,351 South African adults (persons aged 18 years and older) living in households or in hostel accommodation. All racial and ethnic groups were represented, with the sample selected using a three-stage probability sample design. The response rate was 85.5%.

### Sampling approach

Sampling was divided into three stages. Primary sampling units was selected during the first stage, which was based on the 2001 SA census Enumeration Areas (EAs). The second stage involved sampling of household units within clusters selected in each EA. During the third stage, one adult respondent in each sampled housing unit was selected. A total of 5089 households was selected. Field interviews were conducted with 4433 (87.1%) of designated respondents. Based on quality control, 4351 interviews were retained for use in the analysis. There were no differences in response rates across the four designated racial groups.

### Diagnostic Interview

SASH used version 3 of the World Health Organization Composite Diagnostic Interview (WHO CIDI) (47). Interviewers were trained within a one week period and conducted the interviews in

1  
2  
3 seven different languages, namely English, Afrikaans, Zulu, Xhosa, Northern Sotho, Southern  
4 Sotho, and Tswana. Translations of the CIDI into several native South African languages were  
5 conducted in accordance with WHO requirements. Multilingual and bilingual expert panels  
6 conducted the back-translations (46; 48). Informed consent was obtained from participants after  
7 a complete description of the study was provided. Respondents provided socio-demographic and  
8 diagnostic information, as well as an account of suicidal behaviours during the interviews. The  
9 core diagnostic assessment of mental disorders included anxiety disorders (panic disorder,  
10 agoraphobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder), mood  
11 disorders (major depressive disorder, dysthymia), substance use disorders (alcohol abuse, alcohol  
12 dependence, drug abuse, drug dependence) and intermittent explosive disorder (49, 50). Overall,  
13 percentages were weighted to adjust for differences in selection probabilities, differential non-  
14 response, oversampling of cases, and residual differences on sociodemographic variables  
15 between the sample and the population (46; 51).  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34

### 35 **Suicidal behaviour**

36  
37 The CIDI 3.0 module on suicidal behaviour was used to assess the age-of-first-onset, age of most  
38 recent episode, and lifetime occurrence of suicidal ideation, suicide plans and suicide attempts.  
39 Suicidal ideation, suicide plans and suicide attempts was assessed with questions such as “Have  
40 you ever seriously **thought** about committing suicide?”, “Have you ever made a **plan** for  
41 committing suicide?”, and “Have you ever **attempted** suicide?”, respectively. The outcomes  
42 considered in this study were: suicide attempts in the total sample; suicide ideation in the total  
43 sample; suicide plans among ideators; suicide attempts among ideators with a plan (planned  
44 attempts), and suicide attempts among ideators in the absence of a plan (unplanned or impulsive  
45 attempts).  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

### Childhood adversities

Physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness and financial adversity were the various childhood adversities assessed. Biological and non-biological parents were included in measures of parental death, divorce or other parental loss. Financial adversities were assessed with questions on whether the family had insufficient funds to pay for basic necessities. Questions about repeated fondling, attempted rape or rape were asked to assess for sexual abuse. A modified version of the Conflict Tactics Scale was used to assess family violence and physical abuse. A standard chronic conditions checklist assessed for life-threatening physical illnesses in childhood (52).

### Data analysis

All data analyses were processed and analysed centrally by a team of statisticians at the Harvard School of Public Health (Boston, USA) using the SAS version 9.1.3 software package. Discrete-time survival analysis with time-varying covariates was used to study the risk factors of lifetime suicide ideation, plans and attempts. Data were weighted to adjust for the stratified multistage sample design, differential probability of selection within households as a function of household size and clustering of data, and differential non-response. A post-stratification weight was also used to make the sample distribution comparable, for age, gender, and province, with the population distribution in the 2001 South African census. Both weighted and geographic clustering of data were taken into account in the data analyses by using a jackknife repeated replications simulation method implemented in SAS macro 14. The survival coefficients were exponentiated and are reported below in the form of odds ratios.

The association between suicidality and childhood adversity was examined using discrete-time survival models with the analysis unit being person-years. Bivariate analyses (considering one

adversity at a time) and multivariate analyses (considering all adversities simultaneously) were conducted. Two types of multivariate models were tested: multivariate additive models (simultaneously considering all childhood adversities) and multivariate interactive models (with number and type of childhood adversities experienced by each respondent included as dummy variables). The analysis also examined interactions between the life stage (13-19 years, 20-29 years, 30+ years) of respondents and each childhood adversity, as well as the influence each adversity had on early-, middle- and later- onset suicidality. Analyses were conducted using SUDAAN version 8.1 to adjust for clustering and weighting. Odds ratios (ORs) with a 95% confidence interval (CIs) are reported. Wald  $X^2$ - tests were used to examine multivariate significance. Associations between adversities and suicide outcomes were adjusted for gender, age, educational level, marital status, interactions between demographic variables, life course and parental psychopathology. Analyses also examined the influence of respondents' lifetime mental disorders on suicidality, as well as interactions between gender and each childhood adversity. Statistical significance using two-sided tests was set at  $p < .05$  (20).

## RESULTS

### Demographic details

In the sample, ( $n = 4351$ ), there were slightly more female (53.7%) than male respondents. There were more black (76.2%) than coloured (10.4%), white (10%), and Indian/Asian (3.4%) respondents. Furthermore, half of the sample was married and most were unemployed (69.2%), had less than 12 years of education (62.7%) and lived in an urban area (59.7%) (see Table 1).

### Prevalence of childhood adversities among the total sample

In the total sample, 35.4% of participants with one adversity had a suicide attempt, compared with 23.4% with one adversity that had not made an attempt. Physical abuse (24.9%), parental

1  
2  
3 divorce (14.2%) and parental death (11.6%) were most prevalent among those suicide  
4  
5 attempters. Among those exposed to one childhood adversity, without a suicide attempt, the two  
6  
7 most prevalent adversities reported were physical abuse (12.2%) and parental death (11.3%). In  
8  
9 the total sample 15.4% of participants exposed to two or more adversities had a suicide attempt.  
10  
11 In contrast, 8.6% of participants exposed to two or more adversities had not made an attempt  
12  
13 (Table 2).  
14  
15  
16  
17  
18

### 19 **Prevalence of childhood adversities among suicidal ideators in the total sample**

20  
21 In the sample as a whole, 35.9% of those with one adversity had suicidal ideation compared with  
22  
23 22.7% of those with one adversity who had no ideation. The most prevalent adversities  
24  
25 associated with suicidal ideation were physical abuse (21.1%), parental death (13.9%), and  
26  
27 parental divorce (7.9%). Among those without suicidal ideation, physical abuse (11.8%) and  
28  
29 parental death (11.3%) were the most commonly endorsed childhood adversities. Of those who  
30  
31 endorsed two or more childhood adversities, 10.8% reported suicidal ideation and 8.6% did not  
32  
33 (Table 2). In summary, the most prevalent childhood adversities reported among the total  
34  
35 sample with/without suicidal ideation were firstly, physical abuse and secondly, the death of a  
36  
37 parent.  
38  
39  
40  
41  
42

### 43 **Prevalence of suicide attempts in the total sample**

44  
45 In the total sample, 24.9% of those with childhood physical abuse had attempted suicide while  
46  
47 12.2% of respondents with no physical abuse had no attempt. Of those exposed to parental  
48  
49 divorce, 14.2% had attempted suicide and 4.8% had made no attempt. The second most prevalent  
50  
51 childhood adversity was parental death with 11.6% of those with parental death attempting  
52  
53 suicide and 11.3% of those with parental death with no attempts (Table 2).  
54  
55  
56  
57  
58  
59  
60

### Prevalence of childhood adversities among suicidal ideators

#### With/without a plan

Among suicidal ideators with a plan, 32.9% had experienced one childhood adversity. Among ideators with no plan, 41.7% had one childhood adversity. Among ideators with a plan, the following were the most prevalent childhood adversities: physical abuse (24.3%), parental death (12.2%), and parental divorce (9.7%). Among ideators without a plan, 27.9% endorsed physical abuse, 16.1% parental death, and 9.2% parental divorce (Table 2). In both groups (ideators with and without a plan), physical abuse was the most prevalent childhood adversity, followed by parental death and parental divorce.

#### With or without an attempt

Among suicidal ideators who had attempted suicide, 35.4% were exposed to one childhood adversity and 15.4% were exposed to two or more childhood adversities. In the group of ideators who had made an attempt, 24.9% had experienced physical abuse, 14.2% parental divorce, and 11.6% parental death (Table 2). 40.5% of those with one adversity, and 9.6% of those exposed to two or more adversities were suicidal ideators with no attempts. In this group, the most prevalent adversities were physical abuse (24.5%); parental death (15.6%) and parental divorce (6.7%) reported (Table 2).

Among all ideators (with/without a plan, with/without an attempt), the most prevalent childhood adversity was physical abuse, followed by parental death and parental divorce. Of note, in the group of ideators with an attempted suicide parental divorce was more prevalent than parental death.

### Bivariate and multivariate results: Type of childhood adversity

1  
2  
3 Bivariate and multivariate analyses were performed to examine the associations between the  
4  
5 different childhood adversities (physical abuse, sexual abuse, parental death, parental divorce,  
6  
7 other parental loss, family violence, physical illness, financial adversity) and lifetime suicidal  
8  
9 ideation, plans and attempts.  
10  
11

12  
13  
14 In the total sample, bivariate analysis revealed significant associations between (i) sexual abuse  
15  
16 (OR=7.9, p=0.003), (ii) physical abuse (OR 2, p=0.007) and (iii) parental divorce (OR 2.8,  
17  
18 p<.001), and lifetime suicide attempts. Among ideators in the sample, physical abuse (OR=1.7,  
19  
20 p<.001) was significantly associated with suicidal ideation. The relationship between childhood  
21  
22 adversities and lifetime plans was not statistically significant. However, a significant association  
23  
24 was found between parental divorce and lifetime suicidal attempts among ideators (OR=3.0,  
25  
26 p<.001) (See Table 7).  
27  
28  
29

30  
31 Multivariate analysis also revealed a significant association between (i) sexual abuse (OR=7.6,  
32  
33 p=0.003), (ii) physical abuse (OR 2.0, p=0.006) and (iii) parental divorce (OR 2.7, p=0.001) and  
34  
35 lifetime suicide attempts, in the total sample. Physical abuse (OR=1.7, p<.001) and parental  
36  
37 divorce (OR = 1.6, p=0.038) were both significantly associated with suicidal ideation in the  
38  
39 overall sample. Among ideators, no significant associations were found between any of the  
40  
41 childhood adversities and lifetime plans. However, the relationship between parental divorce and  
42  
43 lifetime suicidal attempts among ideators was significant (OR=3.1, p=0.023) (Table 3).  
44  
45  
46  
47

48  
49 Findings from multivariate analysis, therefore, confirm findings of bivariate analysis for all  
50  
51 groups, except for ideators. Among ideators bivariate analysis revealed a significant relationship  
52  
53 between physical abuse and suicidal ideation. This was confirmed in multivariate analysis where  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 the association between parental divorce and suicidal ideation was significant for the whole  
4  
5 sample.  
6  
7

### 8 9 **Bivariate associations between the number of adversities and lifetime suicidality**

10  
11 The relationship between the number of childhood adversities and lifetime suicidal ideation,  
12  
13 plans and attempts was further examined. There was a significant relationship between the  
14  
15 number of childhood adversities and lifetime suicide attempts. Two or more childhood  
16  
17 adversities were associated with a 2-fold higher risk of lifetime suicide attempts in the total  
18  
19 sample (OR=2.1,  $p<.001$ ). A significant relationship was also established between one, as well as  
20  
21 two or more adversities with ideators in the total sample. Among ideators, no significant  
22  
23 association was found between the number of childhood adversities and lifetime plans. A  
24  
25 significant relationship was found between two or more adversities and lifetime attempts among  
26  
27 ideators (OR=2.7,  $p=0.016$ ), indicating a more than 2-fold higher risk of lifetime suicide attempts  
28  
29 in this group (Table 4).  
30  
31  
32  
33  
34  
35

### 36 **Multivariate associations between number of childhood adversities and lifetime suicidality**

37  
38 In the final multivariate model which included 2 or more adversities as a predictor variable,  
39  
40 sexual abuse (OR=9.3,  $p<.001$ ), childhood physical abuse (OR=2.2,  $p=0.003$ ) and parental  
41  
42 divorce (OR=3.1,  $p<.001$ ) retained significant associations with lifetime suicide attempts in the  
43  
44 total sample. Physical abuse (OR=2.1,  $p<.001$ ), parental death (OR=1.7,  $p=0.010$ ), parental  
45  
46 divorce (OR=1.9,  $p=0.004$ ) and other parental loss (OR = 2.1,  $p=0.004$ ) were significant  
47  
48 predictors of suicidal ideation. Physical abuse (OR=0.4,  $p=0.038$ ) was significantly associated  
49  
50 with lifetime plans among ideators. There were no significant associations between childhood  
51  
52 adversities and lifetime attempts among those with suicidal ideation (Table 5).  
53  
54  
55  
56  
57  
58  
59  
60



## Associations between the types of childhood adversity and lifetime suicidality over the life course

Multivariate analyses were performed to examine the association between the types of childhood adversity and lifetime suicidal ideation, plans and attempts during childhood years (age 4- 12), teenage years (age 13-19), young adulthood (age 20-29) and later adulthood (30 years and older) (See tables 6, 6a, 6b, 6c and 6d).

Childhood years (4-12). Sexual abuse (OR=61.6,  $p=0.002$ ) in early childhood (4-12 years of age) was significantly associated with lifetime suicide attempts in the total sample (OR = 61.6, CI=4.5-841.0,  $p=0.002$ ). Both sexual abuse (OR=34.8, CI= 3.1-392.6,  $p=0.003$ ) and physical abuse (OR=3.7,  $p=0.041$ ) were associated with a higher risk for suicidal ideation among the total sample. No significant associations were found between any of the childhood adversities and lifetime plans in the group of ideators. Among those with suicidal ideation, parental death (OR=22.7,  $p=0.021$ ) was significantly associated with suicide attempts in childhood years (See Table 6a).

Teen years (13-19). Sexual abuse (OR=20.3,  $p=0.010$ ), physical abuse (OR=3.7,  $p=0.004$ ), and parental divorce (OR=4.6,  $p=0.002$ ) were significantly associated with suicide attempts in the total sample of teenagers. Physical abuse (OR=3.6,  $p<.001$ ) and parental death (OR=2.2,  $p=0.021$ ) significantly increased the risk for suicidal ideation among the total group of teens. Physical illness (OR=9.9,  $p=0.007$ ) significantly increased the risk of suicidal plans in teens with suicidal ideation. Suicide attempts among teens with suicidal ideation was significantly predicted by parental divorce (OR=4.3,  $p=0.035$ ) (See Table 6b).

1  
2  
3 *Young adulthood (20-29).* None of the childhood adversities were significantly associated with  
4 lifetime suicide attempts during young adulthood in the sample overall. An explanation could be  
5 that suicide attempts spike earlier and later in life among South Africans, contributing to the lack  
6 of significance. Parental loss other than parental death was significantly associated with suicidal  
7 ideation (OR=2.9, p=0.019) (See Table 6c).  
8  
9

10  
11  
12  
13  
14  
15  
16 *Later adulthood (≥ 30).* Childhood physical abuse (OR=2.2, p=0.035) was significantly  
17 predictive of suicidal attempts. The likelihood of suicidal ideation significantly increased in later  
18 adulthood if parental loss other than parental death (OR=5.1, p<.001) or physical illness had  
19 been present during childhood (OR=4.3, p=0.028). No significant relationship was found  
20 between any of the childhood adversities and lifetime plans in the group of ideators although a  
21 significant relationship was found between two or more adversities and lifetime plans among  
22 those who were ideators (OR=44.5, p<0.008). None of the childhood adversities were  
23 significantly associated with suicide attempts among ideators in this age group (See Table 6d).  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35

## 36 DISCUSSION

37  
38 Rates of childhood adversities and suicidal behaviours were both high among South Africans,  
39 with more than a third of respondents in the total sample who attempted suicide experiencing one  
40 childhood adversity, and 15.4% experiencing two or more adversities. Overall, physical abuse,  
41 sexual abuse, parental divorce and physical illness were far more prevalent in those with a  
42 suicide attempt than in those without. The most prevalent childhood adversities endorsed overall  
43 were physical abuse followed by parental death. Physical abuse, parental divorce and death of a  
44 parent were also the most prevalent adversities experienced in those with a suicide attempt as  
45 well as in those with suicidal ideation. These findings are somewhat dissimilar to other country  
46 samples; for example in the 21 countries that participated in the WMHS, physical abuse (29.3%),  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 family violence (24.8%) and neglect (19.3%) were the most prevalent childhood adversities  
4 among those with a lifetime suicide attempt, while physical abuse (20.6%), family violence  
5 (17.6%) and death of a parent (14.2%) were most often reported among participants with lifetime  
6 suicidal ideation (20). Cross-nationally, it would appear that physical abuse is the commonest  
7 childhood adversity associated with lifetime suicide attempts and ideation (20).  
8  
9  
10  
11  
12  
13

14  
15  
16 The estimate lifetime prevalence of 2.9% for attempted suicide among South Africans is close to  
17 the rates of 4.6% and 4.1% reported for general and Black populations respectively in USA. In  
18 addition the 9.1% estimated prevalence of suicide ideation is comparable with previous estimates  
19 from studies in South African clinical samples. Joe et al. (2008) reported for the first time on the  
20 rates of suicide ideation, plan and attempts among the different ethnic groups, in data from the  
21 SASH study (9). Overall, the results suggest that people in SA engage in suicidal thought and  
22 behaviours at levels nearly comparable with those of Western nations.  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32

33  
34 When examining suicidal behaviour risk in the context of childhood adversity, sexual abuse,  
35 physical abuse and parental divorce emerged as significant risk factors for lifetime suicide  
36 attempts in the total sample. Furthermore, physical abuse and parental divorce were significant  
37 risk factors for suicidal ideation in the total sample, while parental divorce emerged as a  
38 significant risk factor among ideators with lifetime suicide. These findings are largely consistent  
39 with the data from the overall cross-national WMHS, which found that physical and sexual abuse  
40 significantly increased the likelihood of suicidal ideation and attempts, while neglect was a risk  
41 factor for suicidal behaviour in multivariate additive analyses (20).  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52

53  
54 Of the adversities implicated, sexual and physical abuse were more significant risk factors than  
55 other adversities, highlighting the fact that intrusive and aggressive experiences in childhood  
56  
57  
58  
59  
60

1  
2  
3 may have more devastating and longer lasting effects (53). This may be due to the extreme  
4 powerlessness and loss of control that such abuse causes, or to physically aggressive assaults  
5 resulting in the devaluation of one's body and consequent susceptibility to self harm (28). In a  
6 country with high rates of sexual and physical abuse (45) this is particularly concerning. The  
7 impact of parental divorce on suicidality supports previous findings that parental divorce, if  
8 accompanied by other adversities such as childhood abuse, increases the risk of suicidal  
9 behaviour (54).  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19

20  
21 We also found that exposure to *two or more childhood adversities* significantly increased the risk  
22 of suicide attempts among ideators. This confirms earlier work showing exposure to multiple  
23 childhood adversities increases the risk of suicidal behaviour (21; 23; 24; 55; 56). Bruffaerts et  
24 al (2010) found a sub-additive effect with regards to the onset of suicidal behaviour when  
25 considering multiple adversities (20). Thus, the impact of multiple adversities was not equal to  
26 the sum of the odds ratios of individual adversities. In the overall WMHS analysis exposure to  
27 multiple childhood adversities had a significant effect on the persistence of suicide when  
28 considering every additional childhood adversity exposed to, however in the current study it was  
29 not possible to stratify the number of adversities beyond two or more adversities (i.e. into more  
30 than 2 categories) given the relatively small number of cases in the sample overall with non-fatal  
31 suicidal behaviour. Physical abuse, parental death, parental loss other than through death, and  
32 parental divorce emerged as independent risk factors for suicidal ideation in the total sample.  
33 Moreover, the effects of childhood adversities on suicidal tendencies tended to differ over the *life*  
34 *course*. Consistent with nationally representative data in WMHS, childhood adversities were  
35 associated with the highest risk of suicide attempts in childhood, with a decrease in risk in  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 adolescence and young adulthood, followed by an increase in risk again during later adulthood  
4  
5 (20).  
6  
7

8  
9 In *childhood*, sexual abuse was significantly associated with lifetime suicide attempts in the total  
10 sample, while sexual and physical abuse was significantly associated with suicidal ideation.  
11  
12 Among suicidal ideators, parental death was significantly associated with lifetime suicide  
13 attempts. Exposure to childhood sexual abuse, physical abuse or parental divorce significantly  
14 increased suicide attempts during *teenage years*, while physical abuse and parental death were  
15 associated with suicidal ideation in teens. Among teen suicidal ideators, physical illness was  
16 significantly associated with suicidal plans, while parental divorce was associated with suicide  
17 attempts. These findings emphasize the need to focus suicide prevention strategies at youth in  
18 particular. In *young adulthood*, parental loss other than the death of a parent was significantly  
19 associated with suicidal ideation in the total sample. Interestingly, childhood physical abuse was  
20 identified as a significant risk factor for suicidal attempts in *later adulthood*, while childhood  
21 physical illness and parental loss other than the death of a parent significantly increased the risk  
22 for ideation.  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39

40 Similar to findings from SASH, childhood sexual abuse emerged as a particularly robust risk  
41 factor for suicide attempts in younger participants in the WMH cross-national analysis, with a  
42 10.9 times higher odds of suicide attempts in children, a 6.1 times higher likelihood in  
43 adolescents and a 2.9-fold risk in young adults who were exposed (20). This is in keeping with  
44  
45 Enns hypothesis that sexual abuse results in suicidal behaviour at a younger age (21). Consistent  
46 with other studies, childhood physical and sexual abuse, in particular, emerged as risk factors for  
47 the emergence and persistence of suicidal behaviour, especially in adolescence. Loss of a parent,  
48  
49 physical ill-health and family violence has also been found to be associated with persistence of  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 suicidality (20; 28; 53). These findings extend previous work done in other developing countries  
4  
5 that have found childhood adversities to be a significant risk factor for suicidality (20; 57; 58;  
6  
7 59).  
8  
9

### 11 **Limitations**

12  
13  
14 The following limitations need to be highlighted. First, recall bias might have impacted on the  
15  
16 accuracy of recall of childhood adversities. This said, participants were asked questions about  
17  
18 childhood adversities in sequence which may have facilitated more accurate recall (60).  
19  
20 Systematic reviews have also found that recall of past experiences can be accurate and can  
21  
22 provide valuable data (61; 62). Thus, there is evidence to support the validity of accurate recall  
23  
24 of childhood adversities (62). Further, studies have shown that responses to questions on  
25  
26 childhood adversities, similar to those asked in the SASH study, generally remain stable over  
27  
28 time (63; 64). Second, variables such as culture, ethnicity and mental status at the time of the  
29  
30 interview might have influenced the recall and reporting of suicidal behaviour. Third, owing to  
31  
32 the cross-sectional design, details regarding childhood adversities and suicidal incidents were not  
33  
34 assessed. However, it is much more likely that adversities and suicidality were under-reported  
35  
36 rather than over-reported (6; 20; 62; 65). Some of the participants might have been scared to tell  
37  
38 the interviewers about their suicidal behaviours. Stigma associated with mental health may have  
39  
40 also played a role in reporting suicidal tendencies. The status of the participant's mental health,  
41  
42 the role of ethnicity, culture and generational factors may have also contributed to the under-  
43  
44 reporting of suicidality. Fourth, the survey was conducted in adults living in households and  
45  
46 hostel quarters thus the findings are not generalizable to homeless and institutionalized persons  
47  
48 who were not included in the survey. Fifth, the CIDI instrument which was used in this study is a  
49  
50 lay-administered instrument which does not include an assessment of several key DSM-IV  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 diagnoses (such as bipolar disorder and psychosis), are associated with elevated rates of  
4  
5 suicidality. As a result, some participants with suicidality may have not have been diagnosed  
6  
7 with a disorder. Furthermore, in view of the large confidence intervals and small sample sizes for  
8  
9 some of these analyses caution is required in drawing conclusions. Lastly, we did not control for  
10  
11 other unmeasured causes of childhood adversities and suicidality, or protective (resiliency)  
12  
13 factors that may have contributed to the associations observed in these data. Both other risk and  
14  
15 resiliency factors may have contributed to both the prevalence of non-fatal suicidal behaviours  
16  
17 and to the associations with different forms of childhood adversity and warrant further  
18  
19 investigation. Notwithstanding these limitations, this study represents the first investigation  
20  
21 among South Africans of a wide range of childhood adversities and their impact on the onset and  
22  
23 persistence of suicidality over the life course.  
24  
25  
26  
27  
28  
29

### 30 **Conclusions**

31  
32 Childhood adversities especially sexual abuse, physical abuse and parental divorce are important  
33  
34 risk factors for the onset and persistence of suicidal behaviour with the risk greatest in children  
35  
36 and adolescents. Public health efforts aimed at prevention of early childhood sexual and  
37  
38 physical abuse, in particular, may have a significant impact on reducing suicidality over the life  
39  
40 course and improving mental health outcomes.  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

### **Acknowledgements**

The South African Stress and Health Study were conducted in conjunction with the World Health Organization World Mental Health (WMH) Survey initiative. We thank the WMH staff for assistance with instrumentation, fieldwork and data analysis. The US National Institute of Mental Health, the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, US Public Health Service, the Fogarty International Center, Pan American Health Organization, Eli Lilly and Company, Ortho-McNeil Pharmaceutical, GlaxoSmithKline and Bristol-Myers Squibb supported the activities of this initiative. The SASH Study was funded by grant R01-MH059575 from the National Institute of Mental Health and the National Institute of Drug Abuse.

### **Declarations of interest and funding**

This study was funded by NIH. Additional funding was received from the South African Department of Health and the University of Michigan. D.J.S. and S.S. are also supported by the Medical Research Council of South Africa. D.J.S. has received research grants and / or consultancy honoraria from AstraZeneca, Eli Lilly, GlaxoSmithKline, Lundbeck, Orion, Pfizer, Pharmacia, Roche, Servier, Solvay, Sumitomo and Wyeth. S.S. has received research grants or travel sponsorship from AstraZeneca, Eli Lilly, GlaxoSmithKline, Lundbeck and Servier. S.S. is supported by the by the South African Research Chairs Initiative of the Department of Science and Technology and the National Research Foundation. B.B has received congress sponsorship from Janssen-Cilag.



**REFERENCES**

1. World Health Organization. Suicide Prevention (SUPRE). Geneva, Switzerland. 2007.  
[http://www.who.int/mental\\_health/prevention/suicide/suicideprevention/en/](http://www.who.int/mental_health/prevention/suicide/suicideprevention/en/)
2. Murray, C.L., Lopez, A.D. The global burden of disease: a comprehensive assessment of mortality and disability from disease, injuries and risk factors in 1990 and projected to 2020. Cambridge, MA: Harvard University Press, 1996.
3. Burrows, S., Laflamme, L. Pattern analysis of suicide mortality surveillance data in urban South Africa. *Suicide and Life-Threatening Behaviour* 2008;**38**:209-220.
4. Meel, B.I. Epidemiology of suicide by hanging in Transkei. South Africa. *Am J Forensic Med Pathol.* 2006;**27**:75-78.
5. Flisher, A.J., Liang, H., Laubscher, R. Suicide trends in South Africa, 1968-90. *Scand J Public Health* 2004;**32**:411-418.
6. Joe, S., Stein, DJ., Seedat, S., Herman, A., Williams, DR. non-fatal suicidal behavior among South Africans: Results from the South Africa Stress and Health Study. *Social Psychiatry Epidemiology* 2008;**43**(6):454–461.doi:10.1007/s00127-008-0348-7.
7. Beautrais, A.L., Joyce, P/R/. & Mulder, R.T. (1996). Risk factors for serious suicide attempts among youth aged 13 through 24 years. *J Am Acad Child Adolesc Psychiatry* 1996;**35**(9):1174-1182.
8. Harrison, EC, Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis. *Br J Psychiatry* 1997;**170**:205-228

- 1  
2  
3 9. Joe, S., Stein, D.J., Seedat, S., et al. Prevalence and correlates of non-fatal suicidal behaviour  
4 among South Africans. *Br J Psychiatry* 2008;**192**:310-311.  
5  
6
- 7  
8  
9 10. Nock, M.K., Borges, G., Bromet, E.J., et al. Suicide and Suicidal Behaviour. *Epidemiologic*  
10  
11 *Reviews* 2008;**30**:133-154.  
12
- 13  
14 11. Nock, M.K., Borges, G., Bromet, E.J., et al. Cross-national prevalence and risk factors for  
15 suicidal ideation, plans and attempts. *Br J Psychiatry* 2008;**192**:98-105.  
16  
17
- 18  
19 20 12. Nock, M.K., Hwang, I., Sampson, N.A., et al. Cross-national analysis of the associations  
21 among mental disorders and suicidal behaviour: Findings from the WHO World Mental  
22 Health Surveys. *PLoS Medicine* 2009;**6**(8).e1000123.  
23  
24  
25
- 26  
27 28 13. Bondy, B., Buettner, A., Zill, P. Genetics of suicide. *Molecular Psychiatry* 2006;**11**:336-351.  
29  
30
- 31  
32 33 14. Kohli, M.A., Salyakina, D., Pfennig, A., et al. Association of genetic variants in the  
34 neurotrophic receptor encoding gene NTRK2 and a lifetime history of suicide attempts in  
35 depressed patients. *Arch Gen Psychiatry* 2010;**67**:348-59.  
36  
37  
38
- 39  
40 41 15. Roy, A., Hu, X-Z., Janal, M.N., & Goldman, D. Interaction between childhood trauma and  
42 serotonin transporter gene variation and suicide. *Neuropsychopharmacology* 2007;**32**:2046–  
43 2052  
44  
45  
46  
47
- 48  
49 50 16. Risch, N., Herrell, R., Lehner, T., et al. Interaction between the serotonin transporter gene (5-  
51 HTTLPR), stressful life events, and the risk of depression: A meta-analysis. *JAMA*  
52 2009;**301**:2462–2471.  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
17. Borges, G., Benjet, C., Medina-Mora, M.E., et al. Traumatic events and suicide related outcomes among Mexico City adolescents. *J Child Psychol Psychiatry* 2008;**6**:654-666.
  18. Weissman MM, Bland RC, Canino GJ, Greenwald S, Hwu HG, Joyce PR, et al. Prevalence of suicide ideation and suicide attempts in nine countries. *Psychology Med* 1999;**29**:9-17.
  19. Brodsky, BS & Stanley, B. Adverse childhood experiences and suicidal behaviour. *Psychiatry Clinical Northern America* 2008;**31**:223-235
  20. Bruffaerts, R., Demyttenaere, K., Borges, G., et al. Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *Br J Psychiatry* 2010;**197**:20-27.
  21. Enns, M.W., Cox, B.J., Afifi, T.O., et al. Childhood adversities and risk for suicidal ideation and attempts: a longitudinal population-based study. *Psychological Medicine* 2006;**36**:1769-1778.
  22. Johnson, J.G., Cohen, P., Gould, M.S., et al. Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. *Arch Gen Psychiatry* 2002;**59**:741-749.
  23. Dube, S.R., Anda, R.F., Felitti, V.J., et al. Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *JAMA* 2001;**286**:3089-3096.
  24. Afifi, T.O., Enns, M.W., Cox, B.J., et al. Population attributable fractions of psychiatric disorders and suicide ideation and attempts associated with adverse childhood experiences. *Am J Public Health* 2008;**98**:946-952.

- 1  
2  
3  
4 25. Burke, A.K., Galfalvy, H., Everett, B., et al. Effect of exposure to suicidal behavior on  
5  
6 suicide attempt in a high-risk sample of offspring of depressed parents. *J Am Acad Child*  
7  
8 *Adolesc Psychiatry* 2010;**49**:114-121.  
9
- 10  
11 26. Labonte, B., Suderman, M., Maussion, G., Navaro, L., Yerko, V., Mahar, I., & Turecki, G.  
12  
13 Genome-wide epigenetic regulation by early-life trauma. *Arch Gen Psychiatry*  
14  
15 2012;**69**(7):722-731.Doi:10.1001/archgenpsychiatry.2011.2287  
16  
17
- 18  
19 27. Lipschitz, D.S., Winegar, R.K., Nicolaou, A.L., et al. Perceived abuse and neglect as risk  
20  
21 factors for suicidal behaviour in adolescent inpatients. *J Nerv Ment Dis* 1999;**187**:32-39.  
22  
23
- 24  
25 28. Ystgaard, M., Hestetun, I., Loeb, M., & Mehlum, L. Is there a specific relationship between  
26  
27 childhood sexual and physical abuse and repeated suicidal behaviour? *Child Abuse Neg*  
28  
29 2004;**28**:863-875.  
30  
31
- 32  
33 29. Boudewyn, A., & Liem, J. Childhood sexual abuse as a presecutor to depression and self-  
34  
35 destructive behavior in adulthood. *J Trauma Stress* 1995;**8**:445-459.  
36  
37
- 38  
39 30. Brown, J., Cohen, P., Johnson, J.G., & Smailes, E.M. Childhood abuse and neglect:  
40  
41 Specificity of effects on adolescent and young adult depression and suicidality. *J Am*  
42  
43 *Acad Child Adolesc Psychiatry* 1999;**38**:1490-1496.  
44  
45
- 46  
47 31. Bryant, S.L., & Range, L.M. Suicidality in college women who were sexually and physically  
48  
49 abused and physically punished by parents. *Violence Vict* 1995;**10**:195-201.  
50  
51
- 52  
53 32. Davidson, J.R.T., Hughes, D.C., George, L.K., & Blazer, D.G. The association of sexual  
54  
55 assault and attempted suicide within the community. *Arch Gen Psychiatry* 1996;**53**:550-555  
56  
57  
58  
59  
60

- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
33. Fergusson, D.M., & Mullen, P.E. Childhood Sexual abuse – An evidence based perspective. Sage, CA: Thousand Oaks, 1999.
34. Finkelhor, D. Early and long-term effects of child sexual abuse: An update. *Professional Psychology: Research & Practice* 1990;**21**(5):325-330.
35. Finkelhor, D., & Hashima, P.Y. (2001). The victimization of children and youth: A comprehensive overview. In S.O. White (Ed.) *Handbook of youth and justice. The Plenum series in crime and justice*. Dordrecht: Plenum, 2001:49-78.
36. Holmes, W.C., & Slap, G.B. Sexual abuse of boys: Definition, prevalence, correlates, sequelae, and management. *JAMA: JAMA* 1998;**280**(21):1855-1862
37. Kendall-Tackett, K.A., Williams, L.M., & Finkelhor, D. Impact of sexual abuse on children: A review and synthesis of recent empirical studies. *Psychol Bull* 1993;**113**(1):164-180.
38. Martin, G. Reported family dynamics, sexual abuse, and suicidal behaviors in community adolescents. *Arch Suicide Res* 1996;**2**:183-195.
39. Peters, D.K., & Range, L.M. Childhood sexual abuse and current suicidality in college women and men. *Child Abuse Negl* 1995;**19**:335-341.
40. Putman, F.W. Ten-year research update review: Child sexual abuse. *J Am Acad Child Adolesc Psychiatry* 2003;**42**(3):269-278
41. Stepakoff, S. Effects of sexual victimization on suicidal ideation and behaviour in US college women. *Suicide and Life-Threatening Behavior* 1998;**28**:107-126.

- 1  
2  
3 42. Malinosky-Rummel, R., & Hansen, D.J. Long-term consequences of childhood physical  
4  
5 abuse. *Psychol Bull* 1993;**144**:68-79  
6  
7  
8  
9 43. Silverman, A.B., Reinherz, H., & Giaconia, R.M. The long-term sequelae of child and  
10  
11 adolescent abuse: A longitudinal community study. *Child Abuse Negl* 1996;**20**:709-723  
12  
13  
14 44. Chapman, D.P., Whitfield, C.L., Felitti, V.J., Dube, S.R., Edwards, V.J., & Anda, R.F.  
15  
16 Adverse childhood experiences and the risk of depression in adulthood. *J Affect Disord*  
17  
18 2004;**82**:217-225  
19  
20  
21  
22 45. Jewkes, R.K., Dunkle, K., Nduna, M., et al. Associations between childhood adversity and  
23  
24 depression, substance abuse and HIV and HSV2 incident infections in rural South African  
25  
26 youth. *Child Abuse Negl* 2010;**34**:833-841.  
27  
28  
29  
30 46. Williams, D.R., Herman, A., Kessler, R.C., et al. The South Africa Stress and Health Study:  
31  
32 Rationale and Design. *Metab Brain Dis* 2004;**19**(1/2):135-147.  
33  
34  
35  
36 47. Kessler, R.C., Üstün, T.B. The World Mental Health (WMH) Survey Initiative Version of the  
37  
38 World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int*  
39  
40 *J Methods Psychiatr Res* 2004;**13**:61-98.  
41  
42  
43  
44 48. Seedat, S., Stein, D.J., Herman, A., et al. Twelve-month treatment of Psychiatric disorders in  
45  
46 South Africa Stress and Health Study (World Mental Health Survey Initiative). *Psychiatric*  
47  
48 *Epidemiology* 2008;**38**:211-220.  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
49. World Health Organization. World Health Organization Manual of the international statistical classification of diseases, injuries and causes of death, ninth revision. Geneva, Switzerland, 1992.
50. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV), 4<sup>th</sup> Edition. Washington: American Psychiatric Association Press, 1994.
51. Stein, D.J., Chiu, W.T., Hwang, I., et al. Cross-national analysis of the associations between traumatic events and suicidal behavior: Findings from the WHO World Mental Health Surveys. *PloS ONE* 2010;**5**(5):e10574.
52. Kessler, R.C., McLaughlin, K.A., Green, J.G. Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *Br J Psychiatry* 2010;**197**:378-385.
53. Joiner Jr, T.E., Sachs-Ericsson, N.J., Wingate, L.R. Childhood physical and sexual abuse and lifetime number of suicide attempts: A persistent and theoretically important relationship. *Behav Res Ther* 2007;**45**:539-547.
54. Afifi, T.O., Boman, J., Fleisher, W., et al. The relationship between child abuse, parental divorce, and lifetime mental disorders and suicidality in a nationally representative adult sample. *Child Abuse Negl* 2009;**33**:139–147.
55. Bebbington, P.E., Cooper, C.C., Minot, S., et al. Suicide attempts, gender, and sexual abuse: data from the 2000 British Psychiatric Morbidity Survey. *Am J Psychiatry* 2009;**166**:1135-1140.

- 1  
2  
3  
4 56. Molner, B, Buka, S, & Kessler, R. Child sexual abuse and subsequent psychopathology:  
5  
6 results from the National Comorbidity Survey. American Journal Public Health 2001;**91**:753-  
7  
8 760.  
9
- 10  
11 57. Borges, G., Angst, J., Nock, M.K., et al. Risk factors for the incidence and persistence of  
12  
13 suicide related outcomes: a 10 year follow up study using the National Comorbidity Surveys.  
14  
15 J Affect Disord 2008;**105**:25-33  
16  
17
- 18  
19 58. Gureje, O., Kola, L., Uwakwe, R., et al. The profile and risks of suicidal behaviours in the  
20  
21 Nigerian Survey of Mental Health and Well Being. Psychol Med 2007;**37**:821-830.  
22  
23
- 24  
25 59. Xing, X-Y., Tao, F-B., Wan, Y-H., et al. Family factors associated with suicide attempts  
26  
27 among Chinese adolescent students: A national cross-sectional survey. J Adolesc Health  
28  
29 2010;**46**:592-599.  
30  
31
- 32  
33 60. Knauper, BC., CF, Schwarz, N., Bruce, ML., Kessler, RC. Improving the accuracy of major  
34  
35 depression age of onset reports in the US National Comorbidity Survey. Int J Methods  
36  
37 Psychiatr Res 1999;**8**(1):39-48  
38  
39
- 40  
41 61. Brewin, CR., Andrews, B., Botlib, IH. Psychopathology and early experience: a reappraisal  
42  
43 of retrospective reports. Psychol Bull 1993;**113**:82-98.  
44  
45
- 46  
47 62. Hardt, J., Rutter, M. Validity of adult retrospective reports of adverse childhood experiences:  
48  
49 a review of the evidence. J Child Psychol Psychiatry 2004;**45**:260-273.  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
63. Dube, SR., Williamson, DF., Thompson, T., Felitti, VJ, Anda, RF. Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse Negl* 2004;**28**(7):729-737.
64. Yancura, LA., Aldwin, CM. (2009). Stability and change in retrospective reports of childhood experiences over a 5-year period: Findings from the David Longitudinal Study. *Psychol Aging* 2009;**24**(3):715-721
65. Wilsnack, S.C., Wonderlich, S.A., Kristjanson, A.F., et al. (2002). Self reports of forgetting and remembering childhood sexual abuse in a nationally representative sample of US women. *Child Abuse Negl* 2002;**26**:139-147.

**Table 1:** Descriptive Characteristics (N= 4351)

Mean Age (yrs) (SE)	37.0 (0.26)
<b>Age categories (yrs)</b>	
18 – 29	39.1%
30 – 39	22.1%
40 - 49	18.1%
≥ 50	20.7%
<b>Gender</b>	
Male	46.3%
Female	53.7%
<b>Race</b>	
Black	76.2%
Coloured	10.4%
White	10.0%
Indian/Asian	3.4%
<b>Married</b>	50.1%
<b>Location</b>	
Rural	38.4%
Urban	61.6%
<b>Education</b>	
None	6.8 %
Grade 1-7	19.1%
Grade 8-11	35.4%
Matric	23.5%
Matric +	15.3%
<b>Employed</b>	31.0%
<b>Income Category (Rands), (mean SD)</b>	
0	13.7%
1 - 2500	29.5%
2501 – 5000	15.4%
5001 – 10 000	19.6%
≥ 10001	21.8%
<b>Province</b>	
Eastern Cape	13.1%
Free State	6.2%
Guateng	23.0%
Kwazulu Natal	19.5%
Limpopo	10.5%
Mpumalanga	6.6%
Northern Cape	1.9%
North West	8.3%
Western Cape	11.1%

**Table 2:** Prevalence of childhood adversities and suicidal behaviour in South Africa

[% (S.E.)]

	Total Sample		Total Sample		Suicidal Ideators		Suicidal Ideators	
	With Attempt	No attempt	With Ideation	No ideation	With Plan	No plan	With Attempt	No attempt
Physical Abuse	24.9 (4.6)	12.2 (0.8)	21.1 (2.5)	11.8 (0.7)	24.3 (4.6)	27.9 (4.0)	24.9 (4.6)	24.5 (3.6)
Sexual Abuse	2.1 (1.2)	0.1 (0.0)	0.7 (0.4)	0.1 (0.0)	1.6 (0.9)	0.0 (0.0)	2.1 (1.2)	0.0 (0.0)
Parent Died	11.6 (2.4)	11.3 (0.6)	13.9 (2.3)	11.3 (0.6)	12.2 (2.4)	16.1 (4.2)	11.6 (2.4)	15.6 (3.8)
Parent Divorced	14.2 (3.8)	4.8 (0.4)	7.9 (1.6)	4.7 (0.4)	9.7 (2.6)	9.2 (3.7)	14.2 (3.8)	6.7 (2.9)
Other Parent Loss	2.1 (1.2)	2.2 (0.4)	3.9 (1.2)	2.1 (0.4)	1.1 (0.6)	3.0 (1.4)	2.1 (1.2)	2.7 (1.3)
Family Violence	4.3 (1.5)	3.0 (0.3)	4.1 (0.9)	2.9 (0.3)	4.7 (1.5)	6.3 (1.8)	4.3 (1.5)	4.5 (1.4)
Physical Illness	5.0 (2.3)	2.5 (0.3)	4.0 (1.2)	2.4 (0.3)	4.4 (1.8)	4.7 (1.8)	5.0 (2.3)	4.3 (1.6)
Financial Adversity	6.1 (2.4)	5.6 (0.5)	4.1 (0.9)	5.8 (0.5)	6.0 (2.1)	3.3 (1.5)	6.1 (2.4)	2.9 (1.0)
1	35.4 (4.2)	23.4 (1.0)	35.9 (2.8)	22.7 (0.9)	32.9 (4.0)	41.7 (5.2)	35.4 (4.2)	40.5 (4.5)
2+	15.4 (3.4)	8.6 (0.5)	10.8 (1.7)	8.6 (0.5)	14.1 (3.2)	13.2 (3.3)	15.4 (3.4)	9.6 (2.3)
a	(140)	(107309)	(394)	(112243)	(171)	(1976)	(140)	(2212)

<sup>a</sup> Number of cases with the outcome variable; N represents the number of person years.

<sup>b</sup> % represents the percentage of people with the adversity among the cases with the outcome variable indicated in the column header. For example: the first cell is the % of those with physical abuse among those with attempts.

**Table 3:** Multivariate model for associations between childhood adversities and lifetime suicidality<sup>1</sup>

	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Suicidal Ideators with LT plans <sup>d</sup>		Suicidal Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.0* (1.2-3.3)*	7.4(0.006)*	1.7* (1.3-2.3)*	15.2(<.001)*	0.6 (0.3-1.4)	1.3(0.25)	1.0 (0.5-2.3)	0.0(0.93)
Sexual Abuse	7.6* (2.0-29.9)*	8.9(0.003)*	2.6 (0.6-10.6)	1.8(0.18)	---	---	---	---
Parent Died	1.1 (0.6-1.8)	0.1(0.78)	1.4 (0.9-2.1)	2.7(0.10)	0.7 (0.3-1.7)	0.6(0.45)	0.8 (0.5-1.5)	0.4(0.52)
Parent Divorced	2.7* (1.5-5.0)*	10.8(0.001)*	1.6* (1.0-2.4)*	4.3(0.038)*	0.9 (0.3-3.3)	0.0(0.88)	3.1* (1.2-8.6)*	5.2(0.023)*
Other Parent Loss	1.0 (0.3-3.3)	0.0(0.95)	1.7 (1.0-3.0)	3.6(0.06)	0.4 (0.1-2.6)	0.9(0.34)	2.0 (0.2-17.3)	0.4(0.51)
Family Violence	0.7 (0.3-1.7)	0.6(0.42)	0.8 (0.5-1.4)	0.5(0.47)	1.0 (0.4-2.4)	0.0(0.97)	2.4 (0.9-6.3)	3.5(0.06)
Physical Illness	1.1 (0.4-3.5)	0.1(0.81)	1.2 (0.6-2.3)	0.2(0.63)	0.8 (0.2-3.1)	0.1(0.71)	1.2 (0.3-3.9)	0.1(0.80)
Financial Adversity	1.0 (0.4-2.7)	0.0(0.94)	0.6 (0.4-1.1)	3.0(0.08)	2.4 (0.7-8.4)	1.9(0.17)	2.1 (0.7-6.0)	2.1(0.15)

\*Significant at the .05 level, two-sided test

LT: lifetime

<sup>b</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

**Table 4:** Associations between number of childhood adversities and lifetime suicidality<sup>1</sup>

Number of child adversities	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
1	1.9* (1.3-2.8)*		1.8* (1.5-2.3)*		0.5 (0.3-1.0)		0.9 (0.5-1.7)	
2+	2.1* (1.2-3.8)*	14.3(<.001)*	1.4* (1.0-2.0)*	28.3(<.001)*	1.1 (0.3-3.3)	4.5(0.10)	2.7* (1.3-5.9)*	8.3(0.016)*

\*Significant at the .05 level, two-sided test

LT: lifetime

<sup>b</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

view only

**Table 5:** Final multivariate model for associations between childhood adversities and lifetime suicidality<sup>1</sup>

	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.2* (1.3-3.8)*	8.9(0.003)*	2.1* (1.6-2.8)*	25.4(<.001)*	0.4* (0.2-1.0)*	4.3(0.038)*	0.8 (0.3-2.1)	0.3(0.60)
Sexual Abuse	9.3* (2.5-35.2)*	11.2(<.001)*	3.7 (0.9-15.9)	3.3(0.07)	---	---	---	---
Parent Died	1.2 (0.7-2.3)	0.4(0.51)	1.7* (1.1-2.6)*	6.6(0.010)*	0.4 (0.1-1.3)	2.2(0.14)	0.6 (0.3-1.1)	2.8(0.10)
Parent Divorced	3.1* (1.7-5.6)*	14.5(<.001)*	1.9* (1.2-3.0)*	8.1(0.004)*	0.7 (0.2-2.3)	0.4(0.51)	2.4 (0.9-6.4)	3.0(0.08)
Other Parent Loss	1.1 (0.3-4.3)	0.0(0.87)	2.1* (1.3-3.6)*	8.3(0.004)*	0.3 (0.0-2.0)	1.8(0.18)	1.3 (0.1-13.3)	0.1(0.79)
Family Violence	0.9 (0.3-2.3)	0.1(0.76)	1.1 (0.6-2.3)	0.2(0.69)	0.4 (0.1-1.8)	1.6(0.20)	1.2 (0.4-4.1)	0.1(0.76)
Physical Illness	1.4 (0.4-5.3)	0.2(0.63)	1.6 (0.7-3.3)	1.4(0.24)	0.6 (0.1-2.5)	0.5(0.46)	0.9 (0.2-3.3)	0.0(0.85)
Financial Adversity	1.3 (0.4-3.7)	0.2(0.65)	0.9 (0.4-1.7)	0.1(0.71)	1.6 (0.4-6.0)	0.6(0.44)	1.4 (0.5-4.3)	0.4(0.52)
group significance test for all types		29.4(<.001)*		43.0(<.001)*		833.9(<.001)*		11.5(0.18)
significance test for difference between types		13.1(0.07)		9.2(0.24)		805.7(<.001)*		11.8(0.11)
2+ adversities	0.7 (0.2-1.8)	0.7(0.41)	0.5* (0.3-0.9)*	4.9(0.028)*	4.7 (0.8-29.2)	2.9(0.09)	2.9 (0.8-10.6)	2.7(0.10)

\*Significant at the .05 level, two-sided test

LT: lifetime

<sup>b</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

South Africa Table 6. Interactions between child adversity and lifecourse<sup>1</sup>

		LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
		OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Interactions									
Physical Abuse	13-19	6.2 (0.6-62.0)	3.9(0.27)	1.0 (0.2-4.2)	13.2(0.004)*	0.8 (0.1-7.3)	0.1(0.97)	---	---
	20-29	2.7 (0.3-24.3)		0.3 (0.1-1.2)		0.9 (0.2-4.0)		---	
	30+	3.7 (0.5-28.4)		0.5 (0.1-2.2)		---		---	
Sexual Abuse	13-19	0.3 (0.0-8.7)	70.1(<.001)*	0.1 (0.0-4.4)	147.3(<.001)*	0.0* (0.0-0.0)*	0.6(0.45)	---	66.0(<.001)*
	20-29	0.1 (0.0-4.5)		0.1 (0.0-2.0)		0.0* (0.0-0.0)*		0.0* (0.0-0.0)*	
	30+	0.0* (0.0-0.0)*		0.0* (0.0-0.0)*		---		---	
Parent Died	13-19	0.7 (0.0-18.9)	1.7(0.63)	1.5 (0.1-18.8)	0.9(0.84)	0.1 (0.0-6.6)	3.5(0.32)	0.0* (0.0-0.0)*	130.0(<.001)*
	20-29	0.2 (0.0-8.3)		0.9 (0.1-12.2)		0.1 (0.0-2.6)		0.0* (0.0-0.0)*	
	30+	0.5 (0.0-16.3)		1.1 (0.1-17.9)		0.0 (0.0-1.4)		0.0* (0.0-0.0)*	
Parent Divorced	13-19	1.6 (0.1-25.5)	2.1(0.56)	0.9 (0.1-10.7)	1.9(0.59)	0.1 (0.0-5.5)	1.8(0.63)	---	---
	20-29	0.6 (0.0-9.1)		0.4 (0.0-4.0)		0.2 (0.0-9.8)		---	
	30+	1.5 (0.1-27.8)		0.8 (0.1-8.9)		0.1 (0.0-7.3)		---	
Other Parent Loss	13-19	0.3 (0.1-1.6)	91.1(<.001)*	45.6* (3.8-540.5)*	100.1(<.001)*	---	---	---	---
	20-29	174.6* (11.5-2640.7)*		746.2* (147.5-3775.9)*		---		---	
	30+	179.8* (16.7-1936.1)*		---		---		---	
Family Violence	13-19	211.4* (11.8-3776.4)*	18.7(<.001)*	1.1 (0.1-13.0)	2.8(0.42)	101.4* (1.1-9315.2)*	4.4(0.11)	0.0* (0.0-0.0)*	0.4(0.84)
	20-29	44.3* (2.1-945.4)*		0.3 (0.0-3.1)		11.5 (0.2-696.2)		0.0* (0.0-0.0)*	

	30+	115.1* (7.2-1831.8)*		0.5 (0.0-4.3)		---		0.0* (0.0-0.0)*	
Physical Illness	13-19	567.1* (34.8-9251.4)*	43.3(<.001)*	1.0 (0.1-13.9)	3.3(0.35)	439.3* (7.8-24619.1)*	12.7(0.002)*	0.0* (0.0-0.0)*	98.1(<.001)*
	20-29	49.1* (1.4-1667.6)*		0.7 (0.1-7.9)		9.1 (0.1-1409.7)		0.1 (0.0-2.8)	
	30+	---		3.0 (0.3-33.0)		---		---	
Financial Adversity	13-19	292.0* (26.1-3266.5)*	43.7(<.001)*	0.3 (0.0-4.9)	2.8(0.42)	---	---	0.0* (0.0-0.0)*	130.0(<.001)*
	20-29	121.5* (15.7-939.8)*		0.3 (0.0-3.3)		---		0.0* (0.0-0.0)*	
	30+	328.9* (34.6-3126.2)*		1.0 (0.1-15.9)		---		0.0* (0.0-0.0)*	
significance test for all child adversities			3313.2(<.001)*		1136.6(<.001)*		588.1(<.001)*		352.5(<.001)*
significance test for all child adversities and number of child adversities			5396.2(<.001)*		2805.8(<.001)*		611.3(<.001)*		352.6(<.001)*
2+ adversities	13-19	0.4 (0.0-15.3)	8.5(0.037)*	2.9 (0.2-49.3)	7.9(0.047)*	0.0 (0.0-1.5)	3.3(0.19)	1.2 (0.0-173.4)	0.1(0.95)
	20-29	5.4 (0.1-224.2)		12.1 (0.9-162.3)		0.2 (0.0-9.8)		1.5 (0.1-23.7)	
	30+	0.4 (0.0-14.6)		2.2 (0.2-31.3)		---		---	

\*Significant at the .05 level, two-sided test

<sup>1</sup>Models included all controls and interaction terms between int interval dummies (13-19,20-29,30+) and each control. Only the interaction terms between the int dummies and child adversity variables are shown in table. Assessed in Part 2 sample. Controls for the model include three int dummies (13-19,20-29,30+), and country, and also include significant variables from demographic and parent psychopathology models, details in following footnotes

<sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.



South Africa Table 6a. Multivariate model for associations between child adversity and LT suicidality during childhood years<sup>1</sup>

	Int range 4-12							
	LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Physical Abuse	0.6 (0.1-4.3)	0.3(0.60)	3.7* (1.0-13.4)*	4.2(0.041)*	---	---	0.0* (0.0-0.0)*	1177.3(<.001)*
Sexual Abuse	61.6* (4.5-841.0)*	9.9(0.002)*	34.8* (3.1-392.6)*	8.6(0.003)*	---	---	---	---
Parent Died	2.6 (0.1-52.0)	0.4(0.53)	1.5 (0.1-16.9)	0.1(0.76)	8.6 (0.3-234.7)	1.7(0.19)	22.7* (1.5-338.3)*	5.3(0.021)*
Parent Divorced	3.0 (0.2-38.0)	0.7(0.39)	2.9 (0.3-24.8)	0.9(0.33)	4.6 (0.1-215.6)	0.6(0.43)	0.0* (0.0-0.0)*	135.3(<.001)*
Other Parent Loss	0.0* (0.0-0.0)*	53.4(<.001)*	0.0* (0.0-0.0)*	77.1(<.001)*	---	---	---	---
Family Violence	0.0* (0.0-0.1)*	12.9(<.001)*	1.9 (0.3-13.1)	0.5(0.48)	---	---	---	---
Physical Illness	0.0* (0.0-0.0)*	44.3(<.001)*	1.4 (0.2-13.2)	0.1(0.75)	---	---	---	---
Financial Adversity	0.0* (0.0-0.0)*	64.2(<.001)*	2.0 (0.2-22.3)	0.3(0.57)	0.0* (0.0-0.0)*	26.8(<.001)*	0.0* (0.0-0.2)*	10.0(0.002)*
group significance test for all types		347.6(<.001)*		822.4(<.001)*		204.6(<.001)*		1425.4(<.001)*
significance test for difference between types		301.9(<.001)*		637.3(<.001)*		203.1(<.001)*		1123.3(<.001)*
2+ adversities	0.6 (0.0-13.1)	0.1(0.73)	0.1 (0.0-1.3)	3.2(0.07)	---	---	---	---

\*Significant at the .05 level, two-sided test

<sup>1</sup>Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from

<sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

<sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

For peer review only

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

For peer review only

South Africa Table 6b. Multivariate model for associations between child adversity and LT suicidality during teen years<sup>1</sup>

	Int range 13-19							
	LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Physical Abuse	3.7* (1.5-9.2)*	8.5(0.004)*	3.6* (2.2-5.9)*	26.1(<.001)*	0.3 (0.0-2.5)	1.2(0.28)	1.1 (0.3-4.7)	0.0(0.90)
Sexual Abuse	20.3* (2.0-210.2)*	6.6(0.010)*	4.6 (0.3-61.6)	1.4(0.24)	---	---	---	---
Parent Died	1.8 (0.5-6.5)	0.9(0.35)	2.2* (1.1-4.3)*	5.3(0.021)*	0.7 (0.1-6.8)	0.1(0.72)	0.5 (0.1-2.2)	0.8(0.38)
Parent Divorced	4.6* (1.7-12.1)*	9.8(0.002)*	2.5 (1.0-6.1)	3.8(0.05)	0.4 (0.1-3.1)	0.8(0.37)	4.3* (1.1-17.0)*	4.5(0.035)*
Other Parent Loss	0.0* (0.0-0.0)*	238.2(<.001)*	0.2 (0.0-1.5)	2.6(0.11)	---	---	0.0* (0.0-0.0)*	60.3(<.001)*
Family Violence	1.9 (0.5-7.2)	1.0(0.33)	2.1 (0.6-7.6)	1.5(0.23)	2.3 (0.1-46.2)	0.3(0.59)	0.9 (0.1-5.7)	0.0(0.89)
Physical Illness	2.9 (0.3-27.8)	0.9(0.34)	1.5 (0.4-5.4)	0.3(0.56)	9.9* (1.8-54.0)*	7.3(0.007)*	1.5 (0.2-11.6)	0.1(0.71)
Financial Adversity	1.9 (0.2-14.5)	0.4(0.53)	0.6 (0.2-2.3)	0.6(0.45)	1.0 (0.1-19.3)	0.0(1.00)	4.0 (0.4-42.9)	1.3(0.25)
group significance test for all types		1168.3(<.001)*		37.5(<.001)*		421.4(<.001)*		1337.0(<.001)*
significance test for difference between types		1004.7(<.001)*		12.4(0.09)		374.6(<.001)*		1283.5(<.001)*
2+ adversities	0.2 (0.0-1.4)	2.6(0.11)	0.3 (0.1-1.0)	3.9(0.048)*	0.9 (0.0-32.5)	0.0(0.93)	2.5 (0.3-18.7)	0.9(0.35)

\*Significant at the .05 level, two-sided test

<sup>1</sup>Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from

<sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

1  
2  
3  
4  
5 <sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
6 psychopathology, controlling for types of parental disorders (6 dummies).

7  
8 <sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent  
9 psychopathology not controlled for due to insignificance in previous models.

10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

For peer review only

South Africa Table 6c. Multivariate model for associations between child adversity and LT suicidality during young adult years<sup>1</sup>

	Int range 20-29							
	LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Physical Abuse	1.6 (0.8-3.5)	1.7(0.20)	1.1 (0.7-1.8)	0.2(0.64)	0.4 (0.1-1.2)	2.7(0.10)	0.9 (0.3-3.2)	0.0(0.88)
Sexual Abuse	5.1 (0.4-66.1)	1.6(0.20)	2.2 (0.3-17.5)	0.5(0.46)	---	---	0.0* (0.0-0.0)*	68.1(<.001)*
Parent Died	0.6 (0.2-2.4)	0.4(0.51)	1.4 (0.7-2.8)	0.7(0.40)	0.4 (0.0-2.8)	1.0(0.32)	0.6 (0.2-2.2)	0.7(0.42)
Parent Divorced	1.7 (0.7-4.5)	1.3(0.25)	1.1 (0.5-2.6)	0.1(0.74)	0.8 (0.2-4.2)	0.0(0.84)	2.9 (0.7-12.7)	2.2(0.14)
Other Parent Loss	1.2 (0.2-7.6)	0.1(0.82)	2.9* (1.2-7.4)*	5.5(0.019)*	0.1 (0.0-1.5)	3.0(0.08)	10.5 (0.7-160.1)	3.0(0.09)
Family Violence	0.4 (0.1-1.5)	2.0(0.16)	0.5 (0.2-1.8)	1.1(0.30)	0.3 (0.0-2.6)	1.4(0.24)	2.1 (0.2-25.7)	0.4(0.55)
Physical Illness	0.3 (0.0-5.1)	0.8(0.36)	1.0 (0.4-2.6)	0.0(0.96)	0.2 (0.0-4.6)	1.0(0.32)	0.1 (0.0-1.4)	3.0(0.08)
Financial Adversity	0.8 (0.2-3.6)	0.1(0.76)	0.5 (0.2-1.4)	1.9(0.17)	1.7 (0.3-10.9)	0.3(0.57)	1.3 (0.2-7.7)	0.1(0.78)
group significance test for all types		9.9(0.27)		9.6(0.30)		1038.1(<.001)*		97.5(<.001)*
significance test for difference between types		5.2(0.64)		10.2(0.18)		973.6(<.001)*		99.6(<.001)*
2+ adversities	3.1 (0.8-12.3)	2.7(0.10)	1.3 (0.7-2.6)	0.7(0.41)	9.1 (0.5-169.9)	2.3(0.13)	3.5 (0.4-28.8)	1.4(0.24)

\*Significant at the .05 level, two-sided test

<sup>1</sup>Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from

<sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

1  
2  
3  
4  
5 <sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
6 psychopathology, controlling for types of parental disorders (6 dummies).

7  
8 <sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent  
9 psychopathology not controlled for due to insignificance in previous models.

10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

For peer review only

South Africa Table 6d. Multivariate model for associations between child adversity and LT suicidality during later adult years<sup>1</sup>

	Int range 20-29							
	LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Physical Abuse	2.2* (1.0-4.8)*	4.4(0.035)*	1.8 (0.9-3.5)	3.2(0.07)	0.4 (0.1-1.2)	2.8(0.10)	1.4 (0.4-5.3)	0.2(0.65)
Sexual Abuse	0.0* (0.0-0.0)*	81.7(<.001)*	0.0* (0.0-0.0)*	218.1(<.001)*	---	---	0.8 (0.0-16.7)	0.0(0.88)
Parent Died	1.3 (0.3-4.9)	0.1(0.70)	1.6 (0.7-3.6)	1.5(0.22)	0.2 (0.0-1.6)	2.3(0.13)	0.6 (0.2-1.9)	0.8(0.37)
Parent Divorced	4.6 (1.0-21.6)	3.9(0.049)*	2.4 (0.9-6.2)	3.5(0.06)	0.3 (0.0-2.5)	1.2(0.28)	1.9 (0.1-31.6)	0.2(0.65)
Other Parent Loss	1.3 (0.2-9.4)	0.1(0.80)	5.1* (2.1-12.1)*	14.1(<.001)*	0.2 (0.0-4.0)	1.1(0.30)	0.6 (0.1-6.9)	0.2(0.70)
Family Violence	1.0 (0.2-6.5)	0.0(0.96)	0.9 (0.2-3.4)	0.0(0.86)	0.0* (0.0-0.9)*	4.3(0.037)*	0.8 (0.0-25.2)	0.0(0.92)
Physical Illness	5.5 (0.9-32.1)	3.7(0.05)	4.3* (1.1-15.9)*	4.8(0.028)*	0.0* (0.0-0.9)*	4.1(0.042)*	1.6 (0.1-20.8)	0.1(0.73)
Financial Adversity	2.1 (0.3-15.5)	0.6(0.44)	2.0 (0.5-8.4)	1.0(0.31)	0.7 (0.1-4.9)	0.1(0.75)	0.8 (0.1-4.6)	0.1(0.78)
group significance test for all types		338.1(<.001)*		525.7(<.001)*		7.9(0.34)		5.9(0.66)
significance test for difference between types		272.0(<.001)*		477.0(<.001)*		4.8(0.57)		5.7(0.57)
2+ adversities	0.2 (0.0-1.6)	2.4(0.12)	0.2 (0.1-1.1)	3.6(0.06)	44.5* (2.5-779.1)*	7.0(0.008)*	2.1 (0.2-18.5)	0.5(0.49)

\*Significant at the .05 level, two-sided test

<sup>1</sup>Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from

<sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).



1  
2  
3  
4  
5 <sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
6 psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

7  
8 <sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
9 psychopathology, controlling for types of parental disorders (6 dummies).

10 <sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent  
11 psychopathology not controlled for due to insignificance in previous models.  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

South Africa Table 7. Bivariate model for associations between child adversities and LT suicidality<sup>1</sup>

	LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Physical Abuse	2.0* (1.2-3.2)*	7.3(0.007)*	1.7* (1.3-2.3)*	16.7(<.001)*	0.7 (0.3-1.4)	1.2(0.26)	1.1 (0.5-2.5)	0.1(0.81)
Sexual Abuse	7.9* (1.9-32.1)*	8.6(0.003)*	3.0 (0.7-12.2)	2.5(0.11)	---	---	---	---
Parent Died	1.1 (0.7-1.7)	0.1(0.76)	1.3 (0.9-1.9)	2.0(0.16)	0.8 (0.4-1.9)	0.3(0.62)	0.8 (0.4-1.5)	0.4(0.53)
Parent Divorced	2.8* (1.5-5.2)*	11.4(<.001)*	1.5 (1.0-2.3)	3.7(0.05)	1.2 (0.4-3.8)	0.1(0.78)	3.0* (1.1-8.0)*	4.9(0.027)*
Other Parent Loss	0.9 (0.3-2.8)	0.1(0.81)	1.6 (0.9-2.7)	2.9(0.09)	0.5 (0.1-2.7)	0.7(0.41)	2.5 (0.6-11.0)	1.5(0.22)
Family Violence	1.0 (0.4-2.2)	0.0(0.98)	1.1 (0.6-1.8)	0.0(0.83)	0.8 (0.4-2.0)	0.2(0.68)	2.2 (0.9-5.5)	2.9(0.09)
Physical Illness	1.5 (0.6-4.1)	0.7(0.39)	1.3 (0.7-2.4)	0.7(0.42)	0.9 (0.2-3.5)	0.0(0.86)	1.2 (0.4-4.0)	0.1(0.77)
Financial Adversity	1.2 (0.5-2.8)	0.1(0.73)	0.7 (0.4-1.2)	1.4(0.23)	1.9 (0.6-6.8)	1.1(0.29)	2.0 (0.7-6.3)	1.6(0.21)

\*Significant at the .05 level, two-sided test

<sup>1</sup>Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from

<sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

1  
2  
3  
4  
5 <sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
6 psychopathology, controlling for types of parental disorders (6 dummies).

7  
8 <sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent  
9 psychopathology not controlled for due to insignificance in previous models.

10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

For peer review only

## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found
<b>Introduction</b>		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
<b>Methods</b>		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses

Continued on next page

**Results**

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

**Discussion**

Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results

**Other information**

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based
---------	----	---------------------------------------------------------------------------------------------------------------------------------------------------------------

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).



**Association between childhood adversities and long-term suicidality among South Africans: Results from the South African Stress and Health Study**

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2013-004644.R1
Article Type:	Research
Date Submitted by the Author:	28-Feb-2014
Complete List of Authors:	Bruwer, Belinda; Stellenbosch University, Psychiatry Govender, Ravi; Stellenbosch University, Psychiatry Bishop, Melanie; Stellenbosch University, Psychiatry Williams, David; Harvard University, Human Development and Health Stein, Dan; University of Cape Town, Psychiatry and mental health Seedat, Soraya; Stellenbosch University, Psychiatry
<b>Primary Subject Heading</b>:	Mental health
Secondary Subject Heading:	Mental health
Keywords:	MENTAL HEALTH, Child & adolescent psychiatry < PSYCHIATRY, Adult psychiatry < PSYCHIATRY, PSYCHIATRY, Suicide & self-harm < PSYCHIATRY

SCHOLARONE™  
Manuscripts

only

*Association between childhood adversities and suicidality*

**Association between childhood adversities and long-term suicidality among South Africans: Results from the South African Stress and Health Study**

Belinda Bruwer<sup>\*a</sup>, Ravi Govender<sup>a</sup>, Melanie Bishop<sup>a</sup>, David R Williams<sup>b</sup>, Dan J Stein<sup>c</sup>, Soraya Seedat<sup>a</sup>

<sup>a</sup> Department of Psychiatry, Stellenbosch University, PO Box 19063, Tygerberg, 7505, Republic of South Africa.

<sup>b</sup> Department of Society, Human Development and Health, Harvard School of Public Health, and Department of African and African American Studies, Harvard University. Department of Society, Human Development and Health, 677 Huntington Avenue, 6<sup>th</sup> floor, Boston, MA 02115, United States of America

<sup>c</sup> Department of Psychiatry and Mental Health, University of Cape Town, Groote Schuur Hospital (J2), Anzio Road, Observatory, 7925, Cape Town, Republic of South Africa

\*Corresponding author: Department of Psychiatry, University of Stellenbosch, PO Box 19063, Tygerberg, 7505, Republic of South Africa.

Tel nr: +27219404467. Fax nr: +27219404543, [bbuwer@sun.ac.za](mailto:bbuwer@sun.ac.za)

Keywords: Childhood adversities, suicidal ideation, suicidal attempts, suicide, suicidal behaviour

Word count: 5349

*Association between childhood adversities and suicidality***ABSTRACT****Objective:**

Suicide and suicidal behaviours are significant public health problems and a leading cause of death worldwide and in South Africa. We examined the association between childhood adversities and suicidal behaviour over the life course.

**Methods:**

A national probability sample of 4,351 South African adult participants (aged 18 years and older) in the South African Stress and Health (SASH) study was interviewed, as part of the World Mental Health Survey initiative. Respondents provided socio-demographic and diagnostic information, as well as an account of suicide-related thoughts and behaviours. Outcomes were defined as suicide attempts and suicidal ideation in the total sample, and suicide plans and attempts among ideators. Childhood adversities included physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness and financial adversity. The association between suicidality and childhood adversities was examined using discrete-time survival models.

**Results:**

More than a third of respondents with suicidal behaviour experienced at least 1 childhood adversity, with physical abuse, parental death and parental divorce the most prevalent adversities. Physical abuse, sexual abuse and parental divorce were identified as significant risk markers for lifetime suicide attempts, while physical abuse and parental divorce were significantly correlated with suicidal ideation. Two or more childhood adversities were associated with a 2-fold higher risk of lifetime suicide attempts. Sexual abuse (OR=9.3, childhood, parental divorce (OR=3.1)



*Association between childhood adversities and suicidality*

1  
2  
3 and physical abuse (OR=2.2) had the strongest associations with lifetime suicide attempts. The  
4  
5 effect of childhood adversities on suicidal tendencies varied over the *life course*. For example,  
6  
7 sexual abuse was significantly associated with suicide attempts during childhood and teen years,  
8  
9 but not during young and later adulthood.  
10  
11

**Conclusions:**

12  
13  
14  
15  
16 Childhood adversities, especially sexual abuse, physical abuse and parental divorce are important  
17  
18 risk factors for the onset and persistence of suicidal behaviour, with this risk greatest in childhood  
19  
20 and adolescence. The risk for suicidal behaviour was greatest in childhood and adolescence.  
21  
22 Suicidal risk in childhood and adolescence was significantly associated with the following  
23  
24 childhood adversities: sexual abuse, physical abuse and parental divorce.  
25  
26  
27  
28  
29

30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Keywords: Childhood adversities, suicidal ideation, suicidal attempts

*Association between childhood adversities and suicidality***Strengths and limitations**

- These findings extend previous work done in other developing countries that have found childhood adversities to be a significant risk factor for suicidality (20; 57; 58; 59).
- Recall bias might have impacted on the accuracy of recall of childhood adversities.
- Variables such as culture, ethnicity and mental status at the time of the interview might have influenced the recall and reporting of suicidal behaviour.
- Owing to the cross-sectional design, details regarding childhood adversities and suicidal incidents were not assessed. Some of the participants might have been scared to tell the interviewers about their suicidal behaviours. Stigma associated with mental health may have also played a role in reporting suicidal tendencies. The status of the participant's mental health, the role of ethnicity, culture and generational factors may have also contributed to the under-reporting of suicidality.
- The survey was conducted in adults living in households and hostel quarters thus the findings are not generalizable to homeless and institutionalized persons who were not included in the survey.
- The CIDI instrument which was used in this study is a lay-administered instrument which does not include an assessment of several key DSM-IV diagnoses (such as bipolar disorder and psychosis), are associated with elevated rates of suicidality. As a result, some participants with suicidality may have not have been diagnosed with a disorder.

*Association between childhood adversities and suicidality*

- In view of the large confidence intervals and small sample sizes for some of these analyses caution is required in drawing conclusions.
- We did not control for other unmeasured causes of childhood adversities and suicidality, or protective (resiliency) factors that may have contributed to the associations observed in these data.

For peer review only

*Association between childhood adversities and suicidality***INTRODUCTION**

Suicide and suicidal behaviour are significant public health problems. Suicide is one of the leading causes of death worldwide with almost 1 million people committing suicide each year [1]. This figure is likely to grow to approximately 1.2 million suicides in 2020 [2]. In South Africa, the annual rate of suicide is high [3, 4] mirroring international trends [5]. So, too, are rates of suicidal behaviour with an estimated prevalence of 9.1% for lifetime suicidal ideation and 2.9% for suicide attempts among South Africans according to the South African Stress and Health Survey (SASH) [6].

Despite the enormity of the problem, the aetiology of suicidal behaviour is not fully understood. There are controversies in the literature regarding prior psychiatric disorder and risk for suicide attempts. While some authors have argued that pre-existing disorder is an important risk factor (7-11), others have argued that suicide attempts are not necessarily associated with prior psychopathology [12]. Genetic factors also play an important role in suicidal behaviour [13-16]. While there is stronger evidence pointing towards environmental or experiential factors [17, 18] such as exposure to childhood adversities (19-28]. Recent multi-level country data from the World Mental Health Surveys (WMHS) initiative has allowed for cross-national comparisons of suicidality. The WMHS investigated the association between childhood adversities and suicidal behaviour [20], the persistence of suicidality over time, and the extent to which associations between childhood trauma and suicidality changed over the life course. The WMHS found a dose-response relationship between the number of adversities and suicidal behaviour. Sexual abuse and physical abuse were the strongest risk factors for both the onset and persistence of suicidal behaviours, with the risk for suicidality greatest during childhood (age 4-12 years) and adolescence (age 13-19 years) [20].

*Association between childhood adversities and suicidality*

1  
2  
3 Numerous studies have examined the link between childhood sexual abuse and suicidality [29-  
4  
5 41]. All of these authors have found that exposure to childhood sexual abuse increases the risk for  
6  
7 mental disorders, including suicidality. Furthermore, the majority of studies that have focused on  
8  
9 the link between childhood physical abuse and suicidality have found that exposure to childhood  
10  
11 physical abuse increases the risk for suicidality [42, 43]. There also appears to be an association  
12  
13 between the number of childhood adversities experienced and the later suicidal behaviour [21, 23,  
14  
15 24, 44, 45].  
16  
17  
18  
19

20  
21 Exposure to early life stress is prevalent among South Africans. In one sample of South African  
22  
23 rural youth, the prevalence of physical and sexual abuse was shown to be very high with 94.4%  
24  
25 of males exposed to physical abuse and 39.1% of females to sexual abuse [46]. More than a  
26  
27 quarter of adults who were interviewed endorsed exposure to childhood adversity (parental death,  
28  
29 parental separation or parental divorce) in the SASH study [47]. Significantly more females were  
30  
31 prone to be victims of domestic violence than men [47]. Women also reported twice as many  
32  
33 suicidal attempts than the male participants in the SASH study [9].  
34  
35  
36  
37

**Objective**

38  
39 We report in more detail on data from a South African dataset gathered as part of the World  
40  
41 Mental Health Surveys, which allowed for comparison with data from the overall cross-national  
42  
43 sample. This data are particularly interesting as South Africa is a middle income African country  
44  
45 with high rates of violent trauma exposure. The present study aimed to examine the relationship  
46  
47 between the type and frequency of childhood adversity exposure to suicidal behaviour over the  
48  
49 life trajectory of South Africans, given that there are no published nationally representative data  
50  
51 that may be useful in informing both clinical practice and policy.  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality***METHODS****Sample**

Data for the SASH Study were collected between January 2002 and June 2004. WMH surveys were carried out in 21 countries which included Nigeria and South Africa [48]. For detailed information on study methods see Williams et al. (2004) [48]. The research protocol for the SASH study was approved by the Human Subjects Committee of the University of Michigan, by Harvard Medical School ethics committee and by a single project assurance of compliance from the Medical University of South Africa (MEDUNSA), and by the National Institute of Mental Health. It was a national probability sample of 4,351 South African adults (persons aged 18 years and older) living in households or in hostel accommodation. All racial and ethnic groups were represented, with the sample selected using a three-stage probability sample design. The response rate was 85.5%.

*Sampling approach*

Sampling was divided into three stages. Primary sampling units was selected during the first stage, which was based on the 2001 SA census Enumeration Areas (EAs). The second stage involved sampling of household units within clusters selected in each EA. South Africans in both urban and rural areas were sampled. Sampled residences were stratified into 10 diverse housing categories: Rural-commercial, agricultural, rural traditional subsistence areas, African townships, informal urban or peri-urban shack areas, Coloured townships, Indian townships, general metropolitan residential areas, general large metropolitan residential areas, and domestic servant accommodation in urban areas. During the third stage, one adult respondent in each sampled housing unit was selected. A total of 5089 households was selected. Field interviews were conducted with 4433 (87.1%) of designated respondents. Based on quality control, 4351

*Association between childhood adversities and suicidality*

interviews were retained for use in the analysis. There were no differences in response rates across the four designated racial groups (white, Coloured [mixed racial origin], Indian, black). According to the 2001 Census statistics, 79.% people in South Africa are Black African, 8.9% are coloured, 9.6% are white, and 2.5% are Indian/Asian [49].

**Diagnostic Interview**

SASH used version 3 of the World Health Organization Composite Diagnostic Interview (WHO CIDI) [50]. Interviewers were trained within a one week period and conducted the interviews in seven different languages, namely English, Afrikaans, Zulu, Xhosa, Northern Sotho, Southern Sotho, and Tswana. Translations of the CIDI into several native South African languages were conducted in accordance with WHO requirements. Multilingual and bilingual expert panels conducted the back-translations [51, 52]. Informed consent was obtained from participants after a complete description of the study was provided. Respondents provided socio-demographic and diagnostic information, as well as an account of suicidal behaviours during the interviews. The core diagnostic assessment of mental disorders included anxiety disorders (panic disorder, agoraphobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder), mood disorders (major depressive disorder, dysthymia), substance use disorders (alcohol abuse, alcohol dependence, drug abuse, drug dependence) and intermittent explosive disorder [53, 54].

**Suicidal behaviour**

The CIDI 3.0 module on suicidal behaviour was used to assess the age-of-first-onset, age of most recent episode, and lifetime occurrence of suicidal ideation, suicide plans and suicide attempts. Suicidal ideation, suicide plans and suicide attempts was assessed with questions such as “Have you ever seriously thought about committing suicide?”, “Have you ever made a plan for committing suicide?”, and “Have you ever attempted suicide?”, respectively. Ideators only

*Association between childhood adversities and suicidality*

1  
2  
3 proceeded to answer questions about plans (“Have you ever made a plan for committing  
4  
5 suicide?”) and attempts (“Have you ever attempted suicide?”). Information on the age of first  
6  
7 occurrence of the three main outcomes was obtained. To get a better understanding of the  
8  
9 progression from ideation to attempt, the outcomes considered in this study were: suicide  
10  
11 attempts in the total sample; suicide ideation in the total sample; suicide plans among ideators;  
12  
13 suicide attempts among ideators with a plan (planned attempts), and suicide attempts among  
14  
15 ideators in the absence of a plan (unplanned or impulsive attempts).  
16  
17  
18  
19

**Childhood adversities**

20  
21  
22 Physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family  
23  
24 violence, physical illness and financial adversity were the various childhood adversities assessed.  
25  
26 Biological and non-biological parents were included in measures of parental death, divorce or  
27  
28 other parental loss. Financial adversities were assessed with questions on whether the family had  
29  
30 insufficient funds to pay for basic necessities. Questions about repeated fondling, attempted rape  
31  
32 or rape were asked to assess for sexual abuse. This comprised the following “The next 2  
33  
34 questions are about sexual assault: (i) The first is about rape. We define this as someone either  
35  
36 having sexual intercourse with you or penetrating your body with a finger or object when you did  
37  
38 not want them to, either by threatening you or using force, or when you were so young that you  
39  
40 didn’t know what was happening. Did this ever happen to you?”, and (ii) “Other than rape, were  
41  
42 you ever sexually assaulted or molested?”. A modified version of the Conflict Tactics Scale  
43  
44 (CTS2) was used to assess family violence and physical abuse [55]. Respondents were classified  
45  
46 as having experienced *physical abuse* when they indicated that, when they were growing up,  
47  
48 their father or mother (includes biological, step, or adoptive parents) slapped, hit, pushed,  
49  
50 grabbed, shoved, or threw something at them, or that they were beaten as a child by the persons  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



*Association between childhood adversities and suicidality*

1  
2  
3 who raised them. Family violence was assessed as present when respondents indicated that they  
4  
5 (i) “were often hit, shoved, pushed, grabbed, or slapped while growing up” or (ii) “witnessed  
6  
7 physical fights at home, like when your father beat up your mother?” A standard chronic  
8  
9 conditions checklist assessed for life-threatening physical illnesses in childhood [56].  
10  
11

**Data analysis**

12  
13  
14  
15  
16 All data analyses were processed and analysed centrally by a team of statisticians at the Harvard  
17  
18 School of Public Health (Boston, USA) using the SAS version 9.1.3 software package. Discrete-  
19  
20 time survival analysis with time-varying covariates was used to study the risk factors of lifetime  
21  
22 suicide ideation, plans and attempts. Data were weighted to adjust for the stratified multistage  
23  
24 sample design, differential probability of selection within households as a function of household  
25  
26 size and clustering of data, and differential non-response. Overall, percentages were weighted to  
27  
28 adjust for differences in selection probabilities, differential non-response, oversampling of cases,  
29  
30 and residual differences on sociodemographic variables between the sample and the population  
31  
32 [48, 57]. A post-stratification weight was also used to make the sample distribution comparable,  
33  
34 for age, sex, and province, with the population distribution in the 2001 South African census.  
35  
36 Both weighted and geographic clustering of data were taken into account in the data analyses by  
37  
38 using a jackknife repeated replications simulation method implemented in SAS macro 14. The  
39  
40 survival coefficients were exponentiated and are reported below in the form of odds ratios.  
41  
42  
43  
44  
45  
46  
47

48 The association between suicidality and childhood adversity was examined using discrete-time  
49  
50 survival models with the analysis unit being person-years. Bivariate analyses (considering one  
51  
52 adversity at a time) and multivariate analyses (considering all adversities simultaneously) were  
53  
54 conducted. Two types of multivariate models were tested: multivariate additive models  
55  
56 (simultaneously considering all childhood adversities) and multivariate interactive models (with  
57  
58  
59  
60

### *Association between childhood adversities and suicidality*

number and type of childhood adversities experienced by each respondent included as dummy variables). The analysis also examined interactions between the life stage (13-19 years, 20-29 years, 30+ years) of respondents and each childhood adversity, as well as the influence each adversity had on early-, middle- and later- onset suicidality. Analyses were conducted using SUDAAN version 8.1 to adjust for clustering and weighting. Odds ratios (ORs) with a 95% confidence interval (CIs) are reported. Wald  $X^2$ - tests were used to examine multivariate significance. Associations between adversities and suicide outcomes were adjusted for sex, age, educational level, marital status, interactions between demographic variables, life course and parental psychopathology. Analyses also examined the influence of respondents' lifetime mental disorders on suicidality, as well as interactions between sex and each childhood adversity. Statistical significance using two-sided tests was set at  $p < .05$  [20].

## **RESULTS**

### ***Demographic details***

In the sample, ( $n = 4351$ ), there were slightly more female (53.7%) than male respondents. There were more black (76.2%) than coloured (10.4%), white (10%), and Indian/Asian (3.4%) respondents. Furthermore, half of the sample was married and most were unemployed (69.2%), had less than 12 years of education (62.7%) and lived in an urban area (59.7%) (see Table 1).

### ***Prevalence of childhood adversities among the total sample***

Figure 1 provides a schematic representation of the suicidality data reported in the sections which follow. In the total sample, 35.4% of participants with one adversity had a suicide attempt, compared with 23.4% with one adversity who had not made an attempt. Physical abuse (24.9%), parental divorce (14.2%) and parental death (11.6%) were most prevalent among those suicide attempters. Among those exposed to one childhood adversity, without a suicide attempt, the two

### *Association between childhood adversities and suicidality*

1  
2  
3 most prevalent adversities reported were physical abuse (12.2%) and parental death (11.3%). In  
4  
5 the total sample 15.4% of participants exposed to two or more adversities had a suicide attempt.  
6  
7  
8 In contrast, 8.6% of participants exposed to two or more adversities had not made an attempt  
9  
10 (Table 2).  
11

### *Prevalence of childhood adversities among suicidal ideators in the total sample*

12  
13  
14  
15  
16 In the sample as a whole, 35.9% of those with one adversity had suicidal ideation compared with  
17  
18 22.7% of those with one adversity who had no ideation. The most prevalent adversities  
19  
20 associated with suicidal ideation were physical abuse (21.1%), parental death (13.9%), and  
21  
22 parental divorce (7.9%). Among those without suicidal ideation, physical abuse (11.8%) and  
23  
24 parental death (11.3%) were the most commonly endorsed childhood adversities. Of those who  
25  
26 endorsed two or more childhood adversities, 10.8% reported suicidal ideation and 8.6% did not  
27  
28 (Table 2). In summary, the most prevalent childhood adversities reported among the total sample  
29  
30 with/without suicidal ideation were firstly, physical abuse and secondly, the death of a parent.  
31  
32  
33  
34  
35

### *Prevalence of suicide attempts in the total sample*

36  
37  
38 In the total sample, 24.9% of those with childhood physical abuse had attempted suicide while  
39  
40 12.2% of respondents with no physical abuse had no attempt. Of those exposed to parental  
41  
42 divorce, 14.2% had attempted suicide and 4.8% had made no attempt. The second most prevalent  
43  
44 childhood adversity was parental death with 11.6% of those with parental death attempting  
45  
46 suicide and 11.3% of those with parental death with no attempts (Table 2).  
47  
48  
49  
50

### *Prevalence of childhood adversities among suicidal ideators*

51  
52  
53  
54 *With/without a plan*  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

1  
2  
3 Among suicidal ideators with a plan, 32.9% had experienced one childhood adversity. Among  
4  
5 ideators with no plan, 41.7% had one childhood adversity. Among ideators with a plan, the  
6  
7 following were the most prevalent childhood adversities: physical abuse (24.3%), parental death  
8  
9 (12.2%), and parental divorce (9.7%). Among ideators without a plan, 27.9% endorsed physical  
10  
11 abuse, 16.1% parental death, and 9.2% parental divorce (see Table 2). In both groups (ideators  
12  
13 with and without a plan), physical abuse was the most prevalent childhood adversity, followed by  
14  
15 parental death and parental divorce.  
16  
17  
18

*With or without an attempt*

19  
20  
21  
22 Among suicidal ideators who had attempted suicide, 35.4% were exposed to one childhood  
23  
24 adversity and 15.4% were exposed to two or more childhood adversities. In the group of ideators  
25  
26 who had made an attempt, 24.9% had experienced physical abuse, 14.2% parental divorce, and  
27  
28 11.6% parental death (Table 2). 40.5% of those with one adversity, and 9.6% of those exposed to  
29  
30 two or more adversities were suicidal ideators with no attempts. In this group, the most prevalent  
31  
32 adversities were physical abuse (24.5%), parental death (15.6%) and parental divorce (6.7%)  
33  
34 reported (Table 2).  
35  
36  
37  
38  
39

40 Among all ideators (with/without a plan, with/without an attempt), the most prevalent childhood  
41  
42 adversity was physical abuse, followed by parental death and parental divorce. Of note, in the  
43  
44 group of ideators with an attempted suicide parental divorce was more prevalent than parental  
45  
46 death.  
47  
48  
49

*Bivariate and multivariate results: Type of childhood adversity*

50  
51  
52 Bivariate and multivariate analyses were performed to examine the associations between the  
53  
54 different childhood adversities (physical abuse, sexual abuse, parental death, parental divorce,  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

other parental loss, family violence, physical illness, financial adversity) and lifetime suicidal ideation, plans and attempts.

In the total sample, bivariate and multivariate analysis revealed significant associations between (i) sexual abuse (bivariate: OR=7.9, p=0.003; multivariate: OR=7.6, p=0.003), (ii) physical abuse (OR 2, p=0.007; OR 2.0, p=0.006) and (iii) parental divorce (OR 2.8, p<.001; OR 2.7, p=0.001), and lifetime suicide attempts. Among ideators in the sample, physical abuse (OR=1.7, p<.001; OR=1.7, p<.001) was significantly associated with suicidal ideation. Multivariate analyses revealed an additional association with suicidal ideation, namely parental divorce (OR = 1.6, p=0.038). The relationship between childhood adversities and lifetime plans was not statistically significant. However, a significant association was found between parental divorce and lifetime suicidal attempts among ideators (OR=3.0, p<.001; OR=3.1, p=0.023) (Table 3).

Findings from multivariate analysis, therefore, confirm findings of bivariate analysis for all groups, except for ideators. Among ideators bivariate analysis revealed a significant relationship between physical abuse and suicidal ideation. This was confirmed in multivariate analysis where the association between parental divorce and suicidal ideation was significant for the whole sample.

*Bivariate associations between the number of adversities and lifetime suicidality*

The relationship between the number of childhood adversities and lifetime suicidal ideation, plans and attempts was further examined. There was a significant relationship between the number of childhood adversities and lifetime suicide attempts. Two or more childhood adversities were associated with a 2-fold higher risk of lifetime suicide attempts in the total



*Association between childhood adversities and suicidality*

Childhood years (4-12). Sexual abuse (OR=61.6, CI=4.5-841.0, p=0.002) in early childhood (4-12 years of age) was significantly associated with lifetime suicide attempts in the total sample (OR = 61.6, CI=4.5-841.0, p=0.002). Both sexual abuse (OR=34.8, CI= 3.1-392.6, p=0.003) and physical abuse (OR=3.7, CI=1.0-13.4, p=0.041) were associated with a higher risk for suicidal ideation among the total sample. No significant associations were found between any of the childhood adversities and lifetime plans in the group of ideators. Among those with suicidal ideation, parental death (OR=2.2, CI=1.1-4.3, p=0.021) was significantly associated with suicide attempts in childhood years.

Teen years (13-19). Sexual abuse (OR=20.3, CI=2.0-210.2, p=0.010), physical abuse (OR=3.7, CI=1.5-9.2, p=0.004), and parental divorce (OR=4.6, CI=1.7-12.1, p=0.002) were significantly associated with suicide attempts in the total sample of teenagers. Physical abuse (OR=3.6, CI=2.2-5.9, p<.001) and parental death (OR=2.2, CI=1.1-4.3, p=0.021) significantly increased the risk for suicidal ideation among the total group of teens. Physical illness (OR=9.9, CI=1.8-54.0, p=0.007) significantly increased the risk of suicidal plans in teens with suicidal ideation. Suicide attempts among teens with suicidal ideation was significantly predicted by parental divorce (OR=4.3, CI=1.1-17.0, p=0.035).

Young adulthood (20-29). None of the childhood adversities were significantly associated with lifetime suicide attempts during young adulthood in the sample overall. An explanation could be that suicide attempts spike earlier and later in life among South Africans, contributing to the lack of significance. Parental loss other than parental death was significantly associated with suicidal ideation (OR=2.9, CI=1.2-7.4, p=0.019).

*Association between childhood adversities and suicidality*

1  
2  
3 Later adulthood ( $\geq 30$ ). Childhood physical abuse (OR=2.2, CI=1.0-4.8, p=0.035) was  
4 significantly predictive of suicidal attempts. The likelihood of suicidal ideation significantly  
5 increased in later adulthood if parental loss other than parental death (OR=5.1, CI=2.1-12.1,  
6 p<.001) or physical illness had been present during childhood (OR=4.3, CI=1.1-15.9, p=0.028).  
7  
8 No significant relationship was found between any of the childhood adversities and lifetime  
9 plans in the group of ideators although a significant relationship was found between two or more  
10 adversities and lifetime plans among those who were ideators (OR=44.5, CI=2.5-779.1,  
11 p<0.008). None of the childhood adversities were significantly associated with suicide attempts  
12 among ideators in this age group.  
13  
14

**DISCUSSION**

15  
16  
17 Rates of childhood adversities and suicidal behaviours were both high among South Africans,  
18 with more than a third of respondents in the total sample who attempted suicide experiencing one  
19 childhood adversity, and 15.4% experiencing two or more adversities. Overall, physical abuse,  
20 sexual abuse, parental divorce and physical illness were far more prevalent in those with a suicide  
21 attempt than in those without. The most prevalent childhood adversities endorsed overall were  
22 physical abuse followed by parental death. Physical abuse, parental divorce and death of a parent  
23 were also the most prevalent adversities experienced in those with a suicide attempt as well as in  
24 those with suicidal ideation. These findings are somewhat dissimilar to other country samples;  
25 for example in the 21 countries that participated in the WMHS, physical abuse (29.3%), family  
26 violence (24.8%) and neglect (19.3%) were the most prevalent childhood adversities among those  
27 with a lifetime suicide attempt, while physical abuse (20.6%), family violence (17.6%) and death  
28 of a parent (14.2%) were most often reported among participants with lifetime suicidal ideation  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



*Association between childhood adversities and suicidality*

1  
2  
3 [20]. Cross-nationally, it would appear that physical abuse is the commonest childhood adversity  
4 associated with lifetime suicide attempts and ideation [20].  
5  
6  
7

8  
9 The estimate lifetime prevalence of 2.9% for attempted suicide among South Africans is close to  
10 the rates of 4.6% and 4.1% reported for general and Black populations respectively in USA. In  
11 addition the 9.1% estimated prevalence of suicide ideation is comparable with previous estimates  
12 from studies in South African clinical samples. Joe et al. (2008b) reported for the first time on the  
13 rates of suicide ideation, plan and attempts among the different ethnic groups, in data from the  
14 SASH study [6]. Overall, the results suggest that people in SA engage in suicidal thought and  
15 behaviours at levels nearly comparable with those of Western nations.  
16  
17  
18  
19  
20  
21  
22  
23  
24

25  
26 When examining suicidal behaviour risk in the context of childhood adversity, sexual abuse,  
27 physical abuse and parental divorce emerged as significant risk factors for lifetime suicide  
28 attempts in the total sample. Furthermore, physical abuse and parental divorce were significant  
29 risk factors for suicidal ideation in the total sample, while parental divorce emerged as a  
30 significant risk factor among ideators with lifetime suicide. These findings are largely consistent  
31 with the data from the overall cross-national WMHS, which found that physical and sexual abuse  
32 significantly increased the likelihood of suicidal ideation and attempts, while neglect was a risk  
33 factor for suicidal behaviour in multivariate additive analyses [20].  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45

46 Of the adversities implicated, sexual and physical abuse were more significant risk factors than  
47 other adversities, highlighting the fact that intrusive and aggressive experiences in childhood may  
48 have more devastating and longer lasting effects [58]. This may be due to the extreme  
49 powerlessness and loss of control that such abuse causes, or to physically aggressive assaults  
50 resulting in the devaluation of one's body and consequent susceptibility to self harm [28]. In a  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

country with high rates of sexual and physical abuse [46] this is particularly concerning. The impact of parental divorce on suicidality supports previous findings that parental divorce, if accompanied by other adversities such as childhood abuse, increases the risk of suicidal behaviour [59].

We also found that exposure to *two or more childhood adversities* significantly increased the risk of suicide attempts among ideators. This confirms earlier work showing exposure to multiple childhood adversities increases the risk of suicidal behaviour [21, 23, 24, 60, 61]. Bruffaerts et al (2010) found a sub-additive effect with regards to the onset of suicidal behaviour when considering multiple adversities [20]. Thus, the impact of multiple adversities was not equal to the sum of the odds ratios of individual adversities. In the overall WMHS analysis exposure to multiple childhood adversities had a significant effect on the persistence of suicide when considering every additional childhood adversity exposed to, however in the current study it was not possible to stratify the number of adversities beyond two or more adversities (i.e. into more than 2 categories) given the relatively small number of cases in the sample overall with non-fatal suicidal behaviour. Physical abuse, parental death, parental loss other than through death, and parental divorce emerged as independent risk factors for suicidal ideation in the total sample. Moreover, the effects of childhood adversities on suicidal tendencies tended to differ over the *life course*. Consistent with nationally representative data in WMHS, childhood adversities were associated with the highest risk of suicide attempts in childhood, with a decrease in risk in adolescence and young adulthood, followed by an increase in risk again during later adulthood [20].

In *childhood*, sexual abuse was significantly associated with lifetime suicide attempts in the total sample, while sexual and physical abuse were significantly associated with suicidal ideation.

*Association between childhood adversities and suicidality*

1  
2  
3 Among suicidal ideators, parental death was significantly associated with lifetime suicide  
4 attempts. Exposure to childhood sexual abuse, physical abuse or parental divorce significantly  
5 increased suicide attempts during *teenage years*, while physical abuse and parental death were  
6 associated with suicidal ideation in teens. Among teen suicidal ideators, physical illness was  
7 significantly associated with suicidal plans, while parental divorce was associated with suicide  
8 attempts. These findings emphasize the need to focus suicide prevention strategies at youth in  
9 particular. In *young adulthood*, parental loss other than the death of a parent was significantly  
10 associated with suicidal ideation in the total sample. Interestingly, childhood physical abuse was  
11 identified as a significant risk factor for suicidal attempts in *later adulthood*, while childhood  
12 physical illness and parental loss other than the death of a parent significantly increased the risk  
13 for ideation.  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29

30 Similar to findings from SASH, childhood sexual abuse emerged as a particularly robust risk  
31 factor for suicide attempts in younger participants in the WMH cross-national analysis, with a  
32 10.9 times higher odds of suicide attempts in children, a 6.1 times higher likelihood in  
33 adolescents and a 2.9-fold risk in young adults who were exposed [20]. This is in keeping with  
34 Enns hypothesis that sexual abuse results in suicidal behaviour at a younger age [21]. Consistent  
35 with other studies, childhood physical and sexual abuse, in particular, emerged as risk factors for  
36 the emergence and persistence of suicidal behaviour, especially in adolescence. Loss of a parent,  
37 physical ill-health and family violence has also been found to be associated with persistence of  
38 suicidality [20, 28, 58]. These findings extend previous work done in other developing countries  
39 that have found childhood adversities to be a significant risk factor for suicidality [20, 62-64].  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57

*Limitations*

*Association between childhood adversities and suicidality*

1  
2  
3 The following limitations need to be highlighted. First, recall bias might have impacted on the  
4 accuracy of recall of childhood adversities. This said, participants were asked questions about  
5 childhood adversities in sequence which may have facilitated more accurate recall [65].  
6  
7  
8 Systematic reviews have also found that recall of past experiences can be accurate and can  
9 provide valuable data [66, 67]. Thus, there is evidence to support the validity of accurate recall of  
10 childhood adversities [67]. Further, studies have shown that responses to questions on childhood  
11 adversities, similar to those asked in the SASH study, generally remain stable over time [68, 69].  
12  
13 We recommend that future studies examine ethnicity in relation to adversity and suicidal  
14 outcomes. Second, in view of the cross-sectional design, more detailed, temporal information on  
15 childhood adversities and suicidal incidents was not obtained. Third, variables such as culture,  
16 ethnicity and mental status at the time of the interview may have influenced the recall and  
17 reporting of suicidal behaviour. It is possible that response bias may have been particularly  
18 skewed to disenfranchised South Africans (e.g. poor, young, urban and black respondents), who  
19 may have been too afraid to divulge information on suicidality. Stigma associated with mental  
20 health problems may have also played a role in the reporting of suicidal tendencies. Thus,  
21 participants' mental health status, ethnicity, culture and generational factors may have also  
22 contributed to the under-reporting of suicidality. It is possible that individuals reporting childhood  
23 adversities may have also been more likely to report suicidal behaviour, while those not reporting  
24 childhood adversities may have underreported suicidality. Stigma and mental health status (e.g.  
25 depressed persons may be more inclined to report suicidality and more likely to remember  
26 negative childhood experiences) may also be contributory factors. In addition, some participants  
27 may have been afraid to report suicidal behaviours. The role of ethnicity, culture and generational  
28 factors may have also contributed to the under-reporting of suicidality. Overall, it is much more  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

likely that adversities and suicidality were under-reported rather than over-reported [9, 20, 67, 70]. Fourth, we do not assess for self-mutilating behavior. The importance of discriminating suicidal behaviour from non-suicidal self-mutilation cannot be underestimated. Fifth, the survey was conducted in adults living in households and hostel quarters thus the findings are not generalizable to homeless and institutionalized persons who were not included in the survey. Sixth, the CIDI instrument which was used in this study is a lay-administered instrument which does not include an assessment of several key DSM-IV diagnoses (such as bipolar disorder and psychosis), are associated with elevated rates of suicidality. As a result, some participants with suicidality may have not have been diagnosed with a disorder. Furthermore, in view of the large confidence intervals and small sample sizes for some of these analyses caution is required in drawing conclusions. In addition, we did not control for other unmeasured causes of childhood adversities and suicidality, or protective (resiliency) factors that may have contributed to the associations observed in these data. Both other risk and resiliency factors may have contributed to both the prevalence of non-fatal suicidal behaviours and to the associations with different forms of childhood adversity and warrant further investigation. Lastly, it is important to point out that these data were collected approximately 10 years ago. Notwithstanding these limitations, this study represents the first investigation among South Africans of a wide range of childhood adversities and their impact on the onset and persistence of suicidality over the life course.

***Conclusions***

Childhood adversities especially sexual abuse, physical abuse and parental divorce are associated with the onset and persistence of suicidal behaviour with the risk greatest in children and adolescents. Public health efforts aimed at prevention of early childhood sexual and physical

*Association between childhood adversities and suicidality*

1  
2  
3 abuse, in particular, may have a significant impact on reducing suicidality over the life course and  
4  
5  
6 improving mental health outcomes.  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review only

*Association between childhood adversities and suicidality***Acknowledgements**

The South African Stress and Health Study was conducted in conjunction with the World Health Organization World Mental Health (WMH) Survey initiative. We thank the WMH staff for assistance with instrumentation, fieldwork and data analysis. The US National Institute of Mental Health, the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, US Public Health Service, the Fogarty International Center, Pan American Health Organization, Eli Lilly and Company, Ortho-McNeil Pharmaceutical, GlaxoSmithKline and Bristol-Myers Squibb supported the activities of this initiative. The SASH Study was funded by grant R01-MH059575 from the National Institute of Mental Health and the National Institute of Drug Abuse.

**Declarations of interest and funding**

This study was funded by the NIH. Additional funding was received from the South African Department of Health and the University of Michigan. D.J.S. and S.S. are also supported by the Medical Research Council of South Africa. D.J.S. has received research grants for investigator-initiated trials and / or consultancy honoraria from AstraZeneca, Eli Lilly, GlaxoSmithKline, Lundbeck, Orion, Pfizer, Pharmacia, Roche, Servier, Solvay, Sumitomo and Wyeth. S.S. has received research grants for investigator-initiated trials and/or travel sponsorship from AstraZeneca, Eli Lilly, GlaxoSmithKline, Lundbeck, Janssen, Dr Reddy's and Servier. S.S. is supported by the South African Research Chairs Initiative of the Department of Science and Technology and the National Research Foundation. B.B has received congress sponsorship from Janssen-Cilag.

**Contributorship Statement**

Belinda Bruwer: Data interpretation, drafting manuscript, final approval of manuscript submitted for publication, ensuring that questions related to the accuracy of the work are appropriately

*Association between childhood adversities and suicidality*

resolved.

Ravi Govender: Data interpretation, drafting manuscript, final approval of manuscript submitted for publication, ensuring that questions related to the accuracy of the work are appropriately resolved

Melanie Bishop: Data interpretation, revising the manuscript, final approval of manuscript submitted for publication, ensuring that questions related to the accuracy of the work are appropriately resolved

David Williams: Substantial contributions to the conception or design of the work, data acquisition, data analysis and interpretation, critically revising of the manuscript, final approval of the version to be published; and accountability for all aspects of the work

Dan Stein: Substantial contributions to the conception or design of the work, data acquisition, data analysis and interpretation, critically revising of the manuscript, final approval of the version to be published; and accountability for all aspects of the work

Soraya Seedat: Substantial contributions to the conception or design of the work, data acquisition, data analysis and interpretation, critically revising of the manuscript, final approval of the version to be published; and accountability for all aspects of the work

**Data Sharing Statement**

Data for the SASH Study were collected between January 2002 and June 2004. WMH surveys were carried out in 21 countries which included Nigeria and South Africa (Williams et al., 2004).

For detailed information on study methods see Williams et al., 2004

All data analyses were processed and analysed centrally by a team of statisticians at the Harvard School of Public Health (Boston, USA) using the SAS version 9.1.3 software package



*Association between childhood adversities and suicidality***REFERENCES**

1. World Health Organization. Suicide Prevention (SUPRE). Geneva, Switzerland. 2007.  
[http://www.who.int/mental\\_health/prevention/suicide/suicideprevention/en/](http://www.who.int/mental_health/prevention/suicide/suicideprevention/en/)
2. Murray, C.L., Lopez, A.D. The global burden of disease: a comprehensive assessment of mortality and disability from disease, injuries and risk factors in 1990 and projected to 2020. Cambridge, MA: Harvard University Press, 1996.
3. Burrows, S., Laflamme, L. Pattern analysis of suicide mortality surveillance data in urban South Africa. *Suicide and Life-Threatening Behaviour* 2008;**38**:209-220.
4. Meel, B.I. Epidemiology of suicide by hanging in Transkei. South Africa. *Am J Forensic Med Pathol.* 2006;**27**:75-78
5. Flisher, A.J., Liang, H., Laubscher, R. Suicide trends in South Africa, 1968-90. *Scand J Public Health* 2004;**32**:411-418.
6. Joe, S., Stein, DJ., Seedat, S., Herman, A., Williams, DR. non-fatal suicidal behavior among South Africans: Results from the South Africa Stress and Health Study. *Social Psychiatry Epidemiology* 2008;**43**(6):454-461.doi:10.1007/s00127-008-0348-7.
7. Beautrais, A.L., Joyce, P/R/. & Mulder, R.T. (1996). Risk factors for serious suicide attempts among youth aged 13 through 24 years. *J Am Acad Child Adolesc Psychiatry* 1996;**35**(9):1174-1182.
8. Harrison, EC, Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis. *Br J Psychiatry* 1997;**170**:205-228

*Association between childhood adversities and suicidality*

9. Joe, S., Stein, D.J., Seedat, S., et al. Prevalence and correlates of non-fatal suicidal behaviour among South Africans. *Br J Psychiatry* 2008;**192**:310-311.
10. Nock, M.K., Borges, G., Bromet, E.J., et al. Suicide and Suicidal Behaviour. *Epidemiologic Reviews* 2008;**30**:133-154.
11. Nock, M.K., Borges, G., Bromet, E.J., et al. (2008b). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *British Journal of Psychiatry*, 192, 98-105.
12. Nock, M.K., Hwang, I., Sampson, N.A., et al. Cross-national analysis of the associations among mental disorders and suicidal behaviour: Findings from the WHO World Mental Health Surveys. *PLoS Medicine* 2009;**6**(8).e1000123.
13. Bondy, B., Buettner, A., Zill, P. Genetics of suicide. *Molecular Psychiatry* 2006;**11**:336-351.
14. Kohli, M.A., Salyakina, D., Pfennig, A., et al. Association of genetic variants in the neurotrophic receptor encoding gene *NTRK2* and a lifetime history of suicide attempts in depressed patients. *Arch Gen Psychiatry* 2010;**67**:348-59.
15. Roy, A., Hu, X-Z., Janal, M.N., & Goldman, D. Interaction between childhood trauma and serotonin transporter gene variation and suicide. *Neuropsychopharmacology* 2007;**32**:2046–2052
16. Risch, N., Herrell, R., Lehner, T., et al. Interaction between the serotonin transporter gene (5-HTTLPR), stressful life events, and the risk of depression: A meta-analysis. *JAMA* 2009;**301**:2462–2471.
17. Borges, G., Benjet, C., Medina-Mora, M.E., et al. Traumatic events and suicide related outcomes among Mexico City adolescents. *J Child Psychol Psychiatry* 2008;**6**:654-666. Weissman MM, Bland

*Association between childhood adversities and suicidality*

- 1  
2  
3 RC, Canino GJ, Greenwald S, Hwu HG, Joyce PR, et al. (1999) Prevalence of suicide ideation and  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
18. Brodsky, BS & Stanley, B. Adverse childhood experiences and suicidal behaviour. *Psychiatry Clinical Northern America* 2008;**31**:223-235
19. Bruffaerts, R., Demyttenaere, K., Borges, G., et al. Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *Br J Psychiatry* 2010;**197**:20-27.
20. Enns, M.W., Cox, B.J., Afifi, T.O., et al. Childhood adversities and risk for suicidal ideation and attempts: a longitudinal population-based study. *Psychological Medicine* 2006;**36**:1769-1778.
21. Johnson, J.G., Cohen, P., Gould, M.S., et al. Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. *Arch Gen Psychiatry* 2002;**59**:741-749.
22. Dube, S.R., Anda, R.F., Felitti, V.J., et al. Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *JAMA* 2001;**286**:3089-3096.
23. Afifi, T.O., Enns, M.W., Cox, B.J., et al. Population attributable fractions of psychiatric disorders and suicide ideation and attempts associated with adverse childhood experiences. *Am J Public Health* 2008;**98**:946-952.
24. Burke, A.K., Galfalvy, H., Everett, B., et al. Effect of exposure to suicidal behavior on suicide attempt in a high-risk sample of offspring of depressed parents. *J Am Acad Child Adolesc Psychiatry* 2010;**49**:114-121.

*Association between childhood adversities and suicidality*

25. Labonte, B., Suderman, M., Maussion, G., et al. Genome-wide epigenetic regulation by early-life trauma. *Arch Gen Psychiatry* 2012;**69**(7):722-731. Doi:10.1001/archgenpsychiatry.2011.2287
26. Lipschitz, D.S., Winegar, R.K., Nicolaou, A.L., et al. (1999). Perceived abuse and neglect as risk factors for suicidal behaviour in adolescent inpatients. *The Journal of Nervous and Mental Disease*, 187, 32-39.
27. Ystgaard, M., Hestetun, I., Loeb, M., et. al Is there a specific relationship between childhood sexual and physical abuse and repeated suicidal behaviour? *Child Abuse Neg* 2004;**28**:863-875
28. Boudewyn, A., & Liem, J. Childhood sexual abuse as a precursor to depression and self-destructive behavior in adulthood. *J Trauma Stress* 1995;**8**:445-459.
29. Brown, J., Cohen, P., Johnson, J.G., & Smailes, E.M. Childhood abuse and neglect: Specificity of effects on adolescent and young adult depression and suicidality. *J Am Acad Child Adolesc Psychiatry* 1999;**38**:1490-1496.
30. Bryant, S.L., & Range, L.M. Suicidality in college women who were sexually and physically abused and physically punished by parents. *Violence Vict* 1995;**10**:195-201.
31. Davidson, J.R.T., Hughes, D.C., George, L.K., & Blazer, D.G. The association of sexual assault and attempted suicide within the community. *Arch Gen Psychiatry* 1996;**53**:550-555
32. Fergusson, D.M., & Mullen, P.E. *Childhood Sexual abuse – An evidence based perspective*. Sage, CA: Thousand Oaks, 1999.
33. Finkelhor, D. Early and long-term effects of child sexual abuse: An update. *Professional Psychology: Research & Practice* 1990;**21**(5):325-330.

*Association between childhood adversities and suicidality*

- 1  
2  
3 34. Finkelhor, D., & Hashima, P.Y. (2001). The victimization of children and youth: A comprehensive  
4 overview. In S.O. White (Ed.) Handbook of youth and justice. The Plenum series in crime and  
5 justice. Dordrecht: Plenum, 2001:49-78.  
6  
7  
8  
9  
10  
11 35. Holmes, W.C., & Slap, G.B. Sexual abuse of boys: Definition, prevalence, correlates, sequelae, and  
12 management. JAMA: JAMA 1998;**280**(21):1855-1862  
13  
14  
15  
16  
17 36. Kendall-Tackett, K.A., Williams, L.M., & Finkelhor, D. Impact of sexual abuse on children: A  
18 review and synthesis of recent empirical studies. Psychol Bull 1993;**113**(1):164-180.  
19  
20  
21  
22  
23 37. Martin, G. Reported family dynamics, sexual abuse, and suicidal behaviors in community  
24 adolescents. Arch Suicide Res 1996;**2**:183-195.  
25  
26  
27  
28  
29 38. Peters, D.K., & Range, L.M. Childhood sexual abuse and current suicidality in college women and  
30 men. Child Abuse Negl 1995;**19**:335-341.  
31  
32  
33  
34 39. Putman, F.W. Ten-year research update review: Child sexual abuse. J Am  
35 Acad Child Adolesc Psychiatry 2003;**42**(3):269-278  
36  
37  
38  
39  
40 40. Stepakoff, S. Effects of sexual victimization on suicidal ideation and behaviour in US college  
41 women. Suicide and Life-Threatening Behavior 1998;**28**:107-126.  
42  
43  
44  
45  
46 41. Malinosky-Rummel, R., & Hansen, D.J. Long-term consequences of childhood physical abuse.  
47 Psychol Bull 1993;**144**:68-79  
48  
49  
50  
51  
52 42. Silverman, A.B., Reinherz, H., & Giaconia, R.M. The long-term sequelae of child and adolescent  
53 abuse: A longitudinal community study. Child Abuse Negl 1996;**20**:709-723  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
43. Chapman, D.P., Whitfield, C.L., Felitti, V.J., et al. Adverse childhood experiences and the risk of depression in adulthood. *J Affect Disord* 2004;**82**:217-225
44. Dube, S.R., Felitti, V.J., Dong, M., et al. Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. *Pediatrics* 2003;**111**:564-572.
45. Jewkes, R.K., Dunkle, K., Nduna, M., et al. Associations between childhood adversity and depression, substance abuse and HIV and HSV2 incident infections in rural South African youth. *Child Abuse Negl* 2010;**34**:833-841.
46. Seedat, S., Stein, D.J., Jackson, P.B., et al. Life stress and mental disorders in the South African Stress and Health study. *South African Medical Journal* 2009a;**99**:375-382.
47. Williams, D.R., Herman, A., Kessler, R.C., et al. The South Africa Stress and Health Study: Rationale and Design. *Metab Brain Dis* 2004;**19**(1/2):135-147.
48. Statistics South Africa. Census 2001: Census in Brief. Pretoria: Statistics South Africa. 2001. Available from <http://www.statssa.gov.za/census01/html/CInBrief/CIB2001.pdf> (Accessed January 2014)
49. Kessler, R.C., Üstün, T.B. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;**13**:61-98.
50. Seedat, S., Stein, D.J., Herman, A., et al. Twelve-month treatment of Psychiatric disorders in South Africa Stress and Health Study (World Mental Health Survey Initiative). *Psychiatric Epidemiology* 2008;**38**:211-220.
51. Seedat, S., Williams, D.R., Herman, A., et al. Mental health service use among South Africans for mood, anxiety and substance use disorders. *South African Medical Journal* 2009b;**99**:346-352.

*Association between childhood adversities and suicidality*

- 1  
2  
3 52. World Health Organization. World Health Organization Manual of the international statistical  
4 classification of diseases, injuries and causes of death, ninth revision. Geneva, Switzerland, 1992.  
5  
6  
7  
8  
9 53. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV),  
10 4<sup>th</sup> Edition. Washington: American Psychiatric Association Press, 1994.  
11  
12  
13 54. Straus MA. Measuring Intrafamily Conflict and Violence: The Conflict Tactics (CT) Scales. Journal  
14 of Marriage and Family 1979;**41(1)**:75  
15  
16  
17  
18 55. Kessler, R.C., McLaughlin, K.A., Green, J.G. Childhood adversities and adult psychopathology in  
19 the WHO World Mental Health Surveys. Br J Psychiatry 2010;**197**:378-385.  
20  
21  
22  
23  
24 56. Stein, D.J., Chiu, W.T., Hwang, I., et al. Cross-national analysis of the associations between  
25 traumatic events and suicidal behavior: Findings from the WHO World Mental Health Surveys. PloS  
26 ONE 2010;**5(5)**:e10574.  
27  
28  
29  
30  
31  
32 57. Joiner Jr, T.E., Sachs-Ericsson, N.J., Wingate, L.R. Childhood physical and sexual abuse and  
33 lifetime number of suicide attempts: A persistent and theoretically important relationship. Behav Res  
34 Ther 2007;**45**:539-547.  
35  
36  
37  
38  
39  
40 58. Afifi, T.O., Boman, J., Fleisher, W., et al. The relationship between child abuse, parental divorce,  
41 and lifetime mental disorders and suicidality in a nationally representative adult sample. Child  
42 Abuse Negl 2009;**33**:139–147.  
43  
44  
45  
46  
47  
48 59. Bebbington, P.E., Cooper, C.C., Minot, S., et al. Suicide attempts, gender, and sexual abuse: data  
49 from the 2000 British Psychiatric Morbidity Survey. Am J Psychiatry 2009;**166**:1135-1140.  
50  
51  
52  
53  
54 60. Molner, B, Buka, S, & Kessler, R. Child sexual abuse and subsequent psychopathology: results from  
55 the National Comorbidity Survey. American Journal Public Health 2001;**91**:753-760.  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3  
4 61. Borges, G., Angst, J., Nock, M.K., et al. Risk factors for the incidence and persistence of suicide  
5 related outcomes: a 10 year follow up study using the National Comorbidity Surveys. *J Affect*  
6 *Disord* 2008;**105**:25-33  
7  
8  
9  
10  
11 62. Xing, X-Y., Tao, F-B., Wan, Y-H., et al. Family factors associated with suicide attempts among  
12 Chinese adolescent students: A national cross-sectional survey. *J Adolesc Health* 2010;**46**:592-599.  
13  
14  
15 63. Gureje, O., Kola, L., Uwakwe, R., et al. The profile and risks of suicidal behaviours in the Nigerian  
16 Survey of Mental Health and Well Being. *Psychol Med* 2007;**37**:821-830.  
17  
18  
19  
20 64. Knauper, BC., CF, Schwarz, N., Bruce, ML., et al. Improving the accuracy of major depression age  
21 of onset reports in the US National Comorbidity Survey. *Int J Methods Psychiatr Res* 1999;**8**(1):39-  
22 48  
23  
24  
25  
26  
27  
28 65. Brewin, CR., Andrews, B., Botlib, IH. Psychopathology and early experience: a reappraisal of  
29 retrospective reports. *Psychol Bull* 1993;**113**:82-98  
30  
31  
32  
33  
34 66. Hardt, J., Rutter, M. Validity of adult retrospective reports of adverse childhood experiences: a  
35 review of the evidence. *J Child Psychol Psychiatry* 2004;**45**:260-273.  
36  
37  
38  
39  
40 67. Dube, SR., Williamson, DF., Thompson, T., et al. Assessing the reliability of retrospective reports of  
41 adverse childhood experiences among adult HMO members attending a primary care clinic. *Child*  
42 *Abuse Negl* 2004;**28**(7):729-737.  
43  
44  
45  
46  
47  
48 68. Yancura, LA., Aldwin, CM. (2009). Stability and change in retrospective reports of childhood  
49 experiences over a 5-year period: Findings from the David Longitudinal Study. *Psychol Aging*  
50 2009;**24**(3):715-721  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



*Association between childhood adversities and suicidality*

- 1  
2  
3 69. Wilsnack, S.C., Wonderlich, S.A., Kristjanson, A.F., et al. (2002). Self reports of forgetting and  
4 remembering childhood sexual abuse in a nationally representative sample of US women. *Child*  
5  
6 Abuse Negl 2002;**26**:139-147.  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality***Table 1:** Descriptive Characteristics (N= 4351)

		N
Mean Age (yrs) (SE)	37.0 (0.26)	
<b>Age categories (yrs)</b>		
18 – 29	39.1%	1701
30 – 39	22.1%	962
40 - 49	18.1%	788
≥ 50	20.7%	901
<b>Sex</b>		
Male	46.3%	2015
Female	53.7%	2336
<b>Race</b>		
Black	76.2%	3315
Coloured	10.4%	453
White	10.0%	435
Indian/Asian	3.4%	148
<b>Married</b>	50.1%	2180
<b>Location</b>		
Rural	38.4%	1671
Urban	61.6%	2680
<b>Education</b>		
None	6.8 %	296
Grade 1-7	19.1%	831
Grade 8-11	35.4%	1540
Matric	23.5%	1022
Matric +	15.3%	666
<b>Employed</b>	31.0%	1349
<b>Income Category (Rands), (mean SD)</b>		
0	13.7%	596
1 - 2500	29.5%	1284
2501 – 5000	15.4%	670
5001 – 10 000	19.6%	853
≥ 10001	21.8%	949
<b>Province</b>		
Eastern Cape	13.1%	570
Free State	6.2%	270
Guateng	23.0%	1001
Kwazulu Natal	19.5%	848
Limpopo	10.5%	457
Mpumalanga	6.6%	287
Northern Cape	1.9%	83
North West	8.3%	361
Western Cape	11.1%	483

*Association between childhood adversities and suicidality***Table 2:** Prevalence of childhood adversities and suicidal behaviour in South Africa[%<sup>b</sup> (S.E.)]

	Total Sample		Total Sample		Suicidal Ideators		Suicidal Ideators	
	With Attempt	No attempt	With Ideation	No ideation	With Plan	No plan	With Attempt	No attempt
Physical Abuse	24.9 (4.6)	12.2 (0.8)	21.1 (2.5)	11.8 (0.7)	24.3 (4.6)	27.9 (4.0)	24.9 (4.6)	24.5 (3.6)
Sexual Abuse	2.1 (1.2)	0.1 (0.0)	0.7 (0.4)	0.1 (0.0)	1.6 (0.9)	0.0 (0.0)	2.1 (1.2)	0.0 (0.0)
Parent Died	11.6 (2.4)	11.3 (0.6)	13.9 (2.3)	11.3 (0.6)	12.2 (2.4)	16.1 (4.2)	11.6 (2.4)	15.6 (3.8)
Parent Divorced	14.2 (3.8)	4.8 (0.4)	7.9 (1.6)	4.7 (0.4)	9.7 (2.6)	9.2 (3.7)	14.2 (3.8)	6.7 (2.9)
Other Parent Loss	2.1 (1.2)	2.2 (0.4)	3.9 (1.2)	2.1 (0.4)	1.1 (0.6)	3.0 (1.4)	2.1 (1.2)	2.7 (1.3)
Family Violence	4.3 (1.5)	3.0 (0.3)	4.1 (0.9)	2.9 (0.3)	4.7 (1.5)	6.3 (1.8)	4.3 (1.5)	4.5 (1.4)
Physical Illness	5.0 (2.3)	2.5 (0.3)	4.0 (1.2)	2.4 (0.3)	4.4 (1.8)	4.7 (1.8)	5.0 (2.3)	4.3 (1.6)
Financial Adversity	6.1 (2.4)	5.6 (0.5)	4.1 (0.9)	5.8 (0.5)	6.0 (2.1)	3.3 (1.5)	6.1 (2.4)	2.9 (1.0)
1	35.4 (4.2)	23.4 (1.0)	35.9 (2.8)	22.7 (0.9)	32.9 (4.0)	41.7 (5.2)	35.4 (4.2)	40.5 (4.5)
2+	15.4 (3.4)	8.6 (0.5)	10.8 (1.7)	8.6 (0.5)	14.1 (3.2)	13.2 (3.3)	15.4 (3.4)	9.6 (2.3)
a	(140)	(107309)	(394)	(112243)	(171)	(1976)	(140)	(2212)

<sup>a</sup> Number of cases with the outcome variable; N represents the number of person years.

<sup>b</sup> % represents the percentage of people with the adversity among the cases with the outcome variable indicated in the column header. For example: the first cell is the % of those with physical abuse among those with attempts.

Association between childhood adversities and suicidality

**Table 3:** Multivariate and Bivariate models for associations between childhood adversities and lifetime suicidality<sup>1</sup>

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

	LT Attempts in total sample <sup>b</sup>				Ideators among total sample <sup>c</sup>				Suicidal Ideators with LT plans <sup>d</sup>				Suicidal Ideators with LT attempts <sup>e</sup>			
	Multivariate		Bivariate		Multivariate		Bivariate		Multivariate		Bivariate		Multivariate		Bivariate	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.0* (1.2-3.3)*	7.4(0.006)*	2.0* (1.2-3.2)*	7.3(0.007)*	1.7* (1.3-2.3)*	15.2(<.001)*	1.7* (1.3-2.3)*	16.7(<.001)*	0.6 (0.3-1.4)	1.3(0.25)	0.7 (0.3-1.4)	1.2(0.26)	1.0 (0.5-2.3)	0.0(0.93)	1.1 (0.5-2.5)	0.1(0.81)
Sexual Abuse	7.6* (2.0-29.9)*	8.9(0.003)*	7.9* (1.9-32.1)*	8.6(0.003)*	2.6 (0.6-10.6)	1.8(0.18)	3.0 (0.7-12.2)	2.5(0.11)	---	---	---	---	---	---	---	---
Parent Died	1.1 (0.6-1.8)	0.1(0.78)	1.1 (0.7-1.7)	0.1(0.76)	1.4 (0.9-2.1)	2.7(0.10)	1.3 (0.9-1.9)	2.0(0.16)	0.7 (0.3-1.7)	0.6(0.45)	0.8 (0.4-1.9)	0.3(0.62)	0.8 (0.5-1.5)	0.4(0.52)	0.8 (0.4-1.5)	0.4(0.53)
Parent Divorced	2.7* (1.5-5.0)*	10.8(0.001)*	2.8* (1.5-5.2)*	11.4(<.001)*	1.6* (1.0-2.4)*	4.3(0.038)*	1.5 (1.0-2.3)	3.7(0.05)	0.9 (0.3-3.3)	0.0(0.88)	1.2 (0.4-3.8)	0.1(0.78)	3.1* (1.2-8.6)*	5.2(0.023)*	3.0* (1.1-8.0)*	4.9(0.027)*
Other Parent Loss	1.0 (0.3-3.3)	0.0(0.95)	0.9 (0.3-2.8)	0.1(0.81)	1.7 (1.0-3.0)	3.6(0.06)	1.6 (0.9-2.7)	2.9(0.09)	0.4 (0.1-2.6)	0.9(0.34)	0.5 (0.1-2.7)	0.7(0.41)	2.0 (0.2-17.3)	0.4(0.51)	2.5 (0.6-11.0)	1.5(0.22)
Family Violence	0.7 (0.3-1.7)	0.6(0.42)	1.0 (0.4-2.2)	0.0(0.98)	0.8 (0.5-1.4)	0.5(0.47)	1.1 (0.6-1.8)	0.0(0.83)	1.0 (0.4-2.4)	0.0(0.97)	0.8 (0.4-2.0)	0.2(0.68)	2.4 (0.9-6.3)	3.5(0.06)	2.2 (0.9-5.5)	2.9(0.09)
Physical Illness	1.1 (0.4-3.5)	0.1(0.81)	1.5 (0.6-4.1)	0.7(0.39)	1.2 (0.6-2.3)	0.2(0.63)	1.3 (0.7-2.4)	0.7(0.42)	0.8 (0.2-3.1)	0.1(0.71)	0.9 (0.2-3.5)	0.0(0.86)	1.2 (0.3-3.9)	0.1(0.80)	1.2 (0.4-4.0)	0.1(0.77)
Financial Adversity	1.0 (0.4-2.7)	0.0(0.94)	1.2 (0.5-2.8)	0.1(0.73)	0.6 (0.4-1.1)	3.0(0.08)	0.7 (0.4-1.2)	1.4(0.23)	2.4 (0.7-8.4)	1.9(0.17)	1.9 (0.6-6.8)	1.1(0.29)	2.1 (0.7-6.0)	2.1(0.15)	2.0 (0.7-6.3)	1.6(0.21)

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.  
<sup>b</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).  
<sup>c</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).  
<sup>d</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).  
<sup>e</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

**Table 4:** Associations between number of childhood adversities and lifetime suicidality<sup>1</sup>

Number of child adversities	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
1	1.9* (1.3-2.8)*		1.8* (1.5-2.3)*		0.5 (0.3-1.0)		0.9 (0.5-1.7)	
2+	2.1* (1.2-3.8)*	14.3(<.001)*	1.4* (1.0-2.0)*	28.3(<.001)*	1.1 (0.3-3.3)	4.5(0.10)	2.7* (1.3-5.9)*	8.3(0.016)*

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.

<sup>b</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

*Association between childhood adversities and suicidality***Table 5:** Final multivariate model for associations between childhood adversities and lifetime suicidality<sup>1</sup>

	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.2* (1.3-3.8)*	8.9(0.003)*	2.1* (1.6-2.8)*	25.4(<.001)*	0.4* (0.2-1.0)*	4.3(0.038)*	0.8 (0.3-2.1)	0.3(0.60)
Sexual Abuse	9.3* (2.5-35.2)*	11.2(<.001)*	3.7 (0.9-15.9)	3.3(0.07)	---	---	---	---
Parent Died	1.2 (0.7-2.3)	0.4(0.51)	1.7* (1.1-2.6)*	6.6(0.010)*	0.4 (0.1-1.3)	2.2(0.14)	0.6 (0.3-1.1)	2.8(0.10)
Parent Divorced	3.1* (1.7-5.6)*	14.5(<.001)*	1.9* (1.2-3.0)*	8.1(0.004)*	0.7 (0.2-2.3)	0.4(0.51)	2.4 (0.9-6.4)	3.0(0.08)
Other Parent Loss	1.1 (0.3-4.3)	0.0(0.87)	2.1* (1.3-3.6)*	8.3(0.004)*	0.3 (0.0-2.0)	1.8(0.18)	1.3 (0.1-13.3)	0.1(0.79)
Family Violence	0.9 (0.3-2.3)	0.1(0.76)	1.1 (0.6-2.3)	0.2(0.69)	0.4 (0.1-1.8)	1.6(0.20)	1.2 (0.4-4.1)	0.1(0.76)
Physical Illness	1.4 (0.4-5.3)	0.2(0.63)	1.6 (0.7-3.3)	1.4(0.24)	0.6 (0.1-2.5)	0.5(0.46)	0.9 (0.2-3.3)	0.0(0.85)
Financial Adversity	1.3 (0.4-3.7)	0.2(0.65)	0.9 (0.4-1.7)	0.1(0.71)	1.6 (0.4-6.0)	0.6(0.44)	1.4 (0.5-4.3)	0.4(0.52)
group significance test for all types		29.4(<.001)*		43.0(<.001)*		833.9(<.001)*		11.5(0.18)
significance test for difference between types		13.1(0.07)		9.2(0.24)		805.7(<.001)*		11.8(0.11)
2+ adversities	0.7 (0.2-1.8)	0.7(0.41)	0.5* (0.3-0.9)*	4.9(0.028)*	4.7 (0.8-29.2)	2.9(0.09)	2.9 (0.8-10.6)	2.7(0.10)

\*Significant at the .05 level, two-sided test

LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.<sup>b</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).<sup>c</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).<sup>d</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).<sup>e</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

*Association between childhood adversities and suicidality*

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review

**South Africa Table 6a. Multivariate model for associations between child adversity and LT suicidality<sup>1</sup>**

## Association between childhood adversities and suicidality

	Life stage	Int range 4-12							
		LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
		OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Physical Abuse	Childhood	0.6 (0.1-4.3)	0.3(0.60)	<b>3.7*</b> (1.0-13.4)*	<b>4.2(0.041)*</b>	---	---	<b>0.0* (0.0-0.0)*</b>	<b>1177.3(&lt;.001)*</b>
	Teen years	<b>3.7* (1.5-9.2)*</b>	<b>8.5(0.004)*</b>	<b>3.6*</b> (2.2-5.9)*	<b>26.1(&lt;.001)*</b>	0.3 (0.0-2.5)	1.2(0.28)	1.1 (0.3-4.7)	0.0(0.90)
	Young adult	1.6 (0.8-3.5)	1.7(0.20)	1.1 (0.7-1.8)	0.2(0.64)	0.4 (0.1-1.2)	2.7(0.10)	0.9 (0.3-3.2)	0.0(0.88)
	Later adult	<b>2.2* (1.0-4.8)*</b>	<b>4.4(0.035)*</b>	1.8 (0.9-3.5)	3.2(0.07)	0.4 (0.1-1.2)	2.8(0.10)	1.4 (0.4-5.3)	0.2(0.65)
Sexual Abuse	Childhood	<b>61.6*</b> (4.5-841.0)*	<b>9.9(0.002)*</b>	<b>34.8*</b> (3.1-392.6)*	<b>8.6(0.003)*</b>	---	---	---	---
	Teen years	<b>20.3*</b> (2.0-210.2)*	<b>6.6(0.010)*</b>	4.6 (0.3-61.6)	1.4(0.24)	---	---	---	---
	Young adult	5.1 (0.4-66.1)	1.6(0.20)	2.2 (0.3-17.5)	0.5(0.46)	---	---	<b>0.0* (0.0-0.0)*</b>	<b>68.1(&lt;.001)*</b>
	Later adult	<b>0.0* (0.0-0.0)*</b>	<b>81.7(&lt;.001)*</b>	<b>0.0*</b> (0.0-0.0)*	<b>218.1(&lt;.001)*</b>	---	---	0.8 (0.0-16.7)	0.0(0.88)
Parent Died	Childhood	2.6 (0.1-52.0)	0.4(0.53)	1.5 (0.1-16.9)	0.1(0.76)	8.6 (0.3-234.7)	1.7(0.19)	<b>22.7*</b> (1.5-338.3)*	<b>5.3(0.021)*</b>
	Teen years	1.8 (0.5-6.5)	0.9(0.35)	<b>2.2*</b> (1.1-4.3)*	<b>5.3(0.021)*</b>	0.7 (0.1-6.8)	0.1(0.72)	0.5 (0.1-2.2)	0.8(0.38)
	Young adult	0.6 (0.2-2.4)	0.4(0.51)	1.4 (0.7-2.8)	0.7(0.40)	0.4 (0.0-2.8)	1.0(0.32)	0.6 (0.2-2.2)	0.7(0.42)
	Later adult	1.3 (0.3-4.9)	0.1(0.70)	1.6 (0.7-3.6)	1.5(0.22)	0.2 (0.0-1.6)	2.3(0.13)	0.6 (0.2-1.9)	0.8(0.37)
Parent Divorced	Childhood	3.0 (0.2-38.0)	0.7(0.39)	2.9 (0.3-24.8)	0.9(0.33)	4.6 (0.1-215.6)	0.6(0.43)	<b>0.0* (0.0-0.0)*</b>	<b>135.3(&lt;.001)*</b>
	Teen years	<b>4.6* (1.7-12.1)*</b>	<b>9.8(0.002)*</b>	2.5 (1.0-6.1)	3.8(0.05)	0.4 (0.1-3.1)	0.8(0.37)	<b>4.3* (1.1-17.0)*</b>	<b>4.5(0.035)*</b>
	Young adult	1.7 (0.7-4.5)	1.3(0.25)	1.1 (0.5-2.6)	0.1(0.74)	0.8 (0.2-4.2)	0.0(0.84)	2.9 (0.7-12.7)	2.2(0.14)
	Later adult	<b>4.6* (1.0-21.6)*</b>	<b>3.9(0.049)*</b>	2.4 (0.9-6.2)	3.5(0.06)	0.3 (0.0-2.5)	1.2(0.28)	1.9 (0.1-31.6)	0.2(0.65)



## Association between childhood adversities and suicidality

Other Parent Loss	Childhood	<b>0.0* (0.0-0.0)*</b>	<b>53.4(&lt;.001)*</b>	<b>0.0* (0.0-0.0)*</b>	<b>77.1(&lt;.001)*</b>	---	---	---	---
	Teen years	<b>0.0* (0.0-0.0)*</b>	<b>238.2(&lt;.001)*</b>	0.2 (0.0-1.5)	2.6(0.11)	---	---	<b>0.0* (0.0-0.0)*</b>	<b>60.3(&lt;.001)*</b>
	Young adult	1.2 (0.2-7.6)	0.1(0.82)	<b>2.9* (1.2-7.4)*</b>	<b>5.5(0.019)*</b>	0.1 (0.0-1.5)	3.0(0.08)	10.5 (0.7-160.1)	3.0(0.09)
	Later adult	1.3 (0.2-9.4)	0.1(0.80)	<b>5.1* (2.1-12.1)*</b>	<b>14.1(&lt;.001)*</b>	0.2 (0.0-4.0)	1.1(0.30)	0.6 (0.1-6.9)	0.2(0.70)
Family Violence	Childhood	<b>0.0* (0.0-0.1)*</b>	<b>12.9(&lt;.001)*</b>	1.9 (0.3-13.1)	0.5(0.48)	---	---	---	---
	Teen years	1.9 (0.5-7.2)	1.0(0.33)	2.1 (0.6-7.6)	1.5(0.23)	2.3 (0.1-46.2)	0.3(0.59)	0.9 (0.1-5.7)	
	Young adult	0.4 (0.1-1.5)	2.0(0.16)	0.5 (0.2-1.8)	1.1(0.30)	0.3 (0.0-2.6)	1.4(0.24)	2.1 (0.2-25.7)	0.4(0.55)
	Later adult	1.0 (0.2-6.5)	0.0(0.96)	0.9 (0.2-3.4)	0.0(0.86)	<b>0.0* (0.0-0.9)*</b>	<b>4.3(0.037)*</b>	0.8 (0.0-25.2)	0.0(0.92)
Physical Illness	Childhood	<b>0.0* (0.0-0.0)*</b>	<b>44.3(&lt;.001)*</b>	1.4 (0.2-13.2)	0.1(0.75)	---	---	---	---
	Teen years	2.9 (0.3-27.8)	0.9(0.34)	1.5 (0.4-5.4)	0.3(0.56)	<b>9.9* (1.8-54.0)*</b>	<b>7.3(0.07)*</b>	1.5 (0.2-11.6)	0.1(0.71)
	Young adult	0.3 (0.0-5.1)	0.8(0.36)	1.0 (0.4-2.6)	0.0(0.96)	0.2 (0.0-4.6)	1.0(0.32)	0.1 (0.0-1.4)	3.0(0.08)
	Later adult	5.5 (0.9-32.1)	3.7(0.05)	<b>4.3* (1.1-15.9)*</b>	<b>4.8(0.028)*</b>	<b>0.0* (0.0-0.9)*</b>	<b>4.1(0.042)*</b>	1.6 (0.1-20.8)	0.1(0.73)
Financial Adversity	Childhood	<b>0.0* (0.0-0.0)*</b>	<b>64.2(&lt;.001)*</b>	2.0 (0.2-22.3)	0.3(0.57)	<b>0.0* (0.0-0.0)*</b>	<b>26.8(&lt;.001)*</b>	<b>0.0* (0.0-0.2)*</b>	<b>10.0(0.002)*</b>
	Teen years	1.9 (0.2-14.5)	0.4(0.53)	0.6 (0.2-2.3)	0.6(0.45)	1.0 (0.1-19.3)	0.0(1.00)	4.0 (0.4-42.9)	
	Young adult	0.8 (0.2-3.6)	0.1(0.76)	0.5 (0.2-1.4)	1.9(0.17)	1.7 (0.3-10.9)	0.3(0.57)	1.3 (0.2-7.7)	0.1(0.78)
	Later adult	2.1 (0.3-15.5)	0.6(0.44)	2.0 (0.5-8.4)	1.0(0.31)	0.7 (0.1-4.9)	0.1(0.75)	0.8 (0.1-4.6)	0.1(0.78)
group significance test for all types	Childhood		<b>347.6(&lt;.001)*</b>		<b>822.4(&lt;.001)*</b>		<b>204.6(&lt;.001)*</b>		<b>1425.4(&lt;.001)*</b>
	Teen years		<b>1168.3(&lt;.001)*</b>		<b>37.5(&lt;.001)*</b>		<b>421.4(&lt;.001)*</b>		<b>1337.0(&lt;.001)*</b>

## Association between childhood adversities and suicidality

	Young adult		9.9(0.27)		9.6(0.30)		<b>1038.1(&lt;.001)*</b>		<b>97.5(&lt;.001)*</b>
	Later adult		<b>338.1(&lt;.001)*</b>		<b>525.7(&lt;.001)*</b>		7.9(0.34)		5.9(0.66)
significance test for difference between types	Childhood		<b>301.9(&lt;.001)*</b>		<b>637.3(&lt;.001)*</b>		<b>203.1(&lt;.001)*</b>		<b>1123.3(&lt;.001)*</b>
	Teen years		<b>1004.7(&lt;.001)*</b>		12.4(0.09)		<b>374.6(&lt;.001)*</b>		<b>1283.5(&lt;.001)*</b>
	Young adult		5.2(0.64)		10.2(0.18)		<b>973.6(&lt;.001)*</b>		<b>99.6(&lt;.001)*</b>
	Later adult		<b>272.0(&lt;.001)*</b>		<b>477.0(&lt;.001)*</b>		4.8(0.57)		5.7(0.57)
2+ adversities	Childhood	0.6 (0.0-13.1)	0.1(0.73)	0.1 (0.0-1.3)	3.2(0.07)	---	---	---	---
	Teen years	0.2 (0.0-1.4)	2.6(0.11)	<b>0.3* (0.1-1.0)*</b>	<b>3.9(0.048)*</b>	0.9 (0.0-32.5)	0.0(0.93)	2.5 (0.3-18.7)	
	Young adult	3.1 (0.8-12.3)	2.7(0.10)	1.3 (0.7-2.6)	0.7(0.41)	9.1 (0.5-169.9)	2.3(0.13)	3.5 (0.4-28.8)	1.4(0.24)
	Later adult	0.2 (0.0-1.6)	2.4(0.12)	0.2 (0.1-1.1)	3.6(0.06)	<b>44.5* (2.5-779.1)*</b>	<b>7.0(0.008)*</b>	2.1 (0.2-18.5)	0.5(0.49)

\*Significant at the .05 level, two-sided test

<sup>1</sup>Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent psychopathology, details in following footnotes

<sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

*Association between childhood adversities and suicidality*

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review only

*Association between childhood adversities and suicidality*

1  
2  
3  
4  
5  
6  
7  
8  
9 **Association between childhood adversities and long-term suicidality among**  
10  
11 **South Africans: Results from the South African**  
12 **Stress and Health Study**  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality***ABSTRACT****Objective:**

Suicide and suicidal behaviours are significant public health problems and a leading cause of death worldwide and in South Africa. We examined the association between childhood adversities and suicidal behaviour over the life course.

**Methods:**

A national probability sample of 4,351 South African adult participants (aged 18 years and older) in the South African Stress and Health (SASH) study was interviewed, as part of the World Mental Health Survey initiative. Respondents provided socio-demographic and diagnostic information, as well as an account of suicide-related thoughts and behaviours. Outcomes were defined as suicide attempts and suicidal ideation in the total sample, and suicide plans and attempts among ideators. Childhood adversities included physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness and financial adversity. The association between suicidality and childhood adversities was examined using discrete-time survival models.

**Results:**

More than a third of respondents with suicidal behaviour experienced at least 1 childhood adversity, with physical abuse, parental death and parental divorce the most prevalent adversities. Physical abuse, sexual abuse and parental divorce were identified as significant risk markers for lifetime suicide attempts, while physical abuse and parental divorce were significantly correlated with suicidal ideation. Two or more childhood adversities were associated with a 2-fold higher risk of lifetime suicide attempts. Sexual abuse (OR=9.3, childhood, parental divorce (OR=3.1)

*Association between childhood adversities and suicidality*

1  
2  
3 and physical abuse (OR=2.2) had the strongest associations with lifetime suicide attempts. The  
4  
5 effect of childhood adversities on suicidal tendencies varied over the *life course*. For example,  
6  
7 sexual abuse was significantly associated with suicide attempts during childhood and teen years,  
8  
9 but not during young and later adulthood.  
10  
11

12  
13  
14 **Conclusions:**

15  
16 Childhood adversities, especially sexual abuse, physical abuse and parental divorce are important  
17  
18 risk factors for the onset and persistence of suicidal behaviour, with this risk greatest in childhood  
19  
20 and adolescence. The risk for suicidal behaviour was greatest in childhood and adolescence.  
21  
22 Suicidal risk in childhood and adolescence was significantly associated with the following  
23  
24 childhood adversities: sexual abuse, physical abuse and parental divorce.  
25  
26  
27  
28  
29

30  
31 **Keywords:** Childhood adversities, suicidal ideation, suicidal attempts  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality***INTRODUCTION**

Suicide and suicidal behaviour are significant public health problems. Suicide is one of the leading causes of death worldwide with almost 1 million people committing suicide each year [1]. This figure is likely to grow to approximately 1.2 million suicides in 2020 [2]. In South Africa, the annual rate of suicide is high [3, 4] mirroring international trends [5]. So, too, are rates of suicidal behaviour with an estimated prevalence of 9.1% for lifetime suicidal ideation and 2.9% for suicide attempts among South Africans according to the South African Stress and Health Survey (SASH) [6].

Despite the enormity of the problem, the aetiology of suicidal behaviour is not fully understood. There are controversies in the literature regarding prior psychiatric disorder and risk for suicide attempts. While some authors have argued that pre-existing disorder is an important risk factor (7-11), others have argued that suicide attempts are not necessarily associated with prior psychopathology [12]. Genetic factors also play an important role in suicidal behaviour [13-16]. While there is stronger evidence pointing towards environmental or experiential factors [17, 18] such as exposure to childhood adversities (19-28]. Recent multi-level country data from the World Mental Health Surveys (WMHS) initiative has allowed for cross-national comparisons of suicidality. The WMHS investigated the association between childhood adversities and suicidal behaviour [20], the persistence of suicidality over time, and the extent to which associations between childhood trauma and suicidality changed over the life course. The WMHS found a dose-response relationship between the number of adversities and suicidal behaviour. Sexual abuse and physical abuse were the strongest risk factors for both the onset and persistence of suicidal behaviours, with the risk for suicidality greatest during childhood (age 4-12 years) and adolescence (age 13-19 years) [20].

*Association between childhood adversities and suicidality*

1  
2  
3 Numerous studies have examined the link between childhood sexual abuse and suicidality [29-  
4  
5 41]. All of these authors have found that exposure to childhood sexual abuse increases the risk for  
6  
7 mental disorders, including suicidality. Furthermore, the majority of studies that have focused on  
8  
9 the link between childhood physical abuse and suicidality have found that exposure to childhood  
10  
11 physical abuse increases the risk for suicidality [42, 43]. There also appears to be an association  
12  
13 between the number of childhood adversities experienced and the later suicidal behaviour [21, 23,  
14  
15 24, 44, 45].  
16  
17  
18  
19

20  
21 Exposure to early life stress is prevalent among South Africans. In one sample of South African  
22  
23 rural youth, the prevalence of physical and sexual abuse was shown to be very high with 94.4%  
24  
25 of males exposed to physical abuse and 39.1% of females to sexual abuse [46]. More than a  
26  
27 quarter of adults who were interviewed endorsed exposure to childhood adversity (parental death,  
28  
29 parental separation or parental divorce) in the SASH study [47]. Significantly more females were  
30  
31 prone to be victims of domestic violence than men [47]. Women also reported twice as many  
32  
33 suicidal attempts than the male participants in the SASH study [9].  
34  
35  
36  
37

**Objective**

38  
39  
40 We report in more detail on data from a South African dataset gathered as part of the World  
41  
42 Mental Health Surveys, which allowed for comparison with data from the overall cross-national  
43  
44 sample. This data are particularly interesting as South Africa is a middle income African country  
45  
46 with high rates of violent trauma exposure. The present study aimed to examine the relationship  
47  
48 between the type and frequency of childhood adversity exposure to suicidal behaviour over the  
49  
50 life trajectory of South Africans, given that there are no published nationally representative data  
51  
52 that may be useful in informing both clinical practice and policy.  
53  
54  
55  
56  
57  
58  
59  
60



*Association between childhood adversities and suicidality***METHODS****Sample**

Data for the SASH Study were collected between January 2002 and June 2004. WMH surveys were carried out in 21 countries which included Nigeria and South Africa [48]. For detailed information on study methods see Williams et al. (2004) [48]. The research protocol for the SASH study was approved by the Human Subjects Committee of the University of Michigan, by Harvard Medical School ethics committee and by a single project assurance of compliance from the Medical University of South Africa (MEDUNSA), and by the National Institute of Mental Health. It was a national probability sample of 4,351 South African adults (persons aged 18 years and older) living in households or in hostel accommodation. All racial and ethnic groups were represented, with the sample selected using a three-stage probability sample design. The response rate was 85.5%.

*Sampling approach*

Sampling was divided into three stages. Primary sampling units was selected during the first stage, which was based on the 2001 SA census Enumeration Areas (EAs). The second stage involved sampling of household units within clusters selected in each EA. South Africans in both urban and rural areas were sampled. Sampled residences were stratified into 10 diverse housing categories: Rural-commercial, agricultural, rural traditional subsistence areas, African townships, informal urban or peri-urban shack areas, Coloured townships, Indian townships, general metropolitan residential areas, general large metropolitan residential areas, and domestic servant accommodation in urban areas. During the third stage, one adult respondent in each sampled housing unit was selected. A total of 5089 households was selected. Field interviews were conducted with 4433 (87.1%) of designated respondents. Based on quality control, 4351

### *Association between childhood adversities and suicidality*

interviews were retained for use in the analysis. There were no differences in response rates across the four designated racial groups: (white, Coloured [mixed racial origin], Indian, black). According to the 2001 Census statistics, 79.% people in South Africa are Black African, 8.9% are coloured, 9.6% are white, and 2.5% are Indian/Asian [49].

### **Diagnostic Interview**

SASH used version 3 of the World Health Organization Composite Diagnostic Interview (WHO CIDI) [50]. Interviewers were trained within a one week period and conducted the interviews in seven different languages, namely English, Afrikaans, Zulu, Xhosa, Northern Sotho, Southern Sotho, and Tswana. Translations of the CIDI into several native South African languages were conducted in accordance with WHO requirements. Multilingual and bilingual expert panels conducted the back-translations [51, 52]. Informed consent was obtained from participants after a complete description of the study was provided. Respondents provided socio-demographic and diagnostic information, as well as an account of suicidal behaviours during the interviews. The core diagnostic assessment of mental disorders included anxiety disorders (panic disorder, agoraphobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder), mood disorders (major depressive disorder, dysthymia), substance use disorders (alcohol abuse, alcohol dependence, drug abuse, drug dependence) and intermittent explosive disorder [53, 54]. ~~Overall, percentages were weighted to adjust for differences in selection probabilities, differential non-response, oversampling of cases, and residual differences on sociodemographic variables between the sample and the population (Williams et al, 2004; Stein et al, 2010).~~

### **Suicidal behaviour**

The CIDI 3.0 module on suicidal behaviour was used to assess the age-of-first-onset, age of most recent episode, and lifetime occurrence of suicidal ideation, suicide plans and suicide attempts.

*Association between childhood adversities and suicidality*

1  
2  
3 Suicidal ideation, suicide plans and suicide attempts was assessed with questions such as “Have  
4 you ever seriously thought about committing suicide?”, “Have you ever made a plan for  
5 committing suicide?”, and “Have you ever attempted suicide?”, respectively. Ideators only  
6  
7  
8 proceeded to answer questions about plans (“Have you ever made a plan for committing  
9 suicide?”) and attempts (“Have you ever attempted suicide?”). Information on the age of first  
10 occurrence of the three main outcomes was obtained. To get a better understanding of the  
11 progression from ideation to attempt, tThe outcomes considered in this study were: suicide  
12 attempts in the total sample; suicide ideation in the total sample; suicide plans among ideators;  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

**Childhood adversities**

Physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness and financial adversity were the various childhood adversities assessed. Biological and non-biological parents were included in measures of parental death, divorce or other parental loss. Financial adversities were assessed with questions on whether the family had insufficient funds to pay for basic necessities. Questions about repeated fondling, attempted rape or rape were asked to assess for sexual abuse. This comprised the following “The next 2 questions are about sexual assault: (i) The first is about rape. We define this as someone either having sexual intercourse with you or penetrating your body with a finger or object when you did not want them to, either by threatening you or using force, or when you were so young that you didn’t know what was happening. Did this ever happen to you?”, and (ii)“Other than rape, were you ever sexually assaulted or molested?”. A modified version of the Conflict Tactics Scale (CTS2) was used to assess family violence and physical abuse [55]. Respondents were classified

*Association between childhood adversities and suicidality*

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

as having experienced physical abuse when they indicated that, when they were growing up, their father or mother (includes biological, step, or adoptive parents) slapped, hit, pushed, grabbed, shoved, or threw something at them, or that they were beaten as a child by the persons who raised them. Family violence was assessed as present when respondents indicated that they (i) “were often hit, shoved, pushed, grabbed, or slapped while growing up” or (ii) “witnessed physical fights at home, like when your father beat up your mother?” A standard chronic conditions checklist assessed for life-threatening physical illnesses in childhood [56].

**Data analysis**

All data analyses were processed and analysed centrally by a team of statisticians at the Harvard School of Public Health (Boston, USA) using the SAS version 9.1.3 software package. Discrete-time survival analysis with time-varying covariates was used to study the risk factors of lifetime suicide ideation, plans and attempts. Data were weighted to adjust for the stratified multistage sample design, differential probability of selection within households as a function of household size and clustering of data, and differential non-response. Overall, percentages were weighted to adjust for differences in selection probabilities, differential non-response, oversampling of cases, and residual differences on sociodemographic variables between the sample and the population [48, 57]. A post-stratification weight was also used to make the sample distribution comparable, for age, sex, gender, and province, with the population distribution in the 2001 South African census. Both weighted and geographic clustering of data were taken into account in the data analyses by using a jackknife repeated replications simulation method implemented in SAS macro 14. The survival coefficients were exponentiated and are reported below in the form of odds ratios.

*Association between childhood adversities and suicidality*

The association between suicidality and childhood adversity was examined using discrete-time survival models with the analysis unit being person-years. Bivariate analyses (considering one adversity at a time) and multivariate analyses (considering all adversities simultaneously) were conducted. Two types of multivariate models were tested: multivariate additive models (simultaneously considering all childhood adversities) and multivariate interactive models (with number and type of childhood adversities experienced by each respondent included as dummy variables). The analysis also examined interactions between the life stage (13-19 years, 20-29 years, 30+ years) of respondents and each childhood adversity, as well as the influence each adversity had on early-, middle- and later- onset suicidality. Analyses were conducted using SUDAAN version 8.1 to adjust for clustering and weighting. Odds ratios (ORs) with a 95% confidence interval (CIs) are reported. Wald  $X^2$ - tests were used to examine multivariate significance. Associations between adversities and suicide outcomes were adjusted for sex gender, age, educational level, marital status, interactions between demographic variables, life course and parental psychopathology. Analyses also examined the influence of respondents' lifetime mental disorders on suicidality, as well as interactions between sex gender and each childhood adversity. Statistical significance using two-sided tests was set at  $p < .05$  [20].

**RESULTS***Demographic details*

In the sample, ( $n = 4351$ ), there were slightly more female (53.7%) than male respondents. There were more black (76.2%) than coloured (10.4%), white (10%), and Indian/Asian (3.4%) respondents. Furthermore, half of the sample was married and most were unemployed (69.2%), had less than 12 years of education (62.7%) and lived in an urban area (59.7%) (see Table 1).

## *Association between childhood adversities and suicidality*

### ***Prevalence of childhood adversities among the total sample***

Figure 1 provides a schematic representation of the suicidality data reported in the sections which follow. In the total sample, 35.4% of participants with one adversity had a suicide attempt, compared with 23.4% with one adversity who had not made an attempt. Physical abuse (24.9%), parental divorce (14.2%) and parental death (11.6%) were most prevalent among those suicide attempters. Among those exposed to one childhood adversity, without a suicide attempt, the two most prevalent adversities reported were physical abuse (12.2%) and parental death (11.3%). In the total sample 15.4% of participants exposed to two or more adversities had a suicide attempt. In contrast, 8.6% of participants exposed to two or more adversities had not made an attempt (Table 2).

### ***Prevalence of childhood adversities among suicidal ideators in the total sample***

In the sample as a whole, 35.9% of those with one adversity had suicidal ideation compared with 22.7% of those with one adversity who had no ideation. The most prevalent adversities associated with suicidal ideation were physical abuse (21.1%), parental death (13.9%), and parental divorce (7.9%). Among those without suicidal ideation, physical abuse (11.8%) and parental death (11.3%) were the most commonly endorsed childhood adversities. Of those who endorsed two or more childhood adversities, 10.8% reported suicidal ideation and 8.6% did not (Table 2). In summary, the most prevalent childhood adversities reported among the total sample with/without suicidal ideation were firstly, physical abuse and secondly, the death of a parent.

### ***Prevalence of suicide attempts in the total sample***

In the total sample, 24.9% of those with childhood physical abuse had attempted suicide while 12.2% of respondents with no physical abuse had no attempt. Of those exposed to parental divorce, 14.2% had attempted suicide and 4.8% had made no attempt. The second most prevalent

*Association between childhood adversities and suicidality*

1  
2  
3 childhood adversity was parental death with 11.6% of those with parental death attempting  
4  
5 suicide and 11.3% of those with parental death with no attempts (Table 2).  
6  
7

*Prevalence of childhood adversities among suicidal ideators**With/without a plan*

8  
9  
10  
11  
12  
13 Among suicidal ideators with a plan, 32.9% had experienced one childhood adversity. Among  
14  
15 ideators with no plan, 41.7% had one childhood adversity. Among ideators with a plan, the  
16  
17 following were the most prevalent childhood adversities: physical abuse (24.3%), parental death  
18  
19 (12.2%), and parental divorce (9.7%). Among ideators without a plan, 27.9% endorsed physical  
20  
21 abuse, 16.1% parental death, and 9.2% parental divorce (see Table 2). In both groups (ideators  
22  
23 with and without a plan), physical abuse was the most prevalent childhood adversity, followed by  
24  
25 parental death and parental divorce.  
26  
27  
28

*With or without an attempt*

29  
30  
31  
32 Among suicidal ideators who had attempted suicide, 35.4% were exposed to one childhood  
33  
34 adversity and 15.4% were exposed to two or more childhood adversities. In the group of ideators  
35  
36 who had made an attempt, 24.9% had experienced physical abuse, 14.2% parental divorce, and  
37  
38 11.6% parental death (Table 2). 40.5% of those with one adversity, and 9.6% of those exposed to  
39  
40 two or more adversities were suicidal ideators with no attempts. In this group, the most prevalent  
41  
42 adversities were physical abuse (24.5%), parental death (15.6%) and parental divorce (6.7%)  
43  
44 reported (Table 2).  
45  
46  
47  
48

49  
50 Among all ideators (with/without a plan, with/without an attempt), the most prevalent childhood  
51  
52 adversity was physical abuse, followed by parental death and parental divorce. Of note, in the  
53  
54 group of ideators with an attempted suicide parental divorce was more prevalent than parental  
55  
56 death.  
57  
58  
59  
60

*Association between childhood adversities and suicidality****Bivariate and multivariate results: Type of childhood adversity***

Bivariate and multivariate analyses were performed to examine the associations between the different childhood adversities (physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness, financial adversity) and lifetime suicidal ideation, plans and attempts.

In the total sample, bivariate and multivariate analysis revealed significant associations between (i) sexual abuse (bivariate: OR=7.9, p=0.003; multivariate: OR=7.6, p=0.003), (ii) physical abuse (OR 2, p=0.007; OR 2.0, p=0.006) and (iii) parental divorce (OR 2.8, p<.001; OR 2.7, p=0.001), and lifetime suicide attempts. Among ideators in the sample, physical abuse (OR=1.7, p<.001; OR=1.7, p<.001) was significantly associated with suicidal ideation. Multivariate analyses revealed an additional association with suicidal ideation, namely parental divorce (OR = 1.6, p=0.038). The relationship between childhood adversities and lifetime plans was not statistically significant. However, a significant association was found between parental divorce and lifetime suicidal attempts among ideators (OR=3.0, p<.001; OR=3.1, p=0.023) (Table 3Table available from authors).

~~Multivariate analysis also revealed a significant association between (i) sexual abuse (OR=7.6, p=0.003), (ii) physical abuse (OR 2.0, p=0.006) and (iii) parental divorce (OR 2.7, p=0.001) and lifetime suicide attempts, in the total sample. Physical abuse (OR=1.7, p<.001) and parental divorce (OR = 1.6, p=0.038) were both significantly associated with suicidal ideation in the overall sample. Among ideators, no significant associations were found between any of the childhood adversities and lifetime plans. However, the relationship between parental divorce and lifetime suicidal attempts among ideators was significant (OR=3.1, p=0.023) (Table 3).~~



*Association between childhood adversities and suicidality*

Findings from multivariate analysis, therefore, confirm findings of bivariate analysis for all groups, except for ideators. Among ideators bivariate analysis revealed a significant relationship between physical abuse and suicidal ideation. This was confirmed in multivariate analysis where the association between parental divorce and suicidal ideation was significant for the whole sample.

*Bivariate associations between the number of adversities and lifetime suicidality*

The relationship between the number of childhood adversities and lifetime suicidal ideation, plans and attempts was further examined. There was a significant relationship between the number of childhood adversities and lifetime suicide attempts. Two or more childhood adversities were associated with a 2-fold higher risk of lifetime suicide attempts in the total sample (OR=2.1,  $p<.001$ ). A significant relationship was also established between one, as well as two or more adversities with ideators in the total sample. Among ideators, no significant association was found between the number of childhood adversities and lifetime plans. A significant relationship was found between two or more adversities and lifetime attempts among ideators (OR=2.7,  $p=0.016$ ), indicating a more than 2-fold higher risk of lifetime suicide attempts in this group (Table 4).

*Multivariate associations between number of childhood adversities and lifetime suicidality*

In the final multivariate model which included 2 or more adversities as a predictor variable, sexual abuse (OR=9.3,  $p<.001$ ), childhood physical abuse (OR=2.2,  $p=0.003$ ) and parental divorce (OR=3.1,  $p<.001$ ) retained significant associations with lifetime suicide attempts in the total sample. Physical abuse (OR=2.1,  $p<.001$ ), parental death (OR=1.7,  $p=0.010$ ), parental divorce (OR=1.9,  $p=0.004$ ) and other parental loss (OR = 2.1,  $p=0.004$ ) were significant predictors of suicidal ideation. Physical abuse was associated with a lower odds of lifetime

### *Association between childhood adversities and suicidality*

~~suicide plans among ideators (OR = 0.4, p=0.038). Physical abuse (OR=0.4, p=0.038) was significantly associated with lifetime plans among ideators.~~ There were no significant associations between childhood adversities and lifetime attempts among those with suicidal ideation (Table 5).

### *Associations between the types of childhood adversity and lifetime suicidality over the life course*

Multivariate analyses were performed to examine the association between the types of childhood adversity and lifetime suicidal ideation, plans and attempts during childhood years (age 4- 12), teenage years (age 13-19), young adulthood (age 20-29) and later adulthood (30 years and older) (Tables available from authors).

Childhood years (4-12). Sexual abuse (OR=61.6, CI=4.5-841.0, p=0.002) in early childhood (4-12 years of age) was significantly associated with lifetime suicide attempts in the total sample (OR = 61.6, CI=4.5-841.0, p=0.002). Both sexual abuse (OR=34.8, CI= 3.1-392.6, p=0.003) and physical abuse (OR=3.7, CI=1.0-13.4, p=0.041) were associated with a higher risk for suicidal ideation among the total sample. No significant associations were found between any of the childhood adversities and lifetime plans in the group of ideators. Among those with suicidal ideation, parental death (OR=2.2, CI=1.1-4.3,2.7, p=0.021) was significantly associated with suicide attempts in childhood years.

Teen years (13-19). Sexual abuse (OR=20.3, CI=2.0-210.2, p=0.010), physical abuse (OR=3.7, CI=1.5-9.2, p=0.004), and parental divorce (OR=4.6, CI=1.7-12.1, p=0.002) were significantly associated with suicide attempts in the total sample of teenagers. Physical abuse (OR=3.6, CI=2.2-5.9, p<.001) and parental death (OR=2.2, CI=1.1-4.3, p=0.021) significantly increased

*Association between childhood adversities and suicidality*

the risk for suicidal ideation among the total group of teens. Physical illness (OR=9.9, [CI=1.8-54.0](#), p=0.007) significantly increased the risk of suicidal plans in teens with suicidal ideation. Suicide attempts among teens with suicidal ideation was significantly predicted by parental divorce (OR=4.3, [CI=1.1-17.0](#), p=0.035).

Young adulthood (20-29). None of the childhood adversities were significantly associated with lifetime suicide attempts during young adulthood in the sample overall. An explanation could be that suicide attempts spike earlier and later in life among South Africans, contributing to the lack of significance. Parental loss other than parental death was significantly associated with suicidal ideation (OR=2.9, [CI=1.2-7.4](#), p=0.019).

Later adulthood (≥ 30). Childhood physical abuse (OR=2.2, [CI=1.0-4.8](#), p=0.035) was significantly predictive of suicidal attempts. The likelihood of suicidal ideation significantly increased in later adulthood if parental loss other than parental death (OR=5.1, [CI=2.1-12.1](#), p<.001) or physical illness had been present during childhood (OR=4.3, [CI=1.1-15.9](#), p=0.028). No significant relationship was found between any of the childhood adversities and lifetime plans in the group of ideators although a significant relationship was found between two or more adversities and lifetime plans among those who were ideators (OR=44.5, [CI=2.5-779.1](#), p<0.008). None of the childhood adversities were significantly associated with suicide attempts among ideators in this age group.

**DISCUSSION**

Rates of childhood adversities and suicidal behaviours were both high among South Africans, with more than a third of respondents in the total sample who attempted suicide experiencing one childhood adversity, and 15.4% experiencing two or more adversities. Overall, physical abuse,

*Association between childhood adversities and suicidality*

1  
2  
3 sexual abuse, parental divorce and physical illness were far more prevalent in those with a suicide  
4 attempt than in those without. The most prevalent childhood adversities endorsed overall were  
5  
6 physical abuse followed by parental death. Physical abuse, parental divorce and death of a parent  
7  
8 were also the most prevalent adversities experienced in those with a suicide attempt as well as in  
9  
10 those with suicidal ideation. These findings are somewhat dissimilar to other country samples;  
11  
12 for example in the 21 countries that participated in the WMHS, physical abuse (29.3%), family  
13  
14 violence (24.8%) and neglect (19.3%) were the most prevalent childhood adversities among those  
15  
16 with a lifetime suicide attempt, while physical abuse (20.6%), family violence (17.6%) and death  
17  
18 of a parent (14.2%) were most often reported among participants with lifetime suicidal ideation  
19  
20 [20]. Cross-nationally, it would appear that physical abuse is the commonest childhood adversity  
21  
22 associated with lifetime suicide attempts and ideation [20].  
23  
24  
25  
26  
27  
28  
29

30 The estimate lifetime prevalence of 2.9% for attempted suicide among South Africans is close to  
31  
32 the rates of 4.6% and 4.1% reported for general and Black populations respectively in USA. In  
33  
34 addition the 9.1% estimated prevalence of suicide ideation is comparable with previous estimates  
35  
36 from studies in South African clinical samples. Joe et al. (2008b) reported for the first time on the  
37  
38 rates of suicide ideation, plan and attempts among the different ethnic groups, in data from the  
39  
40 SASH study [6]. Overall, the results suggest that people in SA engage in suicidal thought and  
41  
42 behaviours at levels nearly comparable with those of Western nations.  
43  
44  
45  
46  
47

48 When examining suicidal behaviour risk in the context of childhood adversity, sexual abuse,  
49  
50 physical abuse and parental divorce emerged as significant risk factors for lifetime suicide  
51  
52 attempts in the total sample. Furthermore, physical abuse and parental divorce were significant  
53  
54 risk factors for suicidal ideation in the total sample, while parental divorce emerged as a  
55  
56 significant risk factor among ideators with lifetime suicide. These findings are largely consistent  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

1  
2  
3 with the data from the overall cross-national WMHS, which found that physical and sexual abuse  
4 significantly increased the likelihood of suicidal ideation and attempts, while neglect was a risk  
5  
6 factor for suicidal behaviour in multivariate additive analyses [20].  
7  
8  
9

10  
11 Of the adversities implicated, sexual and physical abuse were more significant risk factors than  
12 other adversities, highlighting the fact that intrusive and aggressive experiences in childhood may  
13 have more devastating and longer lasting effects [58]. This may be due to the extreme  
14 powerlessness and loss of control that such abuse causes, or to physically aggressive assaults  
15 resulting in the devaluation of one's body and consequent susceptibility to self harm [28]. In a  
16 country with high rates of sexual and physical abuse [46] this is particularly concerning. The  
17 impact of parental divorce on suicidality supports previous findings that parental divorce, if  
18 accompanied by other adversities such as childhood abuse, increases the risk of suicidal  
19 behaviour [59].  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32

33  
34 We also found that exposure to *two or more childhood adversities* significantly increased the risk  
35 of suicide attempts among ideators. This confirms earlier work showing exposure to multiple  
36 childhood adversities increases the risk of suicidal behaviour [21, 23, 24, 60, 61]. Bruffaerts et al  
37 (2010) found a sub-additive effect with regards to the onset of suicidal behaviour when  
38 considering multiple adversities [20]. Thus, the impact of multiple adversities was not equal to  
39 the sum of the odds ratios of individual adversities. In the overall WMHS analysis exposure to  
40 multiple childhood adversities had a significant effect on the persistence of suicide when  
41 considering every additional childhood adversity exposed to, however in the current study it was  
42 not possible to stratify the number of adversities beyond two or more adversities (i.e. into more  
43 than 2 categories) given the relatively small number of cases in the sample overall with non-fatal  
44 suicidal behaviour. Physical abuse, parental death, parental loss other than through death, and  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

1  
2  
3 parental divorce emerged as independent risk factors for suicidal ideation in the total sample.  
4  
5 Moreover, the effects of childhood adversities on suicidal tendencies tended to differ over the *life*  
6  
7 *course*. Consistent with nationally representative data in WMHS, childhood adversities were  
8  
9 associated with the highest risk of suicide attempts in childhood, with a decrease in risk in  
10  
11 adolescence and young adulthood, followed by an increase in risk again during later adulthood  
12  
13 [20].  
14  
15  
16  
17

18  
19 In *childhood*, sexual abuse was significantly associated with lifetime suicide attempts in the total  
20  
21 sample, while sexual and physical abuse were significantly associated with suicidal ideation.  
22  
23 Among suicidal ideators, parental death was significantly associated with lifetime suicide  
24  
25 attempts. Exposure to childhood sexual abuse, physical abuse or parental divorce significantly  
26  
27 increased suicide attempts during *teenage years*, while physical abuse and parental death were  
28  
29 associated with suicidal ideation in teens. Among teen suicidal ideators, physical illness was  
30  
31 significantly associated with suicidal plans, while parental divorce was associated with suicide  
32  
33 attempts. These findings emphasize the need to focus suicide prevention strategies at youth in  
34  
35 particular. In *young adulthood*, parental loss other than the death of a parent was significantly  
36  
37 associated with suicidal ideation in the total sample. Interestingly, childhood physical abuse was  
38  
39 identified as a significant risk factor for suicidal attempts in *later adulthood*, while childhood  
40  
41 physical illness and parental loss other than the death of a parent significantly increased the risk  
42  
43 for ideation.  
44  
45  
46  
47  
48  
49

50  
51 Similar to findings from SASH, childhood sexual abuse emerged as a particularly robust risk  
52  
53 factor for suicide attempts in younger participants in the WMH cross-national analysis, with a  
54  
55 10.9 times higher odds of suicide attempts in children, a 6.1 times higher likelihood in  
56  
57 adolescents and a 2.9-fold risk in young adults who were exposed [20]. This is in keeping with  
58  
59  
60

*Association between childhood adversities and suicidality*

Enns hypothesis that sexual abuse results in suicidal behaviour at a younger age [21]. Consistent with other studies, childhood physical and sexual abuse, in particular, emerged as risk factors for the emergence and persistence of suicidal behaviour, especially in adolescence. Loss of a parent, physical ill-health and family violence has also been found to be associated with persistence of suicidality [20, 28, 58]. These findings extend previous work done in other developing countries that have found childhood adversities to be a significant risk factor for suicidality [20, 62-64].

*Limitations*

The following limitations need to be highlighted. First, recall bias might have impacted on the accuracy of recall of childhood adversities. This said, participants were asked questions about childhood adversities in sequence which may have facilitated more accurate recall [65]. Systematic reviews have also found that recall of past experiences can be accurate and can provide valuable data [66, 67]. Thus, there is evidence to support the validity of accurate recall of childhood adversities [67]. Further, studies have shown that responses to questions on childhood adversities, similar to those asked in the SASH study, generally remain stable over time [68, 69].

We recommend that future studies examine ethnicity in relation to adversity and suicidale outcomes. variables. Second-Third, in view of owing to the cross-sectional design, more detailed, temporal information ons regarding childhood adversities and suicidal incidents wasere not obtainedassessed. Third, variables such as culture, ethnicity and mental status at the time of the interview may have influenced the recall and reporting of suicidal behaviour. -It is possible that response bias may have been particularly skewed to disenfranchised South Africans (e.g. poor, young, urban an black respondents), who may have been too afraid to divulge information on suicidality. Stigma associated with mental health problems may have also played a role in the

*Association between childhood adversities and suicidality*

1  
2  
3 reporting suicidal tendencies. Thus, participants' mental health status, ethnicity, culture and  
4  
5 generational factors may have also contributed to the under-reporting of suicidality. It is possible  
6  
7 that individuals reporting childhood adversities may have also been more likely to report suicidal  
8  
9 behaviour, while those not reporting childhood adversities may have underreported suicidality.  
10  
11 ~~However, it is much more likely that adversities and suicidality were under-reported rather than~~  
12  
13 ~~over-reported (Wilsnaek et al, 2002; Hardt & Rutter, 2004; Joe et al, 2008; Bruffaerts et al, 2010).~~  
14  
15 ~~Some of the participants might have been scared to tell the interviewers about their suicidal~~  
16  
17 ~~behaviours. Stigma and mental health status (e.g. depressed persons may be more inclined to~~  
18  
19 ~~report suicidality and more likely to remember negative childhood experiences) associated with~~  
20  
21 ~~mental health may have also be contributory factors played a role in reporting suicidal tendencies.~~  
22  
23 In addition, some participants may have been afraid to report suicidal behaviours. ~~The status of~~  
24  
25 ~~the participant's mental health,~~ The role of ethnicity, culture and generational factors may have  
26  
27 also contributed to the under-reporting of suicidality. Overall, it is much more likely that  
28  
29 adversities and suicidality were under-reported rather than over-reported [9, 20, 67, 70]. Fourth,  
30  
31 we do not assess for self-mutilating behavior. The importance of discriminating suicidal  
32  
33 behaviour from non-suicidal self-mutilation cannot be underestimated. Fifth, the survey was  
34  
35 conducted in adults living in households and hostel quarters thus the findings are not  
36  
37 generalizable to homeless and institutionalized persons who were not included in the survey.  
38  
39 Sixth, the CIDI instrument which was used in this study is a lay-administered instrument which  
40  
41 does not include an assessment of several key DSM-IV diagnoses (such as bipolar disorder and  
42  
43 psychosis), are associated with elevated rates of suicidality. As a result, some participants with  
44  
45 suicidality may have not have been diagnosed with a disorder. Furthermore, in view of the large  
46  
47 confidence intervals and small sample sizes for some of these analyses caution is required in  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



*Association between childhood adversities and suicidality*

1  
2  
3 drawing conclusions. In addition, we did not control for other unmeasured causes of childhood  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

drawing conclusions. In addition, we did not control for other unmeasured causes of childhood  
adversities and suicidality, or protective (resiliency) factors that may have contributed to the  
associations observed in these data. Both other risk and resiliency factors may have contributed to  
both the prevalence of non-fatal suicidal behaviours and to the associations with different forms  
of childhood adversity and warrant further investigation. Lastly, it is important to point out that  
these data were collected approximately 10 years ago. Notwithstanding these limitations, this  
study represents the first investigation among South Africans of a wide range of childhood  
adversities and their impact on the onset and persistence of suicidality over the life course.

***Conclusions***

Childhood adversities especially sexual abuse, physical abuse and parental divorce are important  
risk factors for associated with the onset and persistence of suicidal behaviour with the risk  
greatest in children and adolescents. Public health efforts aimed at prevention of early childhood  
sexual and physical abuse, in particular, may have a significant impact on reducing suicidality  
over the life course and improving mental health outcomes.

*Association between childhood adversities and suicidality***REFERENCES**

1. World Health Organization. Suicide Prevention (SUPRE). Geneva, Switzerland. 2007.  
[http://www.who.int/mental\\_health/prevention/suicide/suicideprevention/en/](http://www.who.int/mental_health/prevention/suicide/suicideprevention/en/)
2. Murray, C.L., Lopez, A.D. The global burden of disease: a comprehensive assessment of mortality and disability from disease, injuries and risk factors in 1990 and projected to 2020. Cambridge, MA: Harvard University Press, 1996.
3. Burrows, S., Laflamme, L. Pattern analysis of suicide mortality surveillance data in urban South Africa. *Suicide and Life-Threatening Behaviour* 2008;**38**:209-220.
4. Meel, B.I. Epidemiology of suicide by hanging in Transkei. South Africa. *Am J Forensic Med Pathol.* 2006;**27**:75-78
5. Flisher, A.J., Liang, H., Laubscher, R. Suicide trends in South Africa, 1968-90. *Scand J Public Health* 2004;**32**:411-418.
6. Joe, S., Stein, DJ., Seedat, S., Herman, A., Williams, DR. non-fatal suicidal behavior among South Africans: Results from the South Africa Stress and Health Study. *Social Psychiatry Epidemiology* 2008;**43**(6):454-461.doi:10.1007/s00127-008-0348-7.
7. Beautrais, A.L., Joyce, P/R/. & Mulder, R.T. (1996). Risk factors for serious suicide attempts among youth aged 13 through 24 years. *J Am Acad Child Adolesc Psychiatry* 1996;**35**(9):1174-1182.
8. Harrison, EC, Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis. *Br J Psychiatry* 1997;**170**:205-228

*Association between childhood adversities and suicidality*

- 1  
2  
3 9. Joe, S., Stein, D.J., Seedat, S., et al. Prevalence and correlates of non-fatal suicidal behaviour among  
4  
5 South Africans. *Br J Psychiatry* 2008;**192**:310-311.  
6  
7
- 8 10. Nock, M.K., Borges, G., Bromet, E.J., et al. Suicide and Suicidal Behaviour. *Epidemiologic Reviews*  
9  
10 2008;**30**:133-154.  
11  
12
- 13 11. Nock, M.K., Borges, G., Bromet, E.J., et al. (2008b). Cross-national prevalence and risk factors for  
14  
15 suicidal ideation, plans and attempts. *British Journal of Psychiatry*, 192, 98-105.  
16  
17
- 18 12. Nock, M.K., Hwang, I., Sampson, N.A., et al. Cross-national analysis of the associations among  
19  
20 mental disorders and suicidal behaviour: Findings from the WHO World Mental Health Surveys.  
21  
22 *PLoS Medicine* 2009;**6**(8).e1000123.  
23  
24  
25
- 26 13. Bondy, B., Buettner, A., Zill, P. Genetics of suicide. *Molecular Psychiatry* 2006;**11**:336-351.  
27  
28  
29
- 30 14. Kohli, M.A., Salyakina, D., Pfennig, A., et al. Association of genetic variants in the neurotrophic  
31  
32 receptor encoding gene NTRK2 and a lifetime history of suicide attempts in depressed patients. *Arch*  
33  
34 *Gen Psychiatry* 2010;**67**:348-59.  
35  
36  
37
- 38 15. Roy, A., Hu, X-Z., Janal, M.N., & Goldman, D. Interaction between childhood trauma and serotonin  
39  
40 transporter gene variation and suicide. *Neuropsychopharmacology* 2007;**32**:2046–2052  
41  
42  
43
- 44 16. Risch, N., Herrell, R., Lehner, T., et al. Interaction between the serotonin transporter gene (5-  
45  
46 HTTLPR), stressful life events, and the risk of depression: A meta-analysis. *JAMA* 2009;**301**:2462–  
47  
48 2471.  
49  
50  
51
- 52 17. Borges, G., Benjet, C., Medina-Mora, M.E., et al. Traumatic events and suicide related outcomes  
53  
54 among Mexico City adolescents. *J Child Psychol Psychiatry* 2008;**6**:654-666. Weissman MM, Bland  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3 RC, Canino GJ, Greenwald S, Hwu HG, Joyce PR, et al. (1999) Prevalence of suicide ideation and  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
18. Brodsky, BS & Stanley, B. Adverse childhood experiences and suicidal behaviour. *Psychiatry Clinical Northern America* 2008;**31**:223-235
19. Bruffaerts, R., Demyttenaere, K., Borges, G., et al. Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *Br J Psychiatry* 2010;**197**:20-27.
20. Enns, M.W., Cox, B.J., Afifi, T.O., et al. Childhood adversities and risk for suicidal ideation and attempts: a longitudinal population-based study. *Psychological Medicine* 2006;**36**:1769-1778.
21. Johnson, J.G., Cohen, P., Gould, M.S., et al. Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. *Arch Gen Psychiatry* 2002;**59**:741-749.
22. Dube, S.R., Anda, R.F., Felitti, V.J., et al. Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *JAMA* 2001;**286**:3089-3096.
23. Afifi, T.O., Enns, M.W., Cox, B.J., et al. Population attributable fractions of psychiatric disorders and suicide ideation and attempts associated with adverse childhood experiences. *Am J Public Health* 2008;**98**:946-952.
24. Burke, A.K., Galfalvy, H., Everett, B., et al. Effect of exposure to suicidal behavior on suicide attempt in a high-risk sample of offspring of depressed parents. *J Am Acad Child Adolesc Psychiatry* 2010;**49**:114-121.

*Association between childhood adversities and suicidality*

- 1  
2  
3 25. Labonte, B., Suderman, M., Maussion, G., Navaro, L., Yerko, V., Mahar, I., & Turecki, G. Genome-  
4 wide epigenetic regulation by early-life trauma. *Arch Gen Psychiatry* 2012;**69**(7):722-  
5 731. Doi:10.1001/archgenpsychiatry.2011.2287  
6  
7  
8  
9  
10  
11 26. Lipschitz, D.S., Winegar, R.K., Nicolaou, A.L., et al. (1999). Perceived abuse and neglect as risk  
12 factors for suicidal behaviour in adolescent inpatients. *The Journal of Nervous and Mental Disease*,  
13 187, 32-39.  
14  
15  
16  
17  
18 27. Ystgaard, M., Hestetun, I., Loeb, M., & Mehlum, L. Is there a specific relationship between  
19 childhood sexual and physical abuse and repeated suicidal behaviour? *Child Abuse Neg*  
20 2004;**28**:863-875  
21  
22  
23  
24  
25 28. Boudewyn, A., & Liem, J. Childhood sexual abuse as a precursor to depression and self-destructive  
26 behavior in adulthood. *J Trauma Stress* 1995;**8**:445-459.  
27  
28  
29  
30  
31 29. Brown, J., Cohen, P., Johnson, J.G., & Smailes, E.M. Childhood abuse and neglect: Specificity of  
32 effects on adolescent and young adult depression and suicidality. *J Am*  
33 *Acad Child Adolesc Psychiatry* 1999;**38**:1490-1496.  
34  
35  
36  
37  
38  
39 30. Bryant, S.L., & Range, L.M. Suicidality in college women who were sexually and physically abused  
40 and physically punished by parents. *Violence Vict* 1995;**10**:195-201.  
41  
42  
43  
44  
45 31. Davidson, J.R.T., Hughes, D.C., George, L.K., & Blazer, D.G. The association of sexual assault and  
46 attempted suicide within the community. *Arch Gen Psychiatry* 1996;**53**:550-555  
47  
48  
49  
50  
51 32. Fergusson, D.M., & Mullen, P.E. *Childhood Sexual abuse – An evidence based perspective*. Sage,  
52 CA: Thousand Oaks, 1999.  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
33. Finkelhor, D. Early and long-term effects of child sexual abuse: An update. *Professional Psychology: Research & Practice* 1990;**21**(5):325-330.
34. Finkelhor, D., & Hashima, P.Y. (2001). The victimization of children and youth: A comprehensive overview. In S.O. White (Ed.) *Handbook of youth and justice*. The Plenum series in crime and justice. Dordrecht: Plenum, 2001:49-78.
35. Holmes, W.C., & Slap, G.B. Sexual abuse of boys: Definition, prevalence, correlates, sequelae, and management. *JAMA: JAMA* 1998;**280**(21):1855-1862
36. Kendall-Tackett, K.A., Williams, L.M., & Finkelhor, D. Impact of sexual abuse on children: A review and synthesis of recent empirical studies. *Psychol Bull* 1993;**113**(1):164-180.
37. Martin, G. Reported family dynamics, sexual abuse, and suicidal behaviors in community adolescents. *Arch Suicide Res* 1996;**2**:183-195.
38. Peters, D.K., & Range, L.M. Childhood sexual abuse and current suicidality in college women and men. *Child Abuse Negl* 1995;**19**:335-341.
39. Putman, F.W. Ten-year research update review: Child sexual abuse. *J Am Acad Child Adolesc Psychiatry* 2003;**42**(3):269-278
40. Stepakoff, S. Effects of sexual victimization on suicidal ideation and behaviour in US college women. *Suicide and Life-Threatening Behavior* 1998;**28**:107-126.
41. Malinosky-Rummel, R., & Hansen, D.J. Long-term consequences of childhood physical abuse. *Psychol Bull* 1993;**144**:68-79

*Association between childhood adversities and suicidality*

- 1  
2  
3 42. Silverman, A.B., Reinherz, H., & Giaconia, R.M. The long-term sequelae of child and adolescent  
4  
5 abuse: A longitudinal community study. *Child Abuse Negl* 1996;**20**:709-723  
6  
7  
8  
9 43. Chapman, D.P., Whitfield, C.L., Felitti, V.J., Dube, S.R., Edwards, V.J., & Anda, R.F. Adverse  
10  
11 childhood experiences and the risk of depression in adulthood. *J Affect Disord* 2004;**82**:217-225  
12  
13  
14  
15 44. Dube, S.R., Felitti, V.J., Dong, M., Chapman, D.P., Giles, W.H., & Anda, R.F. Childhood abuse,  
16  
17 neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood  
18  
19 experiences study. *Pediatrics* 2003;**111**:564-572.  
20  
21  
22 45. Jewkes, R.K., Dunkle, K., Nduna, M., et al. Associations between childhood adversity and  
23  
24 depression, substance abuse and HIV and HSV2 incident infections in rural South African youth.  
25  
26 *Child Abuse Negl* 2010;**34**:833-841.  
27  
28  
29  
30 46. Seedat, S., Stein, D.J., Jackson, P.B., Heeringa, S.G., Williams, D.R., Myer, L. Life stress and mental  
31  
32 disorders in the South African Stress and Health study. *South African Medical Journal* 2009a;**99**:375-  
33  
34 382.  
35  
36  
37 47. Williams, D.R., Herman, A., Kessler, R.C., et al. The South Africa Stress and Health Study:  
38  
39 Rationale and Design. *Metab Brain Dis* 2004;**19**(1/2):135-147.  
40  
41  
42  
43 48. Statistics South Africa. Census 2001: Census in Brief. Pretoria: Statistics South Africa. 2001.  
44  
45 Available from <http://www.statssa.gov.za/census01/html/CInBrief/CIB2001.pdf> (Accessed January  
46  
47 2014)  
48  
49  
50 49. Kessler, R.C., Üstün, T.B. The World Mental Health (WMH) Survey Initiative Version of the World  
51  
52 Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods*  
53  
54 *Psychiatr Res* 2004;**13**:61-98.  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
50. Seedat, S., Stein, D.J., Herman, A., et al. Twelve-month treatment of Psychiatric disorders in South Africa Stress and Health Study (World Mental Health Survey Initiative). *Psychiatric Epidemiology* 2008;**38**:211-220.
51. Seedat, S., Williams, D.R., Herman, A., et al. Mental health service use among South Africans for mood, anxiety and substance use disorders. *South African Medical Journal* 2009b;**99**:346-352.
52. World Health Organization. *World Health Organization Manual of the international statistical classification of diseases, injuries and causes of death, ninth revision*. Geneva, Switzerland, 1992.
53. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders (DSM-IV)*, 4<sup>th</sup> Edition. Washington: American Psychiatric Association Press, 1994.
54. [Straus MA. Measuring Intrafamily Conflict and Violence: The Conflict Tactics \(CT\) Scales. \*Journal of Marriage and Family\* 1979;\*\*41\*\*\(1\):75](#)
55. Kessler, R.C., McLaughlin, K.A., Green, J.G. Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *Br J Psychiatry* 2010;**197**:378-385.
56. Stein, D.J., Chiu, W.T., Hwang, I., et al. Cross-national analysis of the associations between traumatic events and suicidal behavior: Findings from the WHO World Mental Health Surveys. *PloS ONE* 2010;**5**(5):e10574.
57. Joiner Jr, T.E., Sachs-Ericsson, N.J., Wingate, L.R. Childhood physical and sexual abuse and lifetime number of suicide attempts: A persistent and theoretically important relationship. *Behav Res Ther* 2007;**45**:539-547.



*Association between childhood adversities and suicidality*

- 1  
2  
3 58. Afifi, T.O., Boman, J., Fleisher, W., et al. The relationship between child abuse, parental divorce,  
4 and lifetime mental disorders and suicidality in a nationally representative adult sample. *Child*  
5 *Abuse Negl* 2009;**33**:139–147.  
6  
7  
8  
9  
10  
11 59. Bebbington, P.E., Cooper, C.C., Minot, S., et al. Suicide attempts, gender, and sexual abuse: data  
12 from the 2000 British Psychiatric Morbidity Survey. *Am J Psychiatry* 2009;**166**:1135-1140.  
13  
14  
15  
16  
17 60. Molner, B, Buka, S, & Kessler, R. Child sexual abuse and subsequent psychopathology: results from  
18 the National Comorbidity Survey. *American Journal Public Health* 2001;**91**:753-760.  
19  
20  
21  
22  
23 61. Borges, G., Angst, J., Nock, M.K., et al. Risk factors for the incidence and persistence of suicide  
24 related outcomes: a 10 year follow up study using the National Comorbidity Surveys. *J Affect*  
25 *Disord* 2008;**105**:25-33  
26  
27  
28  
29  
30  
31 62. Xing, X-Y., Tao, F-B., Wan, Y-H., et al. Family factors associated with suicide attempts among  
32 Chinese adolescent students: A national cross-sectional survey. *J Adolesc Health* 2010;**46**:592-599.  
33  
34  
35  
36 63. Gureje, O., Kola, L., Uwakwe, R., et al. The profile and risks of suicidal behaviours in the Nigerian  
37 Survey of Mental Health and Well Being. *Psychol Med* 2007;**37**:821-830.  
38  
39  
40  
41 64. Knauper, BC., CF, Schwarz, N., Bruce, ML., Kessler, RC. Improving the accuracy of major  
42 depression age of onset reports in the US National Comorbidity Survey. *Int J Methods Psychiatr Res*  
43 1999;**8**(1):39-48  
44  
45  
46  
47  
48  
49 65. Brewin, CR., Andrews, B., Botlib, IH. Psychopathology and early experience: a reappraisal of  
50 retrospective reports. *Psychol Bull* 1993;**113**:82-98  
51  
52  
53  
54 66. Hardt, J., Rutter, M. Validity of adult retrospective reports of adverse childhood experiences: a  
55 review of the evidence. *J Child Psychol Psychiatry* 2004;**45**:260-273.  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3 67. Dube, SR., Williamson, DF., Thompson, T., Felitti, VJ, Anda, RF. Assessing the reliability of  
4 retrospective reports of adverse childhood experiences among adult HMO members attending a  
5 primary care clinic. *Child Abuse Negl* 2004;**28**(7):729-737.  
6  
7  
8  
9  
10  
11 68. Yancura, LA., Aldwin, CM. (2009). Stability and change in retrospective reports of childhood  
12 experiences over a 5-year period: Findings from the David Longitudinal Study. *Psychol Aging*  
13 2009;**24**(3):715-721  
14  
15  
16  
17  
18  
19 69. Wilsnack, S.C., Wonderlich, S.A., Kristjanson, A.F., et al. (2002). Self reports of forgetting and  
20 remembering childhood sexual abuse in a nationally representative sample of US women. *Child*  
21 *Abuse Negl* 2002;**26**:139-147.  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality***Table 1:** Descriptive Characteristics (N= 4351)

		N
Mean Age (yrs) (SE)	37.0 (0.26)	
<b>Age categories (yrs)</b>		
18 – 29	39.1%	1701
30 – 39	22.1%	962
40 - 49	18.1%	788
≥ 50	20.7%	901
<b>Sex Gender</b>		
Male	46.3%	2015
Female	53.7%	2336
<b>Race</b>		
Black	76.2%	3315
Coloured	10.4%	453
White	10.0%	435
Indian/Asian	3.4%	148
<b>Married</b>	50.1%	2180
<b>Location</b>		
Rural	38.4%	1671
Urban	61.6%	2680
<b>Education</b>		
None	6.8 %	296
Grade 1-7	19.1%	831
Grade 8-11	35.4%	1540
Matric	23.5%	1022
Matric +	15.3%	666
<b>Employed</b>	31.0%	1349
<b>Income Category (Rands), (mean SD)</b>		
0	13.7%	596
1 - 2500	29.5%	1284
2501 – 5000	15.4%	670
5001 – 10 000	19.6%	853
≥ 10001	21.8%	949
<b>Province</b>		
Eastern Cape	13.1%	570
Free State	6.2%	270
Guateng	23.0%	1001
Kwazulu Natal	19.5%	848
Limpopo	10.5%	457
Mpumalanga	6.6%	287
Northern Cape	1.9%	83
North West	8.3%	361
Western Cape	11.1%	483

*Association between childhood adversities and suicidality***Table 2:** Prevalence of childhood adversities and suicidal behaviour in South Africa[%<sup>b</sup> (S.E.)]

	Total Sample		Total Sample		Suicidal Ideators		Suicidal Ideators	
	With Attempt	No attempt	With Ideation	No ideation	With Plan	No plan	With Attempt	No attempt
Physical Abuse	24.9 (4.6)	12.2 (0.8)	21.1 (2.5)	11.8 (0.7)	24.3 (4.6)	27.9 (4.0)	24.9 (4.6)	24.5 (3.6)
Sexual Abuse	2.1 (1.2)	0.1 (0.0)	0.7 (0.4)	0.1 (0.0)	1.6 (0.9)	0.0 (0.0)	2.1 (1.2)	0.0 (0.0)
Parent Died	11.6 (2.4)	11.3 (0.6)	13.9 (2.3)	11.3 (0.6)	12.2 (2.4)	16.1 (4.2)	11.6 (2.4)	15.6 (3.8)
Parent Divorced	14.2 (3.8)	4.8 (0.4)	7.9 (1.6)	4.7 (0.4)	9.7 (2.6)	9.2 (3.7)	14.2 (3.8)	6.7 (2.9)
Other Parent Loss	2.1 (1.2)	2.2 (0.4)	3.9 (1.2)	2.1 (0.4)	1.1 (0.6)	3.0 (1.4)	2.1 (1.2)	2.7 (1.3)
Family Violence	4.3 (1.5)	3.0 (0.3)	4.1 (0.9)	2.9 (0.3)	4.7 (1.5)	6.3 (1.8)	4.3 (1.5)	4.5 (1.4)
Physical Illness	5.0 (2.3)	2.5 (0.3)	4.0 (1.2)	2.4 (0.3)	4.4 (1.8)	4.7 (1.8)	5.0 (2.3)	4.3 (1.6)
Financial Adversity	6.1 (2.4)	5.6 (0.5)	4.1 (0.9)	5.8 (0.5)	6.0 (2.1)	3.3 (1.5)	6.1 (2.4)	2.9 (1.0)
1	35.4 (4.2)	23.4 (1.0)	35.9 (2.8)	22.7 (0.9)	32.9 (4.0)	41.7 (5.2)	35.4 (4.2)	40.5 (4.5)
2+	15.4 (3.4)	8.6 (0.5)	10.8 (1.7)	8.6 (0.5)	14.1 (3.2)	13.2 (3.3)	15.4 (3.4)	9.6 (2.3)
a	(140)	(107309)	(394)	(112243)	(171)	(1976)	(140)	(2212)

<sup>a</sup> Number of cases with the outcome variable; N represents the number of person years.

<sup>b</sup> % represents the percentage of people with the adversity among the cases with the outcome variable indicated in the column header. For example: the first cell is the % of those with physical abuse among those with attempts.

Association between childhood adversities and suicidality

**Table 3: Multivariate and Bivariate models for associations between childhood adversities and lifetime suicidality<sup>1</sup>**

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

	LT Attempts in total sample <sup>b</sup>				Ideators among total sample <sup>c</sup>				Suicidal Ideators with LT plans <sup>d</sup>				Suicidal Ideators with LT attempts <sup>e</sup>			
	Multivariate		Bivariate		Multivariate		Bivariate		Multivariate		Bivariate		Multivariate		Bivariate	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.0* (1.2-3.3)*	7.4(0.006)*	2.0* (1.2-3.2)*	7.3(0.007)*	1.7* (1.3-2.3)*	15.2(<0.001)*	1.7* (1.3-2.3)*	16.7(<0.01)*	0.6 (0.3-1.4)	1.3(0.25)	0.7 (0.3-1.4)	1.2(0.26)	1.0 (0.5-2.3)	0.0(0.93)	1.1 (0.5-2.5)	0.1(0.81)
Sexual Abuse	7.6* (2.0-29.9)*	8.9(0.003)*	7.9* (1.9-32.1)*	8.6(0.003)*	2.6 (0.6-10.6)	1.8(0.18)	3.0 (0.7-12.2)	2.5(0.11)	---	---	---	---	---	---	---	---
Parent Died	1.1 (0.6-1.8)	0.1(0.78)	1.1 (0.7-1.7)	0.1(0.76)	1.4 (0.9-2.1)	2.7(0.10)	1.3 (0.9-1.9)	2.0(0.16)	0.7 (0.3-1.7)	0.6(0.45)	0.8 (0.4-1.9)	0.3(0.62)	0.8 (0.5-1.5)	0.4(0.52)	0.8 (0.4-1.5)	0.4(0.53)
Parent Divorced	2.7* (1.5-5.0)*	10.8(0.001)*	2.8* (1.5-5.2)*	11.4(<0.001)*	1.6* (1.0-2.4)*	4.3(0.038)*	1.5 (1.0-2.3)	3.7(0.05)	0.9 (0.3-3.3)	0.0(0.88)	1.2 (0.4-3.8)	0.1(0.78)	3.1* (1.2-8.6)*	5.2(0.023)*	3.0* (1.1-8.0)*	4.9(0.027)*
Other Parent Loss	1.0 (0.3-3.3)	0.0(0.95)	0.9 (0.3-2.8)	0.1(0.81)	1.7 (1.0-3.0)	3.6(0.06)	1.6 (0.9-2.7)	2.9(0.09)	0.4 (0.1-2.6)	0.9(0.34)	0.5 (0.1-2.7)	0.7(0.41)	2.0 (0.2-17.3)	0.4(0.51)	2.5 (0.6-11.0)	1.5(0.22)
Family Violence	0.7 (0.3-1.7)	0.6(0.42)	1.0 (0.4-2.2)	0.0(0.98)	0.8 (0.5-1.4)	0.5(0.47)	1.1 (0.6-1.8)	0.0(0.83)	1.0 (0.4-2.4)	0.0(0.97)	0.8 (0.4-2.0)	0.2(0.68)	2.4 (0.9-6.3)	3.5(0.06)	2.2 (0.9-5.5)	2.9(0.09)
Physical Illness	1.1 (0.4-3.5)	0.1(0.81)	1.5 (0.6-4.1)	0.7(0.39)	1.2 (0.6-2.3)	0.2(0.63)	1.3 (0.7-2.4)	0.7(0.42)	0.8 (0.2-3.1)	0.1(0.71)	0.9 (0.2-3.5)	0.0(0.86)	1.2 (0.3-3.9)	0.1(0.80)	1.2 (0.4-4.0)	0.1(0.77)
Financial Adversity	1.0 (0.4-2.7)	0.0(0.94)	1.2 (0.5-2.8)	0.1(0.73)	0.6 (0.4-1.1)	3.0(0.08)	0.7 (0.4-1.2)	1.4(0.23)	2.4 (0.7-8.4)	1.9(0.17)	1.9 (0.6-6.8)	1.1(0.29)	2.1 (0.7-6.0)	2.1(0.15)	2.0 (0.7-6.3)	1.6(0.21)

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.  
<sup>b</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).  
<sup>c</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).  
<sup>d</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).  
<sup>e</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

**Table 4:** Associations between number of childhood adversities and lifetime suicidality<sup>1</sup>

Number of child adversities	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
1	1.9* (1.3-2.8)*		1.8* (1.5-2.3)*		0.5 (0.3-1.0)		0.9 (0.5-1.7)	
2+	2.1* (1.2-3.8)*	14.3(<.001)*	1.4* (1.0-2.0)*	28.3(<.001)*	1.1 (0.3-3.3)	4.5(0.10)	2.7* (1.3-5.9)*	8.3(0.016)*

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.

<sup>b</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup>Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

## Association between childhood adversities and suicidality

**Table 5:** Final multivariate model for associations between childhood adversities and lifetime suicidality<sup>1</sup>

	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.2* (1.3-3.8)*	8.9(0.003)*	2.1* (1.6-2.8)*	25.4(<.001)*	0.4* (0.2-1.0)*	4.3(0.038)*	0.8 (0.3-2.1)	0.3(0.60)
Sexual Abuse	9.3* (2.5-35.2)*	11.2(<.001)*	3.7 (0.9-15.9)	3.3(0.07)	---	---	---	---
Parent Died	1.2 (0.7-2.3)	0.4(0.51)	1.7* (1.1-2.6)*	6.6(0.010)*	0.4 (0.1-1.3)	2.2(0.14)	0.6 (0.3-1.1)	2.8(0.10)
Parent Divorced	3.1* (1.7-5.6)*	14.5(<.001)*	1.9* (1.2-3.0)*	8.1(0.004)*	0.7 (0.2-2.3)	0.4(0.51)	2.4 (0.9-6.4)	3.0(0.08)
Other Parent Loss	1.1 (0.3-4.3)	0.0(0.87)	2.1* (1.3-3.6)*	8.3(0.004)*	0.3 (0.0-2.0)	1.8(0.18)	1.3 (0.1-13.3)	0.1(0.79)
Family Violence	0.9 (0.3-2.3)	0.1(0.76)	1.1 (0.6-2.3)	0.2(0.69)	0.4 (0.1-1.8)	1.6(0.20)	1.2 (0.4-4.1)	0.1(0.76)
Physical Illness	1.4 (0.4-5.3)	0.2(0.63)	1.6 (0.7-3.3)	1.4(0.24)	0.6 (0.1-2.5)	0.5(0.46)	0.9 (0.2-3.3)	0.0(0.85)
Financial Adversity	1.3 (0.4-3.7)	0.2(0.65)	0.9 (0.4-1.7)	0.1(0.71)	1.6 (0.4-6.0)	0.6(0.44)	1.4 (0.5-4.3)	0.4(0.52)
group significance test for all types		29.4(<.001)*		43.0(<.001)*		833.9(<.001)*		11.5(0.18)
significance test for difference between types		13.1(0.07)		9.2(0.24)		805.7(<.001)*		11.8(0.11)
2+ adversities	0.7 (0.2-1.8)	0.7(0.41)	0.5* (0.3-0.9)*	4.9(0.028)*	4.7 (0.8-29.2)	2.9(0.09)	2.9 (0.8-10.6)	2.7(0.10)

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.

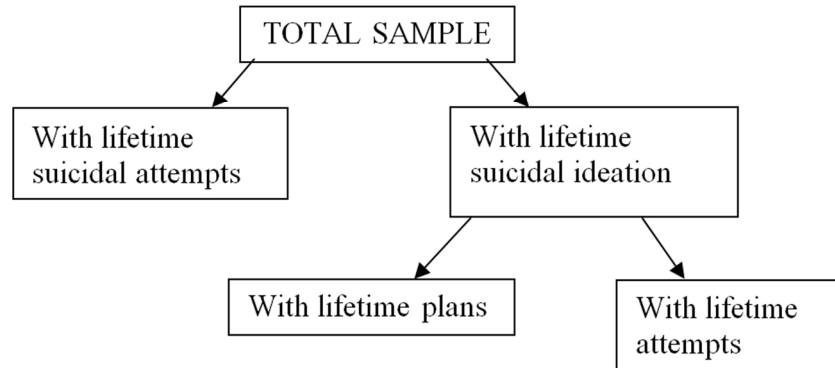
<sup>b</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup> Models controls for int(1-5 intervals), demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

1  
2  
3  
4  
5  
6  
7 **Figure 1:** Schematic representation  
8  
9



23 Schematic representation  
24 301x142mm (96 x 96 DPI)  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found
<b>Introduction</b>		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
<b>Methods</b>		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses

Continued on next page

**Results**

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

**Discussion**

Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results

**Other information**

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based
---------	----	---------------------------------------------------------------------------------------------------------------------------------------------------------------

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

# BMJ Open

## Association between childhood adversities and long-term suicidality among South Africans from the results of the South African Stress and Health Study: a cross-sectional study

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2013-004644.R2
Article Type:	Research
Date Submitted by the Author:	28-Apr-2014
Complete List of Authors:	Bruwer, Belinda; Stellenbosch University, Psychiatry Govender, Ravi; Stellenbosch University, Psychiatry Bishop, Melanie; Stellenbosch University, Psychiatry Williams, David; Harvard University, Human Development and Health Stein, Dan; University of Cape Town, Psychiatry and mental health Seedat, Soraya; Stellenbosch University, Psychiatry
<b>Primary Subject Heading</b>:	Mental health
Secondary Subject Heading:	Mental health
Keywords:	MENTAL HEALTH, Child & adolescent psychiatry < PSYCHIATRY, Adult psychiatry < PSYCHIATRY, PSYCHIATRY, Suicide & self-harm < PSYCHIATRY

SCHOLARONE™  
Manuscripts

Only

*Association between childhood adversities and suicidality*

**Association between childhood adversities and long-term suicidality among South Africans from the results of the South African Stress and Health Study: a cross-sectional study**

Belinda Bruwer\*<sup>a</sup>, Ravi Govender<sup>a</sup>, Melanie Bishop<sup>a</sup>, David R Williams<sup>b</sup>, Dan J Stein<sup>c</sup>, Soraya Seedat<sup>a</sup>

<sup>a</sup> Department of Psychiatry, Stellenbosch University, PO Box 19063, Tygerberg, 7505, Republic of South Africa.

<sup>b</sup> Department of Society, Human Development and Health, Harvard School of Public Health, and Department of African and African American Studies, Harvard University. Department of Society, Human Development and Health, 677 Huntington Avenue, 6<sup>th</sup> floor, Boston, MA 02115, United States of America

<sup>c</sup> Department of Psychiatry and Mental Health, University of Cape Town, Groote Schuur Hospital (J2), Anzio Road, Observatory, 7925, Cape Town, Republic of South Africa

\*Corresponding author: Department of Psychiatry, University of Stellenbosch, PO Box 19063, Tygerberg, 7505, Republic of South Africa.

Tel nr: +27219404467. Fax nr: +27219404543, [bbrewer@sun.ac.za](mailto:bbrewer@sun.ac.za)

Keywords: Childhood adversities, suicidal ideation, suicidal attempts, suicide, suicidal behaviour

Word count: 5349

*Association between childhood adversities and suicidality***ABSTRACT****Objective:**

Suicide and suicidal behaviours are significant public health problems and a leading cause of death worldwide and in South Africa. We examined the association between childhood adversities and suicidal behaviour over the life course.

**Methods:**

A national probability sample of 4,351 South African adult participants (aged 18 years and older) in the South African Stress and Health (SASH) study was interviewed, as part of the World Mental Health Survey initiative. Respondents provided socio-demographic and diagnostic information, as well as an account of suicide-related thoughts and behaviours. Outcomes were defined as suicide attempts and suicidal ideation in the total sample, and suicide plans and attempts among ideators. Childhood adversities included physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness and financial adversity. The association between suicidality and childhood adversities was examined using discrete-time survival models.

**Results:**

More than a third of respondents with suicidal behaviour experienced at least 1 childhood adversity, with physical abuse, parental death and parental divorce the most prevalent adversities. Physical abuse, sexual abuse and parental divorce were identified as significant risk markers for lifetime suicide attempts, while physical abuse and parental divorce were significantly correlated with suicidal ideation. Two or more childhood adversities were associated with a 2-fold higher risk of lifetime suicide attempts. Sexual abuse (OR=9.3, childhood, parental divorce (OR=3.1)

*Association between childhood adversities and suicidality*

1  
2  
3 and physical abuse (OR=2.2) had the strongest associations with lifetime suicide attempts. The  
4  
5 effect of childhood adversities on suicidal tendencies varied over the *life course*. For example,  
6  
7 sexual abuse was significantly associated with suicide attempts during childhood and teen years,  
8  
9 but not during young and later adulthood.  
10  
11

**Conclusions:**

12  
13  
14  
15  
16 Childhood adversities, especially sexual abuse, physical abuse and parental divorce are important  
17  
18 risk factors for the onset and persistence of suicidal behaviour, with this risk greatest in childhood  
19  
20 and adolescence. The risk for suicidal behaviour was greatest in childhood and adolescence.  
21  
22 Suicidal risk in childhood and adolescence was significantly associated with the following  
23  
24 childhood adversities: sexual abuse, physical abuse and parental divorce.  
25  
26  
27  
28  
29

30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Keywords: Childhood adversities, suicidal ideation, suicidal attempts

*Association between childhood adversities and suicidality***Article Summary****Strengths and limitations**

- Recall bias might have impacted on the accuracy of recall of childhood adversities.
- In view of the cross-sectional design, more detailed, temporal information on childhood adversities and suicidal incidents was not obtained.
- Variables such as culture, ethnicity and mental status at the time of the interview may have influenced the recall and reporting of suicidal behaviour. Stigma associated with mental health problems may have also played a role in the reporting suicidal tendencies.
- We do not assess for self-mutilating behavior. The importance of discriminating suicidal behaviour from non-suicidal self-mutilation cannot be underestimated. The CIDI instrument which was used in this study is a lay-administered instrument which does not include an assessment of several key DSM-IV diagnoses (such as bipolar disorder and psychosis), are associated with elevated rates of suicidality. As a result, some participants with suicidality may have not have been diagnosed with a disorder.
- This study represents the first investigation among South Africans of a wide range of childhood adversities and their impact on the onset and persistence of suicidality over the life course.

*Association between childhood adversities and suicidality***INTRODUCTION**

Suicide and suicidal behaviour are significant public health problems. Suicide is one of the leading causes of death worldwide with almost 1 million people committing suicide each year [1]. This figure is likely to grow to approximately 1.2 million suicides in 2020 [2]. In South Africa, the annual rate of suicide is high [3, 4] mirroring international trends [5]. So, too, are rates of suicidal behaviour with an estimated prevalence of 9.1% for lifetime suicidal ideation and 2.9% for suicide attempts among South Africans according to the South African Stress and Health Survey (SASH) [6].

Despite the enormity of the problem, the aetiology of suicidal behaviour is not fully understood. There are controversies in the literature regarding prior psychiatric disorder and risk for suicide attempts. While some authors have argued that pre-existing disorder is an important risk factor (7-11), others have argued that suicide attempts are not necessarily associated with prior psychopathology [12]. Genetic factors also play an important role in suicidal behaviour [13-16]. While there is stronger evidence pointing towards environmental or experiential factors [17, 18] such as exposure to childhood adversities [19-28]. Recent multi-level country data from the World Mental Health Surveys (WMHS) initiative has allowed for cross-national comparisons of suicidality. The WMHS investigated the association between childhood adversities and suicidal behaviour [20], the persistence of suicidality over time, and the extent to which associations between childhood trauma and suicidality changed over the life course. The WMHS found a dose-response relationship between the number of adversities and suicidal behaviour. Sexual abuse and physical abuse were the strongest risk factors for both the onset and persistence of suicidal behaviours, with the risk for suicidality greatest during childhood (age 4-12 years) and adolescence (age 13-19 years) [20].



*Association between childhood adversities and suicidality*

Numerous studies have examined the link between childhood sexual abuse and suicidality [29-41]. All of these authors have found that exposure to childhood sexual abuse increases the risk for mental disorders, including suicidality. Furthermore, the majority of studies that have focused on the link between childhood physical abuse and suicidality have found that exposure to childhood physical abuse increases the risk for suicidality [42, 43]. There also appears to be an association between the number of childhood adversities experienced and the later suicidal behaviour [21, 23, 24, 44, 45].

Exposure to early life stress is prevalent among South Africans. In one sample of South African rural youth, the prevalence of physical and sexual abuse was shown to be very high with 94.4% of males exposed to physical abuse and 39.1% of females to sexual abuse [46]. More than a quarter of adults who were interviewed endorsed exposure to childhood adversity (parental death, parental separation or parental divorce) in the SASH study [47]. Significantly more females were prone to be victims of domestic violence than men [47]. Women also reported twice as many suicidal attempts than the male participants in the SASH study [9].

**Objective**

We report in more detail on data from a South African dataset gathered as part of the World Mental Health Surveys, which allowed for comparison with data from the overall cross-national sample. This data are particularly interesting as South Africa is a middle income African country with high rates of violent trauma exposure. The present study aimed to examine the relationship between the type and frequency of childhood adversity exposure to suicidal behaviour over the life trajectory of South Africans, given that there are no published nationally representative data that may be useful in informing both clinical practice and policy.

*Association between childhood adversities and suicidality***METHODS****Sample**

Data for the SASH Study were collected between January 2002 and June 2004. WMH surveys were carried out in 21 countries which included Nigeria and South Africa [48]. For detailed information on study methods see Williams et al. (2004) [48]. The research protocol for the SASH study was approved by the Human Subjects Committee of the University of Michigan, by Harvard Medical School ethics committee and by a single project assurance of compliance from the Medical University of South Africa (MEDUNSA), and by the National Institute of Mental Health. It was a national probability sample of 4,351 South African adults (persons aged 18 years and older) living in households or in hostel accommodation. All racial and ethnic groups were represented, with the sample selected using a three-stage probability sample design. The response rate was 85.5%.

*Sampling approach*

Sampling was divided into three stages. Primary sampling units was selected during the first stage, which was based on the 2001 SA census Enumeration Areas (EAs). The second stage involved sampling of household units within clusters selected in each EA. South Africans in both urban and rural areas were sampled. Sampled residences were stratified into 10 diverse housing categories: Rural-commercial, agricultural, rural traditional subsistence areas, African townships, informal urban or peri-urban shack areas, Coloured townships, Indian townships, general metropolitan residential areas, general large metropolitan residential areas, and domestic servant accommodation in urban areas. During the third stage, one adult respondent in each sampled housing unit was selected. A total of 5089 households was selected. Field interviews were conducted with 4433 (87.1%) of designated respondents. Based on quality control, 4351

### *Association between childhood adversities and suicidality*

interviews were retained for use in the analysis. There were no differences in response rates across the four designated racial groups (white, Coloured [mixed racial origin], Indian, black). According to the 2001 Census statistics, 79.% people in South Africa are Black African, 8.9% are coloured, 9.6% are white, and 2.5% are Indian/Asian [49].

### **Diagnostic Interview**

SASH used version 3 of the World Health Organization Composite Diagnostic Interview (WHO CIDI) [50]. Interviewers were trained within a one week period and conducted the interviews in seven different languages, namely English, Afrikaans, Zulu, Xhosa, Northern Sotho, Southern Sotho, and Tswana. Translations of the CIDI into several native South African languages were conducted in accordance with WHO requirements. Multilingual and bilingual expert panels conducted the back-translations [51, 52]. Informed consent was obtained from participants after a complete description of the study was provided. Respondents provided socio-demographic and diagnostic information, as well as an account of suicidal behaviours during the interviews. The core diagnostic assessment of mental disorders included anxiety disorders (panic disorder, agoraphobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder), mood disorders (major depressive disorder, dysthymia), substance use disorders (alcohol abuse, alcohol dependence, drug abuse, drug dependence) and intermittent explosive disorder [53, 54].

### **Suicidal behaviour**

The CIDI 3.0 module on suicidal behaviour was used to assess the age-of-first-onset, age of most recent episode, and lifetime occurrence of suicidal ideation, suicide plans and suicide attempts. Suicidal ideation, suicide plans and suicide attempts was assessed with questions such as “Have you ever seriously thought about committing suicide?”, “Have you ever made a plan for committing suicide?”, and “Have you ever attempted suicide?”, respectively. Ideators only

*Association between childhood adversities and suicidality*

1  
2  
3 proceeded to answer questions about plans (“Have you ever made a plan for committing  
4  
5 suicide?”) and attempts (“Have you ever attempted suicide?”). Information on the age of first  
6  
7 occurrence of the three main outcomes was obtained. To get a better understanding of the  
8  
9 progression from ideation to attempt, the outcomes considered in this study were: suicide  
10  
11 attempts in the total sample; suicide ideation in the total sample; suicide plans among ideators;  
12  
13 suicide attempts among ideators with a plan (planned attempts), and suicide attempts among  
14  
15 ideators in the absence of a plan (unplanned or impulsive attempts).  
16  
17  
18  
19  
20

**Childhood adversities**

21  
22 Physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family  
23  
24 violence, physical illness and financial adversity were the various childhood adversities assessed.  
25  
26 Biological and non-biological parents were included in measures of parental death, divorce or  
27  
28 other parental loss. Financial adversities were assessed with questions on whether the family had  
29  
30 insufficient funds to pay for basic necessities. Questions about repeated fondling, attempted rape  
31  
32 or rape were asked to assess for sexual abuse. This comprised the following “The next 2  
33  
34 questions are about sexual assault: (i) The first is about rape. We define this as someone either  
35  
36 having sexual intercourse with you or penetrating your body with a finger or object when you did  
37  
38 not want them to, either by threatening you or using force, or when you were so young that you  
39  
40 didn’t know what was happening. Did this ever happen to you?”, and (ii) “Other than rape, were  
41  
42 you ever sexually assaulted or molested?”. A modified version of the Conflict Tactics Scale  
43  
44 (CTS2) was used to assess family violence and physical abuse [55]. Respondents were classified  
45  
46 as having experienced *physical abuse* when they indicated that, when they were growing up,  
47  
48 their father or mother (includes biological, step, or adoptive parents) slapped, hit, pushed,  
49  
50 grabbed, shoved, or threw something at them, or that they were beaten as a child by the persons  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

1  
2  
3 who raised them. Family violence was assessed as present when respondents indicated that they  
4  
5 (i) “were often hit, shoved, pushed, grabbed, or slapped while growing up” or (ii) “witnessed  
6  
7 physical fights at home, like when your father beat up your mother?” A standard chronic  
8  
9 conditions checklist assessed for life-threatening physical illnesses in childhood [56].  
10  
11

**Data analysis**

12  
13  
14  
15  
16 All data analyses were processed and analysed centrally by a team of statisticians at the Harvard  
17  
18 School of Public Health (Boston, USA) using the SAS version 9.1.3 software package. Discrete-  
19  
20 time survival analysis with time-varying covariates was used to study the risk factors of lifetime  
21  
22 suicide ideation, plans and attempts. Data were weighted to adjust for the stratified multistage  
23  
24 sample design, differential probability of selection within households as a function of household  
25  
26 size and clustering of data, and differential non-response. Overall, percentages were weighted to  
27  
28 adjust for differences in selection probabilities, differential non-response, oversampling of cases,  
29  
30 and residual differences on sociodemographic variables between the sample and the population  
31  
32 [48, 57]. A post-stratification weight was also used to make the sample distribution comparable,  
33  
34 for age, sex, and province, with the population distribution in the 2001 South African census.  
35  
36 Both weighted and geographic clustering of data were taken into account in the data analyses by  
37  
38 using a jackknife repeated replications simulation method implemented in SAS macro 14. The  
39  
40 survival coefficients were exponentiated and are reported below in the form of odds ratios.  
41  
42

43  
44 The association between suicidality and childhood adversity was examined using discrete-time  
45  
46 survival models with the analysis unit being person-years. Bivariate analyses (considering one  
47  
48 adversity at a time) and multivariate analyses (considering all adversities simultaneously) were  
49  
50 conducted. Two types of multivariate models were tested: multivariate additive models  
51  
52 (simultaneously considering all childhood adversities) and multivariate interactive models (with  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

number and type of childhood adversities experienced by each respondent included as dummy variables). The analysis also examined interactions between the life stage (13-19 years, 20-29 years, 30+ years) of respondents and each childhood adversity, as well as the influence each adversity had on early-, middle- and later- onset suicidality. Analyses were conducted using SUDAAN version 8.1 to adjust for clustering and weighting. Odds ratios (ORs) with a 95% confidence interval (CIs) are reported. Wald  $X^2$ - tests were used to examine multivariate significance. Associations between adversities and suicide outcomes were adjusted for sex, age, educational level, marital status, interactions between demographic variables, life course, lifetime mental disorders and parental psychopathology. Analyses also examined the influence of respondents' lifetime mental disorders on suicidality, as well as interactions between sex and each childhood adversity. Statistical significance using two-sided tests was set at  $p < .05$  [20]. Based on an N of 4000 (alpha of 0.05, 2 sided significance), the study was adequately powered (.99), to detect an OR of 2.0 of a continuously distributed normalized predictor and a 10% prevalence of suicidal behaviour.

**RESULTS*****Demographic details***

In the sample, (n = 4351), there were slightly more female (53.7%) than male respondents. There were more black (76.2%) than coloured (10.4%), white (10%), and Indian/Asian (3.4%) respondents. Furthermore, half of the sample was married and most were unemployed (69.2%), had less than 12 years of education (62.7%) and lived in an urban area (59.7%) (see Table 1).

***Prevalence of childhood adversities among the total sample***

Figure 1 provides a schematic representation of the suicidality data reported in the sections which follow. In the total sample, 35.4% of participants with one adversity had a suicide attempt,

### *Association between childhood adversities and suicidality*

1  
2  
3 compared with 23.4% with one adversity who had not made an attempt. Physical abuse (24.9%),  
4  
5 parental divorce (14.2%) and parental death (11.6%) were most prevalent among those suicide  
6  
7 attempters. Among those exposed to one childhood adversity, without a suicide attempt, the two  
8  
9 most prevalent adversities reported were physical abuse (12.2%) and parental death (11.3%). In  
10  
11 the total sample 15.4% of participants exposed to two or more adversities had a suicide attempt.  
12  
13 In contrast, 8.6% of participants exposed to two or more adversities had not made an attempt  
14  
15 (Table 2).  
16  
17  
18  
19

### *Prevalence of childhood adversities among suicidal ideators in the total sample*

20  
21  
22 In the sample as a whole, 35.9% of those with one adversity had suicidal ideation compared with  
23  
24 22.7% of those with one adversity who had no ideation. The most prevalent adversities  
25  
26 associated with suicidal ideation were physical abuse (21.1%), parental death (13.9%), and  
27  
28 parental divorce (7.9%). Among those without suicidal ideation, physical abuse (11.8%) and  
29  
30 parental death (11.3%) were the most commonly endorsed childhood adversities. Of those who  
31  
32 endorsed two or more childhood adversities, 10.8% reported suicidal ideation and 8.6% did not  
33  
34 (Table 2). In summary, the most prevalent childhood adversities reported among the total sample  
35  
36 with/without suicidal ideation were firstly, physical abuse and secondly, the death of a parent.  
37  
38  
39  
40  
41  
42

### *Prevalence of suicide attempts in the total sample*

43  
44  
45 In the total sample, 24.9% of those with childhood physical abuse had attempted suicide while  
46  
47 12.2% of respondents with no physical abuse had no attempt. Of those exposed to parental  
48  
49 divorce, 14.2% had attempted suicide and 4.8% had made no attempt. The second most prevalent  
50  
51 childhood adversity was parental death with 11.6% of those with parental death attempting  
52  
53 suicide and 11.3% of those with parental death with no attempts (Table 2).  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality****Prevalence of childhood adversities among suicidal ideators****With/without a plan*

Among suicidal ideators with a plan, 32.9% had experienced one childhood adversity. Among ideators with no plan, 41.7% had one childhood adversity. Among ideators with a plan, the following were the most prevalent childhood adversities: physical abuse (24.3%), parental death (12.2%), and parental divorce (9.7%). Among ideators without a plan, 27.9% endorsed physical abuse, 16.1% parental death, and 9.2% parental divorce (see Table 2). In both groups (ideators with and without a plan), physical abuse was the most prevalent childhood adversity, followed by parental death and parental divorce.

*With or without an attempt*

Among suicidal ideators who had attempted suicide, 35.4% were exposed to one childhood adversity and 15.4% were exposed to two or more childhood adversities. In the group of ideators who had made an attempt, 24.9% had experienced physical abuse, 14.2% parental divorce, and 11.6% parental death (Table 2). 40.5% of those with one adversity, and 9.6% of those exposed to two or more adversities were suicidal ideators with no attempts. In this group, the most prevalent adversities were physical abuse (24.5%), parental death (15.6%) and parental divorce (6.7%) reported (Table 2).

Among all ideators (with/without a plan, with/without an attempt), the most prevalent childhood adversity was physical abuse, followed by parental death and parental divorce. Of note, in the group of ideators with an attempted suicide parental divorce was more prevalent than parental death.

***Bivariate and multivariate results: Type of childhood adversity***



### *Association between childhood adversities and suicidality*

Bivariate and multivariate analyses were performed to examine the associations between the different childhood adversities (physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness, financial adversity) and lifetime suicidal ideation, plans and attempts.

In the total sample, bivariate and multivariate analysis revealed significant associations between (i) sexual abuse (bivariate: OR=7.9, p=0.003; multivariate: OR=7.6, p=0.003), (ii) physical abuse (OR 2, p=0.007; OR 2.0, p=0.006) and (iii) parental divorce (OR 2.8, p<.001; OR 2.7, p=0.001), and lifetime suicide attempts. Among ideators in the sample, physical abuse (OR=1.7, p<.001; OR=1.7, p<.001) was significantly associated with suicidal ideation. Multivariate analyses revealed an additional association with suicidal ideation, namely parental divorce (OR = 1.6, p=0.038). The relationship between childhood adversities and lifetime plans was not statistically significant. However, a significant association was found between parental divorce and lifetime suicidal attempts among ideators (OR=3.0, p<.001; OR=3.1, p=0.023) (Table 3).

Findings from multivariate analysis, therefore, confirm findings of bivariate analysis for all groups, except for ideators. Among ideators bivariate analysis revealed a significant relationship between physical abuse and suicidal ideation. This was confirmed in multivariate analysis where the association between parental divorce and suicidal ideation was significant for the whole sample.

### ***Bivariate associations between the number of adversities and lifetime suicidality***

The relationship between the number of childhood adversities and lifetime suicidal ideation, plans and attempts was further examined. There was a significant relationship between the number of childhood adversities and lifetime suicide attempts. Two or more childhood

*Association between childhood adversities and suicidality*

adversities were associated with a 2-fold higher risk of lifetime suicide attempts in the total sample (OR=2.1,  $p<.001$ ). A significant relationship was also established between one, as well as two or more adversities with ideators in the total sample. Among ideators, no significant association was found between the number of childhood adversities and lifetime plans. A significant relationship was found between two or more adversities and lifetime attempts among ideators (OR=2.7,  $p=0.016$ ), indicating a more than 2-fold higher risk of lifetime suicide attempts in this group (Table 4).

*Multivariate associations between number of childhood adversities and lifetime suicidality*

In the final multivariate model which included 2 or more adversities as a predictor variable, sexual abuse (OR=9.3,  $p<.001$ ), childhood physical abuse (OR=2.2,  $p=0.003$ ) and parental divorce (OR=3.1,  $p<.001$ ) retained significant associations with lifetime suicide attempts in the total sample. Physical abuse (OR=2.1,  $p<.001$ ), parental death (OR=1.7,  $p=0.010$ ), parental divorce (OR=1.9,  $p=0.004$ ) and other parental loss (OR = 2.1,  $p=0.004$ ) were significant predictors of suicidal ideation (Table 5a) The same findings emerged after controlling for mental disorders, with the exception that sexual abuse was also significantly associated with suicidal ideation (Table 5b). Physical abuse was associated with a lower odds of lifetime suicide plans among ideators (OR = 0.4,  $p=0.038$ ) (Table 5a). There were no significant associations between childhood adversities and lifetime attempts among those with suicidal ideation. The findings remain unchanged after controlling for mental disorders (Table 5b).

*Associations between the types of childhood adversity and lifetime suicidality over the life course*

Multivariate analyses were performed to examine the association between the types of childhood adversity and lifetime suicidal ideation, plans and attempts during childhood years (age 4- 12),

*Association between childhood adversities and suicidality*

1  
2  
3 teenage years (age 13-19), young adulthood (age 20-29) and later adulthood (30 years and older)  
4  
5 (see Web table 1).  
6  
7

8  
9 Childhood years (4-12). Sexual abuse (OR=61.6, CI=4.5-841.0, p=0.002) in early childhood (4-  
10  
11 12 years of age) was significantly associated with lifetime suicide attempts in the total sample  
12  
13 (OR = 61.6, CI=4.5-841.0, p=0.002). Both sexual abuse (OR=34.8, CI= 3.1-392.6, p=0.003) and  
14  
15 physical abuse (OR=3.7, CI=1.0-13.4, p=0.041) were associated with a higher risk for suicidal  
16  
17 ideation among the total sample. No significant associations were found between any of the  
18  
19 childhood adversities and lifetime plans in the group of ideators. Among those with suicidal  
20  
21 ideation, parental death (OR=2.2, CI=1.1-4.3, p=0.021) was significantly associated with suicide  
22  
23 attempts in childhood years.  
24  
25  
26  
27

28  
29 Teen years (13-19). Sexual abuse (OR=20.3, CI=2.0-210.2, p=0.010), physical abuse (OR=3.7,  
30  
31 CI=1.5-9.2, p=0.004), and parental divorce (OR=4.6, CI=1.7-12.1, p=0.002) were significantly  
32  
33 associated with suicide attempts in the total sample of teenagers. Physical abuse (OR=3.6,  
34  
35 CI=2.2-5.9, p<.001) and parental death (OR=2.2, CI=1.1-4.3, p=0.021) significantly increased  
36  
37 the risk for suicidal ideation among the total group of teens. Physical illness (OR=9.9, CI=1.8-  
38  
39 54.0, p=0.007) significantly increased the risk of suicidal plans in teens with suicidal ideation.  
40  
41 Suicide attempts among teens with suicidal ideation was significantly predicted by parental  
42  
43 divorce (OR=4.3, CI=1.1-17.0, p=0.035).  
44  
45  
46  
47

48  
49 Young adulthood (20-29). None of the childhood adversities were significantly associated with  
50  
51 lifetime suicide attempts during young adulthood in the sample overall. An explanation could be  
52  
53 that suicide attempts spike earlier and later in life among South Africans, contributing to the lack  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

of significance. Parental loss other than parental death was significantly associated with suicidal ideation (OR=2.9, CI=1.2-7.4, p=0.019).

Later adulthood ( $\geq 30$ ). Childhood physical abuse (OR=2.2, CI=1.0-4.8, p=0.035) was significantly predictive of suicidal attempts. The likelihood of suicidal ideation significantly increased in later adulthood if parental loss other than parental death (OR=5.1, CI=2.1-12.1, p<.001) or physical illness had been present during childhood (OR=4.3, CI=1.1-15.9, p=0.028). No significant relationship was found between any of the childhood adversities and lifetime plans in the group of ideators although a significant relationship was found between two or more adversities and lifetime plans among those who were ideators (OR=44.5, CI=2.5-779.1, p<.008). None of the childhood adversities were significantly associated with suicide attempts among ideators in this age group.

**DISCUSSION**

Rates of childhood adversities and suicidal behaviours were both high among South Africans, with more than a third of respondents in the total sample who attempted suicide experiencing one childhood adversity, and 15.4% experiencing two or more adversities. Overall, physical abuse, sexual abuse, parental divorce and physical illness were far more prevalent in those with a suicide attempt than in those without. The most prevalent childhood adversities endorsed overall were physical abuse followed by parental death. Physical abuse, parental divorce and death of a parent were also the most prevalent adversities experienced in those with a suicide attempt as well as in those with suicidal ideation. These findings are somewhat dissimilar to other country samples; for example in the 21 countries that participated in the WMHS, physical abuse (29.3%), family violence (24.8%) and neglect (19.3%) were the most prevalent childhood adversities among those with a lifetime suicide attempt, while physical abuse (20.6%), family violence (17.6%) and death

*Association between childhood adversities and suicidality*

1  
2  
3 of a parent (14.2%) were most often reported among participants with lifetime suicidal ideation  
4  
5 [20]. Cross-nationally, it would appear that physical abuse is the commonest childhood adversity  
6  
7 associated with lifetime suicide attempts and ideation [20].  
8  
9

10  
11 The estimate lifetime prevalence of 2.9% for attempted suicide among South Africans is close to  
12  
13 the rates of 4.6% and 4.1% reported for general and Black populations respectively in USA. In  
14  
15 addition the 9.1% estimated prevalence of suicide ideation is comparable with previous estimates  
16  
17 from studies in South African clinical samples. Joe et al. (2008b) reported for the first time on the  
18  
19 rates of suicide ideation, plan and attempts among the different ethnic groups, in data from the  
20  
21 SASH study [6]. Overall, the results suggest that people in SA engage in suicidal thought and  
22  
23 behaviours at levels nearly comparable with those of Western nations.  
24  
25  
26  
27

28  
29 When examining suicidal behaviour risk in the context of childhood adversity, sexual abuse,  
30  
31 physical abuse and parental divorce emerged as significant risk factors for lifetime suicide  
32  
33 attempts in the total sample. Furthermore, physical abuse and parental divorce were significant  
34  
35 risk factors for suicidal ideation in the total sample. After adjusting for mental illness, sexual  
36  
37 abuse was also a significant risk factor for suicidal ideation. Parental divorce emerged as a  
38  
39 significant risk factor among ideators with lifetime suicide. These findings are largely consistent  
40  
41 with the data from the overall cross-national WMHS, which found that physical and sexual abuse  
42  
43 significantly increased the likelihood of suicidal ideation and attempts, while neglect was a risk  
44  
45 factor for suicidal behaviour in multivariate additive analyses [20].  
46  
47  
48  
49

50  
51 Of the adversities implicated, sexual and physical abuse were more significant risk factors than  
52  
53 other adversities, highlighting the fact that intrusive and aggressive experiences in childhood may  
54  
55 have more devastating and longer lasting effects [58]. This may be due to the extreme  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

1  
2  
3 powerlessness and loss of control that such abuse causes, or to physically aggressive assaults  
4  
5 resulting in the devaluation of one's body and consequent susceptibility to self harm [28]. In a  
6  
7 country with high rates of sexual and physical abuse [46] this is particularly concerning. The  
8  
9 impact of parental divorce on suicidality supports previous findings that parental divorce, if  
10  
11 accompanied by other adversities such as childhood abuse, increases the risk of suicidal  
12  
13 behaviour [59].  
14  
15

16  
17  
18 We also found that exposure to *two or more childhood adversities* significantly increased the risk  
19  
20 of suicide attempts among ideators. This confirms earlier work showing exposure to multiple  
21  
22 childhood adversities increases the risk of suicidal behaviour [21, 23, 24, 60, 61]. Bruffaerts et al  
23  
24 (2010) found a sub-additive effect with regards to the onset of suicidal behaviour when  
25  
26 considering multiple adversities [20]. Thus, the impact of multiple adversities was not equal to  
27  
28 the sum of the odds ratios of individual adversities. In the overall WMHS analysis exposure to  
29  
30 multiple childhood adversities had a significant effect on the persistence of suicide when  
31  
32 considering every additional childhood adversity exposed to, however in the current study it was  
33  
34 not possible to stratify the number of adversities beyond two or more adversities (i.e. into more  
35  
36 than 2 categories) given the relatively small number of cases in the sample overall with non-fatal  
37  
38 suicidal behaviour. Physical abuse, parental death, parental loss other than through death, and  
39  
40 parental divorce emerged as independent risk factors for suicidal ideation in the total sample.  
41  
42 Moreover, the effects of childhood adversities on suicidal tendencies tended to differ over the *life*  
43  
44 *course*. Consistent with nationally representative data in WMHS, childhood adversities were  
45  
46 associated with the highest risk of suicide attempts in childhood, with a decrease in risk in  
47  
48 adolescence and young adulthood, followed by an increase in risk again during later adulthood  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60 [20].

*Association between childhood adversities and suicidality*

1  
2  
3 In *childhood*, sexual abuse was significantly associated with lifetime suicide attempts in the total  
4 sample, while sexual and physical abuse were significantly associated with suicidal ideation.  
5  
6 Among suicidal ideators, parental death was significantly associated with lifetime suicide  
7 attempts. Exposure to childhood sexual abuse, physical abuse or parental divorce significantly  
8 increased suicide attempts during *teenage years*, while physical abuse and parental death were  
9 associated with suicidal ideation in teens. Among teen suicidal ideators, physical illness was  
10 significantly associated with suicidal plans, while parental divorce was associated with suicide  
11 attempts. These findings emphasize the need to focus suicide prevention strategies at youth in  
12 particular. In *young adulthood*, parental loss other than the death of a parent was significantly  
13 associated with suicidal ideation in the total sample. Interestingly, childhood physical abuse was  
14 identified as a significant risk factor for suicidal attempts in *later adulthood*, while childhood  
15 physical illness and parental loss other than the death of a parent significantly increased the risk  
16 for ideation.  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32

33  
34  
35 Similar to findings from SASH, childhood sexual abuse emerged as a particularly robust risk  
36 factor for suicide attempts in younger participants in the WMH cross-national analysis, with a  
37 10.9 times higher odds of suicide attempts in children, a 6.1 times higher likelihood in  
38 adolescents and a 2.9-fold risk in young adults who were exposed [20]. This is in keeping with  
39 Enns hypothesis that sexual abuse results in suicidal behaviour at a younger age [21]. Consistent  
40 with other studies, childhood physical and sexual abuse, in particular, emerged as risk factors for  
41 the emergence and persistence of suicidal behaviour, especially in adolescence. Loss of a parent,  
42 physical ill-health and family violence has also been found to be associated with persistence of  
43 suicidality [20, 28, 58]. These findings extend previous work done in other developing countries  
44 that have found childhood adversities to be a significant risk factor for suicidality [20, 62-64].  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality**Limitations*

The following limitations need to be highlighted. First, recall bias might have impacted on the accuracy of recall of childhood adversities. This said, participants were asked questions about childhood adversities in sequence which may have facilitated more accurate recall [65]. Systematic reviews have also found that recall of past experiences can be accurate and can provide valuable data [66, 67]. Thus, there is evidence to support the validity of accurate recall of childhood adversities [67]. Further, studies have shown that responses to questions on childhood adversities, similar to those asked in the SASH study, generally remain stable over time [68, 69]. We recommend that future studies examine ethnicity in relation to adversity and suicidal outcomes. Second, in view of the cross-sectional design, more detailed, temporal information on childhood adversities and suicidal incidents was not obtained. Third, variables such as culture, ethnicity and mental status at the time of the interview may have influenced the recall and reporting of suicidal behaviour. It is possible that response bias may have been particularly skewed to disenfranchised South Africans (e.g. poor, young, urban and black respondents), who may have been too afraid to divulge information on suicidality. Stigma associated with mental health problems may have also played a role in the reporting suicidal tendencies. Thus, participants' mental health status, ethnicity, culture and generational factors may have also contributed to the under-reporting of suicidality. It is possible that individuals reporting childhood adversities may have also been more likely to report suicidal behaviour, while those not reporting childhood adversities may have underreported suicidality. Stigma and mental health status (e.g. depressed persons may be more inclined to report suicidality and more likely to remember negative childhood experiences) may also be contributory factors. In addition, some participants



*Association between childhood adversities and suicidality*

1  
2  
3 may have been afraid to report suicidal behaviours. The role of ethnicity, culture and generational  
4  
5 factors may have also contributed to the under-reporting of suicidality. Overall, it is much more  
6  
7 likely that adversities and suicidality were under-reported rather than over-reported [9, 20, 67,  
8  
9 70]. Fourth, we do not assess for self-mutilating behavior. The importance of discriminating  
10  
11 suicidal behaviour from non-suicidal self-mutilation cannot be underestimated. Fifth, the survey  
12  
13 was conducted in adults living in households and hostel quarters thus the findings are not  
14  
15 generalizable to homeless and institutionalized persons who were not included in the survey.  
16  
17 Sixth, the CIDI instrument which was used in this study is a lay-administered instrument which  
18  
19 does not include an assessment of several key DSM-IV diagnoses (such as bipolar disorder and  
20  
21 psychosis), are associated with elevated rates of suicidality. As a result, some participants with  
22  
23 suicidality may have not have been diagnosed with a disorder. Furthermore, in view of the large  
24  
25 confidence intervals and small sample sizes for some of these analyses caution is required in  
26  
27 drawing conclusions. In addition, we did not control for other unmeasured causes of childhood  
28  
29 adversities and suicidality, or protective (resiliency) factors that may have contributed to the  
30  
31 associations observed in these data. Both other risk and resiliency factors may have contributed to  
32  
33 both the prevalence of non-fatal suicidal behaviours and to the associations with different forms  
34  
35 of childhood adversity and warrant further investigation. Lastly, it is important to point out that  
36  
37 these data were collected approximately 10 years ago. Notwithstanding these limitations, this  
38  
39 study represents the first investigation among South Africans of a wide range of childhood  
40  
41 adversities and their impact on the onset and persistence of suicidality over the life course.  
42  
43  
44  
45  
46  
47  
48  
49  
50

**Conclusions**

51  
52 Childhood adversities especially sexual abuse, physical abuse and parental divorce are associated  
53  
54 with the onset and persistence of suicidal behaviour with the risk greatest in children and  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

1  
2  
3 adolescents. Public health efforts aimed at prevention of early childhood sexual and physical  
4  
5 abuse, in particular, may have a significant impact on reducing suicidality over the life course and  
6  
7 improving mental health outcomes.  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review only

*Association between childhood adversities and suicidality*

Funding: This work was funded by the South African Department of Health and the University of Michigan; Medical Research Council of South Africa

Contributorship:

Belinda Bruwer: Data interpretation, drafting manuscript, final approval of manuscript submitted for publication, ensuring that questions related to the accuracy of the work are appropriately resolved.

Ravi Govender: Data interpretation, drafting manuscript, final approval of manuscript submitted for publication, ensuring that questions related to the accuracy of the work are appropriately resolved

Melanie Bishop: Data interpretation, revising the manuscript, final approval of manuscript submitted for publication, ensuring that questions related to the accuracy of the work are appropriately resolved

David Williams: Substantial contributions to the conception or design of the work, data acquisition, data analysis and interpretation, critically revising of the manuscript, final approval of the version to be published; and accountability for all aspects of the work

Dan Stein: Substantial contributions to the conception or design of the work, data acquisition, data analysis and interpretation, critically revising of the manuscript, final approval of the version to be published; and accountability for all aspects of the work

Soraya Seedat: Substantial contributions to the conception or design of the work, data acquisition, data analysis and interpretation, critically revising of the manuscript, final approval of the version to be published; and accountability for all aspects of the work

Competing Interests:

*Association between childhood adversities and suicidality*

This study was funded by NIH. Additional funding was received from the South African Department of Health and the University of Michigan. D.J.S. and S.S. are also supported by the Medical Research Council of South Africa. D.J.S. has received research grants and / or consultancy honoraria from AstraZeneca, Eli Lilly, GlaxoSmithKline, Lundbeck, Orion, Pfizer, Pharmacia, Roche, Servier, Solvay, Sumitomo and Wyeth. S.S. has received research grants or travel sponsorship from AstraZeneca, Eli Lilly, GlaxoSmithKline, Lundbeck and Servier. S.S. is supported by the by the South African Research Chairs Initiative of the Department of Science and Technology and the National Research Foundation. B.B has received congress sponsorship from Janssen-Cilag.

Data Sharing Statement: No additional data are available

**REFERENCES**

*Association between childhood adversities and suicidality*

- 1  
2  
3 1. World Health Organization. Suicide Prevention (SUPRE). Geneva, Switzerland. 2007.  
4  
5 [http://www.who.int/mental\\_health/prevention/suicide/suicideprevention/en/](http://www.who.int/mental_health/prevention/suicide/suicideprevention/en/)  
6  
7
- 8  
9 2. Murray, C.L., Lopez, A.D. The global burden of disease: a comprehensive assessment of mortality  
10 and disability from disease, injuries and risk factors in 1990 and projected to 2020. Cambridge, MA:  
11 Harvard University Press, 1996.  
12  
13
- 14  
15 3. Burrows, S., Laflamme, L. Pattern analysis of suicide mortality surveillance data in urban South  
16 Africa. *Suicide and Life-Threatening Behaviour* 2008;**38**:209-220.  
17  
18
- 19  
20 4. Meel, B.I. Epidemiology of suicide by hanging in Transkei. South Africa. *Am J Forensic Med Pathol.*  
21 2006;**27**:75-78  
22  
23
- 24  
25 5. Flisher, A.J., Liang, H., Laubscher, R. Suicide trends in South Africa, 1968-90. *Scand J Public*  
26 Health 2004;**32**:411-418.  
27  
28
- 29  
30 6. Joe, S., Stein, DJ., Seedat, S., et al. non-fatal suicidal behavior among South Africans: Results from  
31 the South Africa Stress and Health Study. *Social Psychiatry Epidemiology* 2008;**43**(6):454–  
32 461. doi:10.1007/s00127-008-0348-7.  
33  
34
- 35  
36 7. Beautrais, A.L., Joyce, P/R/. & Mulder, R.T. (1996). Risk factors for serious suicide attempts among  
37 youth aged 13 through 24 years. *J Am Acad Child Adolesc Psychiatry* 1996;**35**(9):1174-1182.  
38  
39
- 40  
41 8. Harrison, EC, Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis.  
42 *Br J Psychiatry* 1997;**170**:205-228  
43  
44
- 45  
46 9. Joe, S., Stein, D.J., Seedat, S., et al. Prevalence and correlates of non-fatal suicidal behaviour among  
47 South Africans. *Br J Psychiatry* 2008;**192**:310-311.  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

10. Nock, M.K., Borges, G., Bromet, E.J., et al. Suicide and Suicidal Behaviour. *Epidemiologic Reviews* 2008;**30**:133-154.
11. Nock, M.K., Borges, G., Bromet, E.J., et al. (2008b). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *British Journal of Psychiatry*, 192, 98-105.
12. Nock, M.K., Hwang, I., Sampson, N.A., et al. Cross-national analysis of the associations among mental disorders and suicidal behaviour: Findings from the WHO World Mental Health Surveys. *PLoS Medicine* 2009;**6**(8).e1000123.
13. Bondy, B., Buettner, A., Zill, P. Genetics of suicide. *Molecular Psychiatry* 2006;**11**:336-351.
14. Kohli, M.A., Salyakina, D., Pfennig, A., et al. Association of genetic variants in the neurotrophic receptor encoding gene NTRK2 and a lifetime history of suicide attempts in depressed patients. *Arch Gen Psychiatry* 2010;**67**:348-59.
15. Roy, A., Hu, X-Z., Janal, M.N., et al. Interaction between childhood trauma and serotonin transporter gene variation and suicide. *Neuropsychopharmacology* 2007;**32**:2046–2052
16. Risch, N., Herrell, R., Lehner, T., et al. Interaction between the serotonin transporter gene (5-HTTLPR), stressful life events, and the risk of depression: A meta-analysis. *JAMA* 2009;**301**:2462–2471.
17. Borges, G., Benjet, C., Medina-Mora, M.E., et al. Traumatic events and suicide related outcomes among Mexico City adolescents. *J Child Psychol Psychiatry* 2008;**6**:654-666. Weissman MM, Bland
18. RC, Canino GJ, Greenwald S, Hwu HG, Joyce PR, et al. (1999) Prevalence of suicide ideation and suicide attempts in nine countries. *Psychology Med*, 29: 9–17.

*Association between childhood adversities and suicidality*

- 1  
2  
3 19. Brodsky, BS & Stanley, B. Adverse childhood experiences and suicidal behaviour. *Psychiatry*  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
Clinical Northern America 2008;**31**:223-235
20. Bruffaerts, R., Demyttenaere, K., Borges, G., et al. Childhood adversities as risk factors for onset  
and persistence of suicidal behaviour. *Br J Psychiatry* 2010;**197**:20-27.
21. Enns, M.W., Cox, B.J., Afifi, T.O., et al. Childhood adversities and risk for suicidal ideation and  
attempts: a longitudinal population-based study. *Psychological Medicine* 2006;**36**:1769-1778.
22. Johnson, J.G., Cohen, P., Gould, M.S., et al. Childhood adversities, interpersonal difficulties, and  
risk for suicide attempts during late adolescence and early adulthood. *Arch Gen Psychiatry*  
2002;**59**:741-749.
23. Dube, S.R., Anda, R.F., Felitti, V.J., et al. Childhood abuse, household dysfunction, and the risk of  
attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences  
Study. *JAMA* 2001;**286**:3089-3096.
24. Afifi, T.O., Enns, M.W., Cox, B.J., et al. Population attributable fractions of psychiatric disorders  
and suicide ideation and attempts associated with adverse childhood experiences. *Am J Public*  
*Health* 2008;**98**:946-952.
25. Burke, A.K., Galfalvy, H., Everett, B., et al. Effect of exposure to suicidal behavior on suicide  
attempt in a high-risk sample of offspring of depressed parents. *J Am Acad Child Adolesc*  
*Psychiatry* 2010;**49**:114-121.
26. Labonte, B., Suderman, M., Maussion, G., et al. Genome-wide epigenetic regulation by early-life  
trauma. *Arch Gen Psychiatry* 2012;**69**(7):722-731.Doi:10.1001/archgenpsychiatry.2011.2287

*Association between childhood adversities and suicidality*

- 1  
2  
3  
4 27. Lipschitz, D.S., Winegar, R.K., Nicolaou, A.L., et al. (1999). Perceived abuse and neglect as risk  
5 factors for suicidal behaviour in adolescent inpatients. *The Journal of Nervous and Mental Disease*,  
6 187, 32-39.  
7  
8  
9  
10 28. Ystgaard, M., Hestetun, I., Loeb, M., et al. Is there a specific relationship between childhood sexual  
11 and physical abuse and repeated suicidal behaviour? *Child Abuse Neg* 2004;**28**:863-875  
12  
13 29. Boudewyn, A., & Liem, J. Childhood sexual abuse as a precursor to depression and self-destructive  
14 behavior in adulthood. *J Trauma Stress* 1995;**8**:445-459.  
15  
16  
17  
18  
19  
20 30. Brown, J., Cohen, P., Johnson, J.G., et al. Childhood abuse and neglect: Specificity of effects on  
21 adolescent and young adult depression and suicidality. *J Am Acad Child Adolesc Psychiatry*  
22 1999;**38**:1490-1496.  
23  
24  
25  
26  
27  
28  
29 31. Bryant, S.L., & Range, L.M. Suicidality in college women who were sexually and physically abused  
30 and physically punished by parents. *Violence Vict* 1995;**10**:195-201.  
31  
32  
33  
34 32. Davidson, J.R.T., Hughes, D.C., George, L.K., et al. The association of sexual assault and attempted  
35 suicide within the community. *Arch Gen Psychiatry* 1996;**53**:550-555  
36  
37  
38  
39  
40 33. Fergusson, D.M., & Mullen, P.E. *Childhood Sexual abuse – An evidence based perspective*. Sage,  
41 CA: Thousand Oaks, 1999.  
42  
43  
44  
45  
46 34. Finkelhor, D. Early and long-term effects of child sexual abuse: An update. *Professional*  
47 *Psychology: Research & Practice* 1990;**21**(5):325-330.  
48  
49  
50  
51  
52 35. Finkelhor, D., & Hashima, P.Y. (2001). The victimization of children and youth: A comprehensive  
53 overview. In S.O. White (Ed.) *Handbook of youth and justice*. The Plenum series in crime and  
54 justice. Dordrecht: Plenum, 2001:49-78.  
55  
56  
57  
58  
59  
60



*Association between childhood adversities and suicidality*

- 1  
2  
3  
4 36. Holmes, W.C., & Slap, G.B. Sexual abuse of boys: Definition, prevalence, correlates, sequelae, and  
5 management. JAMA: JAMA 1998;**280**(21):1855-1862  
6  
7  
8  
9 37. Kendall-Tackett, K.A., Williams, L.M., & Finkelhor, D. Impact of sexual abuse on children: A  
10 review and synthesis of recent empirical studies. Psychol Bull 1993;**113**(1):164-180.  
11  
12  
13  
14 38. Martin, G. Reported family dynamics, sexual abuse, and suicidal behaviors in community  
15 adolescents. Arch Suicide Res 1996;**2**:183-195.  
16  
17  
18  
19  
20 39. Peters, D.K., & Range, L.M. Childhood sexual abuse and current suicidality in college women and  
21 men. Child Abuse Negl 1995;**19**:335-341.  
22  
23  
24  
25  
26 40. Putman, F.W. Ten-year research update review: Child sexual abuse. J Am  
27 Acad Child Adolesc Psychiatry 2003;**42**(3):269-278  
28  
29  
30  
31  
32 41. Stepakoff, S. Effects of sexual victimization on suicidal ideation and behaviour in US college  
33 women. Suicide and Life-Threatening Behavior 1998;**28**:107-126.  
34  
35  
36  
37  
38 42. Malinosky-Rummel, R., & Hansen, D.J. Long-term consequences of childhood physical abuse.  
39 Psychol Bull 1993;**144**:68-79  
40  
41  
42  
43 43. Silverman, A.B., Reinherz, H., & Giaconia, R.M. The long-term sequelae of child and adolescent  
44 abuse: A longitudinal community study. Child Abuse Negl 1996;**20**:709-723  
45  
46  
47  
48  
49 44. Chapman, D.P., Whitfield, C.L., Felitti, V.J., et al. Adverse childhood experiences and the risk of  
50 depression in adulthood. J Affect Disord 2004;**82**:217-225  
51  
52  
53  
54  
55 45. Dube, S.R., Felitti, V.J., Dong, M., et al. Childhood abuse, neglect, and household dysfunction and  
56 the risk of illicit drug use: The adverse childhood experiences study. Pediatricc 2003;**111**:564-572.  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3 46. Jewkes, R.K., Dunkle, K., Nduna, M., et al. Associations between childhood adversity and  
4  
5 depression, substance abuse and HIV and HSV2 incident infections in rural South African youth.  
6  
7 Child Abuse Negl 2010;**34**:833-841.  
8  
9  
10  
11 47. Seedat, S., Stein, D.J., Jackson, P.B., et al. Life stress and mental disorders in the South African  
12  
13 Stress and Health study. South African Medical Journal 2009a;**99**:375-382.  
14  
15  
16 48. Williams, D.R., Herman, A., Kessler, R.C., et al. The South Africa Stress and Health Study:  
17  
18 Rationale and Design. Metab Brain Dis 2004;**19**(1/2):135-147.  
19  
20  
21  
22 49. Statistics South Africa. Census 2001: Census in Brief. Pretoria: Statistics South Africa. 2001.  
23  
24 Available from <http://www.statssa.gov.za/census01/html/CInBrief/CIB2001.pdf> (Accessed January  
25  
26 2014)  
27  
28  
29 50. Kessler, R.C., Üstün, T.B. The World Mental Health (WMH) Survey Initiative Version of the World  
30  
31 Health Organization (WHO) Composite International Diagnostic Interview (CIDI). Int J Methods  
32  
33 Psychiatr Res 2004;**13**:61-98.  
34  
35  
36 51. Seedat, S., Stein, D.J., Herman, A., et al. Twelve-month treatment of Psychiatric disorders in South  
37  
38 Africa Stress and Health Study (World Mental Health Survey Initiative). Psychiatric Epidemiology  
39  
40 2008;**38**:211-220.  
41  
42  
43  
44 52. Seedat, S., Williams, D.R., Herman, A., et al. Mental health service use among South Africans for  
45  
46 mood, anxiety and substance use disorders. South African Medical Journal 2009b;**99**:346-352.  
47  
48  
49 53. World Health Organization. World Health Organization Manual of the international statistical  
50  
51 classification of diseases, injuries and causes of death, ninth revision. Geneva, Switzerland, 1992.  
52  
53  
54  
55 54. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV),  
56  
57 4<sup>th</sup> Edition. Washington: American Psychiatric Association Press, 1994.  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3  
4 55. Straus MA. Measuring Intrafamily Conflict and Violence: The Conflict Tactics (CT) Scales. *Journal*  
5  
6 of Marriage and Family 1979;**41(1)**:75  
7
- 8 56. Kessler, R.C., McLaughlin, K.A., Green, J.G. Childhood adversities and adult psychopathology in  
9  
10 the WHO World Mental Health Surveys. *Br J Psychiatry* 2010;**197**:378-385.  
11  
12
- 13 57. Stein, D.J., Chiu, W.T., Hwang, I., et al. Cross-national analysis of the associations between  
14  
15 traumatic events and suicidal behavior: Findings from the WHO World Mental Health Surveys. *PloS*  
16  
17 ONE 2010;**5(5)**:e10574.  
18  
19  
20
- 21 58. Joiner Jr, T.E., Sachs-Ericsson, N.J., Wingate, L.R. Childhood physical and sexual abuse and  
22  
23 lifetime number of suicide attempts: A persistent and theoretically important relationship. *Behav Res*  
24  
25 Ther 2007;**45**:539-547.  
26  
27  
28
- 29 59. Afifi, T.O., Boman, J., Fleisher, W., et al. The relationship between child abuse, parental divorce,  
30  
31 and lifetime mental disorders and suicidality in a nationally representative adult sample. *Child*  
32  
33 Abuse Negl 2009;**33**:139–147.  
34  
35  
36
- 37 60. Bebbington, P.E., Cooper, C.C., Minot, S., et al. Suicide attempts, gender, and sexual abuse: data  
38  
39 from the 2000 British Psychiatric Morbidity Survey. *Am J Psychiatry* 2009;**166**:1135-1140.  
40  
41  
42
- 43 61. Molner, B, Buka, S, & Kessler, R. Child sexual abuse and subsequent psychopathology: results from  
44  
45 the National Comorbidity Survey. *American Journal Public Health* 2001;**91**:753-760.  
46  
47  
48
- 49 62. Borges, G., Angst, J., Nock, M.K., et al. Risk factors for the incidence and persistence of suicide  
50  
51 related outcomes: a 10 year follow up study using the National Comorbidity Surveys. *J Affect*  
52  
53 Disord 2008;**105**:25-33  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality*

- 1  
2  
3 63. Xing, X-Y., Tao, F-B., Wan, Y-H., et al. Family factors associated with suicide attempts among  
4  
5 Chinese adolescent students: A national cross-sectional survey. *J Adolesc Health* 2010;**46**:592-599.  
6  
7  
8 64. Gureje, O., Kola, L., Uwakwe, R., et al. The profile and risks of suicidal behaviours in the Nigerian  
9  
10 Survey of Mental Health and Well Being. *Psychol Med* 2007;**37**:821-830.  
11  
12  
13 65. Knauper, BC., CF, Schwarz, N., et al. Improving the accuracy of major depression age of onset  
14  
15 reports in the US National Comorbidity Survey. *Int J Methods Psychiatr Res* 1999;**8**(1):39-48  
16  
17  
18 66. Brewin, CR., Andrews, B., Botlib, IH. Psychopathology and early experience: a reappraisal of  
19  
20 retrospective reports. *Psychol Bull* 1993;**113**:82-98  
21  
22  
23  
24 67. Hardt, J., Rutter, M. Validity of adult retrospective reports of adverse childhood experiences: a  
25  
26 review of the evidence. *J Child Psychol Psychiatry* 2004;**45**:260-273.  
27  
28  
29  
30 68. Dube, SR., Williamson, DF., Thompson, T., et al. Assessing the reliability of retrospective reports of  
31  
32 adverse childhood experiences among adult HMO members attending a primary care clinic. *Child*  
33  
34 *Abuse Negl* 2004;**28**(7):729-737.  
35  
36  
37  
38 69. Yancura, LA., Aldwin, CM. (2009). Stability and change in retrospective reports of childhood  
39  
40 experiences over a 5-year period: Findings from the David Longitudinal Study. *Psychol Aging*  
41  
42 2009;**24**(3):715-721  
43  
44  
45  
46 70. Wilsnack, S.C., Wonderlich, S.A., Kristjanson, A.F., et al. (2002). Self reports of forgetting and  
47  
48 remembering childhood sexual abuse in a nationally representative sample of US women. *Child*  
49  
50 *Abuse Negl* 2002;**26**:139-147.  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*Association between childhood adversities and suicidality***Figure Legend**

Figure 1: Schematic Representation

For peer review only

*Association between childhood adversities and suicidality***Table 1:** Descriptive Characteristics (N= 4351)

		N
Mean Age (years) (SE)	37.0 (0.26)	
<b>Age categories (years)</b>		
18 – 29	39.1%	1701
30 – 39	22.1%	962
40 - 49	18.1%	788
≥ 50	20.7%	901
<b>Sex</b>		
Male	46.3%	2015
Female	53.7%	2336
<b>Race</b>		
Black	76.2%	3315
Coloured (mixed race)	10.4%	453
White	10.0%	435
Indian/Asian	3.4%	148
<b>Married</b>	50.1%	2180
<b>Location</b>		
Rural	38.4%	1671
Urban	61.6%	2680
<b>Education</b>		
None	6.8 %	296
Grade 1-7	19.1%	831
Grade 8-11	35.4%	1540
Matric	23.5%	1022
Matric +	15.3%	665.7
<b>Employed</b>	31.0%	1349
<b>Income Category (Rands), (mean SD)</b>		
0	13.7%	596
1 - 2500	29.5%	1284
2501 – 5000	15.4%	670
5001 – 10 000	19.6%	853
≥ 10001	21.8%	949
<b>Province</b>		
Eastern Cape	13.1%	570
Free State	6.2%	270
Gauteng	23.0%	1001
Kwazulu Natal	19.5%	848
Limpopo	10.5%	457
Mpumalanga	6.6%	287
Northern Cape	1.9%	83
North West	8.3%	361
Western Cape	11.1%	483

*Association between childhood adversities and suicidality***Table 2:** Prevalence of childhood adversities and suicidal behaviour in South Africa[%<sup>b</sup> (S.E.)]

	Total Sample		Total Sample		Suicidal Ideators		Suicidal Ideators	
	With Attempt	No attempt	With Ideation	No ideation	With Plan	No plan	With Attempt	No attempt
Physical Abuse	24.9 (4.6)	12.2 (0.8)	21.1 (2.5)	11.8 (0.7)	24.3 (4.6)	27.9 (4.0)	24.9 (4.6)	24.5 (3.6)
Sexual Abuse	2.1 (1.2)	0.1 (0.0)	0.7 (0.4)	0.1 (0.0)	1.6 (0.9)	0.0 (0.0)	2.1 (1.2)	0.0 (0.0)
Parent Died	11.6 (2.4)	11.3 (0.6)	13.9 (2.3)	11.3 (0.6)	12.2 (2.4)	16.1 (4.2)	11.6 (2.4)	15.6 (3.8)
Parent Divorced	14.2 (3.8)	4.8 (0.4)	7.9 (1.6)	4.7 (0.4)	9.7 (2.6)	9.2 (3.7)	14.2 (3.8)	6.7 (2.9)
Other Parent Loss	2.1 (1.2)	2.2 (0.4)	3.9 (1.2)	2.1 (0.4)	1.1 (0.6)	3.0 (1.4)	2.1 (1.2)	2.7 (1.3)
Family Violence	4.3 (1.5)	3.0 (0.3)	4.1 (0.9)	2.9 (0.3)	4.7 (1.5)	6.3 (1.8)	4.3 (1.5)	4.5 (1.4)
Physical Illness	5.0 (2.3)	2.5 (0.3)	4.0 (1.2)	2.4 (0.3)	4.4 (1.8)	4.7 (1.8)	5.0 (2.3)	4.3 (1.6)
Financial Adversity	6.1 (2.4)	5.6 (0.5)	4.1 (0.9)	5.8 (0.5)	6.0 (2.1)	3.3 (1.5)	6.1 (2.4)	2.9 (1.0)
1	35.4 (4.2)	23.4 (1.0)	35.9 (2.8)	22.7 (0.9)	32.9 (4.0)	41.7 (5.2)	35.4 (4.2)	40.5 (4.5)
2+	15.4 (3.4)	8.6 (0.5)	10.8 (1.7)	8.6 (0.5)	14.1 (3.2)	13.2 (3.3)	15.4 (3.4)	9.6 (2.3)
a	(140)	(107309)	(394)	(112243)	(171)	(1976)	(140)	(2212)

<sup>a</sup> Number of cases with the outcome variable; N represents the number of person years.

<sup>b</sup> % represents the percentage of people with the adversity among the cases with the outcome variable indicated in the column header. For example: the first cell is the % of those with physical abuse among those with attempts.

Association between childhood adversities and suicidality

**Table 3:** Multivariate and Bivariate models for associations between childhood adversities and lifetime suicidality<sup>1</sup>

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

	LT Attempts in total sample <sup>b</sup>				Ideators among total sample <sup>c</sup>				Suicidal Ideators with LT plans <sup>d</sup>				Suicidal Ideators with LT attempts <sup>e</sup>			
	Multivariate		Bivariate		Multivariate		Bivariate		Multivariate		Bivariate		Multivariate		Bivariate	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.0* (1.2-3.3)*	7.4(0.006)*	2.0* (1.2-3.2)*	7.3(0.007)*	1.7* (1.3-2.3)*	15.2(<.001)*	1.7* (1.3-2.3)*	16.7(<.001)*	0.6 (0.3-1.4)	1.3(0.25)	0.7 (0.3-1.4)	1.2(0.26)	1.0 (0.5-2.3)	0.0(0.93)	1.1 (0.5-2.5)	0.1(0.81)
Sexual Abuse	7.6* (2.0-29.9)*	8.9(0.003)*	7.9* (1.9-32.1)*	8.6(0.003)*	2.6 (0.6-10.6)	1.8(0.18)	3.0 (0.7-12.2)	2.5(0.11)	---	---	---	---	---	---	---	---
Parent Died	1.1 (0.6-1.8)	0.1(0.78)	1.1 (0.7-1.7)	0.1(0.76)	1.4 (0.9-2.1)	2.7(0.10)	1.3 (0.9-1.9)	2.0(0.16)	0.7 (0.3-1.7)	0.6(0.45)	0.8 (0.4-1.9)	0.3(0.62)	0.8 (0.5-1.5)	0.4(0.52)	0.8 (0.4-1.5)	0.4(0.53)
Parent Divorced	2.7* (1.5-5.0)*	10.8(0.001)*	2.8* (1.5-5.2)*	11.4(<.001)*	1.6* (1.0-2.4)*	4.3(0.038)*	1.5 (1.0-2.3)	3.7(0.05)	0.9 (0.3-3.3)	0.0(0.88)	1.2 (0.4-3.8)	0.1(0.78)	3.1* (1.2-8.6)*	5.2(0.023)*	3.0* (1.1-8.0)*	4.9(0.027)*
Other Parent Loss	1.0 (0.3-3.3)	0.0(0.95)	0.9 (0.3-2.8)	0.1(0.81)	1.7 (1.0-3.0)	3.6(0.06)	1.6 (0.9-2.7)	2.9(0.09)	0.4 (0.1-2.6)	0.9(0.34)	0.5 (0.1-2.7)	0.7(0.41)	2.0 (0.2-17.3)	0.4(0.51)	2.5 (0.6-11.0)	1.5(0.22)
Family Violence	0.7 (0.3-1.7)	0.6(0.42)	1.0 (0.4-2.2)	0.0(0.98)	0.8 (0.5-1.4)	0.5(0.47)	1.1 (0.6-1.8)	0.0(0.83)	1.0 (0.4-2.4)	0.0(0.97)	0.8 (0.4-2.0)	0.2(0.68)	2.4 (0.9-6.3)	3.5(0.06)	2.2 (0.9-5.5)	2.9(0.09)
Physical Illness	1.1 (0.4-3.5)	0.1(0.81)	1.5 (0.6-4.1)	0.7(0.39)	1.2 (0.6-2.3)	0.2(0.63)	1.3 (0.7-2.4)	0.7(0.42)	0.8 (0.2-3.1)	0.1(0.71)	0.9 (0.2-3.5)	0.0(0.86)	1.2 (0.3-3.9)	0.1(0.80)	1.2 (0.4-4.0)	0.1(0.77)
Financial Adversity	1.0 (0.4-2.7)	0.0(0.94)	1.2 (0.5-2.8)	0.1(0.73)	0.6 (0.4-1.1)	3.0(0.08)	0.7 (0.4-1.2)	1.4(0.23)	2.4 (0.7-8.4)	1.9(0.17)	1.9 (0.6-6.8)	1.1(0.29)	2.1 (0.7-6.0)	2.1(0.15)	2.0 (0.7-6.3)	1.6(0.21)
Group Significant test of controls: demographic variables		403.8(<.001)*				1102.1 (<.001)*				12.0 (0.002)*						
Group significance of controls: interactions between demographics and intervals		816.6(<.001)*				1374.8 (<.001)*				159.9 (<.001)*						
Group significance of controls: demographics and interactions between demographics and intervals		8369.9(<.001)*				6190.0 (<.001)*				529.0 (<.001)*						
Group significance of controls: parent psychopathology		12.0(0.003)*				16.7 (<.001)*										



*Association between childhood adversities and suicidality*

\*Significant at the .05 level, two-sided test

LT: lifetime

<sup>a</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include intervals (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.

<sup>b</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

## Association between childhood adversities and suicidality

**Table 4:** Associations between number of childhood adversities and lifetime suicidality<sup>1</sup>

Number of child adversities	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
1	1.9* (1.3-2.8)*		1.8* (1.5-2.3)*		0.5 (0.3-1.0)		0.9 (0.5-1.7)	
2+	2.1* (1.2-3.8)*	14.3(<.001)*	1.4* (1.0-2.0)*	28.3(<.001)*	1.1 (0.3-3.3)	4.5(0.10)	2.7* (1.3-5.9)*	8.3(0.016)*
Group significant test of controls: demographic variables		538.4(<.001)*		1146.6(<.001)*		600.3(<.001)*		1943.4(<.001)*
Group significance of controls: interactions between demographics and intervals		859.8(<.001)*		1473.5(<.001)*		1389.0(<.001)*		1657.7(<.001)*
Group significance of controls: demographics and interactions between demographics and intervals		11496.7(<.001)*		7255.3(<.001)*		11233.3(<.001)*		6714.6(<.001)*
Group significance of controls: parent psychopathology		12.7(0.002)*		19.1(<.001)*		14.1(0.029)*		

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include intervals (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.

<sup>b</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

**Table 5a:** Final multivariate model for associations between childhood adversities and lifetime suicidality<sup>1</sup>

	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.2* (1.3-3.8)*	8.9(0.003)*	2.1* (1.6-2.8)*	25.4(<.001)*	0.4* (0.2-1.0)*	4.3(0.038)*	0.8 (0.3-2.1)	0.3(0.60)
Sexual Abuse	9.3* (2.5-35.2)*	11.2(<.001)*	3.7 (0.9-15.9)	3.3(0.07)	---	---	---	---

*Association between childhood adversities and suicidality*

Parent Died	1.2 (0.7-2.3)	0.4(0.51)	1.7* (1.1-2.6)*	6.6(0.010)*	0.4 (0.1-1.3)	2.2(0.14)	0.6 (0.3-1.1)	2.8(0.10)
Parent Divorced	3.1* (1.7-5.6)*	14.5(<.001)*	1.9* (1.2-3.0)*	8.1(0.004)*	0.7 (0.2-2.3)	0.4(0.51)	2.4 (0.9-6.4)	3.0(0.08)
Other Parent Loss	1.1 (0.3-4.3)	0.0(0.87)	2.1* (1.3-3.6)*	8.3(0.004)*	0.3 (0.0-2.0)	1.8(0.18)	1.3 (0.1-13.3)	0.1(0.79)
Family Violence	0.9 (0.3-2.3)	0.1(0.76)	1.1 (0.6-2.3)	0.2(0.69)	0.4 (0.1-1.8)	1.6(0.20)	1.2 (0.4-4.1)	0.1(0.76)
Physical Illness	1.4 (0.4-5.3)	0.2(0.63)	1.6 (0.7-3.3)	1.4(0.24)	0.6 (0.1-2.5)	0.5(0.46)	0.9 (0.2-3.3)	0.0(0.85)
Financial Adversity	1.3 (0.4-3.7)	0.2(0.65)	0.9 (0.4-1.7)	0.1(0.71)	1.6 (0.4-6.0)	0.6(0.44)	1.4 (0.5-4.3)	0.4(0.52)
group significance test for all types		29.4(<.001)*		43.0(<.001)*		833.9(<.001)*		11.5(0.18)
significance test for difference between types		13.1(0.07)		9.2(0.24)		805.7(<.001)*		11.8(0.11)
2+ adversities	0.7 (0.2-1.8)	0.7(0.41)	0.5* (0.3-0.9)*	4.9(0.028)*	4.7 (0.8-29.2)	2.9(0.09)	2.9 (0.8-10.6)	2.7(0.10)
Group significant test of controls: demographic variables		414.6(<.001)*		1112.0(<.001)*		214.0(<.001)*		10.4(0.005)*
Group significance of controls: demographics and interactions between demographics and intervals		831.6(<.001)*		1405.7(<.001)*		1063.6(<.001)*		174.7(<.001)*
Group significance of controls: demographics and interactions between demographics and intervals		8596.4(<.001)*		6292.0(<.001)*		4268.0(<.001)*		532.5(<.001)*
Group significance of controls: parent psychopathology		11.6(0.003)*		15.4(<.001)*		15.0(0.020)*		

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include intervals (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.

<sup>b</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

## Association between childhood adversities and suicidality

Table 5b: Final multivariate model for associations between childhood adversities and lifetime suicidality, controlling for mental disorders

	LT Attempts in total sample <sup>b</sup>		Ideators among total sample <sup>c</sup>		Ideators with LT plans <sup>d</sup>		Ideators with LT attempts <sup>e</sup>	
	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square	OR(95% CI)	Chi-square
Physical Abuse	2.1* (1.2-3.7)*	6.1(0.013)*	2.0* (1.5-2.8)*	19.74(<.001)*	0.4* (0.2-0.9)*	5.7(0.017)*	0.7 (0.3-1.9)	0.4(0.53)
Sexual Abuse	11.7* (3.3-42.3)*	14.7(<.001)*	4.6* (1.2-18.1)*	4.9(0.027)*	---	---	---	---
Parent Died	1.3 (0.7-2.4)	0.6(0.46)	1.8* (1.2-2.7)*	7.6(0.006)*	0.4 (0.1-1.3)	2.5(0.11)	0.5 (0.3-1.1)	3.3(0.07)
Parent Divorced	3.4* (1.8-6.2)*	15.6(<.001)*	2.0* (1.2-3.1)*	8.8(0.003)*	0.7 (0.2-2.5)	0.2(0.63)	2.3 (0.8-6.5)	2.7(0.10)
Other Parent Loss	1.2 (0.3-4.3)	0.1(0.79)	2.1* (1.3-3.4)*	8.9(0.003)*	0.3 (0.0-2.2)	1.6(0.20)	1.5 (0.2-9.2)	0.2(0.66)
Family Violence	0.9 (0.3-2.7)	0.0(0.89)	1.1 (0.5-2.4)	0.1(0.75)	0.5 (0.1-2.8)	0.6(0.42)	1.4 (0.4-5.1)	0.3(0.59)
Physical Illness	1.4 (0.4-5.2)	0.3(0.61)	1.4 (0.6-3.1)	0.7(0.41)	0.6 (0.2-2.7)	0.4(0.54)	1.0 (0.3-3.7)	0.0(0.98)
Financial Adversity	1.5 (0.5-4.5)	0.6(0.45)	1.0 (0.5-2.0)	0.0(0.99)	1.8 (0.5-6.7)	0.8(0.37)	1.1 (0.3-3.8)	0.0(0.84)
group significance test for all types		32.5(<.001)*		44.5(<.001)*		586.1(<.001)*		18.4(0.018)*
significance test for difference between types		16.2(0.023)*		6.9(0.44)		569.3(<.001)*		12.6(0.08)
2+ adversities	0.7 (0.2-1.8)	1.4(0.25)	0.4* (0.2-0.8)*	6.4(0.011)*	3.2 (0.4-23.8)	1.4(0.24)	2.6 (0.7-9.6)	2.2(0.14)
Group significant test of controls: demographic variables		408.3(<.001)*		1173.4(<.001)*		247.8(<.001)*		188.1(<.001)*
Group significance of controls: interactions between demographics and intervals		819.9(<.001)*		1303.7(<.001)*		1230.7(<.001)*		391.3(<.001)*
Group significance of controls: demographics and interactions between demographics and intervals		9644.8(<.001)*		5395.1(<.001)*		3699.2(<.001)*		1530.7(<.001)*
Group significance of controls: parent psychopathology		5.2(0.07)		5.5(0.06)		19.5(0.003)*		
Group significance of controls: mental disorders		121.9(<.001)*		131.1(<.001)*		33.5(<.001)*		29.5(<.001)*

\*Significant at the .05 level, two-sided test  
LT: lifetime

<sup>1</sup> Assessed in Part 2 sample due to having part 2 controls. Controls for the model include intervals (1-5 intervals), and also include significant variables from demographic and parent psychopathology models, details in the following footnotes.

<sup>b</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>c</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

<sup>d</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. For parent psychopathology, controlling for types of parental disorders (6 dummies).

<sup>e</sup> Models controls for intervals (1-5 intervals), demographics (sex, age, time-varying education), interaction between intervals(13-19,20-29,30+) and age, education. Parent psychopathology not controlled for due to insignificance in previous models.

*Association between childhood adversities and suicidality*

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review only

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

**Association between childhood adversities and long-term suicidality among  
South Africans: Results from the South African  
Stress and Health Study: A cross sectional study design**

For peer review only

## ABSTRACT

### Objective:

Suicide and suicidal behaviours are significant public health problems and a leading cause of death worldwide and in South Africa. We examined the association between childhood adversities and suicidal behaviour over the life course.

### Methods:

A national probability sample of 4,351 South African adult participants (aged 18 years and older) in the South African Stress and Health (SASH) study was interviewed, as part of the World Mental Health Survey initiative. Respondents provided socio-demographic and diagnostic information, as well as an account of suicide-related thoughts and behaviours. Outcomes were defined as suicide attempts and suicidal ideation in the total sample, and suicide plans and attempts among ideators. Childhood adversities included physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family violence, physical illness and financial adversity. The association between suicidality and childhood adversities was examined using discrete-time survival models.

### Results:

More than a third of respondents with suicidal behaviour experienced at least 1 childhood adversity, with physical abuse, parental death and parental divorce the most prevalent adversities. Physical abuse, sexual abuse and parental divorce were identified as significant risk markers for lifetime suicide attempts, while physical abuse and parental divorce were significantly correlated with suicidal ideation. Two or more childhood adversities were associated with a 2-fold higher risk of lifetime suicide attempts. Sexual abuse (OR=9.3, childhood, parental divorce (OR=3.1)

1  
2  
3 and physical abuse (OR=2.2) had the strongest associations with lifetime suicide attempts. The  
4  
5 effect of childhood adversities on suicidal tendencies varied over the *life course*. For example,  
6  
7 sexual abuse was significantly associated with suicide attempts during childhood and teen years,  
8  
9 but not during young and later adulthood.  
10  
11

### 12 13 14 **Conclusions:**

15  
16 Childhood adversities, especially sexual abuse, physical abuse and parental divorce are important  
17  
18 risk factors for the onset and persistence of suicidal behaviour, with this risk greatest in childhood  
19  
20 and adolescence. The risk for suicidal behaviour was greatest in childhood and adolescence.  
21  
22 Suicidal risk in childhood and adolescence was significantly associated with the following  
23  
24 childhood adversities: sexual abuse, physical abuse and parental divorce.  
25  
26  
27  
28  
29

30  
31 **Keywords:** Childhood adversities, suicidal ideation, suicidal attempts  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



## INTRODUCTION

Suicide and suicidal behaviour are significant public health problems. Suicide is one of the leading causes of death worldwide with almost 1 million people committing suicide each year [1]. This figure is likely to grow to approximately 1.2 million suicides in 2020 [2]. In South Africa, the annual rate of suicide is high [3, 4] mirroring international trends [5]. So, too, are rates of suicidal behaviour with an estimated prevalence of 9.1% for lifetime suicidal ideation and 2.9% for suicide attempts among South Africans according to the South African Stress and Health Survey (SASH) [6].

Despite the enormity of the problem, the aetiology of suicidal behaviour is not fully understood. There are controversies in the literature regarding prior psychiatric disorder and risk for suicide attempts. While some authors have argued that pre-existing disorder is an important risk factor (7-11), others have argued that suicide attempts are not necessarily associated with prior psychopathology [12]. Genetic factors also play an important role in suicidal behaviour [13-16]. While there is stronger evidence pointing towards environmental or experiential factors [17, 18] such as exposure to childhood adversities (19-28]. Recent multi-level country data from the World Mental Health Surveys (WMHS) initiative has allowed for cross-national comparisons of suicidality. The WMHS investigated the association between childhood adversities and suicidal behaviour [20], the persistence of suicidality over time, and the extent to which associations between childhood trauma and suicidality changed over the life course. The WMHS found a dose-response relationship between the number of adversities and suicidal behaviour. Sexual abuse and physical abuse were the strongest risk factors for both the onset and persistence of suicidal behaviours, with the risk for suicidality greatest during childhood (age 4-12 years) and adolescence (age 13-19 years) [20].

1  
2  
3 Numerous studies have examined the link between childhood sexual abuse and suicidality [29-  
4 41]. All of these authors have found that exposure to childhood sexual abuse increases the risk for  
5 mental disorders, including suicidality. Furthermore, the majority of studies that have focused on  
6 the link between childhood physical abuse and suicidality have found that exposure to childhood  
7 physical abuse increases the risk for suicidality [42, 43]. There also appears to be an association  
8 between the number of childhood adversities experienced and the later suicidal behaviour [21, 23,  
9 24, 44, 45].

10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21 Exposure to early life stress is prevalent among South Africans. In one sample of South African  
22 rural youth, the prevalence of physical and sexual abuse was shown to be very high with 94.4%  
23 of males exposed to physical abuse and 39.1% of females to sexual abuse [46]. More than a  
24 quarter of adults who were interviewed endorsed exposure to childhood adversity (parental death,  
25 parental separation or parental divorce) in the SASH study [47]. Significantly more females were  
26 prone to be victims of domestic violence than men [47]. Women also reported twice as many  
27 suicidal attempts than the male participants in the SASH study [9].

### 38 **Objective**

39  
40 We report in more detail on data from a South African dataset gathered as part of the World  
41 Mental Health Surveys, which allowed for comparison with data from the overall cross-national  
42 sample. This data are particularly interesting as South Africa is a middle income African country  
43 with high rates of violent trauma exposure. The present study aimed to examine the relationship  
44 between the type and frequency of childhood adversity exposure to suicidal behaviour over the  
45 life trajectory of South Africans, given that there are no published nationally representative data  
46 that may be useful in informing both clinical practice and policy.

## METHODS

### Sample

Data for the SASH Study were collected between January 2002 and June 2004. WMH surveys were carried out in 21 countries which included Nigeria and South Africa [48]. For detailed information on study methods see Williams et al. (2004) [48]. The research protocol for the SASH study was approved by the Human Subjects Committee of the University of Michigan, by Harvard Medical School ethics committee and by a single project assurance of compliance from the Medical University of South Africa (MEDUNSA), and by the National Institute of Mental Health. It was a national probability sample of 4,351 South African adults (persons aged 18 years and older) living in households or in hostel accommodation. All racial and ethnic groups were represented, with the sample selected using a three-stage probability sample design. The response rate was 85.5%.

### *Sampling approach*

Sampling was divided into three stages. Primary sampling units was selected during the first stage, which was based on the 2001 SA census Enumeration Areas (EAs). The second stage involved sampling of household units within clusters selected in each EA. South Africans in both urban and rural areas were sampled. Sampled residences were stratified into 10 diverse housing categories: Rural-commercial, agricultural, rural traditional subsistence areas, African townships, informal urban or peri-urban shack areas, Coloured townships, Indian townships, general metropolitan residential areas, general large metropolitan residential areas, and domestic servant accommodation in urban areas. During the third stage, one adult respondent in each sampled housing unit was selected. A total of 5089 households was selected. Field interviews were conducted with 4433 (87.1%) of designated respondents. Based on quality control, 4351

1  
2  
3 interviews were retained for use in the analysis. There were no differences in response rates  
4  
5 across the four designated racial groups (white, Coloured [mixed racial origin], Indian, black).  
6  
7 According to the 2001 Census statistics, 79.% people in South Africa are Black African, 8.9%  
8  
9 are coloured, 9.6% are white, and 2.5% are Indian/Asian [49].  
10  
11

### 12 13 **Diagnostic Interview**

14  
15 SASH used version 3 of the World Health Organization Composite Diagnostic Interview (WHO  
16  
17 CIDI) [50]. Interviewers were trained within a one week period and conducted the interviews in  
18  
19 seven different languages, namely English, Afrikaans, Zulu, Xhosa, Northern Sotho, Southern  
20  
21 Sotho, and Tswana. Translations of the CIDI into several native South African languages were  
22  
23 conducted in accordance with WHO requirements. Multilingual and bilingual expert panels  
24  
25 conducted the back-translations [51, 52]. Informed consent was obtained from participants after  
26  
27 a complete description of the study was provided. Respondents provided socio-demographic and  
28  
29 diagnostic information, as well as an account of suicidal behaviours during the interviews. The  
30  
31 core diagnostic assessment of mental disorders included anxiety disorders (panic disorder,  
32  
33 agoraphobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder), mood  
34  
35 disorders (major depressive disorder, dysthymia), substance use disorders (alcohol abuse, alcohol  
36  
37 dependence, drug abuse, drug dependence) and intermittent explosive disorder [53, 54].  
38  
39  
40  
41  
42  
43  
44

### 45 **Suicidal behaviour**

46  
47 The CIDI 3.0 module on suicidal behaviour was used to assess the age-of-first-onset, age of most  
48  
49 recent episode, and lifetime occurrence of suicidal ideation, suicide plans and suicide attempts.  
50  
51 Suicidal ideation, suicide plans and suicide attempts was assessed with questions such as “Have  
52  
53 you ever seriously thought about committing suicide?”, “Have you ever made a plan for  
54  
55 committing suicide?”, and “Have you ever attempted suicide?”, respectively. Ideators only  
56  
57  
58  
59  
60

1  
2  
3 proceeded to answer questions about plans (“Have you ever made a plan for committing  
4 suicide?”) and attempts (“Have you ever attempted suicide?”). Information on the age of first  
5 occurrence of the three main outcomes was obtained. To get a better understanding of the  
6 progression from ideation to attempt, the outcomes considered in this study were: suicide  
7 attempts in the total sample; suicide ideation in the total sample; suicide plans among ideators;  
8 suicide attempts among ideators with a plan (planned attempts), and suicide attempts among  
9 ideators in the absence of a plan (unplanned or impulsive attempts).  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

### 21 **Childhood adversities**

22  
23 Physical abuse, sexual abuse, parental death, parental divorce, other parental loss, family  
24 violence, physical illness and financial adversity were the various childhood adversities assessed.  
25  
26 Biological and non-biological parents were included in measures of parental death, divorce or  
27 other parental loss. Financial adversities were assessed with questions on whether the family had  
28 insufficient funds to pay for basic necessities. Questions about repeated fondling, attempted rape  
29 or rape were asked to assess for sexual abuse. This comprised the following “The next 2  
30 questions are about sexual assault: (i) The first is about rape. We define this as someone either  
31 having sexual intercourse with you or penetrating your body with a finger or object when you did  
32 not want them to, either by threatening you or using force, or when you were so young that you  
33 didn’t know what was happening. Did this ever happen to you?”, and (ii) “Other than rape, were  
34 you ever sexually assaulted or molested?”. A modified version of the Conflict Tactics Scale  
35 (CTS2) was used to assess family violence and physical abuse [55]. Respondents were classified  
36 as having experienced *physical abuse* when they indicated that, when they were growing up,  
37 their father or mother (includes biological, step, or adoptive parents) slapped, hit, pushed,  
38 grabbed, shoved, or threw something at them, or that they were beaten as a child by the persons  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 who raised them. Family violence was assessed as present when respondents indicated that they  
4  
5 (i) “were often hit, shoved, pushed, grabbed, or slapped while growing up” *or* (ii) “witnessed  
6  
7 physical fights at home, like when your father beat up your mother?” A standard chronic  
8  
9 conditions checklist assessed for life-threatening physical illnesses in childhood [56].  
10  
11

### 12 13 14 **Data analysis**

15  
16 All data analyses were processed and analysed centrally by a team of statisticians at the Harvard  
17  
18 School of Public Health (Boston, USA) using the SAS version 9.1.3 software package. Discrete-  
19  
20 time survival analysis with time-varying covariates was used to study the risk factors of lifetime  
21  
22 suicide ideation, plans and attempts. Data were weighted to adjust for the stratified multistage  
23  
24 sample design, differential probability of selection within households as a function of household  
25  
26 size and clustering of data, and differential non-response. Overall, percentages were weighted to  
27  
28 adjust for differences in selection probabilities, differential non-response, oversampling of cases,  
29  
30 and residual differences on sociodemographic variables between the sample and the population  
31  
32 [48, 57]. A post-stratification weight was also used to make the sample distribution comparable,  
33  
34 for age, sex, and province, with the population distribution in the 2001 South African census.  
35  
36 Both weighted and geographic clustering of data were taken into account in the data analyses by  
37  
38 using a jackknife repeated replications simulation method implemented in SAS macro 14. The  
39  
40 survival coefficients were exponentiated and are reported below in the form of odds ratios.  
41  
42

43  
44 The association between suicidality and childhood adversity was examined using discrete-time  
45  
46 survival models with the analysis unit being person-years. Bivariate analyses (considering one  
47  
48 adversity at a time) and multivariate analyses (considering all adversities simultaneously) were  
49  
50 conducted. Two types of multivariate models were tested: multivariate additive models  
51  
52 (simultaneously considering all childhood adversities) and multivariate interactive models (with  
53  
54  
55  
56  
57  
58  
59  
60

number and type of childhood adversities experienced by each respondent included as dummy variables). The analysis also examined interactions between the life stage (13-19 years, 20-29 years, 30+ years) of respondents and each childhood adversity, as well as the influence each adversity had on early-, middle- and later- onset suicidality. Analyses were conducted using SUDAAN version 8.1 to adjust for clustering and weighting. Odds ratios (ORs) with a 95% confidence interval (CIs) are reported. Wald  $X^2$ - tests were used to examine multivariate significance. Associations between adversities and suicide outcomes were adjusted for sex-, age-, educational level, marital status, interactions between demographic variables, life course, [lifetime mental disorders](#) and parental psychopathology. Analyses also examined the influence of respondents' lifetime mental disorders on suicidality, as well as interactions between sex and each childhood adversity. Statistical significance using two-sided tests was set at  $p < .05$  [20].

Based on an N of 4000 (alpha of 0.05, 2 sided significance), the study was adequately powered (.99), to detect an OR of 2.0 of a continuously distributed normalized predictor and a 10% prevalence of suicidal behaviour.

## RESULTS

### *Demographic details*

In the sample, ( $n = 4351$ ), there were slightly more female (53.7%) than male respondents. There were more black (76.2%) than coloured (10.4%), white (10%), and Indian/Asian (3.4%) respondents. Furthermore, half of the sample was married and most were unemployed (69.2%), had less than 12 years of education (62.7%) and lived in an urban area (59.7%) (see Table 1).

### *Prevalence of childhood adversities among the total sample*

Figure 1 provides a schematic representation of the suicidality data reported in the sections which follow. In the total sample, 35.4% of participants with one adversity had a suicide attempt,

1  
2  
3 compared with 23.4% with one adversity who had not made an attempt. Physical abuse (24.9%),  
4  
5 parental divorce (14.2%) and parental death (11.6%) were most prevalent among those suicide  
6  
7 attempters. Among those exposed to one childhood adversity, without a suicide attempt, the two  
8  
9 most prevalent adversities reported were physical abuse (12.2%) and parental death (11.3%). In  
10  
11 the total sample 15.4% of participants exposed to two or more adversities had a suicide attempt.  
12  
13 In contrast, 8.6% of participants exposed to two or more adversities had not made an attempt  
14  
15 (Table 2).  
16  
17  
18  
19

### 20 21 ***Prevalence of childhood adversities among suicidal ideators in the total sample***

22  
23 In the sample as a whole, 35.9% of those with one adversity had suicidal ideation compared with  
24  
25 22.7% of those with one adversity who had no ideation. The most prevalent adversities  
26  
27 associated with suicidal ideation were physical abuse (21.1%), parental death (13.9%), and  
28  
29 parental divorce (7.9%). Among those without suicidal ideation, physical abuse (11.8%) and  
30  
31 parental death (11.3%) were the most commonly endorsed childhood adversities. Of those who  
32  
33 endorsed two or more childhood adversities, 10.8% reported suicidal ideation and 8.6% did not  
34  
35 (Table 2). In summary, the most prevalent childhood adversities reported among the total sample  
36  
37 with/without suicidal ideation were firstly, physical abuse and secondly, the death of a parent.  
38  
39  
40  
41  
42

### 43 44 ***Prevalence of suicide attempts in the total sample***

45  
46 In the total sample, 24.9% of those with childhood physical abuse had attempted suicide while  
47  
48 12.2% of respondents with no physical abuse had no attempt. Of those exposed to parental  
49  
50 divorce, 14.2% had attempted suicide and 4.8% had made no attempt. The second most prevalent  
51  
52 childhood adversity was parental death with 11.6% of those with parental death attempting  
53  
54 suicide and 11.3% of those with parental death with no attempts (Table 2).  
55  
56  
57  
58  
59  
60



### ***Prevalence of childhood adversities among suicidal ideators***

#### *With/without a plan*

Among suicidal ideators with a plan, 32.9% had experienced one childhood adversity. Among ideators with no plan, 41.7% had one childhood adversity. Among ideators with a plan, the following were the most prevalent childhood adversities: physical abuse (24.3%), parental death (12.2%), and parental divorce (9.7%). Among ideators without a plan, 27.9% endorsed physical abuse, 16.1% parental death, and 9.2% parental divorce (see Table 2). In both groups (ideators with and without a plan), physical abuse was the most prevalent childhood adversity, followed by parental death and parental divorce.

#### *With or without an attempt*

Among suicidal ideators who had attempted suicide, 35.4% were exposed to one childhood adversity and 15.4% were exposed to two or more childhood adversities. In the group of ideators who had made an attempt, 24.9% had experienced physical abuse, 14.2% parental divorce, and 11.6% parental death (Table 2). 40.5% of those with one adversity, and 9.6% of those exposed to two or more adversities were suicidal ideators with no attempts. In this group, the most prevalent adversities were physical abuse (24.5%), parental death (15.6%) and parental divorce (6.7%) reported (Table 2).

Among all ideators (with/without a plan, with/without an attempt), the most prevalent childhood adversity was physical abuse, followed by parental death and parental divorce. Of note, in the group of ideators with an attempted suicide parental divorce was more prevalent than parental death.

### ***Bivariate and multivariate results: Type of childhood adversity***

1  
2  
3 Bivariate and multivariate analyses were performed to examine the associations between the  
4  
5 different childhood adversities (physical abuse, sexual abuse, parental death, parental divorce,  
6  
7 other parental loss, family violence, physical illness, financial adversity) and lifetime suicidal  
8  
9 ideation, plans and attempts.  
10  
11

12  
13  
14 In the total sample, bivariate and multivariate analysis revealed significant associations between  
15  
16 (i) sexual abuse (bivariate: OR=7.9, p=0.003; multivariate: OR=7.6, p=0.003), (ii) physical abuse  
17  
18 (OR 2, p=0.007; OR 2.0, p=0.006) and (iii) parental divorce (OR 2.8, p<.001; OR 2.7, p=0.001),  
19  
20 and lifetime suicide attempts. Among ideators in the sample, physical abuse (OR=1.7, p<.001;  
21  
22 OR=1.7, p<.001) was significantly associated with suicidal ideation. Multivariate analyses  
23  
24 revealed an additional association with suicidal ideation, namely parental divorce (OR = 1.6,  
25  
26 p=0.038). The relationship between childhood adversities and lifetime plans was not statistically  
27  
28 significant. However, a significant association was found between parental divorce and lifetime  
29  
30 suicidal attempts among ideators (OR=3.0, p<.001; OR=3.1, p=0.023) (Table 3).  
31  
32  
33  
34  
35

36 Findings from multivariate analysis, therefore, confirm findings of bivariate analysis for all  
37  
38 groups, except for ideators. Among ideators bivariate analysis revealed a significant relationship  
39  
40 between physical abuse and suicidal ideation. This was confirmed in multivariate analysis where  
41  
42 the association between parental divorce and suicidal ideation was significant for the whole  
43  
44 sample.  
45  
46  
47  
48

#### 49 ***Bivariate associations between the number of adversities and lifetime suicidality***

50  
51 The relationship between the number of childhood adversities and lifetime suicidal ideation,  
52  
53 plans and attempts was further examined. There was a significant relationship between the  
54  
55 number of childhood adversities and lifetime suicide attempts. Two or more childhood  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

adversities were associated with a 2-fold higher risk of lifetime suicide attempts in the total sample (OR=2.1,  $p<.001$ ). A significant relationship was also established between one, as well as two or more adversities with ideators in the total sample. Among ideators, no significant association was found between the number of childhood adversities and lifetime plans. A significant relationship was found between two or more adversities and lifetime attempts among ideators (OR=2.7,  $p=0.016$ ), indicating a more than 2-fold higher risk of lifetime suicide attempts in this group (Table 4).

### ***Multivariate associations between number of childhood adversities and lifetime suicidality***

In the final multivariate model which included 2 or more adversities as a predictor variable, sexual abuse (OR=9.3,  $p<.001$ ), childhood physical abuse (OR=2.2,  $p=0.003$ ) and parental divorce (OR=3.1,  $p<.001$ ) retained significant associations with lifetime suicide attempts in the total sample. Physical abuse (OR=2.1,  $p<.001$ ), parental death (OR=1.7,  $p=0.010$ ), parental divorce (OR=1.9,  $p=0.004$ ) and other parental loss (OR = 2.1,  $p=0.004$ ) were significant predictors of suicidal ideation (Table 5a): The same findings emerged after controlling for mental disorders, with the exception that sexual abuse was also significantly associated with suicidal ideation (Table 5b). Physical abuse was associated with a lower odds of lifetime suicide plans among ideators (OR = 0.4,  $p=0.038$ ) (Table 5a). There were no significant associations between childhood adversities and lifetime attempts among those with suicidal ideation. (Table 5): The findings remain unchanged after controlling for mental disorders (Table 5b).

### ***Associations between the types of childhood adversity and lifetime suicidality over the life course***

Multivariate analyses were performed to examine the association between the types of childhood adversity and lifetime suicidal ideation, plans and attempts during childhood years (age 4- 12),

1  
2  
3 teenage years (age 13-19), young adulthood (age 20-29) and later adulthood (30 years and older)  
4  
5 (Tables available from authors).  
6  
7

8  
9 Childhood years (4-12). Sexual abuse (OR=61.6, CI=4.5-841.0, p=0.002) in early childhood (4-  
10  
11 12 years of age) was significantly associated with lifetime suicide attempts in the total sample  
12  
13 (OR = 61.6, CI=4.5-841.0, p=0.002). Both sexual abuse (OR=34.8, CI= 3.1-392.6, p=0.003) and  
14  
15 physical abuse (OR=3.7, CI=1.0-13.4, p=0.041) were associated with a higher risk for suicidal  
16  
17 ideation among the total sample. No significant associations were found between any of the  
18  
19 childhood adversities and lifetime plans in the group of ideators. Among those with suicidal  
20  
21 ideation, parental death (OR=2.2, CI=1.1-4.3, p=0.021) was significantly associated with suicide  
22  
23 attempts in childhood years.  
24  
25  
26  
27

28  
29 Teen years (13-19). Sexual abuse (OR=20.3, CI=2.0-210.2, p=0.010), physical abuse (OR=3.7,  
30  
31 CI=1.5-9.2, p=0.004), and parental divorce (OR=4.6, CI=1.7-12.1, p=0.002) were significantly  
32  
33 associated with suicide attempts in the total sample of teenagers. Physical abuse (OR=3.6,  
34  
35 CI=2.2-5.9, p<.001) and parental death (OR=2.2, CI=1.1-4.3, p=0.021) significantly increased  
36  
37 the risk for suicidal ideation among the total group of teens. Physical illness (OR=9.9, CI=1.8-  
38  
39 54.0, p=0.007) significantly increased the risk of suicidal plans in teens with suicidal ideation.  
40  
41 Suicide attempts among teens with suicidal ideation was significantly predicted by parental  
42  
43 divorce (OR=4.3, CI=1.1-17.0, p=0.035).  
44  
45  
46  
47

48  
49 Young adulthood (20-29). None of the childhood adversities were significantly associated with  
50  
51 lifetime suicide attempts during young adulthood in the sample overall. An explanation could be  
52  
53 that suicide attempts spike earlier and later in life among South Africans, contributing to the lack  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 of significance. Parental loss other than parental death was significantly associated with suicidal  
4 ideation (OR=2.9, CI=1.2-7.4, p=0.019).  
5  
6  
7

8  
9 Later adulthood ( $\geq 30$ ). Childhood physical abuse (OR=2.2, CI=1.0-4.8, p=0.035) was  
10 significantly predictive of suicidal attempts. The likelihood of suicidal ideation significantly  
11 increased in later adulthood if parental loss other than parental death (OR=5.1, CI=2.1-12.1,  
12 p<.001) or physical illness had been present during childhood (OR=4.3, CI=1.1-15.9, p=0.028).  
13  
14 No significant relationship was found between any of the childhood adversities and lifetime  
15 plans in the group of ideators although a significant relationship was found between two or more  
16 adversities and lifetime plans among those who were ideators (OR=44.5, CI=2.5-779.1,  
17 p<.008). None of the childhood adversities were significantly associated with suicide attempts  
18 among ideators in this age group.  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30

## 31 DISCUSSION

32 Rates of childhood adversities and suicidal behaviours were both high among South Africans,  
33 with more than a third of respondents in the total sample who attempted suicide experiencing one  
34 childhood adversity, and 15.4% experiencing two or more adversities. Overall, physical abuse,  
35 sexual abuse, parental divorce and physical illness were far more prevalent in those with a suicide  
36 attempt than in those without. The most prevalent childhood adversities endorsed overall were  
37 physical abuse followed by parental death. Physical abuse, parental divorce and death of a parent  
38 were also the most prevalent adversities experienced in those with a suicide attempt as well as in  
39 those with suicidal ideation. These findings are somewhat dissimilar to other country samples;  
40 for example in the 21 countries that participated in the WMHS, physical abuse (29.3%), family  
41 violence (24.8%) and neglect (19.3%) were the most prevalent childhood adversities among those  
42 with a lifetime suicide attempt, while physical abuse (20.6%), family violence (17.6%) and death  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 of a parent (14.2%) were most often reported among participants with lifetime suicidal ideation  
4  
5 [20]. Cross-nationally, it would appear that physical abuse is the commonest childhood adversity  
6  
7 associated with lifetime suicide attempts and ideation [20].  
8  
9

10  
11 The estimate lifetime prevalence of 2.9% for attempted suicide among South Africans is close to  
12  
13 the rates of 4.6% and 4.1% reported for general and Black populations respectively in USA. In  
14  
15 addition the 9.1% estimated prevalence of suicide ideation is comparable with previous estimates  
16  
17 from studies in South African clinical samples. Joe et al. (2008b) reported for the first time on the  
18  
19 rates of suicide ideation, plan and attempts among the different ethnic groups, in data from the  
20  
21 SASH study [6]. Overall, the results suggest that people in SA engage in suicidal thought and  
22  
23 behaviours at levels nearly comparable with those of Western nations.  
24  
25  
26  
27

28  
29 When examining suicidal behaviour risk in the context of childhood adversity, sexual abuse,  
30  
31 physical abuse and parental divorce emerged as significant risk factors for lifetime suicide  
32  
33 attempts in the total sample. Furthermore, physical abuse and parental divorce were significant  
34  
35 risk factors for suicidal ideation in the total sample. After adjusting for mental illness, sexual  
36  
37 abuse was also a significant risk factor for suicidal ideation. Parental divorce emerged as a  
38  
39 significant risk factor among ideators with lifetime suicide. These findings are largely consistent  
40  
41 with the data from the overall cross-national WMHS, which found that physical and sexual abuse  
42  
43 significantly increased the likelihood of suicidal ideation and attempts, while neglect was a risk  
44  
45 factor for suicidal behaviour in multivariate additive analyses [20].  
46  
47  
48  
49

50  
51 Of the adversities implicated, sexual and physical abuse were more significant risk factors than  
52  
53 other adversities, highlighting the fact that intrusive and aggressive experiences in childhood may  
54  
55 have more devastating and longer lasting effects [58]. This may be due to the extreme  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

powerlessness and loss of control that such abuse causes, or to physically aggressive assaults resulting in the devaluation of one's body and consequent susceptibility to self harm [28]. In a country with high rates of sexual and physical abuse [46] this is particularly concerning. The impact of parental divorce on suicidality supports previous findings that parental divorce, if accompanied by other adversities such as childhood abuse, increases the risk of suicidal behaviour [59].

We also found that exposure to *two or more childhood adversities* significantly increased the risk of suicide attempts among ideators. This confirms earlier work showing exposure to multiple childhood adversities increases the risk of suicidal behaviour [21, 23, 24, 60, 61]. Bruffaerts et al (2010) found a sub-additive effect with regards to the onset of suicidal behaviour when considering multiple adversities [20]. Thus, the impact of multiple adversities was not equal to the sum of the odds ratios of individual adversities. In the overall WMHS analysis exposure to multiple childhood adversities had a significant effect on the persistence of suicide when considering every additional childhood adversity exposed to, however in the current study it was not possible to stratify the number of adversities beyond two or more adversities (i.e. into more than 2 categories) given the relatively small number of cases in the sample overall with non-fatal suicidal behaviour. Physical abuse, parental death, parental loss other than through death, and parental divorce emerged as independent risk factors for suicidal ideation in the total sample. Moreover, the effects of childhood adversities on suicidal tendencies tended to differ over the *life course*. Consistent with nationally representative data in WMHS, childhood adversities were associated with the highest risk of suicide attempts in childhood, with a decrease in risk in adolescence and young adulthood, followed by an increase in risk again during later adulthood [20].

1  
2  
3 In *childhood*, sexual abuse was significantly associated with lifetime suicide attempts in the total  
4 sample, while sexual and physical abuse were significantly associated with suicidal ideation.  
5  
6 Among suicidal ideators, parental death was significantly associated with lifetime suicide  
7 attempts. Exposure to childhood sexual abuse, physical abuse or parental divorce significantly  
8 increased suicide attempts during *teenage years*, while physical abuse and parental death were  
9 associated with suicidal ideation in teens. Among teen suicidal ideators, physical illness was  
10 significantly associated with suicidal plans, while parental divorce was associated with suicide  
11 attempts. These findings emphasize the need to focus suicide prevention strategies at youth in  
12 particular. In *young adulthood*, parental loss other than the death of a parent was significantly  
13 associated with suicidal ideation in the total sample. Interestingly, childhood physical abuse was  
14 identified as a significant risk factor for suicidal attempts in *later adulthood*, while childhood  
15 physical illness and parental loss other than the death of a parent significantly increased the risk  
16 for ideation.  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34

35 Similar to findings from SASH, childhood sexual abuse emerged as a particularly robust risk  
36 factor for suicide attempts in younger participants in the WMH cross-national analysis, with a  
37 10.9 times higher odds of suicide attempts in children, a 6.1 times higher likelihood in  
38 adolescents and a 2.9-fold risk in young adults who were exposed [20]. This is in keeping with  
39 Enns hypothesis that sexual abuse results in suicidal behaviour at a younger age [21]. Consistent  
40 with other studies, childhood physical and sexual abuse, in particular, emerged as risk factors for  
41 the emergence and persistence of suicidal behaviour, especially in adolescence. Loss of a parent,  
42 physical ill-health and family violence has also been found to be associated with persistence of  
43 suicidality [20, 28, 58]. These findings extend previous work done in other developing countries  
44 that have found childhood adversities to be a significant risk factor for suicidality [20, 62-64].  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



### *Limitations*

The following limitations need to be highlighted. First, recall bias might have impacted on the accuracy of recall of childhood adversities. This said, participants were asked questions about childhood adversities in sequence which may have facilitated more accurate recall [65]. Systematic reviews have also found that recall of past experiences can be accurate and can provide valuable data [66, 67]. Thus, there is evidence to support the validity of accurate recall of childhood adversities [67]. Further, studies have shown that responses to questions on childhood adversities, similar to those asked in the SASH study, generally remain stable over time [68, 69]. We recommend that future studies examine ethnicity in relation to adversity and suicidal outcomes. Second, in view of the cross-sectional design, more detailed, temporal information on childhood adversities and suicidal incidents was not obtained. Third, variables such as culture, ethnicity and mental status at the time of the interview may have influenced the recall and reporting of suicidal behaviour. It is possible that response bias may have been particularly skewed to disenfranchised South Africans (e.g. poor, young, urban and black respondents), who may have been too afraid to divulge information on suicidality. Stigma associated with mental health problems may have also played a role in the reporting suicidal tendencies. Thus, participants' mental health status, ethnicity, culture and generational factors may have also contributed to the under-reporting of suicidality. It is possible that individuals reporting childhood adversities may have also been more likely to report suicidal behaviour, while those not reporting childhood adversities may have underreported suicidality. Stigma and mental health status (e.g. depressed persons may be more inclined to report suicidality and more likely to remember negative childhood experiences) may also be contributory factors. In addition, some participants

1  
2  
3 may have been afraid to report suicidal behaviours. The role of ethnicity, culture and generational  
4 factors may have also contributed to the under-reporting of suicidality. Overall, it is much more  
5 likely that adversities and suicidality were under-reported rather than over-reported [9, 20, 67,  
6 70]. Fourth, we do not assess for self-mutilating behavior. The importance of discriminating  
7 suicidal behaviour from non-suicidal self-mutilation cannot be underestimated. Fifth, the survey  
8 was conducted in adults living in households and hostel quarters thus the findings are not  
9 generalizable to homeless and institutionalized persons who were not included in the survey.  
10 Sixth, the CIDI instrument which was used in this study is a lay-administered instrument which  
11 does not include an assessment of several key DSM-IV diagnoses (such as bipolar disorder and  
12 psychosis), are associated with elevated rates of suicidality. As a result, some participants with  
13 suicidality may have not have been diagnosed with a disorder. Furthermore, in view of the large  
14 confidence intervals and small sample sizes for some of these analyses caution is required in  
15 drawing conclusions. In addition, we did not control for other unmeasured causes of childhood  
16 adversities and suicidality, or protective (resiliency) factors that may have contributed to the  
17 associations observed in these data. Both other risk and resiliency factors may have contributed to  
18 both the prevalence of non-fatal suicidal behaviours and to the associations with different forms  
19 of childhood adversity and warrant further investigation. Lastly, it is important to point out that  
20 these data were collected approximately 10 years ago. Notwithstanding these limitations, this  
21 study represents the first investigation among South Africans of a wide range of childhood  
22 adversities and their impact on the onset and persistence of suicidality over the life course.  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50

### 51 ***Conclusions***

52 Childhood adversities especially sexual abuse, physical abuse and parental divorce are associated  
53 with the onset and persistence of suicidal behaviour with the risk greatest in children and  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 adolescents. Public health efforts aimed at prevention of early childhood sexual and physical  
4  
5 abuse, in particular, may have a significant impact on reducing suicidality over the life course and  
6  
7  
8 improving mental health outcomes.  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review only

## REFERENCES

1. World Health Organization. Suicide Prevention (SUPRE). Geneva, Switzerland. 2007.  
[http://www.who.int/mental\\_health/prevention/suicide/suicideprevention/en/](http://www.who.int/mental_health/prevention/suicide/suicideprevention/en/)
2. Murray, C.L., Lopez, A.D. The global burden of disease: a comprehensive assessment of mortality and disability from disease, injuries and risk factors in 1990 and projected to 2020. Cambridge, MA: Harvard University Press, 1996.
3. Burrows, S., Laflamme, L. Pattern analysis of suicide mortality surveillance data in urban South Africa. *Suicide and Life-Threatening Behaviour* 2008;**38**:209-220.
4. Meel, B.I. Epidemiology of suicide by hanging in Transkei. South Africa. *Am J Forensic Med Pathol.* 2006;**27**:75-78
5. Flisher, A.J., Liang, H., Laubscher, R. Suicide trends in South Africa, 1968-90. *Scand J Public Health* 2004;**32**:411-418.
6. Joe, S., Stein, DJ., Seedat, S., Herman, A., Williams, DR. non-fatal suicidal behavior among South Africans: Results from the South Africa Stress and Health Study. *Social Psychiatry Epidemiology* 2008;**43**(6):454-461.doi:10.1007/s00127-008-0348-7.
7. Beautrais, A.L., Joyce, P/R/. & Mulder, R.T. (1996). Risk factors for serious suicide attempts among youth aged 13 through 24 years. *J Am Acad Child Adolesc Psychiatry* 1996;**35**(9):1174-1182.
8. Harrison, EC, Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis. *Br J Psychiatry* 1997;**170**:205-228

- 1  
2  
3 9. Joe, S., Stein, D.J., Seedat, S., et al. Prevalence and correlates of non-fatal suicidal behaviour among  
4  
5 South Africans. *Br J Psychiatry* 2008;**192**:310-311.  
6  
7
- 8 10. Nock, M.K., Borges, G., Bromet, E.J., et al. Suicide and Suicidal Behaviour. *Epidemiologic Reviews*  
9  
10 2008;**30**:133-154.  
11  
12
- 13 11. Nock, M.K., Borges, G., Bromet, E.J., et al. (2008b). Cross-national prevalence and risk factors for  
14  
15 suicidal ideation, plans and attempts. *British Journal of Psychiatry*, 192, 98-105.  
16  
17
- 18 12. Nock, M.K., Hwang, I., Sampson, N.A., et al. Cross-national analysis of the associations among  
19  
20 mental disorders and suicidal behaviour: Findings from the WHO World Mental Health Surveys.  
21  
22 *PLoS Medicine* 2009;**6**(8).e1000123.  
23  
24
- 25 13. Bondy, B., Buettner, A., Zill, P. Genetics of suicide. *Molecular Psychiatry* 2006;**11**:336-351.  
26  
27
- 28 14. Kohli, M.A., Salyakina, D., Pfennig, A., et al. Association of genetic variants in the neurotrophic  
29  
30 receptor encoding gene *NTRK2* and a lifetime history of suicide attempts in depressed patients. *Arch*  
31  
32 *Gen Psychiatry* 2010;**67**:348-59.  
33  
34
- 35 15. Roy, A., Hu, X-Z., Janal, M.N., & Goldman, D. Interaction between childhood trauma and serotonin  
36  
37 transporter gene variation and suicide. *Neuropsychopharmacology* 2007;**32**:2046–2052  
38  
39  
40  
41  
42
- 43 16. Risch, N., Herrell, R., Lehner, T., et al. Interaction between the serotonin transporter gene (5-  
44  
45 HTTLPR), stressful life events, and the risk of depression: A meta-analysis. *JAMA* 2009;**301**:2462–  
46  
47 2471.  
48  
49
- 50 17. Borges, G., Benjet, C., Medina-Mora, M.E., et al. Traumatic events and suicide related outcomes  
51  
52 among Mexico City adolescents. *J Child Psychol Psychiatry* 2008;**6**:654-666. Weissman MM, Bland  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 RC, Canino GJ, Greenwald S, Hwu HG, Joyce PR, et al. (1999) Prevalence of suicide ideation and  
4  
5  
6 suicide attempts in nine countries. *Psychology Med*, 29: 9–17.  
7
- 8 18. Brodsky, BS & Stanley, B. Adverse childhood experiences and suicidal behaviour. *Psychiatry*  
9  
10 *Clinical Northern America* 2008;**31**:223-235  
11  
12
- 13 19. Bruffaerts, R., Demyttenaere, K., Borges, G., et al. Childhood adversities as risk factors for onset  
14  
15 and persistence of suicidal behaviour. *Br J Psychiatry* 2010;**197**:20-27.  
16  
17  
18
- 19 20. Enns, M.W., Cox, B.J., Afifi, T.O., et al. Childhood adversities and risk for suicidal ideation and  
20  
21 attempts: a longitudinal population-based study. *Psychological Medicine* 2006;**36**:1769-1778.  
22  
23  
24
- 25 21. Johnson, J.G., Cohen, P., Gould, M.S., et al. Childhood adversities, interpersonal difficulties, and  
26  
27 risk for suicide attempts during late adolescence and early adulthood. *Arch Gen Psychiatry*  
28  
29 2002;**59**:741-749.  
30  
31  
32
- 33 22. Dube, S.R., Anda, R.F., Felitti, V.J., et al. Childhood abuse, household dysfunction, and the risk of  
34  
35 attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences  
36  
37 Study. *JAMA* 2001;**286**:3089-3096.  
38  
39  
40
- 41 23. Afifi, T.O., Enns, M.W., Cox, B.J., et al. Population attributable fractions of psychiatric disorders  
42  
43 and suicide ideation and attempts associated with adverse childhood experiences. *Am J Public*  
44  
45 *Health* 2008;**98**:946-952.  
46  
47  
48
- 49 24. Burke, A.K., Galfalvy, H., Everett, B., et al. Effect of exposure to suicidal behavior on suicide  
50  
51 attempt in a high-risk sample of offspring of depressed parents. *J Am Acad Child Adolesc*  
52  
53 *Psychiatry* 2010;**49**:114-121.  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3  
4 25. Labonte, B., Suderman, M., Maussion, G., Navaro, L., Yerko, V., Mahar, I., & Turecki, G. Genome-  
5 wide epigenetic regulation by early-life trauma. *Arch Gen Psychiatry* 2012;**69**(7):722-  
6 731. Doi:10.1001/archgenpsychiatry.2011.2287  
7  
8  
9  
10  
11 26. Lipschitz, D.S., Winegar, R.K., Nicolaou, A.L., et al. (1999). Perceived abuse and neglect as risk  
12 factors for suicidal behaviour in adolescent inpatients. *The Journal of Nervous and Mental Disease*,  
13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
25. Labonte, B., Suderman, M., Maussion, G., Navaro, L., Yerko, V., Mahar, I., & Turecki, G. Genome-wide epigenetic regulation by early-life trauma. *Arch Gen Psychiatry* 2012;**69**(7):722-731. Doi:10.1001/archgenpsychiatry.2011.2287
26. Lipschitz, D.S., Winegar, R.K., Nicolaou, A.L., et al. (1999). Perceived abuse and neglect as risk factors for suicidal behaviour in adolescent inpatients. *The Journal of Nervous and Mental Disease*, 187, 32-39.
27. Ystgaard, M., Hestetun, I., Loeb, M., & Mehlum, L. Is there a specific relationship between childhood sexual and physical abuse and repeated suicidal behaviour? *Child Abuse Negl* 2004;**28**:863-875
28. Boudewyn, A., & Liem, J. Childhood sexual abuse as a precursor to depression and self-destructive behavior in adulthood. *J Trauma Stress* 1995;**8**:445-459.
29. Brown, J., Cohen, P., Johnson, J.G., & Smailes, E.M. Childhood abuse and neglect: Specificity of effects on adolescent and young adult depression and suicidality. *J Am Acad Child Adolesc Psychiatry* 1999;**38**:1490-1496.
30. Bryant, S.L., & Range, L.M. Suicidality in college women who were sexually and physically abused and physically punished by parents. *Violence Vict* 1995;**10**:195-201.
31. Davidson, J.R.T., Hughes, D.C., George, L.K., & Blazer, D.G. The association of sexual assault and attempted suicide within the community. *Arch Gen Psychiatry* 1996;**53**:550-555
32. Fergusson, D.M., & Mullen, P.E. *Childhood Sexual abuse – An evidence based perspective*. Sage, CA: Thousand Oaks, 1999.

- 1  
2  
3 33. Finkelhor, D. Early and long-term effects of child sexual abuse: An update. *Professional*  
4  
5 *Psychology: Research & Practice* 1990;**21**(5):325-330.  
6  
7  
8  
9 34. Finkelhor, D., & Hashima, P.Y. (2001). The victimization of children and youth: A comprehensive  
10  
11 overview. In S.O. White (Ed.) *Handbook of youth and justice*. The Plenum series in crime and  
12  
13 justice. Dordrecht: Plenum, 2001:49-78.  
14  
15  
16  
17 35. Holmes, W.C., & Slap, G.B. Sexual abuse of boys: Definition, prevalence, correlates, sequelae, and  
18  
19 management. *JAMA: JAMA* 1998;**280**(21):1855-1862  
20  
21  
22  
23 36. Kendall-Tackett, K.A., Williams, L.M., & Finkelhor, D. Impact of sexual abuse on children: A  
24  
25 review and synthesis of recent empirical studies. *Psychol Bull* 1993;**113**(1):164-180.  
26  
27  
28  
29 37. Martin, G. Reported family dynamics, sexual abuse, and suicidal behaviors in community  
30  
31 adolescents. *Arch Suicide Res* 1996;**2**:183-195.  
32  
33  
34  
35 38. Peters, D.K., & Range, L.M. Childhood sexual abuse and current suicidality in college women and  
36  
37 men. *Child Abuse Negl* 1995;**19**:335-341.  
38  
39  
40 39. Putman, F.W. Ten-year research update review: Child sexual abuse. *J Am*  
41  
42 *Acad Child Adolesc Psychiatry* 2003;**42**(3):269-278  
43  
44  
45  
46 40. Stepakoff, S. Effects of sexual victimization on suicidal ideation and behaviour in US college  
47  
48 women. *Suicide and Life-Threatening Behavior* 1998;**28**:107-126.  
49  
50  
51  
52 41. Malinosky-Rummel, R., & Hansen, D.J. Long-term consequences of childhood physical abuse.  
53  
54 *Psychol Bull* 1993;**144**:68-79  
55  
56  
57  
58  
59  
60



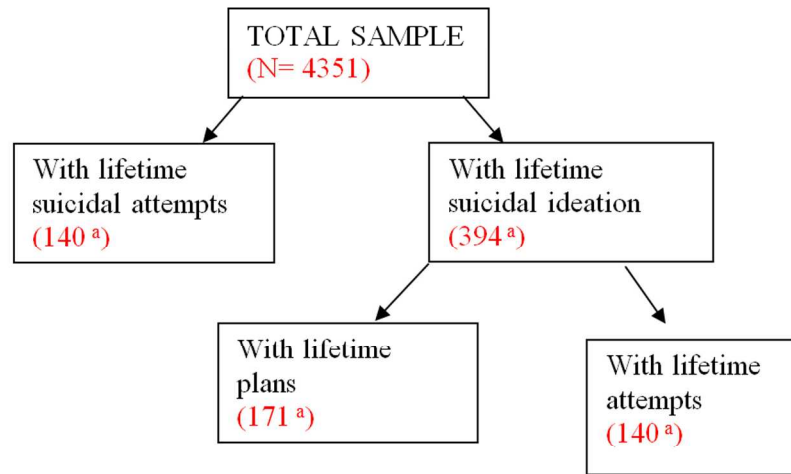
- 1  
2  
3  
4 42. Silverman, A.B., Reinherz, H., & Giaconia, R.M. The long-term sequelae of child and adolescent  
5  
6 abuse: A longitudinal community study. *Child Abuse Negl* 1996;**20**:709-723  
7  
8  
9 43. Chapman, D.P., Whitfield, C.L., Felitti, V.J., Dube, S.R., Edwards, V.J., & Anda, R.F. Adverse  
10  
11 childhood experiences and the risk of depression in adulthood. *J Affect Disord* 2004;**82**:217-225  
12  
13  
14 44. Dube, S.R., Felitti, V.J., Dong, M., Chapman, D.P., Giles, W.H., & Anda, R.F. Childhood abuse,  
15  
16 neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood  
17  
18 experiences study. *Pediatrics* 2003;**111**:564-572.  
19  
20  
21 45. Jewkes, R.K., Dunkle, K., Nduna, M., et al. Associations between childhood adversity and  
22  
23 depression, substance abuse and HIV and HSV2 incident infections in rural South African youth.  
24  
25 *Child Abuse Negl* 2010;**34**:833-841.  
26  
27  
28  
29 46. Seedat, S., Stein, D.J., Jackson, P.B., Heeringa, S.G., Williams, D.R., Myer, L. Life stress and mental  
30  
31 disorders in the South African Stress and Health study. *South African Medical Journal* 2009a;**99**:375-  
32  
33 382.  
34  
35  
36 47. Williams, D.R., Herman, A., Kessler, R.C., et al. The South Africa Stress and Health Study:  
37  
38 Rationale and Design. *Metab Brain Dis* 2004;**19**(1/2):135-147.  
39  
40  
41  
42 48. Statistics South Africa. Census 2001: Census in Brief. Pretoria: Statistics South Africa. 2001.  
43  
44 Available from <http://www.statssa.gov.za/census01/html/CInBrief/CIB2001.pdf> (Accessed January  
45  
46 2014)  
47  
48  
49 49. Kessler, R.C., Üstün, T.B. The World Mental Health (WMH) Survey Initiative Version of the World  
50  
51 Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods*  
52  
53 *Psychiatr Res* 2004;**13**:61-98.  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 50. Seedat, S., Stein, D.J., Herman, A., et al. Twelve-month treatment of Psychiatric disorders in South  
4  
5 Africa Stress and Health Study (World Mental Health Survey Initiative). *Psychiatric Epidemiology*  
6  
7 2008;**38**:211-220.  
8  
9  
10  
11 51. Seedat, S., Williams, D.R., Herman, A., et al. Mental health service use among South Africans for  
12  
13 mood, anxiety and substance use disorders. *South African Medical Journal* 2009b;**99**:346-352.  
14  
15  
16 52. World Health Organization. World Health Organization Manual of the international statistical  
17  
18 classification of diseases, injuries and causes of death, ninth revision. Geneva, Switzerland, 1992.  
19  
20  
21  
22 53. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV),  
23  
24 4<sup>th</sup> Edition. Washington: American Psychiatric Association Press, 1994.  
25  
26  
27 54. Straus MA. Measuring Intrafamily Conflict and Violence: The Conflict Tactics (CT) Scales. *Journal*  
28  
29 of Marriage and Family 1979;**41**(1):75  
30  
31  
32 55. Kessler, R.C., McLaughlin, K.A., Green, J.G. Childhood adversities and adult psychopathology in  
33  
34 the WHO World Mental Health Surveys. *Br J Psychiatry* 2010;**197**:378-385.  
35  
36  
37 56. Stein, D.J., Chiu, W.T., Hwang, I., et al. Cross-national analysis of the associations between  
38  
39 traumatic events and suicidal behavior: Findings from the WHO World Mental Health Surveys. *PloS*  
40  
41 ONE 2010;**5**(5):e10574.  
42  
43  
44  
45 57. Joiner Jr, T.E., Sachs-Ericsson, N.J., Wingate, L.R. Childhood physical and sexual abuse and  
46  
47 lifetime number of suicide attempts: A persistent and theoretically important relationship. *Behav Res*  
48  
49 Ther 2007;**45**:539-547.  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 58. Afifi, T.O., Boman, J., Fleisher, W., et al. The relationship between child abuse, parental divorce,  
4 and lifetime mental disorders and suicidality in a nationally representative adult sample. *Child*  
5 *Abuse Negl* 2009;**33**:139–147.  
6  
7  
8  
9  
10  
11 59. Bebbington, P.E., Cooper, C.C., Minot, S., et al. Suicide attempts, gender, and sexual abuse: data  
12 from the 2000 British Psychiatric Morbidity Survey. *Am J Psychiatry* 2009;**166**:1135-1140.  
13  
14  
15  
16  
17 60. Molner, B, Buka, S, & Kessler, R. Child sexual abuse and subsequent psychopathology: results from  
18 the National Comorbidity Survey. *American Journal Public Health* 2001;**91**:753-760.  
19  
20  
21  
22  
23 61. Borges, G., Angst, J., Nock, M.K., et al. Risk factors for the incidence and persistence of suicide  
24 related outcomes: a 10 year follow up study using the National Comorbidity Surveys. *J Affect*  
25 *Disord* 2008;**105**:25-33  
26  
27  
28  
29  
30  
31 62. Xing, X-Y., Tao, F-B., Wan, Y-H., et al. Family factors associated with suicide attempts among  
32 Chinese adolescent students: A national cross-sectional survey. *J Adolesc Health* 2010;**46**:592-599.  
33  
34  
35  
36 63. Gureje, O., Kola, L., Uwakwe, R., et al. The profile and risks of suicidal behaviours in the Nigerian  
37 Survey of Mental Health and Well Being. *Psychol Med* 2007;**37**:821-830.  
38  
39  
40  
41 64. Knauper, BC., CF, Schwarz, N., Bruce, ML., Kessler, RC. Improving the accuracy of major  
42 depression age of onset reports in the US National Comorbidity Survey. *Int J Methods Psychiatr Res*  
43 1999;**8**(1):39-48  
44  
45  
46  
47  
48  
49 65. Brewin, CR., Andrews, B., Botlib, IH. Psychopathology and early experience: a reappraisal of  
50 retrospective reports. *Psychol Bull* 1993;**113**:82-98  
51  
52  
53  
54 66. Hardt, J., Rutter, M. Validity of adult retrospective reports of adverse childhood experiences: a  
55 review of the evidence. *J Child Psychol Psychiatry* 2004;**45**:260-273.  
56  
57  
58  
59  
60

- 1  
2  
3 67. Dube, SR., Williamson, DF., Thompson, T., Felitti, VJ, Anda, RF. Assessing the reliability of  
4 retrospective reports of adverse childhood experiences among adult HMO members attending a  
5 primary care clinic. *Child Abuse Negl* 2004;**28**(7):729-737.  
6  
7  
8  
9  
10  
11 68. Yancura, LA., Aldwin, CM. (2009). Stability and change in retrospective reports of childhood  
12 experiences over a 5-year period: Findings from the David Longitudinal Study. *Psychol Aging*  
13 2009;**24**(3):715-721  
14  
15  
16  
17  
18  
19 69. Wilsnack, S.C., Wonderlich, S.A., Kristjanson, A.F., et al. (2002). Self reports of forgetting and  
20 remembering childhood sexual abuse in a nationally representative sample of US women. *Child*  
21 *Abuse Negl* 2002;**26**:139-147.  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8 **Figure 1:** Schematic representation



24  
25 <sup>a</sup> Number of cases with the outcome variable; N represents the number of person years.

26  
27 Schematic representation of Suicidal behaviour in the total sample  
28 289x172mm (300 x 300 DPI)

South Africa Web Table 1. Multivariate model for associations between child adversity and LT suicidality<sup>1</sup>

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

	Life stage	Int range 4-12							
		LT Attempts in total sample <sup>2</sup>		Ideators among total sample <sup>3</sup>		Among Ideators, LT Plans <sup>4</sup>		Among Ideators, LT Attempts <sup>5</sup>	
		OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare	OR(95% CI)	Chisquare
Physical Abuse	Childhood	0.6 (0.1-4.3)	0.3(0.60)	<b>3.7* (1.0-13.4)*</b>	<b>4.2(0.041)*</b>	---	---	<b>0.0* (0.0-0.0)*</b>	<b>1177.3(&lt;.001)*</b>
	Teen years	<b>3.7* (1.5-9.2)*</b>	<b>8.5(0.004)*</b>	<b>3.6* (2.2-5.9)*</b>	<b>26.1(&lt;.001)*</b>	0.3 (0.0-2.5)	1.2(0.28)	1.1 (0.3-4.7)	0.0(0.90)
	Young adult	1.6 (0.8-3.5)	1.7(0.20)	1.1 (0.7-1.8)	0.2(0.64)	0.4 (0.1-1.2)	2.7(0.10)	0.9 (0.3-3.2)	0.0(0.88)
	Later adult	<b>2.2* (1.0-4.8)*</b>	<b>4.4(0.035)*</b>	1.8 (0.9-3.5)	3.2(0.07)	0.4 (0.1-1.2)	2.8(0.10)	1.4 (0.4-5.3)	0.2(0.65)
Sexual Abuse	Childhood	<b>61.6* (4.5-841.0)*</b>	<b>9.9(0.002)*</b>	<b>34.8* (3.1-392.6)*</b>	<b>8.6(0.003)*</b>	---	---	---	---
	Teen years	<b>20.3* (2.0-210.2)*</b>	<b>6.6(0.010)*</b>	4.6 (0.3-61.6)	1.4(0.24)	---	---	---	---
	Young adult	5.1 (0.4-66.1)	1.6(0.20)	2.2 (0.3-17.5)	0.5(0.46)	---	---	<b>0.0* (0.0-0.0)*</b>	<b>68.1(&lt;.001)*</b>
	Later adult	<b>0.0* (0.0-0.0)*</b>	<b>81.7(&lt;.001)*</b>	<b>0.0* (0.0-0.0)*</b>	<b>218.1(&lt;.001)*</b>	---	---	0.8 (0.0-16.7)	0.0(0.88)
Parent Died	Childhood	2.6 (0.1-52.0)	0.4(0.53)	1.5 (0.1-16.9)	0.1(0.76)	8.6 (0.3-234.7)	1.7(0.19)	<b>22.7* (1.5-338.3)*</b>	<b>5.3(0.021)*</b>
	Teen years	1.8 (0.5-6.5)	0.9(0.35)	<b>2.2* (1.1-4.3)*</b>	<b>5.3(0.021)*</b>	0.7 (0.1-6.8)	0.1(0.72)	0.5 (0.1-2.2)	0.8(0.38)
	Young adult	0.6 (0.2-2.4)	0.4(0.51)	1.4 (0.7-2.8)	0.7(0.40)	0.4 (0.0-2.8)	1.0(0.32)	0.6 (0.2-2.2)	0.7(0.42)
	Later adult	1.3 (0.3-4.9)	0.1(0.70)	1.6 (0.7-3.6)	1.5(0.22)	0.2 (0.0-1.6)	2.3(0.13)	0.6 (0.2-1.9)	0.8(0.37)
Parent Divorced	Childhood	3.0 (0.2-38.0)	0.7(0.39)	2.9 (0.3-24.8)	0.9(0.33)	4.6 (0.1-215.6)	0.6(0.43)	<b>0.0* (0.0-0.0)*</b>	<b>135.3(&lt;.001)*</b>
	Teen years	<b>4.6* (1.7-12.1)*</b>	<b>9.8(0.002)*</b>	2.5 (1.0-6.1)	3.8(0.05)	0.4 (0.1-3.1)	0.8(0.37)	<b>4.3* (1.1-17.0)*</b>	<b>4.5(0.035)*</b>
	Young adult	1.7 (0.7-4.5)	1.3(0.25)	1.1 (0.5-2.6)	0.1(0.74)	0.8 (0.2-4.2)	0.0(0.84)	2.9 (0.7-12.7)	2.2(0.14)
	Later adult	<b>4.6* (1.0-21.6)*</b>	<b>3.9(0.049)*</b>	2.4 (0.9-6.2)	3.5(0.06)	0.3 (0.0-2.5)	1.2(0.28)	1.9 (0.1-31.6)	0.2(0.65)

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

Other Parent Loss	Childhood	<b>0.0* (0.0-0.0)*</b>	<b>53.4(&lt;.001)*</b>	<b>0.0* (0.0-0.0)*</b>	<b>77.1(&lt;.001)*</b>	---	---	---	---
	Teen years	<b>0.0* (0.0-0.0)*</b>	<b>238.2(&lt;.001)*</b>	0.2 (0.0-1.5)	2.6(0.11)	---	---	<b>0.0* (0.0-0.0)*</b>	<b>60.3(&lt;.001)*</b>
	Young adult	1.2 (0.2-7.6)	0.1(0.82)	<b>2.9* (1.2-7.4)*</b>	<b>5.5(0.019)*</b>	0.1 (0.0-1.5)	3.0(0.08)	10.5 (0.7-160.1)	3.0(0.09)
	Later adult	1.3 (0.2-9.4)	0.1(0.80)	<b>5.1* (2.1-12.1)*</b>	<b>14.1(&lt;.001)*</b>	0.2 (0.0-4.0)	1.1(0.30)	0.6 (0.1-6.9)	0.2(0.70)
Family Violence	Childhood	<b>0.0* (0.0-0.1)*</b>	<b>12.9(&lt;.001)*</b>	1.9 (0.3-13.1)	0.5(0.48)	---	---	---	---
	Teen years	1.9 (0.5-7.2)	1.0(0.33)	2.1 (0.6-7.6)	1.5(0.23)	2.3 (0.1-46.2)	0.3(0.59)	0.9 (0.1-5.7)	
	Young adult	0.4 (0.1-1.5)	2.0(0.16)	0.5 (0.2-1.8)	1.1(0.30)	0.3 (0.0-2.6)	1.4(0.24)	2.1 (0.2-25.7)	0.4(0.55)
	Later adult	1.0 (0.2-6.5)	0.0(0.96)	0.9 (0.2-3.4)	0.0(0.86)	<b>0.0* (0.0-0.9)*</b>	<b>4.3(0.037)*</b>	0.8 (0.0-25.2)	0.0(0.92)
Physical Illness	Childhood	<b>0.0* (0.0-0.0)*</b>	<b>44.3(&lt;.001)*</b>	1.4 (0.2-13.2)	0.1(0.75)	---	---	---	---
	Teen years	2.9 (0.3-27.8)	0.9(0.34)	1.5 (0.4-5.4)	0.3(0.56)	<b>9.9* (1.8-54.0)*</b>	<b>7.3(0.007)*</b>	1.5 (0.2-11.6)	0.1(0.71)
	Young adult	0.3 (0.0-5.1)	0.8(0.36)	1.0 (0.4-2.6)	0.0(0.96)	0.2 (0.0-4.6)	1.0(0.32)	0.1 (0.0-1.4)	3.0(0.08)
	Later adult	5.5 (0.9-32.1)	3.7(0.05)	<b>4.3* (1.1-15.9)*</b>	<b>4.8(0.028)*</b>	<b>0.0* (0.0-0.9)*</b>	<b>4.1(0.042)*</b>	1.6 (0.1-20.8)	0.1(0.73)
Financial Adversity	Childhood	<b>0.0* (0.0-0.0)*</b>	<b>64.2(&lt;.001)*</b>	2.0 (0.2-22.3)	0.3(0.57)	<b>0.0* (0.0-0.0)*</b>	<b>26.8(&lt;.001)*</b>	<b>0.0* (0.0-0.2)*</b>	<b>10.0(0.002)*</b>
	Teen years	1.9 (0.2-14.5)	0.4(0.53)	0.6 (0.2-2.3)	0.6(0.45)	1.0 (0.1-19.3)	0.0(1.00)	4.0 (0.4-42.9)	
	Young adult	0.8 (0.2-3.6)	0.1(0.76)	0.5 (0.2-1.4)	1.9(0.17)	1.7 (0.3-10.9)	0.3(0.57)	1.3 (0.2-7.7)	0.1(0.78)
	Later adult	2.1 (0.3-15.5)	0.6(0.44)	2.0 (0.5-8.4)	1.0(0.31)	0.7 (0.1-4.9)	0.1(0.75)	0.8 (0.1-4.6)	0.1(0.78)
group significance test for all types	Childhood		<b>347.6(&lt;.001)*</b>		<b>822.4(&lt;.001)*</b>		<b>204.6(&lt;.001)*</b>		<b>1425.4(&lt;.001)*</b>
	Teen years		<b>1168.3(&lt;.001)*</b>		<b>37.5(&lt;.001)*</b>		<b>421.4(&lt;.001)*</b>		<b>1337.0(&lt;.001)*</b>
	Young adult		9.9(0.27)		9.6(0.30)		<b>1038.1(&lt;.001)*</b>		<b>97.5(&lt;.001)*</b>

1  
2  
3  
4

	Later adult		<b>338.1(&lt;.001)*</b>		<b>525.7(&lt;.001)*</b>		7.9(0.34)		5.9(0.66)
significance test for difference between types	Childhood		<b>301.9(&lt;.001)*</b>		<b>637.3(&lt;.001)*</b>		<b>203.1(&lt;.001)*</b>		<b>1123.3(&lt;.001)*</b>
	Teen years		<b>1004.7(&lt;.001)*</b>		12.4(0.09)		<b>374.6(&lt;.001)*</b>		<b>1283.5(&lt;.001)*</b>
	Young adult		5.2(0.64)		10.2(0.18)		<b>973.6(&lt;.001)*</b>		<b>99.6(&lt;.001)*</b>
	Later adult		<b>272.0(&lt;.001)*</b>		<b>477.0(&lt;.001)*</b>		4.8(0.57)		5.7(0.57)
2+ adversities	Childhood	0.6 (0.0-13.1)	0.1(0.73)	0.1 (0.0-1.3)	3.2(0.07)	---	---	---	---
	Teen years	0.2 (0.0-1.4)	2.6(0.11)	<b>0.3* (0.1-1.0)*</b>	<b>3.9(0.048)*</b>	0.9 (0.0-32.5)	0.0(0.93)	2.5 (0.3-18.7)	
	Young adult	3.1 (0.8-12.3)	2.7(0.10)	1.3 (0.7-2.6)	0.7(0.41)	9.1 (0.5-169.9)	2.3(0.13)	3.5 (0.4-28.8)	1.4(0.24)
	Later adult	0.2 (0.0-1.6)	2.4(0.12)	0.2 (0.1-1.1)	3.6(0.06)	<b>44.5* (2.5-779.1)*</b>	<b>7.0(0.008)*</b>	2.1 (0.2-18.5)	0.5(0.49)

23 \*Significant at the .05 level, two-sided test

24  
25 <sup>1</sup>Assessed in Part 2 sample due to having part 2 controls. Controls for the model include int (1-5 intervals), and also include significant variables from demographic and parent  
26 psychopathology, details in following footnotes

27  
28 <sup>2</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
29 psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

30  
31 <sup>3</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
32 psychopathology, controlling for number of parental disorders (dummies for 1, 2+ disorders).

33  
34 <sup>4</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. For parent  
35 psychopathology, controlling for types of parental disorders (6 dummies).

36  
37 <sup>5</sup>Models controls for int(1-5 intervals), countries, demographics (sex, age, time-varying education), interaction between int intervals(13-19,20-29,30+) and age, education. Parent  
38 psychopathology not controlled for due to insignificance in previous models.

39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49



## STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found
<b>Introduction</b>		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
<b>Methods</b>		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses

Continued on next page

**Results**

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

**Discussion**

Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results

**Other information**

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based
---------	----	---------------------------------------------------------------------------------------------------------------------------------------------------------------

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).