

# The Effect of Sociodemographic and Socioeconomic Factors in Criminal Behavior of Male Patients With A Bipolar I Disorder



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## SUMMARY

**Objective:** This study evaluates the influence of socioeconomic and demographic factors on the criminal behavior of male patients with bipolar type I disorder.

**Methods:** A total of 48 male patients diagnosed with type I bipolar disorder according to DSM IV criteria and a criminal history in a forensic psychiatry facility and 53 male patients with the same diagnosis but without a criminal history who were treated at the Bakirkoy Prof. Dr. Mazhar Osman Training and Research Hospital for Psychiatry, Neurology and Neurosurgery were included in the study group. Socioeconomic and sociodemographic characteristics were compared between the two patient groups.

**Results:** The average duration of formal education in the forensic group (7.42±3.74 years) was less than in the control group (9.74±3.96 years) (p<0.05). The proportion of divorced and the widowed patients was greater among the forensic group (70.9%) relative to the control group (49%), (p<0.05). The proportion of people without professional training (50% vs. 22.6%) and the unemployment rate (75% vs. 45.3%) were greater among the forensic group relative to the control group (p<0.001). Fewer patients in the control group were enrolled in social insurance compared to the control group (54.2% vs. 5.7%), (p<0.001). Logistic regression analysis indicated a relationship between lower migration rate and lack of social insurance with criminal behavior among patients in the forensic group.

**Conclusion:** The findings demonstrate the relationship between sociodemographic and socioeconomic factors and criminal behavior in male patients with a bipolar I disorder. To protect both the patient and the society, these factors are of importance and they should be taken into account by both juridical and psychiatric institutions.

**Key Words:** bipolar I disorder, crime, demographic factors, socioeconomic factors

## INTRODUCTION

Numerous studies have examined the association between psychiatric disorders and violent behavior, and several have emphasized an increased risk of violent behavior among patients with serious mental illness (Meninger 2000, Erb 2001, Shanda et al 2010, Volavka 2013).

Not all psychiatric disorders are associated with the same risk of violent behavior; however the incidence of violent behavior has increased proportionally with the overall increase in violent behavior among the general population (Erb 2001,

Meninger 2000, Mulvey 1994). Although most psychiatric disorders are not linked to violent behavior, patients with severe psychiatric illness such as schizophrenia or bipolar disorder are more likely to behave violently (Volavka 2013).

Our knowledge regarding violent behavior and criminal activity among patients with affective disorders is limited. The prevalence of affective disorders among criminal offenders ranges from 1 to 31% (Modestin et al 1997). A study examining criminal behavior among psychiatric patients, including those with bipolar disorder, reported that only 7% of violent offenders had diagnosed affective disorder (Modestin

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et al 1997). The National Comorbidity Survey of police and court records performed in the United States from 1990-1992 reported that the lifetime incidence of aggressive behavior among individuals with a diagnosis of bipolar disorder was 12.2% (Volavka 2013). In a NESARC study involving 43,093 adults in the United States, the 15-year incidence of aggressive behavior among bipolar type I and bipolar type II patients was 25.34% and 13.58%, respectively (Grant et al 2005). Fazel et al (2010) reported a relative risk ratio for violent behavior among bipolar disorder patients (3743) relative to the general population (37,429) of 3.1 in the absence of comorbid substance abuse, and 19.9 for bipolar patients with comorbid substance abuse.

Socio-economic factors have been emphasized in studies examining the causes of violent and criminal behavior among the mentally ill. Factors such as unemployment, low education level, and low socioeconomic status increased the risk of recidivism among male patients, regardless of the presence of mental illness (Marzuk 1996, Erb 2001, Swanson et al 1990, Monahan 1992, Tardiff 2000, Estroff et al 1994, Mulvey 1994, Lamb et al 1999, Öncü et al 2007). Patients with bipolar disorder are subject to a higher unemployment rate, lower rate of marriage, and decreased cognitive function compared with the general population (Morgan et al 2005, Morselli et al. 2004, Akkaya et al 2012). Young affective disorder patients exhibiting criminal behavior are predominantly single men with low socioeconomic status (Modestin et al 1997). Other studies have reported that greater than 50% of patients with an affective disorder are single (White 2004).

Lack of education is associated with increased incidence of violent behavior in nearly all the published studies. Among Turkish psychotic offenders, lack of education is common (Öncü 2002a, Özdemir 1992, Şeker et al. 1997).

Unemployment, unsustainable, and irregular employment are prevalent among individuals with chronic psychotic disorders. Among psychotic patients who committed a crime, 18% had no profession, 79% were unemployed, and 13% only 13% had regular employment (Öncü 2002b). While the rate of unemployment is higher among psychiatric patients than in the general population, there is no difference in ownership and work sustainability has been reported when comparing patients committing a crime and patients with no criminal history. However, patients with psychiatric disease are less likely to have occupations requiring professional expertise (Özdemir 1992, Kayatekin et al 1991, Uygur et al 1992). Despite the high rate of employment among criminal offenders with psychotic illness, high unemployment is also prevalent in non-offenders with psychotic illness; however, unemployment is a significant risk factor for violent and criminal behavior (Öncü et al 2007).

Social security enrollment is important for maintaining access to health care and ensuring regular treatment of mental illness. Studies in Turkey have reported that only 5% of psychotic criminal offenders were enrolled in social security (Kayatekin et al 1991). Another study indicated that 48.6% of criminal offenders with psychotic disease were not enrolled in social insurance (Öncü et al 2007). Low income and lack of social security have also been associated with repetitive criminal behavior (Öncü et al 2002b, Türkcan et al 1997).

Although previous studies have examined the relationship between violent and criminal behavior and chronic psychotic disorder, studies specifically examining this relationship among the population with bipolar type I disorder are inadequate. This study examines the influence of socioeconomic and demographic factors on the risk of recidivism among patients with bipolar type I disorder.

## METHOD

This study was conducted at the Bakirkoy Prof. Dr. Mazhar Osman Training and Research Hospital for Psychiatry, Neurology and Neurosurgery in a Forensic Psychiatry Unit serving a total of 17 provinces and about 27 million people, and at the Raşit Tahsin Mood Center. The Forensic Psychiatry Unit administers compulsory treatment and expertise services for outpatient or inpatient cases who have committed a criminal act. The Raşid Tahsin Mood Centre serves patients with mood disorders in a specialized unit providing outpatient medical treatment and follow up.

At the time of the study, the Forensic Psychiatry Department had a capacity of 392 beds. A total of 48 male cases with a bipolar I disorder according to DSM-IV (American Psychiatric Association 1994) diagnostic criteria were evaluated in this study. This included outpatient and inpatient cases undergoing compulsory treatment services as a result of having committed a criminal offense. At the Raşit Tahsin Mood Center, 53 male cases diagnosed with bipolar disorder according to DSM-IV criteria and with no criminal history were matched in terms of age and disease duration to the criminal group. Patients aged between 18 and 65 years were included in the study. Patients experiencing disease remission (Young Mania Rating Scale score less than 5, Hamilton Depression Rating Scale score less than 7) were included in the study (Karadağ et al 2001, Akdemir et al 1996) to ensure reliability of the data. Patients diagnosed with mood disorders other than bipolar type I disorder, psychiatric disorders associated with a general medical condition, head trauma, epilepsy, mental retardation, or other neurological disorder were excluded from the study. Informed consent was obtained from all patients included in the study. The study was reviewed and approved by the hospital ethics committee.

Current and prior medical records were evaluated between March and October 2009 without considering the time of admission and duration of hospitalization.

The demographic and socio-economic data were collected using a standardized form consisting of 144 questions regarding marital status, level of education, work status, income levels and social security. Individual evaluations included both current and past medical records of patients as well as personal communications with the patients. All statistical analysis was performed using SPSS program version 17.00. Student's *t* test was used to evaluate differences in numeric variables while the chi-square test was used to evaluate categorical variables. Logistic regression analysis was performed to evaluate the relationship between social and economic variables and repeat criminality.

## RESULTS

All of the cases included in the present study involved male patients. There was no significant difference in age between the forensic patients and the control group ( $38.04 \pm 9.98$  vs.  $39.15 \pm 10.46$  years,  $p > 0.05$ ). The average duration of formal education in the forensic patients ( $7.42 \pm 3.74$  years) was significantly less than among the control group ( $9.74 \pm 3.96$  years,  $p < 0.05$ ). Among the forensic patients, the average age at disease onset was  $23.33 \pm 5$  years and the average disease duration was  $14.98 \pm 9.22$  years. However, in the control set the average age

at disease onset was  $23.47 \pm 8.33$  years and the average disease duration was  $15.72 \pm 8.29$  years. The differences in disease onset and disease duration were not statistically significant.

Regarding marital status, the proportion of single, separated, or widowed patients in the forensic group (70.9%) was greater than in the control group (49%) but was not statistically significant ( $p < 0.05$ ). The proportion of married patients was significantly greater in the control group than in the forensic group (50.9% vs. 29.2%,  $p < 0.05$ ), (Table 1).

Although more than half of the patients were living with a first degree relative in both of the patient groups, the proportion of individuals living with a parent was greater in the forensic group (43.8%). 18.8% of the patients in the forensic psychiatry group and 7.5% of the patients in the control group lived alone, a difference that was not statistically significant (Table 1).

The proportion of individuals living in urban areas was greater in the control group than in the forensic group (92.5% - 79.2%), however this difference was not statistically significant.

The proportion of patients with no professional training was significantly greater in the forensic group relative to the control group (50% vs. 22.6%,  $p < 0.001$ ). Unemployment was common in both patient groups, however it was significantly more common among the forensic patient group (45.3% vs. 75%,  $p < 0.001$ ). When evaluating employment status over

**Table I.** Comparison of the cases according to level of education, marital status, who the patients live with and immigration

|                              | Forensic group |      | Control group |      | Total |      | X <sup>2</sup> | sd | p       |
|------------------------------|----------------|------|---------------|------|-------|------|----------------|----|---------|
|                              | n              | %    | n             | %    | n     | %    |                |    |         |
| <b>Level of education</b>    |                |      |               |      |       |      | 12,009         | 4  | 0,017*  |
| Literate                     | 3              | 6,3  | 2             | 3,8  | 5     | 5,0  |                |    |         |
| Primary school               | 24             | 50,0 | 14            | 26,4 | 38    | 37,6 |                |    |         |
| Secondary school             | 9              | 18,8 | 6             | 11,3 | 15    | 14,9 |                |    |         |
| High school                  | 8              | 16,7 | 17            | 32,1 | 25    | 24,8 |                |    |         |
| College                      | 4              | 8,3  | 14            | 26,4 | 18    | 17,8 |                |    |         |
| <b>Marital status</b>        |                |      |               |      |       |      | 11,202         | 3  | 0,011*  |
| Single                       | 21             | 43,8 | 19            | 35,8 | 40    | 39,6 |                |    |         |
| Married                      | 14             | 29,2 | 27            | 50,9 | 41    | 40,6 |                |    |         |
| Widowed                      | 1              | 2,1  | 4             | 7,5  | 5     | 5,0  |                |    |         |
| Divorced                     | 12             | 25,0 | 3             | 5,7  | 15    | 14,9 |                |    |         |
| <b>Who the patients live</b> |                |      |               |      |       |      |                |    |         |
| Alone                        | 9              | 18,8 | 4             | 7,5  | 13    | 12,9 | 2,819          | 1  | 0,225   |
| Cohabit with someone         | 39             | 81,3 | 49            | 92,5 | 88    | 87,1 |                |    |         |
| <b>Immigration</b>           |                |      |               |      |       |      |                |    |         |
| Yes                          | 20             | 41,7 | 37            | 69,8 | 57    | 56,4 | 8,115          | 1  | 0,004** |
| No                           | 28             | 58,3 | 16            | 36,2 | 44    | 43,6 |                |    |         |

$p > 0.05$ : not significant; \* $p < 0.05$ : significant; \*\* $p < 0.01$ : highly significant difference.

**Table II.** Comparison of the Cases in Terms of Professional Life and Social Security

|                          | Forensic group |      | Control group |      | Total |      | X <sup>2</sup> | sd | p         |
|--------------------------|----------------|------|---------------|------|-------|------|----------------|----|-----------|
|                          | n              | %    | n             | %    | S     | %    |                |    |           |
| <b>Working condition</b> |                |      |               |      |       |      | 13,513         | 2  | 0,001***  |
| Unemployed               | 35             | 72,9 | 22            | 41,5 | 57    | 56,4 |                |    |           |
| Working irregularly      | 8              | 16,7 | 9             | 17,0 | 17    | 16,8 |                |    |           |
| Working regularly        | 5              | 10,4 | 22            | 41,5 | 27    | 26,7 |                |    |           |
| <b>Currently job</b>     |                |      |               |      |       |      | 9,224          | 1  | 0,002**   |
| No                       | 36             | 75,0 | 24            | 45,3 | 60    | 59,4 |                |    |           |
| Yes                      | 12             | 25,0 | 29            | 54,7 | 41    | 40,6 |                |    |           |
| <b>Profession</b>        |                |      |               |      |       |      | 7,069          | 1  | 0,008**   |
| No                       | 24             | 50,0 | 12            | 22,6 | 36    | 35,6 |                |    |           |
| Yes                      | 24             | 50,0 | 41            | 77,4 | 65    | 64,4 |                |    |           |
| <b>Income</b>            |                |      |               |      |       |      | 13,522         | 1  | <0,001*** |
| No                       | 27             | 56,3 | 11            | 20,8 | 38    | 37,6 |                |    |           |
| Yes                      | 21             | 43,8 | 42            | 79,2 | 63    | 62,4 |                |    |           |
| <b>Social security</b>   |                |      |               |      |       |      | 28,954         | 1  | <0,001*** |
| No                       | 26             | 54,2 | 3             | 5,7  | 29    | 28,7 |                |    |           |
| Yes                      | 22             | 45,8 | 50            | 94,3 | 72    | 71,3 |                |    |           |

\*\*p<0.01: highly significant difference, \*\*\*p<0.001: very highly significant difference.

**Table III.** Comparison of the cases according to the parental death, parental separation and childhood exposure to violence

|                                                   | Forensic group |      | Control group |      | Total |      | X <sup>2</sup> | sd | p      |
|---------------------------------------------------|----------------|------|---------------|------|-------|------|----------------|----|--------|
|                                                   | n              | %    | n             | %    | n     | %    |                |    |        |
| <b>Death of parents (before the 15 years age)</b> |                |      |               |      |       |      | 0,002          | 1  | 0,966  |
| Yes                                               | 8              | 16,7 | 9             | 17,0 | 17    | 16,8 |                |    |        |
| No                                                | 48             | 83,3 | 44            | 83,0 | 84    | 83,2 |                |    |        |
| <b>Separation of parents</b>                      |                |      |               |      |       |      | 0,279          | 1  | 0,706  |
| Yes                                               | 4              | 8,3  | 3             | 5,7  | 7     | 6,9  |                |    |        |
| No                                                | 44             | 91,7 | 50            | 94,3 | 94    | 93,1 |                |    |        |
| <b>Childhood exposure to violence</b>             |                |      |               |      |       |      | 5,564          | 1  | 0,018* |
| No                                                | 11             | 22,9 | 24            | 45,3 | 35    | 34,7 |                |    |        |
| Yes                                               | 37             | 77,1 | 29            | 54,7 | 66    | 65,3 |                |    |        |

p>0.05: not significant; \*p<0.05: significant.

the preceding year, the number of individuals with regular employment was found to be greater in the control group (41.5% vs. 10.4%, p<0.05).

The proportion of individuals with no personal income was 56.3% in the forensic psychiatry treatment group and 20.8% in the control group, a difference that was statistically significant (p<0.001).

The proportion of patients enrolled in social security was significantly greater in the control group than in the forensic group (54.2% vs. 5.7%, p<0.001) (Table 2).

The proportion of patients who had lost a family member before the age of 15 was 16.7% in the forensic group and

17% in the control group. No statistically significant difference was found between the two groups (p > 0.05). Although the proportion of patients with separated parents was greater in the forensic group than the control group (8.3% vs. 5.7%), this difference was not statistically significant (p>0.05). The proportion of patients who reported childhood exposure to violence was significantly greater in the forensic group than in the control group (77.1% vs. 54.7%, p< 0.05) (Table-3).

A total of 41.7% of the forensic patients reported a history of migration, significantly less than among the control group (69.8%, p>0.05). A greater proportion of the forensic cases had lived in a rural area compared to the control group

**Table IV.** The Effects of Immigration (No/Yes), Duration of Education , Personal Income (No/Yes), Childhood Exposure to Violence(No/Yes), Social Security (No/Yes), and Currently Job (No/Yes) as Explanatory Variables on Criminal Behavior according Regression Analysis

|                                         | B      | S.E.  | Wald   | df | p         | OR     | 95% confidence interval |         |
|-----------------------------------------|--------|-------|--------|----|-----------|--------|-------------------------|---------|
|                                         |        |       |        |    |           |        | Lowest                  | Highest |
| Immigration (No/Yes)                    | 1,761  | 0,583 | 9,123  | 1  | 0,003**   | 5,816  | 1,856                   | 18,232  |
| Duration of Education                   | 0,142  | 0,074 | 3,733  | 1  | 0,053     | 1,153  | 0,998                   | 1,331   |
| Personal Income (No/Yes)                | -0,468 | 0,750 | 0,390  | 1  | 0,532     | 0,626  | 0,144                   | 2,724   |
| Childhood Exposure to Violence (No/Yes) | -0,675 | 0,592 | 1,300  | 1  | 0,254     | 0,509  | 0,159                   | 1,625   |
| Social Security (No/Yes)                | 3,190  | 0,850 | 14,072 | 1  | <0,001*** | 24,284 | 4,587                   | 128,564 |
| Currently Job (No/Yes)                  | 0,558  | 0,691 | 0,651  | 1  | 0,420     | 1,747  | 0,451                   | 6,771   |
| Constant                                | -3,973 | 1,108 | 12,864 | 1  | <0,001*** | 0,019  |                         |         |

p>0.05: not significant; \*\*p<0.01: highly significant difference,\*\*\*p<0.001: very highly significant difference.

Logistic regression model: X<sup>2</sup>=50,389 p<0,001

(20.8% vs. 7.5%) and the proportion of individuals who had moved from a rural region to an urban center was greater in the forensic group than the control group (54.1% vs. 5%).

A logistical regression analysis including the independent variables of history of migration, duration of education, employment status, presence of regular income, and social security enrollment was found to be highly predictive of criminal behavior (X<sup>2</sup> = 50.389 p <0.001). Two independent variables, the absence of migration (5.8-fold), and lack of social security enrollment(24.3-fold) were significantly associated with repeat criminality (Table 4).

## DISCUSSION

The duration of formal education was significantly shorter among the forensic patients (p<0.05), similar to other studies conducted in Turkey and in the international literature associating poor education with increased rates of violent and criminal behavior (Monahan 1992, Özdemir 1992, Şeker et al 1997, Kravitz and Kelly 1999, Öncü et al 2002a, b, Draine 2002).

39.6% of bipolar individuals in both groups were unmarried, while 70.1% of the forensic group and 49% of the control group had left their spouse or had been widowed. A previous study conducted across Turkey reported that 44% of patients with bipolar disorder were unmarried, 46.3% married, 3.9%

were widowed, and 5.8% were divorced (Akkaya et al 2012). The proportion of unmarried affective disorder patients who had committed a crime was reported to be greater than the number of unmarried patients who had not committed a crime (64% to 59%) (Modestin et al 1997). Several additional studies have confirmed that unmarried individuals are more likely to commit crime than those who are married (Marzuk 1996, Erb 2001, Özdemir 1992, Nicholson et al 1991, Şeker et al 1997, Kravitz and Kelly 1999, Torrey 1994, Türkcan et al 2000, Swanson et al 2002, Harris et al 2002, Öncü et al 2002a). Our study also indicated a significantly smaller proportion of married individuals among the forensic group than in the control group. We concluded that being single, separated, or widowed increases the risk of criminal behavior among patients with bipolar disorder.

In a study conducted by Öncü et al. (2007), more than 50% of psychiatric patients were living with a first degree relative, 24.3% individuals with psychiatric illness who had committed a crime lived with a spouse and/or children and in total the proportion of criminal cases living in a family was greater than the proportion of patients living alone (81.4% vs. 15.7%). In another study, approximately half of cases were residing with parents, about 26% of cases lived with a spouse and/or children, 14.2% were living alone, and 0.7% were homeless (Öncü 2002a). In our dataset, 18.8% of individuals in the forensic group lived alone, and 43.8% lived

with parents; these results were similar to data obtained in other studies. There was no significant difference in criminal behavior between individuals who lived alone and those who lived with a family.

Prior to hospitalization, the proportion of individuals living in an urban environment was lower among the forensic group than in the control group. The criminal behavior was more common among individuals who lived in a rural environment prior to hospitalization (20.8% vs. 7.5%). A significantly lower rate of migration was observed in the forensic group compared to the control group. Individuals in the forensic psychiatry group were more likely to live in a rural area and were less likely to have a history of migration. These results suggest that individuals with bipolar disorder living in rural areas may have difficulty accessing medical services and this may increase the severity of disease and the incidence of violent behavior. Further studies will be required to evaluate this hypothesis.

Regarding employment history, 50% of forensic cases had no professional training and a significantly higher unemployment rate than the control group (75% vs. 45.3%). 58.3% of patients who committed a crime were unemployed prior to the crime, 41.7% worked irregularly, and 10.4% of these patients had regular employment at the time of admission to the hospital. Among the forensic cases, unemployment was high prior to the criminal behavior, but increased significantly following the commission of a crime. The difference in employment history between the forensic and control groups may be associated with the clinical severity of the psychiatric illness. However, the relationship between disease severity and unemployment needs to be evaluated in future studies.

In a study by Akkaya et al. (2012) covering the whole of Turkey and including 584 patients with bipolar I disorder, the unemployment rate was reported to be 68.4%. Our study obtained similar results to these previous reports. Among psychotic patients who had committed a crime, Öncü et al. (2002b) reported that the proportion of patients with professional training was greater among the patients who had committed a crime than in the control group, however 86.7% of cases in the forensic group were unemployed; the authors concluded that unemployment was a significant risk factor for criminal behavior. Another study examining patients undergoing compulsory treatment reported that 18% had no professional training and 78% - 79% of these patients had not been employed prior to committing a crime or during the research period, and only 7.5% had been employed prior to the crime with 13% being employed during the research period.

After parole without criminal conviction, the incidence of repeat criminality is greater among patients with lower social function (Kravitz and Kelly 1999).

Research on employment of the mentally ill has indicated an increased proportion of individuals working labor-based jobs.

There is a strong relationship between the level of education and type of employment in later life (Draine et al 2002). In our study group, the forensic psychiatry patients exhibited more severe disease. Circumstances related to disease course, treatment, and judicial processes may contribute to the difficulty in maintaining consistent employment.

Our analysis demonstrated that 54.2% of patients who had committed a crime were not enrolled in social security, while only 5.7% of patients in the control group were not enrolled. According to our logistic regression analysis, there was a strong relationship between the lack of social security and criminal behavior. Non-enrollment in social security was associated with a 24.2 fold increase in the risk of repeat criminal activity. The proportion of patients with no income was greater in the forensic group than in the control group (56.3% to 20.8%). The absence of social security and personal income are important risk factors for criminal activity that may be directly related to the ability to access medical treatment.

Previous study reported that 48.6% of patients who had committed a criminal offense were not enrolled in social security (Öncü et al 2007). Another study reported that 62% of criminal cases involved individuals who had no income and 30% had no social security. Other reports have confirmed that the majority of individuals who commit crimes are not enrolled in social security (Öncü et al 2002b, Türkcan et al 1997).

77.1% of patients who committed a crime were exposed to physical or emotional trauma during childhood. In a study Neria *et al.* in 2005, 40% of patients with psychotic bipolar disorder had a history of childhood trauma. The experience of childhood trauma may be associated with criminal activity in individuals with bipolar disorder.

Numerous factors prevalent among the forensic cases including low level of education, unemployment, lack of income, and the lack of social security, rural living conditions, childhood trauma, and being unmarried or separated are also associated with repeat criminal behavior. Unemployment and the lack of social security are closely associated with criminal activity.

Regardless of employment status, enrollment in social insurance reduces the risk of criminal behavior among the mentally ill. Individuals enrolled in social security have better access to medical treatment that may prevent worsening of the disease and the development of criminal behavior.

Important limitations in this study include the retrospective design, inclusion of outpatient cases as the control group, and the lack of clinical data regarding patient disease history. However, the rate of criminal behavior is low among individuals with bipolar disorder, making this population unsuitable for prospective studies. Additionally, the control group included cases in disease remission. In this respect, further

research is required to evaluate the factors influencing criminal behavior among individuals with bipolar type I disorder.

## CONCLUSION

Social, psychological, and economic factors contribute the incidence of violent and criminal behavior.

In this study, it has been determined that patients with bipolar I disorder who committed a crime have significantly lower levels of education, are more likely to be unmarried, less likely to have moved during their lifetime, less likely to be enrolled in social security, and are more likely to be unemployed. The majority of these patients live in cities, but the incidence of violent and criminal behavior is higher among individuals living in rural areas.

Our data indicated that residing in a rural area and the lack of social security benefits are two strong independent predictors of repeat criminality among individuals with bipolar type I disorder.

These results suggest that bipolar patients may have difficulty accessing psychiatric care. Access to healthcare itself may be a significant motive for migration out or rural areas in addition to other economic concerns. Consistent access to medical treatment, provided with social security enrollment, may positively influence the course of disease in individuals with bipolar disorder. Enrollment in social security and increased access to psychiatric services may reduce the risk of violent and criminal behavior among the mentally ill. Larger studies that incorporate patient clinical histories will be required to validate these findings.

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