

# Mental illness and social exclusion: assessment of the risk of violence after release

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## ABSTRACT

**Objectives:** To examine the predictive validity of the HCR-20 (The Historical Clinical Risk Management-20) to predict future violent incidents in a representative sample of patients with severe mental disorders and with a history of previous admission to prison, who after release are in a situation of extreme social exclusion.

**Material and method:** The study sample was selected from the 235 patients treated by the Mental Health Street Team of Madrid (ECASAM) from June 2014 to June 2017, including those with a previous history of a previous internment in a penitentiary (about which, the HCR-20 was completed).

**Results:** Of the 44 patients included, 29.6% (n=13) ended up participating in a violent incident after the release. The ROC curves (Receiver Operating Characteristic) analysis indicated that the total score of HCR-20 (AUC 0.98, p=0.01) has a high predictive validity.

**Conclusions:** The social and medical changes that take place after the release of patients with severe mental illness justify the need to reassess the risk of violence. In this evaluation, the HCR-20 guide is a useful tool for predicting the risk of involvement in future violent incidents, and the inclusion of factors such as social exclusion and its consequences, as well as problems with substance use is especially important.

**Keywords:** mental health; mental disorders; social marginalization; violence; risk management.

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Text received: 02/01/2019

Text accepted: 26/06/2019

## INTRODUCTION

The link between mental illness and violent crime in prison is an ongoing issue<sup>1</sup>. Much of the interest in the matter arises from concerns about public safety<sup>2</sup>, but it is also important for the health of those with mental disorders<sup>3</sup>. The World Health Organisation (WHO) has commented that rates of mental illness amongst prison inmates are much higher than they are

amongst the general public<sup>4</sup>. This state of affairs may be due to a number of factors, all of which are directly or indirectly related to the phenomenon of social exclusion, the most notable of which are: the deinstitutionalisation of the mentally ill, increasing consumption of toxic substances, and the growing number of homeless people (homelessness) in large cities (a population with a high prevalence of mental disorders)<sup>1,4</sup>.

As far as prison health care is concerned, the Spanish Prison Administration responded to the needs of such patients by setting in motion a specific action programme called the Comprehensive Healthcare Programme for Mentally Ill Prison Inmates (*Programa de Atención Integral al Enfermo Mental en Prisión*, or PAIEM)<sup>5</sup> in 2009, which provides the opportunity for tutored monitoring of the rehabilitation process of each inmate so as to ensure continuity of healthcare, both at the time of admission and after release, facilitating links with specialised psychiatric services in the community.

In this context, with the role played by professionals in identifying the dangers and dimensions of the problems of violent behaviour in persons with mental illness, it is necessary to make use of empirical tools that can evaluate the risk of violent behaviour<sup>3</sup>. Such an evaluation would increase the scope for intervention, because it would enable adjustments to be made to the control and risk minimisation procedures, which would create many options for appropriate intervention adapted to the most likely prognosis<sup>3</sup>, thereby helping to prevent what is known as the “revolving door syndrome”, which consists of mentally ill people recommitting crimes, so that they enter and leave the criminal/prison system (often without any prolonged break)<sup>1,6</sup>.

The HCR-20<sup>7</sup> is a guide for assessing the risk of violence in mentally ill violent inmates, the main objective of which is to reliably and accurately identify patients with a low, medium or high risk of violence<sup>3</sup>. The main aim of this study is to examine the predictive validity of the HCR-20 in a sample of patients with severe mental illness (SMI) and with a background of previous incarceration, who present a situation of extreme social exclusion (homelessness) after release. In particular, the capacity of the total scores of the HCR-20 to predict future violent incidents is evaluated.

## MATERIAL AND METHOD

### Design

This is a retrospective observational study carried out on the population of patients treated by the Street Mental Health Team of the Psychiatric Care Programme for Homeless Mentally Ill Persons (*Programa de Atención Psiquiátrica a Enfermos Mentales Sin Hogar*) in Madrid<sup>1</sup>. The programme provides social/medical care for homeless people in the city; elderly people with SMI who for different reasons do

not participate in monitoring carried out by standard mental health networks.

The diagnostic categories used in the Psychiatric Care Programme for Homeless Mentally Ill Persons (as per the ICD-10) included in the SMI are: schizophrenic disorders (F20.x), persistent delusional disorders (F22.x), schizoaffective disorders (F25.x), other non-organic psychotic disorders (F28 and F29.x), bipolar disorder (F31.x), severe depressive episode with psychotic symptoms (F32.3.x), recurrent severe depressive disorders (F33.x), obsessive-compulsive disorder (F42.x), schizotypal personality disorder (F21.x), severe personality disorders (F60.x), organic mental disorder (F0.x) mental disorder due to psychoactive substance use (F1.x).

The following inclusion criteria were established in the study: 1) monitored by ECASAM; 2) suffering from an SMI; 3) record of previous incarceration; 4) situation of homelessness; 5) age between 18 and 75 years. The criterion used to define a person as suffering from an SMI was the one established by the American National Institute of Mental Health (NIMH)<sup>8</sup>; utilising the diagnostic criteria of the ICD-10 and the international neuropsychiatric interview<sup>9</sup>.

The criterion used to assess the existence of records of a person's prior admission to prison was the presence of at least one previous internment in a prison over the previous year (taking the self-report of the patient himself, and the variable of the presence of criminal behaviour identified by the existence, or not, of a criminal record registered in the baseline evaluation protocol, which includes the official record that a person has been convicted for committing a crime regulated by the Spanish Criminal Code (*Código Penal Español*). The criterion to establish homelessness was the one established by the European Federation of National Organisations Working with the Homeless (FEANTSA), based on the European typology on homelessness and housing exclusion (ETHOS)<sup>10</sup>.

The socio-demographic and clinical variables were also gathered from the data in the baseline evaluation protocol (which apply to each subject at the time that they are included in the Psychiatric Care Programme for Homeless Mentally Ill Persons), and from their clinical histories. The baseline evaluation protocol includes a wide range of information about socio-demographic variables (sex, date of birth, age range, ethnicity/place of origin, mother tongue, maximum educational level achieved, maximum professional level achieved, employment situation, net monthly income, duration of homelessness, type of cohabitation prior to becoming homeless, typology

of homelessness, administrative documentation in order, medical coverage, recognised level of disability, criminal record and previous incarceration) and clinical variables (principal diagnosis as per ICD-109 criteria, previous contact with the psychiatric services, psychiatric admissions, period of evolution of the illness, forms of evolution of the disorder, awareness of illness, severity of the illness evaluated via the score obtained with the severity sub-scale of the global clinical impression scale, global functioning of the patient evaluated with the score obtained with the general functional evaluation scale, past and current consumption of toxic substances, record of infectious/contagious diseases, record of chronic somatic disease).

The information was compiled in a specific data collection logbook (DCL) for the project, which is codified and anonymised for each patient (generating a disassociated data base), to protect their identity.

This study was carried out with the approval of the Clinical Research Ethics Committee (CEIC) of the *Hospital Clínico San Carlos de Madrid*, and complies with all the requirements of the Helsinki Declaration and Spanish legislation on data protection.

### Selection of the sample

The study sample was selected from the total number of patients who had completed the baseline evaluation protocol (applied to each subject at the time they are included in the *Psychiatric Care Programme for Homeless Mentally Ill Persons*), from June 2014 (when the tool was implemented for the first time as part of the programme) to June 2017.

Out of the 235 patients with a correctly completed baseline evaluation protocol, only the 44 patients with a record of previous confinement in prison were included (for whom the HCR-20 was subsequently completed).

### Evaluation instrument

The HCR-20<sup>11</sup> functions as a guide that can be used to make probabilistic judgements about the risk of future violence. It enables a personalised evaluation to be made for preventive management by considering 20 risk factors selected from the scientific literature for their association with violence<sup>12</sup>. It contains three sub-scales that bring together three types of risk factors: past, present and future (Table 1). The historical sub-scale (H) is made up of ten static items that collect information typically documented in official records and that refer to the patient's biography. The clinical sub-scale (C) includes five items related to the

Table 1. Items evaluated in the HCR-20

Historical subscale (H)
H1 Previous violence
H2 Young age at first violent incident
H3 Relationship instability
H4 Employment problems
H5 Substance use problems
H6 Severe mental illness
H7 Psychopathy
H8 Early maladjustment
H9 Personality disorder
H10 Prior supervision failure
Clinical subscale (C)
C1 Lack of insight
C2 Negative attitudes
C3 Active symptoms of severe mental illness
C4 Impulsivity
C5 Unresponsive to treatment
Risk management subscale (R)
R1 Plans lack feasibility
R2 Exposure to destabilisers
R3 Lack of social support
R4 Non-compliance with remediation attempts
R5 Stress

**Note.** HCR-20: *The Historical Clinical Risk Management-20.*

current psychological functioning of the evaluated subject. The risk sub-scale (R) consists of five items that reflect future situational risk factors. Each of the 20 items is scored on a scale of three points (0, 1, 2): 0 indicates that the item is definitely absent; 1, that the item may be present (or less intensely present); and a score of 2 indicates that the item is definitely present (or more intensely present). The total score of the HCR-20 varies between 0 and 40.

In Spain, the HCR-20 has been adopted by the Advanced Studies Group on Violence of the University of Barcelona and is published in Spanish<sup>13</sup>. Both retrospective and prospective studies have shown that the HCR-20 has a good predictive validity<sup>13-17</sup>.

### Procedure

The HCR-20 was completed retrospectively, drawing on the baseline evaluation protocol (used with subjects when they are included in the pro-

gramme), by a psychiatrist trained in the use of risk assessment tool, involved in the evaluation of said protocol and in monitoring each patient, while the validation was conducted by a psychiatrist from outside the programme who was not involved in the baseline evaluation protocol or in patient monitoring (to ensure peer assessment).

The scores were then registered (out of a total of 44 individuals) for each item in the HCR-20, and in the total score of each subscale and the total score. The monitoring period started the day before the end of the baseline evaluation protocol and continued up to the moment the data was collected (June 2018) or up to the day when the person was discharged from the programme (1-12 months).

The data (after completing the HCR-20) about the violent incidents was obtained from the reviews of the clinical histories carried out by the researchers. The definition of violence offered by the authors of HCR-20 guide was used to identify the episodes of violent recidivism in the patient's clinical history, which include any physical or verbal act of aggression, violence against property or sexually inappropriate behaviour.

### Statistical analysis

The qualitative variables were expressed by their frequency distribution, and the quantitative variables (normally distributed), by their mean  $\pm$  standard deviation (SD).

To compare the quantitative variables between the study groups, Student's t-test was used (or the Mann-Whitney nonparametric U test). Comparison between groups for qualitative variables was evaluated with the chi-square test or  $\chi^2$  (or Fisher's exact test when more than 25% of the expected values were less than five).

Student's t-test for independent samples was used to establish if there was any significant difference between the violent and non-violent cases in the total score of the HCR-20. The Mann-Whitney test was used to see if there are any significant differences between the groups in the subscales of the HCR-20. The Mann-Whitney test was used because the subscales of the HCR-20 are ordinal data.

The predictive validity of the evaluation instrument (HCR-20) was established by using the ROC curve analysis, which gives the result in the form of a graph of the true positive rate (sensitivity) compared to the rate of false positives (1-specificity) for each possible cut-off score of the instrument. The area under the curve can be interpreted as the probability of a subject who features in a violent incident selected

at random having a higher score in the instrument than one who does not present any violent incident selected at random. In general, the values of the area under the curve of 0.70 and higher are considered to be moderate, and the ones over 0.75 are good.

The accepted level of significance for all these tests was 5%. The process and analysis of the data was carried out using the SPSS v.15.0 statistical package for Windows (SPSS, Chicago, IL, USA).

## RESULTS

### Descriptive statistics of the sample

The sample consisted of 44 male patients. The mean age of the participants was 42.9 (SD=14.0) years. Of the total sample, 16 patients (36.4%) were Spanish, while eight (18.2%) were North African, nine (20.5%) from Sub-Saharan Africa, seven (15.9%) from Europe (not Spanish), three (6.8%) from Asia, and one (2.3%) from Central America. The principal diagnosis for most of the patients was schizophrenic disorder (n=29; 65.9%), while three (6.8%) had a diagnosis of delusional disorders, two (4.5%) had bipolar disorder, three (6.8%) had personality disorder, one (2.3%) had organic psychosis, four (9.1%) had psychotic disorder due to psychoactive substance use and two (4.5%) suffered from severed personality disorder. 26 patients (59.1%) also presented a background of substance use.

### Descriptive statistics of the total scores of the HCR-20 in the sample

Table 2 shows the mean and standard deviation of the sample for each individual item of the HCR-20, the score of each subscale of the HCR-20 and the total score of the HCR-20.

### Characteristics of the violent and non-violent groups

Of the 44 subjects, 13 patients were re-categorised as violent (as a result of participating in a violent incident), while 31 did not present a violent incident. The analysis with the  $\chi^2$  test did not find significant differences in terms of age (p=0.75;  $\chi^2=1.18$ ), ethnicity (p=0.25;  $\chi^2=7.81$ ) and diagnosis (p=0.61;  $\chi^2=5.38$ ) between the violent and non-violent subjects.

Table 3 shows the mean total scores of the HCR-20, the subscales and the individual items of the HCR-20 for non-violent and violent subjects.

Analysis of the t-test for independent samples showed that there is a significant difference between

Table 2. HCR-20: Mean scores and standard deviations for each individual item, the score of each subscale and the total score (n=44)

Ítem	Mean	SD
<b>Historical scale</b>		
H1 Previous violence	1.68	0.73
H2 Young age at first violent incident	1.40	0.78
H3 Relationship instability	0.93	0.84
H4 Employment problems*	2.00	0.00
H5 Substance use problems	1.79	0.59
H6 Severe mental illness*	2.00	0.00
H7 Psychopathy	1.13	0.79
H8 Early maladjustment	1.52	0.66
H9 Personality disorder	1.36	0.83
H10 Prior supervision failure	1.45	0.72
Total score scale H (historical items)	15.31	4.04
<b>Clinical scale</b>		
C1 Lack of insight	1.56	0.69
C2 Negative attitudes	0.95	0.88
C3 Active symptoms of severe mental illness	1.95	0.21
C4 Impulsivity	1.36	0.80
C5 Unresponsive to treatment	0.63	0.83
Total score scale C (clinical items)	6.43	2.35
<b>Risk management scale</b>		
R1 Plans lack feasibility	1.25	0.83
R2 Exposure to destabilisers*	2.00	0.00
R3 Lack of social support*	2.00	0.00
R4 Non-compliance with remediation attempts	1.20	0.85
R5 Stress*	2.00	0.00
Total score scale R (risk items)	8.45	1.28
Total score HCR-20	30.15	6.39

Note. SD: standard deviation; HCR-20: *The Historical Clinical Risk Management-20.*

\*Variables with constant maximum score for the entire sample.

violent and non-violent subjects in the total score of the HCR-20 ( $t(44)=8.85$ ;  $p < 0.0001$ ).

Analysis of the Mann-Whitney test was carried out on the three subscales (H, C and R) of the HCR-20, to evaluate the differences between the violent group and non-violent group. The sizes of the correlational effect are described below.

It was found that the non-violent subjects (average range=17.42) significantly differed ( $p < 0.001$ ;  $U=44$ ) in their scores in the historical subscale (H) when compared to the violent group (average range=34.62). As regards the C scale, the two groups differed significantly ( $p < 0.001$ ;  $U=30$ ) in their scores on the clinical subscale

of the HCR-20, leading to a result where the group of violent patients had a higher average range (35.69) in comparison to the non-violent group (16.97). There was also a significant difference ( $p=0.001$ ;  $U=70.5$ ) between the mean of the scores of the risk administration scale (R) of the violent group (average range=32.04) and the non-violent one (average range=18.50).

#### Predictive validity of the HCR-20: ROC analysis

The results of the ROC analysis are shown in Table 4.

The total score of the HCR-20 has a good predictive validity for future violent incidents (AUC 0.98,  $p$

Table 3. Mean scores of HCR-20 for non-violent and violent subjects (n=44)

Item	Non violent (n=31)		Violent (n=13)	
	Mean	SD	Mean	SD
<b>Historical scale</b>				
H1 Previous violence	1,54	0,85	2,00	0,00
H2 Young age at first violent incident	1,22	0,84	1,84	0,37
H3 Relationship instability	0,77	0,80	1,30	0,85
H4 Employment problems	2,00	0,00	2,00	0,00
H5 Substance use problems	1,70	0,69	2,00	0,00
H6 Severe mental illness	2,00	0,00	2,00	0,00
H7 Psychopathy	0,87	0,76	1,76	0,43
H8 Early maladjustment	1,35	0,70	1,92	0,27
H9 Personality disorder	1,12	0,88	1,92	0,27
H10 Prior supervision failure	1,22	0,76	2,00	0,00
Total score scale H (historical items)	13,87	3,91	18,76	1,42
<b>Clinical scale</b>				
C1 Lack of insight	1,48	0,76	1,76	0,43
C2 Negative attitudes	0,58	0,76	1,84	0,37
C3 Active symptoms of severe mental illness	1,93	0,24	2,00	0,00
C4 Impulsivity		0,84	1,92	0,27
C5 Unresponsive to treatment	0,35	0,70	1,30	0,75
Total score scale C (clinical items)	5,41	1,96	8,84	1,14
<b>Risk management scale</b>				
R1 Plans lack feasibility	1,06	0,89	1,69	0,48
R2 Exposure to destabilisers	2,00	0,00	2,00	0,00
R3 Lack of social support	2,00	0,00	2,00	0,00
R4 Non-compliance with remediation attempts	1,00	0,89	1,69	0,48
R5 Stress	2,00	0,00	2,00	0,00
Total score scale R (risk items)	8,06	1,28	9,38	0,65
Total score HCR-20	27,29	5,31	37,00	1,95

Note. SD: standard deviation; HCR-20: *The Historical Clinical Risk Management-20*.

<0.01). The H subscale is also a significant predictor of future violent incidents (AUC 0.89,  $p < 0.01$ ). The C subscale of the HCR-20 also significantly predicted future violent incidents (AUC 0.92,  $p < 0.01$ ), as did the R subscale (AUC 0.80,  $p < 0.01$ ).

## DISCUSSION

The main result of this study is that the HCR-20 guide is a useful tool for assessing the risk of participating in future violent incidents after release for

subjects with severe mental illness in situations of extreme social exclusion (homelessness), which is demonstrated by its potential predictive validity for future violent incidents in subjects with a record of imprisonment. This research is necessary given that the limitations of the HCR-20 as a useful evaluation instrument for mental health professionals are still being debated<sup>13-17</sup>.

The statistical analyses showed that there was a significant difference between the violent and non-violent groups in the total score of the HCR-20, and in the clinical, historical and risk subscales, where

Table 4. Area under curve for total scores and the subscales of the HCR-20

Assessment instruments	AUC	Typ. error	Asymptotic significance (p)*	Asymptotic confidence interval at 95%	
				Lower limit	Upper limit
HCR-20 Total†	0.98	0.01	0.000	0.95	1.011
H scale (historical)†	0.89	0.04	0.000	0.79	0.985
C scale (clinical)†	0.92	0.03	0.000	0.84	1.002
R scale (risk)†	0.80	0.06	0.001	0.67	0.936

**Note.** AUC: area under curve; HCR-20: *The Historical Clinical Risk Management-20*.

\*Under non-parametric scenario.

†The contrast result variable has at least one draw between the positive true state group and the negative true state group. The statistical data may be biased.

the violent group obtained significantly higher scores. Analysis of the AUC also indicated that the total score of the HCR-20 had a higher predictive precision than the clinical, historical and risk subscales (separately) for future violent incidents. However, it should be remembered that the statistical data may be biased (since the contrast result variable had at least one draw between the positive true state group and the negative true state group).

The results of this study show that a high score established in this particular risk assessment tool (HCR-20) can predict the likelihood of violence over the course of one year after release; although, as was shown in a previous study by Arbach & Pueyo, accuracy is gradually lost as time passes after release<sup>18</sup>. Therefore the ideal time to carry out this assessment is the moment prior to release.

On the other hand, of a total of 235 patients treated by ECASAM between 2014 and 2018 (with severe mental illness and in a situation of extreme social exclusion), only 18% had previously been imprisoned. But almost a third (29.6%) of those who did have a criminal record ended up participating in a violent incident after release. This finding supports the idea that violent behaviour is found in a small, but critical, sub-group of persons<sup>18,19</sup>. In other words, given that current evidence has not shown that severe mental illness can independently predict violent behaviour, efforts should be made at state level to deal with discriminatory attitudes towards patients with mental illnesses as potentially violent criminals<sup>19</sup>. But at the same time it is possible (and it would be appropriate) to propose preventive measures to reduce the risk of future violent incidents.

Another indirect but nonetheless important finding of this study is the apparent evidence that a patient with severe mental illness and with a criminal

record, who is found to be in a situation of extreme social exclusion after release, presents a higher baseline vulnerability that increases the potential risk of violence in the future. This was found in the study, where all the subjects of the sample constantly presented several of the items that increase the risk of violence, such as: the presence of a mental illness and problems related to employment (in the historical scale), and exposure to destabilising factors, a lack of social support and stress (in the risk scale).

Therefore, although scientific publications on the issue have established that, amongst the risk factors of future violence, the most important one is violence in the past<sup>18,20,21</sup>; recent studies have confirmed that mental illness and violence are mainly linked by the accumulation of a diverse range of risk factors, such as: historical (juvenile detention, physical abuse), clinical (substance abuse, hazardous lifestyles), dispositional (age, sex, etc.) and contextual (unemployment and victimisation) amongst the mentally ill<sup>19</sup>. Along these lines, more recent studies specifically highlight difficulties in reintegration into the labour market for ex-convicts, and the mechanisms of self-exclusion that they themselves suffer from<sup>22</sup>. In view of the results of this study, special attention should be paid to social exclusion and its consequences.

Another indirect result of this study should also be highlighted, and that is that all the subjects of the sample who were re-categorised as violent (e.g., that ended up participating in a violent incident after release), presented problems with substance use. It has been amply demonstrated that mental illness in conjunction with substance abuse is a predictor of violence in samples in the community<sup>23</sup>. The most recent studies establish that substance use has become the main factor associated with this population for committing major crimes such as homicide<sup>24</sup>.

In any case, the fact that the risk of mental illness and an associated act of violence is low or moderate does not mean that it does not exist<sup>1,25</sup> or that measures cannot be taken in this regard<sup>2,3,18,26</sup>. Professionals working in prison mental health services should take interest in issues of violence that involve their patients, not because of their frequency, but because they make reference to the effectiveness of the therapeutic activity and above all, because it can be prevented<sup>3,18,27</sup>, thus reducing avoiding the revolving door phenomenon<sup>1</sup>. Furthermore, with this approach, the dual stigma associated with this condition can be reduced, encouraging any efforts made by this group to integrate into society and improve their quality of life<sup>3,18</sup>.

## CONCLUSIONS

The social and healthcare changes that take place after patients with severe mental illness are released justify the need to reassess the risk of violence. Assessment using the HCR-20 guide is a useful tool for predicting the risk of participating in future violent incidents, where it is especially important to consider other factors such as social exclusion and its consequences (homelessness, employment related problems, stress and exposure to destabilising factors), and problems with substance abuse.

## LIMITATIONS

The limitations of this study should be taken into consideration, and any interpretation of the results should likewise be made with great care, since the size of the sample is small, meaning that there may be a retrospective and observational bias that can affect the results. It is also advisable for the HCR-20 to be used together with other tools and so enable more precise results thanks to the use of a wider range of methods. Another bias should also be taken into account, which is the absence of women in the final sample (which is explained by the small sample size and lower female criminality). More research with larger samples and prospective designs are therefore required.

## FINANCING

This study was financed with in-house resources and received no external funding.

## CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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