HEALTH-RELATED QUALITY OF LIFE OF EX-PRISONERS OF WAR AFFECTED BY POSTTRAUMATIC STRESS DISORDER 25 YEARS AFTER CAPTIVITY

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SUMMARY

Background: *War captivity is one of the most difficult human experiences and can cause long-lasting effects on mental and physical health. Posttraumatic Stress Disorder (PTSD), as one of the frequent consequences of war trauma, is often associated with the psychiatric and/or somatic comorbidity. Therefore, PTSD results in impaired Health-Related Quality of Life (HRQoL). This study aimed to investigate the HRQoL in the Croatian Homeland War ex-POWs affected by PTSD, regarding the intensity of PTSD symptoms, sociodemographic characteristics and somatic comorbidity, and to identify predictors of poor HRQoL.*

Subjects and methods: *The study sample consisted of two groups (45 participants each) based on whether they were POWs or not (control group). All study participants were diagnosed with PTSD according to the ICD-10 criteria and had combat experience as active participants in defence of the Republic of Croatia during the Homeland War. The subjects were evaluated using the sociodemographic questionnaire, PTSD self-report checklist (PCL-5) and Short Form (SF-36) Health Survey questionnaire. The data on participants' physical diseases were collected from medical anamnesis and medical records in the last five years.*

Results: *In relation to ex-POWs, the control group had significantly smaller number of retirees, more unemployed persons, smaller number of married subjects, and higher number of divorced persons. Low socioeconomic status and intensity of PTSD symptoms has been confirmed as a significant predictor of impaired HRQoL in both subject groups. The most commonly PTSD associated physical diseases were musculosceletal, cardiovascular, and gastrointestinal diseases. Endocrine and metabolic diseases were more frequent in the ex-POWs' group.*

Conclusions: *PTSD was associated with the HRQoL, whether the veterans were ex-POWs or not. The hypothesis that exposure of ex-POWs to the trauma of captivity experience impaired HRQoL to a greater extent, compared to the non-detained veterans, was not confirmed. Low socioeconomic status has proved to be the most significant predictor of poorer HRQoL.*

Key words: *Posttraumatic Stress Disorder - Health-Related Quality of Life - Ex-prisoners of War - somatic comorbidity*

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INTRODUCTION

According to estimates by the Croatian Government, during the Homeland War (1990-1996) at least one million people have been exposed to the war stress (Ministry of Croatian Veterans 1999). People were traumatized in different ways: as active participants in defence of the sovereignty of the Republic of Croatia, as civilians exposed to combat operations, or as refugees with a long-term exile from their homes. Over 7,600 persons from the Republic of Croatia (civilians and defenders) were detained in a prisoner of war (POW) camps (Ministry of Croatian Veterans 2014). According to the Croatian Association of Prisoners in Serbian Concentration Camps, the number is as high as about 30,000 people. The exact number of defenders among them is unknown. Captivity is one of the most difficult human experiences, especially for people exposed to the combat stress. Frequently, imprisonment represents a repetitive and prolonged trauma, induced intentionally and traumatization often takes place at the interpersonal level (Herman 1992, Başoğlu 2009). Research on the consequences of captivity indicates a high risk of developing various effects on the health, especially the mental health of the individual, and one of the most common disorders mentioned as a possible consequence of trauma is Posttraumatic Stress Disorder (PTSD) (Solomon et al. 2012).

PTSD occurs after exposure to extreme stressors, life-threatening situations or witnessing the life-threatening situations. According to the International Classification of Diseases (ICD-10), PTSD belongs to a group of anxiety disorders and according to the Diagnostic and Statistical Manual of Mental Disorders (DSM–5), to a group of stress-related disorders (World Health Organization 1992, American Psychiatric Association 2013). To establish a PTSD diagnosis, the requirement of exposure to a traumatic event must be satisfied, and according to the ICD-10, the clinical picture of PTSD is characterized by symptoms classified in three groups: symptoms of re-experiencing trauma, avoidance of trauma reminders and hyperarousal behaviour. In DSM-5,

symptoms are divided into four groups and, besides the above-mentioned symptoms, a group of symptoms includes cognitive and mood disorders.

The prevalence of PTSD depends on the study group and, according to the previous studies, the prevalence in the general population is 1-14% (American Psychiatric Association 1994). More prevalence refers to subpopulations exposed to certain types of stressors, e.g., refugees or other stressors related to war events. Some studies relating to POWs from the Gulf War and World War II indicate a high prevalence of PTSD in this population, up to over 80% (Al-Turkait & Ohaeri 2008, Rintamaki et al. 2009). Often, PTSD can last for decades after exposure to traumatic events, as confirmed by veteran populations from various wars, whether it is caused by life-threatening situations during combat, captivity, or witnessing to traumatic events (Weiss et al. 2003). A large study, conducted in the period from 1986 to 1998 at the 3016 American veterans who participated in combat operations in Vietnam, describes that 15% of veterans had PTSD, and another 11% had partial PTSD at the time of testing (Kulka et al. 1990). A study conducted on Israeli veterans describes the persistence of PTSD in 23.2% of detainees 30 years after the captivity, unlike a significantly lower percentage of 4.3% for non-detainees veterans of the Yom- Kippur War (Neria et al. 1998). PTSD is a disorder with high comorbidity, both in psychiatric and somatic disorders. Many studies deal with health and comorbidity disorder in the veteran population, including ex-POWs. Some point to more frequent somatic comorbidity among ex-POWs compared to veterans who were not detainees, even many years after the war. Studies on veterans from Vietnam War and World War II describe the high incidence of somatic disorders among ex-POWs (Nice et al. 1996, Creasy et al. 1999), considerably impaired health several decades after trauma (Page & Brass 1991), and also indicate high mortality (Solomon et al. 2013).

The World Health Organization (1997) defines the Quality of Life (QoL) as an individual's perception of its position in the specific health, cultural, social, and environmental context. War veterans, especially those with combat PTSD, often have a reduced QoL (Schnurr et al. 2009). Also, Health-Related Quality of Life (HRQoL), can be defined as a particular domain of the QoL concept specifically related to the health, referring patient's functioning, the well-being and perception of general health in the physical, mental and social domains (Apolone & Mosconi 1998). Measurement of QoL can be very individual because of the unique experiences, expectations, and perceptions of each person. Therefore, QoL measurement should include reference to many complex areas (Ahmadi et al. 2013, Swan et al. 2009). Numerous studies describe diminished functioning and strong association of PTSD and decreased HRQoL (Buckley et al. 2004, Mittal et al. 2006). Richardson et al. (2008) found significant deterioration of mental and physical health in veterans suffering from PTSD. Many studies suggest that PTSD treatment leads to improved QoL (Rapaport et al. 2002, Schnurr et al. 2006).

Following the previous studies of captivity trauma, long-term consequences for the ex-POWs' health can be expected. This study aimed to investigate the HRQoL in the Croatian Homeland War ex-POWs affected by PTSD considering the intensity of PTSD symptoms, sociodemographic characteristics, and somatic comorbidity. Considering the exposure of ex-POWs to the trauma of combat and captivity experience, we have assumed significantly impaired HRQoL in the ex-POWs group compared to the group of veterans not detained.

SUBJECTS AND METHODS

Subjects

The study sample consisted of 90 subjects, Croatian war veterans who were treated at the Department of Psychiatry of the County General Hospital Vukovar and Croatian Veterans' Hospital during 2017. All study participants were diagnosed with PTSD according to the ICD-10 criteria and had combat experience as active participants in defence of the Republic of Croatia during the Homeland War. They were divided into two groups (45 participants each) based on whether they were POWs or not (control group). Since there were many more who were not POWs, this control group was chosen randomly. The study was approved by the Ethics Committee of the County General Hospital Vukovar and Croatian Veterans' Hospital, and by the Ethics Committee of the Faculty of Medicine in Osijek. All subjects gave informed consent for participation in the research and patient anonymity has been preserved during all stages of investigation.

Methods

A clinical interview was conducted with all participants, and data on physical diseases were collected. The subjects were evaluated using the sociodemographic questionnaire, PTSD self-report checklist (PCL-5) and Short Form (SF-36) Health Survey questionnaire. The sociodemographic questionnaire was designed by authors and included data on age, employment status, education, marital and socioeconomic status.

The sociodemographic data were coded as follows:

- Years of age (1 ≤ 45y; 2 = 45-54y; 3 = 55-64y; 4 ≥ 64y);
- Employment status (1 = Unemployed; 2 = Employed; 3 = Retired);
- Education (1 = Elementary school; 2 = High school; 3 = BSc; 4 = MSc);
- Marital status (1 = Widower; 2 = Divorced; 3 = Unmarried; 4 = Married),
- Socioeconomic status (1 = Bad; 2 = Moderate; 3 = Good).

The PCL-5 checklist containing 20 items corresponding to the DSM-5 symptom criteria for PTSD was used (American Psychiatric Association 2013, Weathers et al. 2014). The items are related to specific symptoms in the past month. Items were rated on a 5-point scale (0-"Not at all", 1-"A little bit", 2-"Moderately", 3-"Quite a bit", and 4-"Extremely") and four subscales (clusters) were formed: B-Intrusion (items 1-5), C-Avoidance (items 6-7), D-Negative alterations in cognitions and mood (items 8-14), and E-Alterations in arousal and reactivity (items 15-20) (American Psychiatric Association 2013, Wortmann et al. 2016). Cluster scores were calculated as an average score of corresponding items. A total PCL-5 score was obtained by summing the scores for each item and ranged from 0 to 80, where higher scores indicate more severe symptoms.

The Short Form (SF-36) Health Survey questionnaire contains 36 items (questions), 35 of which are distributed as a measure of 8 concepts (dimensions) of health: Physical functioning (PF) – 10 items, Physical role limitations (RP) – 4 items, Bodily pain (BP) – 2 items, General health (GH) – 5 items, Vitality (VT) – 4 items, Social functioning (SF) – 2 items, Emotional role limitations (RE) – 3 items, and Mental health (MH) – 5 items (Ware et al. 1994, Ware & Kosinski 2001). The original scores of SF-36 questionnaire were adjusted by summing and rescaling the factor-weighted scores to fit eight dimensions of health with a range from 0 to 100, where a score of 100 indicates the best health condition. These eight dimensions of health have also been distributed and summarized into two scales: a Physical component score (PCS) and Mental component score (MCS) (Ware et al. 1993, Ware et al. 2001). The Total SF-36 score was obtained by averaging scores for all eight dimensions.

The data on participants' physical diseases were collected from medical anamnesis and medical records in the last five years. The data was divided into Cardiovascular (CVD), Gastrointestinal (GID), Neurological (ND), Endocrine and metabolic (EMD), Musculosceletal (MSD), Malignant (MD), Dermatological (DD), and Urological (UD) diseases groups.

Statistical Analyses

To describe the study sample, frequencies were calculated for sociodemographic and physical diseases data, and mean and standard deviation (SD) were calculated for data on PTSD self-report checklist (PCL-5) and Short Form (SF-36) Health Survey questionnaire. Chi-Square (χ^2) and Mann-Whitney U tests were used to examine the potential differences in those variables between the ex-POWs and the control group.

A generalized regression model analysis was conducted to identify factors affecting patients' QoL. First, univariate analysis was performed to determine the difference between subject groups, and second, the regression model was adjusted for age, employment status, education level, marital and socioeconomic status. In addition, logistic regression was performed to determine the odds ratio (OR) for physical disease morbidity in the ex-POWs and the control group. A specific physical disease was recorded into variables with two levels (1 = diagnosed; 0 = not diagnosed). The adjusted odds ratios were also calculated after including the possible confounding sociodemographic factors in the logistic regression model.

Associations between the data on participants' physical diseases and the PCL-5 and SF-36 scores were evaluated with the Spearman's rank correlations. Dermatological and urological diseases have been removed from the regression and correlation analyses because their incidence among subject groups was not significant (<5%). Statistical analysis was carried out with the Statistica ver. 13.1 software (Dell Inc., Tulsa, OK, USA).

RESULTS

Data on the sociodemographic characteristics of subjects are presented in Table 1. There were no statistically significant differences (p<0.05) in age and the level of education of the ex-POWs and the control group. Most subjects were in age between 45 and 64 years and had a high school level of education. A significant difference was found in the employment (χ^2=11.11; p=0.004) and marital status (χ^2=10.98; p=0.012), and in the self-assessed socioeconomic status (χ^2=9.78; p=0.008). The control group had a significantly smaller number of retirees in relation to ex-POWs, 62.2 and 86.7%, respectively. There were significantly more unemployed persons in the control group (26.7% vs. 2.2% in ex-POWs), while the number of employed subjects was the same in both groups. There were no unmarried and widowers in the ex-POWs group, and the number of married subjects was significantly higher in relation to the control group (91.1% vs. 64.4%). The number of divorced persons was significantly higher in the control group (20.0% vs. 8.9% in ex-POWs). Low socioeconomic status was significantly more prevalent in the control group (44.4% vs. 15.6% in ex-POWs).

Table 2 shows comparison of the PCL-5 cluster scores in ex-POWs and the control group. According to Mann-Whitney U test, there were a significant differences (p<0.05) in the three PCL-5 clusters: B-Intrusion (Z=-2.557; p=0.011), D-Cognition and mood (Z=-2.028; p=0.043), and E-Arousal and reactivity (Z=-2.241; p=0.025). All these cluster symptoms were more pronounced in the control group. The total PCL-5 score was significantly lower (Z=-2.038; p=0.042) in the ex-POWs compared to the control group (33.7 vs. 42.0), indicating the lower intensity of PTSD symptoms in the ex-POWs group.

The data on participants' physical diseases are presented in Table 3. The most commonly PTSD associated physical diseases were musculosceletal, cardiovascular, and gastrointestinal diseases, both in the group of ex-POWs and in the control group. Endocrine and

Table 1. Differences in the sociodemographic data between ex-POWs and the control group

	ex-POWs		Control		χ^2	p
	n	%	n	%		
Age					3.815	0.282
<45	1	2.2	5	11.1		
45-54	21	46.7	22	48.9		
55-64	17	37.8	15	33.3		
>64	6	13.3	3	6.7		
Employment status					*11.114*	*0.004**
Unemployed	1	2.2	12	26.7		
Employed	5	11.1	5	11.1		
Retired	39	86.7	28	62.2		
Education					2.406	0.493
Elementary school	12	26.7	10	22.2		
High school	27	60.0	32	71.1		
BSc	2	4.4	2	4.4		
MSc	4	8.9	1	2.2		
Marital status					*10.980*	*0.012**
Widower	0	0.0	1	2.2		
Divorced	4	8.9	9	20.0		
Unmarried	0	0.0	6	13.3		
Married	41	91.1	29	64.4		
Socioeconomic status					*9.783*	*0.008**
Bad	7	15.6	20	44.4		
Moderate	34	75.6	24	53.3		
Good	4	8.9	1	2.2		

* p<0.05

Table 2. Differences in the PCL-5 cluster scores between ex-POWs and the control group

PCL-5 Clusters	ex-POWs		Control		Z	p
	Mean	SD	Mean	SD		
B-Intrusion	1.8	0.9	2.3	0.9	*-2.557*	*0.011**
C-Avoidance	2.0	1.4	2.0	1.0	-0.016	0.987
D-Cognition and mood	1.6	1.1	2.0	0.9	*-2.028*	*0.043**
E-Arousal and reactivity	1.6	1.0	2.1	0.9	*-2.241*	*0.025**
Total PCL-5	33.7	18.5	42.0	16.6	*-2.038*	*0.042**

* p<0.05

Table 3. Comparison of the physical diseases morbidity in ex-POWs and the control group

Disease	ex-POWs		Control		χ^2	p
	n	%	n	%		
Cardiovascular	23	51.1	22	48.9	0.044	0.833
Gastrointestinal	18	40.0	15	33.3	0.431	0.512
Neurological	6	13.3	12	26.7	2.500	0.114
Endocrine and metabolic	14	31.1	6	13.3	*4.114*	*0.043**
Musculosceletal	28	62.2	25	55.6	0.413	0.520
Malignant	5	11.1	3	6.7	0.549	0.459
Dermatological	1	2.2	2	4.4	0.345	0.557
Urological	2	4.4	1	2.2	0.345	0.557

* p<0.05

metabolic diseases were significantly more frequent (χ^2=4.114; p=0.043) in the group of ex-POWs than in the control group (31.1% vs. 13.3%). Neurological diseases occurred more frequently in the control group, but no statistical significance was determined by the Chi-Square (χ^2) test (χ^2=2.500; p=0.114).

The results of the Short Form (SF-36) Health Survey questionnaire showed that the TSF36-Total SF-36 score in the group of ex-POWs was significantly higher than in the control group (Z=2.227; p=0.026) according to Mann-Whitney U test (Table 4). The statistically significant difference has also been found in the MSC-Mental

component score (Z=2.570; p=0.01), which was also higher in the ex-POWs group. The total PSC-Physical component score did not show a significant difference between groups. The results of individual subscales scores showed differences in several dimensions of health; in the BP-Bodily pain dimension (Z=2.110; p=0.035) with more severe pain in the control group, and in the three mental components of health: SF-Social functioning (Z=2.108; p=0.035), RE-Emotional roles limitation (Z=2.161; p=0.031), and MH-Mental health (Z=3.276; p=0.001). In all these dimensions, the control group had a lower score, indicating poorer social functioning, more impaired functioning due to emotional roles limitation and worse mental health compared to the ex-POWs.

Table 5 shows standardized β - coefficients from the regression analysis of the PCL-5 cluster scores. The results of unadjusted univariate regression confirmed that the control group was statistically significantly (p<0.05) more likely to develop more severe PTSD symptoms compared with ex-POWs group. It was evident from the obtained β - coefficients for the TPCL5-Total PCL-5 score (β=-0.233; p=0.027), and individual clusters: B-Intrusion (β=-0.270; p=0.010), D-Negative alterations in cognitions and mood (β=-0.213; p=0.044), and E-Alterations in arousal and reactivity (β=-0.242; p=0.021). However, when the adjusted linear regression analysis was applied, none of the group related β - coefficients maintained their significance. The bad socioeconomic status appeared to be the most important predictor of the more intense PTSD symptoms in the clusters D (β=-0.309; p=0.010) and E (β=-0.281; p=0.016), and the TPCL5-Total PCL-5 score (β=-0.277; p=0.020). Lower age of participants emerged as a significant predictor of the cluster E symptoms (β=-0.217; p=0.035).

Table 4. Differences in the SF-36 health survey scores between ex-POWs and the control group

SF-8 dimensions	ex-POWs		Control			
	Mean	SD	Mean	SD	Z	p
PF	52.6	23.8	49.2	22.0	0.862	0.389
RP	20.6	30.3	17.8	26.4	0.144	0.885
BP	48.2	18.9	40.4	19.0	2.110	*0.035**
GH	39.6	21.2	31.6	13.6	1.647	0.100
VT	37.2	18.9	30.7	18.6	1.791	0.073
SF	47.2	22.3	36.7	21.6	2.108	*0.035**
RE	27.4	39.8	11.9	27.7	2.161	*0.031**
MH	47.9	16.7	35.2	16.9	3.276	*0.001**
PCS	40.2	16.5	34.7	13.8	1.635	0.102
MCS	39.9	20.9	28.6	15.3	2.570	*0.010**
TSF36	40.1	17.0	31.7	13.4	2.227	*0.026**

PF - Physical functioning; RP - Physical roles limitation; BP - Bodily pain; GH - General health; VT – Vitality;
SF - Social functioning; RE - Emotional roles limitation; MH - Mental health; PCS - Physical component score;
MCS - Mental component score; TSF36 - Total SF-36;   * p<0.05

Table 5. Regression analysis and factors associated with the self-report checklist PCL-5 cluster scores

	Parameter	Univariate exPOWs/ Control	Adjusted exPOWs/ Control	AGE	ES	ED	MS	SEC
B	β	-0.270	-0.194	-0.097	-0.072	-0.100	0.076	-0.153
	95% CI	-0.47-0.07	-0.42-0.03	-0.3-0.11	-0.31-0.17	-0.32-0.11	-0.14-0.29	-0.39-0.08
	p	0.010*	0.093	0.357	0.547	0.356	0.485	0.198
C	β	0.000	-0.008	-0.003	0.049	-0.038	0.186	-0.174
	95% CI	-0.21-0.21	-0.25-0.23	-0.22-0.22	-0.2-0.3	-0.26-0.19	-0.04-0.41	-0.42-0.07
	p	1.000	0.947	0.981	0.697	0.737	0.106	0.163
D	β	-0.213	-0.149	-0.146	0.120	-0.079	0.099	-0.309
	95% CI	-0.42-0.01	-0.37-0.08	-0.35-0.06	-0.12-0.36	-0.29-0.13	-0.12-0.31	-0.54-0.08
	p	0.044*	0.190	0.163	0.317	0.463	0.362	0.010*
E	β	-0.242	-0.205	-0.217	0.149	-0.052	0.168	-0.281
	95% CI	-0.45-0.04	-0.43-0.01	-0.42--0.02	-0.08-0.38	-0.26-0.16	-0.04-0.38	-0.51-0.05
	p	0.021*	0.067	0.035*	0.203	0.625	0.115	0.016*
TPCL5	β	-0.233	-0.177	-0.153	0.083	-0.079	0.138	-0.277
	95% CI	-0.44-0.03	-0.4-0.05	-0.36-0.05	-0.15-0.32	-0.29-0.13	-0.08-0.35	-0.51-0.05
	p	0.027*	0.121	0.142	0.485	0.459	0.202	0.020*

β - standardized beta coefficient; CI - Confidence interval; B – Intrusion; C – Avoidance; D - Cognition and mood;
E - Arousal and reactivity; TPCL5 - Total PCL-5 score; ES - Employment status; ED – Education; MS - Marital status;
SEC - Socioeconomic status;   * p<0.05

The odds ratios obtained from the logistic regression analysis showed that the only group of diseases with a statistically significant difference between subject groups was a group of endocrinal and metabolic diseases (p=0.040). There were 2.94 times more likely to develop these diseases in the ex-POWs group compared to the control group. After the adjustment for the possible confounding factors, the only significant predictor of physical diseases was the marital status as a predictor of cardiovascular diseases (β=-0.362; p=0.009), indicating the better cardiovascular health condition of married participants (Table 6).

Table 6. Regression analysis and factors associated with the physical diseases morbidity in ex-POWs and the control group

		Univariate		Adjusted				
	Parameter	exPOWs/Control	exPOWs/Control	AGE	ES	ED	MS	SEC
CVD	β (OR)	0.025 (1.09)	0.108 (1.48)	0.194	0.099	0.154	-0.362	-0.208
	95% CI	-0.2-0.25	-0.16-0.38	-0.06-0.45	-0.19-0.39	-0.11-0.42	-0.66-0.07	-0.5-0.08
	p	0.833	0.433	0.126	0.506	0.240	0.009*	0.156
GID	β (OR)	0.079 (1.33)	0.055 (1.22)	0.138	0.120	0.009	-0.140	0.008
	95% CI	-0.16-0.32	-0.21-0.32	-0.11-0.38	-0.17-0.41	-0.24-0.26	-0.39-0.11	-0.27-0.28
	p	0.511	0.686	0.271	0.416	0.943	0.281	0.957
ND	β (OR)	-0.237 (0.42)	-0.118 (0.65)	0.020	-0.235	0.150	-0.145	-0.028
	95% CI	-0.54-0.06	-0.46-0.22	-0.29-0.33	-0.55-0.08	-0.16-0.46	-0.43-0.14	-0.36-0.3
	p	0.111	0.239	0.113	0.546	0.705	0.647	0.650
EMD	β (OR)	0.297 (2.94)	0.192 (2.00)	0.236	0.121	-0.055	0.083	0.077
	95% CI	0-0.59	-0.13-0.52	-0.06-0.53	-0.28-0.52	-0.34-0.23	-0.28-0.45	-0.26-0.41
	p	0.040*	0.497	0.898	0.139	0.357	0.319	0.868
LMD	β (OR)	0.076 (1.32)	0.080 (1.34)	0.094	0.003	0.006	0.041	-0.098
	95% CI	-0.16-0.31	-0.18-0.34	-0.15-0.34	-0.27-0.28	-0.24-0.26	-0.2-0.29	-0.37-0.17
	p	0.520	0.548	0.444	0.983	0.960	0.744	0.476
MD	β (OR)	0.154 (1.75)	0.092 (1.40)	-0.213	-0.025	-0.435	-0.099	0.398
	95% CI	-0.26-0.57	-0.4-0.59	-0.7-0.27	-0.56-0.5	-1.02-0.15	-0.53-0.33	-0.09-0.89
	p	0.457	0.714	0.373	0.926	0.103	0.658	0.103

β - standardized beta coefficient; OR - Odds ratio; CI - Confidence interval; CVD - Cardiovascular diseases;
GID - Gastrointestinal diseases; ND - Neurological diseases; EMD - Endocrine and metabolic diseases;
MSD - Musculosceletal diseases; MD - Malignant diseases; TPCL5 - Total PCL-5 score; ES - Employment status;
ED – Education; MS - Marital status; SEC - Socioeconomic status;   * p<0.05

Table 7. Spearman rank order correlations between SF-36 and PCL-5 scores and physical morbidity

		Physical Diseases					
		CVD	GID	ND	EMD	LMD	MD
SF-36	PF	-0.208*	-0.178	-0.103	-0.118	-0.305*	0.125
	RP	-0.195	-0.182	-0.132	-0.149	-0.131	-0.113
	BP	-0.224*	-0.024	-0.228*	0.144	0.021	-0.058
	GH	-0.198	-0.329*	-0.107	-0.097	-0.077	-0.033
	VT	-0.117	-0.240*	-0.283*	0.005	-0.160	0.063
	SF	-0.093	-0.273*	-0.087	-0.079	-0.123	0.039
	RE	-0.117	-0.099	-0.036	0.033	0.087	-0.008
	MH	-0.002	-0.103	-0.279*	0.082	0.083	0.017
	PCS	-0.299*	-0.234*	-0.176	-0.088	-0.217*	0.014
	MCS	-0.105	-0.232*	-0.188	-0.004	-0.050	0.042
	TSF36	-0.208*	-0.244*	-0.207	-0.043	-0.145	0.041
PCL-5	B	0.018	0.109	0.074	-0.054	0.056	0.014
	C	0.004	0.020	0.023	0.084	0.064	-0.017
	D	0.041	0.183	0.113	0.019	0.018	-0.016
	E	0.013	0.130	0.131	-0.020	-0.078	0.024
	TPCL5	0.031	0.142	0.102	0.007	0.010	0.013

PF - Physical functioning; RP - Physical roles limitation; BP - Bodily pain; GH - General health; VT – Vitality;
SF - Social functioning; RE - Emotional roles limitation; MH - Mental health; PCS - Physical component score;
MCS - Mental component score; TSF36 - Total SF-36; B – Intrusion; C – Avoidance; D - Cognition and mood;
E - Arousal and reactivity; TPCL5 - Total PCL-5 score; CVD - Cardiovascular diseases; GID - Gastrointestinal diseases;
ND - Neurological diseases; EMD - Endocrine and metabolic diseases; MSD - Musculosceletal diseases; MD - Malignant diseases;
* p<0.05

Spearman's rho (ρ) correlation coefficients between SF-36 and PCL-5 scores and physical morbidity are presented in Table 7. There was a significant correlation (p<0.05) between the cardiovascular diseases incidence and the total SF-36 score (ρ=-0.208), primarily due to correlation with the PCS-Physical component score (ρ=-0.299) with a significant influence of the PF-Physical functioning and BP-Bodily pain dimensions (ρ=-0.208 and ρ=-0.224, respectively). The gastrointestinal diseases among subjects significantly correlated with the total SF-36 score (ρ=0.244), PCS-Physical component score (ρ=-0.234), and MSC-Mental component score (ρ=-0.232), which is related with impaired GH-General health (ρ=-0.329), VT-Vitality (ρ=-0.240), and SF-Social functioning (ρ=-0.273). Development of the neurological diseases significantly correlated with the BP-Bodily pain dimension (ρ=-0.228), and bad perception of the VT-Vitality (ρ=-0.283) and MH-Mental health (ρ=-0.279). The prevalence of musculoscletal diseases correlated with the PCS-Physical component score (ρ=0.217), mainly due to correlation with a deterioration of PF-Physical functioning (ρ=-0.305). None of the PCL-5 cluster has correlate with any group of physical diseases.

The overall results of the regression analysis for the 8-dimensional SP-36 health survey in Table 8 showed that ex-POWs assessed their health as better compared to the control group. The statistically significant differences (p<0.05) have been found in the health dimensions of the GH-General health (β=-0.221; p=0.036), SF-Social functioning (β=-0.237; p=0.025), RE-Emotional roles limitation (β=-0.224; p=0.034), and MH-Mental health (β=-0.358; p=0.001). Consequently, scores for the MSC-Mental component score (β=-0.299;

Table 8. Regression analysis and factors associated with the 8-dimensional SP-36 health survey

		Univariate		Adjusted				
	Parameter	ex-POWs/ Control	ex-POWs/ Control	AGE	ES	ED	MS	SEC
PF	β	0.073	0.033	-0.142	0.039	-0.048	-0.052	0.213
	95% CI	-0.14-0.28	-0.2-0.27	-0.36-0.07	-0.21-0.29	-0.27-0.18	-0.28-0.17	-0.03-0.46
	p	0.492	0.784	0.196	0.756	0.672	0.648	0.086
RP	β	0.049	0.044	-0.085	-0.107	0.089	-0.012	0.165
	95% CI	-0.16-0.26	-0.2-0.28	-0.3-0.13	-0.36-0.14	-0.14-0.32	-0.24-0.22	-0.08-0.41
	p	0.644	0.717	0.444	0.401	0.438	0.920	0.188
BP	β	0.203	0.191	0.022	-0.196	0.197	0.014	0.177
	95% CI	0-0.41	-0.04-0.42	-0.19-0.23	-0.44-0.04	-0.02-0.41	-0.21-0.23	-0.06-0.41
	p	0.055	0.124	0.638	0.105	0.111	0.750	0.010
GH	β	0.221	0.174	-0.048	-0.193	0.171	0.034	0.307
	95% CI	0.01-0.43	-0.05-0.4	-0.25-0.16	-0.43-0.04	-0.04-0.38	-0.18-0.25	0.08-0.54
	p	0.036*	0.101	0.837	0.109	0.076	0.901	0.010*
VT	β	0.174	0.122	-0.008	-0.230	0.088	0.048	0.343
	95% CI	-0.03-0.38	-0.1-0.35	-0.21-0.2	-0.47-0.01	-0.13-0.3	-0.17-0.26	0.11-0.58
	p	0.101	0.285	0.939	0.057	0.417	0.659	0.004*
SF	β	0.237	0.240	-0.014	-0.134	0.128	-0.074	0.173
	95% CI	0.03-0.44	0.01-0.47	-0.23-0.2	-0.38-0.11	-0.09-0.35	-0.29-0.15	-0.07-0.41
	p	0.025*	0.042*	0.899	0.275	0.249	0.509	0.153
RE	β	0.224	0.155	0.193	-0.088	0.070	-0.068	0.242
	95% CI	0.02-0.43	-0.07-0.38	-0.01-0.4	-0.33-0.15	-0.14-0.28	-0.28-0.15	0.01-0.48
	p	0.034*	0.177	0.067	0.462	0.520	0.535	0.043*
MH	β	0.358	0.270	0.105	-0.090	0.174	0.041	0.236
	95% CI	0.16-0.56	0.06-0.48	-0.09-0.3	-0.32-0.14	-0.03-0.38	-0.16-0.25	0.01-0.46
	p	0.001*	0.014*	0.292	0.429	0.093	0.694	0.037*
PCS	β	0.179	0.144	-0.099	-0.153	0.135	-0.010	0.301
	95% CI	-0.03-0.39	-0.08-0.37	-0.31-0.11	-0.39-0.09	-0.08-0.35	-0.23-0.21	0.07-0.54
	p	0.092	0.211	0.345	0.205	0.214	0.925	0.012*
MCS	β	0.299	0.234	0.107	-0.158	0.132	-0.031	0.302
	95% CI	0.1-0.5	0.02-0.45	-0.09-0.31	-0.39-0.07	-0.08-0.34	-0.24-0.18	0.08-0.53
	p	0.004*	0.036*	0.292	0.176	0.210	0.768	0.010*
TSF36	β	0.267	0.211	0.016	-0.169	0.145	-0.024	0.328
	95% CI	0.06-0.47	-0.01-0.43	-0.19-0.22	-0.4-0.06	-0.06-0.35	-0.23-0.19	0.1-0.56
	p	0.011*	0.060	0.872	0.149	0.170	0.823	0.005*

β - standardized beta coefficient;   CI - Confidence interval;   PF - Physical functioning;   RP - Physical roles limitation; BP - Bodily pain;   GH - General health;   VT – Vitality;   SF - Social functioning;   RE - Emotional roles limitation; MH - Mental health;   PCS - Physical component score;   MCS - Mental component score;   TSF36 - Total SF-36; ES - Employment status;   ED – Education;   MS - Marital status;   SEC - Socioeconomic status;   * p<0.05

p=0.004) and TSF36-Total SF-36 (β=-0.267; p=0.011) were better in the ex-POWs group. However, in the adjusted linear regression analysis, captivity remained significant predictor only for the SF-Social functioning (β=-0.240; p=0.042), MH-Mental health (β=-0.270; p=0.014), and MSC-Mental component score (β=-0.234; p=0.036), while the best predictor became socio-economic status. Low socioeconomic status was a significant predictor of low self-assessed scores for the GH-General health (β=-0.307; p=0.010), VT-Vitality (β=-0.343; p=0.004), RE-Emotional roles limitation (β=-0.242; p=0.043), and MH-Mental health (β=-0.236; p=0.037), and consequently for the PCS-Physical component score (β=-0.301; p=0.012), MSC-Mental component score (β=-0.302; p=0.010) and TSF36-Total SF-36 score (β=-0.328; p=0.005).

DISCUSSION

Sociodemographic Characteristics

In this study, the Croatian war veterans were divided into two groups, considering whether they were ex-POWs or not (control group). All participants were males, most are now aged between 45 and 64 years, and have a high school level of education. A significant difference was in the marital status. The number of married subjects in the ex-POWs group was significantly higher in relation to the control group which is characterized by a large number of divorced persons. Studies dealing with the functioning of veterans in different domains of life point to the difficult functioning of patients with PTSD. Studies of the interpersonal functioning of PTSD patients point to difficulties in marital and family functioning, or difficulties in emotional relationships (Amaya-Jackson et al. 1999). One of these studies confirms that 70% of veterans have disturbed partnerships (Riggs et al. 1998) and that veterans with PTSD are more inclined to break partner relationships (Kulka et al. 1990). Besides impaired functioning within interpersonal, marital and emotional relationships, PTSD is also associated with disrupted work functioning. Veterans suffering from PTSD are more likely to lose their jobs or become homeless (Magruder et al. 2004, Smith et al. 2005, O'Connell et al. 2008). In this study, low socioeconomic status was significantly more prevalent in the control group, which can be explained by a larger number of unemployed persons in this group indicating a more regular income of the ex-POWs.

The Intensity of PTSD Symptoms

PTSD symptoms were more pronounced in the control group. This is contrary to the expectations and results of some other investigations, where more intense PTSD symptoms were detected in the ex-POWs many years after detention. A comparison study of Israeli ex-POWs 18 and 30 years after captivity with veterans with only combat experience, points to the more significant intensity of PTSD symptoms in ex-POWs (Solomon et al. 2008). Similar results were found in studies dealing with the consequences of captivity on mental health (Engdahl et al. 1998). In our study, we did not deal with individual traumatic events, and some research suggests that the severity of PTSD is associated with the number of traumatic experiences (Marušić et al. 1995). Many studies show a high rate of morbidity among ex-POWs (e.g. World War II and Vietnam War ex-POWs) compared to veterans who were not detainees and had a combat experience (Nice et al. 1996).

Comorbidity

PTSD is not only a mental disorder but is associated with an increased risk for physical illness and early mortality (McFarlane 2010). Frequent physical comorbidity with PTSD has been confirmed in many studies in which the results point to more frequent physical illness in PTSD veterans compared to those without PTSD or in comparison with the general population (Boscarino 1997, Otoole & Cats 2008). The results of our research indicate the highest incidence of musculoscteletal, cardiovascular, and gastrointestinal diseases in both subject groups. Regarding somatic comorbidity, endocrine and metabolic diseases were the only group of diseases with a significant difference between groups, and with the higher incidence in the group of ex-POWs. Neurological diseases occurred more frequently in the control group.

Increased risk for cardiovascular diseases associated with PTSD has been confirmed in other studies. Edmonson et al. (2013) have described a high prevalence of myocardial infarction and increased risk of death from cardiovascular diseases in patients with PTSD. Somatic comorbidity research in veterans 15 years after the war also point to frequent comorbidity of PTSD with cardiovascular diseases with other physical diseases such as musculoskeletal, dermatological, pulmonary, gastrointestinal and metabolic disorders (Britvić et al. 2015). A study involving hospitalized Croatian veterans suffering from PTSD describes diabetes, hypertension, ulcerative disease and hyperlipidemia as the most common comorbid physical conditions (Filaković et al. 1997). Jakovljević et al. (2007) confirm the association between PTSD and metabolic disorders. A large US study of comorbidity of anxiety disorders with physical illness indicates high PTSD comorbidities, particularly with neurological, immune, cardiovascular, and bone and joint diseases (Sareen et al. 2005). Frequent comorbidity is also caused by the bad living habits in veterans suffering from PTSD such as excessive smoking, alcohol consumption, inadequate physical activity and excessive body weight (Zen et al. 2012, Bartoli et al. 2015). Studies investigating the physical health of ex-POWs show different results, some of which point to a possible manifestation of the consequences for physical health several decades after captivity (Page & Brass 2001). In addition, some associate detention conditions (treatment of detainees, poor hygiene and nutrition) with long-lasting detrimental effects on the health of ex-

POWs (Engdahl et al. 1993). A survey involving Australian World War II detainees showed a significant deterioration of physical health, more physical symptoms, and increased usage of drugs. Ex-POWs were more likely to have gastrointestinal, musculoskeletal, and cognitive disorders, and more extrapyramidal signs associated with ataxia (Creasey et al. 1999). A study also conducted on Australian POWs, and deals with the physical health consequences of injuries and torture during captivity, suggests the more frequent occurrence of the chronic peripheral nerve disorders, spinal and joint diseases, and increased prevalence of peptic ulcer disease (Venn & Guest 1991). The high incidence of the duodenal ulcer at World War II ex-POWs has been observed even 40 years after detention, and is associated with losing body mass and nutritional deficit disorder during captivity (Tennant et al. 1986).

Health-Related Quality of Life (HRQoL)

In this study, HRQoL was assessed with an SF-36 questionnaire, which is often used in epidemiological studies to evaluate the health and impact of various diseases on the functioning and QoL of a particular population (Higgins & Campanera 2011). Ex-POWs and the control group were compared through the eight dimensions of health summarized in two profiles: mental and physical health. The results showed that non-detainees had lower scores for mental health profile and overall HRQoL. The influence of PTSD on HRQoL and functionality across different functional areas has been proven often (Holbrook et al. 2001, Rapaport et al. 2005). The HRQoL is the subject of many types of research in the last two decades, and many deal with the QoL of veterans suffering from PTSD (Kučukalić et al. 2007). Lower HRQoL in patients with PTSD is also caused by frequent comorbidities and poor living habits, alcohol consumption, and smoking (Schnurr et al. 2006, Aversa et al. 2012). One of the studies describes lower HRQoL in veterans suffering from PTSD in comorbidity with chronic physical pain compared to those without PTSD or without chronic pain (Braš et al. 2011).

The results of correlation analysis in our study showed a significant correlation between several diagnostic groups of the physical diseases and HRQoL. There was a significant association of deteriorated HRQoL with the cardiovascular, gastrointestinal, neurological and musculosceletal diseases. The cardiovascular diseases affected physical functioning and intensity of bodily pain, while gastrointestinal diseases affected the general health impression, vitality, and social functioning. The intensity of bodily pain and poor perception of the vitality and mental health were also associated with the neurological diseases. Difficult physical functioning was also associated with musculosceletal diseases. In our research, it was not confirmed that ex-POWs had significantly more physical diseases compared with non-detained veterans, which is contrary to the results of some other studies (Hourani & Hilton 2002).

Non-detainees have shown poorer social functioning and emotional difficulties with the pronounced PTSD symptoms related to intrusion, negative alterations in cognitions and mood, and alterations in arousal and reactivity. Many studies have been focused on the influence of different clusters of PTSD symptoms on functioning and QoL (Taylor et al. 2006). PTSD has been confirmed as a significant predictor of impaired functioning, or deteriorated HRQoL, especially in the mental health component. The results of a Canadian study comparing veterans with PTSD and those without PTSD confirmed the significant association of PTSD and impaired QoL, especially in the dimension that relates to the sense of emotional well-being. In the same study, the QoL in the profile of physical health was not significantly impaired (Richardson et al. 2008). Other studies indicate an association between poor health and HRQoL in both component, physical and mental (Malik et al. 1999, Baret et al.2002).

The results of regression analysis in our study, which examined the relationship between individual sociodemographic characteristics and dimensions of health, clearly pointed to low socioeconomic status as a significant predictor of poor health and HRQoL in its entirety and in individual dimensions. The low socioeconomic status was also related to more intense PTSD symptoms among subjects. Ex-POWs assessed their health as better compared to the control group, which suggests that socioeconomic indicators could be better predictors of HRQoL than exposure to detention trauma. Such results point to the importance of veterans' post-war care and social support. As the HRQoL of ex-POWs was better than in non-detained veterans, perhaps more social support was provided to ex-POWs through various projects and support programs after release from captivity. In this paper, we did not deal with the issues of social support, but its relevance is indicated by the results of other studies (Hunt & Robbins 2001, Klarić et al. 2008, Yazicioğlu et al. 2006). The adequate psychosocial assistance is an important aspect of positive action on the post-traumatic environment and can prevent PTSD symptoms or other traumatic psychiatric disorders (Kozarić-Kovačić et al. 1995).

Limitations of the study

The study sample size was limited by the number of ex-POWs treated for PTSD in the institution where the survey was conducted. Particular traumatic events, and the duration of detention were not considered. The greatest limitation of the study was the lack of information on possible differences in the types and quality of post-war social support among ex-POWs and non-detained veterans. The availability of this information could be crucial in overcoming the symptoms of PTSD and ensuring an adequate level of QoL. In this paper, we did not deal with psychiatric comorbidity and its influence on the HRQoL.

CONCLUSIONS

According to the results of our study, the experience of war captivity did not cause a long-term higher intensity of PTSD symptom, greater physical comorbidity, nor significantly impaired HRQoL compared to non-detained veterans. Low socioeconomic status has proved to be the most significant predictor of poorer QoL, impaired functioning, and physical comorbidity. Since low socioeconomic status was more pronounced in the non-detained veterans, their QoL was also more impaired. PTSD was associated with the HRQoL, whether the veterans were ex-POWs or not. Further research will provide new insight into the predictors of the HRQoL of veterans of the Croatian Homeland War.

Contribution of individual authors:

Melita Jukić: study conception and design, data acquisition, analysis and interpretation of data, drafting manuscript;

Pavo Filaković, Ivan Požgain & Trpimir Glavina: study conception and design, critical revision.

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