

# A CROSS-SECTIONAL STUDY OF PSYCHIATRIC COMORBIDITY IN CROATIAN HOMELAND WAR VETERANS WHO WERE HELD AS PRISONERS OF WAR AND ARE AFFECTED BY POSTTRAUMATIC STRESS DISORDER

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## SUMMARY

**Background:** As a extremely traumatic experience, captivity may cause other mental disorders in addition to posttraumatic stress disorder, which is highly prevalent among ex-prisoners of war, and which often occurs in comorbidity with at least one other mental disorder. This objective of this study is to identify the incidence of comorbid mental disorders in Homeland war veterans ex-prisoners of war affected by posttraumatic stress disorder, as well as to identify the factors that influenced psychiatric comorbidity.

**Subjects and methods:** The study sample comprised 264 subjects, all of whom were Croatian Homeland War veterans with combat experience in the defence of the Republic of Croatia, and all of whom fulfilled clinical criteria for posttraumatic stress disorder at the time of the study. The subjects were divided into two groups: the experimental group was composed of ex-prisoners of war, and the control group of veterans who had never been prisoners of war. The methods of sociodemographic questionnaire, posttraumatic stress disorder self-report checklist and the Harvard Trauma Questionnaire were used in the study. Psychiatric comorbidity data were retrieved from the subjects' anamnesis and medical records.

**Results:** The results showed that ex-prisoners of war were exposed to a statistically much higher number of traumatic events, and had a significantly higher total number of psychiatric comorbidities ( $p < 0.01$ ) than the control group. The incidence of acute and transient psychotic disorders, generalized anxiety disorders and psychological and behavioural factors associated with disorders or diseases classified elsewhere was significantly higher among ex-prisoners of war. There was no statistically significant difference in overall posttraumatic stress disorder intensity between the two groups ( $p < 0.05$ ).

**Conclusions:** The results of the study confirm our hypothesis that the incidence of psychiatric comorbidity is higher in ex-prisoners of war.

**Key words:** posttraumatic stress disorder - Croatian Homeland War veterans - ex-prisoners of war - psychiatric comorbidity

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## INTRODUCTION

Captivity is one of the most traumatic human experiences (Herman 1992). The number of persons who were held as prisoners at enemy camps during the Homeland War in the Republic of Croatia is measured in tens of thousands, and this number includes Croatian veterans who had actively participated in the defence of the Republic of Croatia (Rehak 2000).

Studies dealing with the trauma experienced by prisoners of war underline that this is a specific type of traumatic situation that differs substantially from the traumatization that occurs while participating in combat activities (Ursano 1996). Even though participation in combat activities threatens a person's physical integrity and life too, unlike in captivity, the threat is not directed against a specific person. Captivity, on the other hand, is a deeply personal trauma that occurs between the victim and their abuser (Kardiner & Spiegel 1947, Neria et al. 2000, Solomon et al. 1993). In combat, soldiers are

surrounded by fellow-fighters and commanding officers, and they have weapons, tools and all other required equipment, including medical care. Social support and contacts between fellow-fighters are of tremendous significance in coping with combat-related stressors (Neria et al. 2000, Solomon et al. 1987, Steiner & Neumann 1978).

Rather than continue an existing trauma, captivity after exposure to combat activities represents a new and entirely different type of trauma (Ursano 1996). Captives are exposed to prolonged and repeated traumatization and to many different types of stressors. Torture, Isolation, humiliation and the cumulative effect of different stressors can result in a range of mental consequences, including the development of posttraumatic stress disorder (PTSD), which the studies have shown can occur with a high lifetime prevalence (Kluznik et al. 1986).

Posttraumatic stress disorder (PTSD) is the most frequent disorder occurring as a result of exposure to traumatic events. The International Classification of Disease

ses (ICD 10) groups its characteristic symptoms into three clusters, whereas the fifth and latest edition of the Diagnostic Statistical Manual of Mental Disorders (DSM 5) groups them into four clusters (World Health Organization 1993, American Psychological Association 2013). Symptom clusters under the ICD 10, which is used in everyday clinical practice in the Republic of Croatia, are as follows: (1) re-experiencing of the traumatic event, (2) avoidance behaviours (avoidance of all trauma reminders), (3) hyperarousal and inability to recall important facts about the traumatic event (World Health Organization 1993). Under the DSM 5, in addition to intrusive symptoms, which relate to the re-experiencing of the trauma in various ways, and to avoidance behaviour symptoms and hyperarousal symptoms, there is a cluster that relates to mood changes and cognitive changes (American Psychological Association 2013).

There are many risk factors for the occurrence and persistence of PTSD. Some of the most important are vulnerability of personality, intensity and duration of the traumatic situation, posttraumatic environment (especially social support), and stressors experienced later in life (Brewin et al. 2000, Marmar et al. 2006, Shalev 1996, Yehuda et al. 1991).

A number of studies confirm a high lifetime prevalence of PTSD among ex-prisoners of war (Başoğlu et al. 1994, Sutker et al. 1993). Some other mental disorders in addition to PTSD also occur as the result of captivity. Studies have suggested a high prevalence of depression, alcoholism and abuse of other addictive substances, and anxiety disorders (Behar 1984, Engdahl et al. 1993, Page et al. 1991, Sierles et al. 1983). Studies have also indicated that PTSD often occurs in comorbidity with at least one, and often with two or more mental disorders, but also with physical diseases and disorders and it can be concluded that it is a multi-systemic, mental and somatic disorder that can significantly complicate the therapeutic approach (Dadić-Hero et al. 2009, Jakovljević et al. 2006, Kessler et al. 1995, Richardson et al. 2017). Research highlights the importance of comorbidities with physical illness and somatoform and functional syndromes, as well as increased rates of premature mortality (Kapfhammer 2018). Comorbidity of PTSD with other mental disorders may increase the risk of developing comorbid somatic disorders. For example, comorbidity of PTSD with depression has been shown to increase the risk of developing metabolic syndrome (Jakovljević et al. 2008). Studies analysing the reasons for such high comorbidity of PTSD with other psychological disorders have yielded mixed results. While some studies have found PTSD to be a predisposition for the development of other disorders (Brown et al. 2001, Erickson et al. 2001, Mellman et al. 1992), others have found that persons who had suffered from other mental disorders prior to developing PTSD are at a heightened risk of developing PTSD after exposure to a traumatic experience (King et al. 2009, O'Toole et al. 1998). Study results have also

shown that PTSD and other mental disorders, like depression, for instance, can occur at the same time (Shalev et al. 1998).

This study aimed to establish the incidence of comorbid mental disorders in Homeland War veterans affected by PTSD with respect to PTSD intensity, sociodemographic characteristics, and self-assessed social support and exposure to traumatic events. Our hypothesis was that the incidence of these disorders is higher in ex-prisoners of war. It is expected that the results of this research will contribute to the field of medicine dealing with veterans' health. In addition, the results of the study will improve the existing knowledge of what factors, in addition to war trauma, influence the mental health of this population and, in particular, the vulnerable population of ex-prisoners of war decades after exposure to war trauma. This study was a part of a larger study of comorbidity and health-related quality of life (Jukić et al. 2019).

## SUBJECTS AND METHODS

### Subjects

The study sample comprised 264 subjects, all of whom were Croatian Homeland War veterans with combat experience in the defence of the Republic of Croatia. All subjects received inpatient, outpatient or day care treatment for PTSD at the Psychiatric Department of the National Memorial Hospital Vukovar in the period 2012-2017, and all fulfilled the clinical criteria for PTSD under the ICD 10 at the time of the study. The study was carried out between 2018 and 2020. The subjects were divided into two groups, one comprising subjects who were held at enemy camps as prisoners-of-war, and the other comprising subjects who did not have this experience. The experimental group was composed of Croatian veterans who were prisoners of war during the Homeland War, and the control group of Croatian veterans who were not prisoners of war. Since the number of Croatian veterans who were not prisoners of war during the Homeland War is much higher, they were chosen randomly (every third veteran who was not prisoner of war). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association 2013) and approved by the Ethics Committee of the Faculty of Medicine at the Josip Juraj Strossmayer University in Osijek and the Ethics Committee of the National Memorial Hospital Vukovar.

### Methods

Medical history data was taken for each subject, a clinical interview was conducted, and it was determined if the subject fulfilled the criteria for PTSD under the ICD 10 at the time of the study (World Health Organization 1993). Psychiatric comorbidity information for the past five years was also collected from medical history data and the data from the available medical records, with the patients' consent.

A sociodemographic questionnaire, the PTSD checklist (PCL 5) and the Harvard Trauma Questionnaire were used in this study.

The sociodemographic questionnaire, designed specifically for the purposes of this study, included questions about the subject's age, work status, education, marital status, and self-assessed material status.

The PCL-5 is a self-assessment instrument whereby the subject assesses specific PTSD symptoms. The checklist comprises 20 affirmative statements that the subjects are asked to rate on a scale from 0 to 4, depending on how well the statement corresponded to the subject's mental state in the past month, and the extent of difficulties that a given symptom or complaint specified in the questionnaire caused for the subject in the past month. 0 stands for no complaint, and four (4) stands for the maximum intensity of complaint. The higher the score, the greater the difficulties that the subject experienced. In addition to the total score, it is possible to obtain results for each of the PTSD symptom clusters. Some sections, or statements, follow individual PTSD criteria under the DSM 5. The higher the score (both the individual score and the collective score for a cluster of symptoms), the higher the intensity of PTSD, or a cluster of PTSD symptoms. The maximum score is 80. A total score of 31 is the optimal lower limit for a PTSD diagnosis, and it was used as one of the criteria for the inclusion or exclusion of subjects. Past studies have shown that this instrument has valid psychometric characteristics and can be used to detect PTSD in the military and veteran populations (Bovin et al. 2016, Wortmann et al. 2016).

The Harvard Trauma Questionnaire comprises four sections relating to traumatic events experienced by the subject, self-assessment of the most traumatic experiences, traumatic brain injuries, and trauma-related psychosocial symptoms (Allden et al. 1998). This study used the first section of the Harvard Trauma Questionnaire, which contains a checklist of traumatic events. Subjects indicated whether they have been exposed to the listed experiences. Some questions refer to witnessing the suffering of others, and other are related to the assessment of social support. The internal consistency of the questionnaires was evaluated with Cronbach's alpha coefficients. The Cronbach's alpha for the questionnaire on perceived social support was 0.71 and was regarded as satisfactory. The Cronbach's alpha coefficients for PCL-5 subscales were 0.90, 0.87, 0.85, and 0.86 for the B, C, D, and E subscales, respectively.

### Statistical analysis

The Kolmogorov-Smirnov test was used to assess the normality of data distribution. Considerable deviations from the normal distribution were identified for all variables. Categorical data was represented by absolute and relative frequencies, whereas numerical data was represented by measures of central tendency (arithmetic mean and median) and variability (standard deviation and the outlier boundaries of the interquartile range). The chi-squared test ( $\chi^2$ ) was used to analyse the differences

between categorical variables, and the Mann-Whitney U test was used to analyse the differences in numerical variables between the two independent groups. Finally, Spearman's rank-order correlation coefficient ( $\rho$ ) was used to evaluate the correlation between the variables.

### RESULTS

Table 1 shows the distribution of subjects by general sociodemographic characteristics and social support. A total of 264 Croatian veterans affected by PTSD participated in the study, of whom 116 (43.9%) had been held as prisoners of war during the Homeland War, and the remaining 148 (56.1%) were the control group. The chi-squared test ( $\chi^2$ ) identified a statistically significant difference ( $p < 0.05$ ) between the two groups in all sociodemographic characteristics, with the exception of education. A statistically significant difference in age was identified between the experimental and the control group of subjects ( $\chi^2 = 13.589$ ,  $p = 0.004$ ). The number of subjects who belonged to the oldest age group ( $n = 12$ , 10.3%) was significantly higher among ex-prisoners of war. Meanwhile, the number of subjects under 45 years of age in this group ( $n = 4$ , 3.5%) was much lower than in the control group ( $n = 4$ , 2.7% > 65 years and  $n = 20$ , 13.5% > 45 years). The number of retirees was significantly higher among the ex-prisoners of war ( $n = 100$ , 86.2%) than in the control group ( $n = 88$ , 59.5%). The number of subjects who were either unemployed ( $n = 28$ , 18.9%) or employed ( $n = 22$ , 21.6%) was much higher in the control group ( $\chi^2 = 24.336$ ,  $p < 0.001$ ). A significantly higher number of ex-prisoners of war ( $n = 102$ , 87.9%) was married compared to the control group ( $n = 85$ , 57.4%). The latter group included a notably higher number of divorcees ( $n = 20$ , 13.5%) and unmarried subjects ( $n = 40$ , 27.0%) ( $\chi^2 = 30.991$ ,  $p < 0.001$ ). The control group had a significantly worse material status ( $\chi^2 = 10.18$ ,  $p = 0.006$ ), with 48 (32.4%) subjects reporting below-average incomes in comparison with the other group, where 18 (15.5%) subjects reported below-average incomes. In terms of social support, the chi-squared test ( $\chi^2$ ) identified a statistically significant difference ( $p < 0.05$ ) between the two groups ( $\chi^2 = 13.140$ ,  $p < 0.001$ ), given that 108 (73.0%) subjects in the control group assessed the social support they received as low, in relation to 61 (52.6%) ex-prisoners of war.

Table 2 shows the results of the PTSD intensity analysis under the PCL-5 questionnaire and the total number of traumatic events under the Harvard Trauma Questionnaire. It is evident from the results that there was no statistically significant difference in the total PCL-5 questionnaire score between the two groups ( $U = 8416$ ,  $p = 0.785$ ,  $\bar{x}$  (SD) = 48.0 (12.8)). The Mann-Whitney U test identified a statistically significant difference in the number of traumas that the subjects had been exposed to ( $U = 13376$ ,  $p < 0.001$ ). In total, ex-prisoners of war were exposed to a higher number of traumatic events (median  $M_e = 26$ , interquartile range  $IQR = 23-30$ ) than the control group ( $M_e = 21$ ,  $IQR = 18-24$ ).

**Table 1.** Distribution of subjects by general sociodemographic characteristics and social support

| Sociodemographic characteristics | Ex-prisoners of war |      | Control group |      | $\chi^2$ * | $\chi^2_{Crit. (DF)}$ ** | P      |
|----------------------------------|---------------------|------|---------------|------|------------|--------------------------|--------|
|                                  | n                   | %    | n             | %    |            |                          |        |
| Age                              |                     |      |               |      | 13.589     | 7.815 (3)                | 0.004  |
| <45                              | 4                   | 3.5  | 20            | 13.5 |            |                          |        |
| 45-54                            | 56                  | 48.5 | 68            | 46.0 |            |                          |        |
| 55-64                            | 44                  | 37.9 | 56            | 37.8 |            |                          |        |
| >64                              | 12                  | 10.3 | 4             | 2.7  |            |                          |        |
| Work status                      |                     |      |               |      | 24.336     | 5.991 (2)                | <0.001 |
| Unemployed                       | 4                   | 3.4  | 28            | 18.9 |            |                          |        |
| Employed                         | 12                  | 10.3 | 32            | 21.6 |            |                          |        |
| Retired                          | 100                 | 86.2 | 88            | 59.5 |            |                          |        |
| Education                        |                     |      |               |      | 0.785      | 5.991 (2)                | 0.675  |
| Primary school                   | 23                  | 19.8 | 24            | 16.2 |            |                          |        |
| Secondary school                 | 79                  | 68.1 | 108           | 73.0 |            |                          |        |
| University                       | 14                  | 12.1 | 16            | 10.8 |            |                          |        |
| Marital status                   |                     |      |               |      | 30.991     | 7.815 (3)                | <0.001 |
| Widower                          | 2                   | 1.7  | 3             | 2.0  |            |                          |        |
| Divorced                         | 6                   | 5.2  | 20            | 13.5 |            |                          |        |
| Unmarried                        | 6                   | 5.2  | 40            | 27.0 |            |                          |        |
| Married                          | 102                 | 87.9 | 85            | 57.4 |            |                          |        |
| Material status                  |                     |      |               |      | 10.180     | 5.991 (2)                | 0.006  |
| Below-average                    | 18                  | 15.5 | 48            | 32.4 |            |                          |        |
| Average                          | 86                  | 74.1 | 90            | 60.8 |            |                          |        |
| Above-average                    | 12                  | 10.3 | 10            | 6.8  |            |                          |        |
| Social support                   |                     |      |               |      | 13.140     | 5.991 (2)                | 0.001  |
| Low                              | 61                  | 52.6 | 108           | 73.0 |            |                          |        |
| Medium                           | 38                  | 32.8 | 32            | 21.6 |            |                          |        |
| High                             | 17                  | 14.7 | 8             | 5.4  |            |                          |        |

\*  $\chi^2$  - chi-square value; \*\* DF - degrees of freedom

**Table 2.** Results of PTSD intensity analysis under the PCL-5 questionnaire and the total number of traumatic events under the Harvard Trauma Questionnaire

|                         | Ex-prisoners of war |                  | Control group  |                  | U***  | P      |
|-------------------------|---------------------|------------------|----------------|------------------|-------|--------|
|                         | $\bar{x} (SD)$ *    | $M_e (IQR)$ **   | $\bar{x} (SD)$ | $M_e (IQR)$      |       |        |
| Total PCL-5             | 47.1 (10.6)         | 49.0 (37.0-52.0) | 48.0 (12.8)    | 46 (38.0-57.0)   | 8416  | 0.785  |
| Total number of traumas | 26.0 (5.5)          | 26.0 (23.0-30.0) | 20.4 (4.8)     | 21.0 (18.0-24.0) | 13376 | <0.001 |

\*  $\bar{x} (SD)$  - arithmetic mean (standard deviation); \*\*  $M_e (IQR)$  - median (interquartile range); \*\*\*Mann-Whitney U test

**Table 3.** Total number of psychiatric comorbidities per subject

| Mental disorders | Ex-prisoners of war |      | Control group |      | $\chi^2$ * | $\chi^2_{Crit. (DF)}$ ** | P      |
|------------------|---------------------|------|---------------|------|------------|--------------------------|--------|
|                  | n                   | %    | n             | %    |            |                          |        |
| None             | 20                  | 17.2 | 72            | 48.7 |            |                          |        |
| One              | 32                  | 27.6 | 43            | 29.1 | 37.585     | 5.991 (2)                | <0.001 |
| Two and more     | 64                  | 55.2 | 33            | 22.3 |            |                          |        |

\*  $\chi^2$  - chi-square value; \*\*DF - degrees of freedom

The total number of comorbid mental disorders is shown in Table 3. The chi-squared test ( $\chi^2$ ) identified a statistically significant difference ( $p < 0.001$ ) in the number of mental disorders per subject between the two groups. 64 (55.2 %) ex-prisoners of war and 33 (22.3%) subjects in the control group were affected by two or more mental disorders. The number of subjects who did not have a psychiatric comorbidity was the highest in the control group ( $n = 72$ , 48.7%). Only 20 (17.2%) ex-prisoners of war were not affected by a mental disorder.

Table 4 shows a distribution of subjects by psychiatric comorbidities. Ex-prisoners of war had a statistically much higher number of acute and transient psychotic disorders (F23) ( $\chi^2 = 7.643$ ,  $p = 0.006$ ), generalized anxiety disorders (F41.1) ( $\chi^2 = 51.457$ ,  $p < 0.001$ ) and psychological and behavioural factors associated with disorders or diseases classified elsewhere (F54) ( $\chi^2 = 12.988$ ,  $p < 0.001$ ) than the control group. No statistically significant differences were identified between the ex-prisoners of war and the control group with respect to other mental disorders.

**Table 4.** Distribution of subjects by psychiatric comorbidities

| Mental disorders** | Ex-prisoners of war |      | Control group |      | $\chi^2$ * | P      |
|--------------------|---------------------|------|---------------|------|------------|--------|
|                    | n                   | %    | n             | %    |            |        |
| F10                | 32                  | 27.6 | 28            | 18.9 | 2.782      | 0.095  |
| F13                | 12                  | 10.3 | 8             | 5.4  | 2.266      | 0.132  |
| F23                | 8                   | 6.9  | 1             | 0.7  | 7.643      | 0.006  |
| F32/33             | 64                  | 55.1 | 64            | 43.2 | 3.705      | 0.054  |
| F41.0              | 40                  | 34.5 | 36            | 24.3 | 3.273      | 0.070  |
| F41.1              | 72                  | 62.1 | 28            | 18.9 | 51.457     | <0.001 |
| F42                | 8                   | 6.9  | 4             | 2.7  | 2.636      | 0.104  |
| F44                | 4                   | 3.5  | 3             | 2.0  | 3.841      | 0.476  |
| F45                | 8                   | 6.9  | 8             | 5.4  | 0.254      | 0.614  |
| F54                | 28                  | 24.1 | 12            | 8.1  | 12.998     | <0.001 |

\*  $\chi^2$  - chi-square value; \*\* F10 - Chronic alcoholism and harmful use of alcohol, F13 - Mental and behavioural disorders due to use of sedatives or hypnotics – harmful use and dependence syndrome, F23-Acute and transient psychotic disorders, F32/33 - Depressive episodes/recurrent depressive disorders, F41.0 - Panic disorder, F41.1 - Generalized anxiety disorders (GAD), F42 - Obsessive-compulsive disorder, F44 - Dissociative disorders, F45 - Somatoform disorder, F54 - Psychological and behavioural factors associated with disorders or diseases classified elsewhere (“psychosomatic”)

**Table 5.** Spearman’s correlations ( $\rho$ ) between the data on sociodemographic characteristics, social support, captivity experience, total number of traumatic events under the Harvard Trauma Questionnaire, PTSD intensity under the PCL-5 questionnaire, and mental comorbidities

|       | F10     | F13     | F23     | F32/33   | F41.0    | F41.1   | F42      | F44    | F45      | F54     | TMD      | TPCL5    |
|-------|---------|---------|---------|----------|----------|---------|----------|--------|----------|---------|----------|----------|
| CAP   | 0.103   | 0.093   | 0.170** | 0.118    | 0.111    | 0.441** | 0.100    | 0.044  | 0.031    | 0.222** | 0.346**  | -0.017   |
| SOCS  | 0.006   | 0.001   | -0.061  | -0.055   | -0.050   | -0.142* | -0.209** | 0.009  | -0.187** | -0.158* | 0.048    | -0.205** |
| AGE   | -0.037  | -0.005  | -0.090  | 0.028    | -0.025   | 0.122*  | 0.150*   | 0.024  | 0.036    | 0.231** | 0.104    | 0.071    |
| WORS  | 0.018   | 0.180** | 0.078   | -0.125*  | -0.049   | -0.047  | -0.002   | -0.032 | -0.124*  | 0.077   | -0.025   | -0.118   |
| EDU   | -0.071  | 0.032   | -0.057  | -0.051   | -0.128*  | -0.023  | 0.160**  | 0.149  | -0.178** | 0.210** | -0.008   | -0.062   |
| MARS  | -0.049  | 0.038   | 0.061   | -0.163** | -0.090   | 0.138*  | -0.053   | -0.026 | 0.041    | -0.098  | -0.069   | -0.078   |
| MATS  | -0.083  | -0.010  | 0.065   | -0.218** | -0.283** | -0.024  | 0.104    | 0.057  | -0.221** | 0.007   | -0.163** | -0.283** |
| TRE   | 0.216** | 0.242** | -0.046  | 0.207**  | 0.125*   | 0.431** | 0.088    | 0.081  | -0.057   | 0.251** | 0.382**  | 0.043    |
| TPCL5 | 0.209** | 0.062   | 0.239** | 0.409**  | 0.164**  | 0.239** | 0.002    | -0.104 | 0.072    | -0.142  | 0.248**  | -        |

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; CAP - Captivity, SOCS - Social support, AGE - Age, WORS - Work status, EDU - Education, MARS - Marital status, MATS - Material status, TRE - Number of traumatic events, TPCL5 - Total score in TPCL5 test; F10 - Chronic alcoholism and harmful use of alcohol, F13 - Mental and behavioural disorders due to use of sedatives or hypnotics – harmful use and dependence syndrome, F23-Acute and transient psychotic disorders, F32/33 - Depressive episodes/recurrent depressive disorders, F41.0 - Panic disorder, F41.1 - Generalized anxiety disorders (GAD), F42 - Obsessive-compulsive disorder, F44 - Dissociative disorders, F45 - Somatoform disorder, F54 - Psychological and behavioural factors associated with disorders or diseases classified elsewhere (“psychosomatic”), TMD-Total number of mental disorders

Table 5 shows the results of Spearman’s correlation ( $\rho$ ) between the data on sociodemographic characteristics, social support, captivity experience, total number of traumatic events under the Harvard Trauma Questionnaire, PTSD intensity under the PCL-5 questionnaire, and psychiatric comorbidities. The results show a significant negative correlation between the total PCL-5 score on the one hand and social support ( $\rho = -0.205$ ) and material status ( $\rho = -0.283$ ) on the other. A statistically significant correlation was also identified between the total PCL-5 test score and chronic alcoholism and harmful use of alcohol (F10) ( $\rho = 0.209$ ), acute and transient psychotic disorders (F23) ( $\rho = 0.239$ ), depressive episodes/recurrent depressive disorders (F32/33) ( $\rho = -0.409$ ), panic disorder (F41.0) ( $\rho = -0.164$ ), generalized anxiety disorder (F41.1) ( $\rho = 0.239$ ) and the total number of psychiatric comorbidities (TMD) ( $\rho = -0.248$ ).

A significant positive correlation ( $p < 0.01$ ) was also detected between the number of traumatic events the subjects were exposed to and the majority of psychiatric comorbidities: chronic alcoholism and harmful use of alcohol (F10) ( $\rho = 0.216$ ), mental and behavioural disorders due to use of sedatives or hypnotics – harmful use and dependence syndrome (F13) ( $\rho = 0.242$ ), depressive episodes/recurrent depressive disorders (F32/33) ( $\rho = 0.207$ ), generalized anxiety disorder (F41.1) ( $\rho = 0.431$ ), psychological and behavioural factors associated with disorders or diseases classified elsewhere (F54) ( $\rho = 0.251$ ) and the total number of psychiatric comorbidities (TMD) ( $\rho = 0.382$ ). A statistically significant correlation ( $p < 0.01$ ) was identified between captivity and acute and transient psychotic disorders (F23) ( $\rho = 0.170$ ), generalized anxiety disorder (F41.1) ( $\rho = 0.441$ ), psychological and behavioural factors associated with disorders or diseases

classified elsewhere (F54) ( $\rho = 0.222$ ) and the total number of psychiatric comorbidities (TMD) ( $\rho = 0.346$ ). A significant correlation was identified between the level of social support and generalized anxiety disorder (F41.1) ( $\rho = -0.142$ ,  $p < 0.05$ ), obsessive-compulsive disorder (F42) ( $\rho = -0.209$ ,  $p < 0.01$ ), somatoform disorders (F45) ( $\rho = -0.187$ ,  $p < 0.01$ ) and psychological and behavioural factors associated with disorders or diseases classified elsewhere (F54) ( $\rho = -0.158$ ,  $p < 0.05$ ). A statistically significant correlation was also identified between the subjects' age and generalized anxiety disorder (F41.1) ( $\rho = 0.122$ ,  $p < 0.05$ ), obsessive-compulsive disorder (F42) ( $\rho = 0.150$ ,  $p < 0.05$ ) and psychological and behavioural factors associated with disorders or diseases classified elsewhere (F54) ( $\rho = 0.231$ ,  $p < 0.01$ ). The highest correlation was identified between work status and mental and behavioural disorders due to use of sedatives or hypnotics – harmful use and dependence syndrome (F13) ( $\rho = 0.180$ ,  $p < 0.01$ ), and a significant correlation was also identified between the subjects' material status ( $p < 0.01$ ) and depressive episodes/recurrent depressive disorders (F32/33) ( $\rho = -0.218$ ), panic disorder (F41.0) ( $\rho = -0.283$ ), somatoform disorder (F45) ( $\rho = -0.221$ ) and the total number of psychiatric comorbidities (TMD) ( $\rho = -0.163$ ).

## DISCUSSION

The results of this study confirmed our hypothesis that comorbid mental disorders are more common in the group of ex-prisoners of war than in the control group of veterans who have no experience of captivity. In addition, the occurrence of comorbid disorders has been shown to be influenced by a number of factors other than the intensity of trauma and PTSD.

### The influence of the traumatic experience on PTSD intensity and psychiatric comorbidity

A number of factors impact the occurrence, persistence and reactivation of PTSD. Many studies have found the intensity of the trauma the person has been exposed to be the most significant factor. All subjects included in this study were exposed to combat trauma, and the experimental group, as we have pointed out above, was also exposed to the trauma of captivity. Our analysis of the number of traumatic events the subjects were exposed to showed that the ex-prisoners of war were exposed to a statistically much larger number of traumatic events.

Given that both groups included in the study were affected by PTSD at the time of the study, there was no significant difference in overall PTSD intensity. Some of the studies dealing with the domination of individual symptom clusters in the context of disorder intensity have identified a correlation between dominant avoidance behaviour symptoms and lower current PTSD intensity (Betemps et al. 2003). Other studies have underlined avoidance of thoughts and emotions associated with the trauma, exaggerated startle response, and hyperarousal

symptoms as the most significant indicators of current PTSD (Creamer 1989, Foa et al. 1995). A study analysing the correlation between a specific type of trauma and specific PTSD symptom clusters, indicated that there is a correlation between dominant avoidance symptoms and emotional numbness on the one hand and the trauma of captivity on the other, whereas autonomic hyperarousal symptoms correlate with combat trauma. Rape victims presented with more pronounced symptoms of avoidance behaviours, whereas the study had not been able to single out a dominant cluster of symptoms in the refugee population (Henigsberg et al. 2001).

The main objective of this study was to identify psychiatric comorbidity in ex-prisoners of war, and compare it to the control group of veterans who were not ex-prisoners of war. Our hypothesis that ex-prisoners of war have a higher incidence of comorbid mental disorders than the control group was confirmed. Comorbidity was analysed over a period of five years before the study, using data obtained from medical histories and available medical records. Since both groups included in our study were affected by PTSD, both the ex-prisoners of war and the control group presented with a high psychiatric comorbidity rate, but it was statistically much higher in the group comprising ex-prisoners of war than in the control group. In the five-year period in question, 17.2% ex-prisoners of war reported no diagnosed mental disorders apart from PTSD. In the control group, 48.7% subjects reported no comorbid mental disorders. Study results have indicated that the incidence of two or more comorbid mental disorders over the five-year period was significantly higher (55.2 %) among ex-prisoners of war than in the control group (22.3 %). Only 17.2% ex-prisoners of war were affected by no comorbid mental disorders.

Most other studies have compared the prevalence of mental disorders in subjects affected by PTSD against subjects not affected by PTSD. The results of most of these studies have pointed to a higher prevalence of other mental disorders in subjects affected by PTSD than in subjects not affected by PTSD. A study analysing the prevalence of PTSD and other mental disorders in World War II veterans indicated that the prevalence of other mental disorders was higher among ex-prisoners of war who were affected by PTSD at the moment of the study or before. More than a half of the subjects affected by PTSD at the moment of the study (54.5%) had no comorbid mental disorders, while 66% ex-prisoners of war who were affected by PTSD at some point in their lifetime were also affected by a comorbid mental disorder. Other mental disorders in veterans not affected by PTSD at some point in their lifetime were confirmed in 34% subjects (Engdahl et al. 1998). A study examining the incidence of depression in comorbidity with PTSD in war veterans in Bosnia and Herzegovina found that depression was statistically significantly more common in ex-prisoners of war than in those without experience of detention, and there was a clear association between depression and PTSD in both study groups

(Babić et al. 2003). Other studies found no difference in the prevalence of other mental disorders regardless of the existence of PTSD (Kluznik et al. 1986).

The results of the correlation analysis in our study showed a correlation between the experience of captivity on the one hand and acute and transient psychotic disorders (ATPD), psychosomatic disorders, and total psychiatric comorbidity on the other. Other studies too have shown a higher incidence of comorbid disorders in ex-prisoners of war in comparison with control groups, whether they comprised members of the general population, or comparable veterans (Dekel et al. 2014, Eberly & Engdahl 1991). A study comparing ex-prisoners of war with the general population with respect to lifetime prevalence of mental disorders finds statistically significant differences in the prevalence of a number of disorders. Depressive disorders and schizophrenia (which was not identified in our subjects) were more frequent among ex-prisoners of war, but the frequency of alcoholism was not significantly higher than in the general population, and the prevalence of bipolar affective disorder (BAD) was lower among ex-prisoners of war than in the general population (Eberly & Engdahl 1991), which contrasts with the results of our study.

The results of a study comparing post-war morbidity in ex-prisoners of war with morbidity in veterans who were not ex-prisoners of war over a period of 40 years indicate a higher frequency of anxiety disorders and other depressive disorders, but not major depressive disorder, while alcohol addiction was more frequent among veterans who were not ex-prisoners of war, which contrasts with the results of our study (Tennant et al. 1986). Kluznik et al. (1986) analysed lifetime prevalence of mental disorders in US ex-prisoners of war from World War II. Their results showed that 67% ex-prisoners of war were affected by PTSD, 55% were affected by generalized anxiety disorders (GAD), 27% were affected by alcohol abuse or addiction, 24% by depression, and 11% by phobic disorders. In comparison with ex-prisoners of war who were not affected by PTSD, there was no significant difference in the prevalence of other mental disorders (Kluznik et al. 1986).

The results of some studies diverge from the results of our own study, namely, they have not identified significant differences in the prevalence of mental disorders in ex-prisoners of war in relation to control groups (Ursano 1981). Others have even identified long-term positive consequences of severe trauma, changes referred to as 'posttraumatic growth' (Sledge et al. 1980).

Our study has not identified a statistically significant difference in the frequency of dissociative disorders between the groups included in the study. The frequency of dissociative disorders is not high in either of the two groups. Past studies have shown these disorders occur relatively frequently in the first years following exposure to trauma (Koopman et al. 1995). Other studies analysing long-term, persistent dissociative disorders have found them to occur more frequently in ex-priso-

ners of war than in the control group comprising veterans who were not ex-prisoners of war (Zerach et al. 2014). Comorbidity with "psychosomatic disorders" in our study was significantly more frequent among ex-prisoners of war than in the control group, which is in line with other studies (Ohry et al. 1994, Solomon et al. 2014).

Our study also assessed the impact of the number of traumatic events our subjects were exposed to on comorbidity of mental disorders. The results of our correlation analysis point to a correlation between a higher number of traumatic events and alcoholism (and alcohol abuse), benzodiazepines and hypnotics addiction (and abuse), depressive disorders, panic disorder, GAD and psychosomatic disorder. The results of a study of Croatian veterans examining comorbidity of PTSD showed that the number of traumatic events the veteran was exposed to during the combat experience did not influence the occurrence of depression as a comorbid disorder (Kozarić-Kovačić et al. 2001). Impact on total psychiatric comorbidity is also evident. This is in line with the results of some other studies analysing the impact of the intensity and scale of the trauma on the incidence of mental disorders. The intensity of trauma and exposure to extreme conditions in captivity, due to a number of mental disorders (depression, anxiety disorders, psychotic disorders) in ex-prisoners of war from the Pacific area in World War II and ex-prisoners of war from the Korean War, have caused the number of hospitalizations to be 4-5 times higher compared to veterans who fought in the same wars, but were not prisoners of war (Beebe 1975). The aforementioned study analysing persistent dissociative disorders over a period of 35 years after captivity in ex-prisoners of war from the Yom Kippur War identified a correlation between persistent dissociative disorders and major trauma in ex-prisoners of war (Solomon et al. 2014). Some studies found no correlation between significant abuse in captivity and long-term mental effects. A study including World War II veterans also identified no difference in comorbid mental disorders between ex-prisoners of war and veterans who had not been prisoners of war, regardless of the fact that ex-prisoners of war had been exposed to severe trauma. Alcoholism and alcohol abuse were more frequent in the control group (Sutker et al. 1993). A study analysing lifetime prevalence of PTSD and other mental disorders in three groups of ex-prisoners of war concluded that trauma intensity was a significant PTSD predictor, but not a significant predictor for most other mental disorders that occurred in the subjects at a significant frequency (Engdahl et al. 1997).

### **The impact of sociodemographic factors and social support on PTSD intensity and psychiatric comorbidity**

Factors other than exposure to traumatic events can influence the occurrence and persistence of PTSD (Green & Trauma 2005). There was a statistically significant

difference in sociodemographic characteristics between the two groups included in our study (age, marital status, work status, self-assessed material status). There was no difference between the two groups in the level of education. Our analysis of sociodemographic factors found the ex-prisoners of war to be much older than the subjects in the control group, which also means that the ex-prisoners of war were of a more mature age than the veterans in the control group during the war. Some studies have shown that a more mature age at the time of the trauma is a protective factor with respect to the development and persistence of PTSD (Engdahl et al. 1997, Speed et al. 1989).

The results of other studies have pointed to the possibility of PTSD symptoms intensifying at an older age (Bonwick & Morris 1996, Hunt & Robbins 2001). The percentage of divorcees was significantly higher in the control group in our study than among the ex-prisoners of war, and no significant correlation was detected between marital status and overall PTSD intensity. Past studies have indicated that close persons in the subjects' environment are a significant protective factor with respect to PTSD intensity (Jakupcak et al. 2010).

The results of our study showed that the number of unemployed subjects was significantly higher in the group of veterans who were not ex-prisoners of war. The percentage of retirees, on the other hand, was significantly higher among ex-prisoners of war. Our study found that work status had no significant impact on overall PTSD intensity. Other studies have shown that unemployment is associated with low self-esteem and the feeling of rejection by one's environment, and that retirement can lead to the intensification of PTSD symptoms (Hunt & Robbins 2001).

Material status, which the subjects in our study's control group assessed as significantly worse than the subjects who were ex-prisoners of war, proved to be significant in correlation analysis results. Poor material status proved a significant negative factor contributing to PTSD intensity in other study results as well. Another study that also included ex-prisoners of war thus showed that there was a correlation between avoidance behaviour symptoms and a greater number of traumatic experiences. In addition to the traumatic experience, the material status of the subjects affected the intensity of hyperarousal symptoms and intrusive symptoms (Lončar et al. 2014).

Social support proved to be one of the most significant posttraumatic factors influencing the occurrence and persistence of PTSD. In our study, the group of veterans who were not ex-prisoners of war rated the social support they received as much lower in statistical terms than the group who were ex-prisoners of war. The results of our correlation analysis indicate that low social support is a significant contributor to overall PTSD symptom intensity. A number of studies have called attention to the significance of social support, underlining that PTSD itself makes it harder for

sufferers to seek and receive social support (Hunter 1993, Shallcross et al. 2016, Solomon et al. 1993).

The correlation analysis of the data in our study revealed that all sociodemographic factors, including self-assessed material status, have a statistically significant impact on the incidence of comorbid mental disorders. Older age is correlated with the incidence of GAD, obsessive compulsive disorder and psychosomatic disorders. The incidence of sedatives and hypnotics addiction (and abuse) was significantly correlated with retired status, while unemployment was significantly correlated with the incidence of depressive and somatoform disorders. The incidence of the latter was also significantly correlated with lower education status. A significant correlation was identified between marital status and depressive disorders and GAD. Single status (widower, divorced, unmarried) influenced the higher incidence of these disorders. A statistically significant correlation was identified between low (below-average) material status and higher incidence of depressive disorders, panic disorder and somatoform disorder. Among the above factors, it was the only one that influenced higher total psychiatric comorbidity.

Other studies too have confirmed the impact of socio-demographic factors on the existence of comorbid disorders. For instance, there is a clear correlation between younger age at the time of captivity and later development of GAD and social phobia (Engdahl et al. 1997). In some studies, older age at the time of the study proved to be a factor correlated with the persistence of PTSD occurring in comorbidity with a depressive disorder (Armenta et al. 2019). The Croatian study on comorbidity of PTSD and depression also shows a significant correlation between age and intensity of depressive symptoms, with depression being more pronounced in older patients with PTSD (Ljubičić et al. 2009). A study dealing with the comorbidity of PTSD and alcohol abuse showed that alcohol abuse was more common in unemployed respondents in comorbidity with PTSD (Zalihić et al. 2008). A study looking at suicide risk in people with PTSD points to the importance of comorbidity of PTSD and depression in relation to increased suicide risk. The results showed that higher suicide risk was associated with depression, concurrent comorbidity with multiple mental disorders, lower educational level, unemployment, and presence of suicide in family history (Aziraj-Smajić & Hasanović 2020). In other studies, education level, socioeconomic and work status, as well as marital status, have proven significant for the comorbidity of mental disorders with PTSD (Dent et al. 1987).

The control group in our study rated the social support it received as significantly lower than the group composed of ex-prisoners of war. 73% of the subjects in the control group perceived the social support they received as low, as opposed to 61% subjects in the group composed of ex-prisoners of war. 14.7% of the subjects in the group composed of ex-prisoners of war rated the social support they received as high, as opposed to only 5.4% subjects in the control group. In a number of



studies, social support in wartime and upon returning from the battlefield proved a significant factor for the occurrence or persistence of trauma-related mental disorders. In addition to the persistence of PTSD, as stated earlier, the results of some studies showed that social support also impacts the morbidity of other mental disorders (Lin et al. 1979, Campbell et al. 2007). In the results of correlation analysis in our study, low social support was correlated with a higher incidence of GAD, obsessive compulsive disorder, and psychosomatic disorders. In some mental morbidity studies, social support proved as one of the most significant predictors (Pietrzak et al. 2009). The comorbidity of PTSD and depression is correlated with, inter alia, lower social support during and after the wartime events (Armenta et al. 2019). In our study, social support did not prove to be a significant factor for the incidence of depression.

### Limitations to the study

The study only included veterans treated at the Psychiatric Department of the National Memorial Hospital Vukovar who were affected by PTSD at the time of the study. The inclusion of a more subjects, including those who were not affected by PTSD at the time of the study, and who had the experience of both captivity and combat, would give us a better idea of the factors that influenced the development of mental disorders. Also, the study has not analysed possible mental disorders that existed prior to the traumatic experience, psychiatric genetics, or other factors that could represent a predisposition for the occurrence of PTSD and other mental disorders. In addition, the study analysed the incidence of mental disorders over a five-year period that occurs two decades after captivity. We have no information about the incidence of these disorders before that.

### CONCLUSION

The study confirmed our hypothesis that the incidence of comorbid mental disorders is higher in ex-prisoners of war affected by PTSD. Factors other than trauma intensity have a significant impact on the persistence and intensity of PTSD more than two decades after exposure to the traumatic experience. Captivity and the number of traumatic events that Homeland War veterans were exposed to also have a significant impact on the incidence of comorbid mental disorders. In addition to the traumatic experience, sociodemographic characteristics and social support influenced the incidence of other mental disorders and PTSD intensity. Further research should focus specifically on older veterans and analyze what factors influence the health of this population, including veterans' physical health. Given the interactions of multiple factors that can lead to significant impairment of health and functioning in this population, a multidisciplinary approach to future research is needed.

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### Contribution of individual authors:

Melita Jukić: study conception and design, investigation, data acquisition, analysis and interpretation of data, writing original draft.

Jasminka Talapko: investigation, writing original draft.

Ivana Škrlec: formal analysis, investigation, visualization.

Petra Čičak: formal analysis, data curation, investigation.

Marko Jukić & Jasmina Lukinac: data curation, methodology, writing review and editing.

Ivan Požgain: study conception and design, critical revision.

All authors approved the final version of the manuscript.

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