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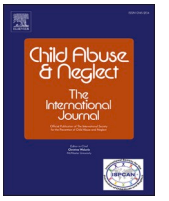

The impact of parental acceptance and childhood maltreatment on mental health and physical pain in Burundian survivors of childhood sexual abuse

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ABSTRACT

Background: Parental support has been suggested to mitigate mental and physical consequences following childhood sexual abuse (CSA). However, many CSA survivors experience parental rejection post-CSA.
Objective: We aimed to understand the impact of abuse-specific parental acceptance on post-traumatic stress disorder (PTSD) and physical pain in Burundian CSA-survivors. We further assessed the significance of parental acceptance among known risk factors for predicting PTSD.
Methods, participants, and settings: Participants ($N = 131$, 80.9 % female, mean age 16.21 years) were recruited via primary health care centers for survivors of sexual violence which survivors approached post-CSA. Survivors reported on PTSD symptoms, daytime/nighttime pain, and adverse childhood experiences in semi-structured interviews. Parental acceptance levels were categorized (acceptance, no acceptance, no contact) for mothers and fathers separately. Kruskal-Wallis tests assessed group differences. Conditional random forests (CRF) evaluated the significance of parental acceptance in predicting PTSD symptom severity.
Results: No significant differences regarding PTSD symptoms and physical pain between levels of maternal acceptance were obtained. Pairwise comparisons revealed significant differences in PTSD symptom severity between paternal acceptance and no acceptance ($d = 1.04$) and paternal acceptance and no contact ($d = 0.81$). The CRF identified paternal acceptance as important variable for the prediction of PTSD symptom severity. Even though results were less conclusive, medium effect sizes hint at less pain perception within the paternal acceptance group.
Conclusions: The results highlight paternal acceptance as a potential risk or protective factor regarding psychological and possibly physical well-being in the aftermath of CSA, even in the context of other known risk factors.

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1. Introduction

Childhood sexual abuse (CSA) has been linked to long-term mental and physical health consequences (Arata et al., 2005; Batchelder et al., 2021; Bohus et al., 2013; Boroughs et al., 2015; Collin-Vézina et al., 2013; Cutajar et al., 2010; Stoltenborgh et al., 2011). Across cultures, and various levels of income, the most frequently reported mental health disorders in the aftermath of CSA is posttraumatic stress disorder (PTSD; Cénat et al., 2023; Choi et al., 2017; De Rose et al., 2016; Hébert & Amédée, 2020; Kessler et al., 2017; Konstantopoulou et al., 2023; Nöthling et al., 2019; Paolucci et al., 2001; Ward et al., 2018; Zink et al., 2009). Emphasizing the deteriorating consequences of CSA, recent studies suggest that CSA might also contribute to the development of Complex PTSD (CPTSD) characterized additionally by disorganized self-organization (World Health Organization (WHO), 2019; Hébert & Amédée, 2020). A recent meta-analysis of 28 studies confirmed elevated PTSD levels among CSA survivors throughout childhood, adolescence, and adulthood (Boumpa et al., 2022). While initially, up to 94 % of survivors meet diagnostic criteria for acute stress disorder post-CSA, this percentage decreases to 45–80 % within three months (Elklit & Christiansen, 2010; Rothbaum et al., 2006; Steenkamp et al., 2012). Nonetheless, longitudinal research indicates that PTSD symptoms remain elevated even years after the abuse, leading to prolonged impairments in survivors' daily functioning (Cutajar et al., 2010; Fergusson et al., 2013). In a sample of Norwegian adult survivors of CSA, 45.1 % reported clinically significant PTSD symptoms, which improved only slightly over the course of 4 years (Steine et al., 2017). According to a longitudinal study with 2688 CSA survivors and 2677 matched controls, CSA survivors in adulthood were 5.6 times (OR = 5.56, $p < .001$) more likely to experience PTSD compared to non-abused controls (Cutajar et al., 2010). Peritraumatic factors, such as penetration during CSA further exacerbate PTSD symptom severity (Boroughs et al., 2015). As an additional risk factor, CSA is often accompanied by other forms of maltreatment or traumatic events, such as physical or emotional violence (Kessler et al., 2010; Vachon et al., 2015). The observed dose-response relationship between experienced traumatic life events and posttraumatic stress symptoms, known as the *building-block effect*, has been recognized as the most significant risk factor for PTSD (Kolassa et al., 2010; Wilker et al., 2015). Moreover, different types of childhood maltreatment occurring during sensitive development periods increase the likelihood of PTSD symptoms due to altered neurodevelopment, gene expression, and emotion regulation (Mehta et al., 2013; Messman-Moore & Bhuptani, 2017; Woon & Hedges, 2008). Hence, childhood maltreatment and family violence might exacerbate PTSD symptoms in survivors of CSA (Moran et al., 2023; Schalinski et al., 2016). Both are likely to reinforce the traumagenic dynamics underlying psychological harm caused by CSA according to the Four-Factor Traumagenics Model (Finkelhor & Browne, 1985). These dynamics include feelings of betrayal, traumatic sexualization, stigmatization, and powerlessness or disempowerment. Supporting the significance of the psychological strain of CSA, both, physical intrusiveness and psychological/emotional factors were identified as defining the severity of CSA (Young et al., 2011).

Consequences of CSA are not limited to mental health. Research has established significant associations between CSA and later somatization, particularly pain symptoms (Hart-Johnson & Green, 2012; Irish et al., 2010; Zink et al., 2009). Most studies examining the link between CSA and physical pain symptoms focus on chronic pain post-CSA rather than immediate pain symptoms. A cross-sectional study comparing 26 female outpatients with and 54 controls without prior experience of CSA found that 69 % of women with CSA experience, as opposed to 43 % of women without CSA experience, reported suffering from pain conditions lasting for at least several months (Finestone et al., 2000). Elevated rates of physical pain in CSA survivors might be the result of physical injuries (Ravn et al., 2018; Siqveland et al., 2017), which can often be traced back to forced penetration or other forms of physical violence inflicted during the abusive incident (Longombe et al., 2008; Rossman et al., 2004; Sugar et al., 2004). A study investigating acute pain immediately after CSA found that 64 % of participants experienced severe pain within 48 h of CSA, with 52 % still experiencing pain one week later (McLean et al., 2012). However, the reported pain locations did not match the locations affected during the abuse for over half the participants. Similar findings were observed among adult female survivors, suggesting widespread pain, despite areas unaffected during sexual assault, as revealed by detailed physical exams and sexual assault nurse exam histories (Tsur et al., 2022; Ulirsch et al., 2014). These findings accentuate the complex and multifaceted victimization dynamics including peri- and post-CSA pain experiences. Considering pain's evolutionary role as protective mechanism against further exposure to harm, Tsur et al. (2022) suggested that peritraumatic pain might serve to initiate various defensive strategies, e.g., crying, shouting, and peritraumatic reactions within the child (Katz et al., 2021). Experiencing recurrent pain could further trigger central sensitization - a prolonged increase in the excitability of neurons in pain pathways, subsequently lowering the pain threshold (Woolf, 2011). Additionally, peritraumatic pain could contribute to post-traumatic intrusions of somatic pain or flashbacks including pain (Macdonald et al., 2018), triggering stress-related hyperalgesia (Johnson & Greenwood-Van Meerveld, 2014) or serving as trauma-reminders. These pain-related post-traumatic symptoms may facilitate intricate mechanisms that promote the co-occurrence of PTSD and physical pain following CSA (Tsur et al., 2022). In turn, trauma-related intrusions and dysfunctional cognitions following CSA might trigger a somatic stress response, which further increases pain sensations (Liedl & Knaevelsrud, 2008; Ravn et al., 2018; Woolf, 2011). Furthermore, avoidance due to fear-avoidance beliefs and pain perception might maintain both PTSD and physical pain in the long-run (Batchelder et al., 2021; Kroska, 2016; Liedl & Knaevelsrud, 2008). In line with these assumptions, multiple studies have found a high comorbidity of PTSD and physical pain (Asmundson et al., 2002; Hirohata et al., 2002; Pacella et al., 2013). However, pain intensities at day- and nighttime might be associated differently with PTSD symptoms and protective factors, as recent research suggests a varying circadian sensitivity to pain (Daguet et al., 2022).

Experiencing acceptance, especially from parents, and fostering long-lasting emotional ties play vital roles in nurturing psychological well-being (Rohner, 2004; Rohner et al., 2005; Rohner & Britner, 2002). Hence, consistent positive associations were found between social support following the disclosure of CSA and beneficial effects on mental health (Hébert et al., 2014; Lynskey & Fergusson, 1997). Furthermore, social support has been associated with positive effects on physiological stress reactions (Uchino, 2006), and pain intensity in chronic pain patients (Lopez-Martinez et al., 2008). In turn, parental rejection, characterized by cold, hostile, and

neglectful behavior, deprives children of love and support, has been associated with maladaptive emotion management, low self-esteem and feelings of unworthiness, (Khaleque & Rohner, 2002; Rohner et al., 2005). In line with these findings, parental invalidation after CSA-disclosure was significantly associated with negative mental health outcomes (Ullman, 2003; Ullman & Peter-Hagene, 2014). More specifically, Hong and Lishner (2016) found that CSA-specific invalidation increased PTSD symptoms in survivors. Referring to the Four-Factor Traumagenics Model (Finkelhor & Browne, 1985), CSA-specific parental rejection might additionally affect two of four trauma-causing factors post-CSA - betrayal and stigmatization. When rejected, children might feel betrayed by their parents, in addition to feeling betrayed by the perpetrator of the sexual abuse. Moreover, experiencing victim-blaming and becoming aware of social taboos, they might feel stigmatized by their parents and society (Collin-Vézina et al., 2013), both representing supplementary forms of psychological maltreatment following CSA. Perceived stigmatization and social rejection post-CSA are thus additionally risk factors which increase distress and therefore aggravate mental health of survivors (Schmitt et al., 2021; Schneider et al., 2018; Ullman, 2003). Moreover, rejected children's overgeneralized negative cognitions likely further contribute to the manifestation and persistence of both PTSD-symptoms (Dunmore et al., 2001; Ehlers & Clark, 2000) and physical pain (Asmundson et al., 2002). At the neurobiological level, the processing of social pain, which can arise from situations like social rejection or exclusion, may rely on similar underlying neural systems as the processing of physical pain. This suggests the existence of a social-physical pain overlap, although this hypothesis has faced some objections in the past (Eisenberger, 2015).

While there is emerging evidence that parental reactions to the disclosure of CSA might be of utmost importance for the course of trauma-related disorders and physical pain, the number of studies remains limited. Especially, comparing the effects of maternal and paternal acceptance, scientific evidence is contradictory. While some studies highlight the importance of paternal acceptance for child mental health (Guelzow et al., 2002; Lynskey & Fergusson, 1997), other studies suggest that maternal acceptance might play a more pivotal role in the manifestation of mental ill health following CSA (Bick et al., 2014; Hébert et al., 2014). Potentially different effects of maternal and paternal acceptance on mental and physical health following CSA therefore need to be further evaluated. As Ullman (2003) argued, more comprehensive research is needed to fully understand how specific reactions in conjunction with other variables and contexts affect CSA survivors well-being. Particularly, in societies of the Global South still struggling with the aftermath of violent conflicts, the impact of parental acceptance on PTSD and physical pain after CSA has to our knowledge never been assessed, especially not with further consideration of additional trauma load. The aim of the present study was to better understand the impact of parental acceptance and rejection in the aftermath of sexual abuse in a (post-)conflict setting. We hypothesized that parental acceptance in the aftermath of CSA would be associated with better mental health and less physical pain symptoms years after the abuse. Furthermore, we expected maternal and paternal acceptance both to be important variables in relation to other known risk factors in predicting PTSD symptom severity and physical pain symptoms on the long-term.

Due to the persistent challenges associated with gender-based violence and childhood maltreatment in low- and middle-income countries (LMCI; Meinck et al., 2015; Sabri et al., 2023; WHO, 2021), data collection was carried out in the central east-African nation of Burundi. A decade long civil war followed by renewed conflicts in 2015 has left the Burundian population particularly vulnerable to several forms of violence, including sexual abuse (Charak et al., 2017; Uvin, 2009). High rates of CSA have been reported in a sample of Burundian youth, where a total of 14.7 % reported having experienced sexual abuse, 67.6 % female and 32.4 % male (Charak et al., 2017). The *Centre Seruka* alone, a specialized center for survivors of sexual violence in Bujumbura, counted a total of 3124 child survivors of sexual violence under the age of 13 years between the years 2011 and 2015 (Psychologues sans Frontières Burundi, 2017).

2. Method

2.1. Participants

A total of $N = 153$ participants with at least one experience of sexual abuse or violence during childhood and/or adolescence were recruited. All participants had, within the past several years, voluntarily reported the abuse to a local specialized center, the Centre Seruka, in Bujumbura, Burundi. For the purposes of this study, they were contacted again by health care workers for their participation. We primarily sought to outreach affected minors but also included young adults. We excluded 14 participants, four due to intellectual disability, and ten because they did not complete the interview. Furthermore, we excluded eight participants because their experience of sexual abuse happened after the age of 21 years. As a result, group comparisons contained a total of $N = 131$ participants. We further excluded 5 participants from the analysis of variable importance for predicting PTSD symptom severity due to missing values, resulting in a final sample of $N = 126$.

2.2. Study design and procedure

In 2017, we conducted a cross-sectional study with survivors of CSA in Bujumbura, Burundi. They were contacted and recruited via a primary care center for survivors of sexual violence, which they had approached in the aftermath of their CSA. The project was implemented by the Non-Governmental Organization (NGO) Psychologues sans Frontières Burundi (PSF-BU) in collaboration with the NGO vivo international, the University of Konstanz, Germany, and Université Lumière de Bujumbura, Burundi. Burundian psychologists with extensive experience in psychological diagnostics and psychotherapy conducted the semi-structured interviews with individuals affected by CSA. Interviewers participated in regular supervision with international mental health care experts. The interviews were conducted either at the office of PSF-BU or in the facilities of the primary care center, ensuring privacy and confidentiality. Prior to the interview, all participants were informed in detail about the project and procedures, including the voluntary

nature of their participation and the confidential handling of personal information. All participants, and at least one caregiver if younger than 18 years of age, provided written informed consent to take part in the study, and for their responses to be used in scientific publications. Every participant received an individual code to protect personally identifiable information. Participants received travel expenses for their participation (about 5 €). The study was approved by the ethics commission of the Université Lumière de Bujumbura.

2.3. Instruments

The instruments used in the semi-structured interviews were adapted to the Burundian context by translating validated French or English versions into Kirundi and back into French in a double-blinded process. Differences between the original and the back-translated versions were discussed with independent translators. All instruments had been used successfully in previous projects in Burundi (Crombach et al., 2014; Crombach & Elbert, 2014). The following instruments were assessed during the diagnostic interviews.

2.3.1. Sociodemographic information and details of the sexual abuse

Sociodemographic information included age, sex, level of education, and with whom the participants lived. Further, we assessed the number and identity of people in the same household, and if their parents were still alive, and, if so, still in a relationship. Assessing the circumstances and the details of the sexual abuse, we asked participants about the presence and frequency of various abusive events. Events included being touched intimately without consent or with force, being forced to touch someone intimately, penetration, witnessed rape, undesired kissing, forced sexual relation with another victim or forced sexual relation with an animal. If possible, details about the perpetrator and the age of the participant during the event were collected. In cases of multiple abuses, we calculated both minimal and maximal age.

2.3.2. Abuse-specific parental acceptance

We asked all participants if they felt accepted after the abuse by their mother and their father, or their respective female and male caregiver. Responses were coded dichotomously (*yes* = 1; *no* = 0). In case of the absence as well as death of one or both parents, we manually recoded the answers into *no contact* to mother or father, respectively.

2.3.3. Physical pain

We used the 11-point Numeric Rating Scale (NRS; Farrar et al., 2001) to assess physical pain intensities on a Likert scale ranging from 0 (*no pain*) to 10 (*worst possible pain*). During the interview, participants were instructed to retrospectively report physical pain intensities for each day of the week preceding the interview separately. Days were split into morning, midday, evening, and night. Daytime pain intensity scores were obtained by calculating the mean of the summed pain intensities for all three anchor points per day and dividing it by the number of days measured, nighttime pain intensity scores included the anchor point *night* only. The NRS-11 has previously been successfully utilized (Alghadir et al., 2016; Pathak et al., 2018) and validated in non-western developing countries, showing good to excellent psychometric properties cross-culturally (Sharma et al., 2017). We found a Cronbach's α of 0.97, and an α of 0.94 for daytime and nighttime pain intensities, respectively.

2.3.4. Traumatic events

Previous exposure to traumatic events was assessed using the event list included in the University of California at Los Angeles (UCLA) PTSD Reaction Index for Children and Adolescents for DSM-5 (Pynoos & Steinberg, 2013). The event list queries 14 traumatic events mapping onto DSM-5 criterion A. Events are scored dichotomously (*yes* = 1; *no* = 0), yielding a possible sum score between 0 and 14.

2.3.5. PTSD symptom severity

PTSD symptom severity was assessed using the UCLA PTSD reaction index for Children and Adolescents for DSM-5 (Pynoos & Steinberg, 2015). The reaction index contains 31 items which are scored on a 5-point Likert scale ranging from 0 (*none of the time*) to 4 (*all of the time*) for the previous four weeks. The overall sum score ranging from 0 to 80 was calculated by summing the individual symptom scores according to scoring protocols (Pynoos & Steinberg, 2015). PTSD symptom severity was defined by the overall sum score, with higher scores reflecting more severe PTSD symptoms. The DSM-5 reaction index has been successfully utilized or validated in non-western, low-income countries (Doric et al., 2019; Kaplow et al., 2020), including Burundi (Rukundo-Zeller et al., 2022). Cronbach's alpha in this study was 0.94.

2.3.6. Experienced childhood maltreatment

We examined the exposure to different types of maltreatment during each year of childhood using a short 20 items version derived from the German version (KERF-20-I; Isele et al., 2014) of the Maltreatment and Abuse Chronology of Exposure Checklist (MACE; Teicher & Parigger, 2015). The checklist categorizes maltreatments into emotional neglect, physical neglect, parental emotional abuse, sibling emotional abuse, parental physical abuse, sibling physical abuse, peer violence, sexual abuse, witnessing interparental violence, and witnessing violence to siblings. Answer options are scored dichotomously (*yes* = 1, and *no* = 0) for almost all but a few reverse coded items. Interpolated subscale scores ranging from 0 to 10 can be summed to reach a total exposure severity (KERF SUM) score of 0 to 100, higher scores depicting higher exposure. A categorical (KERF MULTI) score can be calculated by adding the number of experienced maltreatments after comparing the responses with critical cutoffs for the fulfillment of each form of maltreatment (Isele

et al., 2014; Teicher & Parigger, 2015). The categorial score ranges from 0 to 10. The KERF shows acceptable divergent as well as construct validity when compared with other instruments (Isele et al., 2014).

2.4. Data analysis

The normality assumption was not met for PTSD symptom severity. Based on the assumption that all data points represent true values and interviews were conducted by trained psychologists, we incorporated all values, including outliers, in the analysis. Being rank-based and thus insensitive to outliers, we conducted non-parametric Kruskal-Wallis tests (Kim, 2013; Kruskal & Wallis, 1952) to account for both non-normal data and outliers when examining group differences in PTSD symptom severity, and average daytime and nighttime pain intensities. Post-hoc pairwise comparisons regarding parental acceptance were calculated using Bonferroni-Holm-corrected *p*-values. Cohens *d* (Cohen, 1988) is reported as effect size. All analyses used a two-tailed $\alpha = 0.5$. Kruskal-Wallis tests were performed using the IBM SPSS (Version 28) statistics software.

Aiming to provide evidence for the predictive importance of parental acceptance on PTSD symptom severity among children, adolescents, and young adults in the aftermath of sexual violence, taking childhood maltreatment and trauma load into consideration, we conducted a conditioned random forest regression. Unlike traditional linear modeling, conditional random forest regressions (CRF) relies neither on specific distribution assumptions nor is sensitive to the large number of predictors used (Breiman, 2001). Additionally, CRF takes into account the high co-linearity of multiple childhood maltreatment types. To further consider issues with high versus low levels of categories of predictors inflating variable importance in Breiman's approach, we used CRF with unbiased estimates to assess importance, irrespective of the number of categories, mean values, range, and variance of the predictors (Strobl et al., 2007). Conditional variable importance is determined by assessing the decrease in accuracy, indicated by the rise in mean squared errors (MSE), after permuting a specific predictor variable using conditioned permutation schemes. Essential predictor variables exhibit a significant increase in MSE when permuted, while unimportant predictors show minimal or no change in MSE (Strobl et al., 2007; Strobl et al., 2008). This method reflects the average reduction in accuracy upon removing a particular predictor, considering other predictors. Variables are ranked based on their mean decrease in accuracy, with higher values signifying greater importance. For training and testing the model, we applied a 10×10 Monte Carlo cross-validation algorithm (Kuhn, 2008), where the dataset was randomly split into a training subset (75 % of the data) and a testing subset (25 % of the data) for later evaluation of model accuracy. The cross-validation was repeated in 10 runs, assessing relative variable importance and their standard errors. The CRF included the variables maternal acceptance, and paternal acceptance. To account for the building block effect, we also included the number of life events, as well as the number of types of experienced childhood maltreatments (KERF MULTI) and their overall severity (KERF SUM) to assess the importance of global measures of childhood maltreatment. For a more detailed overview, we included the 10 types of childhood maltreatment separately and investigated each type's predictive importance independent of each other and of the global scales. To account for the severity of the sexual violence that all participants had reported to the clinic, we further included the predictor frequency of being touched intimately without consent, and the frequency of experienced penetrations. As control variables, we included gender and years since (the most recent) abuse. We excluded predictor variables that were reported by 5 % or less of the participants to avoid an increase in error rate due to unbalanced classes (Janitza et al., 2013). The exclusion of predictors with low to no exposure resulted in the exclusion of the variables being forced to touch someone intimately, being forced to witness a sexual abuse, being forced to kiss someone, being forced to have sex with another person, being forced to have sex with an animal. We further assessed the predictive importance of parental acceptance on daytime and nighttime physical pain using the same predictors as for PTSD symptom severity. The CRFs were conducted through the R packages 'caret' (Kuhn, 2008) and 'party' (Strobl et al., 2007), and have been applied in prior research (Pechtel et al., 2014; Schalinski et al., 2016).

Table 1
Descriptive statistics of participants.

	M	*SD*	Range
Age[a]	16.21	5.34	7–25
Educational level[b]	5.46	3.47	0–13
Age during first abuse[c]	11.69	4.63	1–21
Age during most recent abuse[c]	11.81	4.75	1–24
Age of offender[d]	26.46	8.33	8–50
Years since the last abuse[c]	4.38	3.80	0–16
UCLA-PTSD-Overall Score[c]	16.17	12.58	0–60
NRS-11-daytime[b]	1.28	1.95	0–8
NRS-11-nighttime[b]	1.10	2.05	0–8

Note. UCLA-PTSD = University of California – Posttraumatic Stress Disorder – reaction index (0–80). NRS-11 = Numerical Pain Rating Scale (0−10) for daytime and nighttime average.
[a] $n = 131$.
[b] $n = 127$.
[c] $n = 128$.
[d] $n = 123$.
[e] $n = 126$.

Table 2
Ms and SDs for PTSD-symptom severity, daytime, and nighttime pain.

	Maternal						Paternal					
	Acceptance		Rejection		No Contact		Acceptance		Rejection		No Contact	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
PTSD	14.15 ($N = 88$)	10.56	19.22 ($N = 27$)	13.76	24.91 ($N = 11$)	19.26	10.90 ($N = 60$)	9.32	21.80 ($N = 35$)	12.30	19.13 ($N = 30$)	13.80
Pain (day)	1.24 ($N = 90$)	1.95	1.06 ($N = 25$)	1.71	2.00 ($N = 12$)	2.43	0.98 ($N = 58$)	1.66	1.67 ($N = 36$)	2.16	1.26 ($N = 32$)	2.13
Pain (night)	1.01 ($N = 90$)	1.93	0.83 ($N = 25$)	1.73	2.32 ($N = 12$)	3.06	0.56 ($N = 59$)	1.23	1.50 ($N = 35$)	2.36	1.43 ($N = 32$)	2.41

Note. Maternal and Paternal acceptance and rejection refer to abuse-specific acceptance or rejection. Pain intensity per day reflects average pain ratings during the morning, noon, and evening for one week. Pain intensity per night reflects the average pain intensity at night for one week. No Contact entails all cases where the parent was either deceased or there was no regular contact. PTSD = Posttraumatic Stress Disorder.

3. Results

3.1. Descriptives

The analyzed sample ($N = 131$) consisted of 80.9 % female and 19.1 % male participants with a mean age of 16.21 years. They had completed on average 5.46 years of school education. Their last sexual abusive event was experienced on average 4.38 years prior to the interview. The majority (91.8 %) experienced sexual abuse with penetration, and most of the participants (61.8 %) knew their perpetrator, although no intrafamilial CSA was reported. Of the perpetrators, 98.5 % ($n = 129$) were male, one participant did not indicate the offenders' gender. The mean number of experienced traumatic life events was $M = 7.01$. Detailed sociodemographic data can be obtained from Table 1.

3.2. Group differences

We conducted Kruskal-Wallis tests to examine the effects of *maternal* and *paternal acceptance* on *PTSD symptom severity*, and *average daily* and *nightly pain intensities*. For detailed means and standard deviations see Table 2. Kruskal-Wallis tests found no significant difference between children, adolescents and young adults who had no contact with their mother, felt rejected or accepted by their mother in the aftermath of sexual violence regarding PTSD symptom severity ($H(2) = 5.14$, $p = .076$, $d = 0.32$), daytime pain ($H(2) = 3.10$, $p = .213$, $d = 0.19$), and nighttime pain ($H(2) = 3.23$, $p = .199$, $d = 0.20$). However, the medium effect size of PTSD symptom severity might indicate a trend regarding the decrease from the no contact group ($M = 24.91$, $SD = 19.26$), to the rejection group ($M = 19.22$, $SD = 13.76$), to the acceptance group ($M = 14.15$, $SD = 10.57$).

Kruskal-Wallis tests revealed significant differences between children, adolescents and young adults who had no contact with their father, felt rejected or accepted by their father in the aftermath of sexual violence regarding PTSD symptom severity ($H(2) = 23.03$, $p < .001$, $d = 0.91$). No significant group difference were found for daytime pain ($H(2) = 5.74$, $p = .057$, $d = 0.35$) or for nighttime pain ($H(2) = 4.64$, $p = .098$, $d = 0.30$). Pairwise comparisons with adjusted p-values revealed statistically significant differences between the groups paternal acceptance and paternal rejection ($p < .001$, $d = 1.04$), and between the groups paternal acceptance and no contact

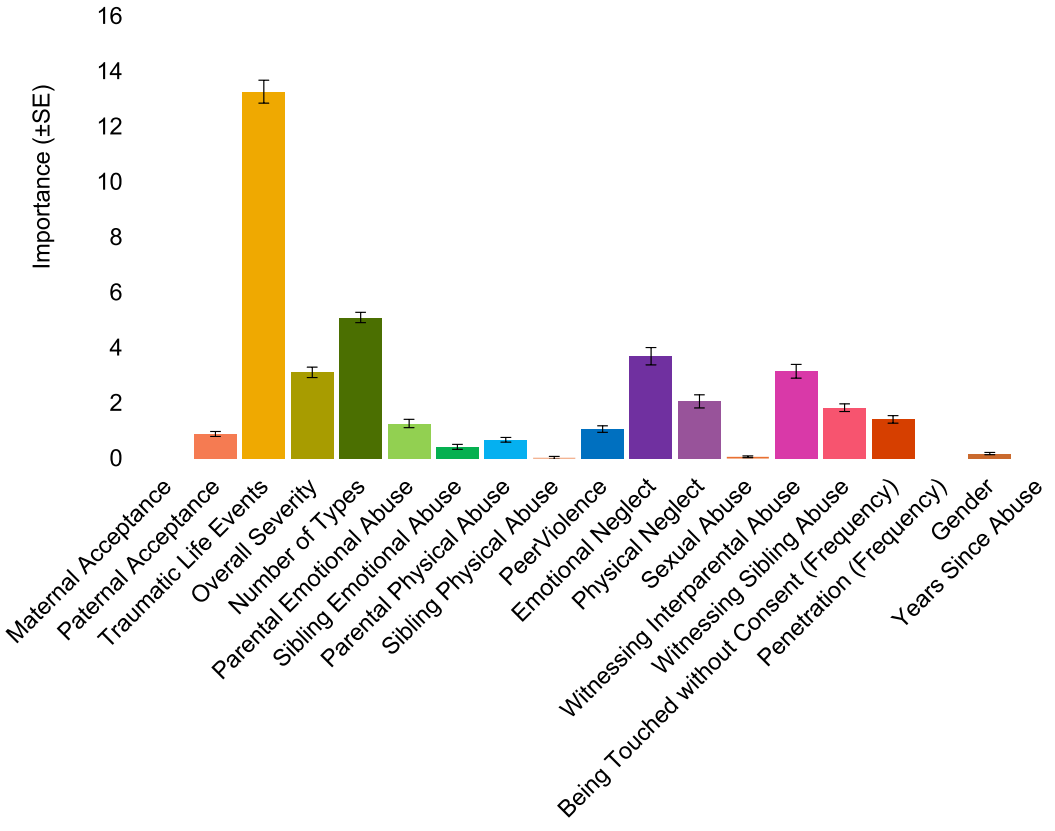

Fig. 1. Relative Variable Importance for Predicting PTSD Symptom Severity.
Note. Mean variable importances from Conditional Random Forest Regression evaluating the relative varibale importance for predicting PTSD symptom severity with $N = 126$. Overall Severity depicts the KERF SUM score, Number of Types reflects the KERF MULTI score, and Traumatic Life Events contain the list of 14 traumatic events according to the UCLA PTSD reaction index. Values ≤ 0 have no predictive value. Error bars represent standard errors.

($p = .006$, $d = 0.81$) for PTSD symptom severity. Regarding daytime and nighttime pain the medium effect sizes might indicate a trend regarding the difference between the rejection group (daytime pain: $M = 1.67$, $SD = 2.16$; nighttime pain: $M = 1.50$, $SD = 2.36$) and the acceptance group (daytime pain: $M = 0.98$, $SD = 1.66$; nighttime pain: $M = 0.56$, $SD = 1.23$).

3.3. Importance of parental acceptance and childhood maltreatment in predicting PTSD symptom severity

To evaluate relative variable importance for predicting PTSD symptom severity, we conducted a CRF regression (Fig. 1). The CRF revealed high relative predictor importance of the building block effect, measured through the number of experienced traumatic life events ($M = 13.28$, $SE = 0.41$). We also found moderate relative predictive importance of the global measures of childhood maltreatment, KERF SUM ($M = 3.12$, $SE = 0.19$), KERF MULTI ($M = 5.10$, $SE = 0.19$). The control variable gender and years since the abuse showed low to no predictive importance ($M = 0.18$, $SE = 0.04$; $M = -0.14$, $SE = 0.04$, respectively). All of the 10 types of childhood maltreatment, parental emotional abuse ($M = 1.27$, $SE = 0.15$), sibling emotional abuse ($M = 0.42$, $SE = 0.09$), parental physical abuse ($M = 0.68$, $SE = 0.08$), sibling physical abuse ($M = 0.03$, $SE = 0.05$), peer violence ($M = 1.06$, $SE = 0.12$), emotional neglect ($M = 3.70$, $SE = 0.32$), physical neglect ($M = 2.07$, $SE = 0.24$), sexual abuse ($M = 0.06$, $SE = 0.03$), witnessing interparental abuse ($M = 3.16$, $SE = 0.25$), and witnessing sibling abuse ($M = 1.84$, $SE = 0.14$), showed low to moderate relative predictive importance. Of the additional variables assessing the context and severity of the sexual violence, only being touched intimately without consent showed predictive importance ($M = 1.41$, $SE = 0.14$). Further, paternal ($M = 0.89$, $SE = 0.09$), but not maternal acceptance ($M = -0.12$, $SE = 0.03$), showed relative predictive importance.

To evaluate relative variable importance for predicting daytime and nighttime pain, we conducted two additional CRFs using the same predictors as for PTSD symptom severity. Only traumatic events showed relative variable importance in predicting physical pain at daytime ($M = 0.38$, $SE = 0.01$), or nighttime ($M = 0.41$, $SE = 0.01$). Neither maternal nor paternal acceptance showed relative predictive importance of physical pain.

4. Discussion

In this cross-sectional study in Burundi, we found that paternal acceptance, more than maternal acceptance, in the aftermath of sexual violence was associated with lower PTSD symptom severity, and less physical pain symptoms in survivors of CSA years after the incident. Paternal acceptance proved to be an important predictor for PTSD symptom severity even when considering the building block effect of traumatic events and childhood maltreatment, and the impact of specific types of childhood maltreatment.

Contrary to our hypotheses and previous research (Bick et al., 2014; Hébert et al., 2014), our results failed to show that maternal acceptance in the aftermath of sexual abuse had a significant impact on the manifestation of PTSD symptom severity and physical pain. Surprisingly, no maternal contact rather than maternal rejection was associated with the highest mean scores of PTSD symptom severity following sexual violence. It may be that maternal presence rather than maternal acceptance plays an integral part in the manifestation of sequelae. In previous studies, maternal availability has been linked to greater discrimination of threat and safety during childhood (van Rooij et al., 2017), and better behavioral affect-related regulation (Gee et al., 2014). Since Burundian mothers are traditionally more involved in child-rearing than Burundian fathers (Crombach & Bambonyé, 2015), maternal availability alone might render children less vulnerable to develop symptoms of PTSD.

In line with our hypotheses, we found that paternal acceptance was associated with significantly lower PTSD symptom severity compared to no paternal contact or paternal rejection. Moreover, paternal rejection was associated with the highest symptom severity of PTSD. Our results concur with both previous research showing that paternal acceptance post-CSA was significantly and positively associated with improved child mental health and psychological adjustment (Guelzow et al., 2002; Lynskey & Fergusson, 1997), and previous research showing that social, especially parental, rejection post-CSA was linked to worse mental health (Hong & Lishner, 2016; Ullman et al., 2007; Ullman & Peter-Hagene, 2014). The association between paternal acceptance and better mental health might reflect discrimination learning of those survivors who experienced paternal acceptance and validation. Discrimination learning in survivors might counteract conditioned fear reactions, and negative cognitions associated with the male gender of the perpetrators (Browne & Finkelhor, 1986), and hence prevent the manifestation of a generalized idea of males as perpetrators. This discrimination, thus, allows better adjustment and daily-functioning and, hence, might prevent the development of severe mental and physical health issues. Paternal rejection, though, was repeatedly found to promote the development of negative self-cognitions, and an unfavorable self-image in general (Khaleque & Rohner, 2002; Rohner et al., 2005), since overgeneralized negative cognitions of rejected children contributed to the manifestation and persistence of PTSD symptoms (Dunmore et al., 2001; Ehlers & Clark, 2000). Furthermore, stigmatization following the disclosure of CSA might evoke further feelings of shame and guilt. More specifically, shame is likely to inflict profound social pain, severely disrupt one's self-esteem, and contribute to maintaining PTSD symptoms (MacGinley et al., 2019; Obong'o et al., 2020; Rukundo-Zeller et al., 2022). One possible explanation for the failure to observe significant associations between daytime and nighttime pain and paternal acceptance, may be attributed to the generally low scores of physical pain. Furthermore, the severity of nighttime pain would need to be significant enough to make it difficult to fall asleep or awaken individuals from their sleep. Interestingly, medium effect sizes regarding daytime and nighttime pain indicate that the paternal acceptance group suffered less daytime and nighttime pain symptoms than the paternal rejection group. These trends are in line with our hypotheses regarding the association between pain sensitivity and PTSD symptoms. Possibly, the beneficial effects of paternal acceptance on PTSD symptoms impact also pain sensitivity of affected children and adolescents by reducing the likelihood of intrusions and avoidance associated with pain perception (Liedl & Knaevelsrud, 2008; Macdonald et al., 2018; Ravn et al., 2018).

Our results that paternal, but not maternal, acceptance was linked to significantly better mental health support previous research

(Guelzow et al., 2002; Lynskey & Fergusson, 1997). Especially in patriarchal cultures, where paternal acceptance carries broader social significance, the differential impact of maternal and paternal acceptance in our sample might be attributed to traditional gender roles (Makinwa-Adebusoye, 2001). Commonly, mothers are assigned to responsibilities in child-rearing exclusively (Crombach & Bambonyé, 2015), while fathers as life-bearers are often absent for work. Paternal acceptance could thus be less readily available and might be related to specific events. Also, perceived parental power and prestige was found to affect the relation between parental acceptance and psychological adjustment. The highest contribution to adjustment was found, when fathers were perceived as both, more powerful and more prestigious (Carrasco & Rohner, 2013). In line with these findings, fathers are often in charge of deciding social and economic family affairs in patriarchal societies (Khaleque & Shirin, 2014). In consequence, experiencing paternal acceptance after disclosure might be more positively affected, which could account for its greater impact on mental health in the Burundian culture. Due to the prominent role of fathers, paternal acceptance could prevent the development of cyclic negative thoughts and emotions, possibly by promoting a positive self-concept and therewith associated positive self-talk (Kross, 2021). While this is the first study to investigate maternal vs. paternal acceptance in a (post-)conflict setting, more research is needed to fully understand the underlying mechanisms regarding differential influences of maternal and paternal acceptance to promote resilience and well-being not only in high-risk areas.

Confirming the building-block effect, we found the highest relative variable importance for the variable number of life events (Kolassa et al., 2010; Wilker et al., 2015). Further supporting the dose-response effect of childhood maltreatment (Moran et al., 2023; Schalinski et al., 2016), both global scales of childhood maltreatment, the number of types and the overall severity, showed high variable importance in the prediction of severe PTSD symptoms. In line with previous findings, our results also emphasize the importance of emotional and physical neglect (Schalinski et al., 2016), as well as the witnessing of interparental abuse (Haj-Yahia et al., 2019). The low variable importance of sexual abuse and the absence of variable importance of penetration is not surprising, since this sample consisted of survivors of CSA only, cancelling out the individual contribution of sexual abusive experiences. Concurrent with previous research, sibling physical abuse showed low variable importance for predicting PTSD (Bowes et al., 2014; Dantchev & Wolke, 2019). The control variables gender and years since the abuse exhibited only marginal importance within the model, suggesting that they did not introduce bias into the results. Hence, for both, male and female survivors in this sample and independent of the time since the abuse, a similar pattern of relative variable importance would emerge.

The following caveats limit the interpretation of the results. In light of the cross-sectional nature of the study, and the reliance on self-reports the causal assumptions between parental invalidation, mental and physical consequences need to be considered with a grain of salt. Recollection biases might have affected reports of traumatic life experiences, childhood abuse and abuse-specific parental acceptance, although studies found a high reliability of retrospective assessments (Goltermann et al., 2023; Paivio, 2001). Nevertheless, the retrospective evaluations of abuse-specific parental acceptance might have been biased by the general parental (in-) validation experienced in the years between the abuse and the interview, meaning that recently experienced general acceptance might have influenced the recall of abuse-specific acceptance. Future research may consider possible interaction effects between general parental acceptance and event-specific acceptance (Hong & Lishner, 2016). Assessing the occurrence of childhood maltreatment in relation to specific sensitive development periods might have yielded even more nuanced estimations of their impact (Schalinski et al., 2016; Teicher et al., 2018; Uhlhaas et al., 2023). Further, we did not explore the reasons for participant reports of no maternal or paternal contact. While some parents may have disowned their children after learning about the abuse, other parents may have passed away. Although both scenarios impact daily functioning and well-being (Mayer et al., 2001), differential effects of loss or rejection remain unclear. Last but not least, we recruited only participants who sought help from a health care center. Hence, the families of the survivors cared and believed their children enough to search out assistance in the aftermath of CSA. Moreover, the survivors might have received medical and legal assistance, and some basic supportive counselling prior to our investigation. Thus, physical, and psychological consequences, as well as the impact of parental invalidation, may have been underestimated in this sample.

To conclude, regarding PTSD, we demonstrated that paternal, rather than maternal, abuse specific acceptance seems to be strongly associated with long-term sequelae of CSA. Furthermore, this study provides a broad overview of the importance of a range of risk factors and shows that paternal acceptance in the aftermath of CSA has an impact on the severity of PTSD symptoms even years after the abuse. The results highlight the significance of paternal acceptance as a beneficial factor for child well-being, suggesting that it deserves more attention by research and those promoting safety, resilience and well-being for children in the aftermath of CSA. Regarding childhood maltreatment, and apart from the *building block effect*, the results emphasize the impact of physical and emotional neglect, and of witnessing interparental violence as significant risk factors for trauma-related mental health problems. To our knowledge this study is the first to specifically investigate the impact of parental reactions on PTSD symptom severity and physical pain in CSA survivors in a Global South, post-conflict society with elevated rates of violence against children. In line with existing research (Hébert et al., 2014; Lynskey & Fergusson, 1997), the results highlight parental, and more specifically paternal, reactions as potential risk or protective factors for psychological and possibly also somatic recovery after CSA.

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CRediT authorship contribution statement

Julia Schneider: Writing – review & editing, Writing – original draft, Visualization, Formal analysis, Data curation. **Anja C. Rukundo-Zeller:** Writing – review & editing, Supervision, Project administration, Methodology, Conceptualization. **Manassé**

Bambonyé: Writing – review & editing, Supervision, Project administration, Methodology, Funding acquisition, Conceptualization. **Sarah Lust:** Writing – review & editing, Formal analysis, Data curation. **Hervé Mugisha:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Jean-Arnaud Muhoza:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Thierry Ndayikengurukiye:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Lydia Nitanga:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Amini Ahmed Rushoza:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Anselm Crombach:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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