Short communication

Neurocognitive impairment and suicide risk among prison inmates

Francesco Vadini[a,c], Giulio Calella[b,c], Alessandro Pieri[c], Elena Ricci[d], Mario Fulcheri[e], Maria Cristina Verrocchio[e], Alfredo De Risio[f,g], Antonina Sciacca[c], Francesca Santilli[h], Giustino Parruti[a,c,*]

[a] Psychoinfectivology Service, Pescara General Hospital, Pescara, Italy
[b] Penitentiary Medicine Unit, ASL Pescara, Italy
[c] Infectious Diseases Unit, Pescara General Hospital, Pescara, Italy
[d] Department of Infectious Diseases, Luigi Sacco Hospital, Milan, Italy
[e] Department of Psychological, Health, and Territorial Sciences, G. d'Annunzio University of Chieti-Pescara, Italy
[f] Correctional Psychology Unit, Department of Mental Health, ASL RM 6, Rome, Italy
[g] The Italian Society for Prison Health and Medicine (SIMSPe), Italy
[h] Department of Medicine and Aging and Center of Excellence on Aging, G. d'Annunzio University of Chieti-Pescara, Italy

ARTICLE INFO

ABSTRACT

Background: Worldwide, prisoners are at high risk of suicide. Reducing the number of suicides in jails and prisons is an international priority. Several risk factors for suicide attempts, such as historical, prison-related, psychosocial and clinical factors, have been found in prisoners. We assessed whether demographic, conviction-related and neuro-behavioral variables might be associated with current suicide risk and lifetime suicide attempts in two large central Italy prisons.

Methods: On a preliminary sample of 254 detainees within an ongoing project, we assessed whether demographic, conviction-related, psychiatric, cognitive variables and illness comorbidity might be associated with current suicide risk and lifetime suicide attempts in two large central Italy prisons. Psychiatric disorders and suicide risk was evaluated using the Mini International Neuropsychiatric Interview. We also have identified the detainees with clear-cut previous suicide attempts. The cognitive function was assessed with a brief neuropsychological battery including trail making A, trail making B, Digit Span, and Symbol Digit test. Impulsivity was assessed with the Barratt Impulsiveness Scale. Cumulative illness was evaluated with Charlson Comorbidity Index.

Results: Impairment in global cognitive function was the strongest predictor of both high suicide risk and lifetime suicide attempts (both $p < 0.001$), independently of psychiatric disorders, psychopharmacological treatment, detention status, conviction time, substance use disorder, impulsivity, and illness comorbidity. Limitation

Limitation: Cross-sectional study design and relatively small sample size.

Conclusion: Cognitive deficits may improve our understanding of the suicidal vulnerability and should be systematically included in the assessment of suicide risk, as potential predictors of suicidal acts and targets of preventive interventions.

1. Introduction

Prisoners' health is a worldwide problem and represents one of the major challenges for public health. The inmates tend to show high rate of morbidity at admission, especially for chronic diseases, cognitive dysfunction and psychiatric disorders (Fazel et al., 2016; Fazel and Danesh, 2002; Kavanagh et al., 2010). It has been widely reported that prisoners have higher rates of mental disorders as compared with the general population, including psychosis, depression, personality disorders and substance misuse, which are risk factors for elevated suicide rates and premature mortality (Fazel et al., 2016; Fazel and Danesh, 2002). Suicide rates in inmates of both sexes are far higher than in the general population in many countries (Fazel et al., 2011). A number of independent risk factors for near-lethal suicide attempts have been found in male and female prisoners. These include historical (or lifetime) factors that may make a person vulnerable to suicide (e.g., childhood trauma), prison-related factors, psychosocial factors and clinical characteristics (Fazel et al., 2008). More recently,

---

* Correspondence to: Infectious Diseases Unit, Pescara General Hospital, Via Fonte Romana 8, 65124 Pescara, Italy.
 E-mail address: parrutig@gmail.com (G. Parruti).

neurocognitive studies support the concept of vulnerability to suicidal behavior associated with certain neuropsychological deficits (Jollant et al., 2011; Richard-Devantoy et al., 2014). Reducing the number of suicides in jails and prisons is an international priority (World Health Organization, 2007) and many countries have released national standards and guidelines for suicide prevention in custodial settings (Daigle et al., 2007). Guidelines for suicide prevention recommend early screening of prisoners at first reception to custody, actions taken in response to positive screening, and ongoing risk monitoring (Konrad et al., 2007). We intended to assess whether demographic, conviction-related and neuro-behavioral variables might be associated with current suicide risk (SR) and lifetime suicide attempts (LSA) in two large central Italy prisons.

2. Methods

2.1. Design, participants and procedures

The high-security prison of Teramo (Abruzzo, Italy) and the prison of Pescara (Abruzzo, Italy) are the main correctional institutions in the Region of Abruzzo. This study was performed by personnel from Pescara General Hospital, Fondazione Onlus Caritas, Pescara, Italy, Centro Lotta Emarginazione e Droga (CLED), Pescara, Italy, and Italian Society for Prison Health and Medicine (SIMSPe), a nation-wide scientific society among infectivologists and psychiatrists working in Italian jails. Once the study was approved by prison authorities and the local Ethics Committee in Pescara, all inmates were consecutively asked to participate in a cross-sectional study on health conditions of prisoners, started on June 2013 and still ongoing. Here we reported results of a preliminary analysis on 254 detainees recruited until October 2015. The investigation was carried out in accordance with the latest version of the Declaration of Helsinki. Two working groups were created. The first consisted of 10 professional educators who had the first contact with the inmates willing to participate, explained the study in detail and collected socio-demographic data (age, education level, and marital status). The other working group included 3 psychologists and 3 psychotherapists, with experience in the screening of psychiatric disorders and cognitive function. This working group was constantly supervised by psychiatrists in the prison. Eligible detainees were those at least 18 years of age, either sex, able to provide informed consent and with sufficient command on the Italian language to go through structured interviewing.

Educators exposed the characteristics and purpose of the study to all eligible detainees, collected their willingness to participate, disclosed they would not receive any financial compensation, privileges, or any other special benefit, such as a reduced sentence, for participating in the study. In the next step, detainees were invited to sign the informed consent and thereafter underwent a psychiatric and neuropsychological evaluation. The same operator assessed in a single session psychiatric disorders using a structured interview, cognitive functions with a brief neuropsychological battery test, and impulsiveness using a self-report questionnaire. The entire examination lasted about 60–80 min.

2.2. Assessment of psychiatric disorders

Psychiatric disorders were rated using the Mini International Neuropsychiatric Interview (MINI) version 5.0 (based on DSM-IV criteria), (Sheehan et al., 1998). The MINI was used as a screening tool for current and past major mental disorders and substance use disorders, including either abuse and dependence (in this study we have collapsed substance abuse and dependence disorders into a single category).

2.3. Assessment of current suicidal risk and lifetime suicide attempts

Suicidal risk was assessed by the MINI suicide risk module. The MINI suicidality module was used to determine the current suicide risk.

It consists of nine questions relevant to suicidal behavior. The questions (score for a positive response) were as follows: 1) intentional accident; 2) death wish; 3) self-harm wish; 4) suicide idea; 5) suicide plan; 6) suicide plan with preparation; 7) deliberate injuring of oneself; 8) suicide attempt in the past month; and 9) suicide attempt in lifetime. The final score makes it possible to stratify the current SR in several levels of severity: in the present work current SR has been stratified in no SR, overall SR (including low-moderate and high SR) and high SR (HSR). Furthermore, based on the available clinical archives, we have identified the detainees with clear-cut previous suicide attempts (lifetime suicide attempts: LSA), including self-cutting, hanging, and self-poisoning, for example by drug overdosing. Suicide attempt was defined as intentional self-harm that required medical treatment in an emergency care unit. Self-harm, without the clear suicidal intention was not considered attempting suicide.

2.4. Neurocognitive assessment

A neuropsychological battery including Trail-Making A (sustained attention), Trail-Making B (task switching), Digit Span (working memory), Symbol Digit test (processing speed) was administered to participants. A standardized z-score was calculated by subtracting the appropriate Italian healthy population normative mean from the raw score and then dividing by the normative standard deviation (SD), (Amodio et al., 2002; Mondini et al., 2011). A composite neuropsychological summary (CNS-4) z-score, reflecting executive function, was calculated by averaging z-scores from each test. Standardized z-scores of each individual test and of CNS-4 were all dichotomized based on a threshold of 1.5 SD below the mean (i.e. < -1.5), with values below this threshold defining neurocognitive impairment.

2.5. Assessment of impulsivity

The impulsive personality trait was assessed with the Barratt Impulsiveness Scale (BIS-11). The BIS-11 has a total score based on 3 subscales; motor impulsiveness, attention impulsivity and non-planning impulsivity (Fossati et al., 2001).

2.6. Cumulative illness evaluation

Disease records were used to generate the Charlson Comorbidity Index (CCI) composite comorbidity scores (Charlson et al., 1994). With this index, a patient's composite CCI score is calculated as a weighted sum of the presence of 19 documented health conditions such as Congestive Heart Failure, AIDS, Diabetes, or Peripheral Vascular Disease. The CCI score was dichotomized using the 95th percentile as the cut-point (> 1 vs. 0–1).

3. Statistical analysis

At the univariate analysis, odds ratios (ORs) and the corresponding 95% confidence intervals (CIs) were used to estimate the association between LSA, overall SR and high SR, and patients' characteristics. We selected the variables significantly associated to each disorder, and included them, as appropriate, in the regression models, to perform the multivariate analyses. Data analysis was conducted with SAS for Windows version 9.4 (SAS Institute Inc, Cary, NC).

4. Results

The preliminary sample of inmates who agreed to participate in this ongoing study was 254 (after exclusion of 194 prisoners for language barriers, 21 for severe mental retardation, 18 for unwillingness to take part in the study, 29 for not signing the informed consent after initial acceptance to participate in the study). On multivariate analysis, neurocognitive impairment, as reflected by the explored domains, was the