

Original paper

Exploring the effects of the past civil war in terms of the prevalence and associating factors of PTSD

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Abstract

The Sri Lanka Army experienced a civil war, which ended in 2009. PTSD is a chronic psychological complication following trauma associated with war, and this study intends to explore the extent of PTSD ten years after the civil war in the Army.

Aims

This study aimed at describing the prevalence of PTSD and its associated factors among armed personnel with combat experience.

Methods

This was a cross-sectional study, conducted in 2019, in the East of Sri Lanka with a total sample of 3365. The other ranks were selected from 71 clusters by multi-stage cluster sampling method whilst the officers were selected by systematic random sampling method from the Officers' Seniority List. The locally validated PTSD checklist military version (PCL-M) questionnaire was used to screen PTSD. A standard questionnaire was used to obtain data on sociodemographics, aggression, smoking, and cannabis usage, whereas locally validated tools (PHQ-9, Chalder fatigue scale, and AUDIT) were used to gather information on psychological and behavioral factors. Data were analyzed with SPSS-20, and the significance of factors associated with PTSD ($p \leq 0.05$) was determined by the Chi-Square test. Multiple logistic regression was used to exclude confounders. The study was conducted after the

ethical clearance from the Ethical Review Committee of the Faculty of Medicine, KDU.

Results

Of the sample, 1845 (75 officers and 1772 other ranks) had combat exposure and were chosen for this study. The prevalence of PTSD was 3.9%. Battle events and consequences, probable depression, fatigue, high-risk drinking (HRD), childhood abuse, expression of aggression, psychiatric family history, inward admission, absenteeism, and psychosocial dysfunction were significantly associated with PTSD. After adjusting the odds ratios, probable depression, fatigue, aggression, and family history of mental disorder, were predictive of PTSD.

Conclusions

Even after ten years, the psychological effect of the civil war persists. Early exposure to childhood abuse, psychiatric family history, and younger age at combat exposure could be risk factors for PTSD, and HRD, depression, fatigue, psychosocial dysfunction, absenteeism, aggression, and tendency to seek medical treatment can be outcomes of PTSD. Screening and psychosocial intervention are recommended in the field.

Keywords: PTSD, depression, fatigue, trauma, army

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Introduction

Sri Lanka Army engaged in a protracted civil war, claiming over 5000 lives and disabling over 20,000 within three years (2006-2009) (1). Post-traumatic stress disorder (PTSD) is implicated as a psychological complication of trauma derived from war (2), and it is a chronic condition brought on by exposure to exceptionally severe stress, such as seeing a comrade die, killing an enemy, or

experiencing fatal injuries (3). This condition does not occur in the immediate aftermath of exposure to the trauma and strikingly, it may even occur in those who had coped with traumatic events (4). Characteristically, post-traumatic stress disorder is comprised of symptoms of re-experiencing the trauma, avoidance of stimuli associated with the trauma, negative alterations in the cognitions and mood associated with the trauma, and symptoms of hyperarousal (3).

The extant epidemiological evidence suggests that the prevalence of PTSD ranged from 2 to 17% in the Western militaries engaged in recent wars (2,5). A descriptive study in the Sri Lanka army (2010), revealed the prevalence of PTSD as 10.5% (95% CI 9.02-12.04%) (6), and a study done in the Sri Lanka naval force (2012) noted the prevalence of PTSD as low as 2.9% among the regular sailors and 1.9% among the sailors in the special forces (7).

Combat exposure is the commonest predictor of PTSD in the military (8), and yet there are other risk factors implicated such as gender, age at exposure to trauma, social support, exposure to childhood adversities and level of education (9). Furthermore, unit factors such as leadership and unit cohesion are discerned to protect from PTSD (10,16). In terms of the outcome of PTSD, depression, fatigue, interpersonal issues affecting the family and occupation, expression of aggression, and alcohol and substance abuse are highlighted (12).

Over time, the course of PTSD may resolve naturally or with medication (13), and hence, it is intriguing to explore the current prevalence and factors associated with PTSD in the Sri Lanka army a decade after the civil war.

Methods

This was a descriptive cross-sectional study conducted in 2019 at the Security Forces Head Quarters East (SF HQ East)¹, among personnel with two or more years of service, and in the rank of lieutenant colonel and below. Other ranks (ORs) were chosen from 71 clusters using a multi-stage cluster sampling method, whilst officers were chosen via systematic sampling from the officers' seniority list. The sample size was 3343 (i.e., 140 officers and 3184 ORs), which was calculated according to the formula described by Lwanga and Lemeshow (1991) (14).

The locally validated PTSD checklist military version (PCL-M) questionnaire was used to screen PTSD which was defined by the cutoff value of 43.5 (6). The socio-demographic data were collected by adapting standard questions used by two local military studies (6,15). The mental health outcomes were measured with locally validated tools, namely the Patient Health Questionnaire (PHQ-9) for depression (i.e. scores at or above 10) (16), the WHO Alcohol Use Disorder Identification Test (AUDIT) for high-risk drinking (HRD) (hazardous, harmful, and dependant use) (i.e. scores at or above 8), and binge drinking (i.e., five or more drinks at a row) (17), and 13 items Chalder Fatigue Scale for fatigue (7). The psychosocial functional impairment was assessed by the tenth question of the PHQ-9, which has been used for depression and PTSD in research (18,19). In addition, standard questions used by studies were applied to

determine the level of unit cohesion, aggression, smoking cigarettes and cannabis use (20,21,22).

The data were analyzed with the SPSS 20. The chi-square test was used to assess the significance of the socio-demographic factors and mental health outcomes associated with PTSD. The Mann-Whitney U test was used to assess the significance of the association between unit cohesion and PTSD. The significance of the association was determined by the probability value ≤ 0.05 .

All the factors significantly associated with PTSD were further analysed with multiple logistic regression (i.e., to calculate the adjusted odds ratios) to determine their predictability over PTSD.

Ethical clearance was sought from the Ethical Review Committee of the Faculty of Medicine, at the Kotalwala Defence University. The anonymity of the respondents was maintained and measures were taken to prevent the effect of duress.

Results

The sample population totalled 3665 (146 officers and 3519 other ranks) with a 100% response rate, and among them, 1845 (50.4%) (75 officers and 1772 other ranks) were exposed to battle. Exclusively, in this study, only those with battle exposure were considered.

Among the respondents, over 20% either sustained injuries or were exposed to bomb explosions, over 40% were exposed to ambushes and experienced killing the enemy, and between 60% to 90% were exposed to other types of trauma as displayed in Figure 1.

The prevalence of probable PTSD was 3.9% (95% CI 3.1% to 4.9%). Among the battle events and consequences, PTSD was significantly associated with disability following the injuries incurred in battle ($X^2=7.040$, $df=1$, $p=0.010$), viewing dead bodies of women and children ($X^2=5.722$, $df=1$, $p=0.020$), killing the enemy ($X^2=6.452$, $df=1$, $p=0.011$), exposure to small arms ($X^2=6.155$, $df=1$, $p=0.012$), exposure to ambushes ($X^2=7.628$, $df=$, $p=0.008$), and exposure to bomb explosions ($X^2=10.065$, $df=1$, $p=0.003$) (Table 1).

Among the events and consequences of battle that were significantly associated with PTSD, disability following the injuries incurred in battle ($X^2=6.142$, 1 , $df=1$, $p=0.013$), killing the enemy ($X^2=7.132$, $df=1$, $p=0.008$), and exposure to bomb explosions ($X^2=4.930$, $df=1$, $p=0.026$) were significantly associated with depression (Table 3).

Three mental health outcomes were significantly associated with PTSD, namely probable depression ($X^2=88.683$, $df=1$, $p=0.000$), fatigue ($X^2=70.651$, $df=1$, $p=0.000$), and HRD ($X^2=11.981$, $df=1$, $p=0.001$) (Table 1).

¹ SFHQ East – designated area troops are distributed

Exposure to childhood abuse ($X^2=3.811$, $df=1$, $p=0.050$), expression of aggression², family history of mental disorder ($X^2=11.395$, $df=1$, $p=0.003$), inward admission ($X^2=5.394$, $df=1$, $p=0.026$), absenteeism ($X^2=6.443$, $df=1$, $p=0.013$) and psychosocial dysfunction ($X^2=43.902$,

$df=1$, $p=0.000$) were other factors that significantly associated with PTSD (Table 1), and no socio-demographic factor was associated with PTSD. Unit cohesion and PTSD did not show an association of significance (Table 1).

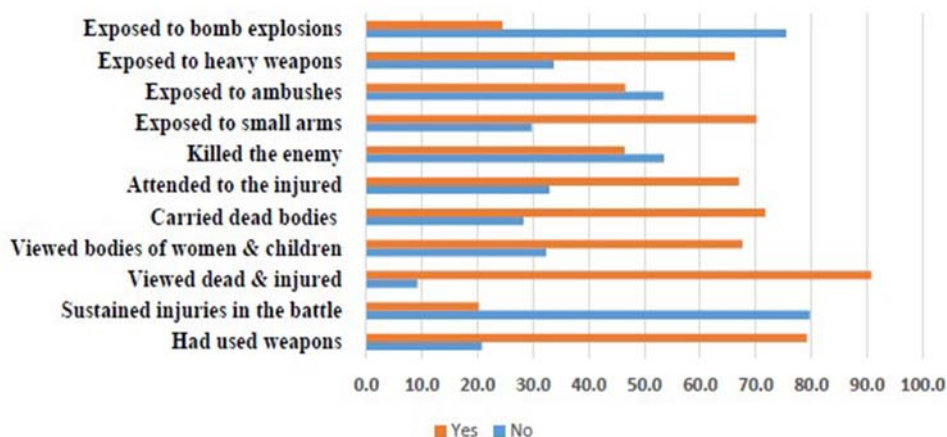


Figure 1. The proportion of exposure to traumatic events and consequences in the battle.

Table 1. The association between PTSD and traumatic events and consequences of battle, sociodemographic factors, mental health outcomes, unit cohesion and other factors

Variable	X ²	df	P value
Traumatic events and consequences of battle			
Sustained injuries in battle	1.037	1	0.309
Disability due to injuries	7.040	1	0.010
Viewed dead and injured	3.672	1	0.059
Viewed bodies of women and children	5.722	1	0.020
Carried dead bodies	2.868	1	0.108
Attended for the injured	0.978	1	0.902
Killed the enemy	6.452	1	0.011
Expose to small arms	6.155	1	0.012
Exposed to heavy arms	3.433	1	0.075
Exposed to ambushes	7.628	1	0.008
Exposed to bomb explosions	10.065	1	0.003
Sociodemographic factors			
Age	1.524	3	0.677
Age at first encounter with battle events	1.185	1	0.276
Civil status	2.785	1	0.095
Rank	4.374	2	0.112
Level of education	0.179	1	0.672
Type of employment (Elite and other)	0.978	1	0.323

(Continued)

² All modes of aggression (verbal, physical and vandalism) exhibited p value as 0.000.

Variable		χ^2	df	P value
Mental health outcomes				
Probable depression		88.683	1	0.000
Fatigue		70.651	1	0.000
High-risk drinking		11.981	1	0.001
Currently smoking		0.066	1	0.811
Cannabis consumption		0.563	1	0.397
Other factors				
Exposed to childhood abuse		3.811	1	0.050
Expression				
Verbally		27.964	1	0.000
Physically		23.536	1	0.000
Vandalism		26.833	1	0.000
Family history of mental disorders		11.395	1	0.003
Inward admissions		5.394	1	0.026
Absenteeism without leave (AWOL)		6.443	1	0.013
Psychosocial dysfunction		43.902	1	0.000
Unit cohesion				
PTSD	Mean rank	Mann U -Whitney	Z	P
No	925.82	27,461.000	-1.623	0.105
Yes	781.31			

After adjusting the odds ratios, probable depression (OR 2.961 (95% CI 1.359-6.454), fatigue (OR 3.281 (95% CI 1.781-6.042), aggression (OR 2.707 (95% CI 1.349-5.433) and family history of mental disorder (OR 2.171 (95%

CI 1.082-4.354), were predictive of PTSD, and the rest of factors that significantly associated with PTSD displayed predictiveness only with unadjusted odds ratios (Table 2).

Table 2. Factors that were predictive of PTSD after adjusting the odds ratio with multiple logistic regression

	Unadjusted OR (95% CI)	*Adjusted OR (95% CI)
Probable depression	7.560 (4.657-12.272)	2.863 (1.625-5.045)
Fatigue	7.512 (4.363-12.933)	3.281 (1.781-6.042)
High-risk drinking	2.261 (1.408-3.629)	1.428 (0.861-2.368)
Exposed to childhood abuse	1.594 (1.004-2.555)	1.168 (.868-1.574)
Aggression		
Verbally	3.081 (1.914-4.959)	1.619 (0.968-2.707)
Physically	3.480 (1.991-6.081)	
Vandalism	3.445 (2.100-5.650)	
Family history of mental disorder	2.911 (1.522-5.565)	2.171 (1.082-4.354)
Inward admissions	1.980 (1.101-3.561)	1.475 (0.784-2.772)
Absenteeism without leave	1.836 (1.141-2.955)	1.198 (0.718-2.000)
Psychosocial dysfunction	5.132 (3.011-8.746)	1.834 (0.990-3.396)

*Adjusted for aggression, psychosocial dysfunction, depression, fatigue, high-risk drinking, family history of mental illness, and inward admission and exposure to childhood abuse.

Table 3. The association between battle events and probable depression

Variable	X ²	df	P value
Disability due to injuries	6.142	1	0.013
Viewed bodies of women and children	3.390	1	0.066
Killed the enemy	7.132	1	0.008
Exposed to ambushes	3.515	1	0.061
Exposed to bomb explosions	4.930	1	0.026

Table 4 indicates that the degree of predictiveness was higher for PTSD than probable depression with killing the enemy (OR 1.374 (95% CI 1.070-1.763) and disability due to injuries (OR 2.480 (95% CI 1.094-5.621), whilst only exposure to bomb explosion was predictive for PTSD (OR 1.953 (95% CI 1.010-3.775).

Table 4. The predictiveness of probable depression and PTSD over the events and consequences of battle after adjusting the odds ratio with multiple logistic regression

	PTSD [*Adjusted OR (95% CI)]	Probable depression [*Adjusted OR (95% CI)]
Exposure to bomb blast	1.953 (1.010-3.775)	1.298 (0.982-1.714)
Disability	2.480 (1.094-5.621)	1.518 (1.010-2.282)
Killing the enemy	1.374 (1.070-1.763)	1.312 (0.685-2.514)

* Adjusted for probable depression and PTSD.

Discussion

This study explored the prevalence and factors associated with PTSD related to battle events of the past civil war.

Most of the battle events and consequences highlighted in Figure 1 were significantly associated with PTSD (Table 1), inferring that even after ten years, the impact of the Past Civil War is still present in the Army.

Prevalence

The prevalence of PTSD was 3.9% (95% CI 3.1%-4.9%), which was lower than that of the 2010 Army study [10.5% (95% CI 9.02 -12.04%)] (6). This could be due to either the recovery of PTSD over the past few years, an observation reiterated by local and international studies (7) (21-22) or under-reporting, recall bias, and early retirement or dismissal from the military on medical grounds. However, the prevalence of PTSD in the Navy sailors exposed to battle events was 2.7% (95% CI 1.1-4.2) (23). The higher prevalence of PTSD in the Army than in the Navy may be due to the differences in the degree of exposure to trauma and combat experience in battle events.

The prevalence of PTSD among active personnel and veterans in the US ranged from 4% to 17%, and in other Western nations, it varied between 2.7% to 12% (2). However, it is noteworthy that comparison of PTSD estimates between forces, between countries, and even between the participating operational duties is difficult without controlling for sampling strategies, measurement strategies, timing and latency of assessment, recall bias, combat experiences, issues related to the PTSD course, chronicity, comorbidity, symptom overlap with other psychiatric disorders and sociopolitical and cultural factors (2).

The socio-demographic associations of PTSD

This study did not see a significant association between socio-demographic factors (i.e. level of education, civil status, age, rank and age at first battle exposure) and symptoms of PTSD (Table 2). The study on Navy sailors too did not observe similar associations (15). Nevertheless, the former Army study revealed that PTSD was significantly higher in those with less education and younger age at first battle exposure (6). Strikingly, the Navy study demonstrated that personnel in the elite units compared with their counterparts in the regular

units were less affected by the age at first battle exposure, and attributed to the higher degree of unit cohesion (23). International literature illuminates that, liability to PTSD increases with younger age, lower educational attainment and being unmarried, owing to the inability to cope with trauma and the vulnerability to trauma exposure (9) (24-26). Thus to substantiate the above, we suggest a study with a larger sample of diagnosed cases with PTSD should be carried out.

The psychological, behavioural and other associations of PTSD

We observed that absenteeism, psychosocial dysfunction, inward admission, family history of mental disorder, aggression, probable depression, fatigue, HRD, and exposure to childhood abuse were significantly associated with PTSD (Table 1). However, after the application of multiple logistic regression to exclude confounders, only, probable depression, fatigue and family history of mental disorders remain significant with PTSD (Table 2), and hence, to consolidate our findings, a study with a larger number of PTSD case load is warranted.

Exposure to childhood abuse and a family history of mental illness was shown to be significantly associated with PTSD by the Sri Lanka Army study (6), and empirical evidence from civilian and military studies upholds the latter findings (9,25,27). Psychiatric literature expounds, that exposure to childhood adversities and inheritance of genes of psychiatric disorders may change the personality and cognitive abilities, so much so, that negative perceptions and inflated responses to the trauma may occur, ensuing PTSD (28).

Trauma research has revealed the significance of the association between PTSD and depression (29). However, depression is also evident as an independent outcome of trauma (30). Due to the mixed results with multiple logistic regression, displayed in Table 6, we were unable to determine whether depression resulted directly from the events and consequences of battle or occurred secondary to PTSD.

Consistent with our findings, the naval study of Sri Lanka too saw a significant association between fatigue and PTSD and emphasized the importance of training and maintenance of good physical and mental health before combat duties (31). Trauma studies corroborate the significance of the relationship between PTSD and fatigue, attributing it to the altered emotional state and the stress-response system in general, and the hypothalamic-pituitary-adrenal (HPA) axis in particular following the exposure to trauma (32-34). It is also noteworthy, that fatigue can independently result from trauma and later be exacerbated by PTSD (35).

Converging with our observation, the Sri Lanka naval study observed that PTSD doubled the hazardous alcohol use (36). Reflectively, international military studies too, have portrayed the significance of the relationship between problem-related use of alcohol and PTSD (37-40), which could be due to personality characteristics, genes and ways of coping with PTSD symptoms (41-43).

The negative impact of PTSD on interpersonal relationships is evinced empirically (12,43-44) and is attributed to the symptoms of hyperarousal (i.e., insomnia, irritability, hypervigilance), avoidance, emotional numbing and re-experiencing the trauma (12,43). Moreover, as a result of emotional numbing in PTSD, susceptibility to aggression increases, giving rise to further impairment in social interactions (43). Military studies demonstrated that absenteeism is significantly observed in PTSD, and erosion of trust with superiors, feeling afraid of peers and superiors, and guilt of experiencing or anticipating killing are implicated (45).

Medically unexplainable physical symptoms (MUPS) are significantly associated with PTSD, and instead of treating PTSD the afflicted veterans and serving personnel seek medical treatment to alleviate MUPS (46), thus, substantiating our observation on PTSD and inward treatment.

Limitations

This study has several limitations. Since this is a cross-sectional study, the causation of the associating factors cannot be demonstrated. False positives or negatives cannot be excluded because a screening tool is employed to identify PTSD, but as the sensitivity and specificity of the PCL-M (Sinhala version) were 95.9% (95% CI 90.35-101.45%) and 92.2% (95% CI 84.85-99.55%) (6), respectively, the impact on the outcome could remain minimal. The gender variable was not included, nevertheless, when considering the ratio of females to males employed in the Army, the change in the outcome is negligible. Although the entire Army should have been cluster sampled, as personnel were allocated under the demographic makeup of the Army, SF HQ East demographically represents the entire Army.

Conclusions

Even after ten years, the psychological effect of the civil war is persisting. While early exposure to childhood abuse, psychiatric family history, and younger age at combat exposure could be risk factors for PTSD, HRD, depression, fatigue, psychosocial dysfunction, AWOL, aggression and the tendency to seek medical treatment can be outcomes of PTSD. Hence, screening and psychosocial intervention are recommended in the field. More studies with a larger PTSD caseload should be implemented to further consolidate the observations made in this study.

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Conflicting interests

None.

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