The use of psychoactive substances is one of the most significant public health problems due to its high prevalence, as well as major medical and social consequences. It was estimated that 1 out of 20 people between the ages of 15 and 64 years, had used an illicit drug during one year. The magnitude of this problem becomes more apparent when considering that more than 10% of those people are suffering from mental disorders due to psychoactive substance use [1].

Human aggression is defined as a behaviour that is intended to hurt another person, resulting or likely...
to result in injury, death or psychological harm [2]. It is known that aggression is a result of a complex interaction of neurobiological, psychological and environmental factors [3]. Unfortunately, we must agree that aggressiveness of people with mental disorders, including people with substance use disorders, attracts little scientific attention despite its obvious importance [4]. Contrary to previous professional opinions, that the risk of aggressive behavior in the population of psychiatric patients was not higher than in the general population, today it is known that people with certain psychiatric diagnoses are at increased risk for committing violent acts [5]. In other words, a mental disorder is, independently from other factors, associated with increased aggression rate and the risk is estimated to be about 4% [6]. The risk of aggressive behavior is even greater when there is a comorbidity of mental disorder and substance abuse [7, 8]. This connection between aggression and psychoactive substance use in people with mental disorders can be explained by acute pharmacological effects of substances that can exacerbate psychiatric symptoms or lead to poor compliance [9].

The association between substance use and aggression derives from the fact that among violent crime offenders there is a large number of people with alcohol or drugs abuse. Substance use-related aggression results in considerable personal suffering and socioeconomic costs [10–12]. This is consistent with the fact that a large number of aggressive offenders are assessed as having been under the influence at the time of the offense [13]. According to the data of the World Health Organization, alcohol consumption is associated with violence more closely than the use of any other psychoactive substance [14]. Literature data show that alcohol intoxication plays an important role in about half of all violent crimes worldwide [13]. It is estimated that over 3 million violent crimes occur each year in the United States where the offenders were under the influence of alcohol [15]. Besides that, specific studies have shown a significant association between alcohol use and homicide all over the world [16]. Alcohol-related aggression is not associated only with acute intoxication, it is also associated with chronic alcohol consumption. When compared to healthy controls, the risk of aggression is five times higher in people with mental disorders due to alcohol use [17]. However, alcohol-related violence does not occur in the majority of all alcohol-dependent patients [18]. In contrast to the above, a recent meta-analysis of 32 studies, showed that the effect of alcohol on aggression was medium [19].

When considering psychiatric treatment of addiction in the context of reducing the risk of aggression in alcoholics, it is important to note that in some studies violent behavior decreased significantly in patients who were successfully treated and remained abstinent at least for one year [20]. On the other hand, noncompliance with psychiatric treatment is described as an important factor for the development of aggressive behavior in all people with mental disorders [21].

The aim of this study was to determine the incidence of people with substance use disorders in the population of violent crime offenders, as well as to consider possible measures to reduce crime rates in this population.

### Material and Methods

For study purposes, forensic psychiatric reports of 94 violent offenders from 2001 to 2018 were examined. The expert reports were obtained from the Psychiatry Clinic in Novi Sad, Serbia, including court case files, medical records, and psychiatric and psychological records of all offenders. All forensic records are the property of the Clinical Centre of Vojvodina and their use was authorized by the Ethics Committee in 2017. We emphasize that the Local Court rules require psychiatric evaluation of all the individuals charged with violent crimes during the trial to assess their mental capacity and criminal liability.

Sample baseline characteristics were summarized using means or frequencies, as appropriate. Data processing included methods of descriptive statistics, numerical features were presented through measures of central tendency (arithmetic mean) and measure of variability (range of values), and attributable features using frequencies and percentages.

### Results

The sample included 94 violent offenders, who were mainly male (85%) and young people (median age 37 ± 4.1 years). Forensic examination and court case files revealed that more than a quarter (27%) of them had first degree relatives who suffered from psychiatric disorders. The most prevalent mental disorder among relatives of violent offenders was alcoholism (68%).

As for the mental state of crime offenders, the data showed that almost one third of all subjects (32%) had a psychiatric diagnosis before they committed the current crime. Substance use disorder was the most frequent diagnosis, accounting for 27.9%. Forensic psychiatric evaluation of the sample showed that one quarter (25%) of all offenders had a major mental disorder at the time when the crime was committed. A “major mental disorder” was defined earlier for research purposes and included mood disorders, psychotic disorders and substance use disorders. More than half (60%) of individuals with major mental disorders received a diagnosis from the group of substance use disorders (F1 according to the International Classification of Diseases – 10th revision). This means that 15% of all offenders from our sample suffered from psychoactive substance use disorder at the time of the offense, while the most common diagnosis was alcohol use disorder (9%) followed by opioid use disorder (5%).
In addition to the above mentioned, it is important to emphasize that exactly half of all the violent crimes were committed under the influence of psychoactive substances. This means that 50% of violent offenders were intoxicated at the time of the crime and the vast majority of them were under the influence of alcohol (96%). Data from the court case files, mainly laboratory findings, enabled the reconstruction of the level of acute alcohol intoxication among violent offenders at the time of the offense. The most frequent level of alcohol intoxication was mild (64%), while moderate and severe degree of intoxication was present in 36%. The severity of intoxication is important for further assessment of the accountability of offenders at the time of committing the offense, because alcohol, among other factors, can negatively impact cognitive and volitional mental functions.

Discussion

The results of our research are in line with literature data with respect to the demographic characteristics of the sample. Our study included 85% of males, confirming the known predominance of males in the population of violent offenders [22]. The average age of the offenders was 37 years, which is consistent with literature data describing the offenders as young adults and middle-aged persons [23].

In view of results showing a high prevalence of mental disorders, mostly alcoholism, in close relatives of violent offenders from our sample, we emphasize the known fact that a family history of mental disorders is considered a major independent risk factor for violence [24].

Almost one third of the sample (32%) was diagnosed and treated by psychiatrists before the offense. This is important in the context of prevention, because adequate treatment lowers and poor compliance increases the risk of violent behavior in the population of people with mental disorders.

In general, high incidence of people with mental disorders (25%) and substance use disorders (15%) in our study sample is consistent with literature data and points out the responsibility of psychiatry as a clinical discipline to at least try to partially reduce the risk of violence [25, 26]. This could be done by timely and adequate treatment of people with mental disorders.

Exactly half of the offenders from the sample were acutely intoxicated at the time of the offense and alcohol was the most frequently used substance (96%). This result is consistent with the results of similar studies reporting that 34–59% of men commit crimes under the influence of psychoactive substances, and that most of the violent offenders were under the influence of alcohol [27].

Conclusion

A large number of people with mental disorders in the group of violent offenders demonstrate that improving prevention, recognition and treatment of mental disorders may contribute to reducing the crime rates. Knowledge about the etiology and treatment of psychoactive substance induced aggression is insufficient, despite the high prevalence of such behavior. Further research is needed to clarify why some people who use psychoactive substances exhibit violence, while others do not. In order to develop specific programs for the prevention of violence in the population using psychoactive substances, controlled studies comparing the specific forms of intervention with the standard treatment of addictive disorders are necessary.

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