*Behavioral Psychology / Psicología Conductual, Vol. 26, Nº 1, 2018, pp. 177-195*

# PREVALENCE OF PSYCHOPATHOLOGICAL FEATURES IN SOUTH AMERICAN PRISONS USING THE PERSONALITY ASSESSMENT INVENTORY

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**Abstract**

There is insufficient information available regarding the psychopathological characteristics of the prison population in low-middle-income countries. This study aimed to estimate the current prevalence of psychiatric symptoms and pathological personality traits among sentenced male prisoners from two Ecuadorian prisons. A sample of 675 individuals aged 18-75 years (*M*= 35.58, *SD*= 10.57) was assessed using the Spanish adaptation of the Personality Assessment Inventory (PAI). Current prevalence was 69.9% for at least one of the studied clinical syndromes. The most prevalent clinical syndromes were Alcohol problems (33.6%), Mania (32.3%), Drug problems (27.9%), Antisocial features (23.8%), Paranoia (21.4%), Schizophrenia (19.5%), and Somatic complaints (17.7%). Comorbidity was found in 49.8% of the sample. Taken together, Alcohol problems and Drug problems accounted for the highest prevalence (55.8% to 71.4%) among individuals with clinically significant scores in each of the syndromes analyzed. Further studies regarding the influence of the variables related to the prison context on the mental health of inmates will increase the usefulness of the findings.

KEY WORDS: *prevalence, psychopathology, prison population, Personality Assessment Inventory*.

**Resumen**

La información sobre la salud mental de la población penitenciaria en países con ingresos medios y bajos es reducida. El objetivo del estudio fue estimar la

The authors would like to thank the Health Coordination Zone 8 (Ministry of Public Health of Ecuador) for supporting and partially funding this study, along with the Undersecretariat of Rehabilitation, Reintegration, and Precautionary Measures for Adults (Ministry of Justice, Human Rights, and Cults of Ecuador) for issuing permits; the authorities of the Regional Guayas Social Rehabilitation Center and Guayaquil Social Rehabilitation Center for the facilities offered to develop the fieldwork; and the team of psychologists from the Health Coordination Zone 8 and Health Coordination Zone 5 for the fieldwork conducted. In addition, this work was partially supported by the Regional Ministry of Economy, Innovation, and Science from Andalusian Government (Project: P2012-SEJ1723) and the Spanish Ministry of Economy and Competitiveness (Project: PSI2013-42792-R). The opinions and conclusions expressed in this article do not reflect any official policy or position of any of these institutions.

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prevalencia actual de síntomas psiquiátricos y rasgos de personalidad patológicos en hombres que cumplen condena en dos prisiones ecuatorianas. Una muestra de 675 individuos, de 18 a 75 años de edad (*M*= 35,58; *DT*= 10,57), fue evaluada con la adaptación española del "Inventario de evaluación de la personalidad" (PAI). La prevalencia actual fue del 69,9% en al menos uno de los síndromes clínicos estudiados. Los síndromes clínicos más prevalentes fueron problemas con el alcohol (33,6%), manía (32,3%), problemas con las drogas (27,9%), rasgos antisociales (23,8%), paranoia (21,4%), esquizofrenia (19,5%) y quejas somáticas (17,7%). Además, se detectó comorbilidad en el 49,8% de la muestra. Los problemas con el alcohol y las drogas obtuvieron conjuntamente las mayores proporciones (55,8%-71,4%) del total de participantes con puntuaciones clínicamente relevantes en cada síndrome analizado. El estudio del efecto del contexto carcelario en la salud mental de los individuos potenciará la utilidad de estos hallazgos.
PALABRAS CLAVE: *prevalencia, psicopatología, población penitenciaria, Inventario de evaluación de la personalidad.*

## Introduction

The prison population has increased in numbers on a global scale, reaching around 11 million people worldwide. Approximately 50% of this population is located in countries such as the USA, China, Brazil, Russian Federation, and India. In South America, Brazil (657,680), Colombia (116,773), Peru (83,639), Argentina (72,693), and Venezuela (54,738) occupy the top places, with prison population rates of 318, 230, 262, 167, and 173 per 100,000 habitants respectively (ICPR, 2017).

Mental health in the prison environment requires special attention, given that the presence of mental illness is significantly higher in this setting when compared with the general population (see Fazel & Seewald, 2012 for a review), becoming a major public health problem (Fazel & Baillargeon, 2011). Nevertheless, in a systematic review of the prevalence of mental illnesses in U.S. state prisons, Prins (2014) refers to a tendency to overestimate the prevalence rates. Among other problems related to inconsistency in the studies included in the review, the author highlights the absence of an unambiguous concept of mental illness, the heterogeneity of the samples, and other aspects related to the sampling strategies and assessment instruments used in those studies. Furthermore, it is important to consider that epidemiological studies require accuracy and methodological rigor in order to implement the findings in the design, funding, and development of any intervention program in the prison context (WHO, 2004). All this becomes particularly relevant in low-middle-income countries (LMICs), in which severe mental illness is more commonly found (Fazel & Seewald, 2012).

Nonetheless, a precarious housing situation, unemployment, crime, and substance use are all presented as risk factors for psychopathology (Frank & Glied, 2006; Marín-Basallote & Navarro-Repiso, 2012). Furthermore, some characteristics of prison confinements such as limited physical space, restricted movement, constant surveillance, forced coexistence, and lack of privacy, can generate or

potentiate mental alterations that differ in nature and severity (Arroyo-Cobo & Ortega, 2009). Of particular concern is violence in prison, often as a result of the impact of situational factors on inmates (see Gadon, Johnstone, & Cooke, 2006 for a review). More specifically coercion and victimization have particularly drawn attention (Colvin, Cullen, & Vander Ven, 2002; Teasdale, Daigle, Hawk, & Daquin, 2016). However, there is insufficient information available regarding the psychopathological characteristics of the prison population from Latin American countries. In fact, most prevalence studies have been developed in English-speaking population and in high-income-countries. Indeed, studies in different cultural and socioeconomic contexts can reveal the impact of individual, familiar, social, economic, and environmental factors on mental health (WHO, 2004). Moreover, further studies on this matter, which take into account the legal status of the prisoners, would facilitate in the future a cross-cultural and stratified analysis of the results.

All this is particularly relevant in the Ecuadorian environment because this type of information can contribute towards consolidating the transformation of the social rehabilitation system, which is one of the policies of the Ecuadorian government, as stated in the National Plan for Good Living (SENPLADES, 2013). In short, this would strengthen the innovation process of the mental healthcare in the Ecuadorian correctional settings. In this regard, the work of the Ministry of Public Health of Ecuador (MSP) significantly favors the development of the New Model of Prison Management, implemented by Ministry of Justice, Human Rights, and Cults of Ecuador (MJDHC), which seeks the comprehensive rehabilitation of inmates.

On the other hand, unifying the use of criteria for assessment instruments in psychopathology (Prins, 2014) is a complex objective, given that the opinion of the professional can be influenced by various factors in each case (Esbec & Echeburúa, 2014; Tejada, Jaramillo, Sánchez-Pedraza, & Vimal, 2014). The contextual and situational reality of the prison population, their health care needs, and resources available for intervention should all receive greater attention. Consequently, estimating the presence of psychiatric symptoms and personality traits that are clinically significant in prison populations could complement the utility of clinical diagnosis based on current classification systems, given that these two criteria do not always correlate.

In this regard, the Personality Assessment Inventory (PAI; Morey, 1991, 2007), commonly used in forensic assessment (Archer, Buffington-Vollum, Stredny, & Handel, 2006), has characteristics that are suitable for this objective. The PAI is a self-report that measures the effect of thoughts, attitudes, behaviors, facts, and past and present circumstances on the development of symptoms, the characteristics of personality, and the individual's behavior at the time of evaluation. It is composed of 4 validity scales, 11 clinical scales, 5 scales for treatment consideration, 2 scales of interpersonal relations, 31 subscales, and 10 complementary indexes (the content of the 22 scales is non-overlapping). The clinical scales represent the clinical syndromes of the highest significance in diagnostic practice, whereas the scales related to the treatment provide complementary information that could be relevant to a possible intervention.

Finally, the interpersonal scales measure the interpersonal relationship style, whereas the complementary indexes can be used to obtain a more precise interpretation of some of the scores.

In forensic settings, the utility of this self-report instrument has been shown in studies of mental disorders (Edens & Ruiz, 2008; Patry, Magaletta, Diamond, & Weinman, 2011), suicidality (Patry & Magaletta, 2015), malingering, suicide risk, and aggression (Wang et al., 1997), psychopathy and institutional misbehavior (Edens, Buffington-Vollum, Colwell, Johnson, & Johnson, 2002), misconduct, recidivism, and violence (Gardner, Boccaccini, Bitting, & Edens, 2015; Newberry & Shuker, 2012; Reidy, Sorensen, & Davidson, 2016), among others. Furthermore, the presence of the PAI in the European context has intensified since the adaptation of the German and Spanish versions (Groves & Engel, 2007; Ortiz-Tallo, Santamaría, Cardenal, & Sánchez, 2011).

Based on these considerations, the aim of this study was to analyze the current prevalence of psychiatric symptoms and personality traits that are clinically significant among sentenced male prisoners in two Ecuadorian prisons using the clinical scales of the Spanish adaptation of the PAI.

## Method

*Participants*

The random sample used in the present study was composed of 675 male sentenced prisoners aged 18-75 years (*M*= 35.58; *SD*= 10.57) from the Regional Guayas Social Rehabilitation Center (CRSRG) and the Guayaquil Social Rehabilitation Center (CRSG). These adult male prisons, which house approximately 9,000 inmates, are located in Guayaquil, Ecuador. The prison population in this country is around 26,000 (ICPR, 2017). According to the characteristics of the centers, we can distinguish five strata. For the CRSRG, these strata are Minimum Security (MIS), Medium Security (MES), Maximum Security (MAS), and Priority (PRI), which is a specific area for people who meet vulnerable situations criteria (e.g., being a senior adult, having a critical illness, disability, or severe physical or mental illness). Finally, the fifth stratum is the CRSG considered as a whole.

The minimum size for the sample was calculated using the software for epidemiological analysis of data Epidat 4.1 (Consellería de Sanidade, Organización Panamericana de la Salud, & Universidad CES, 2014), according to the following parameters: (a) Size of the population= 3,183, (b) Expected proportion= 50%, (c) Confidence level= 95%, (d) Absolute accuracy= 4%, and (e) Design effect= 1. After stratified random sampling procedure with proportional affixation, the distribution and proportion of the sample strata, related to the reference population, were MIS= 152 (21.2%), MES= 178 (21.2%), MAS= 72 (21.1%), PRI= 51 (21.3%), and CRSG= 222 (21.2%).

The inclusion criteria were: (1) serving a sentence in either CRSRG or CRSG, and (2) participating voluntarily in the study. The exclusion criteria were: (1) having insufficient knowledge of the Spanish language, (2) being in an inadequate

physical or mental state to complete the questionnaires, and (3) having an attitude that precludes the development of evaluation. The exclusion criteria were taken into account from the first contact with the inmate until the end of the evaluation. Thus, the proportion of excluded participants (5%) was composed of individuals that did not declare interest in the study, had difficulties with language understanding, or, upon beginning the evaluation, showed misconduct or lack of motivation to continue the study. For those cases, the information provided by the participants was deleted immediately. The excluded participants had the same characteristics as the 675 individuals who had satisfactorily completed the evaluation.

**Table 1**
Socio-demographic characteristics

| Variable | Total sample (*N*= 675) | Subsample (*n*= 538) |
|---|---|---|
| | *n* (%) | *n* (%) |
| Age range (years) | | |
| 18-25 | 87 (12.9) | 63 (11.7) |
| 26-35 | 322 (47.7) | 258 (48.0) |
| 36-45 | 159 (23.5) | 127 (23.6) |
| 46-55 | 70 (10.4) | 59 (11.0) |
| 56-75 | 37 (05.5) | 31 (05.7) |
| Country of origin | | |
| Ecuador | 635 (94.1) | 504 (93.7) |
| American countries | 31 (04.6) | 25 (04.6) |
| European countries | 9 (01.3) | 9 (01.7) |
| Current marital status | | |
| Single/Widowed | 181 (26.8) | 138 (25.7) |
| Married | 86 (12.7) | 76 (14.1) |
| Common law | 336 (49.8) | 270 (50.2) |
| Separated/Divorced | 72 (10.7) | 54 (10.0) |
| Level of education | | |
| None[a] | 132 (19.6) | 94 (17.5) |
| Primary | 390 (57.8) | 310 (57.6) |
| Secondary | 132 (19.6) | 116 (21.6) |
| Superior | 21 (03.0) | 18 (03.3) |
| Employment status | | |
| Employed | 577 (85.5) | 465 (86.4) |
| Unemployed | 98 (14.5) | 73 (13.6) |
| Prior prison terms | | |
| 0 | 361 (53.5) | 290 (53.9) |
| 1 | 131 (19.4) | 102 (19.0) |
| ≥ 2 | 183 (27.1) | 146 (27.1) |
| Type of criminal offense[b] | | |
| AP | 188 (27.9) | 152 (28.3) |
| AIL | 179 (26.5) | 137 (25.5) |
| IPTS | 124 (18.4) | 99 (18.4) |
| ASRI | 117 (17.3) | 92 (17.1) |
| Other | 67 (09.9) | 58 (10.7) |

*Notes*: subsample= PAI protocols that meet the validity criteria for the current study; AP= Against property; AIL= Against the inviolability of life; IPTS= Illegal production or trafficking of substances; ASRI= Against sexual and reproductive integrity. [a]This condition does not imply illiteracy. [b]According to Organic Integral Criminal Code of the Republic of Ecuador (2014).

Given that we failed to find any significant statistical differences between the two centers in terms of the sociodemographic variables, the data were processed and presented as a single sample (Table 1).

In the total sample, Ecuadorians accounted for the highest percentage (94.1%), Common law was the most representative marital status (49.8%), and 19.6% of participants had no level of education (this does not imply illiteracy), whereas 57.8% had only completed Primary School. The percentage of unemployed participants prior to entering prison was 14.5%. For 53.5% of the sample, this was described as their first conviction, 19.4% had been to prison once, and 27.1% of the sample reported having been convicted more than once. The criminal offenses committed by 90.1% of the participants can be classified into four groups: (a) Against property (27.9%), (b) Against the inviolability of life (26.5%), (c) Illegal production or trafficking of substances (18.4%), and (d) Against sexual and reproductive integrity (17.3%).

*Instruments*

a) *Ad hoc Socio-Demographic Questionnaire.* The participants were interviewed using an *ad-hoc* questionnaire to gather information about age, country of origin, current marital status, level of education completed, employment status prior to entering prison (considering any job or professional activity, formal or informal, with a stable and regular income), and prior prison terms. The type of criminal offense, classified according to the Organic Integral Criminal Code of the Republic of Ecuador (2014), was also measured.

b) *Personality Assessment Inventory* (PAI; Morey, 1991, 2007). The Spanish adaptation of the PAI (Ortiz-Tallo et al., 2011) was used to assess personality and psychopathology in adults. The clinical scales used in the present study evaluate somatic complaints (SOM), anxiety (ANX), anxiety-related disorders (ARD), depression (DEP), mania (MAN), paranoia (PAR), schizophrenia (SCZ), borderline features (BOR), antisocial features (ANT), alcohol problems (ALC), and drug problems (DRG) (see Table 2). The PAI is composed of 344 items that use a Likert scale with four response alternatives: 1= False, 2= Slightly True, 3= Mainly True, and 4= Very True. Completion of the questionnaire requires fourth-grade reading level and takes 50-60 minutes. The Spanish adaptation of the PAI has adequate psychometric properties (Ortiz-Tallo et al., 2011). The median Cronbach's alpha coefficients of the scales and subscales were .78 and .70 in the normative sample, and .83 and .74 in the clinical sample respectively. The median of the test-retest coefficients of the scales was .84, while for the subscales this was .79. In addition, Ortiz-Tallo et al. (2011) compared the average T scores of the typical sample of the Spanish adaptation with the American scale of the PAI and found differences in effect sizes that were non-significant for 17 of the 21 scales, and small for the remaining four scales. They concluded that the results obtained were consistent with those found in the original studies (Morey, 1991, 2007). Given the lack of specific norms for Spanish-speaking Latin American populations, the Spanish norms were used in the present study. Ortiz-Tallo et al. (2011) have indicated two

strategies with high sensitivity and specificity to detect random response in general and clinical populations using two validity scales: (1) Inconsistency (ICN) ≥ 75T or Infrequency (INF) ≥ 75T, and (2) ICN ≥ 64T and INF ≥ 60T. However, they also highlighted the limited usefulness of the INF scale in correctional settings since the high scores on this scale appear to be more related to situational characteristics than to a random response pattern. Given these considerations, we preferred to apply the ICN ≥ 75T cut-off point. For the Negative impression (NIM) and Positive impression (PIM) validity scales, the ≥ 101T and ≥ 65T cut-off points were taken into account respectively. As a result, a subsample of 538 participants aged 18-75 years (*M*= 35.90; *SD*= 10.58) were classified as meeting the validity criteria for the current study. The distribution and proportion of this subsample strata, related to the reference population, were MIS= 124 (17.3%), MES= 140 (16.7%), MAS= 55 (16.1%), PRI= 44 (18.4%), and CRSG= 175 (16.7%). The PAI cut-off scores for clinical significance were Mania ≥ 65T, and other scales ≥ 70T (Ortiz-Tallo et al., 2011). Table 3 shows average T scores for 22 scales and 31 subscales of the PAI for both the total sample and the subsample.

**Table 2**
Clinical scales of the Personality Assessment Inventory

| Scale | Interpretation of high scores |
|---|---|
| Somatic complaints (SOM) | Focus on physical health-related issues |
| Anxiety (ANX) | Experience of generalized anxiety across different response modalities |
| Anxiety-related disorders (ARD) | Symptoms and behaviors related to specific anxiety disorders |
| Depression (DEP) | Experience of depression across different response modalities |
| Mania (MAN) | Experience of behavioral, affective, and cognitive symptoms of mania and hypomania |
| Paranoia (PAR) | Experience of paranoid symptoms and traits |
| Schizophrenia (SCZ) | Symptoms relevant to the broad spectrum of schizophrenic disorders |
| Borderline features (BOR) | Attributes indicative of borderline levels of personality functioning |
| Antisocial features (ANT) | Focuses on behavioral and personological features of antisocial personality |
| Alcohol problems (ALC) | Use of and problems with alcohol |
| Drug problems (DRG) | Use of and problems with drugs |

*Source.* Adapted from Personality Assessment Inventory (PAI; Morey, 1991).

**Table 3**
Average T scores for 22 scales and 31 subscales of the Personality Assessment Inventory

| Scale/Subscale | Total sample (*N*= 675) | | Subsample (*n*= 538) | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Validity scales | | | | |
| Inconsistency (ICN) | 60.04 | 11.54 | 57.57 | 09.36 |
| Infrequency (INF) | 71.34 | 10.67 | 71.17 | 10.58 |
| Negative impression (NIM) | 68.47 | 19.04 | 64.70 | 15.23 |
| Positive impression (PIM) | 49.64 | 10.51 | 50.79 | 08.79 |
| Clinical scales | | | | |
| Somatic complaints (SOM) | 60.37 | 11.76 | 59.04 | 10.78 |
| Conversion (SOM-C) | 58.79 | 12.69 | 57.13 | 11.39 |
| Somatization (SOM-S) | 57.10 | 11.13 | 56.08 | 10.48 |
| Health concerns (SOM-H) | 60.82 | 11.21 | 60.03 | 10.80 |
| Anxiety (ANX) | 55.04 | 09.83 | 53.66 | 08.76 |
| Cognitive (ANX-C) | 55.01 | 09.53 | 53.80 | 08.66 |
| Affective (ANX-A) | 51.43 | 08.44 | 50.57 | 07.93 |
| Physiological (ANX-P) | 57.68 | 12.93 | 55.96 | 11.69 |
| Anxiety-related disorders (ARD) | 59.42 | 09.00 | 58.54 | 08.33 |
| Obsessive-Compulsive (ARD-O) | 60.00 | 08.95 | 59.77 | 08.81 |
| Phobias (ARD-P) | 52.08 | 10.41 | 51.56 | 10.42 |
| Traumatic stress (ARD-T) | 59.13 | 10.51 | 57.97 | 09.72 |
| Depression (DEP) | 60.01 | 11.38 | 58.41 | 10.09 |
| Cognitive (DEP-C) | 54.93 | 12.75 | 52.98 | 11.32 |
| Affective (DEP-A) | 60.70 | 11.53 | 59.24 | 10.46 |
| Physiological (DEP-P) | 59.38 | 10.57 | 58.57 | 10.12 |
| Mania (MAN) | 61.44 | 09.76 | 60.54 | 09.19 |
| Activity level (MAN-A) | 60.25 | 10.20 | 59.45 | 10.00 |
| Grandiosity (MAN-G) | 64.11 | 09.74 | 64.19 | 09.63 |
| Irritability (MAN-I) | 51.88 | 11.65 | 50.61 | 10.67 |
| Paranoia (PAR) | 63.26 | 09.05 | 62.49 | 08.50 |
| Hypervigilance (PAR-H) | 61.12 | 08.51 | 60.97 | 08.40 |
| Persecution (PAR-P) | 72.84 | 14.65 | 71.35 | 13.63 |
| Resentment (PAR-R) | 52.24 | 08.61 | 51.76 | 08.47 |
| Schizophrenia (SCZ) | 61.71 | 12.17 | 60.00 | 10.94 |
| Psychotic experiences (SCZ-P) | 60.29 | 13.01 | 58.53 | 11.66 |
| Social detachment (SCZ-S) | 58.59 | 10.24 | 57.63 | 09.95 |
| Thought disorder (SCZ-T) | 57.66 | 11.70 | 56.44 | 11.00 |
| Borderline features (BOR) | 59.00 | 10.55 | 57.53 | 09.33 |
| Affective instability (BOR-A) | 52.90 | 09.14 | 51.83 | 08.73 |
| Identity problems (BOR-I) | 60.19 | 10.23 | 59.40 | 09.53 |
| Negative relationships (BOR-N) | 56.17 | 09.77 | 55.06 | 09.08 |
| Self-Harm (BOR-S) | 60.59 | 13.97 | 58.91 | 12.67 |
| Antisocial features (ANT) | 65.19 | 12.25 | 63.47 | 10.81 |
| Antisocial behaviors (ANT-A) | 64.70 | 11.27 | 63.60 | 10.84 |
| Egocentricity (ANT-E) | 64.09 | 13.38 | 62.29 | 11.77 |
| Stimulus seeking (ANT-S) | 56.90 | 11.61 | 55.59 | 10.55 |
| Alcohol problems (ALC) | 62.66 | 18.51 | 60.86 | 17.42 |

| Scale/Subscale | Total sample (*N*= 675) | | Subsample (*n*= 538) | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Drug problems (DRG) | 61.97 | 19.30 | 59.45 | 17.80 |
| Treatment scales | | | | |
| Aggression (AGG) | 54.55 | 12.22 | 52.91 | 10.80 |
| Aggressive attitude (AGG-A) | 53.87 | 11.91 | 52.44 | 10.91 |
| Verbal aggression (AGG-V) | 48.87 | 09.27 | 48.26 | 08.92 |
| Physical aggression (AGG-P) | 60.42 | 15.09 | 58.18 | 12.81 |
| Suicidal ideation (SUI) | 56.37 | 15.16 | 53.91 | 12.28 |
| Stress (STR) | 61.70 | 10.63 | 60.84 | 10.08 |
| Non-support (NON) | 64.02 | 11.17 | 62.78 | 10.42 |
| Treatment rejection (RXR) | 43.75 | 08.00 | 44.52 | 07.49 |
| Interpersonal scales | | | | |
| Dominance (DOM) | 53.70 | 10.03 | 54.08 | 10.23 |
| Warmth (WRM) | 53.51 | 09.18 | 54.29 | 08.85 |

*Notes*: PAI= Spanish adaptation of the Personality Assessment Inventory (Ortiz-Tallo et al., 2011); Subsample= PAI protocols that meet the validity criteria for the current study.

### *Procedure*

Descriptive cross-sectional methodology was used. In order to avoid some of the methodological problems in prior studies described above, a number of criteria were adopted. First, the sentenced male population was chosen, given that they are the most characteristic and stable population within prison. Consequently, due to the short-term period in prison or outside contact, remand prisoners or those who are on a pre-release regime were excluded. Second, the most crowed prisons were selected in order to access a higher and more representative sample. Third, a rigorous sampling procedure was applied, considering the target population, the strata, and all security levels. Fourth, a suitable tool to assess psychopathology in adults was used. Finally, the validity criteria necessary to detect invalid response styles were observed.

The Undersecretariat of Rehabilitation, Reintegration, and Precautionary Measures for Adults (MJDHC) granted the necessary permits. Statistical information and coordination of the study in the centers according to the required security rules were requested from the directors of the two prisons. A team of nine psychologists from the MSP conducted the fieldwork between February and April 2015, none of which had any authority or connections within the prison context. In addition, they received training in forensic psychopathology, mental health research, application of the research protocol, and recording the information. The *ad hoc* questionnaire was administered immediately after the PAI. In total, the individual evaluation took between 70 and 90 minutes. The participants received the necessary assistance to solve any difficulty caused by the linguistic differences between the Spanish used in Ecuador and that used in the PAI. In terms of the frequency and characteristics of the difficulties encountered during the evaluations, it can be said that there were no major drawbacks in this area. The present study is part of and uses data from a broader project entitled "Study of the Prevalence of Mental Disorders in Prison Population of Guayaquil".

*Ethics statement*

The National Directorate of Primary Healthcare (MSP) reviewed the technical aspects of the study. The Health Coordination Zone 8 (CZ8-S, MSP) managed both the ethics revision and the project approval. The inmates selected by the sampling method were contacted in their pavilion or their security level, where they were given, both individually and in a group, information regarding the characteristics of the study whereupon they could freely decide whether or not to participate in the study. The lack of any kind of benefit in the short, medium, or long-term for their participation in the study was explained, as well as their freedom to leave the study at any time. All individuals signed the Informed Consent Form after listening and reading about the characteristics of the study and the Rights guaranteed to research participants, established by the Constitution of the Republic of Ecuador (2008). This study followed the ethical principles of the Declaration of Helsinki.

*Data analysis*

Analyses were conducted using the statistical package SPSS.22 for Windows (IBM, 2013). In order to find possible differences between the two centers, Student's *t* test for the quantitative variables and $\chi^2$ test for the categorical variables were conducted. Significance levels of $p = < .05, < .01$ were established. Frequency, percentage, and confidence intervals were calculated in order to estimate the prevalence. We also calculated the percentage of the subsample that was within clinical range for two or more of the clinical scales (comorbidity).

## Results

*Prevalence of psychiatric symptoms and pathological personality traits*

The proportions described below are related to the 538 valid clinical evaluations, whose data offers, *a priori*, higher accuracy (see Table 4). From this subsample, 69.9% reached the level of clinical significance for at least one of the studied clinical syndromes. The conditions that obtained the highest prevalence rate in each of the analyzed variables were those participants aged 18-25 years (79.4%), Ecuadorians (70.2%), Separated/Divorced (74.1%), participants without level of education (74.5%), Unemployed (75.3%), having two or more previous convictions (83.6%), and those that had committed a criminal offense against property (78.3%). The comorbidity rate reached 49.6%. The clinical symptoms measured by the ALC, DRG, and MAN scales showed higher prevalence than the others. The problems derived from substance use, taken together, account for the most significant proportions of the individuals that can be classified at the clinically significant level for each scale: BOR (71.4%), ANT (67.2%), SCZ and ARD (64.8%), DEP (64.1%), SOM and ANX (60%), PAR (57.4%), and MAN (55.8%). These scores are followed by manic episodic symptoms (MAN) for each scale: BOR (71.4%), ARD (61.1%), SCZ (60%), ANT (58.6%), ANX (55%), PAR (52.2%), SOM (41.1%), and DEP (39.1%).

**Table 4**
Prevalence of psychiatric symptoms and pathological personality traits

| PAI clinical scales | Subsample (*n*= 538) | | |
|---|---|---|---|
| | % | *n* | 95% CI |
| Somatic complaints (SOM) | 17.7 | 95 | [14.5 - 20.9] |
| Anxiety (ANX) | 03.7 | 20 | [02.1 - 05.3] |
| Anxiety-related disorders (ARD) | 10.0 | 54 | [07.5 - 12.5] |
| Depression (DEP) | 11.9 | 64 | [09.2 - 14.6] |
| Mania (MAN) | 32.3 | 174 | [28.3 - 36.3] |
| Paranoia (PAR) | 21.4 | 115 | [17.9 - 24.9] |
| Schizophrenia (SCZ) | 19.5 | 105 | [16.2 - 22.8] |
| Borderline features (BOR) | 10.4 | 56 | [07.8 - 13.0] |
| Antisocial features (ANT) | 23.8 | 128 | [20.2 - 27.4] |
| Alcohol problems (ALC) | 33.6 | 181 | [29.6 - 37.6] |
| Drug problems (DRG) | 27.9 | 150 | [24.1 - 31.7] |

*Notes:* PAI= Spanish adaptation of the Personality Assessment Inventory (Ortiz-Tallo et al., 2011); Subsample= PAI protocols that meet the validity criteria for the current study.

## Discussion

The aim of this study was to analyze the current prevalence of psychiatric symptoms and personality traits that are clinically significant among sentenced male prisoners from the two most crowded prisons in Ecuador, using the clinical scales of the Spanish adaptation of the PAI (Ortiz-Tallo et al., 2011). As far as we know, there are no previous studies with these methodological characteristics. Actually, our methodological approach substantially differs from the ones used in previous studies (e.g., Fazel & Danesh, 2002; Fazel & Seewald, 2012; Prins, 2014). This approach allows us to obtain valid, accurate, and useful information for mental health services in the prison population. These characteristics are particularly necessary in environments where resources are usually limited or insufficient (LMICs).

Despite the methodological diversity in other prevalence studies (Prins, 2014), we compared our findings with those reported in previous studies, some of which were obtained in contexts that are related — both geographically and culturally — to the one studied here. This makes sense since most of the studies of prevalence of mental disorders have been developed in English-speaking prison population and in high-income-countries.

The current prevalence was 69.9% for any of the studied clinical syndromes. Benavides and Beitia (2012) found a rate of 68.7% among sentenced male prisoners from a Colombian prison, using the Self Reporting Questionnaire (Climent & De Arango, 1983). However, Vicens et al. (2011) detected 41.2% of 1-month prevalence of mental disorders among sentenced male prisoners. This study was conducted in Spanish prisons using the Structured Clinical Interview for DSM-

IV Axis I Disorders (First, Spitzer, Gibbon, & Williams, 1999) and the Spanish version of the International Personality Disorders Examination (López-Ibor, Pérez-Urdániz, & Rubio, 1996). A lower 12-month prevalence of psychiatric disorders among sentenced male prisoners of the state of São Paulo (Brazil) was reported by Andreoli et al. (2014). These authors found a rate of 19.1% using the Brazilian version of the WHO-Composite International Diagnostic Interview [CIDI 2.1] (Quintana, Gastal, Jorge, Miranda, & Andreoli, 2007). Finally, the 12-month prevalence rate for any mental disorder in the Chilean male prison population was 26.6%, using the WHO-Composite International Diagnostic Interview [CIDI 3.0] (Haro et al., 2006; Kessler & Üstün, 2004), as described by Mundt et al. (2013).

Despite the psychometric diversity, there are similarities between the results obtained for six clinical syndromes in our study and those indicated in previous studies. First, the prevalence rates detected here for Alcohol and Drug problems scales are consistent with those mentioned in a systematic review (Fazel, Bains, & Doll, 2006). These authors referred to a range of prevalence rates in male prisoners on reception into prison, from 18% to 30% for alcohol abuse and dependence and from 10% to 48% for drug abuse and dependence, respectively. Second, Vicens et al. (2011), Mundt et al. (2013), and Andreoli et al. (2014) reported prevalence rates for Major depressive disorder (7.8%), Major depressive episode (6.1%), and Depression (5.3%), respectively. The Depression scale used in the present study reveals a prevalence rate consistent with these data. Third, the Anxiety-related disorders scale measures symptoms and related behaviors with phobias, posttraumatic stress, and obsessive-compulsive disorders. The prevalence rate found in our study falls within the proportions reported by Vicens et al. (2011), Andreoli et al. (2014), and Mundt et al. (2013), i.e., 23.3%, 12.2%, and 7.5% respectively. Fourth, García-Campayo (2007) considers that the prevalence of unexplained somatic complaints amongst Spanish prison inmates may be around 15%, which is similar to the data found in the current study using the Somatic complaints scale. Finally, the prevalence rate found with the Antisocial features scale is consistent with the 23% reported by Vicens et al. (2011) for Antisocial personality disorder. Analogous data, i.e., 26.9%, was found by Pondé, Freire, and Mendonça (2011) among sentenced male prisoners from a Brazilian prison (Salvador, Brazil), using the Brazilian Portuguese version of the Mini International Neuropsychiatric Interview (Amorim, 2000).

For the other five clinical syndromes, our findings differ considerably from those of previous studies. First, contrary to expectations, the Anxiety scale showed the lowest prevalence rate in our study. This scale, which evaluates various manifestations of anxiety, should show similar or higher values to that obtained for the Anxiety-related disorders scale, which evaluates specific aspects of anxiety (Ortiz-Tallo et al., 2011). Benavides and Beitia (2012), for instance, reported a prevalence rate of 22%. Moreover, a study performed in the United Kingdom by Singleton, Meltzer, Gatward, Coid, and Deasy (1997) found a prevalence rate of 21% among sentenced male prisoners, using the Clinical Interview Schedule (Lewis, Pelosi, Araya, & Dunne, 1992). Second, Pondé et al. (2011) and Vicens et al. (2011) have reported higher prevalence rates (19.7% and 44% respectively) for Borderline personality disorder than that described here for the Borderline features

scale. Third, for the Paranoid scale the prevalence rate was lower than the 37% found by Vicens et al. (2011). Fourth, the specific symptoms of a manic episode (Mania scale), i.e., emotional lability, agitation, exacerbated self-esteem, and high hostility (Ortiz-Tallo et al., 2011), obtained the second highest proportion in our study. Nevertheless, Mundt et al. (2013) and Andreoli et al. (2014) found prevalence rates of 1.4% and 0.2%, respectively, for this disorder. Finally, the prevalence of Schizophrenia scale is also higher than the results reported by Andreoli et al. (2014), Benavides and Beitia (2012), and Mundt et al. (2013), since these authors reported prevalence rates below 6%. Although the Schizophrenia scale is useful to detect psychotic disorders in prison populations (Rogers, Ustad, & Salekin, 1998), these results could be partially explained by the wide spectrum of symptoms that it covers. Further, this clinical syndrome usually shows high comorbidity with other syndromes (see Bo, Abu-Akel, Kongerslev, Haahr, & Simonsen, 2011 for a review; Ramos, Sendra, Sánchez, & Mena, 2015).

The magnitude of the impact of drug use on the health of prison populations has been highlighted (Carpentier, Royuela, Noor, & Hedrich, 2012; UNODC, 2016). Although a prevalence study does not establish causality, the proportions reached by the related psychiatric symptoms with substance use and its high comorbidity with the remainder of clinical syndromes analyzed deserve special attention. In fact, the priorities of the MJDHC and MSP include the eradication of substance trafficking within prisons as well as the provision of necessary health services to individuals presenting problems related to substance use and other associated disorders.

In order to provide a global analysis and to fully contextualize the findings, it would be necessary to evaluate a set of risk factors before entering prison (Frank & Glied, 2006; Marín-Basallote & Navarro-Repiso, 2012), as well as the inherent conditions of the prison context that act as mental health determinants in prisoners (Arroyo-Cobo & Ortega, 2009; Gadon et al., 2006). It is also important to note that this influence is not the same during incarceration (Dettbarn, 2012) and that the living conditions of inmates depend partially on the financial resources assigned and available (Kim, Becker-Cohen, & Serakos, 2015).

In this line, certain contextual characteristics such as coercion and victimization act as risk factors (Boxer, Middlemass, & Delorenzo, 2009; Listwan, Colvin, Hanley, & Flannery, 2010; Loinaz, Echeburúa, & Irureta, 2011). For these authors, coexistence in a hostile environment and victimization can create psychosocial adaptation problems that can result in aggressive behaviors, anger, anxiety, and depression. On the other hand, sources of social support arise as protective factors, and rehabilitation programs and activities have shown to be the most important (Colvin, 2007). This suggests the importance of assessing contextual and situational factors such as living conditions, coercion, victimization, etc., on the inmates' mental health. Additionally, it would be recommended to assess available social support, inmates' perception on their social support sources and their attitude towards them when planning any type of intervention. This approach has been previously suggested by Day, Brauer, and Butler (2014) with regard to misconduct and resistance. Undoubtedly, an integral analysis of inmates' health and its risk and protective factors will allow to integrate the strategies

involving promotion, prevention and intervention efficiently in this environment. Therefore, the results of this study can serve as a starting point for a comprehensive analysis of the individual and contextual determinants of prisoners' physical and mental health. This would result in an optimization of the resources available for the assessment and treatment of prisoners in Ecuadorian penitentiary centers.

The findings obtained in this study extend the knowledge of psychopathology in prison populations, particularly in the South American context where studies of this sort are scarce. For the first time PAI data are provided for Latin American prison population. Another strength of this study is related to its methodological approach: (a) we chose the most populated prisons and took into account different strata and security levels; (b) we applied a rigorous sampling technique to avoid over-representation of any of the strata and to guarantee the generalization of the findings to the Ecuadorian prison population; (c) in order to minimize the effect of invalid response styles on the results, validity criteria were adopted; and (d) psychologists outside of the forensic settings conducted the fieldwork, which reduces the risk of response bias, given their inability to provide some benefit.

With respect to limitations of our study, there is an absence of females in our studied population. Moreover, it is reasonable to raise some concerns regarding the degree of understanding of Spanish used in the PAI questionnaire by the South American population. This supposed limitation was analyzed in the studies of linguistic adaptation of the Argentinian version of the PAI (Stover, Castro, & Fernández, 2015), where the content of only 4 of the 344 items that compose the PAI had to be modified to improve its comprehension. In any case, it is convenient to emphasize the need to have instruments that are sensitive to the cultural factors of each population (Alamilla & Wojcik, 2013; Puente, Zink, Hernandez, Jackman-Venanzi, & Ardila, 2013).

We should also mention the tendency of self-report questionnaires to overestimate the prevalence rates. However, given the findings just described, it appears that this effect is not evident in the current study. We believe that the technical and psychometric features of PAI make it a good alternative to analyze the psychopathological changes that occur in this environment. Finally, disciplinary rules of prisons, individual characteristics (physical and psychological) of participants, and the time available for the fieldwork, suggested an assessment procedure that was as short and useful as possible.

Our study shows that 69.9% of the sample presented psychiatric symptoms and personality traits that are clinically significant, at least for one of the analyzed clinical syndromes. The three clinical syndromes with the highest prevalence rates were Alcohol problems (33.6%), Mania (32.3%), and Drug problems (27.9%). The observed comorbidity rate was 49.8%. Taken together, Alcohol problems and Drug problems accounted for the highest prevalence (between 55.8% and 71.4%) among individuals with clinically significant scores in each of the syndromes analyzed. Longitudinal studies could help to identify more precisely the effects of short, medium, and long-term incarceration on mental health, along with the variables that have higher consequences for the development, course, and

chronicity of different psychopathologies, and the circumstances that can improve mental health and the adherence to multidisciplinary interventions.

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RECEIVED: March 7, 2017
ACCEPTED: May 16, 2017