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INTRODUCTION

Trauma and Mental Health in South Africa: Overview

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The World Health Organization estimates that about 5 million deaths per year are caused by trauma and intentional and unintentional injuries. Almost 9 out of 10 (90%) of these injury-related deaths occur in low- and middle-income countries (LMICs), one of which is South Africa (Fogarty Global Injury and Trauma Research Training Program, n.d.).

In the context of a country in the midst of change, violence in South Africa—and the physical and psychological injuries that can result from this—is one of the four growing public health crises (along with HIV; tuberculosis; and maternal, neonatal, and child health) that have made health care and prevention so challenging (Mayosi et al., 2012). While these epidemics are receiving attention and creating synergy for change, and progress has been made—more in some areas than others—there is consensus that there is a need for increased budgets for health research as well as emerging new leadership to conduct the work that is required for sustainable changes to be maintained.

Ten years ago, the Phodiso Program, an international collaboration between universities in South Africa and the University of California, Los Angeles, was launched with the aim of focusing on minimizing the negative health and mental health effects of trauma exposure, particularly depression and posttraumatic stress disorder (PTSD). *Phodiso* means *healing* in the Northern Sotho language of South Africa. A central objective of the Phodiso Program is to increase the number of research leaders or investigators who are able to conduct biobehavioral studies of trauma and injuries and their effects on health and mental health. Phodiso is one of a few training programs that acknowledge and encourage the integration of local cultural values into research design and development that promotes coping, health promotion, resilience, and social support for trauma survivors. The papers included in this special section focus on aspects of trauma and the effects of trauma in a cultural context that pertains to the way of life in South Africa.

These articles highlight the complexities of the effects of trauma and call for tailored interventions to address the lasting effects on health and mental health (see Figure 1). There are three main themes covered by the papers in this special issue: (a) the cultural context of violence, (b) children and families, and (c) the circumstances or aftermath arising after violence.

Madigoe, Burns, Zhang, and Subramaney (2017) and Mgoqi-Mbalo, Zhang, and Ntuli (2017) cover the cultural context of violence. In the first article, titled "Toward a Culturally Appropriate Trauma Assessment in a South African Zulu Community," Thebe Madigoe presents the premise that many of the culture-bound beliefs about mental illness and trauma are not taken into consideration when Western-developed measures are used to assess symptoms of posttraumatic stress. In response, Madigoe and colleagues developed a culturally specific measure of PTSD ([Z–CTEQ] Zulu Culture-specific Trauma Experience Questionnaire) and administered this among 100 Zulu-speaking help-seeking adults recruited in the northeastern KwaZulu-Natal region. They found that the use of the Z–CTEQ, when added to the widely used Structured Clinical Interview for DSM Disorders, Axis I, Research Version SCID-I RV (SCID-I RV), increased the rate at which traumatic events were elicited by 28.1%. These results underscore the importance of using culturally relevant tools for the diagnosis and management of trauma in diverse cultural settings.

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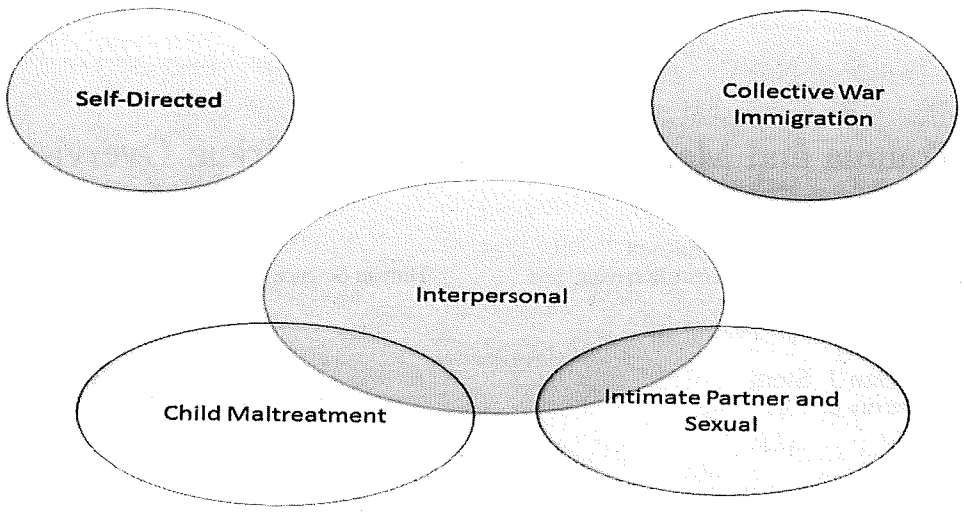

Figure 1. Complexities of Effects of Trauma. See the online article for the color version of this figure.

While culturally specific tools assist with the proper diagnosis of mental health problems, it is equally important to integrate the cultural context in treatment following traumatic incidences such as rape. A lack of understanding with regard to how culture influences mental health is often a critical barrier to treatment. Mgoqi-Mbalo and her team investigated factors associated with the development of depression and PTSD among female rape survivors 6 months following rape. Women were recruited from Limpopo, the Western Cape, and KwaZulu-Natal (KZN). Striking regional differences were found that were linked to socioeconomic status. Specifically, women in the KZN province were 7 times more likely to experience depression compared to women in other provinces, while unmarried survivors in KZN had significantly greater rates of depression (6 times higher) and PTSD compared to their married or cohabiting counterparts. These findings demonstrate how regional differences in socioeconomic status and relationship dynamics increase the risk for PTSD and depression.

Children and families are a relatively understudied population, and this is an important emerging research area in South Africa. In this issue, we focus on the development of tools to address adolescent suicide as well as the relationship between maternal mental health and child development outcomes. Adolescent suicide is an emerging area of concern in South Africa. Notably, the South African National Mental Health Policy Framework Strategic Plan has identified suicide prevention among adolescents as a key area of focus (Republic of South Africa National Department of Health, 2012–2013). In the paper titled "The Development of a Screening Tool for the Early Identification of Risk for Suicidal Behavior Among Students in a Developing Country," Vawda, Milburn, Steyn, and Zhang (2017) directly respond to this initiative by describing the development of a screening tool for teachers to identify at-risk South African youth for suicide. In this study, 12 factors related to suicidal behavior were identified and included. While the results are preliminary, this is a necessary starting point for teachers to refer students at high risk for suicidal behavior. This paper contributes to research on adolescent mental health, particularly suicidal behavior, in LMICs like South Africa.

The South African government has invested a great deal in the improvement of maternal and child health. While many structural factors have been studied, mental health problems that are prevalent in South Africa (e.g., PTSD) have received less attention. In conditions of extreme poverty and instability, characteristic of much of the developing world, the pressures on parents differ markedly from those faced by parents in communities that are typically the focus of research in child development. Koen's paper (Koen et al., 2017) investigates the associations between maternal and infant development. Using data from the Drakenstein Child Health Study, she and her team found that PTSD was significantly associated with poorer fine motor and adaptive behavior–motor development, suggesting that maternal PTSD may be a critical factor in infant neurodevelopment. This issue is important to address in programs that are designed to improve maternal and child health, perhaps by identifying and managing maternal PTSD.

A cornerstone piece of this special issue is the focus on the circumstances and aftermath of traumatic experiences that give rise to negative mental health outcomes for individuals in South Africa. In his discussion of PTSS (Post Traumatic Stress Symptoms) and PTSD and other traumas experienced by homeless refugees living in South Africa, Idemudia (2017) reviews four linked papers that address pre- and postmigration difficulties and their relationship to posttraumatic stress symptoms and PTSD. These four papers report both quantitative and qualitative data from Idemudia's study of 125 randomly selected homeless Zimbabwean refugees in Polokwane, Limpopo Province, South Africa. The key findings of this research were as follows:

1. Pre- and postmigration traumas contributed to PTSS and PTSD in this vulnerable population.

2. As discovered through in-depth qualitative interviews, many of the challenging socioeconomic, cultural, structural, and institutional experiences resulting in PTSS or PTSD were seen across all migration stages.

3. Gender differences emerged such that the path relationship between pre- and postmigration stress and poor mental health or PTSD was not significant for men, whereas this path was significant for women.

4. Rape and sexual harassment were common abuses, and perpetrators were mainly border and police officers.

These papers highlight the need to establish programs within host or receiving countries to assist in the structural challenges faced by refugees in the process of migration.

Interpersonal violence that results in assault and injury is common in South Africa. Despite knowledge of the high number of assaults in this country, few studies have investigated factors that are associated with repeat assault and injury. In a study of two 24-hr emergency clinics (ECs) located in Elsie's River and Khayelitsha near Cape Town, van der Westhuizen, Williams, Stein, and Sorsdahl (2017), recruited a sample of 200 patients who were assessed for injury history, traumatic events, and mental disorders. Recurrent assault injury was found in 31% of the sample, and recurrent injury was predicted by lifetime traumatic events other than injury experiences. Women were less likely to present with assault injuries than men, and assault injury was strongly associated with high levels of witnessing community violence. Routine EC practice should include psychosocial support for assault-injured patients. At a broader level, efforts at reducing violence in the community are key to reducing the likelihood of subsequent injury and assault.

The final paper of this issue, titled "A Longitudinal Study of the Aftermath of Rape Among Rural South African Women," led by Wyatt et al. (2017), reports on a study conducted in a sample of 77 women from the Limpopo and North West Provinces of South Africa. The study examined how both the situational characteristics of rape and individually based factors relate to symptoms of depression, PTSD, and dysfunctional or high-risk sexual behaviors at the 12-month follow-up. Specifically, increases in dysfunctional sexual behaviors and depression were associated with undermining influences within the survivor's social support system as well as beliefs in myths about rape at the 12-month follow-up. To our knowledge, this is the first study conducted on rape survivors in South Africa to demonstrate how changes in factors such as beliefs in myths about rape and social undermining that are unique to the individual and social context influence long-term negative mental health outcomes over time. Interventions that are designed to educate female survivors and citizens of South Africa about rape may reduce pervasive effects over time and reduce risk for revictimization.

The studies of intentional injury and trauma reported in this special issue highlight the kind of mental health outcomes that can occur among men, women, youth, and children in this context—outcomes that are completely preventable. In an effort to find solutions for change, these papers keep the dialogue going about an epidemic in South Africa that deserves more attention, in an effort to find solutions for change.

The most rewarding outcome of these dialogues is that they are being upheld by a diverse and masterful group of investigators from all ethnicities from all over South Africa. Their involvement in research as leaders is part of the new fabric of this beautiful country that was once so completely underrepresented. Now, their diverse voices, research skills, and lived experiences help promote collaborations to conduct cutting-edge research within a cultural context that will provide solutions to these problems. They, too, are the faces of change.

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Trauma and PTSS of Zimbabwean Refugees in South Africa: A Summary of Published Studies

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Objective: This paper is a report of 4 published papers on posttraumatic stress symptoms (PTSS)/posttraumatic stress disorders (PTSD) and traumas experienced by homeless Zimbabwean refugees living in South Africa. The general purpose of the papers was to explore how pre- and postmigration difficulties predicts posttraumatic stress symptoms/disorder; to understand gender differences in PTSS/PTSD reports using quantitative and qualitative approaches; and finally, to understand the nature of abuses, perpetrators, and sex of perpetrators. ***Method:*** Through focused group discussions (FGD)s, structured in-depth interviews, data were collected from 125 randomly selected homeless Zimbabwean refugees in Polokwane, Limpopo Province, South Africa. Age of participants ranged from 18 years to 48 years with a mean age of 28.3 years (SD = 6.27). Participants were assessed on demographic variables, Pre- and Post-Migration Difficulties Checklists, General Health Questionnaire 28 (GHQ-28), and PTSD Checklist (Civilian Version; PCL-C). ***Results:*** Results (Paper 1) indicated that a majority of the participants were significantly traumatized and pre- and postmigration traumas contributed to PTSS and PTSD. The qualitative study (Paper 2) overwhelmingly shared similar experiences that could be temporally framed into pre-, mid-, and postmigration. Many of the challenging sociocultural, structural, and institutional factors that they experienced were seen across all the migration stages. In Paper 3, results of a structural equation model (SEM) showed that none of the 3 paths (pre- and postmigration stress and poor mental health) on PTSD is significant for men whereas for women, the path from poor mental health to PTSD ($\beta = .36$, $p = .013$) is significant. Finally the fourth paper showed that rape and sexual harassment were common abuses. Perpetrators were mainly single male border and police officers. ***Conclusion:*** The Zimbabwean refugees were found to constitute a particularly vulnerable group to have experienced cumulative traumas and therefore reported PTSS, PTSD, and poor mental health. These findings were discussed in line with practical implications for refugees in South Africa where xenophobic feelings are on the rise.

Keywords: trauma, PTSD or PTSS, homeless Zimbabwean refugees, prepost migration stress or difficulties

Over the years, more than 3.4 million Zimbabweans (a quarter of the country's population) have fled the country to other countries, with South Africa as the main destination. In South Africa, they become a vulnerable group with the plausibility of suffering trauma and PTSS or PTSD due to resentments and xenophobic attacks from the local population. According to Kessler (2000), PTSS and PTSD are syndromes recognized in clinical practice as significant health problems because of their nature, diagnoses, and the staggering costs that affect the individual and society at large. PTSS is so named because of the symptoms that are experienced after a traumatic event. PTSS and PTSD are the same except psychiatry prefers to differentiate between symptoms (PTSS) and the fully activated disorder (PTSD). PTSS and PTSD may lead to unfulfilled potential in several areas of an individual's life such as education, marriage, well-being and so forth, Statistical estimates show that PTSD occurs in 1% and 5% in a range of population studies (Hapke, Schumann, Rumpf, John, & Meyer, 2006; Frans, Rimmö, Aberg, & Fredrikson, 2005) and between 3% and 58% for high-risk groups such as displaced people (Hobfoll et al., 2008; Silove, Steel, Bauman, Chey, & McFarlane, 2007). Yet, PTSD studies for high-risk groups such as homeless refugees and particularly in Africa are scarce. In this report, PTSS and PTSD are used interchangeably. Also, refugee is sometimes used in place of undocumented Zimbabweans.

The Phodiso Project—a University of California, Los Angeles (UCLA) and South African Trauma project was used to support this study. The objective of the study was to understand the dynamics of Zimbabwean refugees in South Africa. According to Meldrum (2007), Zimbabwe is known to be Africa's most extraordinary producer of a mass exodus of migrants and the biggest producer of refugees in Southern Africa. In 2008, 3.4 million Zimbabweans were estimated to have fled the country. Economic collapse, hunger, and political repression have been blamed for the mass exodus of Zimbabweans to other countries, including South Africa (Latham & Cohen, 2011).

When refugees vote with their feet—it is usually as a result of wars either within or between countries—ethnic violence leads to internally displaced persons (Idemudia & Boehnke, 2006). In the

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case of Zimbabwe, the situation for the mass exodus is different. Bad governance and leadership fatigue caused a major economic depression in the country leading to a third of the population to leave the country. Due to proximity and economic viability, South Africa became the major destination country for these migrants. This claim is supported by the former South African Minister of Home Affairs, Chief Inkosi Mangosuthu. He cited three reasons for the increase of Zimbabweans: that South Africa was economically buoyant compared to other African countries; that South African employers were more willing to hire foreigners, including vulnerable and undocumented (i.e., illegal) immigrants; and that Southern African countries, which includes Zimbabwe, were historically and economically connected to South Africa (I. Mangosuthu, personal communication, 2016).

On arrival, these migrants are greeted with resentment, hostility, and xenophobic attitudes from South Africans. According to Lindow (2008), the threats of physical harm and actual killings of Zimbabwean immigrants have been used to dissuade them from coming to and remaining in the country. Posel (2003), argued in his study that one of the reasons attributed to this resentment is an association between an increase in illegal migration and the rising rate of unemployment among South Africans. Many problems, including psychological ones, are associated with refugees in Africa and, unfortunately, are underreported or rarely investigated. As a result, the study hypothesized that suffering poverty, maltreatment, general loss as a result of voting with one's feet from home country with cumulative adversities during flight through the sharp-barbed border fence, lions and crocodiles in the Limpopo River, and possible abuses from border police and immigration officers can constitute traumas which no doubt will lead to PTSS and PTSDs for the refugees.

The associations between trauma and outcomes in literature have been exhaustively referenced and reviewed in the various publications being reported. The relationship between homelessness, traumas, and PTSS/PTSD across settings demonstrated that refugees experience greater levels of stress and social difficulties than other immigrants. Refugees report greater emotional distress with high levels of posttraumatic stress, anxiety, and depression (Başoğlu & Paker, 1995; Department of Immigration and Multicultural Affairs and Indigenous Affairs, 2003; Idemudia, 2007; McLennan, 1997; Mollica et al., 2001; Posel, 2003; Schweitzer, Melville, Steel, & Lacherez, 2006; Steel, 2001; Steel, Silove, Phan, & Bauman, 2002). According to Silove (1999), trauma disrupts five broad systems: (a) personal safety, (b) interpersonal attachments, (c) sense of justice, (d) existential meaning, and (e) various psychosocial responses within these domains. In addition, Ward, Bochner, and Furnham, (2003) have associated multiple traumas with PTSD. The stress-diathesis theory (Benight, 2012) and the conservation of resources theory (Hobfoll, 1991) were used to help conceptualize the pre- and post migration trauma exposures and outcomes. (See details in various publications).

Method

This paper is a report of four published articles under the Phodiso Project titled "Trauma among Homeless Zimbabweans in South Africa." One hundred twenty-five homeless Zimbabweans in South Africa responded to a questionnaire with three sections. Section A had 16 sociodemographic items including reasons for leaving Zimbabwe. Section B contained the Pre/Post Migration Difficulties Checklist as well as the 22 short items measuring history of premigration stressors in Zimbabwe and postmigration stressors in South Africa with three domains: threat to life/family, lacking basic resources/hunger, and sexual/physical abuses. The same items were used for pre- andpost migration stressors/difficulties. Section C contained the PTSD scale (17-item PCL-C) and the GHQ-28. Only the findings of each study will be highlighted; the publication links are indicated for reference purposes.

Demographic and Social Characteristics

The sample consisted of 125 homeless Zimbabweans in Polokwane (formerly known as Pietersburg) in Limpopo Province, South Africa. Information was collected on demographic and social characteristics and migration history. Variables included gender, age of participants, work history, migration history, and pre- and postmigration difficulties.

Approach to sampling. There is no accurate data of undocumented Zimbabweans in South Africa. In addition, Polokwane serves as a passage route from Zimbabwe to other parts of South Africa, hence a guided convenient sampling method was used. First, there was a general call for interviews for the study (see the Procedure section). Second, those who responded to the flyers were then checked for certain entry criteria such as: (a) they must be a Zimbabwean, (b) minimum of one month of being a refugee, (c) first-entry refugees (used loosely for undocumented migrants) and homelessness (never had anywhere to stay/living on the streets and hideouts), (d) males or females, (e) 18 years or older, (f) more than one month resident in South Africa, (g) English speaking, and (h) willing to participate. Exclusion criteria included (a) refugees who have a residence, (b) South African Zimbabwean resident, (c) under 18 years, (d) unable to speak English language, and (e) unable to participate in discussions due to serious drug- or alcohol-oriented illness. The participants were people who ran away from Zimbabwe into South Africa as undocumented migrants or refugees but without refugee status documentation and didn't have a shelter of any sort. They were sleeping under bridges, open spaces, market spaces, and so forth.

Procedure

The study was approved by the Institutional Review Boards of UCLA (GO8-06–010-02A) and the University of Limpopo, South Africa (TREC2009/65–119). Recruitment flyers (posters) were posted on public sites and facilities such as nongovernmental organization buildings, shopping malls, and other locations that were frequently visited by homeless and unemployed Zimbabweans. Interested individuals came to a private room in a designated mall (Savannah Mall, Polokwane) where they were screened. The aims and objectives of the research were described and explained. If eligible, individuals were invited to participate in the study. Informed consent was obtained and enrolled participants were then administered a questionnaire via a face-to-face interview. No identifying information was collected. Participants were given incentives which included monetary and nonmonetary assistance such as gift vouchers (R35 which is approximately $6 US) and transportation fares (R15 which is approximately $2.50) to and from Savannah Mall (Polokwane).

Screenings included 500 individuals. Two hundred twenty of the Zimbabweans on screening had relatives (i.e., stable environments) in South Africa and as such were ineligible. Another 100 Zimbabweans were ineligible due to place of origin/inconsistent migratory history. Fifty of the displayed Zimbabweans were younger than the entry age criteria. Only 125 Zimbabweans met the inclusion criteria and participated in the study.

Instruments

The PTSD Scale. The 17-item PCL-C (Weathers Huska, & Keane, 1991) is a self-report measure that assesses trauma that people have in response to stressful experiences. Its items correspond to criteria for diagnosis of PTSD from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed, *DSM–IV*, American Psychiatric Association [APA], 1994). The scale has a Likert score system ranging from 1 (*not at all*) to 5 (*extremely*). The PCL-C can be used with any population. The symptoms endorsed may not be specific to just one event which makes it useful when assessing survivors with multiple (premigration, during, and postmigration) events. The PCL-C determines whether the total severity score exceeds a given cutoff point. In this study, a half-standard deviation was used to determine a continuous measure of PTSD symptoms severity of .50 and above. It has been validated in health care settings (Stein, McQuaid, Pedrelli, Lenox, & McCahill, 2000) and among older adults (Cook, Elhai, & Areán, 2005). This instrument has been extensively used in South Africa and has been validated for South African men and women. Its consistence in the present study was $\alpha = .80$. The cutoff point of 50 corresponds with the validation completed by Hudson, Beckford, Jackson, and Philpot (2008).

GHQ-28. The General Health Questionnaire (Goldberg, 1978; Goldberg & Hillier, 1979) is a psychological instrument used in measuring psychological mental health or dysfunctions. It is a self-administered screening instrument designed to detect psychiatric disorders in community settings and nonpsychiatric clinical settings such as primary care or general practice. It comes in three packs: GHQ-60,-28, and −12. This study used the GHQ-28. The GHQ is popular and widely used in research across different cultural settings. In this scale, the respondents are asked to compare their recent psychological state with their usual state. It consists of 28 items comprising four subscales. Scale A (questions 1–7) measures somatic complaints, Scale B (questions 8–14) measures anxiety and insomnia, Scale C (questions 15–21) measures social dysfunction, and Scale D (questions 22–28) measures severe depression. All items have a 4-point scoring system using Likert scoring: 0 (*less than usual*), 1 (*no more than usual*), 2 (*not at all*), and 3 (*much more than usual*), respectively. Each question has four possible responses. Some of the items are also reversed and so is the scoring. In this study, scoring was completed in such a way that the higher the score, the poorer the psychological symptom report. A retest in 2 weeks among 10 Zimbabwean refugees for this study demonstrated good reliability (0.91). The GHQ-28 is a widely used instrument and validated for African cultures in Nigeria and South Africa with high reliabilities of .71 to 80 (Aderibigbe & Gureje, 1992; Gureje & Obikoya, 1990; Idemudia & Matamela, 2012; Straker, Mendelsohn, Moosa, & Tudin, 1996).

Pre- and Post-Migration Difficulties Checklist. This is a 22-item checklist designed by the author. The checklist measures pre- and postmigration difficulties in Zimbabwe and South Africa. Some of the items were adapted (with permission) from the Wyatt Sexual History Questionnaire which assessed child and adult sexual abuse. The instrument was based on a 5-point Likert scale (from *strongly agree* to *strongly disagree*). A pilot study of 20 Zimbabwean refugees had yielded a good consistency for both premigration (Zimbabwe) and postmigration (South Africa) stress. Content validity was assessed using judgment of experts at UCLA, University of Limpopo, and from review of several peer-reviewed journal articles. For Papers 1–3, responses were dichotomized into 0 (original scores 1 [*strongly disagree*] to 3 [*neutral*]) and 1 (original scores 4 [*agree*] and 5 [*strongly agree*]). The items are short, easy to understand and measures negative life events in the areas of problems with human rights abuse/violence/police victimization, poverty/lack, and sexual/physical abuse. For PTSD symptoms (all publications), only those 14 items that qualify as A-criterion items as specified in *DSM–IV* (TR) were used (APA, 1994). All of these items are presented in the report of results for the grand sample and broken down by gender (refer to Paper 3). For further analytic purposes, two subscales are formed, one on Threat to Life (9 items), and the other on Abuse (5 items). The Threat to Life subscale exhibited a consistency of $\alpha = .86$ (female: $\alpha = .85$; male: $\alpha = .86$) for premigration stress, and $\alpha = .83$ (female: $\alpha = .85$; male: $\alpha = .80$) for postmigration stress. The Abuse subscale exhibited a consistency of $\alpha = .84$ (female: $\alpha = .82$; male: $\alpha = .85$) for premigration stress, and = .87 (female: $\alpha = .82$; male: $\alpha = .88$) for postmigration stress.

Statistical analysis. Various statistics were used for the quantitative papers. Paper 1 was analyzed with a hierarchical multiple regression model having evaluated all data for the assumptions of regression. Paper 2 used two gender-specific focused group discussions, each lasting 90 min, in addition to a semistructured interview to assess experiences before, during, and after arrival in South Africa. Paper 3 used series of SEMs, and Paper 4 used descriptive statistics and percentages.

Results

Paper 1, titled "Trauma Exposures and Posttraumatic Stress Among Zimbabwean Refugees in South Africa" (Idemudia, Williams, Madu, & Wyatt, 2013) evaluated the impact of trauma exposures (pre- and postmigration stressors and poor mental health) on PTSD among homeless Zimbabwean refugees living in South Africa.

Using a guided convenient sampling, structured in-depth interviews were collected from 125 homeless Zimbabwean refugees in Polokwane, Limpopo Province, South Africa. The study was anchored on the hypothesis that predictor variables (pre- and postmigration stressors, poor mental health) would significantly affect outcomes (PTSD). Participants were assessed on demographic variables, Pre- and Post-Migration Difficulties Checklists, and mental health using the GHQ-28 and the PCL-C. Participants ranged from 18 to 48 years with a mean age of 28.3 years (SD = 6.27). The majority of the sample had at least a secondary education (76.8%) and were employed as unskilled laborers (61.6%) in South Africa. Over half (54.4%) of participants in Zimbabwe reported being married, but only 19.2% of participants in South Africa did the same. Hierarchical multiple regression analyses showed that the overall model significantly predicted PTSD

among homeless Zimbabweans ($R^2 = 0.17$, adjusted $R^2 = 0.11$, $F(6, 124) = 2.960$, $p < .01$).

Thus, the entire set of pre- and postmigration variables (posttotal stress, prethreat to life, presex abuse, prepoverty, postsex abuse, postpoverty, and two mental health symptoms (anxiety and insomnia; social dysfunction) explained 41.2% of the total variance on PTSD. However, the main significant predictors in the study were posttotal stress, $t(125) = 2.571$, $p < .001$; postsex abuse, $t(125) = 2.175$, $p < .003$; postpoverty, $t(125) = 3.450$, $p < .001$; anxiety and insomnia, $t(125) = 2.000$, $p < .04$; and social dysfunction, $t(125) = 2.113$, $p < .003$. Of these variables in order of the strongest impact predictor was posttotal stress ($\beta = 0.737$) followed by postpoverty ($\beta = 0.701$), postsex abuse ($\beta = 0.377$) and social dysfunction ($\beta = 0.196$). The Dublin-Watson results (2.252) also showed that the assumption of independent errors was tenable and almost certainly met for this model. Variables excluded in the model were pretotal stress, postthreat to life, somatic complaints (GHQ A), Severe depression (GHQ D) and Total GHQ. Zimbabwean refugees constitute a particularly vulnerable group to poor mental health and PTSD. The paper concluded by recommending integrating refugee treatment in the main stream health system.

Paper 2, titled "Migration Challenges Among Zimbabwean Refugees Before, During and Post Arrival in South Africa" (Idemudia, Williams, & Wyatt, 2013), using a qualitative method, evaluated the experiences encountered before, during, and on arrival in South Africa to enable us understand the physical and emotional traumas across the journey span. Two gender-specific focus group discussions, each lasting 90 min and consisting of homeless Zimbabwean refugees, were conducted in the Limpopo Province of South Africa. A semistructured interview assessed for experiences in and reasons for leaving Zimbabwe, as well as experiences *en route* and within South Africa. Discussions were audio-recorded, transcribed, and analyzed using consensual qualitative research and a constant comparison qualitative method. Three temporal themes were identified which included challenges and trauma experienced in Zimbabwe (premigration), during the immigration journey (midmigration), and upon arrival in South Africa (postmigration). While there were some experiential differences, Zimbabwean men and women shared numerous traumatic commonalities. In addition to the themes, three subthemes contributing to reasons for leaving Zimbabwe, two subthemes of negative and traumatic experiences incurred midmigration, and two postmigration subthemes of challenges were identified. Despite the difficulties encountered in their homeland, newly arrived Zimbabweans in South Africa did exchange old struggles for a new array of foreign and traumatic challenges. Reasons to immigrate and the psychological and physical toll of migration exacted at the individual and community levels were discussed. Recommendations were made which include advocating for culturally congruent mental health research, the training of culturally competent researchers and clinicians, and the development of policies that could influence the quality of life for Zimbabwean refugees were provided.

Paper 3, titled "Gender Differences in Trauma and Posttraumatic Stress Symptoms among Displaced Zimbabweans in South Africa" (Idemudia, Williams, Boehnke, & Wyatt, 2013) evaluated the differences between males and females on PTSS/PTSD as a result of exposure to traumas. A poor mental health status, pre-, and postmigration traumas of men and women were expected to have a relationship with PTSS for women, but not to the same extent for men. Through a guided purposive convenient sampling, structured in-depth interviews, data were obtained from a sample of 125 displaced and homeless Zimbabwean refugees in Polokwane, Limpopo Province, South Africa. Participants were assessed on demographic variables, Pre- and Post-Migration Difficulties Checklists, and mental health using the GHQ-28 and the PCL-C. The hypothesis of a gender difference in the predictability of PTSD was tested with an SEM. For men, none of the three paths (premigration stress, postmigration stress, and poor mental health) on PTSD is significant, whereas for women the path of poor mental health on PTSD ($\beta = .36$, $p = .013$) was significant, but the size of the gender differences was modest. However, effect sizes were always larger for women than they were for men. The findings helped to close the gap in PTSS/PTSD research for Africans and the study recommended that, indeed, likely gender differences in the prediction of PTSS, as suggested in the literature, needs further attention.

Paper 4, titled "Displaced, Homeless and Abused: The Dynamics of Gender-Based Sexual and Physical Abuses of Homeless Zimbabweans in South Africa" (Idemudia, 2014) assessed the nature of sexual/physical and gender-based abuse experienced by displaced Zimbabwean refugees, perpetrators of such abuses, and the gender of perpetrators in South Africa. Through structured in-depth interviews, data were collected from 125 randomly selected homeless Zimbabwean refugees in Polokwane, Limpopo Province, South Africa. Age of participants ranged from 18 years to 48 years with a mean age of 28.3 years ($SD = 6.27$). Participants were assessed on demographic variables and sexual and physical abuses measured with the Post-Migration Difficulties Checklist developed by the author. The study showed that rape and sexual harassment were common and perpetrators were mainly border and police officers. Sex of perpetrators were mainly single men. The study also found other forms of abuse, including physical assaults. The findings have significant practical implications for refugees in South Africa where xenophobic feelings are on the rise. Recommendations were discussed based on the findings of the study, including a need for culturally relevant programs to help refugees cope and deal with traumas they encounter.

Conclusions

Being a summary report of published papers from the Phodiso Trauma Research Project, details of literature reviews and discussions have been carried out in the respective publications and references to publications have been indicated. Only main conclusions will be noted for all papers on PTSS/PTSD and trauma.

- Zimbabwean refugees experienced several premigration difficulties or stressors. In Zimbabwe, the majority of Zimbabwean refugees reported poverty, lacking basic resources, and threats to their life and that of family members and reported human rights abuses.
- In South Africa, participants also reexperienced similar stresses of poverty, sexual and physical abuse, homelessness, and disruption of family life.
- Sexual and physical abuse and total stress in South Africa were significant predictors of PTSD.
- Poor mental health (anxiety/insomnia and social dysfunction) significantly predicted PTSD. Although variables such as threats to life, poverty, sexual and physical abuses

experienced in Zimbabwe (premigration stressors) combined with other variables to predict PTSD, they were not statistically significant in the model for Paper 1.

- The Zimbabwean refugees in the qualitative study overwhelmingly shared similar experiences that could be temporally framed into premigration, midmigration, and postmigration traumas.
- Many of the challenging sociocultural, structural, and institutional factors that they experienced, such as lacking housing (i.e., having an unpredictable and largely homeless life), having vulnerability factors to being exploited and/or coerced (i.e., being poor or an undocumented immigrant), and having a history of witnessing and/or experiencing traumatic events, were reported across all the migration stages. These highly prevalent factors have been previously reported as being associated with and predisposing for poor mental health outcomes.
- Women reported more premigration harassment by the police than did men.
- Men reported more postmigration threat to life than did women.
- SEM results show a systematic difference in the strength of the impact of pre- and postmigration stress, poor mental health, and PTSD for women as compared with men.
- The fourth paper showed that Zimbabwean refugees experienced several migration difficulties bringing about marital, educational, economic and family dislocations.
- In South Africa, participants did experience sexual and physical abuses of different types with border officers and police as main perpetrators with the majority of perpetrators as single males.

Recommendations

Various recommendations were made, including providing long-term and evidence-based interventions for refugees and migrants in difficult circumstances, especially to those who developed PTSS or PTSD, particularly women and children. African men also suffered PTSS/PTSD. According to Vigneswaran (2009), asylum seeking can be a difficult process in South Africa, which further exacerbates experiences of stress and trauma, particularly for men as they can be easy targets for xenophobic attacks. The host or receiving countries should establish humane programs to minimize triggering factors that can predispose refugees to psychological problems. These programs should also target the local population in developing a positive attitude to immigrants, in general, and refugees, in particular, whether they are documented or not. It was also recommended that experts in policy should be included in research of this nature as health services will need to address structural challenges at all stages of migration. Finally, it was also recommended that discriminatory practices and die-hard policies of host countries should be abolished and, instead, reflect the host country's constitution and human rights policies.

Limitations

The study has some limitations. First, the data is cross-sectional, making causal inferences regarding determination problematic. A large group with control is also needed for further studies. Research with undocumented migrants can be fraught with stress and problematic as participants have problems trusting researchers. However, future studies should consider other nationalities from different ethnic groups as cultural factors may affect outcomes. In addition, more research should be geared toward understanding the association between xenophobia and mental health outcomes. However, the findings in this study help in closing some gaps in knowledge on traumas, PTSS, PTSD, and gender.

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Assault Injury Presentation and Lifetime Psychological Trauma in Emergency Centre Patients in South Africa: A Cross-Sectional Study

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There is a paucity of data from emergency centers regarding (a) the prevalence of recurrent assault injury and prior psychological trauma, and (b) psychosocial predictors of assault-injury presentation. ***Objective:*** To address the above gaps to identify psychosocial needs and injury-prevention opportunities. ***Method:*** Patients presenting with assault or unintentional injuries were recruited from 2 emergency centers (ECs; $n = 200$) and assessed for injury history, traumatic events, and mental disorders. Descriptive statistics were computed and predictors for assault-injury presentation and recurrent assault injury were identified using logistic regression. Univariate regression models were employed to identify significant variables before entering these into multivariate models. ***Results:*** The majority of the participants were male (67%), of whom 43% were between the ages of 25 and 40 years. The median number of lifetime traumatic events was 7. Recurrent assault injury was found in 31%. These injuries were predicted by lifetime traumatic events other than injury ($OR = 1.035$, 95% CI [1, 1.07]). Assault-injury presentation was significantly less likely in female participants ($OR = 0.221$, 95% CI [0.1, 0.5]) and was associated with high levels of witnessing community violence ($OR = 1.157$, 95% CI [1.01, 1.32]). ***Conclusion:*** Patients presenting with assault injuries are at risk for injury recurrence, have high levels of past psychological trauma, and should be screened for psychosocial risk. Further research is needed to assess the role of past psychological trauma in risk for assault injury, and clarify treatment needs. The role of EC-based interventions in injury prevention and mental health requires increased recognition in South African policy and practice.

Keywords: psychological trauma, alcohol and drugs, mental health and violence, community violence, violence exposure

Injuries make a substantial contribution to the global burden of disease, especially in low- and middle-income countries (LMICs) where the number of healthy years of life lost (disability-adjusted life years) is 15 times higher than in high-income countries (HICs; World Health Organization, 2008). In a small number of LMICs, such as South Africa and Colombia, injuries due to interpersonal violence are the leading cause of injury disability-adjusted life years (Institute for Health Metrics and Evaluation; Norman, Matzopoulos, Groenewald, & Bradshaw, 2007). Furthermore, in 2010, interpersonal violence was the second leading cause of premature mortality in South African men, second only to HIV/AIDS (Msemburi et al., 2014). Although male homicide rates are six times higher than female homicide rates in South Africa, the South African intimate-partner femicide rate is high compared with international figures, being twice that found in the United States (Abrahams et al., 2009; Matzopoulos et al., 2015).

However, in measuring the impact of interpersonal violence-related injuries in South Africa, mortality figures are only the tip of the proverbial iceberg. Although injury morbidity data are not routinely collected in South Africa, the available data demonstrate the high burden placed on the health-care system by interpersonal violence-related injury. A recent rapid assessment of injury admissions to facilities in three high-violence areas in Cape Town, including Khayelitsha and Elsies River, found that 23% of all cases seen at the ECs, for any reason, were patients injured through interpersonal violence, and these patients constituted 60% of all the injury cases seen (Mureithi et al., 2013). Across the six sites included in the assessment, 70% of the patients with injuries due to violence were male. These data represent a significant problem in the lives of mostly young South Africans. It is important to

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address the needs of young victims of violence for a number of reasons.

First, hospital-based data, mainly from HICs, reveal that injury, and in particular injury due to interpersonal violence, is associated with a risk of further assault injury (Brooke, Efron, Chang, Haut, & Cornwell, 2006; Ponzer, Bergman, & Brismar, 1996; Sims et al., 1989; Stein & Van der Spuy, 1997). Few studies from LMICs report recurrent injury history, with the majority reporting cross-sectional data on acute EC presentation only (Govender, Matzopoulos, Makanga, & Corrigall, 2012; Thanni & Kehinde, 2006). The majority of the studies report factors such as the mechanism of injury, injury severity and mode of transport to hospital (Hodkinson & Wallis, 2009; Mehmood, Razzak, Kabir, Mackenzie, & Hyder, 2013). Second, the psychological trauma of an interpersonal violence-related injury may cause significant psychological distress. Victims of such injuries are at risk for developing posttraumatic stress disorder (PTSD), major depression and substance use disorders (Hedtke et al., 2008; Kilpatrick et al., 2003; Resnick, Acierno, & Kilpatrick, 1997). Furthermore, certain factors such as female gender, mental disorders, or a history of psychological trauma increase an individual's vulnerability to postinjury mental disorders (Alarcon et al., 2012; Osenbach et al., 2014). However, findings from a South African nationally representative study of mental disorders and trauma found no gender differences in the development of PTSD in trauma-exposed individuals (Atwoli et al., 2013), suggesting that, in South Africa, gender might not be a factor to consider when identifying those most in need of services. Third, the impact of these injuries is not limited to the victim of the assault. Injuries due to violence often affect young, potential breadwinners and are associated with a high financial and emotional cost, not only to the health-care system, but also to families as a result of the tragedy itself, loss of income, and rehabilitation costs (Lyons, Finch, McClure, van Beeck, & Macey, 2010).

Despite the high burden of interpersonal violence-related injuries and the known consequences of these injuries in South Africa, few South African EC studies have investigated risk factors for recurrent injury, such as a history of psychological trauma. Those studies that have been conducted included investigations of substance use at the time of injury, demographic factors and patient-disposition data, such as intensive care admissions and discharges (Lewis & Wood, 2015; Plüddemann, Parry, Donson, & Sukhai, 2004). To our knowledge, no researchers have investigated the factors associated with repeat assault-injury presentation in South African ECs.

Thus, in an attempt to address this gap, we investigated the prevalence of recurrent assault injury and lifetime psychological trauma in an injured EC population. In addition, we examined the predictors of presentation for recurrent assault injury to highlight factors that could be amenable to intervention in the South African EC setting. We hypothesized that a number of those presenting with an assault injury would have a history of previous assault injuries, as well as a high frequency of other traumatic events during their lifetimes. Furthermore, we hypothesized that psychosocial factors such as sociodemographic factors, substance use, and past psychological trauma would predict the frequency of violence-related injury experiences.

Method

Study Design

This cross-sectional study was approved by the Human Research Ethics Committee of the University of Cape Town and the Institutional Review Board of the University of California Los Angeles.

Study Setting and Population

This study was undertaken in two 24-hr ECs in two urban, low socioeconomic areas, namely Elsies River and Khayelitsha. The Elsies River Community Health Centre is a 24-hr primary care clinic, with an EC that attends to urgent cases during office hours and all patients who access the clinic after hours and on weekends. This facility receives self-referred cases, as well as patients arriving at the clinic in ambulances. The Khayelitsha site is a secondary care district hospital that includes the 24-hr EC. This site attends to self-referred patients, patients transported to the hospital by prehospital emergency services, as well as referrals from primary care clinics in the area. Both sites refer to a tertiary hospital for specialized services. The two sites were identified by the local Department of Health as having a high burden of violent, substance-related injuries (Naledi, Househam, Groenewald, Bradshaw, & Myers, 2009). The ECs serve these areas that, according to police and health-care statistics, are among the top five most violent areas in the metropole.

A convenience sample of 200 individuals was recruited. Convenience sampling was used because the research team did not have access to the hand-written EC admission books. Furthermore, the level of detail of information recorded in the admissions books tends to vary greatly, which hampers efforts to identify potential study participants. Eligible participants included those who were 18 years of age or older, presenting to an EC for treatment of injuries, including those from assault, unintentional causes such as falls, burns, and so forth Individuals were excluded if they had self-inflicted injuries, were medically unstable, if they required referral to a higher level of care, or were unable to provide informed consent (e.g., intoxicated, receiving pain medication).

Study Procedure

During day, night, and weekend shifts at the ECs from December 2012 to March, 2013, patients were approached by study staff in the waiting areas after they had been triaged. The triage process is a scoring system that enables medical staff to prioritize patients according to the severity of their injuries or medical conditions. If they were amenable to being interviewed, the study was fully described in a private room or treatment area. If the patient agreed to participate, informed consent was taken. Prior to the interview, each participant was informed about the confidentiality of the process. They were assured that participation was voluntary, and that they could withdraw from the study at any time. If medical personnel required attention of the participant, the field workers would temporarily suspend the interview and continue after the medical care had been completed. Participants requiring referral for mental health or social services were provided with referrals. Participants requiring urgent attention were referred directly to the

EC medical staff. On completion of the interview, participants were given a R40 ($2.30) supermarket voucher to compensate them for their time.

Measures

In addition to a number of sociodemographic variables, such as age, gender, race/ethnicity, marital status, education and employment, the following measures were included.

Mental Disorders

The Mini-Neuropsychiatric Interview (MINI), Version 6.0 is a validated, structured diagnostic interview which is compatible with the International Classification of Diseases (ICD-10) and the *Diagnostic and Statistical Manual of Mental Disorders*, (4th ed.; *DSM–IV*; Sheehan et al., 1998). The MINI is widely used in clinical and research settings. Validation studies using the *Structured Clinical Interview for DSM-IIIR* (*SCID*) and the Composite International Diagnostic Interview (CIDI) reported a high concordance between the MINI diagnoses and the other instruments (Lecrubier et al., 1997; Sheehan et al., 1997). In addition, positive predictive values were good (0.60 to 0.74) to very good (>0.75) for the majority of the mental disorder diagnoses. This measure provides a psychiatric diagnosis for 12-month and lifetime prevalence of a mental disorder. The MINI consists of the following modules: Major Depressive Disorder (current, past and recurrent), Suicidality, Manic Episode (current and past), Hypomanic Episode (current and past), Bipolar I and II Disorders (current and past), Bipolar Disorder not Otherwise Specified (current and past), Panic Disorder (current and lifetime), Agoraphobia (current), Social Phobia (current), Obsessive–Compulsive Disorder (current), Posttraumatic Disorder (current), Alcohol Abuse and Dependence (past 12 months), Substance Abuse and Dependence (past 12 months), Psychotic Disorders (current and lifetime), Mood Disorders With Psychotic Features (current and lifetime), Anorexia Nervosa (current), Bulimia Nervosa (current), Generalized Anxiety Disorder (current) and Antisocial Personality Disorder (lifetime).

Injury

Injury intent (assault or unintentional) and the number of previous assault injuries were documented. For the purposes of this study, a recurrent injury was defined as more than one injury within the previous 5 years; recurrent assault injuries within the preceding 5 years were recorded. One of the participant groups in this study comprised victims of assault (interpersonal violence). The other group included patients presenting with unintentional injuries, that is, injuries resulting from an unplanned incident, such as a road-traffic crash, a fall, or a fire.

Traumatic Life Events

The Trauma History Questionnaire (THQ) is a validated measure that assesses various subgroups of stressful events over the lifetime of a subject, including crime-related trauma, general disasters and traumatic experiences, and trauma due to sexual experiences (Green, 1996; Hooper, Stockton, Krupnick, & Green, 2011). The THQ has been found to be reliable, displaying fair to excellent test–retest reliability across items. The tool performed well when tested for construct validity in various samples (Hooper et al., 2011). The frequency of any trauma was calculated to give an indication of the trauma burden and included as a continuous variable. Participants' assault-injury experiences reported in this measure were excluded for the analyses.

Community Violence

Witnessed community violence was measured using the witnessing module of the Survey of Exposure to Community Violence (SECV; Richters & Saltzman, 1990). The full measure and the Witnessing subscale have been found to be reliable and valid across various samples (Wevodau, 2016). The answers for this 11-item questionnaire were documented as *yes* or *no*. The yes answers were summed to provide a score.

Sample-Size Determination

The sample-size determination was conducted on the basis of an estimated mental disorder prevalence of 20%. The 12-month prevalence of mental disorders found in the nationally representative South African Stress and Health study (Herman et al., 2009) was 16.5%. However, the 12-month prevalence for the Western Cape, the province in which this study took place, outstripped the national prevalence, although the actual figure was not reported (Herman et al., 2009); thus the authors decided on an estimated prevalence of 20%. The calculations involved two-sided tests at $\alpha = .05$ and $\beta = 0.10$ (i.e., 90% power). A sample of 186 produces a two-sided 95% confidence interval with a width equal to 0.12 when the sample proportion is 0.20. To account for attrition, we increased the sample size to 200. Unpublished data investigating the re-injury prevalence among patients presenting to the ECs where the study took place revealed that 5% reported having suffered another injury in the preceding 3 months (Sorsdahl, personal communication). The sample size of 200 was sufficient to investigate the prevalence of re-injury.

Data Analysis

Data were analyzed using IBM SPSS Version 20. Descriptive statistics were generated. We examined the unadjusted associations between assault or unintentional injury presentation on demographic, injury, and trauma as independent variables to explore the different characteristics of the two groups. Means and medians were compared using *t* tests and Wilcoxon's rank-sum tests, as appropriate. Proportions were compared using χ^2 tests or Fisher's exact test, as appropriate. In addition, two logistic regression multivariate models were developed to predict recurrent assault injury in the previous 5 years and assault-injury presentation. For each multivariate model, we first identified significant variables by conducting a logistic regression analysis with each individual variable. The variables that were significantly associated with the outcome were entered into the multivariate model. Statistical significance was based on two-sided tests and set at $\alpha = .05$. The results of the regression models were reported as odds ratios (*OR*s) with 95% confidence intervals (CIs).

Results

Characteristics of the Study Participants

The sociodemographic, trauma, and injury characteristics of the 200 participants are presented in Table 1, along with a breakdown of those presenting with an assault or unintentional injury. Most of the participants in the sample were men between the ages of 25–40 years and did not complete high school. Many participants reported experiencing more than one assault injury within the previous 5 years. High frequencies of witnessed community violence exposure and lifetime traumatic experiences were documented in this sample. Unadjusted associations revealed that those presenting with assault injuries were significantly more likely than those in the unintentional injury group to be in the 25- to 40-year-old age range, were male, unemployed, and had experienced a previous assault injury. The members of this group were also significantly more likely to be diagnosed with a current mental disorder or a substance-use disorder and were exposed to higher frequencies of witnessed community violence and lifetime traumatic experiences.

Lifetime Traumatic Experiences

The frequencies of selected lifetime traumatic events are presented in Table 2. In the crime-related category, and the general disaster and trauma category, a high proportion of the sample had been exposed to at least one traumatic event, 63% and 95%, respectively, and there was little difference between male and female participants. Under the main category of general disaster and trauma, the subcategories of witnessing serious injury or death (50%) and having seen dead bodies (52%) had the highest proportion of participants exposed to these events.

Injury Predictors

The unadjusted and adjusted effects of participant demographic, injury, and trauma characteristics on (a) recurrent assault injury and (b) assault-injury presentation are presented in Tables 3 and 4.

After adjusting for the effects of the other variables in the model, recurrent assault injury was predicted by high frequencies

Table 1
Demographic, Injury and Trauma Characteristics of the Sample

Sample characteristics	Total sample $n = 200$ (%)	Assault injury $n = 118$ (%)	Unintentional injury ($n = 82$)	p value
Age				
18–25	60 (30.0)	40 (33.9)	20 (24.4)	.035*
25–40	86 (43.0)	54 (45.8)	32 (39.0)	
>40	54 (27.0)	24 (20.3)	30 (36.6)	
Gender				
Male	134 (67.0)	92 (78.0)	42 (51.2)	<.001*
Female	66 (33.0)	26 (22.0)	40 (48.8)	
Race				
Black	105 (53.0)	62 (52.5)	43 (53.1)	.959
Other non-White	92 (46.2)	55 (46.6)	37 (45.7)	
Other	2 (1.0)	1 (.8)	1 (1.2)	
Marital status				
Alone	105 (53.0)	65 (55.6)	40 (49.4)	.392
In a relationship	93 (47.0)	52 (44.4)	41 (50.6)	
Completed high school				
Yes	65 (32.5)	34 (28.8)	31 (37.8)	.182
No	135 (67.5)	84 (71.2)	51 (62.2)	
Employed				
Yes	104 (52.0)	50 (42.4)	54 (65.9)	.001*
No	96 (48.0)	68 (57.6)	28 (34.1)	
Previous assault injury				
Yes	98 (49.0)	70 (59.3)	28 (34.1)	<.001*
No	102 (51.0)	48 (40.7)	54 (65.9)	
Recurrent assault injury**				
Yes	61 (30.5)	57 (48.3)	4 (4.9)	<.001*
No	139 (69.5)	61 (51.7)	78 (95.1)	
Current mental disorder				
Yes	119 (59.5)	79 (66.9)	40 (48.8)	.010*
No	81 (40.5)	39 (33.1)	42 (51.2)	
Any alcohol or other drug-(AOD) use disorder				
Yes	86 (43.0)	59 (50.0)	27 (32.9)	.016*
No	114 (57.0)	59 (50.0)	55 (67.1)	
AOD and another mental disorder				
Yes	48 (24.0)	9 (11.0)	39 (33.1)	<.001*
No	152 (76.0)	73 (89.0)	79 (66.9)	
Community violence (mean, *SD*)	5.9, 3	6.6, 2.6	4.8, 3.2	<.001*
Lifetime trauma*** (med, range)	7, 48	8, 48	6, 44	.024*

* $p < 0.005$. ** More than 1 assault injury in previous 5 years.
*** Lifetime traumatic events, excluding assault-injury experiences.

Table 2
Exposure to Lifetime Traumatic Events by Categories and by Gender

Category	Total sample $n = 200$ (%)	Men $n = 134$ (%)	Women $n = 66$ (%)
Crime-related events*	124 (62.0)	84 (62.7)	40 (60.6)
General disaster and trauma**	163 (81.5)	107 (79.9)	56 (84.8)
Involved in a serious accident	65 (32.5)	43 (32.1)	22 (33.3)
Feared death or serious injury	60 (30.0)	40 (29.9)	20 (30.3)
Witnessed death or serious injury	87 (43.5)	59 (44.0)	28 (42.4)
Seen dead bodies	84 (42.0)	56 (41.8)	28 (42.4)
Sexual assault	23 (11.5)	9 (6.7)	14 (21.2)

* Including muggings, theft, house break-ins.
** Injury, or feared injury, to self or others.

of lifetime traumatic events, excluding assault-injury experiences, *OR* = 1.035, 95% CI [1, 1.07]; see Table 3.

In the multivariate model (see Table 4) for assault-injury presentation, women were significantly less likely to present for these injuries (*OR* = 0.221, 95% CI [0.1, 0.5]) and had high levels of witnessed community violence (*OR* = 1.157, 95% CI [1.01, 1.32]).

Discussion

This study is one of the first of its kind from an LMIC, and the first in South Africa, to investigate the prevalence of repeat assault injuries and lifetime traumatic events, as well as the predictors of assault-injury history and repeat assault injury in an EC setting. There were a number of important findings. First, a high prevalence of repeat assault injury was found in the assault-injured group. Within the preceding 5 years, 48% of participants presenting with an assault injury had experienced another assault injury in the same time period, which is consistent with data from HIC studies (Sims et al., 1989). Over their lifetimes, 59% of the assault-injured participants had experienced at least one other assault injury, which was consistent with the only other South African study to report repeat assault-injury statistics (Stein & Van der Spuy, 1997). These findings highlight the importance of intervening with assault-injured individuals to prevent further injury.

Second, the participants reported high frequencies of lifetime traumatic events, particularly in the assault-injured group, in which

Table 3
Logistic Regression Results for Demographic, Mental Disorder, and Trauma Correlates of Recurrent Assault Injury in the Preceding 5 Years

Variable	Recurrent injury (5 years) Yes (%)	Unadjusted *OR* (95% CI)	Adjusted *OR* (95% CI)
Age			
18–25	19 (31.1)	1.00	1.00
25–40	31 (50.8)	1.216 (.6–2.45)	.964 (.42–2.22)
>40	11 (18.0)	.552 (.23–1.3)	
Gender			
Male	45 (73.8)	1.00	1.00
Female	16 (26.2)	.633 (.33–1.23)	.581 (.25–1.35)
Race			
Black	28 (45.9)	1.00	
Other non-White	33 (54.1)	1.538 (.84–2.82)	
Other	0	0	
In a relationship			
Alone	31 (50.8)	1.00	
In a relationship	30 (49.2)	1.137 (.62–2.08)	
Completed high school			
No	44 (72.1)	1.00	
Yes	17 (27.9)	.732 (.38–1.42)	
Employed			
No	37 (60.7)	1.00	1.00
Yes	24 (39.3)	.478 (.26–.88)*	.743 (.35–1.58)
Any current mental disorder			
No	16 (26.2)	1.00	1.00
Yes	45 (73.8)	2.470 (1.28–4.78)*	2.562 (.86–7.65)
Any alcohol or other drug (AOD) use			
No	28 (45.9)	1.00	1.00
Yes	33 (54.1)	1.912 (1.04–3.52)*	.663 (.19–2.31)
AOD and another mental disorder			
No		1.00	1.00
Yes		4.004 (1.81–8.84)*	1.225 (.41–3.63)
Community violence (mean, *SD*)	6.8, 2.6	1.165 (1.03–1.31)*	1.062 (.92–1.23)
Lifetime trauma (*mdn*, range)	10, 48	1.045 (1.02–1.08)*	1.035 (1–1.07)*

* $p < 0.005$.

Table 4
Logistic Regression Results for demographic, Mental Disorder, and Trauma Correlates of Assault-Injury Presentation

Variable	Assault-injury presentation		
	Yes (%)	Unadjusted *OR* (95% CI)	Adjusted *OR* (95% CI)
Age			
18–25	40 (33.9)	1.00	1.00
25–40	54 (45.8)	.844 (.42–1.69)	.988 (.41–2.37)
>40	24 (20.3)	.400 (.19–.86)*	.454 (.18–1.15)
Gender			
Male	92 (78)	1.00	1.00
Female	26 (22)	.297 (.16–.55)*	.221 (.1–.5)*
Race			
Black	62 (52.5)	1.00	
Other non-White	55 (46.6)	1.031 (.58–1.82)	
Other	1 (.8)	.694 (.04–11.39)	
In a relationship			
Alone	65 (55.6)	1.00	
In a relationship	52 (44.4)	.780 (.44–1.38)	
Completed high school			
No	84 (71.2)	1.00	
Yes	34 (28.8)	.666 (.37–1.21)	
Employed			
No	68 (57.6)	1.00	1.00
Yes	50 (42.4)	.381 (.21–.68)*	.483 (.23–1.03)
Any current mental disorder			
No	39 (33.1)	1.00	1.00
Yes	79 (66.9)	2.127 (1.19–3.79)*	2.297 (.83–6.34)
Any alcohol or drug use (AOD)			
No	59 (50.0)	1.00	1.00
Yes	59 (50.0)	2.037 (1.14–3.66)*	.293 (.09–1.02)
AOD and another mental disorder			
No	59 (50.0)	1.00	1.00
Yes	59 (50.0)	2.037 (1.14–3.66)*	3.162 (.94–10.68)
Community violence (mean, *SD*)	6.6, 2.6	1.232 (1.1–1.38)*	1.157 (1.01–1.32)*
Lifetime trauma (*mdn*, range)	8, 48	1.034 (1–1.07)*	.996 (.96–1.03)

* $p < 0.005$.

a median of eight events was found, compared with a median of six in the unintentionally injured group. The median of the total number of traumatic events experienced by participants of both groups far exceeded the numbers of traumatic events found in a nationally representative, community-based study in South Africa, the South African Stress and Health Study (Herman et al., 2009). In this study, only 9% of the 4,351 study participants experienced six or more traumas (Williams et al., 2007). Many injured EC patients in these South African ECs had been exposed to a number of lifetime traumatic events, which should be taken into account when planning further research into the mechanisms of vulnerability to injury.

Third, in this study, recurrent assault injury was predicted by a high frequency of lifetime traumatic events (excluding assault-injury experiences), and this was a stronger predictor than witnessed violence in the participants' communities. The increase in the odds of having had recurrent assault injuries was small, yet given the high numbers of traumatic events that participants reported, this may be an important finding. Moreover, the majority of EC studies investigating psychological trauma in relation to injury have explored psychological trauma as a consequence of injury, and not as a preexisting condition, which may function as a risk factor for injury (Bryant et al., 2010; Holbrook, Anderson, Sieber, Browner, & Hoyt, 1999). Those studies that have examined lifetime trauma as a predictor of assault injury have only included experiences of violence as predictors, such as violence perpetration or prior violence victimization (Cheng et al., 2003; Ranney et al., 2011). Thus, in injured EC populations, previous psychological trauma histories could serve to identify high-risk participants in need of additional services. More research is needed in this area.

Fourth, assault-injury presentation in our sample was predicted by male gender and witnessed community violence. This finding is consistent with previous research globally, namely, that men and boys are far more vulnerable to violence victimization than women and girls (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). Further, studies have shown that violent, high-crime neighborhoods are risk factors for violence (Borowsky & Ireland, 2004; Herrenkohl et al., 2000). Our findings in this LMIC population coincide with those reported in HIC populations.

The EC environment is often the first health-care contact for many individuals following a violence-related injury, and the majority of victims will be seen and discharged from the EC without having formally been admitted to a hospital ward (McCaig & Burt, 2001). In South African ECs currently, care of injured patients is usually limited to physical care only, such as suturing of wounds and provision of pain medication. The findings of this

study suggest that many of the patients presenting with violent injury may need further evaluation and intervention, particularly in the light of the high prevalence of mental disorders and risky substance use also found in this study population (van der Westhuizen, Wyatt, Williams, Stein, & Sorsdahl, 2014).

Given that in South Africa, as in many LMICs, mental health is not well integrated into primary care and is chronically underresourced (Burns, 2011), there are opportunities for cost-effective screening and brief intervention in the EC setting. A recent randomized controlled trial in three Cape Town ECs showed that screening for psychosocial factors and lay counselor-delivered brief psychosocial interventions are feasible and acceptable in low-resourced South African ECs (Myers, Stein, Mtukushe, & Sorsdahl, 2012; Sorsdahl et al., 2015). However, when it comes to the prevention of recurrent violent injury and the possible need to address psychological trauma in such interventions, much preliminary work is still required in the South African context.

Limitations

The limitations of this study should be considered when interpreting the findings. First, the reliance on self-report data may lead to under- or overreporting due to difficulties recalling events or the participants' desire to conceal information. Second, the cross-sectional, retrospective nature of this study and the lack of injury surveillance data limit the accuracy of the data regarding the true injury recurrence rates, probably leading to underreporting of injuries. A longitudinal study design, with a link to a mortality database, would give a more accurate picture of injury recurrence and risk factors for repeat assault injury. Last, due to convenience sampling in only two ECs, the small sample size, and the focus on injured EC patients only, the findings may not be generalizable to the country's population. Patients who were intoxicated and those who were seriously injured were not approached. Therefore, it is possible that the substance-using population was underrepresented. However, it is important to note that many of the patients who were intoxicated at the time of injury were no longer intoxicated when they were approached for the study, due to prolonged waiting times in the ECs for less seriously injured patients. In addition, those patients presenting with more serious injuries could constitute an even higher risk group than the patients with less severe injuries.

Conclusion

Despite these limitations, the findings of this study have a number of implications for EC research in South Africa, which could potentially lead to changes in EC practice and the formulation of trauma-focused interventions for LMIC ECs. High assault-injury recurrence rates and past psychological trauma have been found in this LMIC EC context. Given the lack of mental health infrastructure and specialized mental health-care practitioners, the EC provides an ideal location to identify patients at risk who would otherwise not receive services. Although further research is required to assess this need and inform the services required, there is a need for intervention which could impact the mental health and future safety of injured EC patients in the South African LMIC context.

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The Development of a Screening Tool for the Early Identification of Risk for Suicidal Behavior Among Students in a Developing Country

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Objective: Adolescent suicidal behavior is a public health concern in South Africa. The purpose of this article is to report on the development of a screening tool for teachers to identify South African students who are most at risk for suicidal behavior. This need is addressed within the context of the limited number of mental health professionals available to provide screening and care services in South Africa. ***Method:*** Grade 8 students participated by completing sociodemographic questionnaires and self-report psychometric instruments. A screening tool for suicidal behavior was developed using a 4-phase approach. ***Results:*** Twelve factors for high-risk suicidal behavior were identified and included in the screening tool. While further research is needed to validate the screening tool, the findings provide a useful preliminary starting point for teachers to refer students at high risk for suicidal behavior to mental health services for treatment. ***Conclusion:*** This screening tool is based on factors that were identified as being associated with suicidal behavior from local research on South African adolescents. The tool contributes to research on adolescent mental health, particularly suicidal behavior, in developing low and middle income countries like South Africa, with the aim of creating African prevention and intervention programs.

Keywords: young adolescents, suicidal behavior, developing country, screening tool

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Adolescent suicidal behavior can include completed suicides, suicide attempts and/or suicide ideation. Completed suicides among adolescents are increasing worldwide and have already been identified as a significant public health concern in South Africa (Schlebusch, 2005). Moreover, more than 90% of the world's children live in low- and middle-income countries. These countries account for 75% of global suicides further underscoring the significance of this public health problem (McKinnon, Gariépy, Sentenac, & Elgar, 2016). The suicide rate for children and adolescents between ages 5 to 14 years in South Africa is 1.4 per 100,000 and rapidly jumps to 17.6 per 100,000 for young people between ages 15 to 29 (Matzopoulos et al., 2015). The rate for children and adolescents ages 5 to 14 years is double the 0.7 per 100,000 suicide rate reported in the United States (Heise, York, & Thatcher, 2016) but is lower than rates reported in developing countries in Central and South America, such as Guyana, with rates of 3.77 and 6.46 per 100,000 youths between the ages 5 and 14 years, respectively (Kõlves & De Leo, 2014). Suicide ideation is also prevalent in Africa. African developing countries with low and middle income such as Botswana, Kenya, Uganda and Zimbabwe had a pooled prevalence of 21.6% for suicide ideation, compared with a prevalence estimate of 1.7% for countries in the Americas (McKinnon et al., 2016).

Although the South African rates seem low relative to some other countries and regions globally, these rates may not be an accurate reflection of the current problem of suicidal behavior in South Africa. The rates are based on older data from 2009. In addition, the media in South Africa regularly report suicides among adolescents, further suggesting that suicide is not a rare phenomenon among South African adolescents (Carstens, 2015; Nair, 2010;). Previous research also suggests that the effect of suicide can be widespread and is not limited to the person who commits suicide. For every completed suicide, six people are affected (Schneidman, 1973). Among adolescents, in particular, suicide and suicide attempts may have a serious impact on their

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peers. Adolescents' suicidal behaviors can lead to an increase in suicidal ideation and attempts among their peers (Prinstein, Boergers, & Spirito, 2001).

Suicide deaths are also often under reported due to the lack of resources (i.e., few pathologists to diagnose cause of death) and factors such as fears about stigmatizing individuals who have died as well as their survivors. Cultural or religious sanctions can further restrict the reporting of suicides (Schlebusch & Burrows, 2009). This under reporting may be even more pronounced when children and adolescents are involved.

Given the scope and seriousness of suicidal behavior among adolescents in South Africa, the establishment of a national suicide prevention program has been identified as one of the key areas for public health by the South African Department of Health (2012) National Mental Health Policy Framework Strategic Plan, 2013 to 2020. Previous research suggests that given the limited resources of public health systems, school resources should be used to develop evidence-based suicide prevention and intervention programs (e.g., Shilubane et al., 2013; Peltzer, Kleintjies, van Wyk, Thompson, & Mashego, 2008), with school personnel, such as teachers, being involved in screening for a national suicide prevention program to become fully established (Schlebusch, 2012).

A necessary first step in the development of a prevention program is to use screening tools to identify adolescents who are most at risk for suicide. Research on the use of various mental health measures for suicide screening of South African adolescents is limited. Measures recommended for use by the South African Anxiety and Depression Support Group include the Patient Health Questionnaire–9 (PHQ-9) developed by Spitzer, Kroenke, and Williams (1999). The PHQ-9 must be administered by clinicians, limiting its use in nonclinical settings such as schools. Another measure used in South Africa is the Youth Risk Behavior Survey (YRBS) developed by the Youth Risk Behavior Surveillance System in the United States for the Centers for Disease Control and Prevention. The YRBS has been adapted by Shilubane and colleagues (2013). However, little research has been done in this area and most of this work has been largely descriptive (e.g., Wild, Flisher, & Lombard, 2004). Issues such as the sensitivity and specificity of screening tools have not been addressed.

Suicide in South Africa

The development of a screening tool for South African adolescents is challenging as research on suicidal behavior and other mental health problems in developing countries such as South Africa is limited (Joe, Stein, Seedat, Herman, & Williams, 2008). This is due in part to the health transition that South Africa is undergoing, which is characterized as a quadruple burden: the simultaneous occurrence of epidemic infectious communicable diseases, such as HIV/AIDS and tuberculosis and the rise in noncommunicable diseases in a population already facing perinatal and maternal disorders, injury, and violence (Mayosi et al., 2009). Further, the burden of trauma is so widespread that the cover of the October 2015 issue of the *South African Medical Journal* had as its headline, "South Africa's fourth epidemic: The ugly face of trauma." Data on trauma and trauma-related injuries for South Africa indicate that the estimated disability-adjusted life years for intentional injuries is 2,686 per 100,000 as compared with 844 per 100,000 for the Americas and 813 per 100,000 for Southeast Asia, for example (Norman, Bradshaw, Schneider, Pieterse, & Groenewald, 2006). In addition, self-inflicted injuries account for 9.1% of injury mortality among South Africans. Atwoli and colleagues (2013) have noted that previous studies report that more than 80% of South Africans over the age of 18 years have had trauma exposure including physical and sexual violence, witnessing violence, unexpected deaths of loved ones, and accidents. They found a 73.8% lifetime prevalence of trauma exposure among adult South Africans with an average of 4.3 potentially traumatic occurrences over their lifetimes. These rates are similar to rates reported in the United States (Atwoli et al., 2013).

Although specific data on the prevalence of trauma and trauma-related injuries for children and adolescents in South Africa are not available, high levels of cumulative adverse childhood experiences, such as sexual and physical abuse, exposure to domestic violence, parental AIDS-related illness, and deaths, have been associated with suicidal behavior among South African children and adolescents, ages 10 to 18 years (Cluver, Orkin, Boyes, & Sherr, 2015). Poverty has also been found to be associated with both suicidal ideation and attempts (Dupéré, Leventhal, & Lacourse, 2009). In addition, these traumatic experiences may exacerbate internalizing behaviors such as shame, social isolation and depression, and reduce children and adolescents' ability to cope with life stressors; thus placing them at further risk for suicidal behaviors (McKinnon et al., 2016).

The prevention and treatment of noncommunicable diseases, such as mental health problems, are marginalized in South Africa (Mayosi et al., 2009). Mental health care, including treating suicidal behavior and creating prevention programs, is a low public health priority that receives inequitable funding, has a lack of infrastructure, has inadequate resources, and experiences shortages of mental health and psychiatric services. The problem of suicidal behavior among adolescents, has not been high on the public health agenda, being largely overshadowed by other more numerous and pressing health problems (Schlebusch, Burrows, & Vawda, 2009).

Most of the research undertaken on suicidal behavior is descriptive and not longitudinal (Schlebusch & Burrows, 2009); often examines only whether the participant had suicidal ideation and made plans and/or attempts (e.g., Madu & Matla, 2003); has used small sample sizes (e.g., Vawda, 2005); and/or has used quantitative methods with assessments, measures, and instruments that may not be suitable for South African populations (e.g., Shilubane et al., 2013; Peltzer et al., 2008). Nonetheless, hospital-based studies in South Africa indicate a downward trend in the age of patients who present with suicidal attempts at government-funded hospitals. Up to one third of the reports of nonfatal suicidal behavior are for children and adolescents (Schlebusch & Bosch, 2000; Vawda, 2005). With regard to suicidal ideation, plans and attempts among children and adolescents, studies indicate ranges from 4% to 47% for suicidal ideation, 5.9% to 18% for suicidal plans, and 5.4% to 21% for suicide attempts (Madu & Matla, 2003; Mashego & Madu, 2009; Mayekiso & Mkize, 1995; Peltzer et al., 2008; Shilubane et al., 2013). The wide differences in the prevalence estimates reported for adolescents' suicidal behavior including attempts, may be due to differences in community versus hospital samples and differences between rural and urban areas (Schlebusch, 2005, 2012).

Various sociodemographic, lifestyle, and psychological factors have been identified as correlates of suicidal behavior among South African adolescents. These include family conflict as a stressor, rigid problem-solving behavior, overcontrolling parental styles and lack of tolerance by parents or caregivers for developmental/role changes (Pillay & Wassenaar, 1997), interpersonal conflict (Schlebusch & Bosch, 2000), and school-related problems such as failure and bullying (Schlebusch, 2005). Other correlates include a family history of psychopathology (including substance use), acute and chronic stress (Schlebusch, 2005, 2012), and poor perceived parental support and negative feelings about the family and feelings of hopelessness (Shilubane et al., 2013). Anger control problems, low self-esteem, perceived stress and unmet school goals (Peltzer et al., 2008), and past peer and family suicide attempts (Shilubane et al., 2012) are also associated with suicidal behavior. Gender, too, is related to suicidal behavior; more females have been found to attempt suicide than males (Schlebusch, 2005).

The Current Study

Despite the limitations that have been identified in previous research on suicidal behavior among adolescents in South Africa, previous research does suggest that there is a need for a screening tool and that several sociodemographic, lifestyle, and psychological factors should be included in the tool. These factors are a lifetime history of suicidal ideation, plans and/or attempts, substance use, repeating grades, violent behavior, contact with the criminal justice system (police), physical health concerns, a family history of suicide, knowing of peer suicidal behavior (ideation, plans, attempts and completed suicide), depressive symptoms, hopelessness, perceived stress, anger, mastery, self-esteem, and perceived social support from family and friends. We will include these factors as risk factors to develop a screening tool that can be used by teachers in middle school settings to identify students who are high risk for suicidal behavior. The purpose of the screening tool is to address acute risk for suicide for the referral of students to services for the determination of how serious and immediate the risk may be and how best to intervene. The screening tool will provide a mechanical approach, based upon a summing of the items scores on the tool, for teachers to assess students' risk for suicidal behavior, which is superior to an intuitive approach to assessment, where decisions are frequently made based on a limited number and often stereotypical rather than empirically grounded indicators. The process that will be followed involves using the risk factors to develop items for the screening tool, and testing the sensitivity and specificity of the tool by examining how well the tool differentiates between students who are and who are not suicidal.

Method

Participants and procedure. The study was conducted at a government-run coeducational middle school, Grades 8 to 12, in a low socioeconomic area in Durban, South Africa. Three schools in the Durban area were reported in the media as having had a student commit suicide in the past year. These schools were approached to participate in the study, and the first school to respond was accepted as the study site. This school served members of nonwhite ethnic groups, including Indian (descendants of settlers from the Indian subcontinent), Black, and Colored (descendants of mixed White and Black ethnic origin) students who were previously discriminated against under the auspices of Apartheid or legislated separate racial development (Burrows & Laflamme, 2007). All Grade 8 students in the school were approached to participate in the study and the majority, 221 students, agreed to be part of the study after parental consent and child assent were obtained. Students in Grade 8 were selected because suicidal behavior among students, 10 to 14 years, is relatively rare and not well researched (Kõlves & De Leo, 2014). These students were experiencing major life events that could affect their mental health including ongoing developmental changes (e.g., puberty) and the transition to a high school learning environment. Participants were approached in small groups and asked to complete the sociodemographic, lifestyle, and self-reported psychological or psychometric questions. Participants filled out the questionnaires individually and confidentially.

A protocol was created to assist any students who expressed distress. Distressed students were referred to the school counselor for crisis intervention and, when needed, referred to clinical psychologists in the local area state hospitals for further assessment and intervention. Ethical approval for the study was obtained from the both the research ethics committee of the University of KwaZulu-Natal and the institutional review board of the University of California at Los Angeles in the United States.

Measures. The sociodemographic and lifestyle questions included questions on age, gender, students' living arrangements (e.g., living with both parents, one parent), any grade/s repeated, whether they ever drank alcohol, and whether they engaged in cigarette smoking. Participants were also asked if they had any knowledge of a peer's suicidal ideas, plans, attempts, or completed suicide and if they had a family member who had committed suicide (all questions had to be answered as a *yes/no*). Participants were further asked whether they had concerns about their physical health in the last year, had ever been involved in physical fights, or had contact with the criminal justice system (all questions had to be answered as a *yes/no*). The primary suicide variable of interest was personal suicidal behavior, which was coded as whether the participant had ever thought of killing themselves, had ever made a plan to kill themselves, or made an attempt (all questions had to be answered as a *yes/no*).

Participants were asked to complete the following standardized self-report psychometric instruments: the Beck Depression Inventory (BDI), a 21-item inventory that measured depressive symptoms (Beck, Steer, & Brown, 1996); the Beck Hopelessness Scale (BHS), a 20-item scale that assessed feelings about the future and loss of motivation and expectations (Beck, Weissman, Lester, & Trexler 1974); the Perceived Stress Scale (PSS), a 10-item measure to determine the degree to which life situations were appraised as being stressful (Cohen, Kamarck, & Mermelstein, 1983); the Anger Scale, a 29-item scale to ascertain multiple aspects of aggression, including physical, verbal aggression, anger, and hostility (Buss & Perry, 1992); the Mastery Scale, a 7-item scale used to determine personal control or mastery (Pearlin & Schooler, 1978); the Self-Esteem Scale, a 10-item scale used as a measure of self-esteem (Rosenberg, 1989); and the Perceived Social Support Scales (Procidano & Heller, 1983) for family (20 items) and friends (20 items) to ascertain social support.

Data analysis. The development of the screening tool consisted of four phases. The first was to create two opposing groups, one with high suicide behavior, and one with low suicide behavior. These groups, 52 participants (23.53%) in the high-risk group and 169 participants (76.475) in the low-risk group, were created using the responses to the suicidal behavior questions posed as part of the sociodemographic and lifestyle questions. *High risk* was defined as having engaged in some form of suicidal behavior. *Low risk* was defined as not having engaged in any form of suicidal behavior. Those who answered in the affirmative to any of the following questions, "Have you ever thought of killing yourself?" "Have you ever made a plan to kill yourself?" or "Have you ever made an attempt to kill yourself?" were deemed as high risk, and the rest were deemed as low risk.

The second phase involved the identification of themes to be included in the screening tool. To locate these themes, chi-square tests were performed to assess which sociodemographic and lifestyle questions effectively differentiated between those in the high and low risk groups. Those questions where significant differences were detected were selected to be included as themes in the screening tool. This was followed by undertaking *t* tests on mean scores of the low and high risk groups on the selection of psychometric instruments to identify which instruments differentiated between the high and low risk groups. Where means differed, the construct measured by that particular instrument were included as a theme in the screening tool.

The third phase was to develop the items of the screening tool, based on these themes. One item per theme, based on questions in the original questionnaire and the items from the psychometric instruments, were developed. These content and format of items were the result of a consensus decision following a list of proposed items on each theme circulated among the authors of this article, as well as the inputs of two additional subject matter experts. On the basis of these inputs, a final screening tool was proposed.

The final phase involved assessing the sensitivity and specificity of the screening tool. After signing off on the final screening tool, a screening tool score for each student was generated. For each of the lifestyle questions, either a 1 or a 0 was allocated, 1 when the response was in line with a high suicide risk and a 0 when a response was in line with a low risk. For the items created on the basis of the psychometric instruments, a 1 or 0 was also allocated. This allocation of a 1 was based on the student's score being more than two standard deviations higher than the mean, or in cases where norms were available, the score indicative of severe symptoms. The assumption made here was that the teacher who completes the questionnaire would be able to identify the symptom if it was very frequent—as per two standard deviations above the mean or a severe diagnosis. In the cases of lower scores, a 0 was allocated. As there were 12 items, the minimum score was 0 and the maximum was 12. The sensitivity and specificity of the screening tool was then tested, to identify its ability to differentiate between those with high and low risk. This was done by testing these parameters at different score levels.

Results

The mean age of the students was 13.31 years (SD = 0.55). There were 115 (52.0%) boys and 106 (48.0%) girls. Of the total sample of students, 16% reported the suicide of a family member, with peer suicidal ideation reported at 26.1% and peer suicide attempts at 23.1%. A high percentage of students (65.2%) reported knowing of a peer suicide. Those students who had ever thought of killing themselves, had ever made a plan to kill themselves, or made an attempt were classified as having a high risk of committing suicide. In total 52 (23.53%) were identified as high risk and 169 (76.47%) as low risk. The results of the general lifestyle questions posed to the students indicated that 33.5% reported involvement in physical fights and 4.6% reported contact with law enforcement. Concerns about physical health were reported by almost 19%. Alcohol and cigarette use were reported by 23.4% and almost 24% of the students, respectively. These findings are presented in the online supplemental materials; see Table S1.

The summative results pertaining to the standardized psychometric instruments, indicated the following means for depressive symptoms (BDI; M = 9.25, SD = 9.05, n = 214), hopelessness (BHS; M = 3.16, SD = 3.03, n = 221), aggression and anger (Anger Scale; M = 68.57, SD = 21.58, n = 220), stress (PSS; M = 14.02, SD = 7.30, n = 221), mastery (Mastery Scale; M = 20.60, SD = 4.52, n = 220), self-esteem (Self-Esteem Scale; M = 20.87, SD = 6.35, n = 218), family social support (PSS–Family; M = 12.53, SD = 5.05, n = 220), and friend social support (PSS–Friends; M = 11.54, SD = 4.85, n = 220).

The responses to the sociodemographic and lifestyle questions, and psychometric instruments were used to assess whether these measures could distinguish between those with low and high risk for suicide. The results are presented in the online supplemental materials (see Table S2). No differences were found between gender items or among other sociodemographic items in the two groups. Four significant differences were observed for the lifestyle questions. Those at risk for suicide had more contact with the police, had been involved in physical fights, had been more concerned about their health, and reported greater alcohol use compared with those at low risk.

In the online supplemental materials (see Table S3), we show that those with high- and low-suicide behavior risk were compared on their scores on the standardized psychometric instruments. Those with high-suicide behavior risk scored higher on the BDI, BHS, PSS, and Anger Scale. Those with low-suicide behavioral risk scored higher on the Mastery Scale, Self-Esteem Scale, and PSS–Family.

Given the differences demonstrated in the online supplemental materials (see Tables S3 and S4), the screening tool was developed, with one question per theme pertaining to exposure to suicidal behavior, lifestyle, and psychological characteristics, on the basis of the questions. Table S4 of the online supplemental materials presents this screening tool with the 12 questions that comprise the tool. The themes underpinning each question are reflected in the first column. The questions are presented in the second column and would be asked by those administering the screen.

As indicated in the data analysis section, scores of the screening tool were then generated, based on the lifestyle questions as well as the scores on the psychometric instruments. The average score on the screening tool was 1.27 (SD = 1.29). To test the sensitivity, specificity, and accuracy of the screening tool, we created several possible cut offs, in an effort to find the optimal cut off score to use when operationalizing the screening tool. These scores needed to be whole numbers, so the first cut off score was set at 2 (approx-

imately 1.5 standard deviations above the mean). To find the optimal cut off value, where sensitivity, specificity, and accuracy would be optimal, we also set cut off scores at 3, 4, and 5. The results of these trial-and-error tests are presented in the online supplemental materials (see Table S5).

Table S5 in the online supplemental materials shows that the *specificity* (which refers to the screening tool's ability to correctly identify those who are not at high risk for suicidal behavior) of the test is much higher than the *sensitivity* (which refers to the screening tool's ability to correctly identify those who are at high risk for suicidal behavior). Accuracy (the percentage correctly classified—either as high or low risk) increased and plateaued as the cut off scores increased. With a cut off score of 2, sensitivity was 19% and accuracy was 80%. With a cut off score of 3, sensitivity was 52% and accuracy was 74%. With a cut off score of 4, sensitivity was at 38% and accuracy was 80%. With a cut off score of 5, sensitivity was 19% and accuracy was 80%. Thus, the cut off score of 4 yielded the best result.

Discussion

This study examined suicidal behavior among middle school students to develop a screening tool for teachers to use to identity adolescents at risk for suicide. Although the sample consisted of young adolescents, primarily under age 14 years, over 60% indicated that they knew of a peer suicide and over 20% reported a peer had attempted suicide. These findings, combined with what is known about South Africa having significant levels of suicide (Burns, 2011), underscores a need for a screening tool for suicidal behavior among South African adolescents. Nearly one quarter of the students (23.53%) were at high risk for suicidal behavior, reporting that they had thought of killing themselves, made a plan to kill themselves, and/or made an attempt to kill themselves. Lifestyle factors identified as indicating high risk for suicidal behavior were contact with the police, concerns about physical health, alcohol use, depressive symptoms, feelings of hopelessness, perceived stress and anger. Higher levels of mastery, self-esteem, and perceived social support from family were psychological factors that discriminated between those at low risk from those in the high-risk group. These findings are consistent with previous research on lifestyle and psychological factors that are correlates of suicidal behavior among South African young people (e.g., Peltzer et al., 2008; Schlebusch, 2005; Shilubane et al., 2013).

Our goal for developing the screening tool for suicidal behavior was to create an instrument that can be used by teachers to distinguish those at low risk from those at high risk to improve early detection and referral into treatment. This goal is consistent with community-based health approaches to identifying those at risk for disease. For example, in community settings, the goal of health approaches, such as health screenings, is often to identify or separate those persons who have a high probability of disease for treatment from the majority of individuals who are disease free and do not need treatment (Jekel, Katz, & Elmore, 2001). The screening tool that evolved consists of 12 themes or questions that focus on whether a student, relative to other students, seems to have more police involvement, more physical health concerns, more alcohol use, more depression, more feelings of hopelessness, more stress, less mastery, and lower self-esteem, and seems angry, lacks familial support, has peers with suicidal ideation, and has a family member who committed suicide.

A strength of this screening tool is that it is based on factors identified as associated with suicidal behavior from local research on South African adolescents. Further, research on child and adolescent mental disorders represents a small fraction of the 3% to 6% of mental health research conducted globally in low and middle income countries (Patel, Flisher, Nikapota, & Malhotra, 2008). This study is an important beginning to expand the scope of research on adolescent mental health, particularly suicidal behavior, in South Africa.

This research also demonstrates that suicide risk is prevalent among some South African adolescents, in this instance, middle school students. The development of a screening tool to determine who is at risk for suicide is warranted. Given that human resources for mental health care are limited in South Africa, the use of a screening tool for suicidal behavior by teachers in schools is an appropriate first step in the development of suicide prevention programs for adolescents. A national survey indicated that, per 100,000 people, the country has only 0.28 psychiatrists, 0.32 psychologists, 0.40 social workers, 0.13 occupational therapists, and 10 nurses (Burns, 2011). International prevention programs for suicide among young people call for early intervention and assessment services, including suicide screening, that are integrated within school systems, educational institutions, juvenile justice systems, substance abuse programs. and mental health programs (Peña & Caine, 2006). South African prevention and intervention strategies to address suicidal behavior need to be created from findings derived from South African research rather than simply tby ransplanting knowledge about suicide prevention from international programs that may not be applicable within a South African context (Burrows & Schlebusch, 2009).

There are some limitations in this study. The sensitivity of screening tool is relatively low, which could be due to the use of broad or distal suicide risk questions to determine risk. The questions may also need further refinement and the use of Likert-type responses versus the *yes/no* responses may be useful to improve sensitivity. Further research to increase the sensitivity of the tool is necessary. Racial/ethnic variation in the utility of the tool could not be addressed. Students were not asked about their race/ethnicity, as this was considered to be a very sensitive area that could not be queried about when the data were collected (which was relatively close to ending of Apartheid). Data on the race/ethnicity of participants should be collected in future research using the screening tool. Students from white ethnic groups were not included in the sample, since there were none enrolled at the school study site, and this may limit the generalizability and use of the screening tool for all young people in South Africa.

Although additional research remains to be done to fully validate this screening tool, such as establishing positive predictive value in school settings, testing the implementation of this tool in a school setting with teachers should be considered as an important initial step in the validation process. The refinement of this screening tool could be the first phase in the development of a comprehensive suicide screening and prevention program for school age young people in South Africa.

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Towards a Culturally Appropriate Trauma Assessment in a South African Zulu Community

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Objective: To develop a culture specific screening tool for trauma, and to determine whether it would significantly increase the probability of eliciting traumatic events and associated symptoms when added to a Western diagnostic tool for trauma. ***Method:*** A convenience sample of 1 hundred Zulu speaking volunteers was recruited in the North-Eastern KwaZulu-Natal region of South Africa. A demographic questionnaire, the Post Traumatic Stress Disorder (PTSD) section of the Structured Clinical Interview for *DSM* Disorders, Axis I, Research Version (SCID-I RV), and a Zulu Culture-Specific Trauma Experience Questionnaire (Z-CTEQ) designed for this study were administered to the participants. ***Results:*** As measured by the SCID-I RV, the rates of exposure to traumatic events as well as the lifetime prevalence of PTSD were relatively high, at 32% and 24%, respectively. The use of the 10-item Z-CTEQ, when added to the SCID, increased the rate at which traumatic events were elicited by 19.4%. The additional traumatic events elicited were culture-specific in nature and were significantly associated with PTSD ($p < .0001$). The Z-CTEQ also elicited culture-specific attributions for traumatic events, which could prove beneficial for therapeutic interventions. The Z-CTEQ was found to have acceptable internal reliability, with a Cronbach's alpha of 0.78. The construct and discriminant validity of the Z-CTEQ were supported by several significant correlations between the SCID and the Z-CTEQ and between the additional traumatic events elicited and PTSD. ***Conclusion:*** Despite some identified limitations, our findings suggest that the Z-CTEQ can enhance the assessment and management of trauma in the study population.

Keywords: trauma, assessment, posttraumatic stress disorder (PTSD), culture, Zulu

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The international literature documents various clinical syndromes representing psychological sequelae of trauma. Within the *Diagnostic and Statistical Manual of Mental Disorders* and the *International Classification of Diseases* nosological frameworks, such syndromes include acute stress disorder (ASD), posttraumatic stress disorder (PTSD), depressive disorders, substance use disorders, and personality disorders. Acute stress disorder and posttraumatic stress disorder are of special significance as they are conceptualized to occur exclusively as a direct consequence of traumatic experiences (American Psychiatric Association, 2000; World Health Organization, 1992). Of the latter two conditions, PTSD has been the subject of more research as it is more enduring and debilitating.

Cross-cultural studies in psychological trauma and PTSD have, among others, explored the applicability and validity of available assessment tools to varying cultural settings. With very few exceptions, trauma assessment tools described in the international

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literature have been developed within Western cultural contexts. To address this disparity, the Harvard Trauma Questionnaire (HTQ), a PTSD screening tool for survivors of torture and mass violence, was developed and validated for various cultural contexts, beginning with Indo-Chinese refugee communities in the United States of America, and subsequently for similar survivor populations from other parts of Asia and Eastern Europe (Mollica et al., 1992; Mollica, McDonald, Massagli, & Silove, 2004).

The HTQ has been described as "an ambitious attempt to balance cross-cultural standardization with cultural specificity in developing assessment tools" (Shoeb, Weinstein, & Mollica, 2007). It has more recently been adapted and validated for French-speaking torture survivors from Sub-Saharan Africa (de Fouchier et al., 2012).

In a South African study by Ward, Flisher, Zissis, Muller, and Lombard (2004) among mainly White private school learners in Cape Town, the HTQ was "adapted slightly to address violence that is most likely to occur in South Africa. For instance, instead of asking about torture related events . . . questions were asked about beatings, shootings, and stabbings." It was found to have a fair test–retest reliability, but further studies are needed to investigate reliability and validity in broader samples. In another Cape Town study among HIV patients, Myer et al. (2008) found that the HTQ had lower than expected performance characteristics in detecting PTSD. They suggested that the HTQ may not be optimal for assessing PTSD in their study population as its items "were heavily biased toward emotional experiences . . . which may not be well understood in this setting." Another reason they suggested for the underperformance of the HTQ was that it did not adequately capture the possibility of PTSD arising from the diagnosis of HIV itself.

The use of the currently available versions of the HTQ and other trauma screening tools locally could be limited, as they have not been validated for the broader South African population. With 11 official languages and multiple ethnic groups across its nine provinces, South Africa is well known for its cultural diversity. Screening tools developed in one cultural context may not be equally applicable to the various South African cultural settings. It is therefore evident that more sensitive trauma assessment tools for various South African cultural groups are necessary. This is of particular concern in this context, given the high levels of trauma and the call for PTSD to be recognized as a public health crisis in SA (Edwards, 2005).

Study Aims

The current study, part of a larger project on Traditional Cultural Beliefs & Trauma in the North-Eastern KZN, was undertaken to develop a culture-specific (Zulu) tool that could be used to enhance the assessment of trauma, and to determine whether such a tool would significantly increase the rate of eliciting a history of traumatic events and associated symptoms when added to a Western diagnostic assessment tool for trauma. For this purpose, the PTSD section of the Structured Clinical Interview for *DSM–IV* TR disorders was used.

Social and Cultural Context

South Africa is a culturally diverse and multilingual nation. As at the 2011 national census, it had a population of just over 51.7 million people and 11 official languages. The Zulus form the largest ethnic group, accounting for about 22.7% of the population, and reside mainly in the KwaZulu-Natal Province (Statistics South Africa, 2011a). Various scholars have described the traditional world view and cultural belief systems among the Zulu communities of KwaZulu-Natal (e.g., Cheetham & Griffiths, 1980; Edwards, 1985; Ngubane, 1977). Like many nation groups of Sub-Saharan Africa, the majority of Zulus, across their various subcultures, traditionally subscribe to a world view with two interconnected cosmological realms, namely the natural world (the elements, plants, animals, humans) and the supernatural world (evil spirits, ancestors, God).

When the natural and supernatural realms are in equilibrium, health and prosperity will result to the community, families, and individual members thereof. Disequilibrium between these systems results in illness, misfortune, and disaster visited upon individuals, families and communities. Such disequilibrium is believed to principally result from loss of protection by the ancestors, the latter caused by, among others, failing to honor the ancestors, or violating societal taboos. The resultant ancestral displeasure renders the individual and societal system vulnerable to sorcery or witchcraft, and therefore more likely to experience adverse life events, which may include traumatic experiences.

It is evident that within the above world view, external attributions are generally favored over internal attributions with regards to the causality of adverse events. This could have clinical implications in that external attributions are believed to have a higher association with trauma psychopathology than internal ones (Nickerson, Aderka, Bryant, & Hofmann, 2013). Reporting on a qualitative study conducted in the Gauteng Province of South Africa, Ivey and Myers (2008) associated bewitchment beliefs with trauma by observing that such beliefs emerged most strongly following traumatic experiences, in times of stress, or in response to various misfortunes.

Other South African researchers have also reported on various forms of emotional distress in relation to cultural beliefs. Weiss (2004) described a series of cases from the Eastern Cape and Limpopo Provinces of South Africa presenting with acute anxiety and emotional distress following the realization that they had been bewitched. Likewise Madigoe and Weiss (2004) described a case series of patients with a syndrome referred to as "go tsamaya gampe," which can be described as a taboo sex neurosis among Bapedi men in Limpopo Province. They each presented with acute anxiety and emotional distress, fearing imminent death, after realizing that they had violated a sexual taboo. Whereas further research would be required to determine whether this clinical syndrome could be classified as Acute Stress Disorder, a deeper understanding of the cultural context and meaning of the experience is arguably just as essential for optimal clinical assessment and care.

Method

Study Population

The study population was the Zulu speaking residents of the Lower Umfolozi Subdistrict, which is located in the North-Eastern region of KwaZulu-Natal. According to the 2011 census, the population of this subdistrict was reported as 531,684 (Statistics South Africa, 2011b). The subdistrict is served by Ngwelezana Hospital as its district and regional referral hospital. A convenience sample of 100 participants was recruited, which consisted of persons accompanying patients to the Family Medicine Clinic of Ngwelezana Hospital.

Selection Criteria

Participants who were 18 years of age or older, who spoke isiZulu as their first language, were able to understand and to communicate with the interviewer, and were willing and able to give written informed consent were eligible for inclusion in the study. The exclusion criteria were simply the converse of the inclusion criteria.

Ethical Considerations

Ethical and institutional approvals were obtained from the University of KwaZulu-Natal, Ngwelezana Hospital, the KwaZulu-Natal Department of Health and the University of California, Los Angeles. Participants were assured of total anonymity, and all identifiable personal information was delinked from the data collection tools.

Interview Instruments: Selection and Initial Design

Participants were interviewed using a demographic questionnaire, the PTSD section of the Structured Clinical Interview for *DSM* Disorders, Axis I, Research Version (SCID-I RV, *DSM–IV–TR* Version by First Michael, Spitzer Robert, Gibbon Miriam, and Williams Janet, 2002), and a Zulu culture-specific Trauma Experience Questionnaire (Z-CTEQ), a trauma screening tool specially designed for this study. The SCID was selected for this study because it closely reflects the diagnostic assessment process in South African clinical practice.

The approach to the development of the Z-CTEQ was different from that of the HTQ and similar screening tools, in that the Z-CTEQ sought to broadly and rigorously enquire into culture-specific experiences of trauma as well as trauma related symptoms in a more exploratory manner. The Z-CTEQ was divided into two sections, namely the General Section (19 initial items) and the Culture-Specific Section (24 initial items). In the General Section, the first three items were used to screen for any traumatic events and to obtain a description of the main traumatic event reported, in a manner similar to that utilized by the SCID. A further seven items screened for PTSD symptoms across the three symptom clusters of reexperiencing, avoidance and hyperarousal, as well as inquiring, in an open-ended way, into the impact of the reported event on the participant's life. The next four items were open-ended and screened for any other possible symptoms related to the main reported traumatic event. The last five items explored the cultural beliefs and health seeking behaviors of each participant more broadly.

The items in the Culture-Specific Section were mostly similar to those in the General Section but with two notable differences. First, the initial question that screens for traumatic events was modified, and explored any traumatic events experienced that were deemed to be related to local traditional cultural beliefs. As per the literature cited above, it has been shown that in the Zulu cultural context, failure to perform required traditional rituals, the displeasure of one's ancestors and witchcraft are key factors strongly believed to pose a serious threat to one's life. The beliefs represented by these three themes had been observed by the lead author in the study population and other similar cultural contexts over many years of clinical practice. The trauma event screening question in this section therefore inquired about the presence of such life threatening experiences related to these specific beliefs. As in the General Section, a further seven items screened for PTSD symptoms across the three symptom clusters of re-experiencing, avoidance and hyperarousal, as well as inquiring, in an open-ended way, into the impact of the reported event on the participant's life. The next four open-ended questions explored any other possible symptoms identified as related to trauma within the local cultural context. The other difference was that the Culture-Specific Section contained 10 items (instead of five), which explored the cultural beliefs and health seeking behaviors of each participant more broadly and in more detail in this section compared to the General Section. All the items of the Z-CTEQ were selected in consultation with a clinician-researcher who is an expert in trauma and culture.

The interview questionnaires were translated into isiZulu and independently back-translated into English to ensure accuracy and semantic equivalence. The translation was performed by native isiZulu speakers affiliated to the University of Zululand. The back-translation was performed by native isiZulu speakers working at Ngwelezana Hospital. All interviews were conducted in isiZulu.

Statistical Analysis

Statistical analysis of quantitative data was conducted using the SPSS. Descriptive statistics were used to summarize findings. The Pearson's chi squared test (or Fisher's exact test for smaller data subsets) was used to test associations between the variables under study. The level of significance was set at a p value of <0.05. The Cronbach's alpha was used to test the internal reliability of the SCID and the Z-CTEQ.

Results

Demographic Profile

One hundred participants interviewed, with an equal distribution between females and males. Their ages ranged from 18 to 61, with a mode of 26 and a median of 31. The median and mode are presented, rather than the mean and standard deviation, due to the marked positive skewing of the age range of the sample. In terms of marital status, 21% were married, 61% never married, 7% cohabiting and the remaining 11% divorced, separated or widowed. 24% had completed high school, and 8% had a tertiary (university or college) qualification. 57% of the participants were unemployed. (See Table 1).

Participants With Traumatic Events and PTSD on SCID

Of the 100 participants assessed with the SCID, 32 (32%) reported having experienced at least one traumatic event (see Table 2). Of these, 24 (24%) fulfilled criteria for a lifetime diagnosis of PTSD. Eleven of the 50 males reported traumatic events (22%). The number was significantly higher among the female participants, at 21 (42%), with a p value of 0.032 (Pearson's chi squared). Those who fulfilled the criteria for a lifetime diagnosis of PTSD were 5 (10%) among the males and 19 (38%) among the females, $p = .004$.

Table 1
Demographic Profile

Variable	*n* (%)
Gender	
Male	50 (50%)
Female	50 (50%)
Age (years)	
Range	18–61
Mode	26
Median	31
Marital status	
Married	21 (21%)
Unmarried/other	79 (79%)
Level of education	
High school	24 (24%)
Tertiary	8 (8%)
Employment status	
Employed	43 (43%)
Unemployed	57 (57%)

Total Number of Traumatic Events Reported by Assessment Tool

The SCID elicited a total of 36 separate traumatic events from 32 participants. The Z-CTEQ General Section elicited a total of 31 separate traumatic events from 31 participants. These events did not significantly differ, in number or content, from those elicited by the SCID. The traumatic events elicited by the Z-CTEQ Culture-Specific Section will be presented separately and summarized in Table 11.

Correlation of Reporting of Traumatic Events by Assessment Tool

Using Pearson's correlations, there was a strong positive association between the reporting of traumatic events on the SCID and on the Z-CTEQ General Section (Tables 3 and 4; phi coefficient = 0.831). However, there was a weak positive association between the reporting of traumatic events on the SCID and on the Z-CTEQ Culture-Specific Section (Tables 5 and 6; phi coefficient = 0.3398). In addition, we found a weak positive association between the reporting of traumatic events on the Z-CTEQ General Section and on the Z-CTEQ Culture-Specific Section (Tables 7 and 8; phi coefficient = 0.3991).

Internal Reliability of the Z-CTEQ Versus the SCID

Twenty-two items used to assess PTSD in the SCID were tested for internal reliability and yielded a Cronbach's Alpha of 0.88. The six items used to screen for PTSD in the Z-CTEQ General Section yielded a Cronbach's alpha of 0.72. Also, the six items used to screen for PTSD in the Z-CTEQ Culture-Specific Section yielded a Cronbach's alpha of 0.78.

Table 2
Participants with Traumatic Events and PTSD on SCID

Clinical feature	Male, *n* (%) 50 (50%)	Female, *n* (%) 50 (50%)	Total, *n* (%) 100 (100)	*p* (Pearson's chi squared)
Traumatic event reported	11 (22)	21 (42)	32 (32)	.032
PTSD diagnosed	5 (10)	19 (38)	24 (24)	.004

Note. PTSD = posttraumatic stress disorder; SCID = Structured Clinical Interview for *DSM* Disorders.

Table 3
Correlation of Reporting of Traumatic Events by SCID vs. Z-CTEQ General Section

SCID Frequency percent Row %, Column %	Z-CTEQ General Section 0	1	Total
0	54	4	58
	55.10	4.08	59.18
	93.10	6.90	
	93.10	10.00	
1	4	36	40
	4.08	36.73	40.82
	10.00	90.00	
	6.90	90.00	
Total	58	40	98
	59.18	40.82	100.00

Note. SCID = Structured Clinical Interview for DSM Disorders; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire; Effective sample size = 98; frequency missing = 2.

Correlation of Z-CTEQ Traumatic Events With PTSD

On the Z-CTEQ Culture-Specific Section, 16 of 99 participants (16%) reported at least one traumatic event. Of these, 10 (62.5%) screened positive for PTSD. It should be noted that as the Z-CTEQ is a screening and not a diagnostic tool, as it was not designed to diagnose PTSD but to elicit symptoms that, if sufficient in number, range and clinical significance, could indicate the probability of a clinical diagnosis. The association between the traumatic events reported on this screening tool and a positive screen for PTSD was statistically significant ($p < .0001$, Fisher's exact test). (See Tables 9 and 10.)

Discussion of Traumatic Events Elicited by Z-CTEQ Culture-Specific Section

There were a total of 17 separate traumatic events reported by 16 participants on the Z-CTEQ Culture-Specific Section (see Supplemental Table S1 in the online supplemental material). Based on

Table 4
Pearson's Correlations for Reporting of Traumatic Events by SCID vs. Z-CTEQ General Section

Statistic	*df*	Value	Probability
χ^2	1	67.6806	<.0001
Likelihood ratio χ^2	1	77.4145	<.0001
Continuity adjusted χ^2	1	64.2841	<.0001
Mantel-Haenszel χ^2	1	66.9900	<.0001
Phi coefficient		.8310	
Contingency coefficient		.6391	
Cramer's V		.8310	

Note. SCID = Structured Clinical Interview for DSM Disorders; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire.

Table 5
Correlation of Reporting of Traumatic Events by SCID vs. Z-CTEQ Culture-Specific Section

SCID Frequency percent Row %, Column %	Z-CTEQ Culture-Specific Section		
	0	1	Total
0	52	6	58
	52.53	6.06	58.59
	89.66	10.34	
	67.53	27.27	
1	25	16	41
	25.25	16.16	41.41
	60.98	39.02	
	32.47	72.73	
Total	77	22	99
	77.78	22.22	100.00

Note. SCID = Structured Clinical Interview for *DSM* Disorders; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire; Effective sample size = 99; frequency missing = 1.

Table 7
Correlation of Reporting of Traumatic Events by Z-CTEQ General Section vs. Culture-Specific Section

Z-CTEQ General Section Frequency percent Row %, Column %	Z-CTEQ Culture-Specific Section		
	0	1	Total
0	53	5	58
	54.08	5.10	59.18
	91.38	8.62	
	69.74	22.73	
1	23	17	40
	23.47	17.35	40.82
	57.50	42.50	
	30.26	77.27	
Total	76	22	98
	77.55	22.45	100.00

Note. Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire; Effective sample size = 98; frequency missing = 2.

their content and association with PTSD symptoms, they can be summarized as follows:

Four events had been elicited by the SCID and were simply restated on the Z-CTEQ. We consider these to be general traumatic events (i.e., not culture-specific). Three of these were associated with a positive screen for PTSD. Another six events, which we also consider as general traumatic events, had been elicited by the SCID but were described with culture-specific attributions on the Z-CTEQ. Two of these were associated with a positive screen for PTSD.

The last seven events were elicited by the Z-CTEQ and had not been elicited by the SCID. To ensure that these events were correctly classified, they were independently reviewed by two of the authors and, in line with the applicable *DSM–IV–TR* criteria, were considered traumatic if (a) they involved actual or threatened death or serious injury, or a threat to physical integrity, as perceived by the respondent, and (b) they were experienced or witnessed by the respondent, or involved their loved one or close family member, and (c) they caused emotional distress in the respondent at the time of the experience.

The latter finding implies that compared to the SCID, which elicited 36 traumatic events in total when used alone, the addition of the Z-CTEQ Culture-Specific Section increased the yield of traumatic events by 19.4%. Three of these seven additional events were considered to be culture-specific traumatic events, and the other four were considered as general traumatic events with culture-specific attributions. The main themes contained in the cultural beliefs associated with all these seven events were related to the role of witchcraft or ancestral displeasure in the causation of the events. Five of the six participants who reported these seven events screened positive for PTSD.

A detailed description of all the 17 traumatic events elicited by the Z-CTEQ Culture-Specific Section, together with a discussion of their significance within the context of the world view of the study population as discussed above, is presented in supplemental Table S1 in the online supplemental material. The table also indicates which of these events were also reported in the SCID, and whether they were associated with PTSD or not.

Correlation of PTSD on SCID and PTSD on Z-CTEQ

Eleven participants reported the same traumatic events on the SCID and the Z-CTEQ Culture-Specific Section. Of these, six were associated with PTSD on both the SCID and the Z-CTEQ. Three were not associated with PTSD on both the SCID and the Z-CTEQ, and two were associated with PTSD on the SCID but negative for PTSD the Z-CTEQ. Although the interpretation is

Table 6
Pearson's Correlations for Reporting of Traumatic Events by SCID vs. Z-CTEQ Culture-Specific Section

Statistic	*df*	Value	Probability
χ^2	1	11.4309	.0007
Likelihood ratio χ^2	1	11.4546	.0007
Continuity adjusted χ^2	1	9.8318	.0017
Mantel-Haenszel χ^2	1	11.3154	.0008
Phi coefficient		.3398	
Contingency coefficient		.3217	
Cramer's V		.3398	

Note. SCID = Structured Clinical Interview for *DSM* Disorders; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire.

Table 8
Pearson's Correlations for Reporting of Traumatic Events by Z-CTEQ General Section vs. Culture-Specific Section

Statistic	*df*	Value	Probability
χ^2	1	15.6080	<.0001
Likelihood ratio χ^2	1	15.7619	<.0001
Continuity adjusted χ^2	1	13.7226	.0002
Mantel-Haenszel χ^2	1	15.4487	<.0001
Phi coefficient		.3991	
Contingency coefficient		.3707	
Cramer's V		.3991	

Note. Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire.

Table 9
Correlation of Traumatic Events With PTSD Screen (Z-CTEQ Culture-Specific Section)

Traumatic event Frequency percent Row %, Column %	PTSD Screen		
	Negative	Positive	Total
No	83	0	83
	83.84	.00	83.84
	100.00	.00	
	93.26	.00	
Yes	6	10	16
	6.06	10.10	16.16
	37.50	62.50	
	6.74	100.00	
Total	89	10	99
	89.90	10.10	100.00

Note. PTSD = posttraumatic stress disorder; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire. Effective sample size = 99; frequency missing = 1.

limited by the small size of this subset, the findings indicate a moderate positive correlation between PTSD diagnosis on the SCID and PTSD screening on the Z-CTEQ, with a Phi coefficient of 0.67 (see Tables 11 and 12). This lends additional support to the construct validity of the Z-CTEQ. The findings also suggest a lower sensitivity and higher specificity of the Z-CTEQ for PTSD as compared to the SCID.

Discussion

The findings of this study are in line with largely variable findings of previous South African studies in terms of the rate of exposure to traumatic events (32% according to the SCID) and the lifetime prevalence of PTSD (24% according to the SCID), as reviewed by Edwards D (2005).

This is the first published study describing the development of a trauma screening tool in the Zulu population of South Africa. The use of the Z-CTEQ, when added to the SCID, increased the probability of eliciting traumatic events by 19.4%. We need to interrogate whether the sequence in which the questionnaires were administered (SCID, then Z-CTEQ General Section, and then Z-CTEQ Culture-Specific Section) may have contributed to the additional yield of traumatic events by the Z-CTEQ Culture-Specific Section. We argue that this is unlikely to be the case, first because the Z-CTEQ General Section did not yield a higher yield

Table 10
Fisher's Exact Test for Correlation of Traumatic Events With PTSD Screen on Z-CTEQ Culture-Specific Section

Statistic	Value
Cell (1,1) Frequency (F)	83
Left-sided Pr <= F	1.0000
Right-sided Pr ≥ F	<.0001
Table probability (P)	<.0001
Two-sided Pr ≤ P	<.0001

Note. PTSD = posttraumatic stress disorder; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire; Pr = Probability.

Table 11
Correlation of PTSD on SCID and PTSD on Z-CTEQ

PTSD diagnosed on SCID Frequency Percent Row %, Column %	Z-CTEQ PTSD Screen		
	Negative	Positive	Total
No	3	0	3
	27.27	.00	27.27
	100.00	.00	
	60.00	.00	
Yes	2	6	8
	18.18	54.55	72.73
	25.00	75.00	
	40.00	100.00	
Total	5	6	11
	45.45	54.55	100.00

Note. SCID = Structured Clinical Interview for *DSM* Disorders; PTSD = posttraumatic stress disorder; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire.

of reported traumatic events. Second, the Z-CTEQ Culture-Specific Section actually yielded a lower total number of traumatic events, but these differed significantly in content from the ones elicited by the first two tools.

We posit that the exploration of life events using culture-specific terms yielded additional reports of traumatic events as it gave interviewees an opportunity to report even experiences they deemed unique to their cultural context. It is notable that the events uniquely elicited by the Z-CTEQ contained themes related to cultural beliefs concerning witchcraft and ancestral displeasure. Whereas these beliefs have been previously described (see, e.g., Ngubane, 1977; Cheetham & Griffiths, 1980 and Edwards, 1985), this is the first published study in which their association with trauma has been documented.

It is of interest that the Z-CTEQ Culture-Specific Section also allowed the participants to express culture-specific attributions, which all happened to be external in nature, to some of the traumatic events they had reported on the SCID. As noted earlier, and in line with the observation by Nickerson et al. (2013), such attributions are believed to have a higher association with trauma psychopathology than internal ones. The expression of these attributions may therefore have relevance for and even facilitate trauma interventions.

Table 12
Statistics and Fisher's Exact Test for Correlation of PTSD on SCID and PTSD on Z-CTEQ

Statistic	*df*	Value	Probability
χ^2	2	4.9500	.0842
Likelihood Ratio χ^2	2	6.1608	.0459
Mantel-Haenszel χ^2	1	4.0541	.0441
Phi coefficient		.6708	
Contingency coefficient		.5571	
Cramer's V		.6708	

Note. SCID = Structured Clinical Interview for *DSM* Disorders; PTSD = posttraumatic stress disorder; Z-CTEQ = Zulu Culture-Specific Trauma Experience Questionnaire. 100% of the cells have expected counts less than 5. Chi-squared may not be a valid test. In Fisher's Exact Test, table probability (P) = .0606; Pr ≤ P = .0606; sample size = 11.

The strong association between the reporting of traumatic events on the SCID and on the Z-CTEQ General Section supports the construct validity of the relevant items of the Z-CTEQ. In addition, the weak association between the reporting of traumatic events on the SCID and on the Z-CTEQ Culture-Specific Section and between the reporting of traumatic events on the Z-CTEQ General Section and on the Z-CTEQ Culture-Specific Section supports the discriminant validity of the relevant items of the Z-CTEQ Culture-Specific Section. It is evident that the Z-CTEQ Culture-Specific Section added value in eliciting culture-specific traumatic events within the study sample.

The high internal reliability of the SCID (with a Cronbach's alpha of 0.88) is not surprising, as this instrument has well established reliability (see, e.g., Lobbestael, Leurgans, & Arntz, 2010) and an increasingly accepted level of validity (see, e.g., Basco et al., 2000). The internal reliability of the General and Culture-Specific sections of the Z-CTEQ related to PTSD screening was of an acceptable level, with Cronbach's Alpha values of 0.72 and 0.78, respectively.

The construct validity of the Z-CTEQ Culture-Specific Section was further supported by a strong association between reported traumatic events and a positive PTSD screen with the use of this tool. The value of 19.4% additional yield in reported traumatic events gained through the use of the Z-CTEQ Culture-Specific Section cannot be subjected to statistical analysis for significance by itself. However, the statistically significant association of the additional events with a positive PTSD screen ($p < .0001$, Fisher's exact test) lends further support to the construct validity of the Z-CTEQ Culture-Specific Section. It also suggests that the magnitude of the additional yield of traumatic events is clinically significant. It can be inferred from the foregoing that the Z-CTEQ Culture-Specific Section has a higher sensitivity for traumatic events, but only for those of a culture-specific nature.

It is also significant that despite numerous open-ended questions in the Z-CTEQ, no culture-specific symptoms or syndromes of trauma were found in this sample. The additional reporting of traumatic events and attributions on the Z-CTEQ Culture-Specific Section highlights the importance of enquiring into the cultural beliefs of trauma survivors in order to optimize assessment and treatment.

The findings indicate a moderate positive correlation between PTSD diagnosis on the SCID and PTSD screening on the Z-CTEQ, with a Phi coefficient of 0.67. This lends additional support to the construct validity of the Z-CTEQ. The findings also suggest a lower sensitivity but higher specificity of the Z-CTEQ for PTSD as compared to the SCID. This analysis should be interpreted with caution, given the small size of the subset involved.

Two limitations of this study should be noted: As a convenience sample was used, the findings of this study cannot be assumed to be generalizable to the study population. For instance, the study sample is likely to represent a lower socioeconomic level than that of the target population, as participants were more likely to be unemployed and were hence available to accompany patients to the Family Medicine Clinic. This selection bias may have affected some of the findings. Second, as is the case with similar studies, reliance on research participants to recall traumatic events and associated symptoms over a number of years limits the accuracy of such reports.

Finalization of the Z-CTEQ Trauma Screening Tool

In its initial design, the Z-CTEQ consisted of two sections, namely the General Section (with 19 items), and the Culture-Specific Section (with 24 items). The data presented here showed that the General Section of the Z-CTEQ did not in any way enhance the screening or assessment of trauma in the study sample when added to the SCID. With regards to the Culture-Specific Section, the three initial items were found to be valuable in that they elicited traumatic events which were mostly of a culture-specific nature and had not been elicited by the SCID. Also the six items which explored PTSD symptoms across the three symptom clusters of re-experiencing, avoidance and hyperarousal, were strongly correlated with a positive screen for PTSD. The seventh item that inquired, in an open-ended way, into the impact of the reported event on the participant's life, helped to confirm the clinical significance of these associations. In light of these findings, the current version of the Z-CTEQ Trauma Screening Tool consists of these 10 items.

Conclusion

This article describes the process and outcome of developing a culturally appropriate trauma screening tool in a Zulu community of SA. The 10 item Z-CTEQ Trauma Screening Tool significantly increased the probability of eliciting traumatic events, particularly those of a culture-specific nature, when added to the SCID. The additional traumatic events elicited were significantly associated with PTSD. The Z-CTEQ also elicited culture-specific attributions for traumatic events, which could prove beneficial in therapeutic interventions for survivors. The Z-CTEQ was found to have acceptable internal reliability as well as construct and discriminant validity. Despite some identified limitations, our findings suggest that the Z-CTEQ can enhance the assessment and management of trauma in the study population.

Additional studies are required to further refine the Z-CTEQ and improve its reliability and validity.

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Feasibility and Effectiveness of Narrative Exposure Therapy and Cognitive Behavioral Therapy in a Context of Ongoing Violence in South Africa

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Objective: In an observer-blinded intervention trial, we tested the reduction of posttraumatic stress symptoms, aggressive attitude, and behavior in young males living in a context of ongoing community and gang violence by means of (a) forensic offender rehabilitation narrative exposure therapy (FORNET), and (b) the cognitive-behavioral intervention "Thinking for a Change" (TFAC). A waiting list served as the control condition. ***Method:*** A total of 39 young men were included in the data analysis: 15 completed FORNET, 11 underwent cognitive-behavioral therapy (CBT), and 13 were on a waiting list for later treatment. The primary efficacy endpoints were the PTSD Symptom Scale-Interview (PSS-I) severity score, the Appetitive Aggression Scale (AAS) score, and the number of perpetrated violent event types 8 months (on average) after treatment. ***Results:*** Only in the sample receiving FORNET were posttraumatic stress disorder (PTSD) scores significantly reduced at the first follow-up (Cohen's $d = -0.97$) and significantly different from those of the control group (Cohen's $d = -1.03$). The changes in scores for appetitive aggression and perpetrated events were not significant for any of the treatment conditions. ***Conclusions:*** The study shows that trauma-focused treatment can reduce the psychological symptoms of posttraumatic stress even for individuals living under unsafe conditions in low-income urban communities. However, achieving changes in violent behavior within a context of ongoing violence may require more than the treatment of trauma-related suffering, confrontation with one's offenses, or cognitive-behavioral interventions.

Keywords: gang violence, community violence, continuous stress, PTSD, CBT

Low-income urban areas such as the so-called "townships" in South Africa, the favelas in Brazil, and inner-city ghettos in the United States are "hotspots of crime and violence" (United Nations Human Settlements Programme, 2007; Weisburd, Lum, & Yang, 2004). Children living in such disadvantaged socioeconomic conditions are likely to encounter violence both within and outside the family and are frequently exposed to a range of traumatic stressors (Finkelhor, Turner, Hamby, & Ormrod, 2011; Williams et al.,

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2007). Children's exposure to violence can lead to short- and long-term outcomes involving the internalization and externalization of behavior problems during adolescence, including posttraumatic stress (Catani et al., 2009) and the perpetration of violence (Maas, Herrenkohl, & Sousa, 2008; Smith & Thornberry, 1995; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001; Widom, 1989). The group most severely impacted by serious violent crime in low-income urban communities consists of young males who both assault and are the victims of assault (Moffitt, 1993; Seedat, Van Niekerk, Jewkes, Suffla, & Ratele, 2009; Truman & Langton, 2015) and may thus be referred to as "victim-perpetrators" (Roach, 2013, p. 157). In attempting to interrupt the cycle of violence, it is important to overcome the victim-offender dichotomy (Hecker, Hermenau, Crombach, & Elbert, 2015) and to ensure the timely supply of trauma and aggression treatment.

A growing number of studies have successfully tested early interventions in areas of ongoing threat. Results from the Jerusalem Trauma Outreach and Prevention Study (Shalev et al., 2012) demonstrate that both prolonged exposure and cognitive therapy significantly reduced posttraumatic stress disorder (PTSD) prevalence 5 and 9 months after treatment compared with a control group. Cohen, Mannarino, and Iyengar (2011) are conducting a promising series of trauma-focused cognitive-behavioral therapy (CBT) treatment studies on children in the United States and Zambia. Cigrang, Peterson, and Schobitz (2005) tested a brief exposure-based treatment for members of the military in Iraq that included in vivo and in sensu exposure in four therapy sessions over a 5-week period; symptoms were reduced by an average of 56%. Köbach, Hecker, Schaal, and Elbert (2015) successfully reduced PTSD symptoms by means of forensic offender rehabilitation narrative exposure therapy (FORNET) in a group of Congolese ex-combatants in comparison with a control group.

Working with traumatized perpetrators, Stenmark, Guzey, Elbert, and Holen (2014) found that violent offenders with PTSD fail to respond to narrative exposure therapy (NET) more often when their own offenses are not addressed in the course of the therapy. An explanation for this finding could be that an offender's "worst event" – that is, the most psychologically damaging—is a self-perpetrated offense. In a sample of 290 South African males recruited for cross-sectional analysis, 225 had committed a serious crime (such as a severe physical assault, a murder, or a rape), and 18% reported one of their own offenses as their worst traumatic event (Hinsberger et al., 2016, unpublished data). This number is comparable to the 23% rate documented by Kilvinger, Rossegger, Arnold, Urbaniok, and Endrass (2011) in a study of 35 Swiss prisoners. In order to account for the impact of self-perpetrated violent acts and to address the specific needs of violent offenders, NET has been extended to include in sensu exposure sessions for self-committed crimes.

The aim of FORNET is to mitigate the psychological consequences of chronic trauma exposure (such as intrusions, hypervigilance, and avoidance) as well as to reduce violent and criminal behavior through the dissolution of feelings of reward upon committing violence. Repeat perpetrators rarely experience or express feelings of guilt, shame, or pity for their victims, but such feelings are often still found to be associated with their first committed events. Consequently, the focus in FORNET is the first violent assault, killing, or rape. The effectiveness of FORNET (compared with standard treatment) in the reduction of committed offenses and physical health complaints has been demonstrated in a randomized controlled trial with a sample of former Burundian street children (Crombach & Elbert, 2015). Although participants continued to rate violent acts as appealing irrespective of the treatment condition, those who received FORNET treatment did not commit violent offenses as often as those in the control condition. Randomized controlled trials in the Eastern DRC (Hermenau, Hecker, Schaal, Maedl, & Elbert, 2013; Köbach, Schaal, Hecker, et al., 2015) with former members of armed groups provided evidence that in comparison with the standard treatment, FORNET led to a reduction in PTSD severity. The level of attraction to aggressive behavior was also markedly reduced, but in both therapy and control conditions; in this case, however, the change in attitude might be associated with the participants' beneficial change in living conditions (from a militia setting to a civilian population; Hermenau et al., 2013).

Other promising offender-oriented programs include those that address the offenders' habits and the moral content of their thinking, such as CBT (Wikström & Treiber, 2008). The aim of CBT is to correct deficient, dysfunctional, or distorted cognitions that may lead to offending. This is accomplished by increasing an offender's awareness of the link between his or her thought processes and offensive behavior, and by strengthening the individual's ability to alter such processes in a positive direction. A meta-analysis of CBT programs by Landenberger and Lipsey (2005) examined several different cognitive-behavioral curricula, including five evaluations of Thinking for a Change (TFAC). They found that TFAC was just as effective as other CBT interventions in reducing recidivism. In investigating the effects of TFAC on a sample of probationers, Golden, Gatchel, and Cahill (2006) found that, compared with the control group, participants who completed the program showed a 33% reduction in the rate of new criminal offenses and improved their social and interpersonal problem-solving skills. Lowenkamp, Hubbard, Makarios, and Latessa (2009) evaluated the TFAC program in a community corrections agency at a later follow-up time (2 years) than all former studies. Their results indicate that recidivism rates (new arrests) were still lower at that point in time in group-completers in comparison with similar offenders that were not exposed to the intervention. Bickle (2013) explored in a nonrandom, quasi-experimental design whether the TFAC program influences participants' self-assessment of their social problem-solving approaches and skills and their acceptance of criminal attitudes. Compared with a waiting list group, TFAC group-completers did significantly better in demonstrating an understanding of social problem-solving skills and approaches; in addition, TFAC participants appeared to have a reduced acceptance of criminal attitudes when compared with nonparticipants.

The objective of this study was first to investigate whether FORNET—compared with a waiting list group and over time—successfully reduces PTSD symptom scores in a sample of South African men living under conditions of continuous stress due to community and gang violence. In order to explore whether any such reduction can be ascribed to the trauma-specific approach of FORNET or "only" to the undivided attention of a therapist, the FORNET results for PTSD symptom

reduction are contrasted with the results of the CBT intervention "Thinking for a Change" and a waiting list. Second, this study aims to examine whether FORNET and TFAC significantly reduce the attraction to violence in intervention participants as well as the number of perpetrated violent event types compared with a waiting list and over time.

Method

Participants

An initial sample of 89 male study participants was chosen from a larger sample of 405 male isiXhosa from low-income urban communities in Cape Town, South Africa (Gugulethu and Kayeltisha). Participants suffering from acute psychosis were excluded from the intervention study. The inclusion criteria were a minimum of 8 points on the PTSD Symptom Scale-Interview (PSS-I) and a minimum of 9 points on the Appetitive Aggression Scale (AAS), which are comparable to the requirements implemented by Köbach, Schaal, Hecker, et al., (2015) and Hermenau et al. (2013). Because both criteria had to be fulfilled (PTSD symptoms as well as appetitive aggression), the cutoffs had to be set at a low level in order to identify enough participants for the study. Eighty-nine participants met the combined cutoff requirement. The final sample (after study drop-outs and absentees at the follow-up interviews were excluded) that served as the basis for the data analysis consisted of 39 male participants, ranging in age from 16 to 40 years (M = 22.95, Mdn = 22, SD = 4.85). Most of the participants were between 18 and 26, with three outliers over 30, which largely represents the age distribution in gang structures. Seventy-two percent were currently or had previously participated in a reintegration program; 28% had never taken part in a reintegration program. The average number of formal years of education was 10.33 (SD = 2.12, range = 1–16), but 87.2% of the sample had dropped out of school before graduating. 56.4% of the final sample had a PTSD diagnosis; the mean score for the severity of posttraumatic stress was 19.15 (SD = 8.32, range = 8–37). The average score for appetitive aggression was 27.72 (SD = 11.44, range = 9–52), and the average number of offense types was 7.77 (SD = 4.96, *range* = 1–17).

Sampling Procedure

A total of 405 young men were preassessed at the beginning of the study. This sample was recruited with the support of a locally operating institution for offender reintegration (Rebuilding and Life-skills Training Centre [REALISTIC]), a community-based organization in Cape Town that supports ex-prisoners and at-risk youth through a 6-month training program in life skills intended to prevent recidivism and relapses into drug addiction. All participants gave informed and written consent. In the case of underaged participants, parents or caretakers were additionally asked to give their written consent. The study protocol including these consent forms was approved by the Ethical Review Boards of Stellenbosch University, South Africa; the University of Cape Town, South Africa; and the University of Konstanz, Germany. The assessments took 2 hr on average, and interviewees were reimbursed for their participation in each interview with ZAR100, the equivalent of about USD8.50.

Primary Outcome Measures

The data was collected by means of structured interviews. Back-and-forth translations of the questionnaires were used to generate bilingual surveys, starting with a translation from English to isiXhosa, followed by back-translation into English by a different translator. These translations were discussed with the translators in a multiprofessional team until there was consensus on each item. A team of three South African counselors and four German clinical psychologists carried out the initial assessments. Interviewees were encouraged to speak in either English or isiXhosa based on their personal preference. Trained interpreters (native isiXhosa speakers who were fluent in English) accompanied English-speaking interviewers. The counselors received 25 hr of training from two clinical psychologists on the theoretical concepts of mental disorders, trauma, and clinical diagnosis. Regular individual and team supervision ensured cross-interview consistency and mental hygiene (self-care). Five German clinical psychologists and a trained South African counselor conducted the follow-up interviews.

Posttraumatic stress symptom severity. The severity of PTSD symptoms and the diagnosis of PTSD were assessed with Foa and Tolin's PSS-I (Foa & Tolin, 2000), which asks participants about 17 PTSD symptoms experienced during the previous two weeks in accordance with *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; American Psychiatric Association, 2000) criteria. This measure has also been used in previous African samples (e.g., Ertl et al., 2010; Jacob, Neuner, Maedl, Schaal, & Elbert, 2014; Köbach, Schaal, & Elbert, 2015). The PTSD assessment was keyed to the most traumatic event in the participants' past that was still troublesome to them in the present. Experienced events from a trauma-event type list, as well as from the self-committed violence event type list (see the subsection titled "Perpetrated violence" below), were counted as possible index traumata. All symptoms were rated from 0 (*not at all/only once*) to 3 (*five or more times per week/almost always*). The frequencies of all 17 PTSD symptoms were summed up to represent the severity of PTSD (maximum score: 51 points). Change scores resulted from the subtraction of the posttherapy score from the pretherapy score, such that a positive score represents an improvement (decrease) in terms of PTSD severity and a negative score represents the worsening of (increase in) PTSD symptoms. The PSS-I scores exhibited excellent internal consistency (Cronbach's alpha = 0.86) and high interrater reliability (intraclass correlation coefficient = 0.93; Foa & Tolin, 2000). In this study, the Cronbach's alpha was 0.88.

Appetitive aggression. The propensity for violent behavior was measured with the AAS (Weierstall & Elbert, 2011), which consists of 15 questions on attraction to violence ("Do you enjoy inciting your fellows to fight?"), addiction-specific questions ("Once fighting has started, do you get carried away by the violence?") that address the reward-driven aspect of appetitive aggression, and questions about the desire to cause harm ("Once you got used to being cruel, did you want to be crueler and crueler?"). Responses were rated on a 5-point Likert scale (0 = *disagree completely* to 4 = *agree completely*) and summed up, with a maximum score of 60 points. Change scores resulted from the subtraction of the posttherapy score from the pretherapy score, such that a positive score represents an improvement (reduction)

and a negative score represents the intensification of (increase in) attraction to violence. The AAS has demonstrated good psychometric properties in various violent populations. The internal consistency for the AAS is sufficient with a Cronbach's alpha coefficient of 0.85 (Weierstall & Elbert, 2011). For this study, the Cronbach's alpha was 0.86.

Perpetrated violence. The score for perpetrated violence was calculated on the basis of 21 different violent event types. The list of these self-committed offense types was adapted from the AAS and has previously been successfully administered in a population of South African juvenile offenders (Weierstall et al., 2013). The items reflect a range of violence, starting with event types of little impact ("Have you shouted at someone?"; "Have you slapped someone?") and progressing to severe criminal acts ("Have you killed someone?"; "Have you raped someone?"). Possible sum scores for the measure range from 0 to 21. Change scores resulted from the subtraction of the posttherapy score from the pretherapy score, such that a positive score indicates a decrease in offenses and a negative score an increase. In the current study, the Kuder–Richardson's alpha was 0.90 (Hinsberger et al., 2016).

Study Design

Eighty-nine participants were invited to take part in the subsequent treatment period. Thirty-five of them were unable to participate due to multifarious reasons (e.g., work or school attendance). In order to preserve these participants for data analysis, they were placed on a second waiting list ("no camp") so that they could still be contacted for further follow-ups. The remaining participants were randomly assigned to one of the three treatment conditions (FORNET, CBT, and the "camp" waiting list). Attendees were matched first in terms of posttraumatic stress symptom severity, second in their level of appetitive aggression, and third in the severity of their suicidality.

Treatment Conditions

The therapy program was conducted in several 3-week camps in order to provide participants a safe and drug-free environment, nutrition, and shelter, ensuring that therapy motivation would not be undermined by any of these factors. Each camp included 12 to 14 study participants as well as various staff (social workers, facilitators, cooks, security). Sessions took place in separate rooms on the camp premises, thereby guaranteeing confidentiality and privacy. All camp participants (from all three treatment conditions) were able to participate in the free-time activities offered by the camp facilitators. The activities that were offered (soccer games, beach walks, etc.) were invariably nonpsychotherapeutic in nature. Four German and five South African health experts conducted the therapy sessions. All experts took part in an extended theoretical and practical training on either FORNET or CBT that was conducted by narrative exposure therapists and behavior modification therapists. Therapy sessions were conducted in English. The pairing of therapists and interpreters was continuously rotated among participants, but each participant had the same interpreter over the entire course of therapy.

FORNET. FORNET has been adapted for trauma victims from the evidence-based field intervention NET (Schauer, Neuner, & Elbert, 2011). In order to account for the specific behavioral difficulties of violent offenders, exposure sessions are extended to also include perpetrator events. The second adaptation involves the abandonment of the narration to facilitate the clients' trust and openness. This manual-based intervention (further details in Hecker et al., 2015) consists of eight individual sessions of about two hours each. Participants had a therapy session every second working day.

The first session of FORNET begins with psychoeducation about posttraumatic stress symptoms and the purpose and procedure of the intervention. In the same session, therapy starts by chronologically reconstructing the participant's biography. This is done by means of stones, candles, flowers, and sticks that are placed along a rope (the participant's life-line): stones represent traumatic incidents, a candle indicates the death of a loved one, flowers stand for positive events or helpful people, and sticks denote violent offenses committed by the participant. It is possible to combine symbols to reflect the complexity of certain incidents, and the participant decides which symbols best represent his or her experiences. The therapist does not judge or interpret the participant's views. This development of a life-line supports the structuring of events in the participant's life, an aspect that is generally distorted in the case of participants experiencing posttraumatic stress (Krystal, Southwick, Charney, & Schacter, 1995). It also helps the therapist to determine which events will be chosen for the six exposure sessions that follow. In the exposure sessions, the most traumatic experiences and the most violent incidents are reexperienced in sensu. Participants are often troubled by numerous traumatic and violent incidents, not all of which can or need be selected for therapy. The guiding principle of the selection is the fear network, which consists of interconnected perceptions, strong averse feelings, and distressing thoughts related to each traumatic incident; the network grows larger with every new context or environment that becomes unsafe. Thus, in therapy, it is important to cover as many different contexts as possible—for example, physical violence in the family, in the community/school, and at the hands of police/wardens; one's own violent acts; accidents and natural catastrophes/fires; and the experience of being raped or committing rape. The focus is on the worst events and/or the first events, since emotions are often heightened during first events in comparison to events that the participant has "gotten used to" and for which coping mechanisms (such as dissociation or detachment) have already been developed. During exposure sessions, the therapist guides the participant through an incident by continually asking for the participant's context-specific information/sensory perceptions, cognitions, feelings, and physiological responses. This emotional reexperiencing is supported and maintained on a level that is still manageable for the participant. A final body check at the end helps to determine whether there is still anything to talk through before the termination of the session. In concluding the session, the therapist encourages the participant to articulate his or her current thoughts and feelings about the incident. In the last session, the participant creates another life-line display in order to correct any memory errors from the first session. The therapy ends with an outlook of the future and the participant's expression of his or her hopes.

The efficacy of FORNET is based on the process of finding words and expressing what has happened. This process leads to memory reorganization and inhibition, cognitive restructuring, and reevaluation (especially of emotions such as guilt and shame); it

also provides the participant with recognition (by the therapist) of personal trauma.

CBT. CBT is a system of psychotherapy that attempts to reduce excessive emotional reactions and self-defeating behavior by modifying the faulty or erroneous thinking and maladaptive beliefs that underlie these reactions (Beck, 1976, 1983). CBT is constructed around the concept that cognition affects behavior and that individuals have the capacity to monitor and adapt their modes of thinking and thus the way they act (Hollin, 1990).

This study made use of a structured cognitive-behavioral intervention entitled "Thinking for a Change" (Bush, Glick, & Taymans, 1997/2011). The program's curriculum focuses on cognitive restructuring of the thoughts and attitudes that put one at risk of engaging in harmful or criminal behavior, and on improving problem-solving and social skills. "Thinking for a Change" consists of 22 short sessions, which were condensed to seven sessions of two hours, on average, so that the time frame for FORNET and the CBT program would be comparable. Each session was formatted and conveyed with the intent of maximizing consistency across participants. The therapy began with a summary and rationale section in which the scope and breadth of the program and the reasons behind it were provided by the facilitator. Sessions 2 and 3 focused on cognitive self-change (understanding how thinking determines behavior, raising awareness of thinking and one's emotions, finding new ways to think), Session 4 included instruction in certain social skills (understanding and responding to the feelings of others, especially anger, and dealing with accusations), and Sessions 5 and 6 dealt with problem-solving behavior (interruption of impulsive behavior, problem description, gathering information, goal setting, evaluation of plans). All sessions involved homework that the participant was supposed to complete in between sessions; a review of the homework started every session. The final session evaluated and concluded the therapy.

In contrast to FORNET, the cognitive restructuring that CBT employs as a means to improve a participant's situation concentrates on currently important events, not necessarily events from the past that were traumatizing. The focus is on dealing with life and problems in the here and now, and thus the therapy also includes training in important social skills.

Waiting lists. Participants who stayed at the camp but did not receive therapy (*waiting list "camp"*) took part in the nontherapeutic free-time activities that the REALISTIC staff offered to all camp participants (e.g., soccer games, trips to the beach). Participants who chose to not take part in the camp (*waiting list "no camp"*) did not receive any intervention or take part in any activities.

Results

Participant Flow

Two hundred ninety assessments were conducted from October 2013 to March 2014, and a further 115 screenings were completed from October to November 2014. Therapies ran from December 2013 until March 2014, and in November 2014. The largest drop-out of participants occurred during the third camp, when weapons were found despite clear explanation of the rules in advance and written agreements to keep the camp weapon- (and drug-) free. The team of social workers and therapists decided to terminate the camp; participants had the option of joining the REALISTIC program instead. The remaining drop-outs were due to motivational or behavioral problems (e.g., disagreements with the social workers who ran the camp and monitored compliance with camp rules). The first follow-up was conducted, on average, 10.6 months (range: 9 to 12) after the initial assessment and 8.1 month (range: 7 to 11) posttherapy. All interviewers were blind to the treatment condition of the interviewees. The reasons for nonparticipation in the follow-up sessions are shown in the flowchart in Figure 1. The reason "could not be found" encompasses a variety of issues—for example, one participant was homeless and thus could not be tracked down, two participants had moved, and two others were not at home every time the researchers attempted to visit. The majority of participants who could not be found were most likely untraceable because they had given false names at the initial interviews. One participant in the CBT group passed away over the course of the study due to a serious medical condition.

For the analyses, all participants assigned to the two waiting lists had to be combined into one group, irrespective of whether they had participated in a camp ($n = 5$) or not ($n = 8$). The final sample consisted of 15 FORNET, 11 CBT, and 13 waiting list participants. The groups did not differ significantly in terms of years of formal education ($H(2) = 0.862$; $p = .65$), number of participants that had taken part in a reintegration program (Fisher-Freeman-Halton test; $p = .185$; two-sided), the level of trauma exposure before ($H(2) = 1.33$; $p = .514$) or after therapy ($H(2) = 1.05$; $p = .591$), posttraumatic stress symptom severity ($H(2) = 3.50$; $p = .174$), suicidal ideation ($H(2) = 3.06$; $p = .217$), attraction to aggressive behavior ($H(2) = 0.57$; $p = .751$), or offenses committed during one's lifetime ($H(2) = 0.57$; $p = .75$) or in the past 6 months ($H(2) = 0.482$; $p = .79$).

Data Analysis

All analyses were conducted using SPSS version 21, and all statistical methods employed were nonparametric (since the outcome variables violate the assumptions for parametric analysis in terms of normal distribution and homogeneity of variance). Group comparisons were assessed with the Mann–Whitney U test and Wilcoxon signed-rank test. Bonferroni adjustment of 5% significance levels specifies the p value at $p < .017$ for between-groups comparisons and $p < .025$ for within-group comparisons. Cohen's d effect sizes between 0.2 and 0.49 indicate a small effect, 0.5 to 0.79 a medium effect, and >0.79 a large effect (Cohen, 1988).

Reduction of PTSD Symptoms

The graph in Figure 2 demonstrates the course of PTSD symptom severity from preassessment to the first follow-up. The intersecting line separates the cases whose symptoms improved (above the line) from those exhibiting worse symptoms (below the line) after the treatment period. Most of the therapy participants (FORNET as well as CBT) appear above the separating line, indicating that their PTSD symptoms improved. The majority of participants in the comparison group appear below the intersecting line, thus exhibiting a further worsening of symptoms.

Figure 3 presents the change scores for PTSD symptom severity from preassessment to follow-up for each treatment group. We conducted a Wilcoxon signed-rank test to investigate whether the

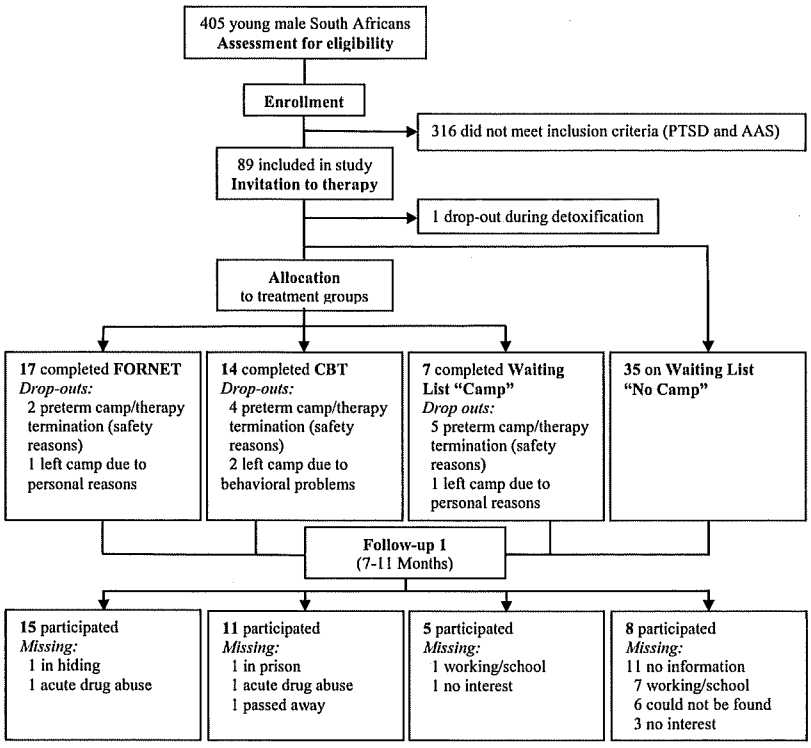

Figure 1. Flowchart of the participants over the course of the study. PTSD = posttraumatic stress disorder; AAS = Appetitive Aggression Scale; FORNET = forensic offender rehabilitation narrative exposure therapy; CBT = cognitive-behavioral therapy.

drop in PSS-I scores in the FORNET and CBT groups and the increase in PSS-I scores in the waiting list group reached statistical significance. Mean PTSD scores did not differ significantly at the first (pre) and second (Post 1) time points in participants who received no treatment ($z = -0.98$, $p = .327$). Although PTSD symptom severity apparently improved, on average, in the CBT group, the difference between the first and second assessment did not reach statistical significance ($z = -1.38$, $p = .169$). Only participants in the FORNET condition showed a significant drop in PTSD symptom scores upon comparison of mean scores pre- (*Mdn* = 24) and postassessment (*Mdn* = 8; $z = -2.5$, $p < .025$, $r = -0.46$, *Cohen's d* = −0.97).

A Mann–Whitney *U* test was conducted to look for significant differences in the reduction of PTSD symptoms across treatment conditions. The test identified a significant difference in the change score (pre to Post 1) between the FORNET group (*Mdn* = 12.0) and the waiting list group (*Mdn* = −3.0; $U = 42.0$, $z = -2.56$, $n_{\text{FORNET}} = 15$, $n_{\text{Waiting list}} = 13$, $p < .017$, $r = -0.48$, *Cohen's d* = −1.03).

Due to the low cutoff of 8 out of 51 points on the PSS-I Scale, we investigated by means of median split analysis the impact that the broad range in PTSD symptom severity within the sample (high vs. low PTSD scores) had on the outcome variables. Participants with a higher level of PTSD symptoms (median split, $z = -2.49$; $p < .05$) yielded better results in PTSD levels posttreatment than those participants with low levels of PTSD.

Reduction in Appetitive Aggression and Perpetrated Violence

The Kruskal-Wallis test did not indicate any significant group differences across treatment conditions in terms of changes in attraction to aggressive behavior ($H(2) = 3.93$; $p = .14$) or perpetrated violence in the previous six months ($H(2) = 1.44$; $p = .487$). Moreover, Wilcoxon signed-rank test did not find any significant differences between preassessment scores and follow-up scores for any of the treatment groups with regard to appetitive aggression (FORNET: $z = -0.50$, $p = .62$, CBT: $z = -1.65$, $p = .10$, waiting list: $z = -1.54$, $p = .12$) or offenses (FORNET: $z = -1.00$, $p = .32$, CBT: $z = -0.85$, $p = .40$, waiting list: $z = -0.36$, $p = .72$). Hence, there was neither a significant reduction nor an increase in committed offense event types or appetitive aggression for any treatment condition or over time. Figure 3 displays the results for all outcome variables.

Influence of Sociodemographic Conditions on Outcome Variables

None of the sociodemographic variables (e.g., age, years of formal education) showed a significant correlation with any of the outcome variables, although nonattendance in the REALISTIC program had a significant influence on appetitive aggression scores: the 11 participants who had never participated in the rehabilitation program exhibited a significantly higher reduction in appetitive aggression scores

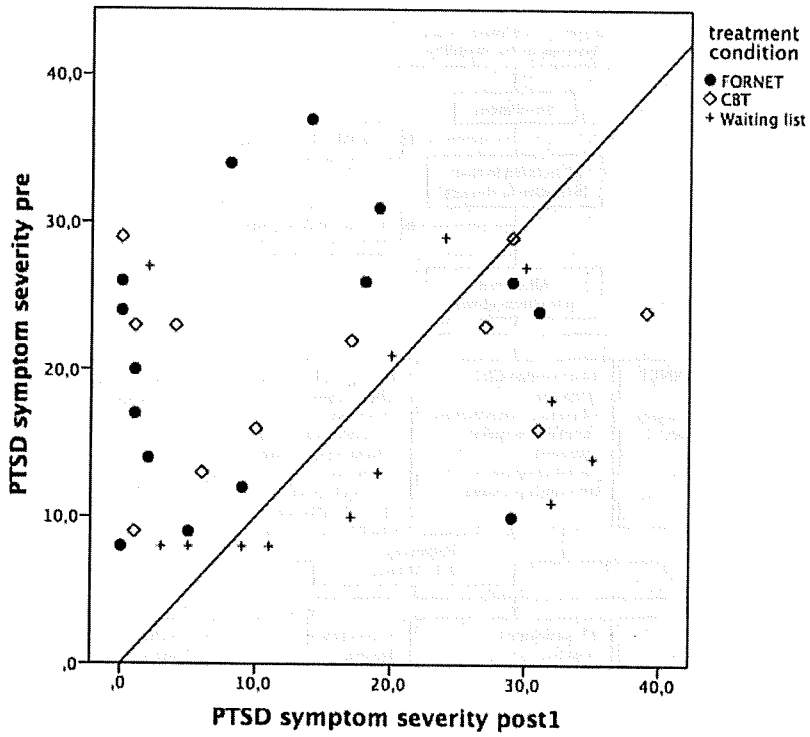

Figure 2. Scatter plot with PTSD symptom severity before (pre) and about 8 months after therapy (Post 1) for the three different treatment conditions. PTSD = posttraumatic stress disorder; FORNET = forensic offender rehabilitation narrative exposure therapy; CBT = cognitive-behavioral therapy.

than the 28 participants who had taken part in the REALISTIC program at any point in time ($z = -2.64$, $p < .01$). The 11 participants who had not taken part in the program showed a significant drop in appetitive aggression from pre- to postscores ($z = -2.45$, $p < .05$), a reduction not seen in our 28 other study participants ($z = -0.22$, $p = .829$).

Discussion

The results of this study indicate that FORNET is not only a potentially effective and feasible intervention for reducing PTSD symptoms in a context of ongoing exposure to military violence and conflict (Köbach, Schaal, Hecker, et al., 2015), but that it is also realizable and effective in a context of enduring gang and community violence. In follow-up assessments (conducted, on average, 8 months posttherapy), the reduction in PTSD symptom scores for the FORNET condition was significant in comparison with the waiting list (control group). The significant outcome of the Wilcoxon signed-rank test indicates that this difference between groups was not due to the worsening in PTSD symptoms of the untreated waiting list, but rather to the improvement of symptoms in the FORNET group.

PTSD change scores for the CBT group were not significantly higher than those of the waiting list, nor were they significantly lower than those of the FORNET group. The fact that this group's PTSD reduction was not significant in comparison with the waiting list indicates that a trauma focus in therapy is necessary to achieve a positive outcome in terms of posttraumatic stress reduction. However, given that the trauma-specific approach of FORNET did not achieve a significantly higher reduction in PTSD than the TFAC program, our results might suggest that there are additional active factors in trauma therapy beyond the specific trauma focus, such as the undivided attention of the therapist.

The association between PTSD scores at the preassessment and the success of PTSD reduction at the follow-up assessment indicates that the treatment effects might be watered down by the inclusion of participants with partial PTSD in the study; the effects of therapy might have been more clear-cut if only participants with high PTSD scores had been admitted to the study.

Attraction to cruelty and the number of committed offense event types could not be successfully reduced by any of the interventions in the study. In light of the FORNET studies on Burundian street children (Crombach & Elbert, 2015), in which perpetrated violence was successfully reduced, and those on former DRC combatants (Hermenau et al., 2013), where appetitive aggression was successfully reduced in both experimental and control groups, this result provides an important insight. The groups examined in these previous studies experienced a change in their environment (a move to a foster home or assistance in leaving the armed militia, respectively), differentiating them from our clientele, who had to remain in the same environment after treatment. Given that there are often multiple challenges in the lives of such individuals, therapeutic benefits are more likely to be effective and sustained with a set of interventions that address multiple targets. FORNET and CBT might only be effective for the treatment of offending

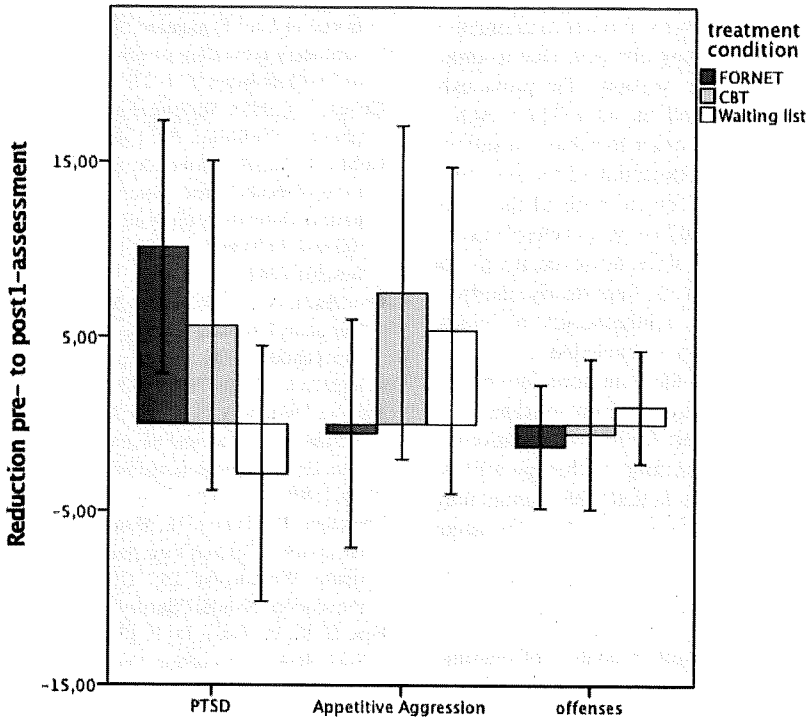

Figure 3. Median change scores for PTSD symptom severity, appetitive aggression, and committed offenses. Whiskers represent a confidence interval of 95%. PTSD = posttraumatic stress disorder; FORNET = forensic offender rehabilitation narrative exposure therapy; CBT = cognitive-behavioral therapy ("Thinking for a Change").

behavior if they are tied to benefits such as access to occupational training and employment in parallel with or immediately following therapy.

The result that only those participants who had never taken part in a reintegration program showed a reduction in appetitive aggression is not in line with the findings of Hermenau et al. (2013), where the reintegration program seemed to be the cause for the reduction in attraction to violence in participants independent of treatment condition. In light of the fact that the reintegration program in the DRC was embedded in a "new" (more peaceful) environmental context, one might conclude that this circumstance could be a precondition for reintegration programs to be effective in South Africa as well—that is, participants need a more peaceful home environment in order to succeed.

Limitations

The major limitation of this study is its small sample size, in part due to the difficult living situation in the townships (participants too deeply involved in gangs or drugs, unable to take time off from school or work, solely responsible for providing for their families, etc.). Robust statistical analyses can compensate for this limitation, but at the cost of reducing the study's power. Significant as well as nonsignificant results might therefore be established in an artifact. Furthermore, the small sample size reduces the generalizability of the study outcome to the male population of South African townships.

Moreover, the study relies on self-reported data. Highly sensitive information—for example, admitting to the commission of a rape or the enjoyment of aggressive behavior—was likely underreported (Kaminer, Hardy, Heath, Mosdell, & Bawa, 2013). Therapy requires trust to be built between the participant and therapist, and thus underreporting may have been greater prior to the intervention and in those who did not receive treatment. This could restrain the outcome for changes over time in offenses committed or attraction to violence in the treatment groups as well as between groups.

Therapy with offenders is known to face the challenge that patients are usually not experiencing a psychological strain that could represent a motivational factor for therapy compliance. If the therapy is mandatory for the participant (e.g., while in prison or on probation), therapy compliance can be maintained despite the lack of an inner motivation. Because participation was voluntary in our study and an inner motivation for therapy was not always present, our original approach, which involved conducting the therapy sessions in a normal office setting, was unsuccessful. The only practical way to conduct interventions with our clientele was to offer the therapy in a camp setting. This approach entails the disadvantage of higher costs and thus reduced feasibility on the part of the intervention provider.

Our drop-out rate of 29% falls in the middle of drop-out rates in studies with comparable samples (e.g., Golden et al., 2006: 38%; Bickle, 2013: 18%). Drop-outs occurred in all three treatment conditions and the majority of the drop-outs (12 out of 16) were

nonsystematic (camp termination due to security problems). Noncompleters were excluded from the analysis in order to maintain a preferably unclouded outcome for therapy efficacy. Due to dropouts and absenteeism at the follow-up sessions, the previously separate waiting lists "camp" ($n = 5$) and "no camp" ($n = 8$) had to be combined into one waiting list in order to achieve a sample size that would be large enough for the execution of the statistical analysis. Because these two samples differ in terms of the camp experience, it is possible that this resulted in a heterogeneous subsample. Due to the small subsample sizes, however, it was not possible to investigate potential differences. Importantly, the free-time camp program encompassed only nontherapeutic activities, suggesting that a confounding effect can be excluded.

In this study, we concentrated on the long-term effects of therapy outcomes with a first follow-up after an average of 8 months posttreatment. Long time intervals for follow-ups have the advantage of measuring the potential duration of therapy effects. The disadvantage of a delayed follow-up is that other factors may come into play, and it becomes more difficult to evaluate the acute efficacy of the therapy.

Conclusion

We conclude from this study that despite a context of ongoing gang and community violence, a trauma-specific intervention is not only feasible in the population under study, but also effective in reducing posttraumatic stress symptoms. However, in order to substantially and enduringly modify deviant behavior, a broader treatment approach might be needed, potentially encompassing trauma-focused psychotherapy, social-worker intervention, and support that addresses individual areas of deficiency or problematic behavior (e.g., encouraging staying in school through graduation, enhancing job opportunities). One step in the direction of a change in context could be the establishment of "peace zones" in townships in which criminal behavior and drug dealing are not tolerated. The requirement that former gang members undergo therapy in order to live in these zones would ensure the combination of intervention and change in environment that our study suggests is necessary for significant improvement.

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Maternal Posttraumatic Stress Disorder and Infant Developmental Outcomes in a South African Birth Cohort Study

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Objective: To investigate the association between maternal posttraumatic stress disorder (PTSD) and infant development in a South African birth cohort. ***Method:*** Data from the Drakenstein Child Health Study were analyzed. Maternal psychopathology was assessed using self-report and clinician-administered interviews; and 6-month infant development using the Bayley III Scales of Infant Development. Linear regression analyses explored associations between predictor and outcome variables. ***Results:*** Data from 111 mothers and 112 infants (1 set of twins) were included. Most mothers (72%) reported lifetime trauma exposure; the lifetime prevalence of PTSD was 20%. Maternal PTSD was significantly associated with poorer fine motor and adaptive behavior – motor development; the latter remaining significant when adjusted for site, alcohol dependence, and infant head-circumference-for-age z score at birth. ***Conclusion:*** Maternal PTSD may be associated with impaired infant neurodevelopment. Further work in low- and middle-income populations may improve early childhood development in this context.

Keywords: maternal posttraumatic stress disorder, infant development, South Africa, birth cohort

Posttraumatic stress disorder (PTSD) is a debilitating disorder affecting vulnerable individuals who have been exposed to traumatic events. Gender differences in trauma exposure, and in the phenomenology of PTSD have been well-documented (Herman et al., 2009; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Olff, Langeland, Draijer, & Gersons, 2007; Sartor et al., 2011), with females at overall greater risk. The development of PTSD during the prenatal and peripartum periods may be particularly

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harmful, with potential adverse effects on both mother and child (Morland et al., 2007; Rogal et al., 2007; Seng, Low, Sperlich, Ronis, & Liberzon, 2011). There is a growing body of work documenting the detrimental effects of trauma exposure and PSTD during pregnancy. For example, in their prospective study of 89 offspring (aged 5.5 years old) of mothers exposed to a moderately severe natural disaster, Laplante, Brunet, Schmitz, Ciampi, and King (2008) reported that children exposed to high levels of objective stressors in utero scored lower on measures of cognitive and language abilities, compared to those who had been exposed to low-moderate levels of prenatal stress. However, there is a relative paucity of research emerging from low- and middle-income (LMIC) settings. Further, few studies to date have explored specifically the association between maternal trauma exposure or PTSD and infant neurodevelopmental outcomes.

The Drakenstein Child Health Study (DCHS) is a population-based birth cohort study investigating maternal and child health longitudinally in a poor, per-iurban subdistrict in the Western Cape, South Africa (Zar, Barnett, Myer, Stein, & Nicol, 2015). This study provides a unique opportunity to investigate the association between maternal trauma and PTSD with adverse birth and developmental outcomes in infancy and childhood in a previously understudied population. Prior studies in this birth cohort have found that this population has a higher prevalence of PTSD than has been reported in nationally representative studies such as the South African Stress and Health Study (SASH; Williams et al., 2007). The purpose of the current analysis was to examine the association between maternal PTSD and infant development at age 6 months. We hypothesized that PTSD would be associated with adverse infant developmental outcomes in this study sample.

Method

This analysis used a subset of data from the DCHS, including a subsample of mothers enrolled into the larger DCHS cohort between March 2012 and December 2013. Further details of inclusion/exclusion criteria are detailed below.

Participants

Pregnant women were recruited at 20–28 weeks' gestation from two primary care clinics—TC Newman and Mbekweni—in the Drakenstein subdistrict in Paarl, Western Cape. TC Newman serves a predominantly mixed-race community, while Mbekweni serves primarily a Black African community. Mothers are followed throughout pregnancy and childbirth until the index child is at least 5 years old (Zar et al., 2015). Exclusion criteria for this substudy were age younger than 18 years, residence outside of the Drakenstein subdistrict, and intention to move out of the region within 2 years of giving birth.

A total of 734 mothers were enrolled during the period March 2012 to December 2013. Of these, 50 mothers were lost to follow-up between enrolment and delivery, and 10 experienced pregnancy losses (miscarriage or stillbirth). Thus, there were 675 live births (including one set of twins) during this period. Those without completed infant developmental data (n = 498) at the time of the current analysis were excluded. An additional 65 mother–infant dyads were excluded primarily due to missing/incomplete 6-month Mini International Neuropsychiatric Interview (MINI) data (i.e., a total of 563 dyads were excluded). Thus, data from 111 mothers and 112 infants (including one set of twins) were included in the final analysis. While the current subset were found to be less likely to be employed (with lower socioeconomic status [SES]), and more likely to report antenatal alcohol use compared to those mothers excluded from this analysis; there were no other appreciable differences between those included and those excluded.

Ethics

The DCHS was approved by the human research ethics committee of the Faculty of Health Sciences, University of Cape Town (UCT) and by Stellenbosch University in South Africa, as well as by the Western Cape Provincial Research Committee. All study participants provided written informed consent; research activities pertaining to the current substudy were included in the larger DCHS consenting process. To obtain data regarding relevant predictor and outcome variables, mothers were asked to complete a battery of self-report and clinician-administered measures at an antenatal visit between 28 and 32 weeks' gestation, and at a number of postnatal visits (Koen et al., 2014; Stein et al., 2015; Zar et al., 2015). These tools were administered by trained study fieldworkers in either English, Afrikaans, or isiXhosa, thus ensuring completion in the participants' preferred language. Further, study clinicians with the relevant psychiatric experience administered structured interviews to participants to determine diagnostic status (see the Measures section). Women were interviewed in private onsite consultation rooms and every effort was made by study staff to maintain confidentiality. Participants were also provided with refreshments and standard reimbursement for transport costs. On completion of the assessment, those participants with suspected psychopathology (including PTSD, depression, and/or substance use) were referred by study staff to the most appropriate care providers in the community, according to a standard operating procedure devised for the purposes of this study. Further, information leaflets designed by the study team were made available to all participants to facilitate autonomous accessing of local health services.

Measures

The comprehensive assessment of enrolled women in this study sample included both self-report assessment tools and clinician-administered diagnostic interviews (Koen et al., 2014; Stein et al., 2015; Zar et al., 2015). All measures had good psychometric properties (reliability and validity) and were suitable for use in the South African context. For the purposes of this analysis, maternal demographic and psychosocial risk factors, maternal PTSD, and infant anthropometric and developmental outcomes were measured as detailed here.

Maternal sociodemographic characteristics. A questionnaire to assess SES was adapted from the version used in the SASH (Myer, Stein, Grimsrud, Seedat, & Williams, 2008). Composite SES scores were calculated, and participants were stratified into quartiles, that is, lowest, low-moderate, moderate-high, and

highest SES. These quartiles were generated for the purposes of this study and represent an internal comparison for this sample.

Psychosocial risk factors. The World Mental Health Life Events Questionnaire (adapted from the SASH; Myer et al., 2008) was used to assess exposure to stressful/negative life events during the past 12 months. The Beck Depression Inventory is a widely used and reliable screen for depressive symptoms (Beck, Steer, & Brown, 1996; Beck, Steer, & Garbin, 1988; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The Edinburgh Postnatal Depression Rating Scale (Cox, Holden, & Sagovsky, 1987) is a 10-item self-report measure of recent depressive symptoms, with good psychometric properties (Eberhard-Gran, Eskild, Tambs, Opjordsmoen, & Samuelsen, 2001). The Self-Reporting Questionnaire (SRQ-20) (Harding et al., 1980; Scholte, Verduin, van Lammeren, Rutayisire, & Kamperman, 2011) was used as a measure of psychological distress in our study. Substance misuse was assessed using the World Health Organization's (WHO's) Alcohol, Smoking, and Substance Involvement Screening Test (WHO ASSIST Working Group, 2002), a reliable, feasible, and validated questionnaire.

Trauma exposure and lifetime PTSD. The Childhood Trauma Questionnaire (Bernstein et al., 1994) is a 28-item inventory assessing childhood abuse and neglect. The Intimate Partner Violence (IPV) Questionnaire was adapted from the WHO multicountry study (Jewkes, 2002) and the Women's Health Study (Zimbabwe; Shamu, Abrahams, Temmerman, Musekiwa, & Zarowsky, 2011) and assessed lifetime and past-year exposure to emotional, physical and sexual abuse. The clinician-administered MINI is an abidged version of the Structured Clinical Interview for the *Diagnostic and Statistical Manual of Mental Disorders*, 4th Edition (*DSM–IV*; Lecrubier et al., 1997; Sheehan et al., 1997, 1998) and was used to obtain more comprehensive data on trauma exposure (as defined by the *DSM–5* criteria; American Psychiatric Association, 2013) and psychopathology (PTSD, depression) at a number of longitudinal time points. For the purposes of this study, maternal phenotype data from the 6-month postpartum MINI assessment were used.

Infant outcomes. *Anthropometry* (weight, head circumference, length/height) at birth and 6 months was measured by trained clinical staff, and the relevant z scores were then calculated using the Fenton preterm growth charts. Following the WHO's convention, low weight-for-age z score (WAZ) and low head-circumference-for-age z score (HCAZ) were each defined as a score of 2 *SD* or more below the mean (WHO, 1995). Prematurity was defined as birth before 37 completed weeks' gestation. The present analysis included only live births, and infants were included if they had developmental data from the 6 month postpartum visit.

Infant developmental outcomes at age 6 months were assessed with the Bayley Scales of Infant and Toddler Development, Third Edition (Bayley-III; Bayley, 2006a), a tool which has been used globally, including in LMIC settings (Ballot, Potterton, Chirwa, Hilburn, & Cooper, 2012), and which remains an essential measure of infant and toddler developmental milestones. The Bayley III scales were administered by two trained physiotherapists and one registered nurse, with overall supervision by a developmental pediatrician. For our purposes, scaled scores were calculated from captured total raw scores on each Bayley III subtest using the specialized software Bayley-III Scoring Assistant Update Version 2.0.2 with Bayley-III PDA conduit (BayleyIII_PDA_2_0_2.exe). These scores represent performance relative to same-age peers. According to the standard guidelines (Bayley, 2006a, 2006b, 2006c), infants scoring ≥ 1 *SD* below the mean of 10 (i.e., scoring ≤ 7) in at least one subtest were classified as manifesting a clinically significant developmental delay in that scale.

Statistical Analysis

All data were analyzed using Stata 12 (StataCorp Inc, College Station, TX). Frequency distributions and medians (interquartile ranges) were used to describe sociodemographic variables of interest (maternal age, marital status, education, employment, income); childhood and adult trauma exposure and stressful life events; PTSD, depression and psychological distress; alcohol and substance use; birth and 6-month anthropometry; and infant developmental outcomes. Among trauma-exposed mothers, crude associations between maternal PTSD and infant development at age 6 months were explored using two-sample t tests and Wilcoxon's rank sum tests (Mann–Whitney tests) for normally and non-normally distributed outcome variables, respectively, where the outcome of interest was scaled scores on each subtest of the Bayley III. In cases where PTSD was significantly associated with scaled scores on the Bayley III subtests in bivariate analysis (at $p < .05$), linear regression models were used to explore the associations between maternal PTSD, potential confounders, and infant developmental outcomes. These models were adjusted for recruitment site, maternal education, intimate partner violence, maternal alcohol use, and infant anthropometry. Given that no mothers in the TC Newman sample were infected with HIV, maternal HIV status was not adjusted for in these models due to concerns around collinearity. Likelihood ratio tests were used to assess model fit. These analyses were restricted to trauma-exposed mothers to parse out the effects of PTSD itself on infant development.

Results

Maternal Sociodemographic Characteristics

The median (interquartile range [IQR]) age of mothers at enrolment was approximately 25 (22; 31) years, Table 1. Most (62%) were unmarried, and almost a third (32%) was primigravid. The prevalence of maternal HIV infection was 19%. Despite most participants (62%) having completed some secondary education, unemployment in this study sample was highly prevalent (84%). The vast majority (88%) reported a household income of less than R5000 (approximately $500 USD) per month.

Psychosocial Risk Factors

More than a quarter of the study sample scored above threshold on the self-report measures of depression (Beck Depression Inventory: 29%; Edinburgh Postnatal Depression Rating Scale: 26%), Table 1. These findings were supported by the clinician-administered psychiatric assessment (MINI), in which 20% of the study sample was found to have experienced a major de-

Table 1
Maternal Demographic and Psychosocial Characteristics, Trauma Exposure, and Posttraumatic Stress Disorder (PTSD)

Variable	Total *n* (%)	Mbekweni *n* (%)	TC Newman *n* (%)	*P* value
Number of mothers	111	56 (50)	55 (50)	
Demographic and psychosocial characteristics				
Self-reported demographic and psychosocial characteristics (antenatal study visit)				
Ethnicity				
Black/African	55 (50)	55 (98)	0 (0)	
Mixed race	56 (50)	1 (2)	55 (100)	<.001
Age at enrolment, median (IQR)	24.9 (21.7 to 30.6)	27.4 (21.9 to 31.6)	24.0 (21.7 to 27.5)	.065
Married/Cohabiting	42 (38)	19 (34)	23 (42)	.391
Educational achievement				
Primary education	8 (7)	6 (11)	2 (4)	
Some secondary education	69 (62)	35 (63)	34 (62)	
Completed secondary education	29 (26)	11 (20)	18 (33)	
Tertiary education	5 (5)	4 (7)	1 (2)	.163
Employed	18 (16)	6 (11)	12 (22)	.113
Average household income				
<R1,000/month	59 (53)	31 (55)	28 (51)	
R1,000–R5,000/month	39 (35)	22 (39)	17 (31)	
>R5,000/month	13 (12)	3 (5)	10 (18)	.113
SES quartile				
Lowest SES	43 (39)	28 (50)	15 (27)	
Low-moderate SES	29 (26)	11 (20)	18 (33)	
Moderate-high SES	21 (19)	12 (21)	9 (16)	
Highest SES	18 (16)	5 (9)	13 (24)	.023
Primagravida	35 (32)	14 (25)	21 (38)	.135
HIV-infected	21 (19)	21 (38)	0 (0)	<.001
Median recent life events experienced (IQR)	1 (0 to 3)	1 (0 to 1.5)	2 (1 to 5)	<.001
Lifetime tobacco use	45 (41)	7 (13)	38 (69)	<.001
Antenatal tobacco use	33 (30)	2 (4)	31 (56)	<.001
Lifetime alcohol use	46 (41)	8 (14)	38 (69)	<.001
Antenatal alcohol use	9 (8)	2 (4)	7 (13)	.094
Antenatal depression (BDI), above threshold	32 (29)	16 (29)	16 (29)	.952
Antenatal depression (EPDS), above threshold	29 (26)	15 (27)	14 (25)	.873
Antenatal psychological distress (SRQ), above threshold	27 (24)	11 (20)	16 (29)	.246
MINI-diagnosed disorders (6-month postpartum study visit)				
Major depressive episode (lifetime)	22 (20)	9 (16)	13 (24)	.317
Major depressive episode (current)	5 (5)	1 (2)	4 (7)	.206
Alcohol dependence/abuse	14 (13)	5 (9)	9 (16)	.267
Trauma exposure and PTSD				
Self-reported trauma exposure (antenatal study visit)				
Childhood trauma, above threshold	33 (30)	13 (23)	20 (36)	.130
Any lifetime intimate partner violence	55 (50)	21 (38)	34 (62)	.010
Any recent intimate partner violence	39 (35)	14 (25)	25 (45)	.024
MINI-diagnosed disorders (6-month postpartum study visit)				
Trauma exposure	80 (72)	41 (73)	39 (71)	.787
PTSD	22 (20)	9 (16)	13 (24)	.317

Note. IQR = interquartile range; SES = socioeconomic status; BDI = Beck Depression Inventory; EPDS = Edinburgh Postnatal Depression Rating Scale; SRQ = Self-Reporting Questionnaire; MINI = Mini International Neuropsychiatric Interview.

pressive episode in their lifetimes, with 5% experiencing a current major depressive episode at the time of assessment. Approximately a quarter (24%) reported experiencing psychological distress (as measured by the SRQ-20), despite a relatively low median (IQR) score (1 [0; 3]) on the measure of past-year stressful life events. Tobacco and alcohol use was prevalent in this study sample, with 41% reporting lifetime use of each of these substances. Further, almost a third (30%) of study participants reported tobacco use during pregnancy, with 8% reporting alcohol consumption during this period. Clinician-administered assessment yielded a sample prevalence of 13% for lifetime alcohol abuse or dependence.

Trauma Exposure and PTSD

Approximately a third (30%) of the study sample reported exposure to trauma during childhood, with half having been exposed to IPV during their lifetimes, Table 1. Further, more than a third (35%) had experienced IPV during the past year. The majority (72%) of this study sample reported exposure to at

least one traumatic event (as defined by the *DSM–5*) in their lifetimes (including, but not limited to, childhood trauma and IPV). The overall lifetime prevalence of PTSD was 20%.

Infant Outcomes

Anthropometry. The median (IQR) gestational age at delivery for infants in this study sample was 39 (38; 40) weeks, Table 2. Fourteen percent of infants were born preterm, 8% had decreased WAZ scores at birth and 15% had reduced HCAZ scores at birth. At age 6 months, the prevalence of decreased WAZ scores in this study sample was 7%, and 2% were found to have reduced HCAZ scores.

Infant development at age 6 months. The median scaled scores for each site, and for the total study sample fell within the normal range across all Bayley III subtests (i.e., no median scores ≥1 *SD* below the standardized mean of 10; Table 3). However, the prevalence of poor infant developmental outcome as demonstrated by dichotomized scaled scores was notable and ranged from 0.9% (adaptive behavior—communication) to 26% (expressive communication and adaptive behavior—self-direction). Overall, 69% of infants in the study sample exhibited poor developmental outcomes on at least one of the Bayley III subtests.

Association Between Maternal PTSD and Infant Developmental Outcomes at Age 6 Months

In crude analyses restricted to trauma-exposed mothers (N = 81), maternal PTSD was found to be significantly associated with poorer infant developmental outcomes in the fine motor and adaptive behavior–motor subscales, as measured by a reduction in the median scaled scores. Infants of mothers with PTSD were found to score 1.8 units (95% confidence interval [CI] [0.4, 3.3]) lower on average on the fine motor subscale (p = .015) and 1.5 units (95% CI [0.5, 2.4]) lower on average on the adaptive behavior–motor subscale (p = .004), Table 4, compared to infants of mothers with trauma exposure but no PTSD.

While the association between maternal PTSD and poor fine motor outcomes was no longer significant when adjusted for study site and maternal education, maternal PTSD remained significantly associated with poorer outcomes in the adaptive behavior–motor subscale when adjusted for study site, alcohol dependence, and infant HCAZ at birth. Infants of mothers with PTSD scored, on average, 1.3 units (95% CI [0.4, 2.3]) lower on the adaptive behavior–motor subscale compared to infants of mothers without PTSD, independent of study site, alcohol dependence, and infant HCAZ at birth.

Discussion

In this study of mother-infant data from the DCHS, maternal PTSD was found to be significantly associated with poorer infant developmental outcomes in the fine motor and adaptive behavior—motor subscales (crude analyses); the latter association remained significant when adjusted for study site, alcohol dependence, and infant HCAZ at birth.

While one small-scale study reported recently that exposure to maternal PTSD may be associated with emotion regulation difficulties in infancy (Bosquet Enlow et al., 2011); to the best of our knowledge, ours is the first to investigate specifically the association between maternal PTSD and infant neurodevelopment in a LMIC setting. Our findings are, however, consistent with a growing body of work on the detrimental effect of maternal anxiety on infant and child neurodevelopment. For example, in their prospective study of 170 mother–infant dyads, Huizink, Robles de Medina, Mulder, Visser, and Buitelaar (2003) reported that higher levels of maternal pregnancy-

Table 2
Infant Anthropometry at Birth and at 6 Months of Age

Variable	Total *n* (%)	Mbekweni *n* (%)	TC Newman *n* (%)	*P* value
Number of infants; sets of twins	112	57 (51); 1	55 (49); 0	
Gender, female	58 (52)	34 (60)	24 (44)	.090
Median gestational age at delivery (IQR)	39 (38 to 40)	39 (38 to 40)	39 (38 to 40)	.943
Preterm birth	16 (14)	7 (12)	9 (16)	.537
Infant anthropometry at birth				
Median weight in kg (IQR)	3.0 (2.7 to 3.4)	3.1 (2.8 to 3.3)	3.0 (2.6 to 3.5)	.463
Median WAZ (IQR)	−.7 (−1.4 to .03)	−.7 (−1.3 to .1)	−.9 (−1.5 to −.01)	.270
Low WAZ (WAZ of −2 or below)	9 (8)	3 (5)	6 (11)	.317
Median head circumference in cm (IQR)	34 (32 to 34)	33 (32 to 34)	34 (32 to 34)	.894
Median HCAZ (IQR)	−.6 (−1.5 to .1)	−.6 (−1.4 to .1)	−.6 (−1.6 to .2)	.907
Low HCAZ (HCAZ of −2 or below)	17 (15)	7 (12)	10 (18)	.384
Infant anthropometry at 6 months of age				
Median age in months at study visit (IQR), corrected for prematurity at birth	5.9 (5.8 to 6.0)	5.9 (5.9 to 6.0)	5.9 (5.8 to 6.0)	.773
Median weight in kg (IQR)	7.8 (6.7 to 8.6)	8.1 (7.1 to 8.8)	7.4 (6.5 to 8.5)	.051
Median WAZ (IQR)	.2 (−.8 to 1.0)	.4 (−.4 to 1.4)	−.1 (−1.0 to .8)	.011
Low WAZ (WAZ of −2 or below)	8 (7)	1 (2)	7 (13)	.030
Median change in WAZ between birth and 6 months (IQR)	.8 (−.2 to 1.5)	1.0 (−.02 to 1.9)	.6 (−.4 to 1.2)	.076
Median head circumference in cm (IQR)	43 (42 to 44.3)	43 (42 to 44.5)	43 (42 to 44)	.815
Median HCAZ (IQR)	.2 (−.6 to 1.4)	.2 (−.6 to 1.8)	−.01 (−.7 to 1.3)	.400
Low HCAZ (HCAZ of −2 or below)	2 (2)	2 (4)	0 (0)	.496
Median change in HCAZ between birth and 6 months (IQR)	1.1 (−.1 to 2.1)	1.3 (−.04 to 2.5)	1.0 (−.1 to 1.8)	.375

Note. IQR = interquartile range; WAZ = weight-for-age *z* score; HCAZ = head circumference-for-age *z* score.

Table 3
Infant Neurodevelopmental Outcomes at 6 Months of Age

Variable	Total *n* (%)	Mbekweni *n* (%)	TC Newman *n* (%)	*P* value
Number of infants; sets of twins	112	57 (51); 1	55 (49); 0	
Median age in months at study visit (IQR), corrected for prematurity at birth	6.0 (5.7 to 6.2)	6.0 (5.8 to 6.2)	5.9 (5.7 to 6.3)	.397
Cognitive scale				
Median score (IQR)	10 (8 to 12)	11 (8 to 12)	10 (8 to 11)	.944
Poor cognitive outcomes	22 (20)	13 (23)	9 (16)	.391
Communication scale				
Receptive communication, median score (IQR)	11 (8 to 12)	10 (9 to 12)	11 (8 to 12)	.788
Poor receptive communication outcomes	25 (22)	13 (23)	12 (22)	.900
Expressive communication, median score (IQR)	11 (7 to 13.5)	11 (9 to 14)	10 (7 to 13)	.258
Poor expressive communication outcomes	29 (26)	13 (23)	16 (29)	.448
Motor scale				
Fine motor, median score (IQR)	13 (12 to 15)	13 (12 to 15)	13 (11 to 15)	.404
Poor fine motor outcomes	5 (4)	2 (4)	3 (5)	.676
Gross motor, median score (IQR)	11 (8 to 12)	11 (9 to 12)	11 (8 to 13)	.600
Poor gross motor outcomes	12 (11)	4 (7)	8 (15)	.234
Social-emotional scale				
Median score (IQR)	13 (11 to 15)	13 (11 to 15)	14 (11 to 16)	.218
Poor social-emotional outcomes	8 (7)	1 (2)	7 (13)	.030
Adaptive behavior scale				
Communication, median score (IQR)	11 (10 to 12)	11 (9 to 12)	11 (10 to 12)	.516
Poor communication outcomes	1 (.9)	0 (0)	1 (2)	.491
Health and safety, median score (IQR)	10 (9 to 10)	10 (9 to 10)	10 (10 to 10)	.126
Poor health and safety outcomes	4 (4)	3 (5)	1 (2)	.618
Leisure, median score (IQR)	11 (9 to 12)	10 (9 to 12)	11 (10 to 13)	.056
Poor leisure outcomes	10 (9)	4 (7)	6 (11)	.524
Self-care, median score (IQR)	11 (10 to 12)	10 (9 to 12)	11 (10 to 12)	.256
Poor self-care outcomes	7 (6)	4 (7)	3 (5)	1.000
Self-direction, median score (IQR)	10 (7 to 11)	10 (7 to 11)	10 (7 to 12)	.272
Poor self-direction outcomes	29 (26)	15 (26)	14 (25)	.917
Social, median score (IQR)	12 (11 to 13)	11 (11 to 12)	12 (11 to 13)	.016
Poor social outcomes	2 (2)	2 (4)	0 (0)	.496
Motor, median score (IQR)	11 (10 to 12)	11 (10 to 12)	11 (10 to 12)	.685
Poor motor outcomes	12 (11)	5 (9)	7 (13)	.554
Any poor developmental outcomes across all scales	77 (69)	40 (70)	37 (67)	.740

Note. IQR = interquartile range.

specific anxiety predicted lower mental and motor developmental scores at infant age 6 months. Similarly, in their investigation of 105 Caucasian mother–infant dyads, Brouwers, van Baarb, and Pop (2001) found that high maternal anxiety during late pregnancy was associated with lower mental developmental scores on the Bayley Scales of Infant Development at age 2 years. More recently, Hadley, Tegegn, Tessema, Asefa, and Galea (2008) have reported that maternal symptoms of common mental disorders (including anxiety and depression) were significantly associated with poorer motor, language and social development of 431 infants aged 3 to 24 months in a rural Ethiopian setting. Several different mechanisms for such an association between maternal stress/anxiety and deficits in infant neurodevelopment have been proposed, including hyperactivity of the hypothalamic–pituitary–adrenal axis, with resultant hypercortisolism in both the mother and the infant (Glover, O'Connor, & O'Donnell, 2010; Talge et al., 2007; Van den Bergh, Mulder, Mennes, & Glover, 2005). Epigenetic modifications via glucocorticoid receptor methylation ("silencing") in children exposed to maternal trauma, stress and anxiety (Radtke et al., 2011; Stein et al., 2014), as well as behavioral components associated with maternal PTSD such as hypervigilance or readily distracted attention (Talge et al., 2007) may also contribute to impaired infant neurodevelopment.

A number of key limitations should be borne in mind when considering our study findings. First, our study sample was relatively small, thus reducing the power to detect potentially significant associations such as those between maternal exposure to psychological trauma and infant developmental outcomes. Second, data on certain psychosocial risk factors (including psychological distress and alcohol/tobacco use) were obtained from self-report assessment tools, which may have biased these findings. Finally, potential moderators and mediators in the relationship between maternal PTSD and infant neurodevelopment (such as partner support and parenting style) were not included in this analysis.

Despite these limitations, our study has allowed one of the first tests of the association between maternal PTSD and poor infant neurodevelopmental outcomes, and the first in a LMIC context. A focus on infant and child development is particularly relevant in LMIC settings. Two recent reviews of data from developing countries (Grantham-McGregor et al., 2007; Walker et al., 2007, 2011; Engle et al., 2007, 2011; Lake, 2011) emphasized that more than 200 million children under the age of five years do not reach their cognitive developmental poten-

Table 4

Adjusted Associations Between Maternal Posttraumatic Stress Disorder (PTSD) and Infant Fine Motor Outcomes and Infant Adaptive Behavior–Motor Outcomes at 6 Months of Age, Restricted to Trauma-Exposed Mothers (n = 81)

	Adjusted associations between maternal PTSD and infant fine motor outcomes				Adjusted associations between maternal PTSD and infant adaptive behavior–motor outcomes			
Variable	Crude regression coefficient [95% CI]	*P* value	Adjusted regression coefficient [95% CI]	*P* value	Crude regression coefficient [95% CI]	*P* value	Adjusted regression coefficient [95% CI]	*P* value
Recruitment site								
Mbekweni	Reference		Reference		Reference		Reference	
TC Newman	−.3 [−1.6 to 1.1]	.684	−.1 [−1.5 to 1.2]	.848	.01 [−.9 to .9]	.990	.2 [−.6 to 1.1]	.599
Maternal educational achievement								
Tertiary education	Reference		Reference		Reference			
Completed secondary education	−2.9 [−6.6 to .8]	.119	−2.3 [−6.1 to 1.4]	.216	−1.0 [−3.5 to 1.6]	.460		
Some secondary education	−2.2 [−5.7 to 1.3]	.222	−1.8 [−5.3 to 1.8]	.327	−1.0 [−3.4 to 1.5]	.437		
Primary education	−5.7 [−10.5 to −.8]	.023	−4.7 [−9.6 to .2]	.061	−1.0 [−4.4 to 2.4]	.558		
Lifetime IPV exposure								
Below threshold	Reference				Reference			
Above threshold	.1 [−1.3 to 1.4]	.936			−1.1 [−2.0 to −.3]	.012		
Recent IPV exposure (antenatal)								
Below threshold	Reference				Reference			
Above threshold	−1.0 [−2.5 to .4]	.152			−1.7 [−2.6 to −.8]	<.001		
Antenatal alcohol use								
No self-reported alcohol use	Reference				Reference			
Self-reported alcohol use	−1.2 [−3.7 to 1.4]	.371			−2.1 [−3.7 to −.4]	.017		
MINI-diagnosed alcohol dependence/abuse								
No alcohol dependence/abuse	Reference				Reference		Reference	
Alcohol dependence/abuse	−.3 [−2.3 to 1.7]	.775			−1.4 [−2.7 to −.1]	.036	−1.3 [−2.5 to −.1]	.035
Infant WAZ at birth	.5 [−.2 to 1.1]	.152			.5 [.03 to .9]	.038		
Infant WAZ at 6 months	−.1 [−.6 to .4]	.719			.2 [−.2 to .5]	.401		
Change in infant WAZ between birth and 6 months	−.4 [−.9 to .1]	.153			−.1 [−.5 to .2]	.449		
Infant HCAZ at birth	.3 [−.3 to 1.0]	.295			.5 [.1 to .9]	.010	.4 [.03 to .8]	.033
Infant HCAZ at 6 months	.3 [−.2 to .8]	.217			.2 [−.1 to .5]	.285		
Change in infant HCAZ between birth and 6 months	.1 [−.4 to .5]	.692			−.1 [−.4 to .2]	.407		
PTSD diagnosis								
No PTSD	Reference		Reference		Reference		Reference	
Lifetime/Current PTSD	−1.8 [−3.3 to −.4]	.015	−1.5 [−3.0 to .1]	.060	−1.5 [−2.4 to −.5]	.004	−1.3 [−2.3 to −.4]	.007

Note. CI = confidence interval; IPV = intimate partner violence; MINI = Mini International Neuropsychiatric Interview; WAZ = weight-for-age *z* score; HCAZ = head circumference-for-age *z* score.

tial in this context. Given the high prevalence of exposure to trauma and PTSD in pregnant women, our data may be important for informing culturally appropriate health promotion, screening and intervention campaigns.

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Risk Factors for PTSD and Depression in Female Survivors of Rape

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Objective: To investigate association of the sociodemographic factors, characteristics of rape and social support to the development of depression and posttraumatic stress disorder at 6 months after the rape. ***Method:*** A cross-sectional survey with female survivors of rape was carried out in 3 provinces of South Africa 6 months after the rape. ***Results:*** One hundred female survivors s of sexual assault were interviewed. More than half (53%) were from Limpopo, 25% from Western Cape, and 22% from KwaZulu-Natal (KZN). 87% reported high levels of PTSD and 51% moderate to severe depression post rape. The major risk factors for PTSD and depression were the unmarried survivors of rape and those living in KZN. The female survivors of rape in KZN province were 7 times more likely to experience symptoms of depression compared to other provinces, while married/cohabiting female rape survivors were 6 times less likely to report symptoms of depression compared to the unmarried female rape survivors. ***Conclusion:*** These findings add support to existing literature on PTSD and depression as common mental health consequence of rape and also provide evidence that survivors' socio- demographics—marital status, employment status—are significant contributors to the development of symptoms of depression and PTSD after rape. The results have research and clinical practice relevance for ensuring that PTSD and trauma treatment focuses on an in-depth understanding of the various aspects of the sociodemographic factors and rape characteristics that contribute to survivors' mental state and how these compound stress and depression symptoms over time post rape victimization.

Keywords: rape, socioeconomic status, social support, depression, stress

Violence against women as a social problem in South Africa has been well documented (Dartnall & Jewkes, 2013; Jewkes, Sikweyiya, Morrell, & Dunkle, 2009). The rate of sexual violence is among the highest in the world. It is estimated that over 40% of South African women will be raped in their lifetime and that only 1 in 9 rapes are reported. Despite the decline in the number of reported sexual assault cases in the 2013–2014 crime statistics (South African Police Services, 2015), the epidemiology of rape remains an issue of considerable importance and a key health risk for South African women.

Previous research has identified numerous psychological effects of sexual assault on women (e.g., depression, anxiety) including posttraumatic stress disorder (Abrahams, Jewkes, & Mathews, 2013; Foa & Riggs, 1993; Foa & Rothbaum, 1998; Resick, 1993; Ullman, Townsend, Filipas, & Starzynski, 2007). Sexual assault has been shown to result in particularly high rates of posttraumatic stress disorder (PTSD; Kilpatrick, Edmunds, & Seymour, 1992; Möller, Bäckstrom, Söndergaard, & Helström, 2014).

However, not all survivors of sexual assault develop PTSD. There is increasing acceptance of the fact that the exposure to trauma such as sexual assault may not always be sufficient to explain the development of PTSD and depression but that other factors have a role to play in understanding the condition (Brewin, Andrews, & Valentine, 2000). To better understand women's responses to sexual assault, various studies have been conducted to identify risk factors for PTSD among survivors of rape. The previous findings suggest that PTSD status and depression are related to factors that occur to the individual before, during, and after a traumatic event.

The empirical research on risk factors for the psychological impact of rape have used a broad variety of factors including preassault factors (e.g., sociodemographic factors—race, employment status, marital status), assault related factors (e.g., victim–perpetrator relationship, physical injuries, and assault severity), and postassault factors (e.g., social support, coping responses).

Pre-Assault—Socio-Demographics

In a study on the depression symptomatology among adults and adolescent female survivors of rape in Eastern and Western Cape provinces of South Africa, Abrahams et al. (2013) found race,

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ethnicity, and unemployment status to be associated with greater likelihood of symptoms of depression. Black (African and Colored) rape survivors from Cape Town reported very high levels of depression symptoms than those in other sites of the study. Furthermore, unemployment has also been significantly associated with symptoms of depression post rape (Abrahams et al., 2013; Möller et al., 2014). Conversely, inconsistent results have been found for the other demographic characteristics of age, marital status, education, and ethnicity (Cochran, Frazier, & Olson, 1997; Möller et al., 2014; Ullman & Filipas, 2001). Understanding the specific aspects of the sociodemographics and individual background factors relating to development of stress and depression post rape is critical.

Assault Characteristics

Kaysen, Rosen, Bowman, and Resick (2010) found that the severity of the violence is a factor that should be considered a risk factor in the immediate aftermath of the event. In addition to the individual demographic background factors, correlates of PTSD have been identified to also include the sexual assault characteristics (e.g., physical injury, severity of sexual victimization) in predicting the risk of PTSD in victims of sexual assault (Abrahams et al., 2013; Acierno, Resnick, Kilpatrick, Saunders, & Best, 1999; Ullman & Filipas, 2001). The findings in these studies suggest injury during rape as one of the risk factors for posttraumatic stress disorder and depression in rape victims (Cook, Pilver, Dinnen, Schnurr, & Hoff, 2013; Möller et al., 2014).

Möller et al. (2014) found that perceived life threat and having been injured during rape were significant risk factors for PTSD among rape survivors at 6 months after the assault. While some of the studies have strongly confirmed the effects of rape severity in PTSD, these are mixed partially because other research has found no association between the severity of assault and development of PTSD following rape victimization (Abrahams et al., 2013).

Post-Assault Factors

Previous research has also given consideration to the influence of social support resources in individuals' psychological responses and recovery after trauma and rape victimization (Brewin et al., 2000; Ullman et al., 2007). It has been theorized that social support as a resiliency resource can aid in recovery from trauma, in part mediating psychological response to rape victimization (Brewin et al., 2000; Hobfoll, 1998; Schumm, Briggs-Phillips, & Hobfoll, 2006). It is suggested that social support networks provide victims of trauma with a platform to express their emotions and come to terms with what has happened and ultimately can also decrease the likelihood that victims experience negative sequelae post victimization (Southivong, Ichikawa, Nakahara, & Southivong, 2013). A meta-analysis on 14 separate risk factors for development of PTSD found the lack of social support among victims of trauma to convey the strongest risk of PTSD (Brewin et al., 2000). More specifically, in a study among female rape and physical assault victims, Gutner, Rizvi, Monson, and Resick (2006) found that the increase of social support over time decreased the PTSD symptomatology. Abrahams et al. (2013) also found that receiving support from various groups of people had lesser likelihood of depression among Colored and African female survivors of rape. Thus, it is possible that social support provided a stress-buffering role for victims of rape.

Not all the studies have found support for the commonly posited theory of the impact of social support network in directly aiding in coping following victimization (Ullman et al., 2007). Despite the mixed findings on social support, there is considerable evidence showing perceived social support to be a stronger direct predictor of psychiatric adjustment (Norris & Kaniasty, 1996; Schumm et al., 2006).

Against the backdrop of this evidence on multiple potential influences on victim's PTSD symptomatology and depression following rape, it is important to identify specifically the risk factors for development of PTSD and depression following the sexual assault and subsequently permit early interventions with those victims at greater risk to reduce the incidence.

Given the prevalence of rape in South Africa and the frequency of associated trauma, identifying factors that place women at risk for the development and persistence of psychological symptoms following rape is imperative. Only a few studies have integrated the various sociodemographic factors with individual rape assault characteristics to understand how these may influence recovery post rape victimization within a culturally diverse sample. To accomplish this, the present study investigated factors associated with the development of depression and posttraumatic stress within a sample of female Black survivors of rape across three of the largest provinces in South Africa (KwaZulu-Natal (KZN), Limpopo. and the Western Cape) with relatively high incidence of reported rape cases. The three provinces account for over 30% of the South African population. With the exception of the Western Cape, both KwaZulu-Natal and the Limpopo provinces are characterized by higher levels of unemployment and relatively low levels of education. All three provinces are critical in the study of rape given the historical high incidence of rape reported in these communities.

In the current study, we examined the combined impact of the sociodemographic variables and characteristics of rape, and explored the potential that social support may have in risk for depressive mood and PTSD. Based on previous findings, we hypothesized the following:

1. The severity of rape (verbal threatened during the rape incident, being punched/kicked and choked, threatened with weapon and use of weapon) will increase the risk of depression and posttraumatic stress disorder.

2. Women reporting lack of social support will exhibit greater depressive mood and PTSD

3. The psychological response to rape victimization will be differentiated by the female survivors' sociodemographic factors (marital status, employment status, education levels, and region)

Method

Participants and Procedure

On average, the participants (n = 100) comprised females in their late 20s (M = 27, SD = 11.5), not married (79%), and

unemployed (67%). Most (53%) were Black female survivors from Limpopo, 25% from the Western Cape, and the remainder from KwaZulu-Natal (22%) provinces of South Africa, reporting to have been raped in the past 6 months. Eighty-four percent of the participants had achieved education levels equal to Grade 12 and less, 16% had achieved more than Grade 12. Over 70% of the survivors of rape in the three provinces were sexually assaulted outside of their homes, 28% reporting to have been raped in their own homes, and mostly (79%) during the night. Only a few (10%) reported to have had any childhood sexual assault history before the current incidence.

The survivors of rape were recruited from the hospital and affiliate sexual assault victim empowerment centers in the three provinces following procedures approved by the Institutional Review Board at the University of California, Los Angeles; University of Cape Town; University of Limpopo; and University of KwaZulu-Natal. The victim empowerment centers and hospital servicing the survivors of rape from the various Black communities were approached to obtain their support in allowing the investigator to recruit. All the interviews were conducted face to face with the participants at the centers before, during, and after a scheduled follow-up appointment at the facilities. Women were assured that all their participation was voluntary and would not impact their treatment and other services with the institution. Informed consent was obtained from the study participants before completing the 45 min interview and survey questionnaire.

Measures

The survey asked questions about demographic background, history of previous sexual victimization, rape assault characteristics including severity of assault, assessed symptoms of depression, posttraumatic stress disorder, social support, and social undermining. Only those measures and items that were used for the present analyses are described herein. The key predictor of interest, sexual assault severity, was assessed with a sum of an index of weapon presence (used or shown), moderate physical violence (using his superior body weight, twisting arm, or holding the victim down), severe physical force (hitting, slapping, choking, or beating), verbal threats, number of assailants, and duration of assault.

The perceptions of social support received was assessed with a brief 10-item Social Support Questionnaire (Van Tilburg, Van Sonderen, & Ormel, 1991; adapted by Timmerman, Emanuels-Zuurveeen, & Emmelkamp, 2000), which includes descriptions of social support pertaining to Emotional Support, Informative Support, Social Companionship, or Instrumental Support received from others. The 5-point rating scale ranges from 1, *none of the time,* to 5, *all of the time.* The social support survey is a valid and reliable scale and has demonstrated satisfactory internal consistency with Cronbach's alpha ranging from .70 to .86. Cronbach's alpha indicated reliability for the current sample ($\alpha = .90$), and a summary score was calculated and used in the analyses.

The experience of social undermining post rape assault was assessed with the 7-item Social Undermining Scale (Vinokur & Van Ryn, 1993), which assesses the frequency at which a person has engaged in behaviors directed toward the target person that displays (a) negative effect (anger, dislike), (b) negative evaluation of the person in terms of his or her attributes, actions, and efforts (criticism), and (c) behaviors that hinder the attainment of instrumental goals. The 7 items on a 5-point scale has a lower alpha coefficient ($\alpha = .73$) compared to previous studies reporting in the range of .84 to .92.

The primary outcome of interest was posttraumatic stress disorder symptoms and depression. The symptoms of posttraumatic stress disorder (PTSD) were assessed using response to symptom items from the Post-Traumatic Stress Disorder Symptom Scale—Self Report (Foa, Cashman, Jaycox, & Perry, 1997) providing the measure of severity and frequency of PTSD symptoms. The scale contains three subscales (Reexperiencing, Avoidance, and Numbing & Arousal) as well as a total score (ranging from 0 to 51). Respondents were asked to rate how often each symptom has bothered them in the past month on a 4-point scale (*Not at all, Once a week or less, 2 to 4 times a week, 5 or more times a week*), which totals up to a sum score of between 0 and 51. The sum score yielded an overall great internal consistency ($\alpha = .95$).

The severity of depression was assessed with Beck Depression Inventory II (BDI-II), a multiple-choice inventory self-rating scale measuring the severity of depression. The BDI-II consists of 21 items referring to common symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex. Each answer is scored on a 4-point scale ranging from 0 to 3. Higher total scores indicate more severe depressive symptoms, with the cut-off for minimal depression at 13 and severe depression cut-off point between a score of 29 and 63. Cronbach's alpha demonstrated reliability for the current sample ($\alpha = .87$), and a summary score was calculated.

Statistical Analyses

Group comparisons between survivors of rape in the three regions—KwaZulu-Natal ($n = 22$), Western Cape ($n = 25$), and Limpopo ($n = 53$)—on age, marital status, and employment status and education levels were examined against the outcome variables in the study, development of depression, and PTSD through ANOVA and student tests. Pearson correlations were performed to examine bivariate associations among region, depression, PTSD, and social support. To test the potential moderators, regression analyses were used. The multivariate linear model included all the variables that contributed significantly to the univariate model. The p values less than 0.05 were considered statistically significant in the multivariate model. The R-square and the adjusted R-square for the final multivariate model were 0.397 and 0.3643, respectively. The VIF (variance inflation factor) values are all less than 2. All statistical analyses were performed with SPSS 11.0 software.

Results

Demographic Characteristics

Table 1 show the demographic profile of the female rape survivors who participated in the study per province. The mean age of the female rape survivors in KZN was significantly higher as compared to other provinces ($p < .05$, see Table 1). A greater proportion of rape victims in KZN (57%) were raped in their own home compared to Limpopo (21%) and Western Cape (20%; $p <$

Table 1
Demographics for Participants

Demographics & Assault Characteristics	*n*	Region			*p*-value
		Limpopo (*n* = 53)	Western Cape (*n* = 25)	KZN (*n* = 22)	
Age (Mean ± *SD*)	27 ± 11.5	26.5 ± 11.7	23.7 ± 9.1	31.9 ± 12.1	.047
Marital status					
Married or live with partner	21 (21%)	14 (26.92%)	2 (8%)	5 (23.81%)	.159
Not	77 (79%)	38 (73.08%)	23 (92%)	16 (76.19%)	
Education					
Secondary or less	84 (84%)	45 (84.91%)	23 (92%)	16 (72.73%)	.222
Tertiary	16 (16%)	8 (15.09%)	2 (8%)	6 (27.27%)	
Employment					
Unemployed	66 (66%)	36 (69.23%)	17 (68%)	13 (59.09%)	.690
Employed (full/part time)	33 (33%)	16 (30.77%)	8 (32%)	9 (40.91%)	
Location of Assault					
My own home	28 (28%)	11 (20.75%)	5 (20%)	12 (57.14%)	.004
Outside of my home	71 (71%)	42 (79.25%)	20 (80%)	9 (42.86%)	
Time of Assault					
Day	28 (28%)	9 (16.98%)	6 (25%)	6 (27.27%)	.553
Night	71 (71%)	44 (83.02%)	18 (75%)	16 (72.73%)	
Any child abuse history					
Yes	10 (10%)	3 (5.66%)	1 (4%)	6 (27.27%)	.013
No	90 (90%)	50 (94.34%)	24 (96%)	16 (72.73%)	
Perpetrator was a stranger					
Yes	35 (35%)	17 (32%)	8 (32%)	10 (46%)	.508
No	65 (65%)	36 (68%)	17 (68%)	12 (54%)	
Severity of Assault					
Punched & kicked	35 (35%)	15 (28%)	7 (28%)	13 (59%)	.078
Threatened with weapon	44 (44%)	28 (52%)	10 (40%)	6 (27%)	
Used a weapon	6 (6%)	4 (8%)	1 (4%)	1 (5%)	
Verbal threat	15 (15%)	6 (11%)	7 (28%)	2 (9%)	
Social support (Mean ± *SD*)	30.7 ± 6.2	32.1 ± 6.4	27.6 ± 4.9	30.9 ± 6.1	.009

Note. KZN = KwaZulu-Natal.

.05). Moreover, the findings also revealed that a significantly higher proportion of KZN female rape survivors had a history of child abuse compared to other provinces ($p < .05$). No significant relationship was observed between marital status, level of education, employment status, time of assault, type of perpetrator, and severity of assault, and the region of the female survivors of rape ($p > .05$).

Sociodemographic Factors, Assault Characteristics, and Post-Assault Factors by PTSD and Depression

The female rape survivors in this study exhibited high levels (87%) of posttraumatic stress disorder and moderate (51%) to severe symptoms of depression. As shown in Table 2, several sociodemographic variables predicted PTSD and symptoms of depression. The unmarried survivors of rape had significantly greater levels of depression symptoms (20.3 ± 6.7 vs. 13.9 ± 7.3, $p < .05$) and PTSD (22.1 ± 11.4 vs. 16.7 ± 8.9, $p < .05$) compared to the married/cohabiting female rape survivors. In addition, the unemployed women significantly had a higher level of symptoms of depression (20.0 ± 7.3 vs. 16.9 ± 6.5, $p < .05$) compared to employed female rape survivors. Interestingly, the female survivors of rape in KZN province experienced a greater PTSD (25.4 ± 13.1) and symptoms of depression (22.4 ± 6.1) compared to other provinces. The use of a weapon during the rape assault significantly increased the symptoms of depression in this group ($p < .05$).

With regard to social support, a positive correlation was observed between social support and symptoms of depression ($r = .37$, $p < .05$), but social support was not statistically associated with PTSD ($r = .12$, $p > .05$).

Additional regression analyses were conducted to further explore the linkage between symptoms of depression and selected demographic variables and social support (Table 3). Symptoms of depression were influenced by region, marital status, and social support. The female survivors of rape in KZN province were seven times more likely to experience symptoms of depression compared to other provinces, while married/cohabiting female rape survivors were six times less likely to report symptoms of depression compared to the unmarried female rape survivors. The model indicates that social support significantly increased symptoms of depression among the female survivors of rape in the present study.

Discussion

This study explored the relation of sociodemographic factors, characteristics of rape, and social support to the development of symptoms of depression and posttraumatic stress disorder among female survivors of rape 6 months following the incident of sexual assault. Overall, the present study supports the notion that survivors of rape face increased risk for development of symptoms of depression and or PTSD. As hypothesized, the results of the current study showed that development of depression and posttraumatic stress disorder was strongly associated with sociodemo-

Table 2
Univariate Analysis of Socio-Demographics With BDI-II and PTSD Score

Demographics & Assault Characteristics	BDI			PTSD		
	Mean ± *SD*	Statistics	*p*-value	Mean ± *SD*	Statistics	*p*-value
Age (years)						
<20	18.7 ± 7.2	F = .93	.399	19 ± 9.4	F = .8	.451
20–29	18.4 ± 7.1			22.2 ± 11.5		
30+	20.7 ± 7.3			22.0 ± 12.4		
Marital status						
Married/live with partner	13.9 ± 6.6	t = 3.91	.002	16.7 ± 8.9	t = 2	.048
Not	20.3 ± 6.7			22.1 ± 11.3		
Education						
Secondary or less	19.7 ± 7.3	t = 1.95	.054	21.8 ± 11.4	t = 1.27	.210
Tertiary	15.9 ± 5.5			18.0 ± 9.1		
Employment						
Unemployed	20 ± 7.3	t = 2.42	.045	21.7 ± 11.3	t = .51	.610
Employed (full/part-time)	16.9 ± 6.5			20.5 ± 11.1		
Province						
Limpopo	19.8 ± 7.5	F = 8.84	<.001	18.7 ± 11.7	F = 3.25	.043
Western Cape	14.5 ± 5.2			22.8 ± 5.6		
KZN	22.4 ± 6.1			25.4 ± 13.1		
Location of assault						
My own home	18.8 ± 6.8	t = −.09	.932	20.9 ± 10.9	t = −.06	.950
Outside of my home	19.1 ± 7.3			21.1 ± 11.1		
Any childhood abuse history						
No	18.7 ± 7.3	t = −1.56	.120	21.1 ± 11	t = −.23	.820
Yes	22.4 ± 5.8			22 ± 13.1		
Perpetrator was a stranger						
Yes	20.9 ± 6.9	t = −1.93	.057	23.4 ± 14.0	t = −1.45	.152
No	18.1 ± 7.1			20.1 ± 9.1		
Severity of Assault						
Punched & kicked	18.2 ± 6.6	F = 4.94	.0031	21.6 ± 11.3	.68	.5661
Threated with weapon	20.9 ± 6.6			22.3 ± 12.1		
Used a weapon	22.8 ± 8.9			17.1 ± 10.9		
Verbal threat	13.8 ± 6.8			18.7 ± 7.6		
Social support		*r* = .37	.0001		*r* = .12	.23

Note. BDI = Beck Depression Inventory; PTSD = posttraumatic stress disorder; KZN = KwaZulu-Natal.

graphic context of marital status and unemployment. The results showed that development of the symptoms of depression and PTSD was strongly associated with marital status: Married/cohabiting female survivors of rape had a significantly lower mean score for symptoms of depression and PTSD compared to their counterparts. These findings provide support to past research indicating that support from intimate partners of rape survivors reduces PTSD and symptoms of depression (Billette, Guay, & Marchand, 2008). In the current study, the lower likelihood of symptoms of depression among the married/cohabiting female survivors of rape

Table 3
Multivariate Regression Analysis of BDI and Socio-Demographics

Socio Demographics and Social Support	Coeff	*SE*	*t*-value	*p*-value
Marital status				
Unmarried	Ref			
Married/live with partner	−6.04	1.59	−3.78	.0003
Employment				
Unemployed	Ref			
Employed (full/part-time)	−1.58	1.34	−1.18	.2406
Region				
Western Cape	Ref			
KZN	7.37	1.76	4.19	<.0001
Limpopo	4.89	1.52	3.23	.0017
Social support	.31	.10	2.93	.0043

Note. KZN = KwaZulu-Natal. R-square = .397; Adj R-square = .3643; VIF (variance inflation factor) values are all less than 2.

is most likely explained by the available support and empathy from the partner subsequent to the rape incident. It is possible that being married provides female survivors of rape with a safe environment to work through the sexual trauma in a manner that lessens the risk of developing increased symptoms of depression. More studies are required to expand on these findings to understand the specific contribution and support of intimate partners in predicting female survivors of rapes' psychological adjustment.

The second finding in our study relates to employment status. The unemployed female survivors of rape in this study showed significant symptoms of depression post rape. Given the widespread belief that unemployment leads to psychological depression, it is possible that sexual assault may reflect a cumulative effect in increasing the risk to the development of the symptoms of depression among the unemployed female survivors of rape in the current study. The findings in this study provide support to previous research indicating that unemployment increases the risk and likelihood for depression among survivors of rape (Abrahams et al., 2013; Möller et al., 2014).

While there may be support for the health-damaging effects of unemployment, very few studies have provided the causal link between unemployment among rape survivors and symptoms of depression. In the current study, we did not control for preexisting depression or psychological trauma. The findings present an opportunity for future studies to understand the causal link between unemployment and symptoms of depression post rape victimization.

As predicted, the psychological response to rape victimization was differentiated across the regions in the current study. The present study observed regional differences on symptoms of depression and PTSD with female survivors of rape, with KZN province significantly reporting more symptoms of depression and PTSD compared to other provinces. Perhaps the explanation for the difference could be explained by the fact that a higher proportion of female survivors of rape in KZN province also reported a history of child sexual abuse. Specific examinations of childhood and adult revictimization suggest that women who are revictimized face increased risk of trauma-related symptoms and in particular depression and posttraumatic stress disorder (Saunders, Villeponteaux, Lipovsky, Kilpatrick, & Veronen, 1992). The cumulative effect of sexual assault experience may potentially explain the observed greater risk in the development of symptoms of depression and posttraumatic stress disorder in this region of KZN.

It is also likely that the, heightened levels of PTSD and symptoms of depression among KZN survivors of rape could be a function of survivors' response to the rape trauma but also a result of exposure to multiple traumatic experiences within the neighboring environments. KZN, the province with the largest population in SA and high levels of poverty, is also ranked as the country's murder capital (South African Police Services, 2015). The exposure to high levels of crime may have a latent effect on survivors' mental health post rape victimization.

Concurrently exposure to poverty may increase vulnerability to depression and stress post rape. In the present study, the female survivors of rape from KZN had the lowest levels of education and were largely unemployed. These stressors (poverty and exposure to crime and trauma) may be associated with increased risk for depression and stress for survivors of rape. For this reason, there is a great need for research on lifetime exposure to adversities and trauma that include community samples of female survivors from diverse ethnic backgrounds within the various South African provinces.

These findings may also be attributed to the fact that a greater proportion of women in KZN were raped in their own home and by a stranger and were punched and kicked, and thus may have experienced a more extreme sense of violation than the other survivors in the Western Cape and Limpopo, resulting into exacerbated PTSD symptomatology and depression.

Furthermore, these findings highlight the importance of the location of where rape occurred as a possible predictor of symptoms of depression. There is limited research on the relation of the location of the incident to the psychological response post rape victimization. This finding can help inform prevention strategies.

As hypothesized, the severity of sexual assault was significantly associated with symptoms of depression; female rape survivors who were threatened with a weapon and had a weapon used during the assault reported a greater mean score for depression. These findings are consistent and in line with the emergent body of research highlighting the relationship between assault severity during rape and post rape depression symptomatology (Möller et al., 2014). In the present study, it is evident that different aspects and/or forms of the severity of assault during rape include different forms of risk for PTSD and depression. The question therefore becomes what specific elements and/or aspects of assault severity during rape victimization increases the risk of and PTSD and symptom of depression. Our results may differ from other previous findings because different measures of assault severity during rape have been used across studies.

Contrary to our hypothesis and the well posited association between social support and lessened risk of development of PTSD symptomatology and depression, the current findings revealed that social support was not associated with PTSD, but significantly increased symptoms of depression among female survivors of rape. This pattern of relationship suggests that not all of the support availed to rape victims following from rape victimization may act as a buffer against greater likelihood of symptoms of depression post rape victimization. It is possible that availability of social support may further weaken the victims' emotional strength and thus prolong recovery from rape trauma. Furthermore, it may be informative to explore the aspects of social support that offer the stress buffering effect among the female survivors of rape, taking into account cumulative experience of interpersonal traumas and socio demographic factors.

The current study has a number of strengths. First, the operationalization of the model of combined predictors (sociodemographic variables, assault characteristics, and social support) of PTSD and depression symptoms allows our findings to be applied within the context of understanding the relationship between predisposing variables and the occurrence of PTSD symptomatology and depression after rape. With the knowledge of the factors that potentially increase the risk for PTSD and depression, researchers and clinicians and others providing care for survivors of rape can more easily identify those female survivors at greater risk, and appropriate resources could be directed to assist the women. Second, the current study specifically examined female survivors of rape from ethnically diverse samples in both urban and rural communities in South Africa. Given that the majority of the sample was Black female survivors of rape living in poverty, this

study extends the understanding of women who are under-researched but are at greater risk for traumatic experiences.

There are several limitations of the current study design. As with all cross-sectional research, we cannot conclude on the causal and or predictive relationships. Therefore, future studies should seek to examine the impact of the predictor variables in a longitudinal design and test for the cumulative traumatic experiences. The sample size in the current study is limited by its nonrepresentative sample. While it is an advantage for our purposes, the participants in this study were all Black female survivors from predominantly Black communities and therefore limits the generalizability of these findings to other ethnic groups in South Africa and moreso to representatively sampled survivors. Because most women were recruited through the hospital and victim empowerment centers (a convenient sample), it is not known if the relationship found here would be replicated in representatively sampled victims, who should be studied in future research. The sample of female survivors in the current study were those that reported their experience to police and the empowerment centers, thus it may likely be over representing the severity of assault, and the proportion of stranger-perpetrated sexual assault.

Despite these limitations, there is an opportunity in the future to test the model on a representative sample. These findings also reinforce the need for more consistent consideration of social context variables in studies of mental health impacts of sexual assault. Given the high likelihood for victimization of women by male perpetrators in South African townships, PTSD assessment and trauma treatment should focus on understanding further both existing and rape-related factors that increase the risk of stress and depression for sexual assault victims. More attention should also be given to the persistent poverty and other sociodemographic factors and impact on the mental health well-being of female rape survivors especially in the rural areas of South Africa that are plagued by high levels of poverty and inequality—a contributor to limited health care and other services.

The current study controlled for previous sexual assault, but given the reported levels of crime and trauma in the communities of the sampled group, further studies are required in understanding the relation of cumulative exposure to trauma to the mental health outcomes in female survivors of rape. In particular, there is a need to understand whether exposure to other forms of interpersonal violence is related to depression and posttraumatic stress disorder in survivors of rape from these communities. Assessment and treatment focusing on isolated incidents of rape can underestimate the impact of individual occurrences of trauma over a lifetime for victims, and how these events shape their responses and emotional well-being over time. In this way, understanding the interwoven nature of trauma over time is critical in the way in which stress and depression is understood and how treatment is approached.

Moreover, while progress has been made since 2007 by introducing sexual offense courts, the Family Violence Child Protection and Sexual Offenses (FCS) units, and the Thuthuzela Care centers based in health facilities, the specialized responses to sexual violence remain a challenge. In combatting sexual violence it is necessary to alter the social conditions that facilitate the risk of rape in the communities, which includes ensuring the widespread availability and access to services that support victims of rape posttrauma victimization for longer periods. In addition, this also calls for a culturally inclusive ecological model of sexual assault recovery that integrates and extends existing models to better examine the complex factors leading to differential post rape adjustment. This has an impact on both the judicial system and mental health system processes when dealing with rape victims. The findings herein highlight the need for sexual violence prevention programs to be comprehensive and community based to address the multiple levels of risk influences identified in this study.

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