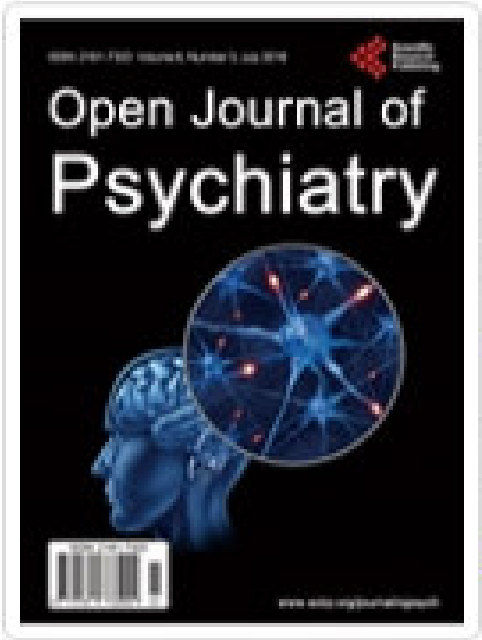

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Post-Traumatic Stress Disorder among Defence and Security Forces in Northern Benin (2023)

Ireti Nethania Elie Ataigba[1,2,3*], Guy Gérard Aza Gnandji[4,5], David Sinet Koivogui[6], Dalmace Fauste Adjaho[2], Eurydice Elvire Djossou[2], Anselme Djidonou[1,2], Francis Tognon Tchegnonsi[1,2], Prosper Gandaho[1,2], Josiane Ezin Houngbe[4,5]

[1]Faculté de Médecine & Institut de Formation en Soins Infirmiers et Obstétricaux, Université de Parakou, Parakou, Bénin
[2]Service de Psychiatrie, Centre Hospitalier Universitaire Départemental du Borgou Alibori, Parakou, Bénin
[3]Organisation Non Gouvernementale de Soutien Réhabilitation Insertion et Réinsertion (SouRIR ONG), Parakou, Bénin
[4]Faculté des Sciences de la Santé, Université d'Abomey-Calavi, Cotonou, Bénin
[5]Centre Nationale Hospitalier Universitaire Hubert Koutoucou Maga de Cotonou, Cotonou, Bénin
[6]Faculté des Sciences et Techniques de Santé, Université Gamal Abdel Nasser de Conakry, Conakry, Guinée
Email: *elieataigba@gmail.com

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Abstract

Introduction: Post-traumatic stress disorder (PTSD) is defined as "actual exposure to death or the threat of death, serious injury or sexual violence", either directly or indirectly, resulting in a symptomatic procession of repetition, avoidance, neurovegetative hyperactivity and individualized symptoms, with or without negative cognitive and mood changes. It therefore goes without saying that the defence and security forces constitute a high-risk population in need of attention. **Objective:** To study post-traumatic stress disorder in defence and security forces in the city of Parakou in 2023. **Methods:** Descriptive cross-sectional study conducted from December 2022 to July 2023. The study population consisted of active military, republican police and firefighters in the city of Parakou in 2023. Non-proportional stratified sampling was used, given the inaccessibility of the source population size for national security reasons. Post-traumatic stress disorder was assessed using the "post-traumatic stress disorder checklist-5 (PCLS-5) scale. **Results:** A total of 305 subjects participated in the survey. Males dominated 90.2%. The most represented corps was the Republican Police (41.6%), most of whom were non-commissioned officers (46.6%). The majority count between 11 and 20 years of service (48.9%), with 2 to 5 missions completed (67.5%). The calculated prevalence of post-traumatic stress disorder was 11.8%, based on the post-traumatic stress disorder checklist-5 (PCL-5). Of the 36 respondents with post-traumatic stress disorder, 20 (55.6%) had experienced an armed attack, 25 (69.4%) had witnessed a violent death, 18 (50.0%) had witnessed the agony of a colleague, 15

(41.7%) had been exposed to a fire or explosion, while 26 (72.2%) had been traumatized by physical and/or verbal aggression. 5 (13.9%) had consulted a specialist psychiatrist, while 6 (16.7%) were on medication and 26 (72.2%) used sport as a means of maintaining physical and mental health. Respectively 22 (61.1%) and 21 (58.3%) had definite symptoms of anxiety and depression. Multivariate analysis revealed a significant association between post-traumatic stress disorder and the following variables: total number of children ≤ 2 ($p = 0.015$), comorbidities such as arterial hypertension ($p = 0.007$), history of hepatitis ($p = 0.017$), work accidents ($p = 0.016$), alcohol dependence ($p = 0.004$), domestic violence ($p = 0.004$), psychological violence ($p = 0.017$) and anxiety disorders ($p < 0.001$). **Conclusion:** Defence and security personnel can also be prey to post-traumatic stress disorder (PTSD), which needs to be systematically taken into account when they are subjected to trauma in the course of their duties. Mental health should be an integral part of the periodic medical check-up objectives for defence and security forces throughout the country.

Keywords

Post-Traumatic Stress Disorder, Forces, Defence, Security, Benin, 2023

1. Introduction

Wars, urban and rural violence, disasters, assaults and hostage-taking generate a state of stress, anguish, anxiety and depression in the direct and indirect victims of these events, to which appropriate and therefore specific therapeutic measures must be applied [1]. Victims' state of health gradually deteriorates if they remain in a state of stress for longer, without any means of restoring their previous stability. This condition, known as post-traumatic stress disorder (PTSD), used to be classified as an anxiety disorder in the DSM-IV. With the advent of DSM-V, it has now been integrated into a new category: disorders related to trauma or stressors [2].

Post-traumatic stress disorder (PTSD) is defined as "actual exposure to death or threat of death, serious injury or sexual violence", either directly or indirectly, leading to a symptomatic procession of repetition, avoidance, neurovegetative hyperactivity and individualization, with or without negative cognitive and mood changes [3]. Some people in the security and emergency professions are exposed to traumatic events daily [4]. The prevalence of post-traumatic stress disorder in the Canadian armed forces was 21.3% in 2021, compared with 5.7% in 2013 [5]. In 2018, this prevalence was estimated at 19.5% among municipal and provincial police officers in the same country [6]. In Marseille in 2019, it was 4% among firefighters [7]. In Senegal, it was 25.7% among Senegalese Blue Helmets [8] and in Benin in 2005, 13.2% among workers of the "Association pour le Développement de la Riziculture en Afrique de l'Ouest", victims of the wars in Côte d'Ivoire in 2002 and 2004 [1].

Post-traumatic stress disorder (PTSD) is known to reduce quality of life to a greater extent than other mental health problems [6]. According to the public health survey carried out after the attacks in Canada in 2022, eleven responders presented suicidal risks, including eight suffering from post-traumatic stress disorder, one of whom had suicidal thoughts [9]. This puts law enforcement, defence and homeland security personnel on the front line. Military personnel, police officers and firefighters, because of their professions, are confronted with serious and complex situations, of which consequences are strong emotions, pains and suffering that are sometimes difficult to master, as their professional and moral standards are higher than those of other professions.

In the absence of adequate care and medical follow-up face repeated traumas, and mental health risks deteriorating further, but this time the consequences can be irreversible: cardiovascular disease, permanent incapacity (disability), and even suicide [10]. At present, the therapeutic treatments on offer are not always appropriate or satisfactory for victims. Better identification of the characteristics of traumatogenic events would enable us to better understand their psychopathological effects, in order to better target the post-traumatic trajectory in victims [11]. So, it would be interesting to examine the role of resilience building in the general population and its long-term effects on patients [12].

The aim of this study, carried out as part of a doctoral thesis in medicine, was to investigate the state of post-traumatic stress in the defence and security forces of the city of Parakou in 2023.

2. Study Framework and Methods

2.1. Population and Procedures

A descriptive cross-sectional study was conducted from December 2022 to July 2023 in the commune of Parakou. The study population consisted of active military, republican police and firefighters in the city of Parakou in 2023. The sample size was calculated using the Schwartz formula, taking as a reference the study by Gansou G.M. carried out in August 2005 in Cotonou on the PSYCHOLOGICAL DEBRIEFING OF WAR VICTIMS, whose reported prevalence was 13.2% among workers of the *Association pour le Développement de la Riziculture en Afrique de l'Ouest*, victims of the wars in Côte d'Ivoire: in 2002 and 2004 [1]. Thus, the minimum size calculated was 270 participants, but 305 subjects were finally surveyed. Non-proportional stratified sampling was used, given the inaccessibility of the source population size for reasons of national security. The aim was therefore to survey the same number of subjects in each stratum, *i.e.* a minimum of 270/3 = 90 subjects. In each stratum made up of military, republican police and firefighters, a convenience approach was adopted. That is, all those present on the days of the survey were surveyed. Each member of a population had a chance of being included in the sample. All members of the military, republican police and fire department, regardless of gender, with at least 6 months' professional experience (or 1 month in the field), under the command of one of the jurisdictions of the

Parakou defence and security forces, having received authorization from their superiors and having given their free and informed consent to the study, were included in our study. All persons meeting the inclusion criteria and present on the days of data collection were surveyed.

2.2. Measurements

A digitized survey form was used, including general information such as: socio-demographic data, medical history, previous treatments, biographical elements, professional data, clinical data and behavioral data.

Post-traumatic stress disorder was assessed using the post-traumatic stress disorder checklist-5 (PCLS-5) scale [13].

The post-traumatic stress disorder checklist-5 (PCL-5) is a measurement tool for assessing the symptoms of post-traumatic stress disorder. It was created by Weathers *et al.* [13] in 1993, based on DSM-IV diagnostic criteria. This self-administered questionnaire, translated into French, was validated by Ventureyraa *et al.* in 2002 for the screening and monitoring of PTSD, and by the French armed forces health service in 2011 [14]. The questionnaire comprises 20 items. Participants are asked to rate the intensity of symptoms on a scale ranging from not at all (0) to extremely (4). Scores range from 0 to 80. Completion time is short, between 5 and 10 minutes.

To detect symptoms of post-traumatic stress disorder, the following interpretation can be proposed for the average score: <40: no symptoms; ≥40: definite symptoms.

To assess anxiety and depression, the hospital anxiety and depression scale (HADS) was used [15].

The HADS scale [15] is a screening instrument for anxiety and depressive disorders. It comprises 14 items rated from 0 to 3. Seven questions relate to anxiety (total A) and seven to depression (total D), giving two scores (maximum score for each = 21). To detect anxiety and depression symptoms, the following interpretation can be proposed for each of the scores (A and D): <7: no symptoms; 8 - 10: doubtful symptoms; ≥11: definite symptoms.

2.3. Analysis

Data analysis was performed using SPSS version 26 software. In addition, the Chi-square test (χ^2) was used to establish the association between the dependent variable (post-traumatic stress disorder) and the study's independent variables. The results are considered significant at the 5% confidence level ($p < 0.05$). The logistic regression model was also performed at the multivariate level to assess the influence of the various independent variables in relation to the dependent variable.

3. Ethical Considerations

Prior to the start of data collection activities, research authorizations were ob-

tained from the Faculty of Medicine of the University of Parakou, Departmental Director of Health of Borgou, the Commander of the Parakou Garrison, the National Director of the Benin Republican Police and the National Commander of the Benin Fire Brigade. Similarly, the informed consent of all participants in this study was obtained prior to submission of the survey form. The confidentiality and anonymity of the data collected were respected.

4. Results

A total of 305 subjects took part in the survey.

4.1. Socio-Demographic Characteristics

The study population was predominantly male (90.2%). The most represented corps was the republican police (41.6%), and most were non-commissioned officers (46.6%). The majority were in their 11th and 20th years of service (48.9%), with 2 to 5 missions completed (67.5%).

Of the people with post-traumatic stress disorder, 32 (88.9%) were male. The majority were military personnel (55.6%). More than half were non-commissioned officers (52.8%) with 11 to 20 years' service (52.8%) and most had completed 2 to 5 missions (61.1%) (Table 1).

4.2. Background Characteristics

Of the 305 agents surveyed, 14 (4.6%) had high blood pressure. Some 130 (42.6%) had been involved in at least one accident, with 32 (10.5%) suffering head or facial injuries, and 24 (7.9%) having undergone at least one operation. Nearly 51 (16.7%) consumed alcohol. A history of psychiatric illness was present in 9 (3%) subjects, with conventional management of 9 (3%). Of these, 149 (48.9%) had domestic violence problems and 46 (15.1%) had legal problems.

Among the subjects with post-traumatic stress disorder, 6 (16.7%) had high blood pressure. Some 22 (61.1%) had experienced at least one accident, with 7 (19.4%) suffering head or facial trauma, and 5 (13.9%) having undergone at least one surgical procedure. In addition, 12 (33.3%) had consumed alcohol. A history of psychiatric illness was present in 2 (5.6%) subjects, for whom conventional treatment was used. 30 (89.3%) had problems with domestic violence, while 10 (27.8%) had legal problems (Table 2).

4.3. Characteristics Relating to Biography

Among the parents of the 305 agents surveyed, 114 (37.4%) fathers were not in school and 163 (53.4%) were alive. As for the mothers, 190 (62.3%) were not in school and 227 (74.4%) were alive.

Among the respondents, 127 (41.6%) had spent their childhood in a polygamous family, and 290 (95.1%) had a good relationship with their family. The most popular leisure activity was sport 94 (30.8%) and only 47 (15.4%) said they were not very sociable.

Table 1. Distribution of surveyed defence and security forces officers by socio-demographic characteristics (Parakou, 2023).

	Sample (N = 305)	Post-Traumatic Stress Disorder	
		No (n = 269)	Yes (n = 36)
Gender			
Male	275 (90.2%)	243 (90.3%)	32 (88.9%)
Female	30 (9.8%)	26 (9.7%)	4 (11.1%)
Professional corps			
Fire department	57 (18.7%)	53 (19.7%)	4 (11.1%)
Republican police	127 (41.6%)	115 (42.8%)	12 (33.3%)
Military	121 (39.7%)	101 (37.5%)	20 (55.6%)
Rank			
Officer	11 (03.6%)	10 (3.7%)	1 (2.8%)
Non-commissioned officer	142 (46.6%)	123 (45.7%)	19 (52.8%)
Private	38 (12.5%)	35 (13.0%)	3 (8.3%)
Enlisted man	114 (37.3%)	101 (37.5%)	13 (36.1%)
Years of service			
1 - 5 years	85 (27.9%)	79 (29.4%)	6 (16.7%)
6 - 10 years	37 (12.1%)	33 (12.3%)	4 (11.1%)
11 - 20 years	149 (48.9%)	130 (48.3%)	19 (52.8%)
21+ years	34 (11.1%)	27 (10.0%)	7 (19.4%)
Number of missions			
0	42 (13.8%)	40 (14.9%)	2 (5.6%)
2 - 5	206 (67.5%)	184 (68.4%)	22 (61.1%)
6 - 10	42 (13.8%)	31 (11.5%)	11 (30.6%)
11 and over	15 (4.9%)	14 (5.2%)	1 (2.8%)
Marital status			
Married	193 (63.3%)	168 (62.5%)	25 (69.4%)
Single	20 (6.6%)	19 (7.1%)	1 (2.8%)
Couple	39 (12.8%)	37 (13.8%)	2 (5.6%)
Cohabiting	52 (17.0%)	45 (16.7%)	7 (19.4%)
Widowed	1 (0.3%)	-	1 (2.8%)
Type of household			
Monogamous	249 (81.6%)	217 (80.7%)	32 (88.9%)
Polygamous	36 (11.8%)	33 (12.3%)	3 (8.3%)

Table 2. Breakdown of defence and security forces officers surveyed by background (Parakou, 2023).

	Sample (N = 305)	Post-Traumatic Stress Disorder	
		No (n = 269)	Yes (n = 36)
Personal medical history (n = 81)			
Diabetes	4 (4.9%)	4 (6.1%)	-
Hypertension	14 (17.3%)	8 (12.1%)	6 (16.7%)
Asthma	6 (7.4%)	5 (7.6%)	1 (2.8%)
Gastric ulcer	15 (18.5%)	14 (21.2%)	1 (2.8%)
Cerebrovascular accident	1 (1.2%)	1 (1.5%)	-
Sexually transmitted infection	4 (4.9%)	3 (4.5%)	1 (2.8%)
Viral hepatitis	5 (6.2%)	3 (4.5%)	2 (5.6%)
Other	32 (39.5%)	28 (42.4%)	4 (11.1%)
Personal history of surgery			
No	281 (92.1%)	250 (92.9%)	31 (86.1%)
Yes	24 (7.9%)	19 (7.1%)	5 (13.9%)
Type of psychoactive substance abused (n = 96)			
Alcohol	51 (53.1%)	39 (53.4%)	12 (52.2%)
Local tobacco	30 (31.3%)	23 (31.5%)	7 (30.4%)
Cannabis	2 (2.1%)	2 (2.7%)	-
Tramadol	4 (4.2%)	2 (2.7%)	2 (8.7%)
Marijuana	2 (2.1%)	1 (1.4%)	1 (4.3%)
Other (medication, cigarettes)	7 (7.3%)	6 (8.2%)	1 (2.8%)
Personal psychiatric history (n = 9)			
Visual hallucination	1 (11.1%)	1 (14.3%)	-
Documented depression	3 (33.3%)	2 (28.6%)	1 (50.0%)
Migraine	3 (33.3%)	3 (42.9%)	-
Documented post-traumatic stress disorder	2 (22.2%)	1 (14.3%)	1 (50.0%)
Type of previous treatment for psychiatric history (n = 12)			
Western medicine	9 (75.0%)	7 (87.5%)	2 (50.0%)
African medicine	1 (8.3%)	-	1 (25.0%)
Prayer sessions	2 (16.7%)	1 (12.5%)	1 (25.0%)
History of domestic violence			
Violence suffered	27 (18.1%)	22 (18.5%)	5 (16.7%)
Violence inflicted	50 (33.6%)	42 (35.3%)	8 (26.7%)
Violence suffered and inflicted	72 (48.3%)	55 (46.2%)	17 (56.7%)

Continued

Type of domestic violence			
Physical	27 (13.6%)	20 (13.2%)	7 (14.9%)
Psychological	14 (7.1%)	7 (4.6%)	7 (14.9%)
Verbal	136 (68.7%)	108 (71.5%)	28 (59.6%)
Sexual	6 (3.0%)	5 (3.3%)	1 (2.1%)
Economic	15 (7.6%)	11 (7.3%)	4 (8.5%)
Incarceration in a military prison			
No	259 (84.9%)	233 (86.6%)	26 (72.2%)
Yes	46 (15.1%)	36 (13.4%)	10 (27.8%)

200 (65.6%) said they had used traditional endogenous protections, in particular ritual scarification 124 (39.4%). They had an average of 2.8 children ± 2.003 with extremes of 0 and 9 children, and less than half 136 (44.6%) had between 3 and 5 children.

As for the parents of the 36 officers with PTSD, 15 (41.7%) fathers were not in school and 19 (52.8%) were alive. As for the mothers, 27 (75.0%) did not attend school and 27 (75.0%) were alive. 12 (33.3%) had spent their childhood in a nuclear family, and 34 (94.4%) had a good relationship with their family of origin. Half of the subjects' favorite distractions were games or sex for 18 (50%). 13 (36.1%) said they were not very sociable. Among them, 27 (75%) had used traditional endogenous protection, notably rings 21 (58.3%). They had an average of 4 children, with extremes of 0 and 9 children and 15 (41.7%) had between 3 and 5 children (Table 3).

4.4. Characteristics of Types of Trauma and Therapeutic Methods Used

Of the 305 respondents, 134 (43.9%) had been traumatized by armed attacks. 17 (5.6%) had consulted a specialist psychiatrist, even though 28 (9.2%) were undergoing treatment and 167 (54.8%) were using group sport as a means of maintaining their physical and mental health. Respectively 59 (13.3%) and 45 (14.8%) had definite symptoms of anxiety and depression.

Of the 36 respondents with post-traumatic stress disorder, 20 (55.6%) had experienced an armed attack, 25 (69.4%) had witnessed a violent death, 18 (50.0%) had witnessed the agony of a colleague, 15 (41.7%) had been exposed to a fire or explosion, while 26 (72.2%) had been traumatized by physical and/or verbal aggression. 5 (13.9%) had consulted a specialist psychiatrist, although 6 (16.7%) were on medication and 26 (72.2%) used sport as a means of maintaining physical and mental health. Respectively 22 (61.1%) and 21 (58.3%) had definite symptoms of anxiety and depression (Table 4).

4.5. Prevalence of Subjects with Post-Traumatic Stress Disorder

On the basis of the post-traumatic stress disorder checklist-5 (PCL-5) scale,

Table 3. Distribution of defence and security forces officers by biographical characteristics (Parakou, 2023).

	Sample (N = 305)	Post-Traumatic Stress Disorder	
		No (n = 269)	Yes (n = 36)
Living father			
No	142 (46.6%)	125 (46.5%)	17 (47.2%)
Yes	163 (53.4%)	144 (53.5%)	19 (52.8%)
Father's level of education			
No schooling	114 (37.4%)	99 (36.8%)	15 (41.7%)
Primary	44 (14.4%)	38 (14.1%)	6 (16.7%)
Secondary	83 (27.2%)	75 (27.9%)	8 (22.2%)
Higher	52 (17%)	46 (17.1%)	6 (16.7%)
Unknown	5 (1.6%)	4 (1.5%)	1 (2.8%)
Literate	7 (2.3%)	7 (2.6%)	-
Living mother			
No	78 (25.6%)	69 (25.7%)	9 (25.0%)
Yes	227 (74.4%)	200 (74.3%)	27 (75.0%)
Mother's level of education			
No schooling	190 (62.3%)	163 (60.6%)	27 (75.0%)
Primary	53 (17.4%)	49 (18.2%)	4 (11.1%)
Secondary	43 (14.1%)	38 (14.1%)	5 (13.9%)
Higher	7 (2.3%)	7 (2.6%)	-
Unknown	1 (0.3%)	1 (0.4%)	-
Literate	11 (3.6%)	11 (4.1%)	-
Childhood upbringing			
Nuclear family	104 (34.1%)	92 (34.2%)	12 (33.3%)
Single-parent family	29 (9.5%)	26 (9.7%)	3 (8.3%)
Blended family	16 (5.2%)	14 (5.2%)	2 (5.6%)
Extended family	29 (9.5%)	21 (7.8%)	8 (22.2%)
Polygamous family	127 (41.6%)	116 (43.1%)	11 (30.6%)
Good relationship with family members			
No	15 (4.9%)	13 (4.8%)	2 (5.6%)
Yes	290 (95.1%)	256 (95.2%)	34 (94.4%)
Nature of relationship with spouse (n = 279)			
Good	264 (94.6%)	234 (95.1%)	30 (90.9%)
Poor	4 (1.4%)	3 (1.2%)	1 (3%)

Continued

Conflict	10 (3.6%)	8 (3.3%)	2 (6.1%)
Other	1 (0.4%)	1 (0.4%)	-
Nature of relationship with children (n = 247)			
Good	238 (96.4%)	204 (96.2%)	34 (97.1%)
Bad	5 (2.0%)	4 (1.9%)	1 (2.9%)
Conflictual	3 (1.2%)	3 (1.4%)	-
Indifferent	1 (0.4%)	1 (0.5%)	-
Number of children			
0	58 (19.0%)	57 (21.2%)	1 (2.8%)
[1 - 2]	78 (25.6%)	64 (23.8%)	14 (38.9%)
[3 - 5]	136 (44.6%)	121 (45.0%)	15 (41.7%)
[6 - 9]	33 (10.8%)	27 (10.0%)	6 (16.7%)
Number of dependents			
1 - 2	49 (16.1%)	46 (17.1%)	3 (8.3%)
3 - 5	122 (40.0%)	110 (40.9%)	12 (33.3%)
6 - 10	121 (39.7%)	102 (37.9%)	19 (52.8%)
11 - 20	13 (4.3%)	11 (4.1%)	2 (5.6%)
Reliable helper in case of infirmity			
Hierarchy	8 (2.6%)	7 (2.6%)	1 (2.8%)
Colleagues	43 (14.1%)	37 (13.8%)	6 (16.7%)
None	89 (29.2%)	82 (30.5%)	7 (19.4%)
Relatives	165 (54.1%)	143 (53.2%)	22 (61.1%)
Traditional ancestral protection measures			
No	105 (34.4%)	96 (35.7%)	9 (25.0%)
Yes	200 (65.6%)	173 (64.3%)	27 (75.0%)
Type of traditional protection used			
Protective rings	114 (37.4%)	93 (22.5%)	21 (58.3%)
Scarification	121 (39.7%)	103 (24.9%)	18 (50.0%)
Amulets	68 (22.3%)	55 (13.3%)	13 (36.1%)
Home divinities	45 (14.8%)	35 (8.5%)	10 (27.8%)
Purification rituals	87 (28.5%)	76 (18.4%)	11 (30.6%)
Potion/powder	64 (21.0%)	52 (12.6%)	12 (33.3%)
Hobbies			
Fighting	6 (2.0%)	6 (2.2%)	-
Games	78 (25.6%)	69 (25.7%)	9 (25.0%)

Continued

Psychoactive substances	7 (2.3%)	7 (2.6%)	-
Sex	26 (8.5%)	17 (6.3%)	9 (25.0%)
Movies	40 (13.1%)	33 (12.3%)	7 (19.4%)
Sports	94 (30.8%)	88 (32.7%)	6 (16.7%)
Other	54 (17.7%)	49 (18.2%)	5 (13.9%)

Table 4. Distribution of defence and security forces officers surveyed according to trauma (Parakou, 2023).

	Sample (N = 305)	Subjects with Post-Traumatic Stress Disorder (n = 36)
Type of trauma suffered		
Fire or explosion	104 (34.1%)	15 (41.7%)
Exposure to a toxic substance	22 (7.2%)	7 (19.4%)
Physical/verbal assault	120 (39.3%)	26 (72.2%)
Armed attack	134 (43.9%)	20 (55.6%)
Severe state of a victim of sexual assault	19 (6.2%)	5 (13.9%)
Participation in armed/civil conflict	119 (39.0%)	22 (61.1%)
Detention in captivity	17 (5.6%)	5 (13.9%)
Serious/fatal injury	59 (19.3%)	14 (38.9%)
Agony of a colleague	80 (26.2%)	18 (50.0%)
Violent death	125 (41.0%)	25 (69.4%)
Psychiatric consultation		
No	285 (93.4%)	31 (86.1%)
Yes	17 (5.6%)	5 (13.9%)
Anxiety		
No symptoms	177 (58.1%)	4 (11.1%)
Certain symptomatology	59 (19.3%)	22 (61.1%)
Doubtful symptomatology	69 (22.6%)	10 (27.8%)
Depression		
No symptomatology	216 (70.8%)	10 (27.8%)
Definite symptomatology	45 (14.8%)	21 (58.3%)
Doubtful symptomatology	44 (14.4%)	5 (13.9%)
Group maintenance sports activity		
No	135 (44.3%)	10 (27.8%)
Yes	167 (54.8%)	26 (72.2%)

36 of the 305 respondents had a score of 40 or above, the diagnostic limit for post-traumatic stress disorder. Thus, the prevalence of post-traumatic stress disorder among Defence and security forces serving in the city of Parakou was estimated at 11.8% in this study.

4.6. Search for Statistical Relationships between Post-Traumatic Stress Disorder and Independent Variables in Bivariate Analysis

A statistically significant association was found between post-traumatic stress disorder and the following variables: marital status ($p = 0.034$), number of children ($p = 0.020$), history of arterial hypertension ($p < 0.001$), history of viral hepatitis ($p = 0.049$), personal history of accidents at work ($p = 0.017$), self-reported abuse of psychoactive substances ($p = 0.001$), use of alcohol ($p = 0.009$), tramadol ($p = 0.017$) and local tobacco ($p = 0.039$); domestic violence ($p = 0.001$), incarceration in a military prison ($p = 0.023$), hobbies ($p = 0.004$), relationship with entourage ($p = 0.022$), traditional protections (rings ($p = 0.006$), amulet ($p = 0.034$), and divinity at home ($p = 0.019$)), number of missions ($p = 0.012$), traumatic events suffered (exposure to a toxic substance ($p = 0, 003$), serious condition of a sexual assault victim ($p = 0.043$), participation in an army/civilian conflict ($p = 0.004$), detention in captivity ($p = 0.021$), life-threatening injury ($p = 0.002$), agony of a colleague ($p = 0.001$), violent death ($p < 0.001$), and serious injury suffered ($p < 0.001$)), anxiety ($p < 0.001$), depression ($p < 0.001$).

4.7. Multivariate Analysis of Factors Associated with Post-Traumatic Stress Disorder in Defence and Security Forces in the City of Parakou

Factors associated with PTSD in multivariate analysis were: total number of children ≤ 2 (OR = 34.414; CI95%: 1.997 - 593.113; $p = 0.015$), presence of arterial hypertension (OR = 15.160; CI95%: 2.073 - 110.889; $p = 0.007$), history of hepatitis (OR = 30.688; CI95%: 1.827 - 515.591; $p = 0.017$), work-related accidents (OR = 6.043; CI95%: 1.406 - 25.973; $p = 0.016$), alcohol consumption (OR = 6.337; CI95%: 1.796 - 22.359; $p = 0.004$), domestic violence (OR = 7.696; CI95%: 1.478 - 48.832; $p = 0.004$) and especially psychological violence (OR = 8.494; CI95%: 1.478 - 48.832; $p = 0.017$) and anxiety disorders (OR = 76.17; CI95%: 14.61 - 397.072; $p < 0.001$). Note that the risk of developing post-traumatic stress disorder was 34.41 in those with one to two children, 30.69 in those with a personal history of viral hepatitis, and 76.17 in those with definite anxiety (**Table 5**).

5. Discussion

5.1. Socio-Demographic Characteristics

5.1.1. Age

In this study, the average age of respondents was 33.93 ± 6.597 years with extremes of 22 and 57 years. This result is near to that of Långström *et al.* [16] in 2006 in Sweden, who found age extremes of 18 to 60 years, and to that of Fraysse

Table 5. Factors associated with post-traumatic stress disorder in defence and security forces (Parakou, 2023).

	Post-Traumatic Stress Disorader		OR	CI95%	p-value
	No	Yes			
Total number of children					
0	57 (18.7%)	1 (0.3%)	1	-	-
1 - 2	64 (21.0%)	14 (4.6%)	34.41	1.997 - 593.113	0.015
3 - 5	121 (39.7%)	15 (4.9%)	3.599	0.233 - 55.537	0.359
4 - 9	27 (8.9%)	6 (2.0%)	10.47	0.575 - 190.812	0.113
Presence of hypertension (ref = No)					
Yes	8 (2.6%)	6 (2.0%)	15.16	2.073 - 110.889	0.007
Personal history of viral hepatitis (ref = No)					
Yes	3 (1.0%)	2 (0.7%)	30.69	1.827 - 515.591	0.017
Presence of work accident (ref = No)					
Yes	130 (42.6%)	108 (40.1%)	6.043	1.406 - 25.973	0.016
Alcohol dependence (ref = No)					
Yes	39 (12.8%)	12 (3.9%)	6.337	1.796 - 22.359	0.004
Domestic violence (ref = No)					
Yes	121 (39.67%)	30 (9.84%)	7.696	1.937 - 30.571	0.004
Presence of psychological violence in the couple (ref = No)					
Yes	14 (4.6%)	7 (19.4%)	8.494	1.478 - 48.832	0.017
Anxiety disorders					
None	171 (56.1%)	4 (1.3%)	1	-	-
Certain	37 (12.1%)	22 (7.2%)	76.17	14.61 - 397.072	<0.001
Doubtful	59 (19.3%)	10 (3.3%)	11.44	2.233 - 58.581	0.003

et al. [7] in 2020 in France, who estimated the average age of participants at 36 years, with extremes of 26 and 39 years. This difference could be explained by the fact that the first study took into account only one-armed group returning from missions, whereas the second included an entire armed corps without restriction.

On the other hand, Bisson Desrochers [6] in 2022 in Canada reported in their study that the age of the population ranged from 23 to 63 years, with an average of 40.2 years. As for Vaillancourt-Morel *et al.* in 2015 in Quebec, they found a different result to that of this series, with age extremes of 18 to 75 years. This may be understandable as this study included veterans.

5.1.2. Gender

Among the subjects with post-traumatic stress disorder, the population was found

to be predominantly male (32 (88.9%)) with a sex ratio of 8. This result is near to that of Fraysse *et al.* [7] in 2020 in France, who counted in their work 2 women (14.29%) and 14 men (85.71%), with a sex ratio of 6. However, it differs from that of Bisson Desrochers [6] in 2022 in Canada, who noted 11 women (36.7%) versus 19 men (63.30%), with a sex ratio of 1.7. This difference could be explained by the fact that men under our skies were more exposed to situations at risk of trauma and that they are the most numerous in the ranks.

5.1.3. Grades

The ranks most affected by PTSD are non-commissioned officers 19 (52.8%), followed by enlisted men 13 (36.1%), then privates 3 (8.3%) and finally officers 1 (2.8%). These results are similar to those reported by Baillon *et al.* [17] in France in 2018, who also found that non-commissioned officers were the most affected group, but with different proportions. According to this study, 75.94% of non-commissioned officers suffered from post-traumatic stress disorder.

5.2. Number of Years of Service

The average number of years of service for respondents with post-traumatic stress disorder was 14.17 ± 6.742 years, with extremes of 3 years and 24 years. Fraysse *et al.* [7] in 2020 in France reported similar values. In their study, the average number of years of service was 14 years, with extremes of 6 and 18 years. Telle *et al.* [18] in 2021 in Belgium and Gallan [19] in 2015 in Canada found different results from the present series, with respectively an average of 15.80 years of experience, with extremes of 1 and 12 years, and an unassessed average with extremes of 9 and 34 years.

5.3. Marital Status

In the study, 25 (69.4%) were married, followed by 7 (19.4%) cohabiting, 3 (8.4%) single and 1 (2.8%) widowed. These figures are close to those of Baillon *et al.* [17] in France in 2018, who found the following proportions 74.87% cohabiting, 17.11% single and 8.02% divorced or widowed. Gallan [19] in Canada in 2015 reported higher results, with 83.33% of respondents being in a relationship. Living in a couple or being married could be a psychologically fragile element for the individual who is already providing enough energy in his or her life as a couple, and is running out of psychic resources to manage the trauma that has been imposed on him or her.

5.4. Background Characteristics

5.4.1. Personal Work Accident History

Some 22 (61.1%) of our respondents had a personal history of accident at work. These values are superposable with those reported by Baillon *et al.* [17] in France in 2018, who noted that 133 (58.1%) of the respondents had suffered accidents during training and 96 (41.9%) during field operations. These data demonstrate the high risk represented by these professions.

5.4.2. Personal Psychiatric History

Among the respondents, 2 people (5.6%) had a psychiatric history, including 1 (2.8%) for post-traumatic stress disorder and 1 (2.8%) for depression. These results are similar to those of Baillon *et al.* [17] in France in 2018, who noted that approximately 5.2% had a psychiatric history, with 2.4% for post-traumatic stress disorder, but contrary to those of Bisson Desrochers [6] in Canada in 2022, who noted depression in 5 subjects (15.2%) and anxiety in 2 (5.4%). It should be noted that very few of the agents in this study had had a lifetime psychiatric consultation 12 (13.9%).

5.5. Characteristics Relating to Biography and Monthly Income

5.5.1. Number of Children

Agents with PTSD have an average of 3.31 children, with extremes of 0 and 9 children. This is well above the extremes of 0 and 2 children found by Fraysse *et al.* [7] in 2020 in France. This could be explained by the fact that there are many polygamists in the present study.

5.5.2. Psychological or Psychiatric Follow-Up

In this study, 5 respondents with post-traumatic stress disorder (13.9%) had consulted a psychiatrist or psychologist. Fraysse *et al.* [7] in 2020 in France noted that only 64 (18.9%) of the respondents had had at least one consultation or received psychiatric follow-up. Although this figure is relatively high in proportion, it reveals, as in the present series, that the rate of referral to mental health specialists remains low among these agents, who nevertheless constitute a population at risk in this field. Debriefing with a psychologist or psychiatrist should be a systematic step when a civil servant is subjected to an event at risk of psychological trauma.

5.6. Prevalence

Of the 305 targets surveyed, 36 (11.80%) had post-traumatic stress disorder. This prevalence is similar to that found by Barluet [17] in the Central African Republic in 2015, which was 12% on a representative sample of soldiers in the "Sangaris" operation (N = 2000). It is nevertheless significantly higher than that found by Baillon *et al.* [20], which was 2.1% in Canada in 2017 among officers serving in the departmental gendarmerie (N = 200). Then, a study carried out by Montreff [9] in France in 2022 noted an equally low prevalence of 4.8%, with 3.4% among firefighters and 9.5% among police officers who rescued after the attacks of November 13, 2015 (N = 306 with 211 firefighters and 95 police officers). The study conducted by Fraysse *et al.* [7] had estimated this prevalence at 1% in France in 2020 among Marseilles city firefighters (N = 356).

However, this prevalence is lower than that reported by Bisson Desrochers [6] in 2022 in Canada among 2 cohorts of police officers (N = 30 and N = 31). In this study, prevalence was estimated at 31.5%. Tine *et al.* [8] in Senegal in 2019 reported 25.7% among Senegalese Blue Helmets.

There are several reasons for the disparity between these different prevalences: the fact that 10% of the population in Western countries were under the care of a psychiatrist or psychologist and that in certain regions of Benin, psychiatric disorders are perceived as spiritual attacks; the fact that many previous studies have been carried out in these countries and have noted a higher prevalence and that improvements in working conditions have followed [20]; the time between the period when the study was carried out and the time of the trauma or the fact that some studies were conducted solely with military personnel, others with firefighters in different countries. Systematic debriefing for these civil servants in developed countries considerably reduces the risk of post-traumatic stress disorder. It is easy to understand that the high proportions come from subjects who have been subjected to the last major wars of the current century.

5.7. Factors Associated with Post-Traumatic Stress Disorder in the Study Population

5.7.1. Total Number of Children

In this study, the number of children was significantly associated with post-traumatic stress disorder in the study population (p = 0.015; CI95% [0.233 - 55.537]; OR = 34.414) and was a factor favoring its occurrence. In fact, the number of children (between 1 and 2) multiplied the risk of post-traumatic stress disorder by 34. This can be explained by the fact that responsibilities increase with the number of children and hence stress factors. This result differs from that of Fraysse *et al.* [7] in France in 2019, where the number of children (p = 0.91) was not linked to post-traumatic stress disorder. This difference could be explained by the fact that the average number of children in the French study was 1, with extremes of 0 and 1, whereas in this study the average was around 4, with extremes of 0 and 9.

5.7.2. Personal History of Medical Pathology

Personal history of medical pathology in the study was significantly associated with post-traumatic stress disorder (PTSD) and is a factor favouring this disorder. These included hypertension (p = 0.007; CI95% [2.073 - 110.889]; OR = 30.66) and personal history of viral hepatitis (p = 0.017; CI95% [1.827 - 515.591]; OR = 30.688). Hypertension thus increases the risk of developing PTSD by a factor of 30. This observation was similar to that of Baillon *et al.* [17] in France in 2018, where medical-surgical history (p < 0.001) was strongly correlated with PTSD. In contrast, Montreff [9] in France in 2022 noted that personal psychiatric history (p = 0.208; OR = 1.43; CI95% [0.25 - 8.23]) was not associated with PTSD. This difference in the interpretation of the results could be explained by the fact that Montreff [9] in France in 2022 had studied only psychiatric history, whereas this study highlights medical history in its entirety.

5.7.3. Declarative Abuse of Psychoactive Substances (Alcohol)

Substance abuse was significantly associated with post-traumatic stress disorder in the study population (p = 0.004; CI95% [1.796 - 22.359]; OR = 6.337). Alcohol

consumption therefore increased the risk of developing post-traumatic stress disorder by a factor of 6. It is not possible to say whether alcohol consumption began before or after the trauma. The survey form did not provide this detail. But it would not be surprising if, in order to calm the anxious symptoms of post-traumatic stress disorder, these subjects were self-medicating with alcohol for anxiolytic purposes. But given that alcohol remains the most tolerated psychoactive substance in our society, it is also possible that these agents began abusing alcohol well before the trauma and its consequences.

It should be noted that these data contrast with the results of the study carried out by Sider [21] in Algeria in 2017, which showed that addiction to alcohol ($p = 0.332$) or drugs ($p = 0.174$) was not associated with post-traumatic stress disorder.

5.7.4. Domestic Violence

Domestic violence was significantly associated with PTSD in the study population ($p = 0.004$; CI95% [1.937 - 30.571]; OR = 7.696) and was an inducing factor in PTSD, particularly psychological violence ($p = 0.017$; CI95% [1.478 - 48.832]; OR = 8.494). In this study, we note that domestic violence specifically multiplies by 8 the risk of developing post-traumatic stress disorder. These results are similar to those reported in the study carried out by Fraysse *et al.* [7] in France in 2020, where family problems ($p < 0.001$) and psychological injuries ($p < 0.001$) were significantly associated with post-traumatic stress disorder. Psychological trauma then occurs on already psychologically fragile ground, precipitating the onset of post-traumatic stress disorder.

5.7.5. Anxiety

Anxiety was significantly associated with PTSD in the study population ($p < 0.001$; CI95% [14.610 - 397.072]; OR = 76.165). Thus, subjects with a definite anxiety symptomatology were 76 times more likely to develop post-traumatic stress disorder. These results are identical to those of the study carried out by Seto *et al.* [22] in Canada in 2020, which showed that anxiety ($p < 0.001$) was associated with post-traumatic stress disorder [22]. In contrast, the study carried out by Sider [21] in Algeria in 2017 showed no correlation between anxiety ($p = 0.366$) and post-traumatic stress disorder.

It should not be forgotten that anxiety is symptomatic of post-traumatic stress disorder and only its presence prior to the occurrence of the trauma should be considered in this analysis. In the case of post-traumatic stress disorder, it should be considered as part of the clinical picture.

5.8. Study Strengths and Limitations

This was a descriptive, analytical, cross-sectional study of post-traumatic stress disorder among Defence and security force officers in the city of Parakou.

Non-proportional stratified probability sampling was adopted in this study, given the inaccessibility of the source population size for reasons of national se-

curity. The statistical unit was represented by all subjects meeting our inclusion criteria. The sampling frame consisted of all respondents present on site at the time of collection. The minimum size (270) of the study population was estimated using the Schwartz formula. But 305 subjects were finally surveyed. Three states (military, police and firefighters ones) were constituted, with a minimum of 90 subjects per stratum. In each stratum, a convenience approach was used. To carry out this study, approval was obtained from the ethics committee of the Parakou Faculty of Medicine, as well as from Departmental Director of Health of Borgou, the Commander of the Parakou Garrison, the National Director of the Benin Republican Police and the National Commander of the Benin Fire Brigade. The data was collected via a digital questionnaire on smartphones. The questionnaire is individual and is sent to eligible subjects, containing a variety of information including post-traumatic stress disorder checklist-5 (PCL-5) assessment items. Guaranteeing the confidentiality of the information collected enabled us to obtain more honest answers. This technique helped to ensure that the results were as reliable as possible.

In the present work, there are still biases linked to the source of the information which could minimize or exaggerate certain aspects of the declarations. Also, the fear of losing their jobs, being punished or being taken to court martial if it came to light that certain revelations came from them could be a source of bias. However, this in no way detracts from the quality of the results obtained.

6. Conclusions

Post-traumatic stress disorder (PTSD) is a condition known to have a relatively greater impact on the quality of life of sufferers. More than one in ten members of the Defence and security forces in the northern Benin town of Parakou suffer from it, according to this study conducted in 2023. Factors such as the total number of children, personal history of high blood pressure, personal history of hepatitis, personal history of accidents at work, self-reported abuse of psychoactive substances (alcohol), and domestic violence, especially psychological and anxiety were associated with PTSD in this study.

Curative and preventive measures will have to be taken by the authorities at various levels to ensure better mental health for these peacekeepers and security guarantors of the country's stability.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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