

# Psychotraumatology of the war: the question of mental health under armed **conflicts** conditions in North-West and South-West of Cameroon

## ABSTRACT

**Background:** The war is a major poly-traumatic event, which leads to massive population displacements. **The** question of the evaluation and psychological care of **psychotraumatized** people is an urgent matter. **Objectives:** This study aimed to investigate the impact of the ongoing war in **North-west** & South-West (NOSO) on the mental health of soldiers and civilians, focusing on war-induced trauma. **Methods:** A cross-sectional study was conducted in different settings in the NOSO. Data was collected from 203 **participants**, two years after the war **beginning**, using a structured questionnaire that included sections on sociodemographic information, trauma-related issues, and mental health. **Results:** The study found that levels of depression and anxiety were relatively average. However, those who were directly exposed to military actions, physical violence, or severe human suffering had higher levels of anxiety, depression, stress, and trauma-related symptoms. **The** war experience varied by gender, age, involved actors (soldiers vs civilians), and living conditions. **Conclusion:** These findings suggest that the mental health of people affected by the war was impacted differently depending on their level of exposure to violence and their living conditions. Additionally, the study identified several stressors, such as military abuses, physical assault, sexual assault, **kidnapping**. Future research should develop effective interventions to support the **wellbeing** of civilians during this difficult time.

**Key words:** War, Armed conflict, mental health conditions, North-west, South-west, Cameroon.

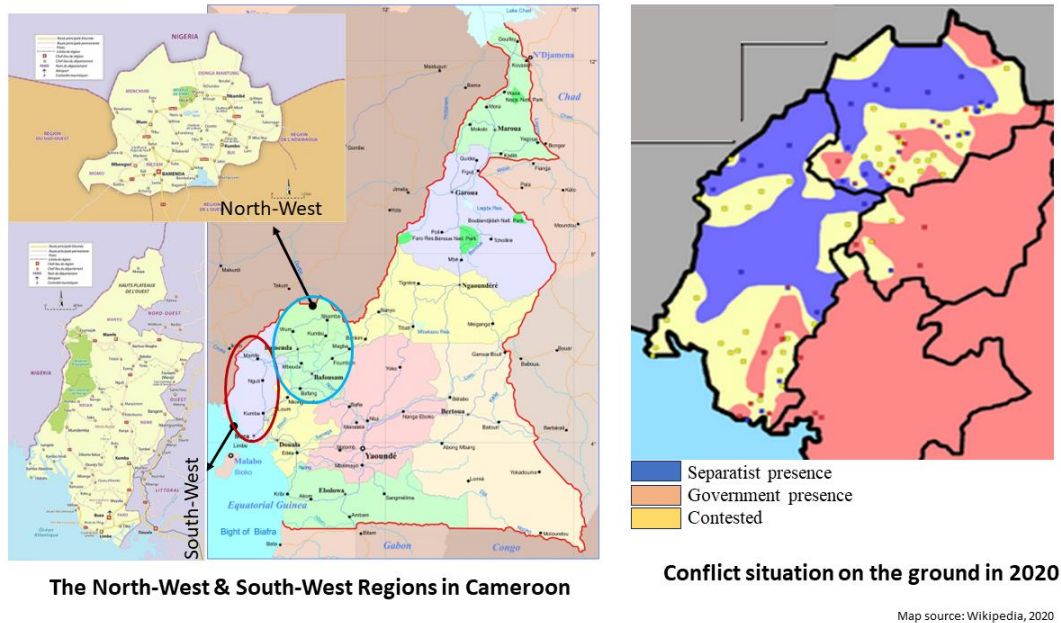
## INTRODUCTION

About **forty** violent conflicts are currently active and nearly 1% of the people in the world are refugees or displaced persons [1]. Over 80% of all refugees or displaced persons are in developing countries, although four million have claimed asylum in **western Europe** in the past decade [2]. Many wars are being played out on the terrain of subsistence economies; most conflict involves regimes at war with sectors of their **own** society - generally the poor and ethnic groups [3]. Atrocities through extrajudicial execution, torture, disappearances, and sexual violation, generate terror, which maximises control over whole populations, as does the intentional destruction of the fabric of social, economic, and cultural life. Community leaders, health workers and facilities, schools, academics, places of worship, and anyone who speaks out for human rights and justice are often targets. **In many regions** such war is a factor in the daily lives and **decision making** of a whole society. However, and unlike conflicts in the 20<sup>th</sup> century, war and armed conflicts in the 21st century **is** associated with less direct mortality but with **long lasting** mental health consequences. The impact of war is not only experienced by combatants and veterans of these conflicts but, to a significant extent, **the civilian population** as well [4]. Targeting **of** civilian spaces such as churches, mosques, shops and businesses, schools, university **campuses** and markets is common. **For this reason**, civilian deaths tend to far outnumber mortality rates among soldiers [5]. Traumatic war experiences among civilians range from

detention in holding camps, displacement, forced separation from family, including parents being separated from children, **physical torture** and witnessing extreme violence. While active military personnel typically undergo strenuous selection processes and resilience training, civilians in a war zone or as refugees and asylum seekers are at higher risk of adverse mental health outcomes [6]. Several systematic reviews have synthesised the extensive literature on the mental health impact of war on diverse subgroups of the **population** including children, adults, torture survivors, **refugees** settled in camps or resettled in high-income countries. Overall, the data from the systematic reviews suggests that civilians exposed to war, whether displaced or not, experience poverty and unemployment. These situations can lead to social marginalisation and stigmatisation of refugees in their host areas, exploitative labor **practices** and their dependence on humanitarian aid, which can be emotionally degrading. **Apart from** those consequences, the World Health Organization (WHO) has stated that in situations of armed conflict, around 10 percent of the people who experience traumatic events will have serious mental health problems, and another 10 percent will develop behavior that will hinder their ability to function effectively. Depression, anxiety, and psychosomatic problems such as insomnia are the most common effects. **Furthermore**, there is a greater probability of transgenerational transmission of these experiences, which means that the **effects** of war can last for decades. Hence, understanding the channels through which war and armed conflicts can perpetuate adverse outcomes is imperative for formulating integrated mental health interventions and policies. Therefore, taking into account the psychopathological consequence of war is an essential issue. **Hence** the current study **which** examines the impact that the war has had on the mental health of NOSO people, in particular on civilians and **soldiers** as suggested by Sugden in a study of this kind [7]. That is why we aim to investigate the following research hypotheses: (i) exposure to the war in the NOSO is positively associated with higher levels of anxiety, depression, stress, DSP, PTSD, and CPTSD; (ii) levels of anxiety, depression, stress, DSO, PTSD, and CPTSD differ based on gender, age, working conditions, and current exposure to traumatic experiences (placement within or outside NOSO).

## **MATERIALS AND METHODS**

**Location of the study area:** The study area refers to the North-West and South-West regions of **Cameroon which before** reunification in 1972, were known as The Southern Cameroons, part of the British League of Nations mandate territory of the British Cameroons in West Africa (Figure 1). Since 2017-2018, those regions **experiment what is named** the Anglophone crisis. **In fact**, The **Anglophone Crisis** also known as the Cameroonian Civil War, is an ongoing armed conflict between Cameroon Armed Forces and Ambazonian separatist rebel groups, part of the long-standing Anglophone problem [8].



**Figure 1: Location of the study area**

**Study population, sampling design, and sample size technique:** According to the United Nations, in situations of armed conflict, not only one **group of population is exposed**, but **several groups**. Sugden (op cit) has identified three categories of people who are likely to be exposed to mental disorders under war conditions: the soldiers, the civilians, and individuals who consume the images, videos, and audio of the war through social media apps, television, radio, and the web. Our study has targeted the two first categories, **that is the soldiers and the civilians**, including people in war-prone areas and people who have moved to other settings. Given the nature of our study population (dispersed and **heterogenous** population), we opted for non-parametric sampling and **for** a convenience sampling method where participants are selected for inclusion in the sample because they are the easiest for the researcher to access. **This is due to geographical proximity, availability at a given time, and willingness to participate in the research**. However, we had one main inclusion criterion: having been directly or not exposed to the throes of war. **Also** because of the highly dispersed nature of the target population, we **resorted (as far as sample size is concerned)**, to the sample saturation **technique** which refers to the point where a collected data sample contains enough information **to adequately represent the entire data set**. **This means that the sample has reached a saturation level when addition of new samples would not significantly contribute to a better understanding of the phenomenon under study**. Thus, our sample consisted of 203 participants, namely 29 soldiers and 174 civilians.

**Data collection:** The data collection method used was the surveys, because data collected through surveys can then be analyzed and used to support or refute research hypotheses and draw conclusions about the study's subject matter. We **particularly** used the Harvard Trauma Questionnaire (HTQ) model **specifically designed** for conflict-affected populations. Among the

six current existing versions<sup>1</sup>, we have combined both the Croatian and Bosnian versions as they better reflect the experiences of soldiers and civilians in one hand, and in another, they reflect the open-ended description of the most traumatic events, measuring both traumatic events and symptoms. In the first section of the questionnaire, 17 items describe a range of stressors experienced by refugees, such as torture, rape, murder, and lack of food or water. For each item, the respondent notes whether he or she has (i) not experienced, (ii) heard about, (iii) witnessed, or (iv) personally experienced that stressor. The symptom portion consists of 30 items, 16 of which correspond to DSM-IV criteria and 14 of which tap other aspects of distress. Items are scored on a 4-point scale from "not at all" to "extremely". The questionnaires were administered to participants between February 2020 and June 2022. Thus far, these surveys have been administered face to face in 9 settings throughout the NOSO (Batibo, Mbengwi, Jakiri, Kumbo, Wum, Kumba, Buea, Nguti, Manfe,). To measure exposure to violence or to a trauma event, respondents were asked a series of yes-or-no questions about lifetime exposure to experiences that were conceptualized in the interviews as traumatic according to the criteria of the The Life Events Checklist for DSM-5 (LEC-5)<sup>2</sup>. Two of these questions were as follows: "Were you ever an unarmed civilian in a place where there was a war?" and "Did you ever live as a civilian in a place where there was ongoing terror of civilians for political, ethnic, religious or other reasons?". We also asked all respondents about exposure to 3 related stressors: being a military ("Did you ever participate in combat?"), becoming an internal displaced person ("Were you ever an IDP—that is, did you ever flee from your home to to escape danger or persecution?"), and witnessing atrocities ("Did you ever see atrocities or carnage such as mutilated bodies or mass killings?"). And to measure mental disorders, we used the WHO Composite International Diagnostic Interview (CIDI), version 3.0 to assess the following disorders: externalizing disorders (ie, attention-deficit/hyperactivity disorder, conduct disorder, alcohol dependence, cannabis dependence, other drug dependence, and tobacco dependence), internalizing disorders (ie, depression, generalized anxiety disorder, fears [including social phobia, simple phobia, agoraphobia, and panic disorder], posttraumatic stress disorder, and eating disorders [including bulimia and anorexia]), and thought disorders (ie, obsessive-compulsive disorder, mania, and schizophrenia). Lifetime disorder age of onset was determined by retrospective recall using special probing techniques designed to optimize the accuracy of dating [9].

**Data analysis:** Associations of personal exposure to civil violence with the subsequent first onset of mental disorders were estimated with discrete-time survival analysis using a log link function [10]. Associations of exposure with disorder persistence were estimated at the person level, again using a log link function, with the outcome defined as the 12-month prevalence among lifetime cases controlling for disorder age of onset and time since onset. Statistical techniques such as frequency distribution and Student's t test were used to analyze the data. Analyses of variance (ANOVA) at 95% confidence level were used to determine the significance difference.

---

<sup>1</sup> Currently there are six versions of this questionnaire. The Vietnamese, Cambodian, and Laotian versions of the HTQ were written for use with Southeast Asian refugees. The Japanese version was written for survivors of the 1995 Kobe earthquake. The Croatian Veterans' Version was written for soldiers who survived the wars in the Balkans, while the Bosnian version was written for civilian survivors of that conflict.

<sup>2</sup> The LEC-5 is a self-report measure designed to screen for potentially traumatic events in a respondent's lifetime. The LEC-5 assesses exposure to 16 events known to potentially result in PTSD or distress.

The data yield was analysed by **Statistical Package Social Science (SPSS)** programme version 17.0.

**Ethical considerations:** Ethics approval was obtained from the Institutional Ethics Committee for Research for Human Health (CEIRSH) of the School of Health Sciences of the Catholic University of Central Africa. Participants were informed of the aims and content of the study and were required to give written, informed consent before enrollment. The participants did not receive any compensation for their participation in the study. All data collected in the Survey Solutions software for this study was deidentified.

## RESULTS

**Sociodemographic characteristics of the respondents:** Of the 203 survey respondents, 139 were male, and 64 were female. Their ages ranged between 26 and 67 years **with an average of 29 ± 13.6 years**. Most of the respondents received **education**, including 38.7% from **secondary level** and 25.6% from **tertiary level**. Before the beginning of the war or at the time of the survey, 43.7% were either self-employed or **worked** in the informal sector, and 24.4% were inactive or unemployed. Most of the respondents were **married (61.1%)** and 28.1 % reported personal exposure to civil and military violence.

Table 1: Sociodemographic characteristics of respondents

	Frequency (%)	OR (CI 95%)	Chi <sup>2</sup>	P value	DI.
<b>Gender</b>					
Male	139 (68.5%)	---	---	---	2
Female	64 (31.5%)	---	---	---	
<b>Age range</b>					
[20-39 years ]	79 (38.9%)	---	---	---	
[40-49 <b>yeras</b> ]	102 (50.2%)	---	---	---	4
[50-69 years and more [	22 (10.8%)	---	---	---	
<b>Socio-professional status</b>					
Unemployed	61 (30.0%)	---	---	---	
Employee	39 (19.2%)	---	---	---	1
Self-employment- <b>Informal sector</b>	87 (42.8%)	---	---	---	
Retired	16 (07.9%)	---	---	---	
<b>Marital status</b>					
Single	59 (29.1%)	---	---	---	
Married	124 (61.1%)	---	---	---	1
Divorced	07 (03.4%)	---	---	---	
Widowed	13 (06.4%)	---	---	---	
<b>Level of education</b>					
No	24 (11.8%)	---	---	---	
Primary	47 (23.2%)	---	---	---	2
Secondary	94 (46.3%)	---	---	---	
University	38 (18.7%)	---	---	---	
<b>Related stressor</b>					
<b>Personally</b> experienced violence	57 (28.1%)	---	---	---	1
Saw or witnessed atrocities	110 (54.2%)	---	---	---	
Professional <b>commitment</b> (soldier)	12 (05.9%)	---	---	---	
Heard about <b>violence &amp; atrocities</b>	24 (11.8%)	---	---	---	
<b>Financial state</b>					
Not enough for basic needs	109 (53.7%)	---	---	---	
Enough only for basic needs	73 (36.0%)	---	---	---	1
Enough for basic and additional needs	21 (10.3%)	---	---	---	

**Mental disorders experienced by the NOSO population:** The war in the NOSO regions is a major polytraumatic event. Results show that individuals are exposed to both common mental disorders and psychiatric disorders. Anger (92.1%), insomnia (83.2%), and panic disorder (84.7%) have been the most common **mental conditions**; whereas general anxiety (72.4%) and depression (47.3%) were the most psychiatric health conditions identified. Table 2 provides details on those prevalence rates according to some selected variables.

Table 2: Distribution of main common mental health and psychiatric disorders identified among the study participants.

Disorders	Gender		Age group		Marital status		Employability		Chi <sup>2</sup>	P value	DF.
	Male	Female	[20-40]	[40-60]	Single	Married	No	Employed			
<b>A. Common mental disorders</b>											
Eating disorders (n=111)	76 (68.5%)	35 (31.5%)	39 (35.1%)	72 (64.9%)	49 (45.2%)	62 (55.8%)	32 (28.8%)	79 (71.2%)	39.016	0.004*	1
Obsessive-Compulsive Disorder (n=86)	69 (80.2%)	17 (19.8%)	61 (70.9%)	25 (29.1%)	30 (38.9%)	56 (65.1%)	24 (27.9%)	62 (72.1%)	21.872	0.001*	1
Personality disorder (n=94)	71 (75.5%)	23 (24.5%)	19 (20.2%)	75 (79.8%)	38 (40.4%)	56 (59.6%)	30 (31.9%)	64 (68.1%)	18.653	0.005*	3
Panic disorder (n=172)	113 (65.7%)	59 (34.3%)	105 (61.1%)	67 (38.9%)	38 (22.1%)	134 (77.9%)	46 (26.8%)	126 (73.2%)	20.476	0.001*	1
Substance use disorder (n=77)	62 (80.5%)	15 (19.5%)	50 (64.9%)	27 (35.1%)	24 (31.2%)	53 (68.8%)	48 (62.3%)	29 (37.7%)	4.683	0.135	4
Specific phobias (n=91)	42 (46.2%)	49 (53.8%)	55 (60.4%)	36 (39.6%)	39 (42.9%)	52 (57.1%)	43 (47.2%)	48 (52.8%)	31.479	0.003*	2
Social anxiety disorder (n=126)	66 (52.4%)	60 (47.6%)	53 (42.1%)	73 (57.9%)	39 (30.6%)	87 (69.4%)	44 (34.9%)	82 (65.1%)	6.390	0.328	2
Anger (187)	123 (65.8%)	64 (52.4%)	74 (39.6%)	113 (60.4%)	51 (27.3%)	136 (72.7%)	57 (30.5%)	130 (69.5%)	24.017	0.001*	4
Insomnia (169)	112 (66.3%)	57 (33.7%)	68 (40.2%)	101 (59.8%)	40 (23.7%)	129 (76.3%)	53 (31.4%)	116 (68.6%)	20.471	0.001*	1
Suicidal feelings (n=58)	41 (70.7%)	17 (29.3%)	18 (31.0%)	40 (69.0%)	31 (53.5%)	27 (46.5%)	37 (63.8%)	21 (36.2%)	19.720	0.171	1
<b>B. Psychiatric disorders</b>											
Anxiety Disorders (n=147)	110 (74.8%)	37 (25.2%)	54 (36.7%)	93 (63.3%)	39 (26.6%)	108 (73.4%)	55 (37.4%)	92 (62.6%)	23.910	0.004*	1
Depression (n=96)	68 (70.8%)	28 (29.2%)	37 (38.5%)	59 (61.5%)	52 (54.2%)	44 (45.8%)	35 (36.4%)	61 (63.6%)	20.572	0.001*	1
Post-Traumatic Stress Disorder (PTSD) (n=19)	19 (100%)	0 (00.0%)	12 (63.2%)	07 (36.8%)	14 (73.7%)	05 (26.3%)	08 (42.1%)	11 (57.9%)	21.800	0.001*	2

P value < 0.005. DF: degree of freedom

**Traumatic life events:** Traumatic events **that happened** with respondents were reported through LEC-5. Based on LEC-5 data, the most prevailing traumatic life events that happened with participants **include:** military actions, physical assault, armed attack, and severe human suffering. The frequency distribution of traumatic events is presented in Figure 2. The results of one-way ANOVA show that participants who were directly exposed to military actions, witnessed them, or learned about them show higher levels of: (i) anxiety [F (5, 56.5) = 2.78,  $p = 0.026$ ,  $\omega^2 = 0.04$ ]; (ii) Panic disorder [F (5, 56.7) = 4.06,  $P$  Value = 0.003,  $\omega^2 = 0.03$ ], (iii) and Obsessive-Compulsive Disorder [F (5, 55.4) = 2.09,  $P$  Value = 0.080,  $\omega^2 = 0.01$ ]<sup>3</sup>. The same concerns participants, who reported experiencing **stressful** event, which, as we assume, is war-related show higher levels of anxiety (F (5, 83.5) = 10.93,  $P$  Value < 0.001,  $\omega^2 = 0.06$ ), depression (F (5, 84.3) = 10.46,  $P$  Value < 0.001,  $\omega^2 = 0.06$ ), specific phobias (F (5, 83.0) = 5.09,  $P$ -Value < 0.001,  $\omega^2 = 0.03$ ), eating disorders (F (5, 84.2) = 14.6,  $P$  Value < 0.001,  $\omega^2 = 0.09$ ), anger (F (5, 84.2) = 16.66,  $P$  Value < 0.001,  $\omega^2 = 0.11$ ), and substance use disorder (F (5, 84.4) = 20.29,  $P$  Value < 0.001,  $\omega^2 = 0.14$ ). Those who reported exposure to physical violence show higher levels of social anxiety disorder (F (5, 50) = 4.33,  $P$  Value = 0.002,  $\omega^2 = 0.02$ ), anger (F (5, 51.7) = 8.52,  $P$  Value < 0.001,  $\omega^2 = 0.02$ ), and personality disorder (F (5, 49.9) = 3.62,  $P$  Value = 0.007,  $\omega^2 = 0.01$ ). Participants reporting the experience of severe human suffering and sexual assault **show** the highest differences in mean scores in suicidal feelings (F (5, 144) = 10.68,  $P$  Value < 0.001,  $\omega^2 = 0.06$ ), depression (F (5, 145) = 10.13,  $P$  Value < 0.001,  $\omega^2 = 0.06$ ), anxiety disorder (F (5, 147) = 5.98,  $P$  Value < 0.001,  $\omega^2 = 0.04$ ), PTSD (F (5, 150) = 7.18,  $P$  Value < 0.001,  $\omega^2 = 0.05$ ), and Obsessive-Compulsive disorder (F (5, 150) = 10.43,  $P$  Value < 0.001,  $\omega^2 = 0.07$ ).

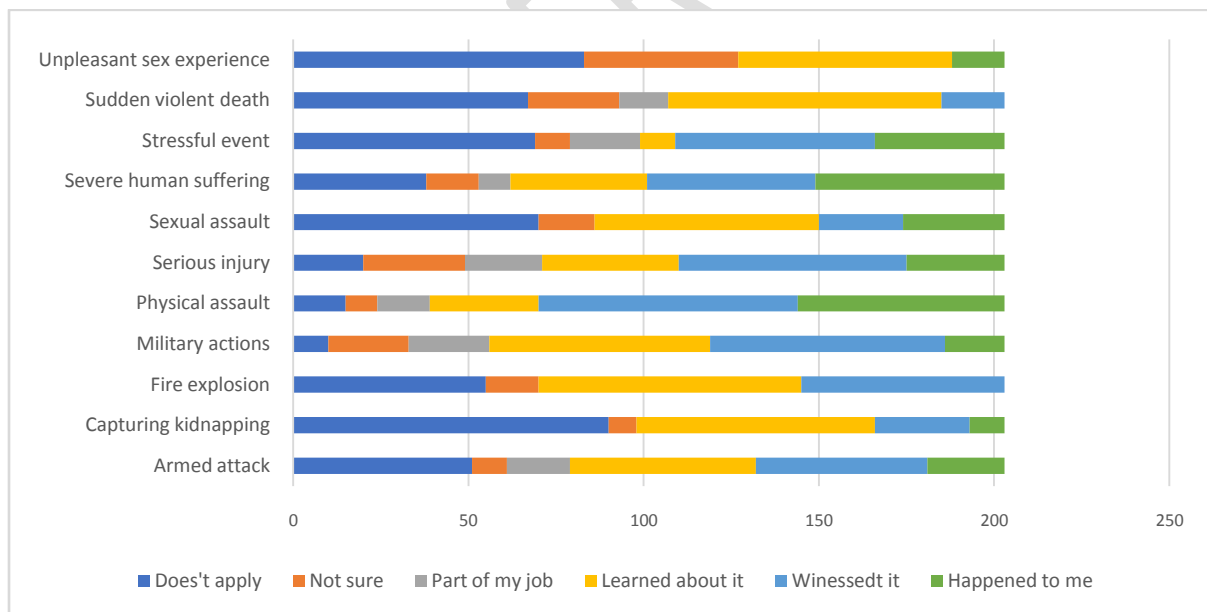


Figure 2: frequency distribution of traumatic events

<sup>3</sup> **F-test** is a **statistical test**, the ratio of a measure of the variation in the group means to a similar measure of the variation within the groups. It is most often used when comparing statistical models that have been fitted to a **data set**, in order to identify the model that best fits the population from which the data were sampled. The **P-value** is the probability of obtaining **results** at least as extreme as the observed results of a statistical hypothesis test, assuming that the null hypothesis is correct. **Omega squared ( $\omega^2$ )** is a **measure of effect size**, or the degree of association for a population. It is an **estimate of** how much variance in the response variables **are** accounted for by the explanatory variables. Omega squared is widely viewed as a **lesser** biased alternative to eta-squared, especially when sample sizes are small.

**Prevailing trauma types:** According to reports from both the Harvard Trauma Questionnaire (HTQ) and the Life Events Checklist for DSM-5 (LEC-5), the beginning of the war, war exposure, or the war itself became the most traumatic event for most of the NOSO population. No statistically significant differences among different trauma types (as fixed factor) and social anxiety disorder ( $F(16, 35.1) = 0.92, P\text{-value} = 0.551$ ), personality disorder ( $F(16, 34.8) = 0.95, P\text{-value} = 0.521$ ), and obsessive-compulsive disorder ( $F(16, 34.9) = 0.58, P\text{-value} = 0.876$ ) were obtained; however, significant differences were obtained for depression ( $F(16, 35.4) = 2.191, P\text{-value} = 0.026$ ), PTSD ( $F(16, 36.9) = 10.365, P\text{-value} < 0.001$ ), and panic disorder & insomnia ( $F(16, 38.9) = 9.3, p < 0.001$ ).

**Overall level of traumatization:** Results show that NOSO population show low levels of PTSD ( $M = 2.45, SD = 1.80$ ; score range 0–5), and low levels of eating disorders and of substance abuse disorder ( $M = 2.26, SD = 1.80$ ; score range 0–5). The levels of traumatization are the following: social anxiety ( $M = 10.95, SD = 6.20$ ; score range 0–30), depression ( $M = 11.59, SD = 7.65$ ; score range 0–30), and personality disorder as well as obsessive-compulsive disorder ( $M = 22.6, SD = 11.9$ ; score range 0–60). Besides, related stressors associated to those mental health conditions are as shown on figure 3.

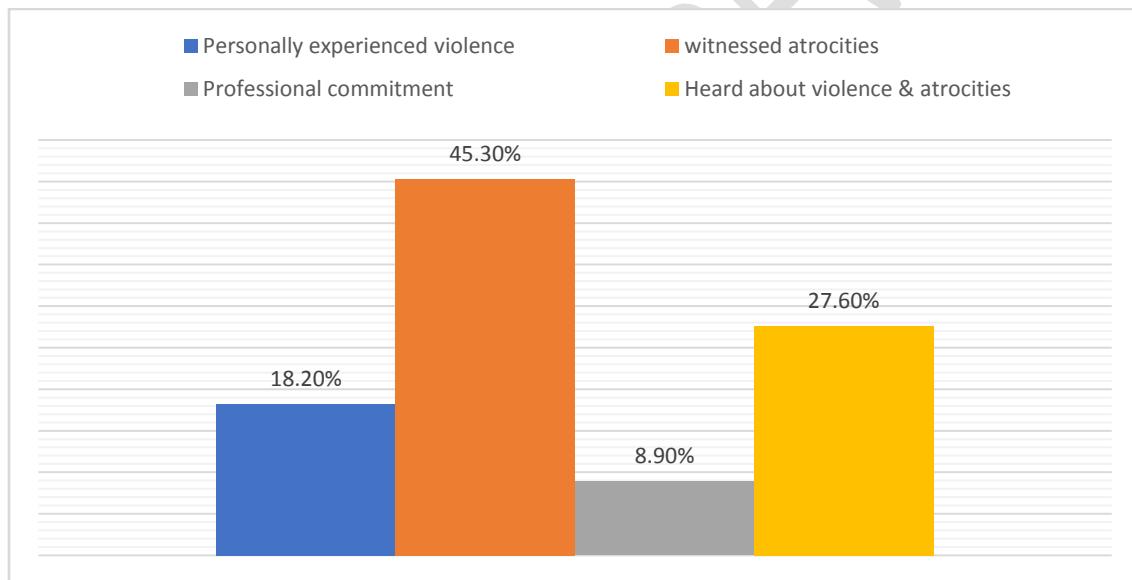


Figure 3: Stressors associated to mental disorders in the NOSO war

## DISCUSSION

To the best of our knowledge, this is the first study exploring mental health conditions among people from the NOSO regions. The key findings of this study can be summarized in three points.

**(i) The war in NOSO, a major polytraumatic event:** As noted in the introduction, the global population living in regions exposed to civil violence is large and growing, with the World Bank estimating that 1.1 billion people (14% of the world's population) lived in "fragile and conflict

exposed situations” in 2020, compared with 612 million people (10% of the world’s population) in 2000 [11]. Regarding the NOSO regions, they are home of about 3 550 000 people, who theoretically live under war conditions for 5 years now. In fact, the conflict originated following the suppression of 2016–2017 protests by Cameroonian authorities, separatists in the Anglophone regions launched a guerrilla campaign and later proclaimed independence. Within two months, the government of Cameroon declared war on the separatists and sent its army into the Anglophone regions. Starting as a low-scale insurgency, the conflict spread to most parts of the Anglophone regions within a year. By the summer of 2019, the government controlled the major cities and parts of the countryside, while the Ambazonian nationalists held parts of the countryside and regularly appeared in the major cities. As in any armed conflict, the destruction is massive. The targets are military and civilians. These destructions are more and more every day. Strategic facilities, nurseries, schools, health establishments, factories, cultural or religious buildings, residential districts, apartment buildings, houses, markets, shopping centres, towns and villages are at the core of numerous attacks, countless kidnappings and on the ground assaults. Some areas are disfigured and devastated. Men, women and children are injured or killed. Others survive in remote villages deprived of basic resources. Families are destroyed. Corpses cover the ground of certain streets before being summarily buried. War is spreading, proliferating, impacting lives and social organisation. After five years of conflict, this war is a major polytraumatic event. The trauma is human, social, economic, political, environmental, and mostly psychological, as results of our study illustrate. Responses of participants to this study show that the whole population is affected by all illnesses relating to psychopathology. We estimated that approximately one in five people in armed-conflict settings has depression, anxiety disorder, post-traumatic stress disorder, panic disorder, or insomnia. This finding contrasts with data from GBD 2016 which suggest a mean global prevalence of one in 14 [12]. Our empirically derived estimates show higher prevalence of severe mental disorders than the previous WHO estimates (about 5.1% point prevalence in current estimate compared with 3–4% 12-month prevalence in previous estimates) and higher prevalence of mild to moderate mental disorders (approximately 17%-point prevalence in the revised estimates, compared with 15–20% 12-month prevalence in previous estimates).

**(2) Exposure to the war trauma:** Like several studies, ours show that war has a devastating impact on the mental health of the population exposed to war. High scores have been obtained on both common disorders and psychiatric disorders, namely personality disorder, obsessive-compulsive disorder, anxiety, and depression. Overall, participants who have been witnessing military actions or experiencing physical violence, together with severe human suffering, just have higher levels of anxiety, depression, and PTSD, than those who did not report having such experience, but at the same time, not critically high. NOSO people reported that the war itself became a major traumatic event for the majority of the population. In addition, we have identified the prevailing trauma types: experience of war (war exposure), death of a close person/relative, military actions, which comply with the reported trauma events that include other stressful event such as physical assault and severe human suffering. The model of polyvictimization suggests that experience of multiple types of victimization over time leads to increased mental health problems [13] and since NOSO people, based on the results of our study and on the open facts, undergo polyvictimization, overall situation with mental health may worsen. Field observations show that due to the presence of increased stress, anxiety, and

depression, together with reduced glimmer of hope to end the war by political mechanisms, the current situation may change for the worse in the future, especially if current living conditions are proved unsatisfactory. In particular, increased levels of suicidal feelings, social anxiety disorder, anger, PTSD, and obsessive-compulsive disorder are to be expected. It means that when the war ends, all NOSO people will develop certain difficulties in self-perception and in relations with other Cameroonian people due to exposure to acute stress and war-related trauma. In-depth analysis allows to make two specific comments: **(i) The first is related to the two groups of mental health diseases:** In the category of common mental conditions, panic disorder, social anxiety disorder, anger, and insomnia are particularly prevalent among the people. And it is so because of the terror and the anguish of destruction and death for themselves and their loved ones. Such a situation has been described in previous studies worldwide, namely in four studies in Sudan, Southwestern Nigeria, and Lebanon that investigated common mental disorders among individuals exposed to war [14]. In one recent study conducted in a refugee camp in Lebanon by the French NGO Médecins sans Frontières, current rates of suicidality reached 12% [15]. Similar results were observed in a Nigerian refugee camp [16]. A survey examining the health status of internally displaced adult females in Darfur reported a prevalence rate of 2% for more specific suicidal behaviors, namely attempted or committed suicide [17]. In the category of psychiatric conditions, PTSD, depression, and anxiety disorders were the most common psychiatric illnesses investigated. However, prevalence rates of anxiety disorders were consistently high. This is not surprising because in 2019, 301 million people were living with an anxiety disorder including a third living in war areas [18]. In the NOSO, anxiety disorders were related to generalised anxiety disorder characterised by excessive worry, to panic disorder characterised by panic attacks, to separation anxiety disorder characterised by excessive fear or anxiety about separation from those individuals to whom the person has a deep emotional bond). All those anxiety disorders are characterised by excessive fear and worry and related behavioural disturbances. Symptoms are severe enough to result in significant distress or significant impairment in functioning. We also found depression and PTSD to be the second and third most commonly reported psychiatric mental disorders. It should be noted that depression is different from usual mood fluctuations and short-lived emotional responses to challenges in everyday life. Based on our field observations, during a depressive episode, the investigated Nosoan experiences depressed mood (feeling sad, irritable, empty) or a loss of pleasure or interest in activities, for most of the day, nearly every day, for at least two weeks. Several other symptoms were also present, which include poor concentration, feelings of excessive guilt or low self-worth, hopelessness about the future, thoughts about dying or suicide, disrupted sleep, changes in appetite or weight, and feeling especially tired or low in energy. Estimates of more precise diagnoses of depression were compatible with the high prevalence of unspecified depression among displaced populations [19]. As for the PTSD identified mostly on soldiers, it has been developed following exposure to an extremely threatening or horrific event or series of events. In NOSO, it is characterised by all of the following: re-experiencing the traumatic event or events in the present (intrusive memories, flashbacks, or nightmares); avoidance of thoughts and memories of the event(s), or avoidance of activities, situations; and persistent perceptions of heightened current threat. These symptoms persist for at least several weeks and cause significant impairment in functioning. **(ii) The second is related to demographics:** Men have appeared to be more prone to traumatic experiences and

increased levels of anxiety, depression, and CPTSD. This is not proven by other studies where female gender was significantly associated with higher rates of common mental disorders, because in the war zone, women faced gender-specific risks as potential victims of rape, sexual abuse, targeted killing, widowhood of deceased soldiers, and pregnancy-related complications due to poor antenatal and postnatal healthcare [20, 21]. Younger (up to 25) and older (over 46) participants show lower levels of trauma experience, while adults (aged between 26 and 45) show higher levels of trauma experience. Because of the war, many Nosoans (inhabitants of the NOSO regions) lost their jobs, and it impacted their financial state, either while staying in NOSO or while moving to other cities. The financial state majorly defines the current, subjectively reported living comfort, which relates to the trauma experience: the worse the subjective living conditions are, the higher the levels of stress, depression, anxiety. Related to these age-of-onset patterns, it is noteworthy that prior studies found that early onset of mental disorders is associated with significant reductions in both education and earnings throughout the life course [22]. This finding is important not only for individuals but also for post-conflict societies, as civil conflicts are overwhelmingly concentrated in low and low-to middle-income countries where the pace of economic development not only remains tenuous but, in fact, has decreased over time [23]. This observation suggests that new generations of young adults with a history of exposure to civil violence in already poor and unstable regions may become less economically productive, potentially contributing to a cycle of economic loss and civil conflict. It is therefore important to identify and address mental disorders both within these regions or countries to support positive future economic, social, and political growth.

**(3) War prevailing stressors:** There is no such thing as a universal response to highly stressful events. It would be simplistic to attribute above mentioned mental health conditions of the Nosoans to war itself. Our findings indicate that poor mental health of Nosoans are actually related to traumatic life events that happened: military and combatant abuses, physical assault, armed attack, kidnapping capturing. They should then be considered as traumatizing factors, i.e. the main mental disorders stressors [24, 25]. What is more, the stress-diathesis model Broerman [26] suggests that mental health outcomes are the result of both environmental stressors and individual vulnerabilities, meaning that being exposed to war-related trauma, together with increased individual anxiety and stress, will lead to worse mental health outcomes after the direct exposure is over. This has already been shown in studies with Cambodian refugees [27].

## LIMITATIONS AND STRENGTHS

**Limitations:** Several **important** limitations of this study need to be highlighted. First, the research sample has a relatively low number of women **in comparison** to men. This has probably led to an underestimation of association. Second, another limitation is consistent with the disadvantages of using the convenience method for sampling; this may include the inability to control the sampling process, the weight of the first **respondents** which leads to community bias, and **also** lack of representativeness due to the non-random way of population sampling. Third, given that civil violence was only one of many questions addressed in the surveys, only a handful of questions **were asked about types of stressors**. In addition, effect size estimates

would presumably be **larger** with more detailed measures than with the coarse measure used here. Fourth, one of the **greatest** limitations of this study is its inability to reach individuals of the NOSO population who experienced a direct impact of war, for example, the combatants (separatists) and those who have been forced to move to remote rural areas (forests). To this end, further investigations should be planned to understand better individuals who have returned after forced displacement since we presume that those populations would have more severe levels of traumatization.

**Strengths, Practical and clinical implications of study:** The study herein has two main strengths to be considered. Firstly, our study assessed populations that may be affected by war. Our subgroup analysis focused on civilians and the military, which highlighted how the availability of mental health resources influences the susceptibility of a population to mental disorders. Secondly, the data of this work is an **important** building block to inform the design of scalable (digital) public health interventions for individuals living in crises that explicitly target mental health. We believe that our study is an **important** step toward finding possible solutions, and highlighting key problems during a time **where** mental health issues are easily overlooked. We believe it carries important practical implications, as it helps identify groups that are vulnerable to mental health risks during the war, making it possible to target psychiatric care to people of the studied groups. The results of the study show **what are** the specific disorders of their members, **what is** the intensity of the most common symptoms, and **what are** the related stressors. This knowledge seems **important** for planning appropriate forms of help. In light of the data obtained, it seems even more important to look for ways to stop or alleviate the suffering of innocent people who are unprepared to take part in combat and are painfully surprised by the participation in traumatic situations, the brutal consequences of which they have to face.

## **CONCLUSION**

Experiencing armed conflict poses serious mental health risks and threats to one's development. Exposure to different types of violence, the duration of the conflict, and the nature of experienced and witnessed traumatic events are all associated with the onset and severity of mental disorders among conflict-affected individuals. Although the links between armed conflict exposure during childhood and subsequent mental health risks are well established, the reported prevalence of mental disorders varies widely. In this survey study of exposure to civil violence, exposure was associated with an elevated risk of mental disorders. To our knowledge, this study is the first to evaluate a range of mental disorders in cross-sectional general population household samples of individuals who were civilians in regions that experienced civil violence. Other studies of the association between exposure to war and mental disorders focused largely on the mental disorders of currently displaced people or survivors of recent conflicts. Our finding of varied disorder onset risk is not surprising, but it is useful to know for service planning purposes that this risk was especially high among people first exposed during their youth. It should be noted that there is wide consensus that mental health and psychosocial support for affected populations should go beyond psychological and medical treatments for mental disorders, and that such support should include psychosocial intervention that strengthens community self-help and support and advocacy for security and protection and for adequate humanitarian aid, including basic health services and livelihood support. Our findings

highlight the need to prioritise conflict-affected regions for implementation of the WHO Mental Health Action Plan. This will require a focus on investment in leadership and governance for mental health, and the development of integrated, responsive mental health and social care services in community-based settings. Strategies for promotion and prevention in mental health, and building and strengthening of information systems, evidence, and research for mental health in conflict-affected countries, are also needed. These services could be initiated with short-term emergency funds that are often available during crises. Demonstration projects can provide proof of concept and attract the further support and funds necessary for system development to reduce the burden of mental disorders among people affected by war and other conflict. As there is no end date for the Russo-Ukrainian war, ongoing monitoring and surveillance of mental health sequelae is necessary. An in-depth understanding of the effect of war and its consequences, among other innumerable mental health problems, is necessary to develop consistent and effective coping strategies.

#### **DATA AVAILABILITY STATEMENT**

All relevant data are included in the paper.

#### **REFERENCES**

- [1] Chudzicka-Czupała, A., Hapon, N., Chiang, SK. *et al.*. Depression, anxiety and post-traumatic stress during the 2022 Russo-Ukrainian war, a comparison between populations in Poland, Ukraine, and Taiwan. *Sci Rep.* 2023; 13, 3602-3622.
- [2] Khorram-Manesh, A., Burkle, F. M., Goniewicz, K. & Robinson, Y. Estimating the number of civilian casualties in modern armed conflicts-A systematic review. *Front. Public Health.* 2021, 9, 765-769.
- [3] Musisi S, Kinyanda E. Long-term impact of war, civil war, and persecution in civilian populations-conflict and post-traumatic stress in African communities. *Front Psychiatry.* 2020; e1220
- [4] Charlson F, van Ommeren M, Flaxman A, Cornett J, Whiteford H, Saxena S. New WHO prevalence estimates of mental disorders in conflict settings: a systematic review and meta-analysis. *Lancet.* 2019; 394:240–824
- [5] Lewtak, K. et al. Ukraine war refugees-Threats and new challenges for healthcare in Poland. *J. Hosp. Infect.* 2022; 125, 37–43.
- [6] Abu Suhaiban H, Grasser LR, Javanbakht A. Mental health of refugees and torture survivors: a critical review of prevalence, predictors, and integrated care. *Int J Environ Res Public Health.* 2019; 16:2309
- [7] Sugden Steve [Internet-Cited December 2023]. the mental health effects of war: backed by science. Available from : <https://healthcare.utah.edu/hmhi/news/2022/03/mental-health-effects-of-war-backed-science>.

- [8] Sombaye Eyango Jules Roger. Inside the Virtual Ambazonia: Separatism, Hate Speech, Disinformation and Diaspora in the Cameroonian Anglophone Crisis. University of San Francisco, Master's Theses, Master of Arts in International Studies, 2018, 87p.
- [9] Knäuper B, Cannell CF, Schwarz N, Bruce ML, Kessler RC. Improving accuracy of major depression age-of-onset reports in the US National Comorbidity Survey. *Int J Methods Psychiatr Res.* 1999;8(1):39-48.
- [10] Suresh K, Severn C, Ghosh D. Survival prediction models: an introduction to discrete-time modeling. *BMC Med Res Methodol.* 2022;22(1):207-217.
- [11] World Bank [Internet-cited January 15, 2024]. Fragile and conflict affected situations. Available from: <https://data.worldbank.org/country/F1>
- [12] Aos T, Abajobir AA, Abate KH, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017; 390: 1211–59
- [13] Wolfe DA. Why polyvictimization matters. *J Interpers Violence.* 2018; 33:832-837
- [14] Llosa AE, Ghantous Z, Souza R, Forgione F, Bastin P, Jones A, et al. Mental disorders, disability and treatment gap in a protracted refugee setting. *Br J Psychiatry* (2014) 204:208–213
- [15] Salah TT, Abdelrahman A, Lien L, Eide AH, Martinez P, Hauff E. The mental health of internally displaced persons: an epidemiological study of adults in two settlements in Central Sudan. *Int J Soc Psychiatry.* 2013; 59:782–788.
- [16] Akinyemi, O.O., Owoaje, E.T., Ige, O.K. *et al.* Comparative study of mental health and quality of life in long term refugees and host populations in Oru-Ijebu, Southwest Nigeria. *BMC Res Notes.* 2012; 5, 394-412 (<https://doi.org/10.1186/1756-0500-5-394>)
- [17] Kim G, Torbay R, Lawry L. Basic health, women's health, and mental health among internally displaced persons in Nyala Province, South Darfur, Sudan. *Am J Public Health.* 2007; 97:353-361.
- [18] Sheikh TL, Mohammed A, Agunbiade S, Ike J, Ebiti WN, Adekeye O. Psycho-trauma, psychosocial adjustment, and symptomatic post-traumatic stress disorder among internally displaced persons in Kaduna, Northwestern Nigeria. *Front Psychiatry.* 2014; 5:127
- [19] Tang SS, Fox SH. Traumatic experiences and the mental health of Senegalese refugees. *J Nerv Ment Dis.* 2001; 189:507-512.
- [20] Jones L, Asare JB, El Masri M, Mohanraj A, Sherief H, van Ommeren M. Severe mental disorders in complex emergencies. *Lancet.* 2009; 374:654–661.
- [21] Morina N, Akhtar A, Barth J and Schnyder U. Psychiatric Disorders in Refugees and Internally Displaced Persons After Forced Displacement: A Systematic Review. *Front. Psychiatry.* 2018; 9:433. doi: 10.3389/fpsy.2018.00433
- [22] Bouchard Jean-Pierre, Stiegler Nancy, Padmanabhanunni Anita, et al. Psychotraumatology of the war in Ukraine: The question of the psychological care of victims who are refugees or who remain in Ukraine. *Annales Medico-Psychologiques*, 2023, Issue 181, 12–15.

[23] Slone M, Mann S. Effects of war, terrorism, and armed conflict on young children: a systematic review. *Child Psychiatry Hum Dev.* 2016; 47:950–965.

[24] Sabin M, Lopes Cardozo B, Nackerud L, Kaiser R, Varese L. Factors associated with poor mental health among Guatemalan refugees living in Mexico 20 years after civil conflict. *JAMA.* 2003; 290:635–642.

[25] Summerfield Derek. War and mental health: a brief overview. *BMJ.* 2000; 321:232–235

[26] Broerman R. Diathesis-stress model. In: Zeigler-Hill, Virgil; Shackelford, Todd K.; Hangen, Emily J.; and Elliot, Andrew J., "Encyclopedia of Personality and Individual Differences" (2020). Psychology Faculty Book Gallery. 15. <https://digitalcommons.fairfield.edu/psychology-books/15>

[27] Carlson EB, Rosser-Hogan R. Trauma experiences, posttraumatic stress, dissociation, and depression in Cambodian refugees. *Am J Psychiatry.* 1991; 148:1548–1551.

UNDER PEER REVIEW