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The impact of co-morbid personality disorder on use of psychiatric services and involuntary hospitalization in people with severe mental illness

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ABSTRACT

Purpose:

To examine the impact of co-morbid personality disorder (PD), on inpatient and community-based service use and risk of involuntary hospitalization, amongst patients with severe mental illness (SMI).

Methods:

We identified SMI cases (schizophrenia, schizoaffective and bipolar disorder) with and without co-morbid PD, and PD cases, aged ≥18 years, in a large secondary mental healthcare case register. Using multivariable logistic regression, we examined the association between co-morbid PD and high level of inpatient and community-based service use (defined as the top decile of service use), and involuntary hospitalization, respectively, adjusting for socio-demographics, clinical symptoms and social functioning.

Results:

SMI patients with co-morbid PD (SMI-PD) (n=961) had more severe symptoms and social functioning problems compared to SMI patients without PD (n=10,963) and patients who had PD but no concurrent SMI (n=2,309). A greater proportion of SMI-PD patients were high inpatient service users (22.4% vs. 10.1%). This association was attenuated but remained significant, after adjustment (fully adjusted odds ratio, OR: 2.31, 95% CI 1.88 – 2.84). The association between SMI-PD and high community-based service use was confounded by symptoms and social functioning. Compared to patients with SMI, SMI-PD patients were significantly more likely to experience involuntary hospitalization (fully adjusted OR 1.56, 95% CI 1.31 – 1.85).

Conclusions:

In SMI patients, co-morbidity with PD is robustly associated with both high use of inpatient psychiatric services and an increased likelihood of involuntary hospitalization. Patients with SMI and

co-morbid PD are likely to require tailored interventions that target both the underlying personality pathology as well as the Axis I disorder.

INTRODUCTION

Personality disorder (PD) is prevalent among patients with severe mental illness (SMI) [1] where it has been shown to be independently associated with both suicidal [2] and violent behaviour [3]. Moreover people with PD are more likely to report poor physical health [4] and are at substantially increased risk of mortality compared to the general population [5]. From a service perspective, studies of cohorts of patients with SMI have found that those with co-morbid PD spend more time in hospital [6][7]. However, the full impact of co-morbid PD on community and hospital-based service utilization by patients with SMI has not been described. Moreover, the factors underlying an association between co-morbid PD and increased service use in patients with SMI are not well understood. Apart from diagnosis [8], heavy service use amongst people with mental disorder is associated with alcohol and drug use, non-adherence with medication [9], homelessness and other socio-demographic variables [10], as well as violence [11]. Some or all of these variables may confound or mediate an association between co-morbid PD and heavy service use in SMI, but no study has examined the impact of controlling for these covariates.

In this study we used a large historic cohort to examine the impact of co-morbid PD on the use of psychiatric services among patients with SMI. For comprehensiveness, we measured both inpatient and community-based service use, and took into account a range of socio-demographic, clinical and social functioning variables. SMI predominates amongst patients who are involuntarily hospitalized [12]. Given that involuntary hospitalization is associated with level of inpatient service use and has an important bearing on clinical outcomes [13], a further objective of this study was to determine whether co-morbid PD is associated with increased involuntary hospitalization amongst patients with SMI – an association which has also not previously been examined.

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METHODS

Setting

The study was based in South London and Maudsley NHS Foundation Trust (SLaM), a state-funded, secondary mental healthcare provider with close to 100% monopoly in serving an aggregate population of 1.2 million people living in four London boroughs (Lambeth, Southwark, Lewisham and Croydon). SLaM services include inpatient and community-based care, as well as psychiatric liaison services to general hospitals, and forensic, old age, child and adolescent, addictions, and learning disability mental health teams. The SLaM Biomedical Research Centre (BRC) Case Register provides anonymised in-depth information derived from SLaM's electronic clinical record system. The development and protocol of this case register has been described in detail in a previous open access publication [14], and the case register has been used extensively in previous research [15][16]. Electronic clinical records have been used comprehensively across all SLaM services since 2006 and the BRC Clinical Record Interactive Search (CRIS) system was developed in 2008 to allow searching and retrieval of anonymised information from full clinical records with over 200,000 cases currently represented on the system. CRIS was approved as a data resource for secondary analysis by the Oxfordshire Research Ethics Committee (reference 08/H0606/71).

Sample

The cohort assembled for this study consisted of individuals from three mutually exclusive diagnostic groups – (1) SMI; (2) PD; and (3) SMI co-morbid with PD (SMI-PD). Diagnoses were based on the 10th edition of the World Health Organisation International Classification of Diseases (ICD-10) [17]. Patients were considered to have SMI if they had been given a lifetime diagnosis of schizophrenia (ICD-10 code: F20), schizoaffective disorder (F25) or bipolar affective disorder (F31) at any time before the end of the study period. Patients with PD had a lifetime diagnosis of any of the ICD-10 categories of PD diagnosis (F60.0- F61.0). Individuals were classified as having SMI and PD co-morbidly if they had been given both an SMI diagnosis and a PD diagnosis during the study period.

Diagnoses were taken from a structured field in the Case Register and supplemented by the appearance of diagnoses in free text, extracted using Generalised Architecture for Text Engineering (GATE) software [18].

All individuals aged 18 or over within the case register that had been given diagnoses falling in any of these groups, and had received SLaM services within the five-year study period from 1 January 2007 to 31 December 2011, were included. The beginning of 2007 was chosen as a starting point for the study because this corresponded to the most complete recording of clinical data on the Case Register. Individuals diagnosed with an organic disorder or with mental retardation, within the observation period, were excluded from the study. We also excluded from the SMI-PD group any individuals with paranoid or schizoid PD (n=74), as these diagnoses should not be made in the presence of a primary psychotic diagnosis such as schizophrenia.

In order to examine the validity of the PD diagnoses in the Case Register, 50 cases with or without a PD diagnosis were randomly selected from our cohort. Case note documents for the 50 individuals were then independently processed to mask all diagnosis information. These 50 cases were subsequently rated by a trained psychiatrist (MF; who was blind to the original diagnostic information) for the presence or absence of PD. The kappa coefficient for level of agreement between the case register diagnosis and blind clinical rating of the case records was 0.72 (p<0.001).

Main outcome measures

Measures of each individual's mental health service use with respect to hospitalization, community-based contact, and involuntary hospitalization were determined by selective and systematic data extraction from the case register. For each patient, the observation period began on the 1st January 2007 or the dates of their first recorded event on the case register from that day onwards, whichever was later. Observation ended on 31st December 2011 or the date of death, whichever was earlier.

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<u>Inpatient service use.</u> The time in days that each individual had spent hospitalized as an inpatient was calculated, as a proportion of the duration of his/her observation period. Patients ranking in the top decile on this measure were considered to be high users of inpatient services.

<u>Community-based service use.</u> Community-based contact was defined as a clinical event in which the patient had face-to-face contact with a healthcare worker in any SLaM service other than inpatient units. The time in days in which each individual had community-based contact (i.e. count of each day in which there was contact) was calculated, as a proportion of the duration of his/her observation period. Patients ranking in the top decile on this measure were considered to be high users of community-based services.

<u>Involuntary hospitalization.</u> The Mental Health Act provides the legislative framework by which people in England and Wales diagnosed with mental disorder can be detained in hospital or police custody and be assessed and treated with respect to their disorder, against their wishes. Use of the Mental Health Act is routinely recorded on the case register. Thus, for each patient in the cohort we were able to ascertain whether he/she had been involuntarily hospitalized at any point within the observation period. This was used as a dichotomous outcome (detained vs. not detained) in the analysis.

Explanatory variables

<u>Demographic and socioeconomic factors.</u>

 Date or birth, gender, ethnicity, relationship status, and employment status were defined from routinely completed fields on the source records. Age was calculated from the beginning of the patient's observation period. Ethnicity classifications were: "White British or other white background", "East Asian", "South Asian", "African, Caribbean or other black background", and "Mixed, unknown, and others". Relationship status was classified as being in a current relationship (cohabiting, married or civil partner) or no current relationship (divorced, civil partnership dissolved,

separated, single, widow/surviving civil partner or unknown). Employment status was classified as being in paid employment (part-time or full-time paid employment, self employed), or not in paid employment (unemployed, registered disabled, retired, full-time student including tertiary or school age, government training scheme, volunteer, not known, other).

We used an area-level index of multiple deprivation to measure socioeconomic status, calculated at the level of lower super output area for the residence (LSOA) -- a UK address-grouping construct which contains an average of 1,500 residents. The patient's address in England that was recorded closest in time to the beginning of the observation period was used to obtain deprivation scores. The index of multiple deprivation is derived from a range of domains applied to the area including: employment, income, education, health, barriers to housing and services, crime and the living environment. Each domain is given a specific weighting to reflect its overall importance in the calculation of this index. Moreover, each domain is made up of a number of specific indicators that reflect different aspects of the deprivation they are intended to measure. Increasing scores in the index of multiple deprivation are indicative of more severe deprivation. In this analysis, deprivation scores were divided into tertiles. A separate category was given for homelessness.

Symptoms and social functioning.

We rated for the presence and severity of symptoms, as well as social functioning problems using the Health of the Nations Outcome Scale (HoNOS), a well-validated, 12-item, clinician-administered measure [19][20][21]. Eight of the 12 items assess clinical symptoms– (1) overactive, aggressive, disruptive or agitated behaviour; (2) non-accidental self-injury; (3) problem-drinking or drug-taking; (4) cognitive problems; (5) physical illness or disability problems; (6) problems associated with hallucinations and delusions; (7) problems with depressed mood; (8) other mental and behavioural problems. The remaining four items cover social functioning – (9) problems with relationships; (10)

problems with activities of daily living; (11) problems with living conditions; (12) problems with occupation and activities. The 12 items have operationalized response options that follow the format of 0 "not a problem"; 1 "subclinical, minor problem requiring no action", 2 "mild problem but definitely present", 3 " moderately severe problem", and 4 "severe to very severe problem" [22]. In this analysis we used items from the first HoNOS questionnaire that was completed during the observation period as measures of baseline level of symptoms and social functioning in each patient. Due to small numbers in some categories, for the purposes of data analysis, all HoNOS items were collapsed into two categories: 0-2) not a problem, subclinical, or mild problem, and 3-4) severe or very severe problem. Overall, 79.7% of patients in the study received at least one HoNOS assessment during the observation period. Due to incomplete data for some covariates, the final fully-adjusted models had analytic samples that were reduced compared to the crude models. However, incomplete data were evenly distributed between the exposure groups.

Statistical analysis

All analyses were undertaken using STATA 11 [23]. We used multivariate logistic regression to model the effect of different diagnosis categories on the three outcomes (inpatient service use, community-based service use, and involuntary hospitalization), adjusting for possible explanatory variables. We present crude and adjusted odds ratios with 95% confidence intervals derived from logistic regression models. In all three cases, the first logistic regression model included only diagnosis as an explanatory variable. The second model also included demographic factors (age, gender, ethnicity, relationship status) and socioeconomic factors (deprivation in area of residence and employment) were subsequently added to the model. In the third and final model of predictors of service use, we added symptoms and social functioning as covariates to the model. In modelling predictors of involuntary hospitalization, we also adjusted for length of observation period.

We conducted two sets of sensitivity analyses. The first set involved using 5% and 15% as alternative definitions to the original top 10% cut-off for defining high inpatient and community-based service use. The second set of sensitivity analyses used inpatient and community-based service use as continuous variables, and modelled these using linear regressions. The service use data were highly skewed and, therefore, we log-transformed these data (resulting in the data approximating a normal distribution) before developing the two linear regression models.

RESULTS

A total of 14233 individuals were identified by CRIS, using our criteria for inclusion into the study. The cohort was 54.3% male and had a mean age of 41.9 years (standard deviation 14.7 years). In terms of ethnic background, 53.8% were white, 30.4% were African, Caribbean or other black background, 2.9% were East Asian, 2.6% were South Asian, and 10.3% were mixed or unknown. Twelve per cent of the cohort had a cohabiting, married or in a civil partnership relationship status and 2.4% of the cohort was classified as homeless. Only 4.2% of the cohort were in paid employment. 5.9% of the cohort died before the end of the study observation period (31st December 2011).

Of the 14233 individuals, 10963 were in the SMI group, 2309 in the PD group, and 961 in the SMI-PD group. Table 1 provides the demographic and socioeconomic characteristics of the patients included in the study, according to the three diagnosis groups. Compared to the SMI group, a larger proportion of the SMI-PD group was younger, from a white ethnic background and was homeless and a smaller proportion was in a relationship.

Differences were noted in the HoNOS sub-scale profiles between the SMI and SMI-PD groups. Compared to the SMI group, the SMI-PD group had a higher proportion of individuals with severe or very severe problems in five of eight symptom domains - overactivity and aggression (13.5% vs 6.8%; p<0.001); non-accidental injury (8.3% vs 1.7%; p<0.001); depressed mood (13.7% vs 6.5%; p<0.001); problem drinking or drug-taking (16.3% vs 6.2%; p<0.001); other mental health problem (23.7% vs

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14.3%; p<0.001). They also had a greater proportion of individuals with severe problems compared to the SMI group, in three of four social functioning domains – occupational (14.2% vs 9.3%; p<0.001); living conditions (11.5% vs 6.9%; p<0.001); and relationship problem (19.7% vs 10.3%; p<0.001). In the remaining three clinical domains (hallucinations and delusions, cognitive problems, physical illness or disability) and one social functioning domain (activities of daily living) the two groups were comparable.

Table 2 shows the measures of psychiatric service use amongst the three diagnosis groups. Five thousand six hundred and eight individuals (39.4% of total cohort) had at least one inpatient admission during the study period. The PD group had proportionately fewer patients (26.9%), and the SMI-PD group had proportionately more patients (63.1%) admitted as an inpatient, compared to the SMI group (40.0%). Those in the top 10 percent of inpatient service use (as a proportion of length of observation period) spent an average of 136.4 days per year in hospital. Amongst the three diagnosis groups, the SMI-PD group had the highest proportions of high users of inpatient services (22.4%) and high users of community-based services (13.6%) respectively. This group also had the highest prevalence of individuals experiencing involuntary hospitalization (41.8%). In contrast, the PD group had the lowest proportions of high users of both inpatient (4.5%) and community-based (5.4%) services, as well as involuntary hospitalization (10.7%).

Table 3 displays the results of multivariate logistic regression for high inpatient service use. Individuals with SMI and co-morbid PD were twice as likely to be high users of inpatient services compared to individuals with SMI without co-morbid PD (crude odds ratio 2.57, 95% confidence interval 2.18 – 3.03, p value<0.001). Adjustment for demographic and socioeconomic factors did not attenuate the association and addition of baseline severity of symptoms and social functioning problems to the model had little impact on the strength of the association (fully adjusted odds ratio 2.31, 95% confidence interval 1.88 – 2.84, p value<0.001).

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The equivalent regression model for high community-based service use is shown in Table 4. Co-morbid PD conferred a small but significant increase in the odds of high service use (crude odds ratio 1.32, 95% confidence interval 1.09 – 1.61, p value<0.05). This association was not attenuated by adjustment for demographic and socioeconomic factors. However, the addition of clinical and social functioning problems to the model rendered the odds ratio non significant (fully adjusted odds ratio 1.11, 95% confidence interval 0.89 – 1.39).

Sensitivity analysis using the top 5% as cut-off for high service use yielded similar results (adjusted odds ratio (AOR) for inpatient service use associated with co-morbid PD: 2.75, 95% confidence interval 2.11-3.58; AOR for community-based service use: 0.96, 95% confidence interval 0.75-1.21); likewise, when using 15% as alternative cut-off (AOR for inpatient service use: 1.98, 95% confidence interval 1.64-2.38; AOR for community-based service use 1.08, 95% confidence interval 0.89-1.30).. When we re-ran the analyses using linear regression, the independent effect of co-morbid PD on the inpatient service use of SMI patients was retained (fully adjusted β coefficient 0.28, 95% confidence interval 0.14 – 0.41, p value<0.001). The sensitivity analysis for community-based service use showed a smaller but independent effect of co-morbid PD (fully adjusted β coefficient 0.16, 95% confidence interval 0.07 – 0.26, p value<0.01).

Table 5 shows the multivariate regression for involuntary hospitalization. SMI patients with co-morbid PD were almost twice as likely to be involuntarily hospitalized compared to SMI patients without co-morbid PD (crude odds ratio 1.83, 95% confidence interval 1.60 – 2.09, p value<0.001). Adjustment for demographic and socioeconomic factors, symptoms and social functioning, and length of observation period in the study, did not attenuate this association (fully adjusted odds ratio 1.56, 95% confidence interval 1.31 – 1.85, p value< 0.001).

DISCUSSION

Main Findings

In this cohort of patients accessing secondary mental health services, SMI patients who had co-morbid PD were significantly more likely to be high users of inpatient services, compared to SMI patients without co-morbid PD. This association remained significant after adjustment for socio-demographic factors and a wide range of clinical and social functioning variables. The presence of co-morbid PD also significantly increased the likelihood of involuntary hospitalization among SMI patients, an association which was not explained by the measured potential confounding variables.

Previous Work and possible mechanisms

To the best of our knowledge this is the first study to examine the impact of co-morbid PD on both inpatient and community-based service use of adult patients with SMI. Tyrer and Simmonds [7] reviewed the outcome of three randomised controlled trials that investigated different models of care in SMI, and found in post-hoc analyses that patients with co-morbid PD spent more time in hospital compared to those without co-morbid PD, regardless of the model of care. Keown and others investigated psychiatric bed use amongst SMI patients seen in a UK community mental health team, and found that the concurrent presence of PD and also severity of PD were associated with increased psychiatric bed use amongst SMI patients [7][6]. Our finding that co-morbid PD increases inpatient service use in SMI patients is consistent with existing evidence that co-morbid personality pathology worsens outcomes in SMI [24][25][26][2][3][27]. The SMI-PD patient group in our study was characterised by a number of factors known to contribute to increased psychiatric service use -- more severe psychopathology [25], higher levels of aggression [11] and self-injury [28], greater problems with alcohol and drug use [29][30], greater problems with housing [11] and occupation, and less stable relationships [31][32], compared to the SMI group. However, adjustment for these potential confounders had little effect on the strength of the association with inpatient service use.

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Based on previous work on patients with PD and co-morbid PD [33][34], one may have expected a similar pattern with regard to community-based services. However we did not detect an association between co-morbid PD and community-based service use. While we would not expect high inpatient use to exclude high community service use, it may be that some patients had their clinical needs met as an inpatient rather than in the community. Indeed, some individuals in the top decile of inpatient service use spent a great majority of the year in hospital, consequently reducing the amount of time that they could have received community services. Although we know of no other study that has examined both inpatient and community-based service use in adults with a dual diagnosis of SMI and PD, a recent study in adolescents with Axis I psychiatric disorders [35] found that those with co-morbid PD used more inpatient and emergency, but comparable outpatient, psychiatric services, compared to those without co-morbid PD.

No study has previously examined the impact of co-morbidity with PD on the risk of involuntary hospitalization in patients with SMI. The combination of personality disorder in the presence of SMI independently increased the risk of involuntary hospitalization. Compared to the SMI group, the SMI-PD group had a higher proportion of individuals with severe clinical problems in five of eight clinical domains, including aggression [36] and non-accidental injury. Levels of social dysfunction were also higher among the SMI-PD group compared to the SMI group. Thus factors associated with increased risk to self and/or others (a criterion for involuntary detention under the English Mental Health Act) were more prevalent in the SMI-PD group compared to those with SMI alone. These factors are very likely to be on the causal pathway to involuntary hospitalization for those with co-morbid PD and the attenuation in the size of the odds ratio which occurred when these covariates were added to the model provides some support for this argument. A diagnosis of personality disorder alone was associated with a lower likelihood of detention in hospital. This is consistent with recommended clinical practice [37], as there is no evidence base to suggest that compulsory treatment in hospital for people with PD improves clinical outcomes.

Strengths and Limitations

The study used a large cohort derived from a secondary mental health setting which included the full range of inpatient and community-based services and to our knowledge is the first study of its kind. We accounted for a wide range of covariates, including demographic, socioeconomic, clinical and social functioning variables. Examining both inpatient admission and all community-based service use in the cohort, as well as involuntary hospitalization, offered a fuller and more comprehensive picture of the impact of co-morbid PD in patients with SMI and this adds to the novelty of the findings.

The findings need to be considered in the light of certain limitations. We relied on ICD-10 diagnoses as opposed to standardised assessments, but the use of routinely-collected clinical data allowed us to obtain data on a very large sample size, thus optimising the precision of our findings. Moreover, our use of routine clinical diagnoses in a very large population favours generalisability to real clinical practice. In addition, we established an acceptable level of reliability between the case register diagnoses of personality disorder and blind clinical ratings. Although there was incomplete data in some models, it is unlikely to explain the observed associations, as there was little variation in results across the regression models. In addition, incomplete data was not unevenly distributed among the exposure groups of interest (SMI and SMI-PD). Misclassification of area deprivation level may have occurred for any cohort members who moved during the course of the study. There was a wide distribution of the time from start of observation to first HoNOS rating in the cohort (median 116 days, interquartile range 18 to 357 days) and this may have influenced the results. The relatively low prevalence of co-morbid PD in the SMI cohort (8.1%), stands in contrast with prevalence rates reported in other studies [38][39][40][41] and indicates that there was under-detection of PD in our sample [24][42]. On the other hand, it is possible that some cases of PD were misclassified and that the probability of this occurring was dependent upon service use (i.e. that heavy users of services were more likely to attract a diagnosis of PD). If this is the case, then it is possible that we have overestimated the strength of association between co-morbid PD and heavy service use. The

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historical cohort design means that in some cases, the diagnosis of co-existing PD was made during the course of or in some cases, towards the end of the individual's observation period. This, together with our cross-sectional analysis, limits our ability to make causal inferences.

We conclude that amongst patients with SMI, the co-existence of PD is independently associated with both high use of inpatient psychiatric services and an increased likelihood of involuntary hospitalization. Co-morbid PD is often unrecognised yet, as shown by our data, it is an important prognostic variable. This highlights the importance of routinely assessing personality status in individuals presenting to secondary mental health services [43] with Axis 1 disorders. Patients with SMI and co-morbid PD are likely to require tailored interventions that target both the underlying personality pathology as well as the Axis I disorder. In this respect, better treatment models are required to help to reduce admissions and involuntary hospitalization for patients with SMI and co-morbid Axis II pathology [7][41][44].

ACKNOWLEDGEMENTS

REFERENCES

1. Zimmerman M, Rothschild L, Chelminski I (2005) The prevalence of DSM-IV personality disorders in psychiatric outpatients. Am J Psychiatry 162:1911–8. doi: 10.1176/appi.ajp.162.10.1911

2. Moran P, Walsh E, Tyrer P, Burns T, Creed F, Fahy T (2003) Does co-morbid personality disorder increase the risk of suicidal behaviour in psychosis? Acta Psychiatr Scand 107:441–8.

3. Moran P, Walsh E, Tyrer P, Burns T, Creed F, Fahy T (2003) Impact of comorbid personality disorder on violence in psychosis: report from the UK700 trial. Br J Psychiatry 182:129–34.

4. Fok M, Hotopf M, Stewart R, Hatch S, Hayes R, Moran P (2013) Personality Disorder and Self-Rated Health: A Population-Based Cross-Sectional Survey. J Personal Disord. doi: 10.1521/pedi_2013_27_119

5. Fok ML, Hayes RD, Chang CK, Stewart R, Callard FJ, Moran P (2012) Life expectancy at birth and all-cause mortality among people with personality disorder. J Psychosom Res 73:104–7. doi: 10.1016/j.jpsychores.2012.05.001

6. Keown P, Holloway F, Kuipers E (2005) The impact of severe mental illness, co-morbid personality disorders and demographic factors on psychiatric bed use. Soc Psychiatry Psychiatr Epidemiol 40:42–49. doi: 10.1007/s00127-005-0842-0

7. Tyrer P, Simmonds S (2003) Treatment models for those with severe mental illness and comorbid personality disorder. Br J Psychiatry Suppl 44:S15–8.

8. Hodgson RE, Lewis M, Boardman AP (2001) Prediction of readmission to acute psychiatric units. Soc Psychiatry Psychiatr Epidemiol 36:304–9.

9. Valenstein M, Copeland LA, Blow FC, McCarthy JF, Zeber JE, Gillon L, Bingham CR, Stavenger T (2002) Pharmacy data identify poorly adherent patients with schizophrenia at increased risk for admission. Med Care 40:630–639. doi: 10.1097/01.Mlr.0000021003.43524.64

10. Lay B, Lauber C, Rössler W (2006) Prediction of in-patient use in first-admitted patients with psychosis. Eur Psychiatry 21:401–409. doi: 10.1016/j.eurpsy.2005.12.004

11. Tulloch AD, Fearon P, David AS (2008) The determinants and outcomes of long-stay psychiatric admissions - A case-control study. Soc Psychiatry Psychiatr Epidemiol 43:569–574. doi: 10.1007/s00127-008-0332-2

12. Salize HJ, Dressing H (2004) Epidemiology of involuntary placement of mentally ill people across the European Union. Br J Psychiatry 184:163–8.

13. Kallert TW, Glockner M, Schutzwohl M (2008) Involuntary vs. voluntary hospital admission. A systematic literature review on outcome diversity. Eur Arch Psychiatry Clin Neurosci 258:195–209. doi: 10.1007/s00406-007-0777-4

14. Stewart R, Soremekun M, Perera G, Broadbent M, Callard F, Denis M, Hotopf M, Thornicroft G, Lovestone S (2009) The South London and Maudsley NHS Foundation Trust Biomedical

Research Centre (SLAM BRC) case register: development and descriptive data. BMC Psychiatry 9:51. doi: 10.1186/1471-244x-9-51

15. Hayes RD, Chang CK, Fernandes A, Begum A, To D, Broadbent M, Hotopf M, Stewart R (2012) Associations between symptoms and all-cause mortality in individuals with serious mental illness. J Psychosom Res 72:114–9. doi: 10.1016/j.jpsychores.2011.09.012

16. Hayes RD, Chang CK, Fernandes AC, Begum A, To D, Broadbent M, Hotopf M, Stewart R (2012) Functional status and all-cause mortality in serious mental illness. PLoS ONE 7:e44613. doi: 10.1371/journal.pone.0044613

17. Organisation WH (2000) Manual of the international statistical classification of diseases and related health problems 10th revision (ICD-10).

18. Cunningham H, Maynard D, Bontcheva K, Tablan V, Aswani N, Roberts I (2011) Text Processing with GATE (Version 6). University of Sheffield Department of Computer Science

19. Orrell M, Yard P, Handysides J, Schapira R (1999) Validity and reliability of the Health of the Nation Outcome Scales in psychiatric patients in the community. Br J Psychiatry 174:409–12.

20. Pirkis JE, Burgess PM, Kirk PK, Dodson S, Coombs TJ, Williamson MK (2005) A review of the psychometric properties of the Health of the Nation Outcome Scales (HoNOS) family of measures. Heal Qual Life Outcomes 3:76. doi: 10.1186/1477-7525-3-76

21. Hunter R, Cameron R, Norrie J (2009) Using Patient-Reported Outcomes in Schizophrenia: The Scottish Schizophrenia Outcomes Study. Psychiatr Serv 60:240–245.

22. Wing J, Curtis RH, Beevor A (1999) Health of the Nation Outcome Scales (HoNOS) - Glossary for HoNOS score sheet. Br J Psychiatry 174:432–434. doi: 10.1192/bjp.174.5.432

23. Stata Corporation: College Station T (2009) Stata Statistical Software, Release 11.

24. Barbato N, Hafner RJ (1998) Comorbidity of bipolar and personality disorder. Aust N Z J Psychiatry 32:276–80.

25. Bahorik AL, Eack SM (2010) Examining the course and outcome of individuals diagnosed with schizophrenia and comorbid borderline personality disorder. Schizophr Res 124:29–35. doi: 10.1016/j.schres.2010.09.005

26. Fan AH, Hassell J (2008) Bipolar disorder and comorbid personality psychopathology: a review of the literature. J Clin Psychiatry 69:1794–803.

27. Moran P, Hodgins S (2004) The correlates of comorbid antisocial personality disorder in schizophrenia. Schizophr Bull 30:791–802.

28. Hull JW, Yeomans F, Clarkin J, Li C, Goodman G (1996) Factors associated with multiple hospitalizations of patients with borderline personality disorder. Psychiatr Serv 47:638–41.

29. Haywood TW, Kravitz HM, Grossman LS, Cavanaugh JL, Davis JM, Lewis DA (1995) Predicting the Revolving-Door Phenomenon among Patients with Schizophrenic, Schizoaffective, and Affective-Disorders. Am J Psychiatry 152:856–861.

30. Olfson M, Mechanic D, Boyer CA, Hansell S, Walkup J, Weiden PJ (1999) Assessing clinical predictions of early rehospitalization in schizophrenia. J Nerv Ment Dis 187:721–9.

31. Kent S, Yellowlees P (1995) The Relationship between Social-Factors and Frequent Use of Psychiatric-Services. Aust N Z J Psychiatry 29:403–408. doi: 10.3109/00048679509064947

32. Postrado LT, Lehman AF (1995) Quality of life and clinical predictors of rehospitalization of persons with severe mental illness. Psychiatr Serv 46:1161–5.

33. Bender DS, Dolan RT, Skodol AE, Sanislow CA, Dyck IR, McGlashan TH, Shea MT, Zanarini MC, Oldham JM, Gunderson JG (2001) Treatment utilization by patients with personality disorders. Am J Psychiatry 158:295–302.

34. Kasen S, Cohen P, Skodol AE, First MB, Johnson JG, Brook JS, Oldham JM (2007) Comorbid personality disorder and treatment use in a community sample of youths: a 20-year follow-up. Acta Psychiatr Scand 115:56–65. doi: 10.1111/j.1600-0447.2006.00842.x

35. Magallon-Neri EM, Canalda G, De la Fuente JE, Forns M, Garcia R, Gonzalez E, Castro-Fornieles J (2012) The influence of personality disorders on the use of mental health services in adolescents with psychiatric disorders. Compr Psychiatry 53:509–515. doi: 10.1016/j.comppsych.2011.08.005

36. Volavka J, Citrome L (2011) Pathways to aggression in schizophrenia affect results of treatment. Schizophr Bull 37:921–9. doi: 10.1093/schbul/sbr041

37. (2009) Borderline Personality Disorder: The NICE Guideline on Treatment and Management. Leicester & London: British Psychological Society & Royal College of Psychiatrists

38. Cutting J, Cowen PJ, Mann AH, Jenkins R (1986) Personality and psychosis: use of the Standardized Assessment of Personality. Acta Psychiatr Scand 73:87–92.

39. Pilgrim J, Mann A (1990) Use of the ICD-10 version of the Standardized Assessment of Personality to determine the prevalence of personality disorder in psychiatric in-patients. Psychol Med 20:985–92.

40. Keown P, Holloway F, Kuipers E (2002) The prevalence of personality disorders, psychotic disorders and affective disorders amongst the patients seen by a community mental health team in London. Soc Psychiatry Psychiatr Epidemiol 37:225–229. doi: 10.1007/s00127-002-0533-z

41. Newton-Howes G, Tyrer P, Anagnostakis K, Cooper S, Bowden-Jones O, Weaver T (2010) The prevalence of personality disorder, its comorbidity with mental state disorders, and its clinical significance in community mental health teams. Soc Psychiatry Psychiatr Epidemiol 45:453–60. doi: 10.1007/s00127-009-0084-7

42. Leontieva L, Gregory R (2013) Characteristics of patients with borderline personality disorder in a state psychiatric hospital. J Pers Disord 27:222–32. doi: 10.1521/pedi_2013_27_078

43. Hesse M, Moran P (2010) Screening for personality disorder with the Standardised Assessment of Personality: Abbreviated Scale (SAPAS): further evidence of concurrent validity. BMC Psychiatry 10:10. doi: 10.1186/1471-244X-10-10

44. Henderson C, Flood C, Leese M, Thornicroft G, Sutherby K, Szmukler G (2004) Effect of joint crisis plans on use of compulsory treatment in psychiatry: single blind randomised controlled trial. Br Med J 329:136–138A. doi: 10.1136/bmj.38155.585046.63