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**Effects of Differing Diagnostic Criteria on Estimated Rates of  
Posttraumatic Stress Disorder in War Zone Exposed Civilians**

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# Does ICD-10 Overestimate the Prevalences of PTSD?

## Effects of Differing Diagnostic Criteria on Estimated Rates of Posttraumatic Stress Disorder in War Zone Exposed Civilians

### Abstract

*DSM-IV and ICD-10 criteria for posttraumatic stress disorder (PTSD) differ in important aspects. Presumably, this difference between the two classification systems accounts for the low concordances regarding PTSD. The goal of this study is to compare the estimated rates of PTSD based on different diagnostic criteria in a sample of war zone exposed civilians in Sarajevo, Bosnia-Herzegovina. The Posttraumatic Diagnostic Scale (PDS) and the Checklist of War Related Experiences were administered to 311 people. Rates for PTSD are much higher when ICD-10 criteria were applied as compared to rates resulting from DSM-IV criteria. The agreement between ICD-10 and DSM-IV is low. DSM-IV criteria differentiate better between treatment conditions and gender than ICD-10 criteria.*

### Keywords

*PTSD, war trauma, civilians, ICD-10, DSM-IV, diagnostic criteria, sex differences*

Although the concept of PTSD is agreed upon in the scientific community, the diagnostic criteria for PTSD are still being discussed. Most of the debate centers around two foci. The first focus is social and political in nature. It concerns the differences and concordances between the two major psychiatric classification systems – the International Classification of Diseases, 10th revision (ICD-10) published by the World Health Organization (WHO; 1993) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) published by the American Psychiatric Association (APA; 1994). ICD-10 is the official coding system in many countries and regions of the world (for example in Europe and Africa) and is therefore used in health care settings and legal proceedings. On the other hand US-American DSM-IV criteria are used in most research papers. As both sets of criteria differ considerably, it is necessary to compare prevalences and estimate concordances according to both classification systems in order to allow a comparison of the numbers offered by research papers on one hand and

legal or public health reports on the other hand.

The second focus lies within the framework of DSM-IV and concerns the effect of reducing the number of required avoidance symptoms on prevalences. DSM-IV criteria require at least three such symptoms, which is often criticized as unnecessarily strict especially in crosscultural contexts.

### Differences between ICD-10 and DSM-IV

Although the underlying concept of PTSD is similar in DSM-IV and ICD-10, the criteria differ in important points (see Table 1 for a comparison between ICD-10 research criteria and DSM-IV).

One striking difference should be highlighted because of its particular relevance for this present article: Contrary to DSM-IV, the ICD-10 usually regards the A-criterion as being satisfied by the sheer presence in a war zone or by the engagement in war activities. Nevertheless, many

| DSM-IV criteria   | ICD-10 criteria  |
|---|--|
| A: Event:<br>A1: Threat to live of self or others                           | A: Event:<br>Exceptionally threatening or catastrophic event which causes distress in almost everybody (such as being in a war zone) |
| A2: Feeling of helplessness, fear and horror                                |  |
| B: At least one intrusion symptom   | B: At least one intrusion symptom  |
| C: At least three symptoms reflecting avoidance or numbing                  | C: At least one avoidance symptom  |
| D: At least two hyperarousal symptoms                                       | D:<br>D1: Difficulty in remembering or<br>D 2: At least two hyperarousal symptoms  |
| E: Duration of symptoms longer than a month, time of onset is not specified | E: Symptoms B, C and D develop within 6 months after exposure, otherwise no duration criterion                                       |
| F: Impairment   | No impairment criterion  |

Table 1: Major Differences between DSM-IV and ICD-10 Criteria for PTSD

studies assessing repeatedly traumatized individuals consider being in a war region as sufficient in its own right to automatically satisfy Criterion A, even when applying the DSM-IV (see Mollica, McInnes, Sarajlic, Lavelle, Sarajlic, & Massagli, 1999; Ai, Peterson, & Uebelhor, 2002). Yet Favaro, Maiorani, Colombo, and Santonastaso (1999) found in a representative sample of Kosovar refugees, that only 30% experienced events qualifying as traumatic in nature in the sense of DSM-IV. Therefore it seems reasonable to have a closer look at the event criterion – even in those heavily traumatized samples – especially because different war zones are characterized by different levels and profiles of exposure to traumatic events.

Another criticism has been expressed by authors working in an intercultural context (Schützwohl & Maercker, 1999; Marsella, Friedman, & Huland Spain, 1996): They postulate that the DSM-IV is too strict in requiring a minimum of three avoidance criteria for criterion C to be fulfilled since this can lead to an underestimation of PTSD diagnoses. There-

fore it is important to investigate the effect of reducing the number of required avoidance symptoms from three to two symptoms.

Finally, duration (Criterion E) is differently specified in both respective criteria catalogues and impairment (Criterion F) is not included in ICD-10. These differences are considerably responsible for low concordance (Peters, Slade, & Andrews, 1999).

### Concordances between ICD-10 and DSM-IV based prevalences

The differences between ICD-10 and DSM-IV criteria usually lead to a prevalence of PTSD twice as high when ICD-10 criteria are used as compared to times when DSM-IV criteria were applied. (Andrews, Slade, & Peters, 1999; Andrews, Henderson, & Hall, 2001; Somasundaram & Sivayokan, 1994). Concordance, calculated by Andrews et al. (2001) as the percentage of people positive on either classification, has been reported as 35%.

### Possible confounders in the estimation of PTSD-prevalences

Apart from the effects of diagnostic criteria on prevalence per se there is the question of how sensitive different criteria are to gender and sample characteristics. While the concept of PTSD was developed mostly on convenience samples of people either in psychotherapeutic or medical treatment the present study included both, a treatment and a randomized resident sample. The authors were interested to see if there are differences between these samples.

Furthermore most epidemiological studies report a gender effect with much higher rates of PTSD in women than in men (Breslau, Chilcoat, Kessler, Peterson, & Lucia 1999, Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Perkonigg, Kessler, Storz & Wittchen, 2000). However, since all these studies applied DSM-criteria, it remains unclear whether the ICD-10 criteria confirm this gender difference.

In essence, a number of explanations accounting for those gender differences can be assumed. One plausible reason may be the difference in reporting styles between males and females, which, in turn, are also influenced by their respective ethno- and socio-cultural context. An example is the A2 criterion of the DSM IV: It is asking for the experience of intensive fear, helplessness and horror. One can expect that in most societies males may agree less to this item, because it contradicts with their expected role-specific behavior. Another explanation refers to the difference in events experienced by males and females. Accordingly, the likelihood to develop PTSD symptoms is related to the type of traumatic events survived (Kessler et al., 1995); in this sense surviving a natural disaster is less likely to cause PTSD than surviving sexual abuse. However, women are more likely to experience these traumatic situations and are therefore more at risk to develop PTSD. Furthermore it is the women who, in most societies, are poorer and less educated; as a result the loss of resources has greater consequences. Finally, it is possible, that biological causes are responsible for a woman's development of PTSD (for a detailed overview of possible causes refer to Gavranidou and Rosner, 2003). If there is a distinction in reporting of events, then the results according to DSM-IV respectively ICD-10-criteria should be different as well.

## Research Questions

1. How do the prevalences based on different criteria sets (DSM-IV and ICD-10) compare?
2. How large is the concordance between DSM-IV and ICD-10 diagnoses?
3. How sensitive are the different criteria sets to sample characteristics and gender?

## Method

### Samples

The following data was collected three and a half years after the end of war, between February and June 1998, in Sarajevo, Bosnia-Herzegovina. A detailed review of the study and its main results can be found in Rosner, Powell, and Butollo (2003). This current article refers only to those results that are relevant for its research questions. The samples were stratified by gender and age, based on the assumption that these variables are correlates of PTSD and treatment utilization (Kessler et al., 1995). Data from 1990 was used for the stratification, because at the time of the study a detailed demographic description of the post-war population was not available. Other potential correlates, such as pre-war socio-economic status, were considered to be no longer relevant. Therefore, they were not assessed, except for the number of years of education. All subjects participated voluntarily and gave their fully informed consent.

This study is based on two treatment and one non-treatment samples. In total 311 persons participated. Inclusion criteria for all three study samples were a) age between 16 and 65, b) living in Sarajevo between February and June 1998, c) living in Canton Sarajevo during the war (between April 1, 1992 and December 31, 1995), d) not suffering from a psychotic dis-

order or an acute crisis and e) literate enough to answer the questionnaires with only a minimum of help. Additional criteria were defined for the respective sub-samples. The sample in psychological treatment consisted of 114 patients participating in some kind of psychotherapy, psychiatric treatment, or psychological or psychosocial consultation with at least one session in the last three months. The 99 patients in the medical sub-sample fulfilled the following criterion: At least three consultations of a specialist physician (not a dentist or a general practitioner) during the last three months. The patients in psychological or medical treatment were approached directly by the staff of 15 psychological or medical treatment centers. Those select centers were broadly representative of psychological and medical treatment in Sarajevo. Each participating psychotherapist or counselor was allocated a quota based on the stratification. In case of the psychological sample, seven of the interviewers approached each new client presenting after the start of the study until their quota was filled. The patients of the medical sample were approached in a similar way by eight interviewers who also worked in hospitals and medical clinics. In this case, the respondents were not their own clients but rather the patients of their medical colleagues. These physicians worked in a wide spectrum of medical disciplines.

The resident sample consisted of 98 non-institutionalized subjects. To approach these individuals a map of the city of Sarajevo was divided into 1 km squares. Two streets from each square were chosen at random. Each pair of interviewers was then given the names of two streets with instruc-

tions to find a total of eight subjects from these two streets. The interviewers started at the first apartment in the first building and questioned the occupants regarding their eligibility according to the general inclusion criteria, the sample-specific criteria and the quotas. After having found suitable subjects in one apartment the interviewers proceeded to the next apartment, interviewing people at a maximum of two apartments per building. Then they moved to the next building in the same street. Each pair had to fill a quota for each cell in the stratification table.

The responder rates were almost 100 % for the two treatment samples. For the resident sample the rate was calculated as follows: In 24 % of households there was no reply. 504 % of the households that initially opened the door refused access. Of those who permitted entry, 83 % were eligible. 35 % of those eligible decided against the interview. It is

unknown how many people lived in the households that refused access. Therefore, the responder rate was calculated by multiplying the percentage of households not refusing access by the percentage of people eligible for interview, resulting in a rate of 32 % (for details see Rosner, Powell, & Butollo, 2003). As there are no comparisons available for responder rates in door-to-door surveys under post-war conditions this rate is difficult to evaluate.

Table 2 provides a short description of the demographics for the three samples.

A comparison between the resident sample and the persons in psychological or psychosocial treatment showed a significant difference in the variable of education level (calculated as the level of the highest school level finished;  $\chi^2 = 10.70$ ;  $df = 2.21$ ;  $p = .005$ ). Likewise, those in medical treatment differed from the resident sample ( $\chi^2 = 6.82$ ;  $df = 2.20$ ;  $p = .03$ ). There was also a significant

difference between the income of members of the resident sample and the persons in medical treatment ( $\chi^2 = 13.96$ ;  $df = 6.20$ ;  $p = .03$ ). Members of the resident sample had a lower average income than members of medical treatment sample. There were no significant differences in the number of traumatic events (a detailed description of events can be found in Rosner et al., 2003). Gender was equally distributed across samples and there were no significant differences in the number of traumatic events between the samples.

### Measures

As none of the standard psychiatric interviews had been translated into Bosnian and validated when the study was carried out, a well known self-report questionnaire for the assessment of PTSD symptoms, the Posttraumatic Diagnostic Scale (PDS, Foa, Cashman, Jaycox, & Perry, 1997) was translated. The PDS offers a diagnosis of PTSD as well as an esti-

|  |          | Residents Sample (N = 98) | Medical Treatment (N = 99) | Psycholog. Treatment (N = 114) | Total (N = 311) |
|--|----------|---------------------------|----------------------------|--------------------------------|-----------------|
| Age  | M years  | 39.94                     | 38.32                      | 36.39                          | 38.13           |
| Sex  | female   | 51                        | 53                         | 58                             | 162             |
|  | male     | 47                        | 56                         | 56                             | 149             |
| Monthly Income (currency: "Convertible Marks") |          | 287.90                    | 397.57                     | 366.47                         | 351.46          |
| Highest Education <sup>1</sup>                 | 8 years  | 10                        | 14                         | 19                             | 43              |
|  | 12 years | 69                        | 52                         | 55                             | 176             |
|  | 16 years | 19                        | 33                         | 40                             | 92              |
| Number of survived traumatic events            | Mean     | 20.37                     | 23.07                      | 21.39                          | 21.60           |
|  | SD       | 8.91                      | 10.49                      | 9.49                           | 9.60            |

<sup>1</sup>The categories reflect different school tracks in Bosnia-Herzegovina. 16 years of education includes secondary education and university, 12 years secondary education and 8 years is the minimum of schooling currently

Table 2: Sample description

mation of symptom severity. To obtain the translated Bosnian version we applied a cyclical procedure of translations, back-translations and field-testing as recommended for the translations of psychological assessment measures (VanDeVijver & Hambleton, 1996). The event list of the original PDS was replaced by a checklist specific to the war situation in Sarajevo (Checklist of War Related Experiences, CWE). Other significant events (before, after, or unrelated to the war) were assessed as well.

The PDS has proven to be reliable and valid in previous research (Cronbach's alpha for the total symptom score = .92; Alpha coefficients were .78 for reexperiencing, .84 for avoidance and .84 for scales; Test-retest reliability of the overall severity score after three weeks = .83; Foa Cashman, Jaycox, & Perry, 1997). The results based on US-American samples suggest that the self-report version underestimates PTSD prevalence compared to interview measures (Foa, Riggs, Dancu, & Rothbaum, 1993). The Cronbach's alphas for the Bosnian version correspond well with the English language version (Bosnian version: reexperiencing = .89;

avoidance = .84; arousal = .84, total symptom score = .93). Convergent and divergent validity is adequate (Powell & Rosner, 2005)

**Interviewers**

The patients in psychological or medical treatment were approached directly by the staff of 15 psychological or medical treatment centers. The interviewers received the approximate equivalent of one hour's local wage. For the resident sample eight pairs of final year and third year students of psychology at Sarajevo University served as interviewers. All interviewers were trained in the use of the questionnaires. Two pilot studies were performed to ensure the appropriate use of the assessment. During the studies constant supervision for all interviewers was provided.

**Procedure**

Although all applied measures are questionnaires, not all subjects proved literate enough to complete them on their own. Therefore in some cases the interviewers had to read some of the questions and sometimes to reread or reformulate the questions.

**Statistics**

Because of multiple comparisons based on the same data, significance levels were set to p = .01. Differences between sub-samples were calculated with  $\chi^2$ -tests. Rates for ICD-10 and DSM-IV were compared using a McNemar test for symmetry.

**Results and Discussion**

**What is the relationship between the PTSD prevalences calculated according to different criteria?**

Table 3 describes estimated rates for PTSD according to standard DSM-IV criteria, DSM-IV without Criterion A, DSM-IV with lowered avoidance criteria (two instead of three symptoms), DSM-IV without E and F, and ICD-10 for the complete sample, the sub-samples, and for gender.

As expected, the strict application of DSM-IV criteria resulted in the lowest PTSD rates. Ignoring both parts of criterion A leads to a rate increase of 6%. This is a procedure which has been followed in a number of studies on multiple traumatization and in particular with war trauma (see for example Arcel & Tocilj-Simunkovic, 1998; Ai et al., 2002), In

|   | Residents sample |    | Medical treatment |    | Psycholog. treatment |    | Female |    | Male  |    | Total |     |
|---|------------------|----|-------------------|----|----------------------|----|--------|----|-------|----|-------|-----|
|   | %                | N  | %                 | N  | %                    | N  | %      | N  | %     | N  | %     | N   |
| DSM-IV                                  | 18.6             | 18 | 32.7              | 32 | 38.6                 | 44 | 38.8   | 62 | 21.5  | 32 | 30.4  | 94  |
| DSM-IV without Criterion A              | 24.7             | 24 | 38.5              | 37 | 45.6                 | 52 | 45.9   | 73 | 27.0  | 40 | 36.8  | 113 |
| DSM-IV: Lowered avoidance (including A) | 19.6             | 19 | 37.8              | 37 | 42.1                 | 48 | 42.5   | 68 | 24.2  | 36 | 33.7  | 104 |
| DSM-IV without E and F                  | 24.74            | 24 | 35.71             | 35 | 43.86                | 50 | 43.13  | 69 | 26.85 | 40 | 35.28 | 109 |
| ICD-10                                  | 44.3             | 43 | 51.0              | 49 | 57.9                 | 66 | 58.5   | 93 | 43.9  | 65 | 51.5  | 158 |

Table 3: Effect of Using Different Diagnostic Criteria According to Sub-sample and Gender

the case of Sarajevo one can assume that a large majority of the population had experienced an event sufficient to satisfy the Criterion A1, since this group resided about three years in a war zone. For short or geographically restricted wars it is probably not justified to implicitly accept Criterion A1 for 100 % of the population (see Favaro et al., 1999). This criterion, however, also has a subjective aspect in that in some circumstances the respondent has to judge whether they or someone else experienced a severe threat to life. This criterion gains relevance if and when there is a habituation to war events. By the same token, it is possible that the willingness to agree to criterion A2 (feelings of fear, helplessness, and horror) varies in unforeseen ways with the increase of exposure to war events. Reasons range from increasing resilience to develop PTSD to increasing numbing (of emotions) due to having already developed the disorder. These six percent of people mentioned above fulfill all symptom criteria of DSM-IV. That reflects a special weakness of the diagnosis based on DSM-IV. Possibly, it depends on the interpretation of traumatic events of a post-war society.

Reducing the threshold of the avoidance criterion by one symptom does not lead to a dramatic increase in prevalence (from 30.4 % to 33.7 %) indicating that there is no evidence for a critical threshold in between these numbers of symptoms in our sample. Contrary to our finding, Schützwohl and Maercker (1999) found in a study with former political prisoners from the Democratic Republic of Germany, that the PTSD

prevalence rose from 30.8 % to 41.1 % with the relaxed avoidance criterion.

Neglecting the criteria of duration and impairment leads to an increase of about 5 % and consequently contributes to an increase in PTSD rates. These results compare to Peters et al. (1999).

Frequency estimates on the basis of the ICD-10 criteria yield a PTSD diagnosis for more than 50 % of the population, which is significantly different from DSM-IV (McNemar test, sig. = .00). In general, the results for the comparisons between ICD-10 and DSM-IV correspond well with others from previous literature (Andrews et al., 1999; Somasundaram & Sivayokan, 1994). ICD-10 rates are twice as high as DSM-IV rates when community samples are used. The higher PTSD rate according to ICD-10 diagnosis is fed by the lower number of avoidance symptoms and the missing criteria concerning duration and impaired functioning in everyday life. However, as mentioned above, the ICD-10 event criterion is, per definition, satisfied by the sheer presence in a war zone. This does not apply to DSM-IV, another factor, which increases the rates.

#### **How large is the concordance between DSM-IV and ICD-10?**

Percentage agreement, calculated from all cases, which are consistently classified as either non-cases or cases, is 75 %. To allow a comparison with another published paper on this issue (Andrews et al., 1999), we calculated the level of concordance defined as the percentage of participants positive on either classification and positive on both sets of criteria. The positive concordance is 53 % as op-

posed to Andrews et al. (1999) who found a concordance of 35 %. The higher number is possibly due to a ceiling effect in our study where all subjects had spent three years in a war zone.

#### **How sensitive are the criteria to sample characteristics and gender?**

Differences between the sub-samples were significant ( $\chi^2 = 10.28$ ;  $df = 2.31$ ;  $p = .006$ ) when DSM-IV criteria were applied. They were not significant with ICD-10 criteria ( $\chi^2 = 3.87$ ;  $df = 2.31$ ;  $p = .11$ ). Both sets of criteria seemed therefore differently sensitive to treatment conditions.

Differences between men and women became significant for DSM-IV ( $\chi^2 = 10.88$ ;  $df = 1.31$ ;  $p = .001$ ), but just missed significance for ICD-10 criteria ( $\chi^2 = 6.52$ ;  $df = 1.31$ ;  $p = .01$ ). Just as reported in literature, our sample showed large differences in PTSD symptomatology between men and women. However the gender differences start fading somewhat when ICD-10 criteria are used. As the gender difference for ICD-10 is only barely significant and other articles on this subject are not available these finding needs to be evaluated cautiously. In order to assess which items contribute the most to gender differences, the individual symptoms and criteria based on DSM-IV were sorted according to their size of difference. Contrary to the assumptions formulated in the beginning, namely that the A2 criterion differentiates the most, it was barely found among the five foremost differentiators. Instead, items of any symptom cluster were identified.

| Items                                    | Female | Male | Difference |
|--|--------|------|------------|
| C 6 emotional numbing                    | 58.9   | 38.8 | 20.1       |
| D 5 exaggerated startle response         | 45.5   | 28.6 | 16.9       |
| B 5 physiological reactivity on exposure | 65.8   | 50.0 | 15.8       |
| C 7 foreshortened future                 | 51.3   | 37.2 | 14.1       |
| C 5 detachment                           | 41.1   | 27.9 | 13.2       |

Table 4: Items Yielding Gender Differences in Percent

## Conclusions

Any conclusions based on the results of this study must first mention its major methodological disadvantage, namely its sole reliance on self-report measures. Having this in mind, there are still a number of conclusions, which can be drawn from our results, as follows.

If DSM-IV and ICD-10 do not actually intend to mean anything different with their respective PTSD constructs, then future formulations of their PTSD criteria should be further aligned, ensuring higher concordances. In addition, special consideration should be given to definitions of event, duration and impairment criteria. Although DSM-IV criteria have been discussed controversially in regards to their three required avoidance symptoms, it seems that in our sample the relative increase in prevalence is relatively small when compared to the contributions by the event, duration and impairment criteria.

The event criterion, which is defined differently in both criteria systems, contributes most to the difference in prevalences. This may be due to habituation and/or emotional numbing caused by war events.

However, the interpretation of an event may also be due to a comparison of one's own situation with those of other traumatized people.

Special conclusions drawn from the case of multiply exposed persons in a war zone highlight the necessity of assessing A1 and A2 criteria for war exposed civilians even when high exposure is verified. DSM-IV criteria are largely conceived in terms of single traumatic events rather than multiple traumatic events and therefore may underestimate true rates of PTSD. Therefore, a diagnosis based on the DSM-IV criteria seems to be better suited for a single-event trauma than for a complex chain of traumatic events as they happen through prolonged war trauma, ongoing torture or physical or sexual abuse. As for ICD-10, neglecting the aspect of impairment portrays an insufficiency. The revision of both classification systems should reflect all these aspects.

Furthermore DSM-IV criteria seem to differentiate more between samples in treatment and between men and women than ICD-10 criteria do. Presumably this is due to the tighter formulation of PTSD in DSM-IV as compared to ICD-10. Whether this increased sensitivity to treatment conditions and gender related symptoms in DSM-IV reflects genuine differences between groups is a

question which needs to be addressed in further research.

It is also necessary to study the reasons for gender differences. One should minimize those differences that are based on the formulation of items in order to find the actual reasons apart from methodological artifacts.

In conclusion, the DSM-IV seems to better portray the current theoretical construct of PTSD. It also appears to be better suited for its refinement regarding research aspects. Nevertheless, the DSM-IV shows weaknesses in terms of definitions, especially those of the A-criterion and its translation into the respective diagnostic instruments. Hence, for European purposes, the research criteria of ICD-10 are absolutely suitable for clinical reports – despite of their shortcomings, because they allow for a greater clinical judgement than DSM-IV, especially regarding clinical relevance and the interpretation of the traumatic event.

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