



Predictors of acute stress disorder in victims of violence in Eastern Democratic Republic of the Congo

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ABSTRACT

Background: The Democratic Republic of the Congo underwent more than 25 years of war resulting in millions of deaths and in survivors struggling with trauma related disorders. The factors contributing to acute stress disorder following a traumatic event remain little understood. Emotion regulation might play a role in the development of acute stress disorder among victims of war-related violence.

Objectives: We assessed the association between acute stress disorder expression and cognitive strategies of emotion regulation among injured victims of violence in the Eastern Democratic Republic of the Congo.

Methods: This cross-sectional study included 120 patients (77% males, mean age 30 ± 11 years) with traumatic wounds admitted at the Bukavu General Hospital. We assessed acute stress disorder through the Stanford Acute Reaction Stress Questionnaire and emotion regulation strategies through the Cognitive emotional regulation questionnaire.

Results: Using Pearson Chi2 and Student t-test we found that compared with patients without acute stress disorder ($N=56$), patients with acute stress disorder ($N=64$) were more likely to be victims of armed robbery ($p=.02$), of a bullet ($p=.04$), of having wounds with fracture ($p=.03$) or neurological damage ($p=.05$). In multivariate logistic regression, wounds with neurological damage [OR=2.23 (1.03-6.05)] and maladaptive emotion regulation, namely self-blame [OR=1.71 (1.01-3.21)] and rumination [OR=1.97 (1.04-4.13)], were significant predictors of acute stress disorder.

Conclusion: Acute stress disorder was prevalent in the aftermath of violence induced injuries and might be associated with emotion regulation strategies such as self-blame and rumination.

Predictores de trastorno de estrés agudo en víctimas de violencia en el este de la República Democrática del Congo

Antecedentes: La República Democrática del Congo atravesó más de 25 años de guerra, resultando en millones de muertos y en los sobrevivientes experimentando trastornos relacionados con trauma. Los factores que contribuyen a desarrollar un trastorno de estrés agudo después de un evento traumático permanecen poco comprendidos. La regulación emocional podría jugar un rol en el desarrollo del trastorno de estrés agudo entre las víctimas de violencia relacionada con la guerra.

Objetivos: Evaluamos la asociación entre la expresión del trastorno de estrés agudo y estrategias cognitivas de regulación emocional entre las víctimas de violencia lesionadas en el este de la República Democrática del Congo.

Métodos: Este estudio transversal incluyó a 120 pacientes (77% varones, edad media 30 ± 11 años) con heridas traumáticas ingresados al Hospital General de Bukavu. Evaluamos el trastorno de estrés agudo a través del Cuestionario de Reacción Aguda al Estrés de Stanford y estrategias de regulación emocional a través del Cuestionario de Regulación Emocional Cognitiva.

Resultados: Usando el Chi2 de Pearson y la prueba de t de Student encontramos que en comparación con pacientes sin trastorno de estrés agudo ($N=56$), los pacientes con trastorno de estrés agudo ($N=64$) fueron más probablemente víctimas de robo a mano armada ($p=.02$), de bala ($p=.04$), de tener heridas con fractura ($p=.03$) o daño neurológico [OR= 2.23 (1.03-6.05)] y regulación emocional desadaptativa, esto es, culpa [OR= 1.71 (1.01-

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关键词

急性应激障碍; 情绪调节; 受伤; 创伤; 刚果民主共和国

HIGHLIGHTS

- Acute stress disorder is strongly associated with maladaptive emotion regulation strategies such as self-blame and rumination.
- Interventions targeting emotion regulation may reduce acute stress reactions in the aftermath of violence induced injuries.

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3.21]) y rumiación [OR= 1.97 (1.04-4.13)], fueron predictores significativos de trastorno de estrés agudo.

Conclusión: El trastorno de estrés agudo fue prevalente después de lesiones provocadas por violencia y podría asociarse con estrategias de regulación emocional como la culpa y la rumiación.

刚果民主共和国东部暴力受害者急性应激障碍的预测因素

背景: 刚果民主共和国经历了超过 25 年的战争，导致数百万人死亡，幸存者挣扎于创伤相关疾病中。创伤事件后导致急性应激障碍的因素仍然知之甚少。情绪调节可能在战争相关暴力受害者的急性应激障碍发展中起到作用。

目的: 我们评估了刚果民主共和国东部暴力受害者的急性应激障碍表现与情绪调节认知策略之间的关联。

方法: 本横断面研究纳入了 120 名收治于布卡武综合医院收治有创伤性伤口的患者 (77% 男性, 平均年龄 30 ± 11 岁)。我们通过斯坦福急性反应应激问卷评估急性应激障碍, 并通过认知情绪调节问卷评估情绪调节策略。

结果: 使用皮尔逊卡方和司徒顿 t 检验, 我们发现与无急性应激障碍的患者 ($N=56$) 相比, 急性应激障碍患者 ($N=64$) 更有可能是持械抢劫的受害者 ($p=.02$), 有子弹 ($p = .04$)、骨折 ($p = .03$) 或神经损伤 ($p = 0.05$) 的受伤。在多元逻辑回归中, 神经损伤的受伤 [OR = 2.23 (1.03-6.05)] 和适应不良情绪调节, 即自责 [OR = 1.71 (1.01-3.21)] 和反刍 [OR=1.97 (1.04-4.13)], 是急性应激障碍的显著预测因子。

结论: 急性应激障碍在暴力致伤后普遍存在, 可能与自责、反刍等情绪调节策略有关。

Abbreviations: ASD: Acute stress Disorder, CERQ: Emotion regulation was assessed by the Cognitive emotional regulation questionnaire; OR: Odd Ratio; PTSD: Post-Traumatic Stress Disorder; SARSQ: Stanford Acute Reaction Stress Questionnaire; SD: Standard Deviation

1. Background

The Democratic Republic of the Congo underwent more than 25 years of wars and armed conflicts that caused more than 5.4 million of deaths (Moszynski, 2008). The prevalence of PTSD is thus dramatically high (up to 50%) in the most affected regions (Johnson et al., 2010). Some parts of the population are more likely to develop Acute stress disorder (ASD) and PTSD, in particular those who were physically injured (Javidi & Yadollahie, 2012).

ASD is a common psychopathological state following violent traumatic event exposure and frequently evolves toward post-traumatic stress disorder (PTSD) (Harvey & Bryant, 2000). However, the psychological factors promoting the development of acute stress reactions following a traumatic event remain little understood.

Emotion regulation might constitute a key predictor of ASD (Ullman et al., 2014). Emotion regulation encompasses all the extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensity and temporal features, to accomplish one's goals (Thompson, 1994). Emotional regulation strategies can be adaptive or maladaptive (Marroquín et al., 2017), the latter being frequently associated with psychiatric and somatic disorders (Kraiss et al., 2020), and most notably PTSD (McLean & Foa, 2017). However, their impact on ASD has received little attention, most specially in the context of armed conflicts.

We assessed the link between probable ASD and cognitive strategies of emotion regulation among

injured victims of violence in the Eastern Republic of the Congo.

2. Methods

2.1. Study design and settings

We conducted a cross sectional survey in the general hospital of Bukavu, in the Eastern Democratic Republic of the Congo. The General hospital of Bukavu is a referral, tertiary hospital in South-Kivu, a region that hosts more than 6 million of people, and the main public hospital of Bukavu (1 million inhabitants). Since 2013, the general hospital of Bukavu has partnered with the IRCR in a project that aims to assure the physical management of all the patients that were stabbed, burned, injured by bullet or presenting with other conflict-related injury.

2.2. Participant recruitment

120 patients (77% were males and mean age 30 ± 11 years), admitted in the Surgery ward for a traumatic wound that was generated by war-related violence, were recruited between 8 February 2020 and 12 March 2021. Only patients who had been injured between 3 days and one month before the assessment were recruited, to keep in line with the timing requirement of the diagnosis of Acute Stress Disorder to be made. We excluded patients who were unable to understand and answer questions, due to important neurological disabilities (such as coma, speech or hearing impairments; 6 patients).

Table 1. Bivariate and multivariate logistic regression of factors associated to probable acute stress disorder.

Factors associated to Acute stress disorder	Unadj OR (95% CI)	P-Value	Adj OR (95% CI)	P-Value
Armed robbery	3.24 (1.29–7.94)	.02	1.54 (0.73–3.15)	.16
Trauma by bullet	2.21 (1.37–5.18)	.04	0.98 (0.87–2.42)	.32
Wounds with fracture	1.97 (1.14–4.29)	.03	1.02 (0.91–3.54)	.45
Wounds with neurological damage	1.95 (1.01–5.21)	.05	2.23 (1.03–6.05)	.04
Refocus on planning	0.89 (0.46–0.95)	.02	0.96 (0.86–1.05)	.34
Positive refocusing	0.95 (0.53–1.18)	.06	–	–
Positive reappraisal	1.09 (0.41–1.89)	.11	–	–
Putting into perspective	0.83 (0.52–1.23)	.40	–	–
Self-blame	1.94 (1.12–3.39)	.03	1.71 (1.01–3.21)	.05
Rumination	2.27 (1.47–7.31)	.01	1.97 (1.04–4.13)	.04
Catastrophizing	1.11 (0.87–1.23)	.75	–	–
Blaming others	1.23(0.94–2.47)	.43	–	–

2.3. Ethical approval

We obtained ethical approval from the Catholic University of Bukavu Ethic committee. We obtained written informed consent from participants, and we ensured their privacy and confidentiality.

2.4. Measures

We collected socio-demographic data including age, sex, marital status and professional occupation through a questionnaire. We also collected the circumstances of the traumatic event. We assessed probable ASD through the Stanford Acute Reaction Stress Questionnaire (SARSQ) (Cardena et al., 2000). A score higher than 90 indicated the presence of probable ASD. In the present study, the alpha-coefficient of SARSQ was 0.88.

We assessed emotion regulation through the Cognitive emotional regulation questionnaire (CERQ), a 36-item validated questionnaire capturing nine stable-dispositional cognitive emotion regulation's strategies (Jermann et al., 2006) among which five are adaptive (acceptance, positive refocusing, refocus on planning, positive reappraisal, putting into perspective) and four maladaptive (self-blame, rumination, catastrophizing and blaming others). In our study, the alpha-coefficients of different subscales ranged from 0.84 to 0.92.

All patients aged more than 18 years old who accepted to sign the informed consent were included in the study. Both questionnaires and consent forms were provided to participants in a paper-pencil version. The main investigator then collected both questionnaires and consent forms directly from participants. We obtained ethical approval from the Catholic University of Bukavu Research Ethics committee. Written informed consent was obtained from the participants and privacy and confidentiality of the participants were ensured.

2.5. Statistical analysis

We analysed data using Stata Version 13 to perform descriptive and inferential analyses. We described

qualitative variables in term of frequencies and percentages, and continuous variables in term of means \pm standard deviation. Pearson Chi2 and Student t-test were used to compare characteristics of patients with and without acute stress disorder for respectively categorical and continuous variables. We used bivariate and multiple logistic regression to determine the association between demographic and psychosocial variables using the individual odds ratio (95% confidence intervals). The associations were deemed significant with a *P*-value less than or equal to 0.05. Variables were included in multiple regression when they were associated with hypertension at a *P*-value ≤ 0.05 .

3. Results

3.1. Demographic characteristics, circumstances of the trauma events and emotion regulation among participants (Supplementary table 1)

Most of our participants were married (72%) and farmers (25%). Among all patients, 64 (55%) met the criteria of acute stress disorder. There were no significant differences in term of demographic factors between patients with acute stress disorder and those without. 48% were victims of armed robbery, got injured by a bullet (60%), and 45% had a wound. Patients with acute stress disorder were more likely to be victims of armed robbery ($p = .02$), of a bullet ($p = .04$), of having wounds with fracture ($p = .03$) or neurological damage ($p = .05$). Patients with acute stress disorder tended to use less refocus on planning ($p = .02$), more self-blame ($p = .03$) and more rumination ($p = 0.01$) than those without such disorder.

3.2. Bivariate and multivariate logistic regression of factors associated to probable ASD (Table 1)

In bivariate logistic regression, probable ASD was associated with armed robbery [OR = 3.24 (1.29–7.94)], trauma by bullet [OR = 2.21 (1.37–5.18)], wounds with fracture [OR = 1.97 (1.14–4.29)], wounds

with neurological damage [OR = 1.95 (1.01-5.21)], refocus on planning [OR = 0.89 (0.46-0.95)], self-blame [OR = 1.94 (1.12-3.39)] and rumination [OR = 2.27 (1.47-7.31)]. In multivariate logistic regression, only wounds with neurological damage [OR = 2.23 (1.03-6.05)], self-blame [OR = 1.71 (1.01-3.21)] and rumination [OR = 1.97 (1.04-4.13)] remained significantly associated with probable ASD.

4. Discussion and conclusion

Probable ASD is highly prevalent (55% of our participants) in our population characterized by intense and repeated confrontation to interpersonal violence. These results align with earlier studies on conflict-affected countries in Africa (Mpembi et al., 2018) and worldwide (Ophuis et al., 2018). Centrally, we showed that probable ASD is associated with increased maladaptive (self-blame/rumination) emotion regulation strategies, previously shown to be associated with PTSD (Bryant et al., 2003), as well as with reduced adaptive ones (refocus on planning). As notable limitations to our study, we report the limited sample size, the cross-sectional design which prevent us to establish cause to effect relationships, and the lack of relevant psychiatric antecedents, including previous traumatic experiences. Therefore, this association of emotion regulation strategies with probable ASD should be investigated by further studies with larger sample and with longitudinal features (Bryant et al., 2003).

Ethics approval and consent to participate

We sought ethical approval from the Catholic University of Bukavu Ethic committee. We obtained informed consent from the participants.

Availability of data and material

The data that support the findings of this study are available on request from the corresponding author, AB. The data are not publicly available since they contain information that could compromise the privacy of research participants.

Authors' contributions

AB designed the study, carried out data collection, data analysis, and preparation of the first and revised drafts of the manuscript. PM contributed to the study design and contributed to the preparation and editing of the manuscript. TC contributed to the study design, data collection and the editing of to the editing of the manuscript. PB contributed to the study design and contributed to the preparation and editing of the manuscript. FC contributed to the

study design and contributed to the preparation and editing of the manuscript. PM contributed to the study design and contributed to the preparation and editing of the manuscript. LM contributed to the study design and contributed to the preparation and editing of the manuscript. CS contributed to the study design, carried out data collection and contributed to the preparation and editing of the manuscript. GP contributed to the design of the study and to the preparation and editing of the manuscript. contributed to the study design and contributed to the preparation and editing of the manuscript. PD contributed to the study design and contributed to the preparation and editing of the manuscript. All authors have read and have approved the manuscript.

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Disclosure statement

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References

- Bryant, R. A., Moulds, M., Guthrie, R., & Nixon, R. D. (2003). Treating acute stress disorder following mild traumatic brain injury. *American Journal of Psychiatry*, 160(3), 585–587. <https://doi.org/10.1176/appi.ajp.160.3.585>
- Cardena, E., Koopman, C., Classen, C., Waelde, L. C., & Spiegel, D. (2000). Psychometric properties of the Stanford acute stress reaction questionnaire (SASRQ): A valid and reliable measure of acute stress. *Journal of Traumatic Stress*, 13(4), 719–734. <https://doi.org/10.1023/A:1007822603186>
- Harvey, A. G., & Bryant, R. A. (2000). Two-year prospective evaluation of the relationship between acute stress disorder and posttraumatic stress disorder following mild traumatic brain injury. *American Journal of Psychiatry*, 157(4), 626–628. <https://doi.org/10.1176/appi.ajp.157.4.626>
- Javidi, H., & Yadollahie, M. (2012). Post-traumatic stress disorder. *The international Journal of Occupational and Environmental Medicine*, 3(1), 2–9.
- Jermann, F., Van der Linden, M., d'Acremont, M., & Zermatten, A. (2006). Cognitive emotion regulation

- questionnaire (CERQ). *European Journal of Psychological Assessment*, 22(2), 126–131. <https://doi.org/10.1027/1015-5759.22.2.126>
- Johnson, K., Scott, J., Rughita, B., Kisielewski, M., Asher, J., Ong, R., & Lawry, L. (2010). Association of sexual violence and human rights violations with physical and mental health in territories of the Eastern Democratic Republic of the Congo. *Jama*, 304(5), 553–562. <https://doi.org/10.1001/jama.2010.1086>
- Kraiss, J. T., Peter, M., Moskowitz, J. T., & Bohlmeijer, E. T. (2020). The relationship between emotion regulation and well-being in patients with mental disorders: A meta-analysis. *Comprehensive Psychiatry*, 102, 152189. <https://doi.org/10.1016/j.comppsy.2020.152189>
- Marroquín, B., Tennen, H., & Stanton, A. L. (2017). Coping, emotion regulation, and well-being: Intrapersonal and interpersonal processes. In M. Robinson & M. Eid (Eds), *The Happy Mind: Cognitive Contributions to Well-Being* (pp. 253–274). Springer.
- McLean, C. P., & Foa, E. B. (2017). Emotions and emotion regulation in posttraumatic stress disorder. *Current Opinion in Psychology*, 14, 72–77. <https://doi.org/10.1016/j.copsyc.2016.10.006>
- Moszynski, P. (2008). 5.4 million people have died in Democratic Republic of Congo since 1998 because of conflict, report says. *Bmj*, 336(7638), 235. <https://doi.org/10.1136/bmj.39475.524282.DB>
- Mpembu, M. N., Lukeba, T., Mayemba, D., Massamba, V. K., Ma Nzuzi, T. M., Gokara, S., Vermeiren, E., Mananga Lelo, G., & Ma Miezi, S. M. (2018). Stress syndrome in patients receiving outpatient treatment at the general hospital, in Bangui, in a context of armed conflict. *The Pan African Medical Journal*, 29(26). <https://doi.org/10.11604/pamj.2018.29.26.7107>
- Ophuis, R. H., Olij, B. F., Polinder, S., & Haagsma, J. A. (2018). Prevalence of post-traumatic stress disorder, acute stress disorder and depression following violence related injury treated at the emergency department: A systematic review. *BMC Psychiatry*, 18(1), 311. <https://doi.org/10.1186/s12888-018-1890-9>
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development*, 59(2-3), 25–52. <https://doi.org/10.1111/j.1540-5834.1994.tb01276.x>
- Ullman, S. E., Peter-Hagene, L. C., & Relyea, M. (2014). Coping, emotion regulation, and self-blame as mediators of sexual abuse and psychological symptoms in adult sexual assault. *Journal of Child Sexual Abuse*, 23(1), 74–93. <https://doi.org/10.1080/10538712.2014.864747>