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ORIGINAL ARTICLE

Prevalence of mental disorders at admission to the penal justice system in emerging countries: a study from Chile

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Background. Previous mental health surveys conducted in prisons within emerging countries recruited samples of all prisoners at any single point in time. However, this sampling strategy results in an overrepresentation of long-term prisoners as compared with those studies recruiting from all admissions over time. This study aimed to assess mental disorders in consecutively admitted prisoners soon after admission, in order to address service needs of people with short-term imprisonments and people at early stages of imprisonment.

Method. Disorders were assessed in a sample of 229 male and 198 female prisoners, consecutively committed to the penal justice system in Santiago de Chile, using the structured Mini-Neuropsychiatric interview. Prevalence rates were calculated as per cent values. Ninety-five per cent confidence intervals were calculated for the proportions.

Results. Illicit drug and/or alcohol use disorders in the year prior to admission were present in 173 (76%) male and 64 (32%) female prisoners. The substances most frequently causing addiction were cocaine-based products in 108 (47%) male and 42 (21%) female prisoners. Current major depression was present in 124 (54%) male and 86 (43%) female prisoners, and current non-affective psychotic disorders in 18 (8%) male and in 10 (5%) female prisoners. High suicidal risk was present in 64 (28%) male prisoners and in 29 (15%) female prisoners.

Conclusion. When consecutive prisoners are assessed at admission, rates of mental health and substance use disorders were higher than in previous studies in emerging countries that had sampled from all existing prisoners at a time. Affective disorders and suicide risk appear more prevalent than in admission studies conducted in Western high-income countries. Previous research may have systematically underestimated the extent of mental health problems in prisoners, which poses a major public health challenge in emerging countries.

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Key words: Admission, mental disorders, prevalence, prison, substance use disorders.

Background

Prison populations have grown 25–30% worldwide in the past 15 years, especially in emerging countries and in particular in South America (Walmsley, 2013). Improvements in mental health care of prison populations are considered urgent public health challenges worldwide. Newly admitted prisoners had high rates of treatment history in psychiatric hospitals in European high-income settings, where large numbers of public psychiatric hospital beds are still available, indicating largely overlapping prison and psychiatric inpatient populations (Mundt *et al.* 2015*b*). Prisons in the USA have been described serving as modern asylums (Easley, 2011). And psychiatric bed removals have been linked with growing prison populations in South America (Mundt *et al.* 2015*a*). Prevalence rates of mental health and substance use disorders in prisoners were estimated to be high (Fazel *et al.* 2006; Fazel & Seewald, 2012), especially at admission with high rates of comorbidity between severe mental health and substance use disorders (Mir *et al.* 2015). Repeat cycles of short incarcerations seem related to poor health outcomes and mortality (Lim *et al.* 2015).

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Prevalence estimates are required to identify treatment needs in this underserved population, and to guide the development of adequate interventions and health policies (Fazel & Baillargeon, 2011). There are two distinct recruitment methods for mental health surveys representing overlapping but different prison populations: (1) Studies sampling from consecutively admitted prisoners, from here on referred to as 'admission studies'. (2) Studies recruiting from all people who are imprisoned at a time and are at varying stages of their imprisonment. The studies of all prisoners at a time provide information on the point-prevalence of mental disorders among prisoners. However, using this method results in an overrepresentation of long-term prisoners as compared with all people who are imprisoned over time. The higher turnover of prisoners with short-term sentences is not considered in such research so consequently, they remain underrepresented. This is important given the mental health conditions of the short- and long-term prisoners are likely to reflect and be driven by different environmental factors: the prison environment in long-term prisoners; the social environment prior to admission in short-term prisoners. Short-term prisoners often face immediate 'pain' of imprisonment, including substance withdrawal, rapid release without treatment and recontact with correctional systems or police. They pose particular challenges to management.

Previous reviews on serious mental illnesses (SMI) often combined findings from admission studies and from studies sampling all existing prisoners (Fazel & Danesh, 2002; Fazel & Seewald, 2012), even though prevalence estimates may differ between the two groups. The most recent meta-analysis identified only seven admission studies from Western high-income countries and none from emerging countries (Fazel & Seewald, 2012).

In contrast to the reviews on SMI, a review on substance use disorders in prison populations only included admission studies (Fazel *et al.* 2006). Assessment of current substance use disorders in all existing prisoners at varying times of imprisonment measures, in part, the degree of restriction to accessing substances inside the penal justice system, and not the rates of substance use disorders prisoners face while in their social environment outside prison (Mundt *et al.* 2013). Mere forced abstinence may not reduce substance use after release from prison (Clarke *et al.* 2013). Therefore, admission studies are preferable for estimating treatment needs for this population. The review reported rates of substance use disorders several orders higher than in the general population (Fazel *et al.* 2006). However, the wide variability of findings in the limited number of admission studies on substance use disorders precluded combining available data in a meta-analysis (Fazel *et al.* 2006). All of the included studies in the review were from Western high-income countries. Emerging countries may have different cultural and socio-economic barriers to use substances in the community, i.e. it may still be uncommon for women to use substances of addiction in certain contexts; countries may have differentially developed systems to divert and treat people with substance use disorders. Furthermore, the types of substances used in the community can vary between countries (Fazel *et al.* 2006; Vicente *et al.* 2006).

Consequently, further admission studies on SMI and substance use disorders are warranted, not only from Western high-income countries, but especially from emerging countries. The aim of the present study was to establish prevalence rates of mental disorders in male and female prisoners at admission in an emerging country in South America, adding to previous point prevalence studies in those settings.

Methods

Sample

We conducted a cross-sectional observational study of consecutively committed prison populations. The sample was selected from lists of consecutively committed people in the three remand prison facilities serving the metropolitan region of Santiago de Chile: Santiago Uno, which serves as a central facility for admissions of male prisoners, and Centro Penitenciario Feminino (CPF) San Joaquín and CPF San Miguel, which serve as central admission facilities for female prisoners to the penal justice system in Santiago de Chile. All the females admitted in the study period were approached for inclusion; every third male on the daily printed admission lists were approached for inclusion. We aimed to recruit a total sample of 200 male and 200 female participants. The sample size was expected to yield percentage estimates with reasonable 95% confidence intervals (CI) for the each gender, i.e. 10% (95% CI: 6–14) or 20% (95% CI: 15–25). Prisoners with all types of verdict such as detention, remand prisoners and sentenced prisoners were included in the study. The interviews were usually conducted within the first week of imprisonment (median 5 days; mean 7.7 days after imprisonment). Therefore, the study may directly reflect the disorders with which prisoners come into the system. Exclusion criteria for the study were the inability to communicate in the Spanish language and a lack of capacity to provide informed consent.

Instruments

Age, marital and employment status, background of migration, educational and income level, were

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assessed using structured questions. The marital status was categorised in the not mutually exclusive categories single, married, co-residing, separated, divorced and widowed. The educational level was categorised according to the International Standard Classification of Education (ISCED) (UNESCO Institute for Statistics, 2011). The levels 5 and 6 (comprising university and doctorate degrees) were comprised to one level. Employment status was dichotomised to working for income and not working for income (unemployed, house-keeping). The per month income was assessed on the personal level and calculated as per capita income for the number of household members. The type of criminal offense was recorded.

The fully structured Mini-International Neuropsychiatric Interview (MINI) [Spanish version] was conducted to assess mental health and substance use disorders. The MINI was developed by Sheehan *et al.* (1998) to categorise mental disorders according to the fourth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The interview schedule was supplemented by the module for borderline personality disorder of the Structured Clinical Interview for DSM-IV (SCID-II) (Fydrich *et al.* 1997).

Procedure

Potential interviewees were first approached by the prison guard on call assisting in the logistics of the study and when available brought to the interview area of the institution for information on the study. When people rejected participation, the next person on the list was approached until 200 of each gender were recruited. Interviewers were four clinical psychologists and a nurse trained and supervised by a senior consultant psychiatrist in using the instruments. In order to improve inter-rater concordance, pairs of interviewers conducted the first 20 interviews together. The interviewers alternated the lead of the interview and discussed points of possible discordance. The interviews lasted for 45–60 min and were held in a separate room of the prison to ensure confidentiality. The data were collected between February 2013 and September 2013. All interviewees provided written informed consent. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The study was approved by the Ethics Review Board of the University of Chile (Acta de Aprobación 01 from 25.01.2012) and by the Ministry of Justice of the Republic of Chile (reference: Subsecretaria de Justicia 15.03.2012).

Analyses

Sociodemographic characteristics and prevalence rates of mental disorders were calculated as per cent values with 95% CI using a bootstrap algorithm. The age and the number of diagnoses were calculated as mean and standard deviations of the mean (M ± S.D.). Subsamples of males and females were analysed. The statistical analyses were made using SPSS version 20.0. Chi-square tests were conducted to assess whether the prevalence rates of mental disorders differed between the genders.

Results

Recruitment

Three out of 473 prisoners did not follow the call to the interview area and could not be screened for eligibility. Seven out of 470 subjects were excluded due to mental or psychological incapacities to participate. Thirty out of 463 subjects rejected participation; 433 agreed to participate in the study; 6 prematurely ended the interview and were excluded from further analysis; the data of 427 participants were used for the final analyses. The rejection rate was 7.0%.

Sociodemographic characteristics of the sample

Sociodemographic characteristics of the sample are reported in Table 1. The vast majority of the sample were Chilean non-migrant populations, most were single, had very low educational levels and were working for income (employed or self-employed) at the time of imprisonment.

Mental health and substance use disorders

DSM-IV diagnoses are reported for the total sample and separately for the subsamples of male and female prisoners in Table 2.

More than half of the males (54.1%) and close to half of the females (43.4%) had major depression. Major depression with melancholic features was more common in men than in women. More than three quarters of the men (75.5%) had substance use disorders, significantly more than women (32.2%). The most frequent illicit substances causing addiction were cocaine-based products in 47.2% of the men and 21.2% of the women. Current non-affective psychosis was present in 7.9% of the men and 5.1% of the women. In addition, 14.4% of the men and 3.5% of the women had signs of affective psychosis. Antisocial personality disorder was seen in 41.9% of the men and 15.2% of the women, borderline

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Table 1. *Sociodemographic characteristics of recently admitted remand prisoners in the metropolitan area of Santiago*

	Total sample $N = 427$ (100%)	Male $N = 229$ (100%)	Female $N = 198$ (100%)
Mean age	31.6 (±11.5)	30.0 (±11.7)	33.5 (±11.0)
Chilean	406 (95.1%)	223 (97.4%)	183 (92.4%)
Non-Chilean migrant populations	21 (4.9%)	6 (2.6%)	15 (7.6%)
Marital status			
Single	253 (59.3%)	134 (58.5%)	116 (60.1%)
Married	85 (19.9%)	37 (16.2%)	48 (24.2%)
Co-residing with partner	141 (33.0%)	71 (31.0%)	70 (35.4%)
Separated	40 (9.4%)	11 (4.8%)	29 (14.6%)
Divorced	5 (1.2%)	2 (0.9%)	3 (1.5%)
Widowed	11 (2.6%)	1 (0.4%)	10 (5.1%)
Mean personal income per month in CLP	307 894 (±499 244)	372 282 (±566 422)	230 908 (±392 415)
Mean per capita household income per month in CLP	204 072 (±227 713)	224 568 (±167 159)	179 316 (±282 718)
Mean number of people per household	3.89 (±2.51)	3.84 (±2.64)	3.93 (±2.37)
Educational level			
ISCED 0	114 (26.7%)	51 (22.3%)	63 (31.8%)
ISCED 1	90 (21.1%)	35 (15.3%)	55 (27.8%)
ISCED 2	120 (28.1%)	75 (32.8%)	45 (22.7%)
ISCED 3	78 (18.3%)	49 (21.4%)	29 (14.6%)
ISCED 4	13 (3.0%)	9 (3.9%)	4 (2.0%)
ISCED 5 or 6	12 (2.8%)	10 (4.4%)	2 (1.0%)
Working for income	331 (77.5%)	195 (85.2%)	136 (68.7%)
Offense category			
Property	106 (27.2%)	65 (28.4%)	41 (20.7%)
Violence	127 (27.4%)	94 (41.0%)	33 (16.7%)
Drug possession/trafficking	150 (34.4%)	31 (13.5%)	119 (60.1%)
Sexual crime	14 (3.3%)	14 (6.1%)	0
Possession of firearm	9 (2.1%)	7 (3.1%)	2 (1.0%)
Unknown	6 (1.2%)	6 (2.6%)	0
Other	14 (3.3%)	11 (4.8%)	3 (1.5%)
Previous imprisonment(s)	191 (44.7%)	95 (41.5%)	96 (48.5%)

CLP, Chilean Pesos; ISCED, International Standard Classification of Education.

personality disorder in 67.3% of the men and 31.3% of the women. Both personality disorders covered by the interview schedule were more common in men than in women. Close to half of all the participants had any suicide risk, while 27.9% of the men and 14.6% of the women had high risk of suicide. A range of conditions including substance use disorders, melancholic depression and high suicide risk, personality disorders and psychotic mood disorders were significantly more frequent in male than in female prisoners.

Discussion

Main findings

Firstly, prevalence rates of substance use disorders and other mental health conditions in this admission study point to higher numbers than expected from previous studies conducted in South America on samples recruited from all existing prisoners.

Secondly, rates of several disorders such as substance use disorders in male prisoners (76%), major depression (49%) and high suicide risk (22%) for both genders found in this admission study are higher as compared with other admission studies from Western high-income countries.

Strengths and limitations

This is the first admission study of mental health and substance use disorders in prison populations from South America. The study used standardised and validated diagnostic instruments applied by trained researchers; it included male and female prison populations, and showed a high acceptability and response rate. The study included prisoners from three central remand and admission facilities receiving all admissions to the prison system of a large metropolitan area.

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Table 2. *Prevalence rates of mental disorders among recently admitted prisoners in the metropolitan area of Santiago de Chile. Significantly different rates between male and female prisoners are marked in bold*

	Total sample $N = 427$ (100%)			Males $N = 229$ (100%)			Females $N = 198$ (100%)			
	N	Prevalence rate (%)	95% CI of the prevalence rate (%)	*N*	Prevalence rate (%)	95% CI of the prevalence rate (%)	*N*	Prevalence rate (%)	95% CI of the prevalence rate (%)	Chi-square
Any current affective disorder	244	57.1	52.7–61.8	140	61.1	54.6–67.2	104	52.5	45.5–59.1	3.21
Major depression	210	49.2	44.7–53.9	124	54.1	47.2–59.8	86	43.4	36.9–50.0	4.88*
Recurrent major depression	121	28.3	24.1–32.8	72	31.4	25.8–37.6	49	24.7	19.2–30.3	2.34
Major depression with melancholic features	144	33.7	29.3–38.2	**96**	**41.9**	**34.9–48.0**	48	24.2	18.2–29.8	14.85**
Dysthymia	13	3.0	1.4–4.7	4	1.7	0.4–3.9	9	4.5	1.5–8.1	2.82
Current manic episode	19	4.4	2.6–6.8	**16**	**7.0**	**3.9–10.5**	3	1.5	0.0–3.0	7.48**
Past manic episode	63	14.8	11.5–18.3	**45**	**19.7**	**14.8–25.3**	18	9.1	5.1–13.6	9.41**
Hypomania	2	0.5	0.0–1.2	2	0.9	0.0–2.2	0			1.74
Past hypomania	27	6.3	4.0–8.7	**24**	**10.5**	**6.6–14.4**	3	1.5	0.0–3.5	14.41**
Any current anxiety disorder[a]	143	33.5	28.8–38.2	85	37.1	30.6–43.7	58	29.3	22.7–36.4	2.92
Current panic disorder	35	8.2	5.6–11.0	20	8.7	5.2–12.7	15	7.6	4.0–11.6	0.19
Lifetime panic disorder	56	13.1	10.1–16.4	34	14.8	10.5–19.2	22	11.1	6.6–15.7	1.30
Current agoraphobia	61	14.3	10.8–17.6	41	17.9	13.1–22.7	20	10.1	6.1–14.6	5.72
Social anxiety disorder	39	9.1	6.6–11.9	**31**	**13.5**	**9.2–18.3**	8	4.0	1.5–7.1	11.71**
GAD	15	3.5	1.9–5.4	11	4.8	2.2–7.8	4	2.0	0.5–4.0	2.43
OCD	36	8.4	5.6–11.2	**29**	**12.7**	**8.3–17.0**	7	3.5	1.0–6.6	11.46**
PTSD	75	17.6	13.8–21.3	43	18.8	14.0–24.0	32	16.2	11.1–21.7	0.50
Substance use disorders without nicotine	237	55.5	50.6–60.4	**173**	**75.5**	**70.3–80.8**	64	32.3	25.8–39.4	80.33**
Alcohol dependence	91	21.3	17.6–25.1	**68**	**29.7**	**24.0–35.4**	23	11.6	7.6–16.2	20.70**
Alcohol abuse	13	3.0	1.6–4.7	9	3.9	1.7–6.6	4	2.0	0.5–4.0	1.31
Drug dependence	175	41.0	36.1–45.9	**128**	**55.9**	**49.8–62.4**	47	23.7	18.2–30.8	45.40**
Drug abuse	35	8.2	5.6–11.0	**28**	**12.2**	**7.9–16.2**	7	3.5	1.0–6.6	10.66**
Cocaine	150	35.1	30.4–39.8	**108**	**47.2**	**40.2–53.7**	42	21.2	15.7–27.3	34.32**
Cocaine paste	97	22.7	19.0–26.9	**65**	**28.4**	**22.7–34.1**	32	16.2	11.1–21.7	11.48**
Marihuana	51	11.9	8.7–15.2	**40**	**17.5**	**12.7–22.3**	11	5.6	2.5–9.1	14.33**
Tranquilizer	4	0.9	0.2–1.9	4	1.7	0.4–3.5	0			3.49

Continued

Table 2. *Continued*

	Total sample $N = 427$ (100%)			Males $N = 229$ (100%)			Females $N = 198$ (100%)			
	N	Prevalence rate (%)	95% CI of the prevalence rate (%)	N	Prevalence rate (%)	95% CI of the prevalence rate (%)	N	Prevalence rate (%)	95% CI of the prevalence rate (%)	Chi-square
Inhalants	2	0.5	0.0–1.2	1	0.4	0.0–1.3	1	0.5	0.0–1.5	0.01
Amphetamines	2	0.5	0.0–1.2	2	0.9	0.0–2.2	0			1.74
Any current psychotic disorder	68	15.9	12.2–19.7	**51**	**22.3**	**17.0–27.9**	17	8.6	5.1–12.6	14.85**
Lifetime psychotic mood disorder	63	14.8	11.5–18.3	**53**	**23.1**	**17.9–28.4**	10	5.1	2.0–8.1	27.64**
Current psychotic mood disorder	40	9.4	6.8–12.2	**33**	**14.4**	**10.5–19.2**	7	3.5	1.0–6.6	14.79**
Lifetime non-affective psychotic disorder	34	8.0	5.4–10.5	23	10.0	6.1–14.0	11	5.6	2.5–9.1	2.92
Current non-affective psychotic disorder	28	6.6	4.4–9.1	18	7.9	4.4–11.4	10	5.1	2.0–8.1	1.37
Eating disorders										
Anorexia nervosa	0			0			0			
Bulimia nervosa	8	1.9	0.7–3.0	3	1.3	0.0–3.1	5	2.5	0.5–5.1	0.85
Personality disorders (APD or BPD)	231	54.1	49.4–58.8	**163**	**71.2**	**64.6–77.3**	68	34.3	27.8–40.9	58.02**
Antisocial personality disorder	126	29.5	25.3–34.0	**96**	**41.9**	**35.4–48.0**	30	15.2	10.1–20.2	36.58**
Borderline personality disorder	216	50.6	45.7–55.3	**154**	**67.2**	**61.1–73.8**	62	31.3	24.8–38.4	54.86**
Suicide risk	208	48.7	43.8–53.4	124	54.1	47.4–60.3	84	42.4	35.4–49.0	11.82**
Low	82	19.2	15.5–23.2	44	19.2	14.4–24.0	38	19.2	13.6–25.3	0.00
Moderate	33	7.7	5.4–10.3	16	7.0	3.9–10.5	17	8.6	4.6–12.1	0.38
High	93	21.8	18.0–26.0	**64**	**27.9**	**22.3–34.1**	29	14.6	9.6–20.2	11.03**

GAD, generalised anxiety disorder; OCD, obsessive compulsive disorder; PTSD, post-traumatic stress disorder; APD, antisocial personality disorder; BPD, borderline personality disorder.
*$p < 0.05$; **$p < 0.01$.

[a]Including current panic disorder, current agoraphobia, social anxiety disorder, GAD, OCD and PTSD.

A limitation of the study is that it only recruited prisoners entering the penal justice system in the metropolitan area of Santiago de Chile, not in any rural areas. However, the prevalence rates in the previous study on all prisoners at a time did not show important differences between Santiago, other urban centres and the provinces in Chile (Mundt *et al.* 2013). Population characteristics apart from gender were not available for the total population admitted to prisons in Chile. Therefore, we could not corroborate how closely characteristics of our sample represented the total population and adjust for possible differences.

Interpretation and comparison with the literature

Admission studies and studies of all existing prisoners represent overlapping but different prison populations and reflect different environmental stressors on mental health. Prevalence rates in this admission study point to much higher numbers than reported in studies of existing prisoners from Chile, South America (Pondé *et al.* 2011; Mundt *et al.* 2013; Andreoli *et al.* 2014) and from other emerging countries (Adesanya *et al.* 1997; Assadi *et al.* 2006; Colmenares Bermúdez *et al.* 2007; Zahari *et al.* 2010; Naidoo & Mkize, 2012). Our present study shows several fold higher prevalence rates for most conditions than the previous study from Chile which sampled from existing prisoners (Mundt *et al.* 2013): i.e. substance use disorders in males (75% at admission *v.* 13% in all existing) and in females (32% at admission *v.* 9% in all existing), affective disorders in males (61% at admission *v.* 8% in all existing) and in females (52% at admission *v.* 11% in all existing), possible non-affective psychosis (7% at admission *v.* 1% in all existing) and in females (5% at admission *v.* 1% in all existing). However, a limitation of that comparison is the use of two different structured interview schedules in the two studies.

Seven admission studies on SMI in prison populations were identified and included in a recent meta-analysis (Fazel & Seewald, 2012). Studies were included on the basis that they used validated diagnostic instruments on unselected general prison populations without previous screening (Fazel & Seewald, 2012). The studies were from Western high-income countries (two from the USA (Trestman *et al.* 2007; Gunter *et al.* 2008), UK (Parsons *et al.* 2001), Australia (Butler & Allnutt, 2003), Holland (Bulten *et al.* 2009), Ireland (Wright *et al.* 2006; Curtin *et al.* 2009) and Austria (Stompe *et al.* 2010)) of which four included both genders, two only men and one only women. One further admission study including only women from Germany had recently been published (Mir *et al.* 2015). Our study showed rates of major depression higher than in any of the other admission studies for either gender. With respect to male prisoners, our findings indicate higher rates of non-affective psychosis than any of the other previous admission studies. Only one admission study from the USA showed rates of substances use disorders that were nearly as high as in the male prisoners from Chile (Gunter *et al.* 2008). Cocaine-based products were the drugs of addiction for more than half of the newly admitted male prisoners in our study, whereas opiates were the most frequently used substances of addiction for prisoners in Western high-income countries. This difference is likely to be characteristic for the entire South American continent where cocaine-based products are the prevailing illegal substances of addiction. The stimulating properties of cocaine may have been linked with the high rates of affective disorders and psychoses. With respect to female prisoners in our sample, we found also high rates of substance use disorders but somewhat lower rates than reported for females in the Western high-income countries (Butler & Allnutt, 2003; Wright *et al.* 2006; Gunter *et al.* 2008). In contrary to most mixed gender studies from Western countries, our study found higher rates for several disorders in male prisoners. This may be related to the much higher rates of substance use disorders in male compared with female prisoners in our sample. In Western countries, female prisoners were estimated to have even higher rates of illicit substance use disorders than male prisoners (Fazel *et al.* 2006). Cultural barriers for women to use illicit substances and alcohol may still be higher in South American than in Western societies. Gender differences should be interpreted with caution because multiple comparisons were made and 5% of the disorders may differ on a significant level only due to chance.

One study from a Western high-income country compared prevalence rates of prisoners at admission with a sample of all existing sentenced prisoners using the same diagnostic interview schedule demonstrated higher rates for all disorders in the admission sample: 1 year prevalence rates of substance use disorders in males (64% at admission *v.* 34% in all existing) and in females (74% at admission *v.* 57% in all existing), affective disorders in males (21% at admission *v.* 12% in all existing) and in females (34% at admission *v.* 20% in all existing), psychoses in males (11% at admission *v.* 4% in all existing) and in females (15% at admission *v.* 6% in all existing) (Butler & Allnutt, 2003). The differences were less pronounced than in the present study. Longitudinal cohort studies from Western high-income countries also indicate that rates of depression are highest at admission and decrease during imprisonment for the subgroup of prisoners who stay for a sustained period of time (Hassan *et al.* 2011; Walker *et al.* 2014).

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Studies that interview consecutively admitted prisoners shortly after their arrival are logistically challenging, but have a number of advantages as compared with interviewing a sample of prisoners who are in a given prison at one point of time. Admission studies allow recruitment before prisoners undergo formal and informal classifications inside the penal justice systems based on the type of offense, behaviour during imprisonment, rehabilitation prognosis, security level required, infectious diseases and other unknown informal criteria applied by the prison services. Therefore, samples may have less selection bias. This aspect could be more relevant for emerging countries where the quality of the infrastructure in prisons can vary considerably between different sectors and departments within single facilities. The poorly resourced sectors with predominantly violent prisoners do not provide the infrastructure and safety required to conduct this kind of research. Sampling at admission in the remand facilities allows assessing those who may be at later stages of imprisonment, placed in sectors where recruitment for surveys is not feasible.

In contrast to reviews on addiction (Fazel *et al.* 2006), reviews on SMI in prison populations combined prevalence estimates from studies of all existing prisoners and admission studies (Fazel & Danesh, 2002; Fazel & Seewald, 2012). They may have systematically underestimated the rates of SMI present in people who are committed to penal justice systems, especially for emerging countries. Our findings support the hypothesis that people with short durations of imprisonments and high reincarceration rates are more ill (Baillargeon *et al.* 2010). To target this group with adequate service development remains a big public health and human rights concern.

Implications for research, service development and health policy

Future research should distinguish between studies representing newly admitted prison populations. Since mental health conditions may have been underestimated, especially in the large group of short-term prisoners and at admission to prison, treatment resources and support inside penal justice systems may need to be increased. Future prison mental health service planning should also acknowledge the mental health burden of prisoners before admission and at admission. In spite of mental health improvements that may occur during imprisonment without treatment, assessment and service delivery at admission may be important for those prisoners not staying for long. Delivery of effective treatments at admission could also strengthen, accelerate and sustain those mental health improvements occurring without mental health interventions in longer-term prisoners.

Admission studies are essential to inform the development of integrated community/prison care models supporting prisoners with short and repeat sentences. The need for mental health care in prisoners is much larger than previously suggested. Substantial resources are needed to assess and provide care for so many people. Intervening might also be a chance to help large numbers of people in need and improve both their mental health and social outcomes, with benefits on an individual and societal level.

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Conflict of Interest

The authors declare to have no competing interests.

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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