Rates of trauma spectrum disorders and risks of posttraumatic stress disorder in a sample of orphaned and widowed genocide survivors

Susanne Schaal[1]*, Jean-Pierre Dusingizemungu[2], Nadja Jacob[1] and Thomas Elbert[1]

[1]Department of Clinical Psychology, University of Konstanz, Germany; [2]Department of Clinical Psychology, University of Butare, Rwanda

Background: During the Rwandan genocide of 1994, nearly one million people were killed within a period of 3 months.

Objective: The objectives of this study were to investigate the levels of trauma exposure and the rates of mental health disorders and to describe risk factors of posttraumatic stress reactions in Rwandan widows and orphans who had been exposed to the genocide.

Design: Trained local psychologists interviewed orphans ($n=206$) and widows ($n=194$). We used the PSS-I to assess posttraumatic stress disorder (PTSD), the Hopkins Symptom Checklist to assess depression and anxiety symptoms, and the M.I.N.I. to assess risk of suicidality.

Results: Subjects reported having been exposed to a high number of different types of traumatic events with a mean of 11 for both groups. Widows displayed more severe mental health problems than orphans: 41% of the widows (compared to 29% of the orphans) met symptom criteria for PTSD and a substantial proportion of widows suffered from clinically significant depression (48% versus 34%) and anxiety symptoms (59% versus 42%) even 13 years after the genocide. Over one-third of respondents of both groups were classified as suicidal (38% versus 39%). Regression analysis indicated that PTSD severity was predicted mainly by cumulative exposure to traumatic stressors and by poor physical health status. In contrast, the importance given to religious/spiritual beliefs and economic variables did not correlate with symptoms of PTSD.

Conclusions: While a significant portion of widows and orphans continues to display severe posttraumatic stress reactions, widows seem to constitute a particularly vulnerable survivor group. Our results point to the chronicity of mental health problems in this population and show that PTSD may endure over time if not addressed by clinical intervention. Possible implications of poor mental health and the need for psychological intervention are discussed.

Keywords: *Posttraumatic stress disorder*; *depression*; *anxiety*; *genocide*; *Rwanda*; *risk factors*

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Over the course of 3 months in 1994, nearly one million Rwandans were killed in one of the worst genocides of the 20th century. The fighting erupted between two artificially divided "ethnic" groups, the Hutu majority and the Tutsi minority. The main goal of the genocide was to eliminate the Tutsi minority (10% of the pre-genocide population of 7.78 million) and Hutu opponents. Many people, including ordinary citizens, joined the slaughter either willingly or under coercion. Over 10% of the Rwandan population was eliminated. These people were the victims of massacres and other acts of extreme violence. Women and girls were subjected to

massive sexual violence. Previous studies have documented an extreme degree of traumatic exposure suffered by Rwandan youth and adolescents (Dyregrov, Gupta, Gjestad, & Mukanoheli, 2000; Neugebauer et al., 2009; Schaal & Elbert, 2006) and adult survivors (Pham, Weinstein, & Longman, 2004). As a result of the genocide, many Rwandans suffered tremendous personal losses. A recent survey of 2,091 Rwandan adults pointed out that the majority of participants (70.9%) had lost a close family member during the genocide (Pham et al., 2004). Verwimp (2003) showed that a third of all interviewed Tutsi households had had all of their members exterminated during the genocide; only 8% did not lose a household member due to violent death.

About 70% of the genocide survivors are women (Smith, 1998) and many of them are widowed; a great number of children are orphaned. It is estimated that 34% of all households in Rwanda are led by widows or orphans (Auswärtiges Amt, 2006), and the country bears one of the highest rates of orphans in Sub-Saharan Africa (Monasch & Boerma, 2004). According to Gishoma (2005) who interviewed Rwandan orphans who had experienced the genocide, the majority (79%) indicated the loss of their parents as the most distressing event. As a result of these experienced losses, a significant portion of widows and orphans meet diagnostic criteria for prolonged grief disorder (Schaal, Elbert, & Neuner, 2009a).

In recent years, research into the mental health consequences of the Rwandan genocide has increased and a number of studies have established evidence about the impact of war trauma. Several surveys have demonstrated that symptoms of posttraumatic stress disorder (PTSD) are common among adult (Brounéus, 2010; Pham et al., 2004) as well as child genocide survivors (Dyregrov et al., 2000; Gishoma, 2005; Schaal & Elbert, 2006; Schaal, Elbert, & Neuner, 2009b). One quarter (24.8%) of adults met symptom criteria for PTSD 8 years after the genocide (Pham et al., 2004) and 30% to 44% of orphans met diagnostic criteria for PTSD as late as 10 to 11 years following the genocide (Gishoma, 2005; Schaal & Elbert, 2006, Schaal et al., 2009b). Studies on the psychological consequences of wars have shown comparably high rates of PTSD in civilian populations in Afghanistan (Scholte et al., 2004), in Kosovo (Lopes Cardozo, Vergara, Agani, & Gotway, 2000), or in Sri Lanka (Elbert et al., 2009).

According to Sezibera and colleagues (Sezibera, Van Broeck, & Philippot, 2009), 72% of interviewed Rwandan genocide orphans met the *DSM–IV* criteria for a PTSD diagnosis 12 years after the fighting. Some studies also showed that many survivors suffer from symptoms of depression (Bolton, 2001; Brounéus, 2010; Gishoma, 2005; Hagengimana, Hinton, Bird, Pollack, & Pitman,

2003) and thoughts of suicidality (Gishoma, 2005). Bolton, Neugebauer, and Ndogoni (2002) found that a significant portion of Rwandans (15.5%) met *DSM–IV* criteria for major depression 5 years after the genocide. In addition, high rates (35%) of panic disorder have been reported among Rwandan widows (Hagengimana et al., 2003).

Many orphans, half-orphans, and widows are left behind by the genocide. The present study included orphans and widows as these two groups constitute two major survivor groups of the Rwandan genocide. While orphans experienced the genocide in their childhood, widows were confronted with the genocide in adulthood. The aims of this study were to document the exposure to traumatic stress and the related mental health status in these two groups and to explore variables associated with mental health. Whereas several studies have examined symptoms of PTSD in children or adolescents (for example Schaal & Elbert, 2006; Dyregrov et al., 2000), no study has, to our knowledge, investigated symptom level of PTSD in Rwandan widows. We expected high rates of symptoms of posttraumatic stress disorder, depression, anxiety, and a high risk of suicidality as well as a strong association between the various mental health conditions.

Method

Participants
In the present study, 194 widows and 206 (49 male) orphans or half-orphans (125 orphans, 81 half-orphans) completed the diagnostic interview. Eighteen subjects who were approached rejected participation in the trial and three subjects did not finish the interview. Descriptors of the sample can be drawn from Table 1.

Procedure
The study was conducted in Butare, Rwanda in August 2007. It was approved by Rwanda's National Institute of Statistics, Kigali and by the University of Konstanz Ethical Review Board. Eligible subjects were widows and orphans who were at least 18 years old at the time of the interview and who had experienced the Rwandan genocide of 1994. Widows were participants who had lost their husbands and who were not remarried. Orphans had lost at least one parent during the course of their lives and were child survivors of the genocide that is not older than 31 years at the time of the interview. Whereas no orphan had experienced the loss of a spouse, the vast majority of widows had also lost a parent (92.2%, $n = 178$). The study procedure and aims of the study were explained to all participants and signed written informed consent was obtained from all subjects. Diagnostic interviews were carried out by 15 Masters-level psychologists and psychology students (seven female and eight male)

Table 1. Characteristics of the sample

	Widows (n = 194)	Orphans (n = 206)	Statistics
Age M (SD; range)	51.77 (12.01; 27–97)	23.44 (4.20; 18–31)	U = 69.50***
Completed school years M (SD; range)	3.85 (3.26; 0–12)	5.96 (3.34; 0–18)	U = 12,996.00***
Highest school degree obtained % (n)			
No degree	64.4 (125)	41.3 (85)	
Primary school	27.8 (54)	45.6 (94)	
Secondary school	1.5 (3)	7.8 (16)	χ^2(4, 400) = 28.17***
Apprenticeship	6.2 (12)	4.9 (10)	
University	–	0.5 (1)	
Religion % (n)			
Catholic	76.3 (148)	46.6 (96)	
Protestant	13.9 (27)	32.0 (66)	
Islamic	2.6 (5)	5.3 (11)	
Adventiste	1.0 (2)	2.9 (6)	
Other	4.6 (9)	7.3 (15)	χ^2(5, 400) = 38.26***
No religion	1.5 (3)	5.8 (12)	
Importance of religion % (n)			
Very important	75.8 (147)	60.2 (124)	
Pretty important	19.6 (38)	30.1 (62)	
Not very important	4.6 (7)	5.3 (11)	
Not at all Important	1.0 (2)	4.4 (9)	U = 16,747.50**
Monthly income[a] M (SD; range)	4,878.0 (8,358.44; 0–53,000.0)	4,401.25 (7,313.67; 0–50,000)	U = 14,417.00**
No monthly income % (n)	24.0 (42)	26.7 (52)	ns
Possessions % (n)			
House	78.4 (152)	62.6 (129)	χ^2(1, 400) = 11.83**
Vegetable garden	78.9 (153)	62.6 (129)	χ^2(1, 400) = 12.68***
Agriculture	72.2 (140)	63.6 (131)	ns
Economic plants	19.6 (38)	16.0 (33)	ns
Number of animals M (SD; range)	1.15 (2.01; 0–13)	1.09 (2.31; 0–13)	ns
Nutrition M (SD; range)			
Number of meals[b]	1.28 (0.56; 0–3)	1.59 (0.58; 0–3)	U = 14,316.00***
Number of snacks[c]	0.21 (0.42; 0–2)	0.36 (0.53; 0–2)	U = 17,146.50**
Times of meat taken[d]	0.18 (0.56; 0–4)	0.57 (1.36; 0–14)	U = 16 10.00***

Note: *$p < .05$; **$p < .01$; ***$p < .001$.
[a]1,000 Rwandan Francs is about 1.30 Euro.
[b]Number of meals eaten in the previous day.
[c]Number of snacks eaten in the previous day.
[d]Number of times meat was eaten in the previous week.

from the National University of Butare, Rwanda. The various questionnaires were translated into Kinyarwanda and back by Masters-level psychology students from the University of Butare. Interviewers participated in an intensive 2-week training program led by two female psychologists (S.S. and N.J.)

Interviewers were supervised in the field by the psychologists and the interviewers received extensive feedback. Interviews were carried out in the five following randomly selected sectors of Butare: Tumba, Mukura, Mbazi, Huye, and Ngoma. Three- to five-trained raters were randomly assigned to each sector; in each sector three-quarters were randomly selected (one-quarter per person). The study was conceived of as community-based and employed a house-to-house survey. Interviewers went from house to house, starting at a convenient location within the assigned quarter. Each subsequent house was approached until the required number of interviews was achieved. The interviews lasted about 2 hours and were conducted in the respondent's home. Following the interviews, interviewees received 1,000 Rwandan Francs (about 1.30 Euro) for their participation.

Measures

Socio-demographic information was obtained, including gender, age, educational background, religious affiliation, and importance of religious/spiritual beliefs, as well as certain economic variables. We assessed the importance of religious/spiritual beliefs on a 4-point Likert scale from 0 (not at all important) to 3 (very important) using the following question proposed by Brown and colleagues (Brown, Nesse, House, & Utz, 2004): "In general, how important are religious or spiritual beliefs in your day-to-day life?"

Economic variables included monthly income, possession status, and nutritional status. Monthly income was assessed by the monthly household income divided by the square root of the total household members (Franzen & Meyer, 2004). The possession status was measured using indicators of home ownership, vegetable garden, agriculture fields and economic plants, and the total number of animals (possession index). Nutritional status was assessed by the total number of meals eaten in the previous day, the number of snacks eaten the day prior to the interview, and how often the person had consumed meat during the previous week (nutrition index). We assessed physical illness by asking if the respondent had had one or more of a potential 11 somatic and chronic health problems in the previous month (possible range of the physical illness score 0–11).

Trauma confrontation was assessed using the Event Scale adopted from Schaal and Elbert (2006). This consisted of 25 yes/no questions about a respondent's exposure to traumatic event types throughout their life. The total number of events was the sum of the different types of events to which the subjects had ever been exposed.

Diagnostic status and symptom severity of PTSD were determined using the PTSD Symptom Scale-Interview (PSS-I; Foa & Tolin, 2000). The PSS-I assesses the 17 *DSM–IV* symptom criteria for PTSD and refers to symptoms experienced in the previous month. Each of the items was answered on a 4-point scale ranging from 0 (not at all/only one time) to 3 (five or more times per week/almost always). A PTSD severity score (possible scores range from 0 to 51; Cronbach's Alpha =.88) was computed by adding all symptom scores.

Symptoms of anxiety and depression were measured using the Hopkins Symptom Checklist-25 (HSCL-25; Derogatis, Lipman, Rickels, Uhlenhut, & Covi, 1974; Lee, Kaaya, Mbwambo, Smith-Fawzi, & Leshabari, 2008). Each of the 10 and 15 items measuring anxiety and depression are rated on a 4-point response scale ranging from 1 (not at all bothered) to 4 (extremely bothered) with a recall period of 1 week. Possible values for the anxiety score range from 10 to 40 (Cronbach's Alpha =.86), for the depression score from 15 to 60 (Cronbach's Alpha =.85). A mean score of 1.75 was considered significant for meeting symptom criteria of syndromal depression and anxiety based upon the instrument standards (Mollica, Wyshak, de Marneffe, Khuon, & Lavelle, 1987; Winokur, Winokur, Rickels, & Cox, 1984).

Risk of suicidality was estimated using the scale for suicidality taken from the "Mini-International Neuropsychiatric Interview" (M.I.N.I.; Sheehan et al., 1998, Cronbach's Alpha =.66), which determines severity of suicidality. A recent study examined psychometric properties of translated Kinyarwandan versions of the PDS and HSCL in a sample of Rwandan Refugees living in Uganda (Ertl, 2008). In general, results indicated satisfactory to good characteristics of validity and reliability. However, in order to ensure accuracy in the translation, a highly educated group of university students who dispose of a great theoretical knowledge of the respective psychological disorders repeated translation and back translation and we took some minor changes in wording. All diagnostic instruments (including the self-rating scales) were administered as clinical interviews.

Data analysis

Descriptive data are presented as frequencies (%), mean scores, and standard deviations. As the PTSD sum score is a count variable, which is not normally distributed and heteroskedatic, multiple linear regression was not appropriate. The alpha likelihood ratio test showed that negative binomial regression outperformed Poisson regression ($\alpha =.50$, $SE =.05$, $\chi^2 =1,031.32$, $p <.001$). Potential predictors of PTSD symptom severity were therefore investigated through negative binomial regression analyses. Candidate explanatory variables included cumulative exposure to traumatic stressors (sum of the 25 different potentially traumatic lifetime events), importance of religious/spiritual beliefs, physical health status (illness score), and the following economic index variables: monthly income, possession index, and nutrition index. The sum of the possession variable (sum of the ownership of a house, vegetable garden, agriculture fields, and economic plants, range 0–4) and the variable of the total number of animals divided by two formed the possession index. The following three variables divided by three formed the nutrition index: number of meals eaten in the day prior to the interview, number of snacks eaten in the day prior to the interview, and consumption of meat in the previous week. The Z-transformations were carried out and transformed into percentile ranks with the help of cumulated normal distribution. The variable of monthly income was logarithmised as it was heteroeskedatic. Age, gender, and the number of years of schooling completed were entered as control variables to regulate confounding effects. The independent variables were entered simultaneously into the analyses. The analyses were carried out separately for widows and

orphans. Data analysis was conducted using SPSS software, version 19.

Results

Trauma exposure

As expected, subjects were exposed to a wide range of life-threatening and other potentially traumatising experiences. Fig. 1 shows the types and frequencies of traumatic events that respondents had ever experienced. All interviewed subjects had experienced or witnessed some kind of violence as all had lived through the genocide (100%). Widows experienced a mean number of 11.18 types of lifetime traumatic events from a possible 25 ($SD = 3.96$, range $= 3–21$). The mean number of reported traumatic events in orphans was 11.42 ($SD = 4.38$; range 3–22). No significant difference was found in the number of traumatic events between orphans and widows.

Most of the widows indicated the genocide in general (22.7%) as their most stressful event ever experienced, followed by someone's murder (11.8%) or the witness of a
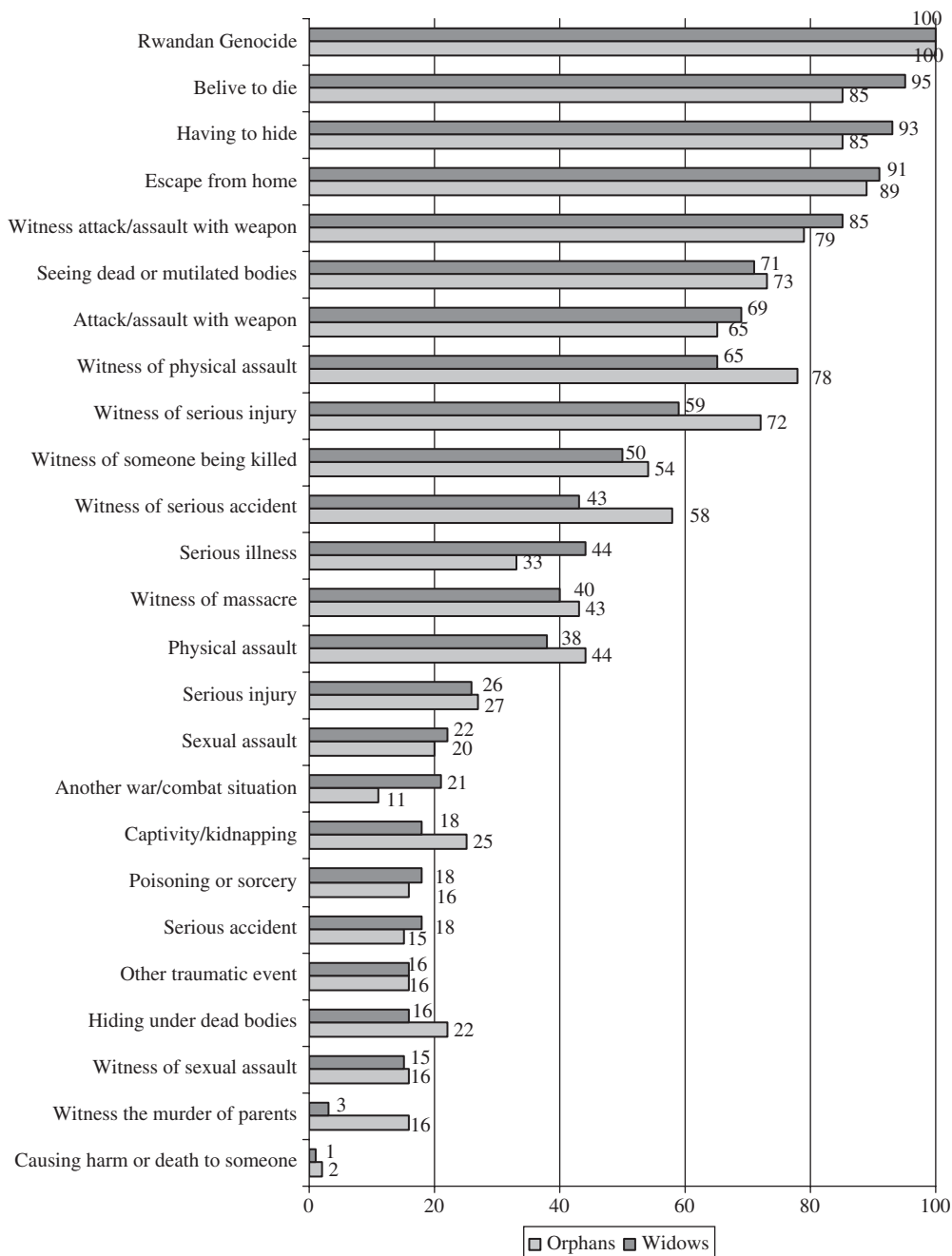

Fig. 1. Lifetime trauma exposure in Rwandan widows ($n = 194$) and orphans ($n = 206$) in%.

massacre (10.3%). Orphans indicated the genocide in general (17.0%), the witness of the killing of a parent (10.2%), or the witness of a massacre (8.7%) as their most stressful experiences.

Level of distress

The prevalence rate for current PTSD in widows was 40.7% ($n = 79$) compared to 28.6% ($n = 59$) in orphans; $\chi^2(1, N = 400) = 6.45$, $p < .05$. Orphans who had lost both parents fulfilled diagnostic criteria significantly more often (32.2%, $n = 44$) than orphans who had lost just one parent (18.8%, $n = 15$), $\chi^2(1, N = 205) = 6.44$, $p < .05$.

Considering the HSCL cut-off score of 1.75, 48.4% ($n = 93$) of the widows and 33.8% ($n = 69$) of the orphans were likely to present depression; $\chi^2(1, N = 396) = 8.74$, $p < .001$. Significantly more widows than orphans were rated as having anxiety symptoms of clinical significance; 59.4% ($n = 114$) versus 41.7% ($n = 86$), $\chi^2(1, N = 398) = 12.35$, $p < .001$.

As can be seen in Table 2, widows also displayed a higher symptom level of PTDS, depression, and anxiety compared to orphans.

A considerable proportion of widows and orphans were classified as suicidal at the time of the interview, 37.6% ($n = 73$) versus 39.0% ($n = 80$).

All reported group differences presented in the Table 2 remained significant if widows and only female orphans were included in the analyses.

Physical illness

Of the widows, 71.1% (orphans: 57.3%) suffered headaches, 51.0% (orphans: 50.5%) from cough, 40.4% (orphans: 39.8%) stomachaches, 39.2% (orphans: 34.0%) from fever, 28.9% (orphans: 27.2%) from sore throat, 29.4% (orphans: 23.3%) from any other physical illness, 24.2% (orphans: 24.3%) from malaria, 23.7% (orphans: 15.5%) from a chronic illnesses (for example asthma, arthritis, scars, or fractures), 16.5% (orphans: 10.7%) from diarrhoea, 15.9% (orphans: 6.3%) from HIV/AIDS, and 1.0% (orphans: 0.5%) from typhus. On average, widows had suffered 3.22 ($SD = 1.85$, range 0–9) physical illnesses during the previous month compared to 2.85 ($SD = 2.00$; range: 0–9) in orphans (ns). Compared to orphans, widows suffered headaches significantly more often, from HIV/AIDS, and from a chronic illness; $\chi^2(1, N = 400) = 8.32$, $p < .001$; $\chi^2(1, N = 296) = 7.06$, $p < .001$; $\chi^2(1, N = 400) = 4.26$, $p < .05$, respectively.

Associations between PTSD and related features

Positive associations were found between the different diagnosis and scores in the total sample ($n = 400$): PTSD diagnosis was positively correlated with depression score (point biserial $r = .59$, $p < .001$), syndromal depression (Phi $= .52$, $p < .001$), with the anxiety score (point biserial $r = .58$, $p < .001$), and syndromal anxiety (Phi $= .47$, $p < .001$). Moderate correlations were present between the PTSD score and the depression score as well as between the PTSD score and the anxiety score (Pearson $r = .69$, $p < .001$, respectively). Significant correlations were found between the physical illness and the PTSD score (Pearson $r = .42$, $p < .001$), between the physical illness and the depression score (Pearson $r = .38$, $p < .001$) as well as between the physical illness score and the anxiety score (Pearson $r = .46$, $p < .001$).

A high degree of comorbidity between the mental health conditions was revealed in the complete sample ($n = 400$). Participants who fulfilled criteria for a PTSD diagnosis reported more severe depression symptoms

Table 2. Mental health in Rwandan orphans and widows ($N = 400$)

	Widows ($n = 194$)	Orphans ($n = 206$)	Statistics
PTSD			
Diagnosis % (n)	40.7 (79)	28.6 (59)	$\chi^2(1, N = 400) = 6.45$*
PTSD severity score M (SD)	13.29 (9.2)	10.67 (9.90)	$U = 15,919.0$***
PTSD Criterion A % (n)	100.0 (194)	96.6 (199)	$\chi^2(1, N = 400) = 6.71$*
PTSD Criterion B % (n)	81.4 (158)	64.1 (132)	$\chi^2(1, N = 400) = 15.11$***
PTSD Criterion C % (n)	51.0 (99)	42.7 (88)	ns
PTSD Criterion D % (n)	74.7 (145)	46.6 (96)	$\chi^2(1, N = 400) = 33.04$***
Depression			
Syndromal depression (%, n)	48.4 (93)	33.8 (69)	$\chi^2(1, N = 396) = 8.74$**
Depression score M (SD)	27.66 (8.24)	25.16 (9.03)	$U = 15,358.0$***
Anxiety			
Syndromal anxiety (%, n)	59.4 (114)	41.7 (86)	$\chi^2(1, N = 398) = 12.35$***
Anxiety score M (SD)	20.32 (7.11)	17.92 (7.17)	$U = 15,457.0$***
Suicide risk (%, n)	37.6 (73)	39.0 (80)	ns

Note: *$p < .05$; **$p < .01$; ***$p < .001$.

than those who did not fulfil the proposed criteria $U = 5,194.50$, $p < .001$, $M = 33.49$ $(SD = 8.33)$, $M = 22.69$ $(SD = 6.34)$, respectively. Those who met criteria for PTSD also suffered from more severe anxiety symptoms than those who had no PTSD diagnosis at the time of the interview $U = 5,459.50$, $p < .001$, $M = 24.79$ $(SD = 6.57)$, $M = 16.05$ $(SD = 5.54)$, respectively. Participants with syndromal depression or clinically significant anxiety in turn reported more symptoms of PTSD than those without syndromal depression, $U = 6,084.50$, $p < .001$, $M = 18.45$ $(SD = 9.51)$, $M = 7.31$ $(SD = 6.51)$, or syndromal anxiety, $U = 6,497.50$, $p < .001$, $M = 17.24$ $(SD = 9.52)$, $M = 6.55$ $(SD = 6.21)$.

Predictors of PTSD

Regression analyses were used to analyse the relationship between the independent variables of number of experienced traumatic events, monthly income, possession index, nutrition index, importance of religious/spiritual beliefs, physical illness, and the dependent variable of the PTSD score. Age, gender, and number of years of schooling completed were entered as control variables.

The results of these analyses are presented in Table 3. Widows and orphans who reported a greater number of potentially traumatic lifetime events were more likely to show more severe PTSD symptoms; widows and orphans who met PTSD diagnosis reported more traumatic events than those who did not meet full PTSD; widows: $M = 13.02$ $(SD = 3.37)$ versus $M = 9.90$ $(SD = 3.84)$; orphans: $M = 14.63$ $(SD = 4.0)$ versus $M = 10.13$ $(SD = 3.85)$. For both groups, there were correlations between physical illness and current PTSD, demonstrating that respondents with more physical health complaints displayed more severe PTSD symptoms. Those widows

and orphans who fulfilled PTSD diagnostic criteria reported more physical health problems in the previous month compared to those who did not fulfil PTSD symptom criteria; widows: $M = 3.76$ $(SD = 1.76)$ versus $M = 2.81$ $(SD = 1.82)$; orphans: $M = 4.31$ $(SD = 1.84)$ versus $M = 2.20$ $(SD = 1.72)$. Age, gender, number of years of schooling completed, religious beliefs, and the economic variables (monthly income, possession index, nutrition index) did not significantly contribute to the prediction of the severity of symptoms of PTSD.

Discussion

The purpose of the present study was to investigate the nature and magnitude of exposure to traumatic events and psychological reactions among Rwandan orphans and widows who had survived the genocide. Moreover, we aimed at examining predictors of posttraumatic stress reactions. Generally, participants reported massive trauma exposure and high rates of distress symptomatology with widows being more affected than orphans. More severe posttraumatic stress reactions were reported by widows and orphans who reported more trauma exposure than by those with less trauma confrontation and by participants with a poorer physical health status than by those with a good physical health status.

The results show that all participants had been exposed to some kind of violence, with a mean of 11 kinds of lifetime traumatic events for both groups from a possible 25. Many studies have unambiguously shown the massive trauma confrontation in Rwandan youth (Dyregrov et al., 2000; Neugebauer et al., 2009; Schaal & Elbert, 2006) and adult survivors (Pham et al., 2004).

The present study demonstrates that diagnostic criteria for of DSM–IV for current PTSD were met by 41% of the

Table 3. Negative binomial regression analyses with PTSD sum score as the dependent variable in widows ($n = 194$) and orphans ($n = 206$)

Predictors	Widows		Orphans	
	B$_{PTSD\ score}$	B SE$_{PTSD\ score}$	B$_{PTSD\ score}$	B SE$_{PTSD\ score}$
Number of traumatic events	0.08***	0.02	0.11***	0.02
Economic variables				
Monthly income[a]	−0.01	0.06	−0.03	0.07
Possession index	−0.46	0.32	−0.54	0.37
Nutrition index	−0.03	0.45	0.44	0.47
Importance of religious/spiritual beliefs	−0.14	0.09	−0.02	0.08
Physical illness	0.13***	0.04	0.15***	0.04
Age	0.00	0.01	−0.01	0.02
Gender (male[0]/female[1])	–	–	0.05	0.21
Completed school years	0.00	0.02	−0.04	0.03

Note: *$p < .05$; **$p < .01$; ***$p < .001$.
[0]: coded 0; [1]: coded 1.
[a]Income has been logarithmised.

widows and by 29% of the interviewed orphans more than 13 years after the end of the genocide. There was a significant difference in PTSD diagnostic status and symptom severity between full orphans and those who had lost one parent. Considering a HSCL cut-off score of 1.75, 48% of the widows and 34% of the orphans met symptom criteria for depression. The rates of clinically significant anxiety were 59% amongst widows and 52% amongst orphans.. Over one-third of widows (38%) and orphans (39%) were classified as suicidal at the time of the interview.

Child survivors of the genocide displayed a considerable morbidity. In addition to the psychological sequelae, trauma confrontation during childhood might have affected their development and disturbed them in the acquisition and maintenance of developmental skills and competencies (Pynoos, Steinberg, & Piacentini, 1999). In contrast, according to Keppel-Benson and Ollendick (1993) children may be protected from the development of strong emotional reactions in the aftermath of trauma confrontation due to their immature cognitive abilities that might protect them from realising acute life threat.

Although there was no significant difference in traumatic exposure between the two groups, widows displayed more severe mental health problems than orphans. This difference was evident for both categorical (diagnostic) and dimensional symptom levels of PTSD, depression, and anxiety. While symptom levels of PTSD, anxiety, and depression in Rwandan widows have not previously been reported, it seems that this group is especially vulnerable. According to Brounéus (2008) who interviewed Rwandan genocide widows, many are without any hope for the future; many have to deal with the stigmatisation, marginalisation and the consequential loss of security. Additional stressors include the need to find food and shelter without the help of a husband. While half-orphans and orphans could often live with the parent alive or within their extended families, widows mostly had to manage their lives on their own. According to Morgan (1994) the loss of a husband often implies the loss of the best friend, losing their most important social network. In Rwanda remarriage is not socially tolerated. It is possible that these additional sources of distress may have increased the risk of adverse reactions and complicated the adjustment process. One victim explained her situation as follows: "Widows are without families, without houses, without money … We become crazy. We aggravate people with our problems. We are the living dead'' (Nowrojee, 1996, p. 73). While it may be possible that enduring marginalisation and stigmatisation aggravate mental health problems, another plausible (and causally opposite) explanation may be that poor mental health increases marginalisation and stigmatisation.

These high levels of distress are consistent with previous reports of elevated rates of PTSD in Rwandan orphans 10 to 11 years following the genocide, ranging from 30% to 44% (Gishoma, 2005; Schaal & Elbert, 2006, Schaal et al., 2009b) and point to the chronicity of mental health problems in this population. The findings are also in accordance with previous studies that reported the incidence of depression and suicidality among Rwandan genocide survivors (Bolton et al., 2002; Gishoma, 2005).

Our findings support the high degree of comorbidity between the different mental health conditions. We confirmed a strong association between the investigated disorders, which were demonstrated by moderate to high correlations. A number of studies have documented an association between PTSD and depression (Sezibera et al., 2009; Thabet, Abed, & Vostanis, 2004; Vizek-Vidović, Kuterovac-Jagodić, & Arambaŝić, 2000), between post-traumatic stress reactions and anxiety (Vizek-Vidović et al., 2000), and between depression and anxiety (Vizek-Vidovic et al., 2000). Moreover, there was a major overlap between the disorders; participants who met the diagnosis for PTSD reported more severe depression and anxiety symptoms than those who did not fulfil PTSD criteria.

As our second goal, we examined correlates of PTSD severity. Presence and severity of PTSD were significantly associated with exposure to traumatic events and widows and in orphans. Evidence of this dose effect supports the findings of other studies, which have consistently demonstrated a significant relationship between trauma exposure and posttraumatic stress reactions (Elbert et al., 2009; Eytan et al., 2004; Roberts, Yona Damundu, Lomoro, & Sondorp, 2009). Such an additive effect of trauma exposure on posttraumatic stress reactions has also been found in Rwandan adolescents (Neugebauer et al., 2009; Schaal & Elbert, 2006).

There was a significant relationship between physical health and PTSD symptom severity in widows and orphans: poorer physical health was associated with stronger PTSD reactions. This finding aligns with previous reports that showed that PTSD was significantly associated with lower self-reports of general health and more physical symptoms (Calhoun, Wiley, & Beckham, 2009; Engelhard, van den Hout, Weerts, & van Doornen, 2009). There are several possible explanations for this relationship. One potential explanation is that somatic and chronic health problems might be associated with less effective coping strategies. Another plausible (and causally opposite) explanation is that more affected PTSD survivors may be less able to overcome obstacles and take care of their physical needs. More recently, however, massive stress-related alterations of the immune function, notably the peripheral T-cell compartment, have been documented for PTSD patients when compared with individuals without PTSD (Sommershof et al., 2009). These changes might constitute a key factor in the

observed susceptibility of survivors with PTSD to a range of physical diseases.

We also evaluated the influence of certain economic variables, such as the possession status, nutrition status, and the monthly income on symptom severity of PTSD. For both groups, these variables did not prove to be predictors of posttraumatic stress disorder in the present study. Particular studies in industrialised countries have reported a relationship between PTSD and socioeconomic status (DiGrande et al., 2008). Similarly, Eytan et al. (2004) documented that persistent PTSD more than 2 years following war was associated with extreme poverty. Nevertheless, in the present study material resources did not serve as a buffer from symptoms of PTSD. Considering the high levels of traumatic experiences it is possible that other relevant factors like social resources which may prevent from marginalization could be more important than economic resources.

In the present study, PTSD was not related to the importance given to religious or spiritual beliefs. Our results are therefore not in accordance with other studies that found that aspects of religious faith were negatively correlated with current PTSD and anxiety levels suggesting an important role in coping with stress (Falsetti, Resick, & Davis, 2003; Gigi, Papirovitz, & Hagit, 2007). According to Duraković-Belko, Kulenović, and Đapić (2003), the most frequently used coping strategies to deal with the most distressing event included daydreaming, religion, and reinterpretation. Nevertheless, results of our study indicate that spirituality did not serve as a protector against developing PTSD. It is possible that the religious activities of an individual might be more important in protecting against mental health problems as these may constitute a main source of social support.

Our findings illustrate that trauma-related symptoms following extreme organised violence may have considerable persistence; these may even persist over decades. This is in accordance with Sezibera et al. (2009), who found that symptoms of PTDS were strongly stable in Rwandan youth during a baseline period of 2 years, with no participant having recovered from PTSD. The Rwandan population still suffers from long-term mental health sequelae. Even though the genocide took place in 1994, it "persists in Rwandan society today", as Verwimp noted (2003, p. 426). Several studies have confirmed that many child survivors of the Holocaust continue to suffer from psychological distress symptoms even half a century later (Amir & Lev-Wiesel, 2003; Trappler, Braunstein, Moskowitz, & Friedman, 2002).

The poor mental and corresponding somatic health is likely to have social as well as economic implications (Bolton & Betancourt, 2004) and may be a significant barrier to reconciliation as high levels of mental distress may influence respondents' attitudes to compromise in post-conflict societies (Pham et al., 2004; Vinck, Pham, Stover, & Weinstein, 2007). People with PTSD are more likely to have feelings of hatred and revenge (Lopes Cardozo, Kaiser, Gotway, & Agani, 2003). A number of studies have shown that traumatised individuals are more likely to become perpetrators (Begic & Jokic-Begic, 2002; Scarpa, 2003). Therefore, treatment of PTSD in post-conflict areas is not only important with regard to the individuals' well-being, but also in the context of ensuring future peace.

The current study has a number of limitations. The interviewees represented a special risk group in that all were widows and orphans; a loss experience was thus a precondition of participation. The focus of the present study was on women. Moreover, we did not apply a diagnostic instrument that would have allowed for determination of a full diagnostic status of affective and anxiety disorders. A cut-off score was used as an indicator for caseness. As the instruments were developed in western cultures diagnostic interpretations of cut-off scores have to be made carefully. Using the same instruments as in the present study, Ertl et al., (2010) demonstrated that mental health assessments in African languages can achieve reliable and valid data, but warrant caution in the unevaluated transfer of cut-off scores. Physical health conditions were assessed by self-report rather than by laboratory indicators. Finally, it may be possible that survivors failed to recall or report traumatic experiences. However, a similar checklist and procedure has been validated in a Ugandan context by extracting cortisol from hair, yielding a measure over a 1-month period (Steudte et al., 2011). We did not collect systematic data on social problems which, however, might be associated with mental health problems in post-war areas. Future studies should consider these possible associations. Findings should not be generalised to all Rwandan widows and orphans as the extent of the genocide varied greatly by regional. The district of Butare was (together with the district of Kibuye) the most affected area with almost half of the population (45.0%) having been exterminated (Nkunzumwami, 1996, cited in Turindwanamungu, 2000).

In conclusion, the current study shows high rates of current PTSD level and symptom level of anxiety and depression in a community-based sample of widowed and orphaned survivors of the Rwandan genocide. In recent years, research into the provision of mental health service has increased. Some studies have shown that brief cognitive and behavioural interventions are associated with a reduction in PTSD symptoms in Rwandan youth (Schaal et al., 2009b; Sezibera et al.; 2009). In a recent study, we examined the effectiveness of a short-term intervention when applied by trained local psychologists (Jacob, Neuner, Mädl, Schaal, & Elbert, paper submitted for publication). Community-based interventions are necessary to restore psychological functioning in survi-

vors of mass violence. However, treatment of trauma-spectrum disorders not only implies reductions on the symptom level but also involves considerable improvements on the social level (Foa et al., 2005) and might also help to overcome marginalisation and stigmatisation. Treatment approaches should also address social problems present at the community level, which may arise as an indirect consequence after violent conflict.

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*Susanne Schaal
Department of Clinical Psychology
University of Konstanz
Germany
Email: Susanne.Schaal@uni-konstanz.de