**Supplementary table 1.** Outcomes considered relevant to rehabilitation services based on recent literature and their inclusion in the current study.

|  |  |  |  |
| --- | --- | --- | --- |
| Category | Outcome | Reference | Inclusion in current study |
| Increased independence  | Progression of independence | (Killaspy and Zis, 2013) | Not included |
| Community / inpatient daysa | N/A | Secondary outcome |
| Accommodation instabilityb | (Tulloch et al., 2011; Tulloch et al., 2010) | Secondary outcome |
| Clinical improvement | Mental health and social functioning | (Gonda et al., 2012; Chatterjee et al., 2009; Maxwell et al., 2018) | Primary outcome |
| Symptoms | (Gonda et al., 2012) | Not included |
| Disability | (Chatterjee et al., 2009; Maxwell et al., 2018) | Secondary outcome |
| Psychological distress | (Gonda et al., 2012; Maxwell et al., 2018) | Not included |
| Post-discharge adjustment  | Accommodation instability | (Tulloch et al., 2011; Tulloch et al., 2010) | Secondary outcome |
| Community / inpatient days | N/A | Secondary outcome |
| Adverse outcome | Death | (Killaspy and Zis, 2013) | Not included |
| Incarceration | N/A | Not included |
| Loss to follow-up | (Killaspy and Zis, 2013) | Not included |
| Days to re-admission | (Grinshpoon et al., 2007) | Not included |
| ED presentations | N/A | Secondary outcome |

CCU: Community-care units.

a Biased in favour of consumers transitioning from long-stay inpatient care to a rehabilitation service.

b Biased against consumers transitioning from long-stay inpatient care to a rehabilitation service.

**Supplementary Table 2.** Summary of studies evaluating the outcomes of psychiatric rehabilitation in people with schizophrenia.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Study | Sample | Context and country  | Design | Outcome measures | Independent predictor variables  | Main findings |
| Chatterjee et al. (2009) | 236 patients (141 males)Age: 20-45 years (74.2%)Primary diagnoses: Schizophrenia (55.5%), bipolar (27.7%), and other psychoses (16.8%) | Community-based rehabilitation in rural India; minimum enrollment in the program was 12 months with a median period of 46 months | Longitudinal with assessments at admission and discharge over a 3-year follow-up period | Disability assessed with Indian Disability Evaluation Assessment Scale (IDEAS) | Marital status, primary diagnosis, duration of illness, medication adherence, household assets, family support, self-help group membership, program drop-out  | Improvement was marked (≥ 40% change from baseline) in 50%, moderate (20-40% change from baseline) in 40%, and minimal (<20% change from baseline) in 10% of participantsPositive predictors of reduced levels of disability were lower baseline disability, family engagement with the program, medication adherence, and engagement with a self-help group; negative predictors were lack of formal education, diagnosis of schizophrenia and dropping out of the program |
| Girolamo et al. (2014) | 403 patients (2/3 male)Mean age: 48 ± 10, range 19-64 yearsPrimary diagnoses: Schizophrenia-spectrum (67.5%) and personality disorders (17.9%) | 23 medium-long-term residential facilities in Italy; mean length of stay: 4.2 years ± 5.5 (median = 2.2) | Longitudinal with 1-year follow-up | Likelihood of home discharge | Socio-demographic (e.g., primary diagnosis, illness duration, age), psychosocial variables (e.g., social support, inactivity) | Positive predictors of home discharge were shorter illness duration, available social support in the last year, and a diagnosis of unipolar depression |
| Gonda et al. (2012) | 337 patients (170 male)Mean age: 33.6 ± 9.8, range 18-61 yearsPrimary diagnoses: Schizophrenia (68%) and schizoaffective (20.8%) disorders | 2 inpatient psychosocial rehabilitation units in NSW, Australia; mean length of stay: 111 ± 73, range 6-602 days | Longitudinal with assessments at admission, discharge and 3-month follow-up | RCS improvement on BPRS-E, HoNOS, and K10 (RCS improved / not improved)  | Age, gender, length of stay, primary diagnosis and co-morbid diagnosis | Between 32% and 49% of the patients made an improvement; between 20% and 32% made RCS improvement across the three outcome measuresPositive predictors of RCS improvement on psychiatric symptomatology (BPRS-E) were schizoaffective disorder [exp(β) = 3.52, *p* < 0.05] and co-morbid alcohol abuse disorder [exp(β) = 2.29, *p* = 0.053] |
| Study | Sample | Context and country  | Design | Outcome measures | Independent predictor variables  | Main findings |
| Grinshpoon et al. (2007) | 4160 patients (2413 male) discharged from their first-in-life psychiatric hospitalization Primary diagnoses: F20-F29 or F30-F39 (100%) | Two cohorts of patients (discharged 1990-1991 and 2000-2001), to assess the effects of the Rehabilitation of the Mentally Disabled Act (RMDA) passed in 2000, Israel | Longitudinal with 3-year follow-up | Time to hospital re-admission  | Age, gender | Re-admission for all patients was lower among females [exp(β) = 0.13, *p* < 0.001] and negatively associated with age [exp(β) for 20-44 y old = 0.13, *p* = 0.001 and for 45-64 y old = 0.414, *p* < 0.001]For the 2000-2001 cohort, long hospitalization (more than 6 months) was associated with reduced likelihood of re-admission during follow-up [exp(β) = 0.26, *p* = 0.056] |
| Killaspy and Zis (2013) | 141 patients (84 male)Mean age: 44 ± 13 yearsPrimary diagnoses: Schizophrenia or schizoaffective disorder (93%) | Mental health residential rehabilitation service in London, UK, incl. 2 shorter-term inpatient units (n = 47), 3 community units (n = 44), 4 community-supported accommodation facilities (n =50) | Retrospective 5-year survey-based study | Change in independence: positive outcome - achieving and sustaining community placement for inpatients and progressing or sustaining a less supported community placement for community patients (progressed / remained stable / relapsed) | Age, history of physical abuse, medication non-adherence, challenging behaviours, social function communication, involuntary treatment | Positive outcome was achieved by 50 (40%) of the patients; 13 (10%) moved to independent accommodation and successfully sustained their tenancy; 33 (27%) remained in a placement with a similar level of support; 41 (38%) moved to more supported placement and/or had a psychiatric admissionIncreased age was associated with a reduced likelihood (OR = 0.93, *p* = 0.003) and medication non-adherence with increased odds of a negative outcome (OR = 33.57, *p* < 0.001)  |
| Study | Sample | Context and country  | Design | Outcome measures | Independent predictor variables  | Main findings |
| Lim et al. (2017) | 246 patients (161 male)Mean age: 37.9 ± 9.4 yearsPrimary diagnosis: Schizophrenia (100%) | 6 community-based psychiatric rehabilitation programs in Los Angeles, USA | Longitudinal with assessments at admission, and at 6 and 12 months after admission | Recovery based on 4 criteria (be in symptomatic remission, demonstrate adequate work and social functioning, and no psychiatric hospitalization) | Demographic (gender, education), clinical (e.g., symptomatology, length of illness, medication use), and psychosocial characteristics (e.g., intrinsic motivation, social support)  | Recovery was recorded in 19.8% and 7.5% of patients at 6- and 12-month follow-up, respectively (n = 146) Higher levels of intrinsic motivation [exp(β) = 1.68], positive family relationships [exp(β) = 1.32], role functioning [exp(β) = 1.34], and social functioning [exp(β) = 1.40] at admission predicted recovery at 6-month follow-up (all *p* < 0.05)  |
| Maxwell et al. (2018) | Clinical group: 210 patients (144 male)Comparison group (mental health sample functioning independently in the community): 114 adults (57 male) Primary diagnosis: Schizophrenia (100%) | 1 inpatient mental health rehabilitation unit in NSW, Australia | Longitudinal with assessments at admission, discharge and at least 1 year post-discharge  | RCS (based on cut-off 3) on HoNOS; LSP-16; and K10 | Age, gender, marital status, type of usual accommodation, country of birth, secondary diagnosis, length of stay, HoNOS total and subscale scores and LSP total and subscale scores at admission  | Positive predictors of RCS improvement on HoNOS total scale were HoNOS Behaviour [exp(β) = 14.57 *p* < 0.01] and Impairment subscales scores [exp(β) = 18.87, *p* < 0.05] at admissionPositive predictors of RCS improvement on LSP total scale were LSP Socialisation [exp(β) = 10.23, *p* < 0.05] and Withdrawal subscales scores [exp(β) = 10.23, *p* < 0.05] at admission |
| Yoon et al. (2013) | 9208 adultsMean age: 41.1 ± 15.6 yearsDiagnoses: Schizophrenia (63%), bipolar (48%), other mental illness (52%), substance abuse (54%)  | Intensive case-management community-treatment program, California, USA; mean tenure: 10.8 ± 8.2 months | Longitudinal followed up to 4 years | Residential transition to different types of living arrangements | Length and continuity of program participation, age, gender, diagnosis, education, race  | Positive predictors of independent living arrangement were uninterrupted program participation, having a diagnosis of bipolar disorder (relative to schizophrenia), and any other diagnosis, such as depression or personality or anxiety disorder (relative to schizophrenia or bipolar disorder) |

BPRS-E: Brief Psychiatric Rating Scale-Expanded version; HoNOS: Health of the Nation Outcome Scales; K10: Kessler 10; LSP: Life Skills Profile-16; NSW: New South Wales; OR: adjusted odds ratio; RCS: Reliable and clinically significant; SLOF: Specific Levels of Functioning; UK: United Kingdom; USA: United States of America

**Supplementary Table 3.** Spearman rank correlation coefficients among the independent variables.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  Independent variables  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |  |
| 1 | Year of admission | 0.02 | 0.00 | -0.02 | 0.30\*\* | -0.21 | 0.03 | 0.17\*\* | -0.15 | 0.08 | 0.07 | 0.07 | 0.10 | 0.17\*\* | 0.09 | 0.04 | -0.02 | 0.12\*\* | 0.39\*\* | 0.01 |  |
| 2 | CCU site 1 |  | -0.19 | -0.15 | -0.10 | -0.16 | -0.07 | 0.01 | 0.07 | -0.02 | -0.05 | -0.10 | -0.05 | -0.08 | -0.08 | -0.06 | 0.15\*\* | -0.02 | -0.10 | 0.09\* |  |
| 3 | CCU site 2 |  |  | -0.39 | -0.26 | -0.41 | 0.05 | 0.08 | -0.11 | -0.01 | 0.00 | 0.09 | 0.11\* | 0.08 | -0.02 | 0.05 | -0.08 | -0.23 | 0.10\* | -0.05 |  |
| 4 | CCU site 3 |  |  |  | -0.20 | -0.32 | -0.06 | 0.02 | 0.01 | 0.04 | 0.00 | 0.02 | -0.02 | -0.02 | -0.04 | 0.04 | -0.15 | 0.10\* | 0.08 | -0.05 |  |
| 5 | CCU site 4 |  |  |  |  | -0.21 | 0.09\* | 0.01 | 0.02 | -0.02 | -0.06 | -0.08 | 0.04 | -0.02 | 0.05 | 0.04 | 0.08 | 0.02 | 0.03 | 0.01 |  |
| 6 | CCU site 5 |  |  |  |  |  | -0.01 | -0.11 | 0.05 | 0.00 | 0.10 | 0.02 | -0.12 | -0.01 | 0.09 | -0.10 | 0.08 | 0.15\*\* | -0.14 | 0.04 |  |
| 7 | Sex |  |  |  |  |  |  | 0.08 | -0.13 | 0.10\* | 0.04 | -0.11 | 0.12\* | 0.05 | 0.02 | 0.10 | 0.00 | 0.10\* | 0.02 | -0.03 |  |
| 8 | Age  |  |  |  |  |  |  |  | -0.13 | 0.00 | -0.01 | -0.12 | 0.28\*\* | 0.01 | -0.03 | 0.00 | 0.09 | -0.07 | -0.06 | -0.08 |  |
| 9 | Primary diagnosis: F20-29.x |  |  |  |  |  |  |  |  | -0.20 | -0.02 | 0.01 | -0.16 | -0.03 | 0.10 | 0.03 | 0.08 | -0.08 | 0.07 | 0.17\*\* |  |
| 10 | Personality disorder as a secondary diagnosis  |  |  |  |  |  |  |  |  |  | -0.01 | 0.00 | -0.02 | -0.06 | -0.20 | -0.13 | 0.08 | 0.08 | 0.01 | 0.07 |  |
| 11 | Agressive behaviour (HoNOS item 1 ≥ 2) |  |  |  |  |  |  |  |  |  |  | 0.22\*\* | 0.00 | 0.55\*\* | 0.40\*\* | 0.27\*\* | 0.05 | 0.23\*\* | 0.06 | 0.04 |  |
| 12 | Substance use problems (HoNOS item 3 ≥ 2) |  |  |  |  |  |  |  |  |  |  |  | -0.08 | 0.29\*\* | 0.25\*\* | 0.01 | -0.11 | 0.13\* | 0.07 | -0.02 |  |
| 13 | Physical impairment (HoNOS item 5 ≥ 2) |  |  |  |  |  |  |  |  |  |  |  |  | 0.24\*\* | 0.07 | 0.17\*\* | 0.01 | -0.08 | -0.10 | -0.05 |  |
| 14 | HoNOS total score  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.59\*\* | 0.44\*\* | -0.02 | 0.26\*\* | 0.14\* | -0.03 |  |
| 15 | Disability (LSP-16 total score)  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.28\*\* | -0.05 | 0.15\* | 0.10 | 0.09 |  |
| 16 | Cognitive functioning (HoNOS Item 4 ≥ 2) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.01 | 0.12\* | 0.20\*\* | 0.03 |  |
| 17 | Total bed-based service  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.15\*\* | -0.06 | 0.52\*\* |  |
| 18 | ED presentations |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.12\*\* | 0.13\*\* |  |
| 19 | POS with family present  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.10\* |  |
| 20 | Treatment status at entry |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1.00 |  |
| CCU: Community-care Unit; HoNOS: Health of the Nation Outcome Scales; LSP-16: Life Skills Profile; POS: Provisions of Service. \* *p* < 0.05. \*\* *p* < 0.01.  |

**Supplementary Table 4.** Change in variables between the 365 days pre-admission and 365 days post-discharge (N = 501).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Outcome | Pre-admission |  | Post-discharge | Wilcoxon Z  | *p-*value |
|  | M | SD |  | M | SD |  |
| HoNOS Subscales  |  |  |  |  |  |  |  |
| Behaviour  | 3.44 | 2.67 |  | 2.45 | 2.60 | -4.42 | < 0.001 |
| Impairment  | 2.42 | 1.89 |  | 2.07 | 1.93 | -2.18 | < 0.001 |
| Symptoms  | 5.52 | 2.94 |  | 3.92 | 2.96 | -5.38 | < 0.001 |
| Social  | 7.06 | 4.13 |  | 4.70 | 3.65 | -6.32 | < 0.001 |
| LSP-16 Subscales  |  |  |  |  |  |  |  |
| Withdrawal  | 5.04 | 2.78 |  | 4.98 | 2.58 | -0.60 | 0.549 |
| Self-care  | 5.80 | 3.28 |  | 5.84 | 3.30 | -1.75 | 0.080 |
| Compliance  | 3.20 | 2.17 |  | 3.06 | 2.00 | -0.26 | 0.799 |
| Anti-social  | 3.70 | 2.93 |  | 3.34 | 2.85 | -1.41 | 0.159 |
| Hospital use  |  |  |  |  |  |  |  |
| Acute bed days | 77.28 | 92.54 |  | 34.34 | 68.61 | -10.60 | < 0.001 |
| Non-acute bed days | 24.26 | 86.30 |  | 36.05 | 89.25 | -2.64 | < 0.005 |

*p: statistical significance;* HoNOS: Health of the Nation Outcome Scales; LSP: Life Skills Profile; Data were missing for: HoNOS subscales (185; 36.9% pre-admission and 292; 58.3% post-discharge), and LSP subscales (248; 49.5% pre-admission and 132; 26.3% post-discharge); The number of paired observations assessed by the Wilcoxon signed-rank test was 179 for HoNOS subscales, 237 for LSP-16 subscales, and 495 for hospital use.

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