HHS Public Access

Author manuscript

J Aging Health. Author manuscript; available in PMC 2021 October 01.

Published in final edited form as:

J Aging Health. 2020 October ; 32(9): 1244–1257. doi:10.1177/0898264320913450.

Life-Course Trauma and Later Life Mental, Physical, and Cognitive Health in a Postapartheid South African Population: Findings From the HAALSI study

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Abstract

Objective: To investigate the relationships between exposure to life-course traumatic events (TEs) and later life mental, physical, and cognitive health outcomes in the older population of a rural South African community.

Method: Data were from baseline interviews with 2,473 adults aged ≥40 years in the population-representative Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa (HAALSI) study, conducted in 2015. We assessed exposure to 16 TEs, and used logistic regression models to estimate associations with depression, post-traumatic stress disorder (PTSD), activities of daily living disability, and cognitive impairment.

Results: Participants reported an average of 5 (*SD* = 2.4) TEs over their lifetimes. Exposure was ubiquitous across sociodemographic and socioeconomic groups. Trauma exposure was associated with higher odds of depression, PTSD, and disability, but not with cognitive health.

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Author Contributions

K.K. and L.B. designed the HAALSI study. K.K. oversaw collection of baseline data. C.F.P. and L.B. conceived the study. C.F.P. analyzed the data and drafted the article. All authors interpreted the data, critically revised the article, and approved the final version. All authors agree to be accountable for all aspects of the work.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

Ethics committee approvals for HAALSI were obtained from the University of the Witwatersrand Human Research Ethics Committee (number M141159), the Harvard T.H. Chan School of Public Health Office of Human Research Administration (number 13–1608), and the Mpumalanga Provincial Research and Ethics Committee. The baseline HAALSI data set and subsample data are freely available in the Harvard Dataverse repository at http://dx.doi.org/10.7910/DVN/F5YHML and https://doi.org/10.7910/DVN/TW84UI

Supplemental Material

Supplemental material for this article is available online.

Discussion: Results suggest that TEs experienced in earlier life continue to reverberate today in terms of mental health and physical disability outcomes in an older population in rural South Africa.

Keywords

traumatic events; physical health; PTSD; depression; aging; Africa

Introduction

Research from high-income countries suggests that a range of traumatic events (TEs) including abuse, neglect, and exposure to or experience of violence are important determinants of physical and mental health in later life (Kaufman et al., 2018; Riem & Karreman, 2019; Wiehn et al., 2018). Trauma in childhood is thought to have direct effects on cognitive development, inflammation, and stress hormones, leading to poor cardiovascular and cardiometabolic outcomes and higher rates of depression and anxiety (Danese et al., 2009; Danese & McEwen, 2012; Suglia et al., 2018; Tosevski & Milovancevic, 2006). During adulthood, exposure to TEs has been associated with elevated stress responses, post-traumatic stress disorder (PTSD), poor mental health, and cardiovascular events (Creamer & Parslow, 2008; Hendrickson et al., 2013; Scott et al., 2013; Suglia et al., 2015; Sumner Jennifer et al., 2015).

The generalizability of these associations outside of high-income countries is not well established in the existing literature (Scott et al., 2013). Here, we focus on a rural South African population, in Agincourt subdistrict in Mpumalanga Province. Similar to the older generation of Black South Africans across the country, this population lived much of their lives exposed to structural racism during apartheid, which was a formal system of legislated racial segregation in place from 1948 to 1994. In addition, nearly a third of the region's residents are former refugees from neighboring Mozambique, who fled to the area to escape the violent Mozambican civil war from 1983 to 1992 (Hargreaves et al., 2004). HIV prevalence in the province is high at just below 23%, though the widespread uptake of antiretroviral therapy has begun to increase life expectancies in the region in recent years (Kabudula et al., 2017; Payne & Kohler, 2017; Simbayi et al., 2019). As with much of South Africa, the population of Agincourt is now rapidly aging, with the share of the population aged above 65 years now greater than that below age 5 (He et al., 2016). However, the relationships between life-course trauma experienced in the historical contexts of apartheid and the Mozambican civil war on aging-related health outcomes among older adults are unknown.

Existing Evidence on TEs and Health in Middle- and High-Income Settings

Some notable research on health outcomes associated with TEs has been conducted in South Africa and in other middle-income settings. Much of this research has stemmed from the World Health Organization's (WHO) World Mental Health (WMH) Survey Initiative, a landmark group of national-level studies with a large and diverse cross-national sample (Alonso et al., 2013; Kessler et al., 2009; WHO WMH Survey Consortium, 2004). Studies using WMH data have found relatively high exposure to TEs across high- and middle-

income contexts and linked these exposures with the onset of chronic physical health conditions including heart disease, hypertension, and diabetes (Benjet et al., 2016; Scott et al., 2013). In South Africa, the South African Stress and Health (SASH) Survey, conducted in 2002 to 2005 as part of the WMH survey, observed a high prevalence of anxiety and mood disorders in comparison with other countries that participated in the WMH surveys, and a high proportion of these disorders were considered severe (Herman et al., 2009; Williams et al., 2004). In the SASH population, exposure to TEs during apartheid was associated with increased prevalence of psychopathologies, PTSD, and chronic diseases including cardiovascular disease, pain, and respiratory conditions (Atwoli et al., 2013, 2015, 2016; Kaminer et al., 2008).

Despite the key insights given by the WHO WMH Survey Initiative and other research in low- and middle-income settings, these studies have focused primarily on younger adult ages (Atwoli et al., 2016; Benjet et al., 2016; Scott et al., 2013). For example, less than 9% of the SASH sample was aged above 60 years (Atwoli et al., 2016). Given the rapid aging of South Africa's population, the investigation of aging-related mental, physical, and cognitive health outcomes in relation to life-course trauma is warranted. Prior research has suggested that older adults may be more likely to experience TEs with increasing age (Creamer & Parslow, 2008) and exhibit greater stress symptoms in response to recent traumas (Kimhi et al., 2012). Cumulative exposure to trauma has also been shown to accelerate age-related declines in physical functioning, cognition, mobility, and self-rated health among older individuals (Blanchette et al., 2019; Krause et al., 2004; Munro et al., 2019) and is related to depressive symptoms and lower life satisfaction among older adults (Ciarleglio et al., 2018; Keinan et al., 2012). However, the bulk of this evidence is from high-income countries. To date, there is little existing research on cumulative trauma exposure and later life health in low- and middle-income settings.

Sociodemographic Patterns of TE Exposure

In high-income countries, exposure to TEs is patterned by sociodemographic factors. Evidence from high-income settings indicates that individuals with low socioeconomic status (SES), with lower social supports, and who are members of racial and/or ethnic minorities are more likely to experience TEs (Hatch & Dohrenwend, 2007; Nurius et al., 2015). In research including a number of low- and middle-income countries, Benjet et al. (2016) found less consistent patterning of traumatic exposures by SES, although higher education was associated with lower risk of witnessing or experiencing violence, but a higher risk of automobile accidents and sexual assault. They additionally found that married adults reported consistently fewer exposures to TEs than nonmarried adults. Given the historical context of the Agincourt region in South Africa, it is unclear whether these types of sociodemographic characteristics similarly protected the older generation of adults from experiencing TEs. Systematic oppression stemming from apartheid and the postapartheid rise in violence and economic strife may have led to exposures to trauma being more widespread, and less sociodemographically patterned, than would be expected from existing research in high-income countries (HICs). For example, economic gradients in the Agincourt region are fairly small, both in terms of assets and consumption, meaning that

only a small portion of the population may have had access to enough resources to be protective (Riumallo-Herl et al., 2019).

A Life-Course Understanding of Connections Between TEs and Later Life Health

Although prior literature has established a clear relationship between exposure to life-course TEs and later life physical, mental, and cognitive health, the specific mechanisms linking these factors are not well understood (Falkingham et al., 2019). As in much of life-course research, establishing clear event–outcome relationships is difficult due to the time span between events and outcomes and the complex and interrelated nature of social, economic, psychological, and physiological factors that develop over an individual's life course. Due to the complexity of the life course, these pathways are perhaps best understood through conceptual and theoretical frameworks, rather than purely through empirical study.

The two primary conceptual frameworks applicable to the study of life-course TEs and later life health are stress proliferation theory (Pearlin, 2010; Pearlin et al., 1981, 2005) and cumulative inequality theory (Ferraro & Shippee, 2009). Stress proliferation theory states that later life health and well-being are shaped by a cumulative process of unequal exposure to stressors, with different groups in society (defined by aspects of social identity such as gender, race, ethnicity, and national origin) having differential exposures to health-related stressors (Pearlin et al., 2005). Stressors can be both chronic (long-term exposures to poverty, discrimination, or unequal access to societal resources) or acute, and they accumulate to cause long-term inequalities in health. Cumulative inequality theory builds on the stress proliferation theory, stating that these accumulated stressors and inequalities can also affect an individual's ability to access supports and resources that may ameliorate age-related declines in health and well-being (Ferraro & Shippee, 2009). That is, individuals with greater accumulated stress (through traumas or chronic adversity) may both be at greater risk of facing more stressors and have fewer resources to manage them.

Guiding Framework

In sum, there is a gap in evidence on the relationship between life-course TEs and later life health in low-income contexts such as regions of South Africa. In particular, the history of apartheid and exposure to conflict from the Mozambican civil war may have led to different types of exposures and distributions of exposures than those observed in high-income countries. Using life-course theory cited earlier as a guiding framework, we thus aimed to (a) describe the sociodemographic patterning of life-course TEs among middle-aged and older adults in rural northeast South Africa; (b) investigate the relationships between life-course trauma with depressive symptoms, PTSD symptoms, disability in activities of daily living (ADLs), and cognitive impairment; and (c) determine whether these relationships differ by the type of TEs an individual was exposed to.

Method

Study Design and Data Collection

We used data from the 2015 baseline interviews and assessments in "Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa" (HAALSI).

HAALSI is representative of the underlying population aged 40 and above in Agincourt subdistrict, Mpumalanga Province, South Africa (Gómez-Olivé et al., 2018). The Agincourt subdistrict covers a region of approximately 450 km^2 including 32 villages with a population of approximately 110,000 people (Gómez-Olivé et al., 2018). Since 1992, a regional census called the "Agincourt Health and Socio-Demographic Surveillance System" (AHDSS) has been operating to track vital and health statistics in the region by the South African Medical Research Council (MRC)/Wits Rural Public Health and Health Transitions Research Unit (Kahn et al., 2012). HAALSI used the AHDSS as its sampling frame, whereby eligible participants were men and women aged 40 or above on July 1, 2014, who had lived in the study area for at least 12 months prior to the 2013 AHDSS census (Gómez-Olivé et al., 2018). The lower limit of the age range at 40 years was selected for the HAALSI sample because life expectancy in this region is much lower than in high-income countries (in 2015, 60.6 years at birth for men and 64.3 years at birth for women; Statistics South Africa, 2015). A total of 5,059 eligible men and women aged 40 years or above consented to participate and were included in HAALSI (85.9% response rate). The present analysis is on a subsample of 2,491 adults aged 40 to 79 who were randomly selected from the larger cohort to participate in a detailed substudy including laboratory assessments and in-depth life-history data (75.2% response rate). Supplemental Table S1 compares sociodemographic and health characteristics between all HAALSI participants aged 40 to 79 years (N = 4,509), the life-history subsample used in these analysis (N = 2,491), and the HAALSI participants aged 40 to 79 years not included in the life-history subsample (N = 2,018). Eligible individuals who were interviewed in the life-history sample were slightly younger on average, with the life-history cohort overrepresenting those aged 40 to 49 and under-representing those aged 60 to 69 years. Only slight variations exist in other characteristics.

Study Setting

This study was conducted in the rural Agincourt subdistrict in Mpumalanga Province, South Africa. During apartheid (1948–1994), Agincourt was designated as a "homeland" for xiTsonga-speaking Black South Africans, who were forcibly relocated to this region on the basis of their ethnic identity as part of apartheid's legislated racialized segregation strategy. These "homeland" areas of South Africa had limited and poor-quality educational opportunities, inadequate health care services, scarce employment opportunities, and high rates of exposure to community violence and abuse (United Nations, 1963). Since the end of apartheid, the economic circumstances of Agincourt have improved, but there remain gaps in basic services such as transportation, health, and sanitation facilities (Barrett, 2005). Furthermore, there remain persistently high rates of violent crime, sexual assault, and theft more broadly in South Africa (Abrahams et al., 2013; Cohn & Breetzke, 2017; Otieno et al., 2015).

Measures

Exposures.—Our primary measure of exposure to traumatic life-course events comes from a module adapted from the English Longitudinal Study of Aging (ELSA) life-history questionnaire (Steptoe et al., 2013). The measure of TEs was translated and back-translated from English to xiTsonga, the regional language, to ensure reliability (Menon et al., 2012). The life-history module asks about whether the respondent experienced any of 16 potentially

TEs during their lifetime, which were grouped into five categories: childhood environment, community violence, illness/accident/disaster, social/family environment, and war violence (Table 1). We use two parameterizations of this index in our analyses—a simple count of how many TEs an individual has experienced and binary variables for exposure to different types of events (Kessler et al., 2017). These binary variables take a value of 1 if the individual had experienced two or more TEs in that category, and 0 if they had experienced 1 or no events in that category. Additional analyses (not shown) using a lower threshold of one event in each category produced overall similar results, but with substantial ceiling effects given the high rates of exposure to life-course trauma in this sample.

Covariates.—Sociodemographic factors thought to be associated with the likelihood of having experienced TEs were age group (40–49, 50–59, 60–69, 70–79), sex, country of birth (South Africa, Mozambique, or other), household size, marital status, level of education, no formal education, some primary (1–7 years), some secondary (8–11 years), secondary or more (12+ years), household assets (in quintiles), and father's educational attainment and occupational skill level as a proxy for early-life socioeconomic status (SES) (Andrade et al., 2014; Benjet et al., 2016; Kobayashi et al., 2017).

Outcomes.—Depressive symptoms were measured using the seven-item Center for Epidemiological Studies–Depression (CES-D) Scale, using a cutoff of 3 or greater to indicate the presence of depressive symptoms (Geldsetzer et al., 2018; Levine, 2013; Payne et al., 2017; Radloff, 1977; Steffick, 2000). PTSD symptoms were measured using the seven-item Short Screening Scale for PTSD battery, dichotomized with score of 4 or more considered indicative of PTSD symptoms (Breslau et al., 1999). The ADLs scale was administered (Katz et al., 1963) with individuals considered as ADL disabled if they reported difficulty in any of the following: walking across a room, toileting, bathing, eating, or getting in/out of bed. Cognitive impairment was defined as scoring <1.5 standard deviations below the mean composite time orientation and episodic memory score in the HAALSI cognitive battery, or requiring a proxy interview with a family member or friend, with "fair" or "poor" proxy-reported memory (Kobayashi et al., 2017, 2019). Time orientation was assessed as the ability to state the current day, month, year, and South African president (4 points total), and episodic memory was assessed as immediate and delayed recall of a 10-word list presented verbally by the interviewer (20 points total).

Statistical Analysis

First, we examined the sociodemographic patterning of TEs. We conducted simple bivariate analyses, comparing the mean number of events experienced across sociodemographic categories, and we conducted multiple linear regression on the count of TEs to understand the combined associations. We generated radar plots to explore the sociodemographic pattern of exposure to event types graphically.

To understand the associations between life-course trauma and psychosocial, physical, and cognitive health outcomes, we specified logistic regression models to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the associations between the total number of TEs experienced, and each of (a) depressive symptoms, (b) PTSD symptoms, (c) ADL

limitations, and (d) cognitive impairment (all yes vs. no), with adjustment for sociodemographic controls. Our primary investigations used a simple index (count) of TEs experienced as the primary exposure. Although this parameterization has a number of benefits— ease of interpretability, ease of computation, and more direct comparability with other samples—it is likely that there is substantial heterogeneity in the later life and life-course effects of exposure to these different events. That is, experiencing a violent attack or rape may associate with worse later life outcomes than spending time caring for a sick or injured loved one. We thus conducted additional analyses using the binary indicators of exposure to specific categories of events (as described above), to determine how different types of traumas may differentially associate with the later life health outcomes. All analyses were conducted using Stata version 15 (StataCorp, 2017).

Results

Sociodemographic Pattern of Exposure to Trauma

Exposure to traumatic life-course events was high across all HAALSI population subgroups. In bivariate analyses shown in Table 2, the lowest average number of events of any subgroup was 4.4 (95% CI = [4.21, 4.68], for those aged 70– 79), and the highest was 5.4 (95% CI = [5.26, 5.61], for those born in Mozambique). The sociodemographic factor most strongly associated with experiencing TEs was age, with those aged 50 to 59 and 60 to 69 years averaging 5.3 (95% CI = [5.12, 5.42]) and 5.1 (95% CI = [4.95, 5.28]) events, respectively, which was substantially higher than exposure in younger and older age groups (Table 2). Experiencing a greater number of TEs was associated with being male, born in Mozambique, and being separated or divorced (relative to never married; Table 2). There was no substantial variation in exposure to TEs by literacy, childhood socioeconomic position, or HIV status (Table 2). The bivariate analyses suggest a slight gradient by education and wealth, with wealthier and more educated individuals reporting slightly less exposure to TEs. However, these gradients were nonstatistically significant in the multivariable analyses controlling for other sociodemographic characteristics.

Figure 1 displays radar plots of exposure to different categories of TEs by sociodemographic characteristics. Patterns of exposure were relatively stable across sociodemographic groups. Females reported somewhat more exposure to poor social and family environment than men (Panel A), and individuals aged 50 to 69 years were more likely to report higher exposure to poor social and family environment and illness, accidents, and disasters than individuals aged 40 to 49 years and 70 to 79 years (Panel B). Individuals with no schooling (Panel C) and those lacking literacy (Panel D) were more likely to report exposure to war violence, likely due to the limited schooling available to the former Mozambican refugees in the sample. A substantially higher proportion of former Mozambicans report experiencing war violence (Panel E). Individuals who were separated or divorced reported slightly higher experience with poor social/family environment and illnesses, accidents, and disasters (Panel F). Very little variation in exposure to trauma was seen by wealth quintile, except for war violence, again likely due to the overrepresentation of former Mozambican refugees in the poorer wealth quintiles. Little variation was seen by HIV status.

Associations Between Life-Course Trauma and Later Life Health

Table 3 describes the associations between cumulative exposure to TEs and each of the presence of depressive symptoms, the presence of PTSD symptoms, ADL disability, and cognitive impairment. Each additional TE reported was associated with an 8% (95% CI = [1.03, 1.14]) increase in the odds of reporting depressive symptoms. A one-unit increase in the number of TEs was associated with a 17% (95% CI = [1.07, 1.29]) increase in the odds of having PTSD symptoms. The events were not only associated with psychosocial health among older adults—each additional trauma associated with an 11% (95% CI = [1.03, 1.18]) increase in the odds of being ADL limited. However, we found no association between life-course trauma and later life cognitive impairment.

Table 4 presents the corresponding results for specific categories of TEs. Exposure to illnesses, accidents, and disasters was associated with a 36% (95% CI = [1.08, 1.72]) increase in the odds of later life depressive symptoms. Coefficients suggest that individuals who experienced war violence, high exposure to poor social/family environment, and high exposure to illnesses, accidents, and disasters may be more likely to have PTSD symptoms, though none of these coefficients reached significance at the $p < .05$ level. Individuals who experienced severe illnesses, accidents, and disasters were nearly twice as likely (OR = 1.90, 95% CI = [1.29, 2.80]) to report an ADL disability, suggesting that these traumas may have led to lasting physical consequences. We observed no significant associations between specific TEs and odds of cognitive impairment in later life.

Discussion

In this article, we aimed to investigate the sociodemographic patterning and later life health consequences of life-course trauma in a cohort of older adults in rural South Africa. This study population represents a unique group of individuals who lived through a period of intense political turmoil, the systematic oppression of apartheid, and survived through the peak of the HIV/AIDS epidemic in South Africa. Approximately one third of the study sample were former refugees from Mozambique, who fled to the Agincourt region during Mozambique's 1983 to 1992 civil war. As such, they represent a unique population in which to study the health consequences during aging of previous life-course trauma.

The HAALSI population had quite high rates of life-course exposure to TEs. This population reported experiencing an average five of the 16 TEs in the questionnaire, compared with a mean of 2.3 among respondents in the ELSA life-history study who were asked the same set of questions (Falkingham et al., 2019). Our analyses investigated variation in exposure to trauma by sociodemographic factors, and the relationships between accumulated life-course trauma and later life physical, mental, and cognitive health. We found that in this postapartheid South African population, exposure to TEs did not follow the clear sociodemographic patterning commonly seen in higher income contexts (Nurius et al., 2015; Pearlin et al., 2005). Contrary to results from higher income counties, we observed that wealth, education, and higher early-life SES were minimally protective against experiencing traumatic life-course events. The age patterns of TEs suggested that exposure was highest among individuals aged 50 to 69 years. These cohorts were born between 1946 and 1965, and thus lived the entirety of early and midlife under the apartheid system. In

addition, the Mozambican-born sample in these ages would have been at prime adult ages during the civil war and refugee migration, exposing them to higher rates of violence and conscription (Gersony, 1988; Weinstein & Francisco, 2005). The distributions of socioeconomic variables were narrow, with few individuals at high levels of wealth, education, or early-life SES. Hence, in this population that was largely barred from obtaining social mobility due to legislated racism over much of the 20th century, social and socioeconomic advantages may have been rare enough to provide limited protection against the experience of adversity at the population level.

Although the patterning of exposure to trauma was different than that observed in prior work in high-income contexts (Vitaliano et al., 2018), our results suggest that the later life repercussions of experiencing trauma in this population were in line with previous literature. Consistent with prior research, and as embedded in conceptual life-course theoretical models mentioned earlier in the article (Ferraro & Shippee, 2009; Pearlin, 2010), individuals who experienced greater cumulative life-course exposures to adversity and trauma had substantially greater odds of experiencing later life depressive and PTSD symptoms and functional disability. We find that the type of adversity and trauma experienced has different associations with different facets of later life health—experiencing illnesses, accidents, and disasters is linked to a greater likelihood of experiencing depressive symptoms and ADL disability. These findings align with theories of stress proliferation and cumulative disadvantage from the life-course literature, in finding that both aggregated exposure to adverse events and TEs, and acute exposures, are linked with later life outcomes.

These associations occur in a rural context where medical and institutional systems are, in large part, poorly equipped to deal with issues of mental health and physical caregiving (Geldsetzer et al., 2018; Harling et al., 2019; Patel et al., 2018). Compared with more urbanized areas of South Africa, the HAALSI sample represents an older population with limited access to health care due to poor distribution of health care providers in rural parts of the country. Furthermore, although the proportion of junior doctors and health care professionals has increased in rural areas due to a mandatory community service program (Reid et al., 2018), provision of specialized services for aged care, mental health, and cognitive health is very limited in this rural area (Geldsetzer et al., 2018; Gómez-Olivé et al., 2018). A recent qualitative study conducted by Naidoo and van Wyk partly in rural and partly in urban regions of the Kwazulu Natal region of South Africa yielded some interesting explanations of the experience of older adults in relation to health care. Although their qualitative findings do not aim to explore differences in rural and urban samples, they did find that long waiting times in health facilities were a concern for older patients (Naidoo & van Wyk, 2019). In common with other rural populations in low- and middle-income countries (LMICs), access to care is limited by both the low availability of specialty services and the substantial travel distances required to access care that is available (Lai et al., 2019; Tetteh et al., 2019). Although the HAALSI sample is representative of the Agincourt subdistrict and similar to many other rural regions in South Africa, our results may not fully generalize to other non-rural regions of the country.

These limitations leave the family as the primary provider of care for those experiencing impairments in mental health and everyday physical activities, which can lead to household

members leaving the workforce to care for family, or to inadequate care that leaves older individuals with unmet need and impaired ability to participate in society (Harling et al., 2019; Payne et al., 2013). In addition, the observed age pattern of TE exposure suggests that the cohorts most affected are currently in their 50s and 60s. Given the observed impacts of life-course exposure to trauma on health and functioning, health systems may need to prepare for an increase in elderly populations at higher risk of depression, PTSD, and functional limitations in coming years.

Surprisingly, we found no relationship between trauma and cognitive impairment in later life. This relationship is well established in high-income contexts (Qureshi et al., 2011; Ritchie et al., 2011; Tsolaki et al., 2010). There are several potential mechanisms that may have led to this surprising lack of association. First, the measure of cognitive impairment used in this study is somewhat course. Future work, using more detailed cognitive instruments to investigate domain-specific associations, is needed to further understand whether this lack of association holds for more granular cognitive measures. Second, sample sizes of individuals aged 70+ are somewhat small in HAALSI (representing just more than 20% of the sample, see Supplemental Table S1), and much of the study population is currently at ages where substantial cognitive impairment is rare. Continued follow-up as the study sample ages will be key for determining whether this currently observed lack of association holds. In particular, longitudinal data will be of central importance in understanding whether exposure to TEs is associated with the rate of aging-related cognitive decline over time.

Limitations

The HAALSI data are currently cross-sectional as they are a baseline of a cohort study, and as such, we are unable to establish causality in any of the relationships we investigate. Survey items are self-reported, and responses could be influenced by recall bias or social desirability (Hardt & Rutter, 2004). In particular, female responses to the question on sexual assault were lower than expected, in light of the high rates of sexual and intimate partner violence reported in South Africa from other sources (Statistics South Africa, 2018). This and any other underreporting of trauma exposure, if nondifferential with respect to the health outcomes, could mean our results are underestimates of the true associations. Our study also relies on a 16-item questionnaire to measure TEs that, although fairly comprehensive, may overlook potential sources of life-course TEs. The survey question on personal illnesses or accidents (“have you experienced a life-threatening illness or accident”) was intended to capture acute, traumatic health events. However, we recognize that it may have also captured some longer term, chronic health conditions, and thus associations with this measure and later life health may represent the progression of an illness over the life course, rather than deriving from the trauma of experiencing an acute health event.

Our models investigating the association between TEs and later life outcomes adjust for sex, birth cohort (age), education, country of birth, and father’s occupational status as “fixed” confounders that are determined in early life. We did not adjust for the other socioeconomic variables measured in the HAALSI study interviews (e.g., current employment status, marital status, household assets, receipt of social support grants), as they reflected

socioeconomic conditions at the time of study interview and did not follow the necessary temporal sequencing to be confounders of the life-course TE–later life health relationship. Rather, later life socioeconomic conditions may lie on the causal pathway and their inclusion in models would likely result in "over-adjustment" of the main effects of the life-course TEs under study. We do recognize the potential for residual confounding by other unmeasured early-life socioeconomic circumstances that influence both the probability of exposure to TEs across the life course and later life health.

Selective survival of individuals who experienced less severe traumas could have led to the surviving population having less exposure to trauma when compared with the underlying birth cohorts that they came from. If this were the case, and if survival is also patterned by levels of the health outcomes prior to the start of the study, then selective survival bias could have distorted our results.

Future analyses using forthcoming longitudinal data on the HAALSI cohort are needed to elucidate the relationships between life-course trauma and incident health outcomes over time. In particular, the cross-sectional analyses used in this article are blind to potential differences in the rate of decline in various measures—that is, we would anticipate that individuals with more disadvantaged life courses may experience more rapid declines in physical, mental, and cognitive health in later life. In addition, longitudinal data will allow the exploration of protective behaviors, such as the role of social supports, family and friend networks, religious attendance, and other factors in promoting resilience and mitigating the impact of life-course trauma exposure.

Conclusion

In sum, our findings suggest that the legacy of systematic disadvantage and structural violence experienced by older Black South Africans continues to reverberate in terms of later life psychosocial and physical health. Exposure to TEs across the life course was more ubiquitous than exposures observed in other, mostly high-income contexts; yet, the adverse relationships with later life mental health and physical disability outcomes were generally similar. Our findings demonstrate the importance of historical political, social, and socioeconomic context in shaping variation in health at older ages. We emphasize the need for researchers to critically evaluate whether existing evidence on aging and health from high-income contexts can be meaningfully generalized to lower income settings.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

The authors would like to thank Sam Liu and the HAALSI study team, participants, and the Agincourt community.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Institute of Aging at the National Institute of Health (1P01AG041710-01A1, HAALSI—Health and Aging in Africa: Longitudinal Studies of INDEPTH Communities).

The Agincourt HDSS was supported by the Wellcome Trust, UK (058893/Z/99/A, 069683/Z/02/Z,085477/Z/08/Z and 085477/B/08/Z), the University of the Witwatersrand and South African Medical Research Council. C.F.P. acknowledges support from the ANU Futures Scheme. S.M. is supported by a Claude Leon Award for early career researchers (2018) and a self-initiated research fellowship from the South African Medical Research Council (2018–2020).

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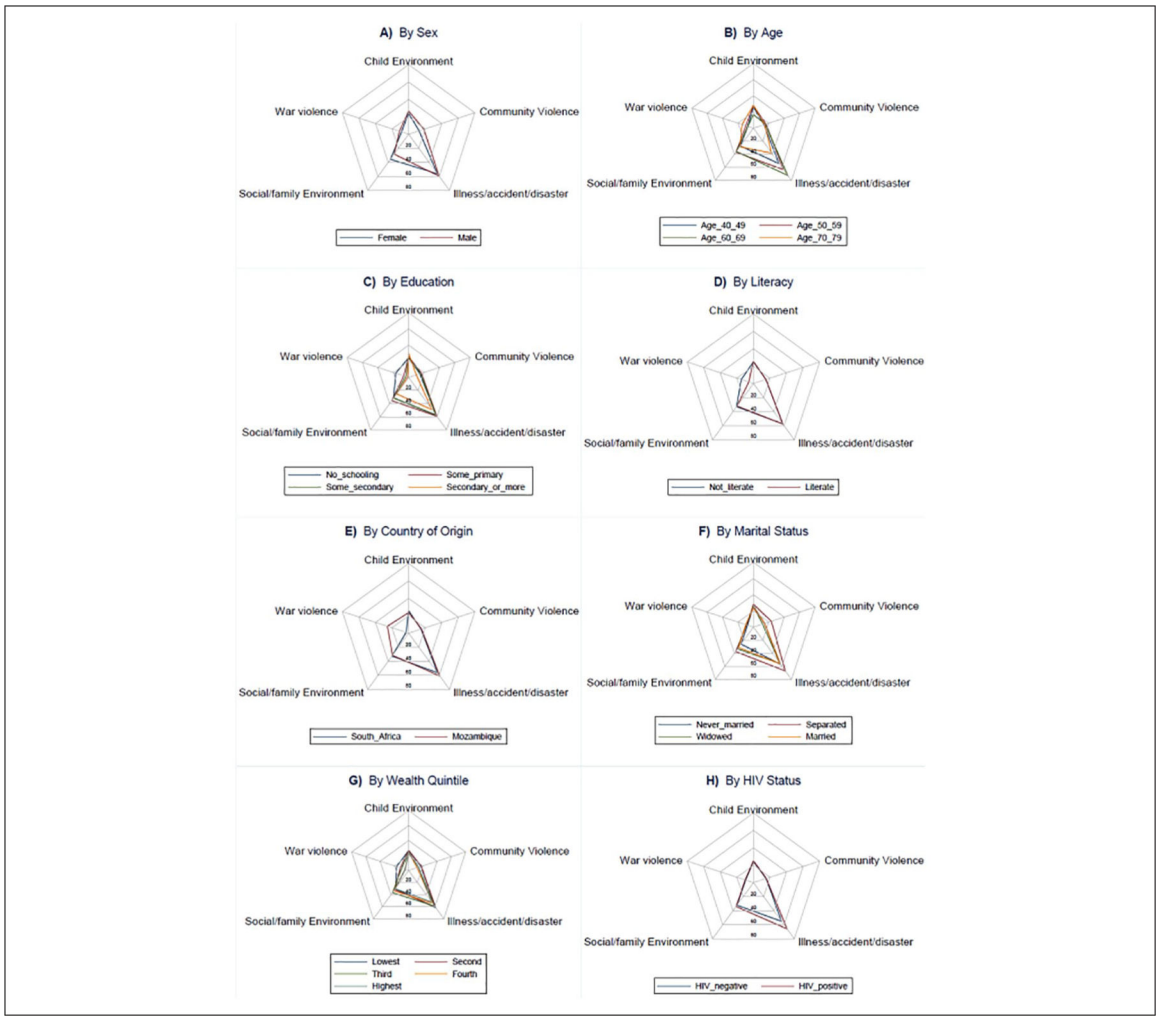

Figure 1.

Percentage of respondents exposed to different categories of traumatic events by sociodemographic characteristics, HAALSI life-history sample 2015.

Note. HAALSI = Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa.

Table 1.

Distribution of Exposure to Traumatic Life-Course Events, HAALSI Life-History Sample 2015.

Adverse life-course events	HAALSI	
	N	%
Childhood environment		
Long-term parental unemployment (age <16)	331	15
Parents often argue (age <16)	568	25
Parents often drink/use drugs (age <16)	598	25
Physically abused by parents (age <16)	935	38
Social/family environment		
Close family addicted to drugs/alcohol	524	21
Provided long-term care to disabled friend/relative	525	21
Experienced severe financial hardship	2,043	83
Illness/accident/disaster		
Had a life-threatening illness or accident	1,254	51
Close friend/family injured or killed from serious accident or injury	1,662	67
Experienced a major natural disaster	1,190	48
Community violence		
Victim of serious physical attack	658	27
Witness violent act causing injury/death not in war	1,211	49
Victim of sexual assault	52	2
War violence		
Fired a weapon in combat or been fired upon	120	5
Witness serious injury/death in combat	385	16
Lost close friend/relative in war	345	14
Average number of life-course events	5.01	
(*SE*)	(2.44)	
N	2,491	

Note. HAALSI = Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa.

Table 2.

Sample Characteristics and Baseline Associations With Total Number of Traumatic Life-Course Events, HAALSI Life-History Sample 2015.

Sample Characteristics	*N* (%)	Mean number of traumatic events	95% CI	Linear association with events
Age				
40–49	609 (25%)	4.8	[4.63, 4.98]	Reference
50–59	816 (33%)	5.3	[5.12, 5.42]	0.43**
60–69	524 (21%)	5.1	[4.95, 5.28]	0.20*
70–79	522 (21%)	4.4	[4.21, 4.68]	−0.41**
Gender				
Women	1,444 (58%)	4.8	[4.71, 4.94]	Reference
Men	1,045 (42%)	5.1	[4.98, 5.26]	0.43***
Education category				
No formal education	996 (40%)	5.1	[4.93, 5.23]	Reference
Some primary (1–7 years)	946 (38%)	5.0	[4.84, 5.13]	0.13
Some secondary (8–11 years)	323 (13%)	4.7	[4.49, 4.97]	0.0064
Secondary or more (12+ years)	231 (9%)	4.6	[4.31, 4.84]	−0.073
Literacy				
Not literate	1,089 (45%)	5.1	[4.93, 5.21]	Reference
Literate	1,380 (56%)	4.9	[4.74, 4.97]	−0.17
Country of origin				
South Africa	1,764 (71%)	4.7	[4.65, 4.85]	Reference
Mozambique or other	719 (29%)	5.4	[5.26, 5.61]	0.59***
Marital status				
Never married	154 (6%)	4.8	[4.42, 5.15]	Reference
Separated/divorced	351 (14%)	5.3	[5.11, 5.58]	0.48*
Widowed	663 (27%)	4.8	[4.6, 4.95]	0.12
Currently married	1,302 (53%)	4.9	[4.82, 5.07]	0.14
Household asset index				
First (lowest) quintile	522 (21%)	5.3	[5.09, 5.49]	Reference
Second quintile	497 (20%)	5.1	[4.91, 5.33]	0.046

Sample Characteristics	*N* (%)	Mean number of traumatic events	95% CI	Linear association with events
Third quintile	473 (19%)	5.0	[4.8, 5.21]	0.031
Fourth quintile	484 (20%)	4.7	[4.51, 4.91]	−0.25
Fifth (highest) quintile	494 (20%)	4.6	[4.4, 4.79]	−0.31
Father's education				
No formal education	1,915 (78%)	5.0	[4.89, 5.09]	Reference
Some education	371 (15%)	4.8	[4.62, 5.06]	0.0035
Father's occupational class				
Skilled	1,235 (50%)	5.0	[4.85, 5.11]	Reference
Unskilled	719 (29%)	4.9	[4.69, 5.01]	−0.086
Other	271 (11%)	5.0	[4.76, 5.29]	0.090
Do not know	241 (10%)	5.0	[4.66, 5.27]	0.14
HIV status				
HIV negative	1,730 (69%)	4.8	[4.74, 4.96]	Reference
HIV positive	609 (24%)	5.2	[5.07, 5.41]	0.18
Refused or indeterminate result	159 (6%)	4.9	[4.53, 5.28]	−0.03

Note. HAALSI = Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa; CI = confidence interval.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3.

ORs for Depressive Symptoms, PTSD Symptoms, ADL Disability, and Cognitive Impairment by Exposure to TEs, HAALSI Life-History Sample 2015.

	Depressive symptoms	PTSD symptoms	ADL disabled	Cognitively impaired
Covariates	**OR/95% CI**	**OR/95% CI**	**OR/95% CI**	**OR/95% CI**
Mean of dependent variable (*SD*)	0.17 (0.38)	0.05 (0.21)	0.06 (0.23)	0.08 (0.27)
Total number of TEs	1.09*** [1.04, 1.14]	1.17*** [1.07, 1.29]	1.11** [1.04, 1.19]	1.04 [0.97, 1.13]
Age (40–49 = reference)				
50–59	1.05 [0.76, 1.44]	1.13 [0.66, 1.94]	1.01 [0.61, 1.68]	2.05 [0.82, 5.16]
60–69	1.31 [0.92, 1.86]	1.05 [0.57, 1.92]	1.01 [0.56, 1.84]	2.94* [1.16, 7.45]
70–79	1.81** [1.27, 2.58]	1.15 [0.61, 2.16]	1.99** [1.19, 3.34]	6.36*** [2.61, 15.51]
Male (female = reference)	0.85 [0.68, 1.06]	0.63* [0.41, 0.95]	0.95 [0.67, 1.35]	0.95 [0.64, 1.42]
Observations	2,479	2,454	2,479	2,461

Note. Additional controls (coefficients not shown) include level of schooling, country of birth (Mozambique vs. South Africa), and father's occupational class (unskilled, skilled, other, unknown). PTSD = posttraumatic stress disorder; ADL = activity of daily living; TE = traumatic event; HAALSI = Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa; OR = odds ratio; CI = confidence interval.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4.

ORs for Depressive Symptoms, PTSD Symptoms, ADL Limitations, and Cognitive Impairment by Categories of Traumatic Life-Course Events, HAALSI Life-History Sample 2015.

	Depressive symptoms	PTSD symptoms	ADL disabled	Cognitively impaired
Covariates	OR/95% CI	OR/95% CI	OR/95% CI	OR/95% CI
Mean of dependent variable (*SD*)	0.17 (0.38)	0.05 (0.21)	0.06 (0.23)	0.08 (0.27)
Category of traumatic events				
Child environment	1.22 [0.96, 1.56]	1.19 [0.79, 1.78]	0.66 [0.43, 1.02]	1.00 [0.63, 1.58]
Social/family environment	1.20 [0.95, 1.50]	1.43 [0.99, 2.07]	1.09 [0.76, 1.54]	1.05 [0.68, 1.61]
Illness/accident/disaster	1.36** [1.08, 1.72]	1.42 [0.95, 2.13]	1.90** [1.29, 2.80]	0.93 [0.61, 1.42]
Community violence	1.04 [0.77, 1.41]	1.18 [0.71, 1.96]	1.22 [0.76, 1.96]	1.27 [0.75, 2.13]
War violence	0.79 [0.53, 1.16]	1.53 [0.88, 2.66]	1.14 [0.68, 1.90]	1.45 [0.87, 2.41]
Age (40–49 = reference)				
50–59	1.04 [0.76, 1.42]	1.13 [0.67, 1.90]	1.01 [0.61, 1.68]	1.47 [0.64, 3.39]
60–69	1.28 [0.90, 1.80]	0.96 [0.52, 1.76]	0.91 [0.51, 1.63]	2.06 [0.89, 4.75]
70–79	1.88*** [1.33, 2.67]	1.06 [0.57, 1.98]	2.25** [1.35, 3.74]	4.13*** [1.91, 8.93]
Male (female = reference)	0.90 [0.72, 1.13]	0.63* [0.42, 0.96]	0.95 [0.67, 1.35]	0.95 [0.64, 1.41]
Observations	2,479	2,454	2,479	2,461

Note. Additional controls (coefficients not shown) include level of schooling, country of birth (Mozambique vs. South Africa), and father's occupational class (unskilled, skilled, other, unknown). PTSD = posttraumatic stress disorder; ADL = activity of daily living; HAALSI = Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa; OR = odds ratio; CI = confidence interval.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

J Aging Health. Author manuscript; available in PMC 2021 October 01.