

Posttraumatic Stress Disorder in a Serbian Community

Seven Years After Trauma Exposure

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Abstract: Posttraumatic stress disorder (PTSD) may develop as a serious long-term consequence of traumatic experiences, even many years after trauma exposure. The objectives of this study were to examine the prevalence of lifetime and current PTSD as well as to detect the most stressful life events and sociodemographic risk factors of PTSD in a general adult Serbian population. The sample consisted of 640 subjects chosen by random walk technique in five regions of the country. The Mini International Neuropsychiatric Interview 5 revealed an 18.8% prevalence rate of current PTSD and a 32.3% prevalence rate of lifetime PTSD. According to the Life Stressor Checklist-Revised, the bombardment, being expelled from home, siege, and participation in combat were the stressful events most likely to be associated with PTSD. The prevalence of PTSD increased among widows and widowers, divorced persons, unemployed persons, and retired persons. The high level of PTSD a few years after the trauma exposure classifies as a significant health problem that can cause serious consequences for families and the community as a whole.

Key Words: PTSD, stress, risk factors, community.

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Posttraumatic stress disorder (PTSD) is the most frequently reported psychiatric consequence of traumatic events and of human-made disasters in particular (McFarlane and de Girolamo, 1996). Studies of the psychological sequelae of disasters have shown that those caused by human intent create severe mental health effects in communities (Norris et al., 2002). The diagnosis of PTSD (American Psychiatric Association, 1994) requires an environmental factor to have occurred, that is, a potentially traumatic event (PTE). PTSD has become a major health concern, making epidemiological data on the prevalence in the community increasingly important. Several studies have suggested that PTSD is one of the psychiatric disorders leading to the widest use of health care systems and a disorder for which the cost per patient could be among the highest (Boscarino, 2004; Kessler, 2000). Epidemiological studies on PTSD in the general population are scarce. Although a number of epidemiological surveys on PTSD have been carried out in North America (Helzer et al., 1987; Kessler et al., 1995) and more recently in other parts of the world (Creamer et al., 2001), there have been few studies on PTSD in the general European population (Frans et al., 2005).

Most of the existing research evidence is on war veterans rather than civilians (Lee et al., 1995; Shlosberg and Strous, 2005), despite the fact that modern warfare threatens more civilians than soldiers. The findings suggest an association between war experience and increased levels of mental disorders several years later, particularly PTSD and

depression (Priebe et al., 2010). Prevalence rates were usually higher than those found in samples not affected by war despite substantial differences between studies (Kessler et al., 2005; Wittchen and Jacobi, 2005). Estimates of lifetime prevalence of PTSD among specific Western groups of trauma survivors range between 15% and 24% (Breslau et al., 1998) as compared with 8% in the general US population (Kessler et al., 1995). de Jong et al. (2003) studied war-affected civilians in Algeria, Cambodia, Ethiopia, and Gaza and reported increased prevalence rates of PTSD (16%–37%). Pham et al. (2004) found a 24.8% prevalence of PTSD among community samples in Rwanda.

Epidemiological studies on PTSD in the United States show a lifetime prevalence rate of 5% to 10% and a current prevalence of 1% to 5% in an adult population (Breslau et al., 1998; Kessler et al., 2005; Resnick et al., 1993). It was shown that lifetime (2%–6%) and current (1%) PTSD prevalence rates in Europe are lower than PTSD prevalence in the American studies (Alonso et al., 2004; Frans et al., 2005; Perkonig et al., 2000). An overview of PTSD prevalence rates derived from community-based surveys showed a broad range of prevalence rates (Hepp et al., 2006). Higher prevalence rates were reported for postconflict regions (de Jong et al., 2001; Priebe et al., 2010). A large epidemiological study in the specific region of former Yugoslavia showed PTSD rates of 35.4% in Bosnia and Herzegovina, 18.0% in Croatia, and 10.6% in the Former Yugoslav Republic of Macedonia (Priebe et al., 2010). Studies have shown a low prevalence rate in Germany and Switzerland (Hepp et al., 2006; Perkonig et al., 2000) and a prevalence of current PTSD in the total Netherlands population of 3.8% (Bronner et al., 2009), which is equal to the prevalence rate in the United States (Kessler et al., 2005). Some authors have found relatively high lifetime prevalence for PTE and, at the same time, a low prevalence of PTSD in Australia (Creamer et al., 2001).

The literature shows a variety of risk factors associated with PTSD, including the history of exposure to traumatic events (Smyth et al., 2008; Solomon et al., 2008) and the severity of trauma exposure (Breslau et al., 1991; Phillips et al., 2010). Severity of a traumatic event has been implicated as one of the most salient predictors of PTSD (Davidson and Smith, 1990). Results of the National Comorbidity Survey indicated that traumatic events such as torture and sexual assault were associated with the highest rates of chronic PTSD, whereas events of lower magnitude such as motor vehicle accidents and life-threatening illness were associated with lower rates of PTSD (Kessler et al., 1999). However, even among those who are exposed to severe traumatic events, only a fraction of individuals develop PTSD (Christiansen and Elklit, 2008; Voges and Romney, 2003). The observation that trauma per se is not a sufficient determinant of PTSD raises a possibility that there may be particular risk factors that make an individual vulnerable toward developing this disorder (Harris et al., 2008; Yehuda and McFarlane, 1995). The risk factors can be divided into two main categories: severity and type of traumatic event and predisposing personal characteristics such as sex or other sociodemographic variables (Lecic Tosevski et al., 2003).

The wars in the former Yugoslavia have attracted the world's attention, but there is no evidence of consequences. It was a long-term conflict between the former Yugoslav countries, and for several million people, the conflict was associated with various extremely stressful and

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potentially traumatic experiences (Priebe et al., 2004). The North Atlantic Treaty Organization (NATO) bombing of Yugoslavia was NATO's military operation against the Federal Republic of Yugoslavia, which lasted from March 24, 1999, to June 10, 1999. During those 78 days, 2,000 civilians and 1,002 soldiers died, including 88 children, whereas 6,000 people were injured (Samardzic and Spiric, 2005). The NATO Operation Allied Force used exclusively a large-scale air campaign; ground units were not used. Almost 27,000 takeoffs were carried out, 8,200 of which were fire strikes. In this process, 23,000 tons of deadly missiles were dropped from air. The planes, ships, and submarines launched more than 1,000 cruise missiles and dropped several thousand bombs. Nearly 2,300 attacks on 995 targets in Federal Republic of Yugoslavia were carried out. A large number of facilities were destroyed, as well as more than 50 bridges; 53 health facilities were bombed, whereas 300 preschool facilities were either destroyed or damaged (Samardzic and Spiric, 2005).

The objectives of our study were to address three issues: a) prevalence rates of lifetime and current PTSD in a community sample 7 years after traumatic experiences, b) what adverse events are associated with PTSD in the settings where people have experienced multiple trauma exposures, and c) risk factors of developing PTSD.

This study was a part of the international research project "Components, Organization, Costs, and Outcomes of Health Care and Community Based Interventions for People with Posttraumatic Stress Following War and Conflict in the Balkans" (Priebe et al., 2004), cofinanced within the sixth Framework Program of the European Union.

METHODS

Sampling Techniques and Participants

A representative targeted nonrandom sample of inhabitants was selected from five randomly selected Serbian areas directly exposed to the NATO bombing campaign in 1999 (Belgrade, Nis, Raska, Pcinj, and Jablanica area). In each locality, streets were randomly identified. Every fourth household was selected until a maximum of 15 interviews per street were carried out. If there were several households in the same building, households were chosen randomly, but no more than six participants were interviewed per building. Advance notifications informing residents of the study purpose and planned visit were mailed where possible. The interview was conducted with the eligible adult member of the household whose birthday was closest to the date of interview and who fulfilled the inclusion criteria: born within the territory of the former Yugoslavia with the residence in the Republic of Serbia, aged between 18 and 65 years, experienced at least one war-related traumatic event at 16 years or older, no severe learning difficulty, and no mental impairment due to a brain injury or other organic cause. The traumatic experience was determined by a brief screening list. The researchers made up to three attempts at different times of the day and on different days of the week to interview eligible participants, after which a replacement participant from another household was identified following the same sampling procedure. The random walk technique is a representative sample selection procedure used when no population list is available. It is used for getting a representative targeted non-random sample for a certain population (Morris and Sinclair, 2004).

The final sample consisted of a mean \pm SD of 640 participants aged 39.8 ± 12.05 years, ranging from 18 to 65 years. A total of 56.7% were women, 58% were married, 26.6% were single, 8.8% were divorced, 5.2% were widowed, and 1.6% were cohabiting. The minimum years of education was 4; and the maximum, 22 (12.71 ± 2.787). As for the employment status, 48.3% were currently employed, 30.2% were unemployed, and 9.8% were retired, whereas 10.6% of the participants were students. There were 9.1% of the participants who had previously participated in combat.

Procedures and Measures

All interviews were conducted between January 15, 2005, and November 20, 2006. After being introduced with the details of the study, the participants gave their written consent and underwent a face-to-face interview.

Data on the participants' age, sex, education level, employment, and marital status were obtained through a brief structured sociodemographic questionnaire.

The history of potential traumatic experience was assessed using a specifically amended version of the Life Stressor Checklist-Revised (Wolfe and Kimerling, 1997). The list is similar to other methods used to assess trauma exposure. It assesses whether a participant had experienced any of the 24 PTEs before, during, and after the trauma. For each event, we recorded the year of the occurrence or, in the case of repeated experience, the year of the most stressful occurrence and the level of personal distress caused by the event at the time of the PTE (on a 5-point Likert scale, ranging from 0, not at all, to 4, extremely).

The actual presence of PTSD was assessed by the Mini International Neuropsychiatric Interview 5 (MINI-5; Sheehan et al., 1998), a structured diagnostic interview assessing the symptom criteria used in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*. It is divided into modules, each corresponding to a diagnostic category with DSM axis I disorders. The modules consist of questions about psychological problems or symptoms, whereas clinical assessment consists of evaluation of the participants' answers in terms of clinically relevant dimensions (time frame, frequency, and severity). The clinical judgment of each symptom is then registered in the form of yes (symptom was clinically relevant) or no (symptom was not clinically relevant) answers. At the end of each module, there is a diagnostic frame, which documents whether the diagnostic criteria were met for each disorder. The MINI was validated by a cross-national study involving more than 600 participants (Sheehan et al., 1998). The reliability of the interview has been shown in various cultures (Kadri et al., 2005; Otsubo et al., 2005).

All those instruments for which there had been no validated translations in Serbian language were translated and translated back into English. All interviewers were either qualified psychologists or psychiatrists, and all of them were trained in the assessments used in the survey. Rating agreement among the interviewers was assessed for the MINI in two mock interviews. An agreement on an item was reached when all the interviewers gave it the same answer.

The research was approved by the ethics committee of the Belgrade University School of Medicine.

Statistical Analysis

Descriptive statistics was used for analysis of war experience and characteristics of the sample. The chi-square test was used for correlations between categorical sociodemographic variables and PTSD. Analysis of variance (ANOVA) was used for correlations between numerical sociodemographic variables and PTSD. By using canonical discriminant analysis, we tried to extract some stressful events that could be the most reliable predictors of current and lifetime PTSD.

RESULTS

The findings showed that there was a high level of current PTSD (18.8%) and lifetime PTSD (32.3%) in the population of Serbia 7 years after the trauma exposure.

The sociodemographic correlates of current and lifetime PTSD were the following: active participation in war ($\chi^2_1 = 8.22, p < 0.01$; $\chi^2_1 = 4.54, p < 0.05$); participants' marital status, single or married ($\chi^2_4 = 11.71, p < 0.05$; $\chi^2_4 = 24.64, p < 0.05$); and employment ($\chi^2_4 = 12.62, p < 0.05$; $\chi^2_4 = 12.82, p < 0.05$), which correlated with both current and lifetime PTSD. The prevalence of PTSD increased among persons who had previously participated in

TABLE 1. Significance of Differences Between Persons With and Without PTSD on Age, Years of Education, and Monthly Income

		Presence of PTSD	n	Mean	SD	F	df	Significance
Current PTSD	Age	No	520	39.17	12.20	8.06	1; 638	0.005
		Yes	120	42.62	10.99			
	Years of school	No	520	12.94	2.69	20.85	1; 638	0.001
		Yes	120	11.68	2.98			
Monthly income	No	501	346.11	240.29	22.23	1; 618	0.001	
	Yes	119	237.82	145.11				
Lifetime PTSD	Age	No	433	38.92	12.44	7.51	1; 638	0.006
		Yes	207	41.70	10.98			
	Years of school	No	433	13.05	2.71	21.11	1; 638	0.001
		Yes	207	11.99	2.82			
	Monthly income	No	414	347.36	233.37	11.74	1; 618	0.001
		Yes	206	281.03	213.96			

combat, as well as in widowed and divorced persons, unemployed persons, and retired persons (Tables 1–3). On the other hand, sex was not related to current PTSD ($\chi^2_1 = 2.63, p > 0.05$), but lifetime PTSD was higher in the women ($\chi^2_1 = 10.05, p < 0.01$).

The univariate ANOVA showed that age (skewness = 0.15) and years of education (skewness = 0.33) were also related to both current and lifetime PTSD. Because monthly income had a skewness of larger than 1 (skewness = 1.67), meaning that distribution deviated from normal, instead of ANOVA, we performed the Kruskal-Wallis' test, which showed that monthly income was also related to both current and lifetime PTSD. The relation was such that persons with PTSD were older on average, had fewer years of education, and had smaller monthly income (Table 1).

Because one might wonder whether the relation between age and PTSD is a consequence of the increasing number of traumatic events with age, we correlated those two and found no correlation ($r = 0.058; p > 0.05$). This finding showed that number of traumatic events had not linearly increased with age, and therefore, it did not affect the relation between age and PTSD.

By using canonical discriminant analysis, we tried to extract stressful events that could be the most reliable predictors of current and lifetime PTSD. The analysis showed that there was only one significant canonical factor for both current and lifetime PTSD, meaning that there was only one combination of stressful events that predicted PTSD.

For the current PTSD, of all stressful events from the Life Stressor Checklist, the following emerged as the most reliable predictors of PTSD: being expelled from home, disease, bomb explosion, siege, sudden death of a close person, combat, nonsexual assault, lack

of food or water, natural disaster, and imprisonment (Table 2). These stressors could predict approximately 24.6% of current PTSD, or, in other words, if one experienced all of the events listed above, that person would have the probability of 24.6% of having current PTSD ($\rho = 0.496, \chi^2_{63} = 170.33, p < 0.01$).

For the lifetime PTSD, of all stressful events from the Life Stressor Checklist, the following emerged as the most reliable predictors of PTSD: being expelled from home, sudden death of a close person, lack of shelter, natural disaster, murder of a close person, and imprisonment (Table 3). These stressors could predict approximately 23.8% of the current PTSD, or, in other words, if one experienced all of the events listed above, that person would have the probability of 23.8% of having lifetime PTSD ($\rho = 0.488, \chi^2_{63} = 164.74, p < 0.01$).

DISCUSSION

More than 6 years after the war, the prevalence rates of PTSD in our country were high, as our findings showed 18.8% of current and 32.3% of lifetime PTSD in the community sample. These prevalence rates are in line with those of other studies in populations affected by war, suggesting that war experience may be associated with negative, long-term consequences for mental health (Gerritsen et al., 2006; Jaranson et al., 2004; Marshall et al., 2005; Neria et al., 2008). The results showed similar rates of PTSD in other Balkan countries that were included in this study—Priebe et al. (2010) showed a prevalence rate of current PTSD of 35.4% in Bosnia and Herzegovina, 18.0% in Croatia, 18.2% in Kosovo, and 10.6% in the Former Yugoslav Republic of Macedonia. Previous research in Bosnia and Herzegovina, Croatia, and Serbia had shown a prevalence rate of PTSD between 16% and 34% (Basoglu et al., 2005; Klaric et al., 2007), which is similar to the findings of our study. Basoglu et al. (2005) found higher rates of

TABLE 2. Structure Matrix of Canonical Function for Current PTSD

	Canonical Function
Expelled from home—during war	0.358
Life-threatening illness—after war/migration	0.285
Mine explosion—during war	0.276
Siege—during war	0.260
Sudden death of a dear person—during war	0.259
Combat situation—during war	0.252
Nonsexual assault—after war/migration	0.251
Lack of food and water—during war	0.249
Expelled from home—after war/migration	0.249
Life-threatening illness—during war	0.246
Natural disaster—after war/migration	0.216
Imprisonment—during war	0.204

TABLE 3. Structure Matrix of Canonical Function for Lifetime PTSD

	Canonical Function
Expelled from home—during war	0.388
Sudden death of a dear person—during war	0.276
Life-threatening illness—after war/migration	0.259
Lack of shelter—during war	0.251
Life-threatening illness—during war	0.247
Natural disaster—after war/migration	0.237
Natural disaster—before war	0.223
Learned about murder of a dear person—during war	0.213
Imprisonment—during war	0.208

PTSD in a nonrandom community-based sample of people with direct war exposure compared with matched interviewees without such experience. A recent Israeli study showed that 27% of a civilian population developed PTSD as a result of exposure to the missile attacks (Besser and Neria, 2009). A survey of war-affected civilians in Algeria, Cambodia, Ethiopia, and Gaza identified war-related experiences after the age of 12 years as the only factor consistently associated with PTSD across all four samples (de Jong et al., 2001). An American study about the long-term prevalence of PTSD symptoms among 11,037 lower Manhattan residents 2 to 3 years after the attack on the World Trade Center showed that the prevalence of probable PTSD was 12.6% (DiGrande et al., 2008). Similar results were shown in one previous Serbian study among medical students 1 year after experiencing air attacks in Belgrade, in which 11% of the students showed a high level of PTSD (Gavrilovic et al., 2002).

Our findings of PTSD rates were significantly higher than those reported for non-war-affected populations in Western countries. A recent community-based study of PTSD in the Netherlands showed a prevalence of current PTSD in the total population of 3.8% (Bronner et al., 2009). A large community-based cohort study in Switzerland showed no single case of full PTSD in the sample, and even for subthreshold PTSD, the prevalence was very low (Hepp et al., 2006). Perkonig et al. (2000) showed a prevalence rate in Germany of 0.7%. It seems that there is a PTSD continuum—at one end, there is a stable socioeconomic and political climate in Switzerland, with a sense of safety in the country that has not been actively involved in warfare for 150 years and has not experienced major natural disasters in the past decades. At the other end of this continuum, there is Serbia and other Balkan countries with ongoing societal instability, political uncertainty, and recurrent conflicts in the 20th century.

A number of studies have shown that multiple exposures to traumatic events, either to the same type of event or to different types of events, are associated with higher levels of symptoms of PTSD (Green et al., 2000; Sledjeski et al., 2008). Our study showed that the bombardment, being expelled from home, being under siege, sudden unexpected death of a close person, combat, nonsexual assault, and lack of food or water were the stressful events most likely to be associated with PTSD. Our findings are consistent with the results of the findings in other postwar countries, in which Bosnia and Herzegovina, Croatia, and the Former Yugoslav Republic of Macedonia reported the shelling and bombardment as the most stressful traumatic events (Priebe et al., 2010). Participants in other postwar countries in the region reported a range of other war experiences, including a loss of family or friends, witnessing murder, being under siege, and being in a concentration camp/prison (Priebe et al., 2010). In our study, imprisonment showed a relatively lower effect on PTSD because in the studied sample, it happened many years before the assessment, during other conflicts in the region. Moreover, when all other stressors are taken into account by the same analysis, imprisonment itself is not that important because all other stressors that might be related to imprisonment have already been taken into account. Being expelled from home had the strong relationship for both current and lifetime PTSD rates, probably because of the feeling of uncontrollability, which is one of the crucial features of stressors that makes them potentially traumatic (Ford, 2009). Torture was a risk factor in Algeria, Ethiopia, and Gaza, which is in contrast to our results (de Jong et al., 2001) and cannot be compared because the studied trauma exposure was NATO air campaign, without face-to-face battle. It is also well known that each traumatic stressor is unique, and therefore, the experience and outcomes of PTEs may be radically different depending on the exact nature and circumstances of their occurrence (Ford, 2009).

There are some differences and similarities in the type of stressful traumatic events in nonwar countries. A large European study that was conducted in six western European nonwar countries showed six most traumatic events related to PTSD: rapes, undisclosed private event,

having a child with serious illness, having been beaten by a partner, having been stalked, or having been beaten by a caregiver (Darves-Bornoz et al., 2008). The community-based survey of PTSD in the Netherlands showed that rape and physical assault were the stressful events most likely to be associated with PTSD; and witnessing injury, the least likely (Bronner et al., 2009). Some other epidemiological studies have shown that events involving interpersonal victimization, such as sexual assault or torture, are associated with the highest rates of chronic PTSD, whereas less intense events, such as death of a loved one or witnessing injury, are associated with lower rates of PTSD (Kessler et al., 1999). Violent assault was associated with the highest risk for developing PTSD in nonwar countries, as was shown in several studies in the United States (Breslau et al., 1998; Kessler et al., 2005; Resnick et al., 1993), Australia (Creamer et al., 2001), and Europe (Alonso et al., 2004; Bronner et al., 2009; Frans et al., 2005; Perkonig et al., 2000). Finally, taking into account both war and nonwar countries, the evidences are strong and unambiguous in suggesting that the type of traumatic event is strongly associated with the development of PTSD.

Furthermore, the findings of our study indicate that the prevalence of PTSD increased among widows and widowers and divorced persons, unemployed persons, and retired persons, as well as in persons with lower education and lower income. These findings are in line with those of previous studies showing an association of socioeconomic adversities after war, particularly old age (de Jong et al., 2001), unemployment (Steel et al., 2002), lower level of education, and being divorced (Karam et al., 2006; Steel et al., 2002), with PTSD.

We have assessed only point prevalence rates and have no information about the onset of the disorder, which is a limitation of our study. Despite the limitation, this study is a part of the largest community-based study assessing PTSD in people directly exposed to war that was conducted several years after the war and that used consistent methods with random sampling.

This study documents the long-term prevalence of PTSD symptoms and associated factors among 640 participants selected by random walk technique in the general population. The results indicate the high level of current and lifetime PTSD. In addition to this, many consequences of PTSD have been identified, such as comorbid mental disorders, increased substance abuse, increased domestic violence, and legal problems. Our findings should raise awareness of health care professionals for detection and treatment of affected individuals to prevent serious consequences for individuals, their families, and the society as a whole.

DISCLOSURE

The authors declare no conflict of interest.

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