



Recidivism among prisoners with severe mental disorders

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ABSTRACT

Introduction: Mental disorders are common among prison inmates, with a high rate of recidivism found among those with severe mental disorders. In Japan, the number of inmates with mental disorders has been increasing with the increasing rate of recidivism. Prisoners need an uninterrupted connection to post-release support to prevent them from being incarcerated again. This study identified inmates diagnosed with mental disorders whose recidivism had recently increased to investigate recidivism among inmates with severe mental disorders and the risk factors for reincarceration.

Methods: This study included 148 prisoners released from the Medical Correction Center in East Japan. Clinical diagnoses were coded using the World Health Organization's International Classification of Diseases, Tenth Revision. Risk factors focusing on the central eight items were categorized, and recidivism within 3 years of release was investigated.

Result: Overall, the recidivism rate was 29.7%, with the risk of recidivism increasing by 170% in inmates with multiple incarcerations. A diagnosis of intellectual disability increased the risk of recidivism by 176%. Patients with schizophrenia were consistently less likely to recidivate than patients with other disorders.

Conclusion: Intellectual disability was identified as a risk factor for recidivism, as was multiple incarcerations. These prisoners may not be connected to medical and social services and thus may not be receiving appropriate assistance. Patients with schizophrenia might be more likely to be connected to medical care and receive support after release. Further research should be conducted using these findings to prevent recidivism among inmates with mental disorders.

1. Introduction

Mental disorders are common among prison inmates [1]. Inmates with mental disorders often have co-occurring chronic physical health problems and substance use disorders that require individualized care [2]. Evidence shows that post-release medications and community health services can help to lower the recidivism rates in this inmate population [3–5]. The recidivism rate of inmates with severe mental disorders is high [6,7], and it is important to ensure an uninterrupted connection to post-release support to prevent recidivism.

Various findings exist on the relationship between mental disorders and recidivism/reincarceration. A recent meta-analysis suggested that the risk factors associated with criminal behavior carry more risk than the mental disorders themselves [8,9]. Substance

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abuse has been identified as a strong predictor of recidivism among inmates with mental disorders [8,10–15] and personality disorders are also strongly associated with recidivism. Some studies have suggested that mental disorders—other than substance-related disorders and personality disorders—are associated with recidivism/reincarceration: schizophrenia and bipolar affective disorder are associated with high rates of recidivism [16], major depression is more likely to occur in recidivists [17], patients with current schizophrenia symptoms reoffend earlier after release [18], and bipolar disorder has a stronger impact on violent reoffending than other mental disorders [19]. These studies investigated the types of mental disorders present in correctional facility inmates and what types of support are needed for them, rather than whether mental disorders per se put offenders at risk for recidivism. Forensic psychiatric patients form a very heterogeneous population with respect to the type and severity of the crimes committed, psychopathological characteristics, and risk and protective factors for reoffending [20]. Therefore, ongoing research into the relationship between mental disorders and recidivism is important.

In Japan, the number of recognized criminal offenses has continued to decline since 2003; however, the ratio of recidivist headcount to total arrests has consistently risen, reaching a record high of 48.7% in 2016 [21]. Thus, the prevention of recidivism is a priority in Japan [22]. The White Paper on Crime uses “recidivism rate within 2 years” and “recidivism rate within 5 years” as indicators of the recidivism rate [23]. These measures determine how many inmates released from penal institutions each year reentered the penal system for a new crime within a certain period after release. Therefore, in this paper, “recidivism” was defined as reentry into a penal institution for a new crime within a certain period after release from prison.

According to Japan’s Ministry of Justice, the ratio of inmates with mental disorders to those without has increased approximately 2.4-fold from 1996 to 2015 [24]. Furthermore, in penal institutions, the recidivism rate of individuals with mental disorders tends to be higher than that of the overall inmate population [24]. The most recent reports to examine each diagnosis and recidivism are those by Yamagami et al. (1995) [15] and Inoue et al. (1996) [25]; however, no studies have been conducted as recidivism became an issue recently.

The Medical Correction Center in East Japan (formerly known as Hachioji Medical Prison Hospital) is a facility of the Ministry of Justice that holds prisoners who are in need of physical and mental health care. The psychiatric unit accommodates prisoners with severe mental disorders who require special care, such as frequent medical examinations and medication, and is staffed by several full-time psychiatrists. The Center also accommodates prisoners with mental disorders who are deemed incapable of living in a general prison. When a prisoner’s symptoms improve with treatment and they are considered capable of living in a general prison, they are returned to the original prison. A release with full sentence from the Center means that the patient has severe symptoms and needs continued medical care. By studying inmates released from the Center, the prognosis for repeat incarceration of those with severe mental disorders can be investigated.

Risk factors for criminal behavior should also be considered. The risk-need-responsivity model is widely known regarding risk factors for recidivism [26]. According to this model and the underlying General Personality and Cognitive Social Learning theory, the central eight (C8) is at the core of the development of criminal behavior. The C* items are: 1) criminal history, 2) procriminal companions, 3) procriminal attitudes and cognitions, 4) antisocial personality pattern, 5) education/employment, 6) family/marital, 7) substance abuse, and 8) leisure/recreation. Bonta et al. reported in 2014 that the C8 predicted general/violent recidivism better than clinical diagnosis in offenders with mental disorders [8].

The Ministry of Justice in Japan implements programs in penal institutions in accordance with the risk-need-responsivity model, which is the basic principle for the treatment of offenders, with the aim of preventing recidivism. However, the association between the C8 and inmates with mental disorders has not been examined in Japan. Investigating these relationships is important to consider appropriate release support.

We hypothesized that some mental disorders are associated with recidivism, and that the C8 items are independent risk factors for reincarceration. This study aimed to (1) identify the diagnoses of inmates with mental disorders who had been exhibiting increased recidivism recently and (2) identify the risks associated with clinical diagnoses or C8 for recidivism among inmates with severe mental disorder.

2. Methods

2.1. Study participants

G × Power 3.1.9.7 for Windows was used to determine the sample size needed for this study [23]. A sample size of 143 was set using the chi-square test family; an effect size, w , of 0.3; error probability, α , of 0.05; power (1- β error) of 0.8; and the degree of freedom (df) of 5.

The participants comprised 165 inmates with mental disorders released from the Medical Correction Center in East Japan between April 2013 and December 2019. Prisoners are transferred to the Center when they are found to be unfit to complete their terms in a general prison due to their mental condition, that is, when they are judged to have a mental disorder that requires intensive treatment. If the treatment alleviates the condition, the inmate is returned to the general prison; if an inmate remains in the medical prison until they have served their full sentence, it is indicative of the severity of the mental disorder and a requirement for continuous intensive treatment. The participants were either released after serving their full sentences or transferred to a prison near their planned residence before their sentence was completed.

The purpose of this study was to investigate the recidivism of released inmates with mental disorders. Therefore, foreign nationals who were deported and could no longer be tracked and older adult inmates released to hospitals due to physical problems (and who were thus unlikely to reoffend) were excluded. Inmates who had missing data for survey items were also excluded. The final number of

participants was 148 (males: 102, females: 46). This met the required sample size calculated above.

2.2. Study instruments

This study investigated the association between diagnostic categories and recidivism. Data was gathered from the medical records of inmates who had been released from the Center. Data was gathered for those inmates whose diagnoses reflected the F code classification of the International Classification of Diseases, Tenth Revision [27]. Only diagnoses requiring intensive medical care were considered as variables. For example, insomnia was excluded. When diagnoses overlapped, both F-codes were counted. For example, if a patient with an intellectual disability presented with a detention reaction, the diagnosis would be coded as F4 (neurotic, stress-related, and somatoform disorders) and F7 (mental retardation).

According to the National Institute of Justice, recidivism is measured by criminal acts that result in rearrest, reconviction, or return to prison with or without a new sentence during a 3-year period following the person's release [28]. Hence, the follow-up period used for this study was 3 years (1095 days). The electronic database under the jurisdiction of the Ministry of Justice confirms whether a person has been admitted to a detention center or prison under their jurisdiction. Therefore, those reincarcerated in a penal institution within 3 years of release were considered to have recidivism.

Demographic data (age and sex) and crime characteristics (offense) were gathered from prison-generated records. Inmates who committed violent crimes such as murder, robbery, burglary, arson, sexual assault, indecent assault, assault, and manslaughter were classified in the violent group. In Japan, individuals who commit serious crimes in a state of insanity or diminished responsibility are diverted from the criminal justice system to the mental health system under the Medical Treatment and Supervision Act [29]. The aforementioned violent crimes are included in the crimes to which this act applies. Inmates who had not committed such crimes were classified in the non-violent group.

The C8 risk factors were used to ascribe risk factors for re-offense. The variables covered by the databases used in our study were limited; therefore, we investigated (1) criminal history (multiple-time offenders), (4) antisocial personality pattern (diagnosis of antisocial personality disorder), (5) education/employment (jobs before recidivism), (6) family/marital (presence of a key family member), and (7) substance abuse. A diagnosis of antisocial personality disorder was categorized as a personality disorder, which is designated F6 in the International Classification of Diseases, Tenth Revision. We defined employment as somehow legitimately earning money, including short- or part-time work. The presence of these C8 risk factors were investigated using prison and medical records. We were not able to investigate (2) procriminal companions, (3) procriminal attitudes and cognitions, and (8) leisure/recreation.

2.3. Data analysis

First, diagnostic classifications were examined to identify inmates' diagnoses. The recidivism rate of each clinical diagnoses was calculated using the F-codes of the International Classification of Diseases, Tenth Revision. To examine the hypothesis that each diagnostic category is an independent predictor of recidivism, Kaplan–Meier survival analyses were conducted on the diagnostic categories for which there were a sufficient number of participants.

Second, we tested the hypothesis that each recidivism risk factor is associated with recidivism using recidivism 3 years after release as the dependent variable and the sociodemographic factors and risk factors associated with the C8 as the independent variables. A chi-square or Fisher's exact test was conducted [30]. The difference between the population mean test was performed for age. To calculate the effect size, Cohen's *d* was used for age and the ϕ coefficient was used for other variables.

Diagnostic categories that were found to be meaningful in the Kaplan–Meier survival analyses and risk factors were examined with Cox proportional hazards models to consider their value for recidivism. Age was included in the analysis after classification with reference to descriptive statistics.

BellCurve (Social Survey Research Information Co., Ltd., Japan) for Excel (Version 4.04) was used for all statistical analyses.

2.4. Ethical considerations

This study was designed in accordance with the Declaration of Helsinki and approved by the Research Ethics Committee of the Medical Correction Center in East Japan (approval number 2020–2) and the Medical School Ethics Review Committee of Tokyo Medical and Dental University (approval number M2020- 285). The study was conducted using data from the medical records of former inmates after their release from prison, using a database managed by the Ministry of Justice with strict security regarding information on the presence or absence of recidivism. We were not able to obtain explicit informed consent from the participants as it was impossible to follow up with them. Therefore, the study used an opt-out method on the Tokyo Medical and Dental University website.

The materials, including medical records and prison-generated records, were stored in a secure vault accessible only to the principal investigator. Only the principal investigator performed data entry in the Medical Correction Center in East Japan. Restrictions were also placed on access to the data held in the electronic medical records and database, which was connected only to an intranet and isolated from external access. Hence, there was no risk of data leakage. No outside parties, including auditors, were involved in data entry or allowed to take materials outside the center for data entry. All personally identifiable information, such as name and date of birth, was deleted. Each participant was assigned a new number that was used only for the purposes of this study. This number was statistically processed so that individuals could not be identified.

3. Results

3.1. Description of participants

Of the surveyed inmates, 68.9% were men, and the average age at release was 44.3 ± 13.5 years. Violent crimes made up 25.7% of the offenses. Furthermore, 41.9% of inmates had a history of multiple incarcerations, 33.1% admitted to substance abuse, 55.4% had a key family member, and 89.2% were unemployed before reoffending.

3.2. Clinical diagnosis of inmates with severe mental disorders

Fifty-two inmates met the criteria for a diagnostic classification of F2 (schizophrenia, schizotypal, and delusional disorders) and 33 met the criteria for F5 (behavioral syndromes associated with physiological disturbances and physical factors). The prevalence of females in the F5 group was particularly striking (Table 1). Only a few inmates were diagnosed with mood or personality disorders (F3 [mood/affective disorders], $n = 10$; F6 [disorders of adult personality and behaviors], $n = 8$). Five inmates were diagnosed with borderline personality disorder, three with kleptomania, and none were diagnosed with antisocial personality disorder.

3.3. Clinical diagnoses, risk factors, and recidivism

After 3 years, 44 of the 148 individuals reoffended, giving an overall rate of recidivism of 29.7%. Table 2 shows the classification of mental disorders and recidivism. We excluded clinical diagnoses for which we did not attain sufficient numbers for analysis (F3 [mood (affective) disorders], F6 [disorders of adult personality and behaviors], and F9 [behavioral and emotional disorders with onset usually occurring in childhood and adolescence]). Kaplan–Meier survival analyses for each disease category regarding recidivism showed a significant difference in F7 (mental retardation; $\text{Logrank}_{(1)} = 7.69$; $P < 0.05$; Fig. 1), while no significant difference was found in the other categories. Less recidivism was consistently found with F2 (schizophrenia, schizotypal, and delusional disorders; $\text{Logrank}_{(1)} = 2.70$; $P = 0.10$; Fig. 2). The other diagnoses showed delayed and diminishing effect, and the proportional hazard assumption was not satisfied; therefore, we determined that F2 (schizophrenia, schizotypal, and delusional disorders) and F7 (mental retardation) were meaningful clinical diagnosis variables. Thus, these categories were used in the Cox proportional hazards models.

Regarding risk factors for recidivism, significant differences were found only for multiple-time offenders (Table 3). Small effect sizes were also observed. No significant differences were found for substance abuse, presence of a key family member, or jobs before incarceration.

The risk of recidivism was examined with a Cox proportional hazards model for demographic variables, risk factors for recidivism, F2 (schizophrenia, schizotypal, and delusional disorders), and F7 (mental retardation). Multiple-time offenders and diagnoses of F7 (mental retardation) were associated with increases in the risk of recidivism. Multiple-time offenders increased the risk of recidivism by 170% (adjusted hazard ratio, 2.70; 95% confidence interval, 1.42–5.14) and diagnoses of F7 (mental retardation) increased the risk of recidivism by 176% (adjusted hazard ratio, 2.76; 95% confidence interval, 1.23–6.18; Table 4).

4. Discussion

4.1. Clinical diagnosis of inmates with severe mental disorders

This study examined the medical records of prisoners who were treated for a mental disorder in a medical prison and released from the facility after completing their sentences. Diagnostic classifications were determined from the World Health Organization's International Classification of Diseases, Tenth Revision F-codes and used to select participants for this study. The most common disorder by code was F2, which refers to the schizophrenia group of disorders. Our analyses indicate that mentally ill prisoners have lower recidivism rates and that inmates with intellectual disabilities have a 184% increased risk of reincarceration.

Table 1
Sex and clinical diagnoses.

| Variable | Male | | Female | |
|---|-----------|------|----------|------|
| | (n = 102) | | (n = 46) | |
| | n | % | n | % |
| Organic, which included symptomatic, mental disorders (F0) | 18 | 17.6 | 4 | 8.7 |
| Mental and behavioral disorders due to psychoactive substance use (F1) | 17 | 16.7 | 9 | 19.6 |
| Schizophrenia, schizotypal, and delusional disorders (F2) | 47 | 46.1 | 5 | 10.9 |
| Mood (affective) disorders (F3) | 7 | 6.9 | 3 | 6.5 |
| Neurotic, stress-related, and somatoform disorders (F4) | 16 | 15.7 | 7 | 15.2 |
| Behavioral syndromes associated with physiological disturbances and physical factors (F5) | 4 | 3.9 | 29 | 63 |
| Disorders of adult personality and behaviors (F6) | 1 | 1 | 7 | 15.2 |
| Mental retardation (F7) | 26 | 25.5 | 0 | 0 |
| Disorders of psychological development (F8) | 9 | 8.8 | 2 | 4.3 |
| Behavioral and emotional disorders with onset usually occurring in childhood and adolescence (F9) | 0 | 0 | 2 | 4.3 |

Table 2
Clinical diagnoses of mental disorders and recidivism.

| Variable | No recidivism | | Recidivism | |
|---|---------------|------|------------|------|
| | (n = 104) | | (n = 44) | |
| | n | % | n | % |
| Organic, which included symptomatic, mental disorders (F0) | 15 | 14.4 | 7 | 15.9 |
| Mental and behavioral disorders due to psychoactive substance use (F1) | 18 | 17.3 | 8 | 18.2 |
| Schizophrenia, schizotypal, and delusional disorders (F2) | 41 | 39.4 | 11 | 25.0 |
| Mood (affective) disorders (F3) | 9 | 8.7 | 1 | 2.3 |
| Neurotic, stress-related, and somatoform disorders (F4) | 16 | 15.4 | 7 | 15.9 |
| Behavioral syndromes associated with physiological disturbances and physical factors (F5) | 20 | 19.2 | 13 | 29.5 |
| Disorders of adult personality and behaviors (F6) | 6 | 5.8 | 2 | 4.5 |
| Mental retardation (F7) | 13 | 12.5 | 13 | 29.5 |
| Disorders of psychological development (F8) | 5 | 4.8 | 6 | 13.6 |
| Behavioral and emotional disorders with onset usually occurring in childhood and adolescence (F9) | 1 | 1.0 | 1 | 2.3 |

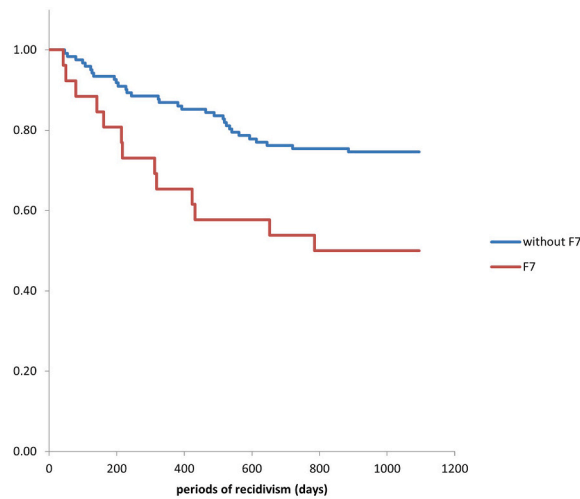


Fig. 1. Kaplan–Meier survival analyses of recidivism with and without mental retardation (F7).

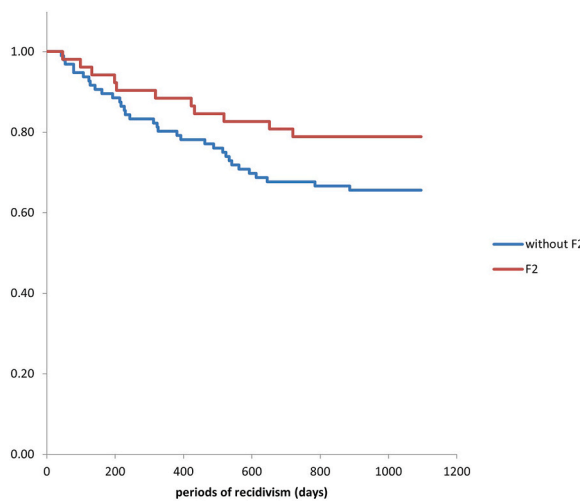


Fig. 2. Kaplan–Meier survival analyses of recidivism with and without schizophrenia, schizotypal, and delusional disorders (F2).

Table 3
Relationship between recidivism and risk factors.

| Variable | No recidivism | | Recidivism | | P-value | Effect size ^a |
|---------------------------------|---------------|------|-------------|------|---------|--------------------------|
| | (n = 104) | | (n = 44) | | | |
| | N | % | N | % | | |
| Male | 74 | 71.2 | 28 | 63.6 | 0.366 | 0.074 |
| Age | 44.5 ± 14.0 | | 43.6 ± 12.2 | | 0.716 | 0.066 |
| Violent crime | 30 | 28.8 | 8 | 18.2 | 0.175 | 0.112 |
| Multiple-time offenders | 35 | 33.7 | 27 | 61.4 | 0.002** | 0.257 |
| Substance abuse | 34 | 32.7 | 15 | 34.1 | 0.869 | 0.014 |
| Presence of a key family member | 61 | 58.7 | 21 | 47.7 | 0.222 | 0.100 |
| Jobs before incarceration | 12 | 11.5 | 4 | 9.1 | 0.778 | 0.036 |

**P < 0.01.

^a Effect size used Cohen's d for age and ϕ coefficient for all others.

Table 4
Hazard ratios for the risk of incident recidivism.

| Variable | n (%) | Recidivism event | Person-years | Recidivism incidence rate | Hazard ratio (95% confidence interval) | | | |
|---|------------|------------------|--------------|---------------------------|--|---------|------------------|---------|
| | | | | | Crude | P value | Adjusted | P value |
| Sex | | | | | | | | |
| Male | 102 (68.9) | 28 | 243.2 | 0.12 | 0.82 (0.44–1.52) | 0.532 | 0.86 (0.39–1.90) | 0.704 |
| Female | 46 (31.1) | 16 | 109.6 | 0.15 | 1.00 (reference) | | 1.00 (reference) | |
| Age | | | | | | | | |
| <30 | 19 (12.8) | 6 | 44.8 | 0.13 | 1.00 (reference) | | 1.00 (reference) | |
| 30–59 | 108 (72.9) | 34 | 252.2 | 0.13 | 1.01 (0.42–2.41) | 0.981 | 1.09 (0.43–2.81) | 0.852 |
| ≥60 | 21 (14.2) | 4 | 55.8 | 0.07 | 0.55 (0.15–1.94) | 0.351 | 0.61 (0.15–2.45) | 0.490 |
| Type of crime | | | | | | | | |
| Non-violent | 110 (74.3) | 36 | 256.9 | 0.14 | 1.00 (reference) | | 1.00 (reference) | |
| Violent | 38 (25.7) | 8 | 96.0 | 0.08 | 0.62 (0.29–1.33) | 0.218 | 0.73 (0.32–1.66) | 0.453 |
| Number of incarcerations | | | | | | | | |
| First-time offenders | 86 (58.1) | 17 | 220.3 | 0.08 | 1.00 (reference) | | 1.00 (reference) | |
| Multiple-time offenders | 62 (41.9) | 27 | 132.6 | 0.20 | 2.45 (1.34–4.50) | 0.004** | 2.70 (1.42–5.14) | 0.003** |
| Substance abuse | | | | | | | | |
| No substance abuse | 99 (66.9) | 29 | 239.8 | 0.12 | 1.00 (reference) | | 1.00 (reference) | |
| Substance abuse | 49 (33.1) | 15 | 113.1 | 0.13 | 1.12 (0.60–2.08) | 0.731 | 1.12 (0.58–2.17) | 0.737 |
| Presence of a key family member | | | | | | | | |
| No family member | 66 (44.6) | 23 | 147.9 | 0.16 | 1.00 (reference) | | 1.00 (reference) | |
| Presence of a key family member | 82 (55.4) | 21 | 205.0 | 0.10 | 0.67 (0.37–1.21) | 0.185 | 0.56 (0.29–1.08) | 0.083 |
| Jobs before incarceration | | | | | | | | |
| Unemployed | 132 (89.2) | 40 | 313.0 | 0.07 | 1.00 (reference) | | 1.00 (reference) | |
| Employed | 16 (10.8) | 4 | 39.8 | 0.10 | 0.80 (0.29–2.23) | 0.668 | 0.69 (0.24–1.98) | 0.489 |
| Schizophrenia, schizotypal, and delusional disorders (F2) | 52 (35.1) | 11 | 133.3 | 0.08 | 0.57 (0.29–1.12) | 0.105 | 0.47 (0.22–1.01) | 0.052 |
| Mental retardation (F7) | 26 (17.6) | 13 | 49.5 | 0.26 | 2.43 (1.27–4.65) | 0.007** | 2.76 (1.23–6.18) | 0.014* |

*P < 0.05. **P < 0.01.

Mental disorders—especially substance use disorders, depression, and personality disorders—are considered to be prevalent among prisoners [31–35]. In the current study, however, these disorders were not common, and antisocial personality disorder was not found. The most commonly diagnosed category of mental disorders was F2 (schizophrenia, schizotypal, and delusional disorders).

Our study targeted inmates with severe mental illness who were difficult to treat in general prisons. Therefore, the pattern

identified in this study may differ from that observed in penal institutions.

The second most common classification found among the study population was F5—behavioral syndromes associated with physiological disturbances and physical factors. Most of these patients had eating disorders. In Japan, many female inmates have eating disorders [36]. The Center actively accepts patients with eating disorders who are undernourished and require physical management. This may have contributed to the high number of patients released with a diagnosis of F5. Most prisoners with eating disorders are incarcerated for theft. Being female, having an eating disorder, and committing theft form a unique population; therefore, more research is needed on this population in the future.

4.2. Clinical diagnosis and recidivism

4.2.1. Overall characteristics

The rate of recidivism in this study was 29.7%. In Japan, the overall 3-year recidivism rate for prisoners released in 2017 was 26.9%, while the rate for those released with full sentence only, without parole, was 36.5% [37]. Since all participants were released from prison with full sentence, the results of this study suggest that mentally ill prisoners have lower recidivism rates. This finding concurs with that reported by Fazel et al. [9] This study identified few substance use or personality disorders in the study cohort; however, many prisoners released with full sentences from non-medical prisons may have these disorders.

The current study results showed no significant differences in recidivism rates for schizophrenia, bipolar disorder, depression, or neurosis. A significant difference was found only for intellectual disabilities. This result is consistent with findings that mental illness does not significantly predict recidivism [8,9]. Other studies have found that low intelligence is associated with general crime [8], a history of past offenses is most predictive of recidivism, and clinical diagnosis does not predict recidivism [38]. In contrast, different studies found that diagnostic classification of mental disorders was associated with recidivism [6,17,18]. However, these reports used inmates without mental disorders as references, which differed from the present study, wherein inmates had mental disorders. Therefore, future studies are required in Japan to compare recidivism rates of inmates with mental disorders with those of inmates who do not have mental disorders.

Antisocial personality/psychopathy is reported to predict recidivism [8]. However, few inmates in this study had a diagnosis of F6 (disorders of adult personality and behaviors) and this category could not be included in the statistical analysis. Five participants were diagnosed with borderline personality disorder, three with kleptomania and, most notably, none with antisocial personality disorder, which is considered common in prisons. In Japan, there are three types of incarceration for inmates with mental disorders: medical prison, high-security prison, and general prison. All three types will yield populations with different mental disorders. Prisoners whose symptoms were thought to improve with medication or other medical treatment and who could not be treated in a general prison were sent to a medical prison. Prisoners with antisocial personality disorder and repeated violent behavior were transferred to a high-security prison, not a medical prison. Additionally, inmates with mental disorders manageable in general prisons were treated in general prisons and not included in this study.

4.2.2. Intellectual disability and recidivism

The current study showed a higher rate of recidivism among inmates with intellectual disabilities who required intensive medical care. However, this rate did not significantly differ from the rates reported in other countries (0%–2.9%) [39]. According to Fazel et al. [39], on average it takes inmates with intellectual disabilities approximately 2 years and 3 months to reoffend, and 52.2% reoffend within a year. The same trend can be seen in the results of this study, where more than half the participants reoffended in less than a year.

Forensic psychiatric patients diagnosed with intellectual disability have been described as exhibiting characteristic traits and behaviors [40]. Low intelligence is associated with general crime [8]. Inmates with intellectual disabilities have been characterized by significant past involvement in the criminal justice system, a high risk of recidivism, and difficulty transitioning to minimum security while in prison or when granted parole [41]. However, offenders with intellectual disabilities are reported to be significantly slower to reoffend [42]. These characteristics differ from those identified in our study, possibly due to the nature of medical prison populations. That is, the participants in the current study were not only diagnosed but also had problems with detention reactions and uncontrolled violent behavior. Studies indicate that a history of criminal activity and deviant lifestyle, rather than a diagnosis of intellectual disability, are significantly associated with general recidivism rates [43]. Patients with intellectual disability are considered to have difficulty recognizing their own dangerous behaviors [20]. In this study, repeat offenders were significantly more associated with recidivism than those with a diagnosis of intellectual disability.

Inmates with intellectual disabilities may be more likely to recidivate because they are not connected to medical and social services once they are released and, therefore, do not receive appropriate assistance. Prisoners with intellectual disabilities have higher rates of psychiatric complications and are more likely to have unmet treatment needs than those without disabilities [44]. Such prisoners are often very isolated with limited social networks, exhibit anxiety and depression, receive little support in the community, and are re-interviewed by the police [45]. The percentage of prisoners with intellectual disabilities in Japan is estimated to be 2.4% [46], higher than the 0.9% in the general population [47].

Japan uses a system that provides prompt access to welfare services for prisoners after their release. However, this system requires the individual's consent and provision of personal information. The Ministry of Justice reported that 28.6% of eligible persons refused to provide such information [46]. A new system may be required that is designed specifically to assist inmates with intellectual disabilities.

4.2.3. Schizophrenia and recidivism

Schizophrenia could be a risk factor for recidivism [6,18]; however, after applying Cox regression analysis, this study found no significant difference for recidivism. The survival analysis values were consistently lower for inmates diagnosed with F2 (schizophrenia, schizotypal, and delusional disorders) than for those not diagnosed with F2. This result may be related to the fact that the schizophrenia domain in this study was a group of severely ill patients who could not be transferred to a general prison. In other words, the inmates were more likely to be linked to medical care since continued medical care was clearly essential, even after maturity release. At our center, we explain the need for continued hospital visits to patients when they first transfer in from prison. When they are released, we provide them with a letter of referral for easy access to medical facilities. Depending on the medical condition of an inmate, family members are contacted, or direct hospital admission is arranged at release.

There is scant evidence to suggest that treating offenders with mental disorders reduces recidivism [48,49]. In contrast, a Medical Treatment and Supervision Act study on post-discharge patients found low rates of re-offense, possibly due to intensive treatment and care planning [50]. Post-release medication and access to community mental health services has been shown to reduce recidivism [4]. One study found an increased risk of crime at all lower levels of adherence to antipsychotic medication when compared to higher levels of adherence (adherence $\geq 80\%$) [51]. Untreated psychosis symptoms are an important risk factor for violent behavior [52]. Continued treatment for prisoners with schizophrenia may help prevent recidivism, while more intensive professional care has been shown to be a protective factor and reduce the hazard ratio for recidivism [53]. Inmates with schizophrenia are more likely to have this protective factor than those with other disorders. In addition to the treatment itself, this group is more likely to be perceived as treatable due to giving the impression that they are more likely to be connected to a safety net than those with other disorders, thus preventing social isolation and reducing recidivism.

4.3. Risk factors and recidivism

A history of multiple incarcerations was most strongly associated with an increased risk of recidivism. This risk for recidivism has long been noted for inmates with mental disorders [8,38,54,55]. In a recent study with a large sample that also included protective factors, history of antisocial behavior was the most accurate predictor of recidivism [53]. Our results were consistent with the findings of the previous study.

No significant differences were found in substance abuse, presence of a key family member, or jobs before incarceration. Antisocial personality disorders are discussed in a previous section. In several studies, substance abuse is particularly associated with recidivism among mentally ill inmates [8,12–15]. However, no association was found in this study, possibly due to the intensive treatment programs Japan has made available at prisons for inmates with a history of illegal drug use since 2006.

Overall, these risk factors may be influenced by the fact that this study involved inmates with severe mental disorders and did not examine inmates with mental disorders in the general prison population. Furthermore, we could not investigate the influence of procriminal companions, procriminal attitudes and cognitions, and leisure/recreation. Criminal history, procriminal companions, procriminal attitudes and cognitions, and antisocial personality pattern are called the Big 4 and considered to have a high correlation with criminal behavior [26]. This is a significant limitation of this study.

5. Limitations

First, this study's sample does not reflect the whole population of inmates with mental disorders in Japan. The sample was limited to inmates who were severely mentally disturbed. In Japan, there is no diversion after admission to penal institutions, and inmates deemed to require intensive medical care are not transferred to forensic hospitals, but receive medical care in medical prisons. Therefore, this study included patients who, in other countries, would be transferred to forensic hospitals. Even though this study targeted "prisoners with mental disorders," the findings cannot be compared with those of previous studies.

Second, the recidivism rate in this study tended to be lower than that in Japan as a whole; the Department of Justice and our study used different definitions of rate of recidivism. The Department of Justice does not observe the period from the date of release to the date of recidivism when defining rate of recidivism, but rather whether the offender has recidivated by the end of a given year.

Third, there were limitations related to differences in follow-up periods. The definition of recidivism in this study was admission to a facility under the jurisdiction of the Ministry of Justice, which excluded cases that concluded at the police level, such as settlements, and cases diverted to medical care due to tactile behavior caused by worsening psychiatric symptoms. Therefore, we could not investigate whether such offenders spent time in the community, were hospitalized, or made hospital visits after their release from prison. In addition, not all offenses resulted in arrests. Tracking of national data on prisons is limited, with most data available being on recidivism. These factors also limited comparisons.

6. Conclusion

We investigated the diagnoses of inmates with mental disorders—a group of inmates that had shown increasing recidivism recently—and recidivism among inmates with severe mental disorders, focusing on C8-related risk factors for reincarceration. The study confirmed that prisoners with intellectual disabilities who had been incarcerated multiple times were at high risk of recidivism. These individuals may not be connected to medical and social services and thus may not be receiving appropriate support. In addition, inmates with diagnoses of F2 (schizophrenia, schizotypal, and delusional disorders) demonstrated a tendency to be less likely to recidivate, possibly because they were more likely to be connected to medical care and receive support after release. This study's

cohort does not reflect the entire population of inmates with mental disorders in Japan, and we were unable to investigate several important variables. To prevent recidivism among inmates with mental disorders, it would be beneficial to conduct a survey on recidivism rates among prisoners without mental disorders, including the C8 items that could not be investigated in this study.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

Author contribution statement

Marika Okamura: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Takayuki Okada: Analyzed and interpreted the data.

Yusuke Okumura: Contributed reagents, materials, analysis tools or data.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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