

University of Groningen

Providers' competencies positively affect personal recovery of involuntarily admitted patients with severe mental illness

Jas, Ellen; Wieling, Martijn

Published in:
International journal of social psychiatry

DOI:
[10.1177/0020764017749864](https://doi.org/10.1177/0020764017749864)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Final author's version (accepted by publisher, after peer review)

Publication date:
2018

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Jas, E., & Wieling, M. (2018). Providers' competencies positively affect personal recovery of involuntarily admitted patients with severe mental illness: A prospective observational study. *International journal of social psychiatry*, 64(2), 145-155. DOI: 10.1177/0020764017749864

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

**Providers' competencies positively affect personal recovery
of involuntarily admitted patients with severe mental
illness: A prospective observational study**

Journal:	<i>International Journal of Social Psychiatry</i>
Manuscript ID	ISP-17-0170.R1
Manuscript Type:	Original Article
Date Submitted by the Author:	n/a
Complete List of Authors:	Jas, Ellen; GGZ Drenthe, Langdurige zorg Wieling, Martijn; University of Groningen, Faculty of Arts, Center for Language and Cognition
Keywords:	Personal recovery, providers' recovery competencies, severe mental illness, inpatients
Abstract:	<p>Abstract</p> <p>Objectives: There is limited research on the patient-provider relationship in inpatient settings. The purpose of this study was to measure the effect of mental health care providers' recovery-promoting competencies on personal recovery in involuntarily admitted psychiatric patients with severe mental illness.</p> <p>Methods: 127 Dutch patients suffering from a severe mental illness residing in a high-secure psychiatric hospital reported the degree of their personal recovery (translated Questionnaire about Processes of Recovery questionnaire, QPR) and the degree of mental health care providers' recovery-promoting competence (Recovery promoting relationship scale, RPRS) at two measurement points, six months apart.</p> <p>Analyses: (Mixed-effects) linear regression analysis was used to test the effect of providers' recovery-promoting competence on personal recovery, while controlling for the following confounding variables: age, gender drug/alcohol problems, social relationships, activities of daily living, treatment motivation and medication adherence.</p> <p>Results: Analyses revealed a significant positive effect of providers' recovery-promoting competencies on the degree of personal recovery ($t = 8.4, p < 0.001$) and on the degree of change in personal recovery over time ($t's > 4, p < 0.001$).</p> <p>Conclusions: This study shows that recovery-promoting competencies of mental health care providers are positively associated with (a change in) personal recovery of involuntarily admitted patients. Further research is necessary on how to organize recovery-oriented care in inpatient settings and how to enhance providers' competencies in a sustainable way.</p>

Abstract

Objectives: There is limited research on the patient-provider relationship in inpatient settings. The purpose of this study was to measure the effect of mental health care providers' recovery-promoting competencies on personal recovery in involuntarily admitted psychiatric patients with severe mental illness.

Methods: 127 Dutch patients suffering from a severe mental illness residing in a high-secure psychiatric hospital reported the degree of their personal recovery (translated Questionnaire about Processes of Recovery questionnaire, QPR) and the degree of mental health care providers' recovery-promoting competence (Recovery promoting relationship scale, RPRS) at two measurement points, six months apart.

Analyses: (Mixed-effects) linear regression analysis was used to test the effect of providers' recovery-promoting competence on personal recovery, while controlling for the following confounding variables: age, gender drug/alcohol problems, social relationships, activities of daily living, treatment motivation and medication adherence.

Results: Analyses revealed a significant positive effect of providers' recovery-promoting competencies on the degree of personal recovery ($t = 8.4, p < 0.001$) and on the degree of change in personal recovery over time ($t_s > 4, p < 0.001$).

Conclusions: This study shows that recovery-promoting competencies of mental health care providers are positively associated with (a change in) personal recovery of involuntarily admitted patients. Further research is necessary on how to organize recovery-oriented care in inpatient settings and how to enhance providers' competencies in a sustainable way.

For Peer Review

Providers' competencies positively affect personal recovery of involuntarily admitted patients with severe mental illness: A prospective observational study

Ellen Jas¹ and Martijn Wieling²

Introduction

Recovery-oriented practice is gaining increasing prominence in mental health care of patients with severe mental illness (New Freedom Commission on Mental Health, 2003). The recovery approach is a fundamental change where the aim of care is no longer focused on cure, but has shifted to promoting personal recovery. Recovery has been defined by Anthony (1993) as "a deeply personal, unique process of changing one's attitudes, values, feelings, goals, skills, and/ or roles" and "a way of living a satisfying, hopeful, and contributing life even within the limitations caused by illness". Recovery has come to mean living a life beyond mental illness (Le Boutillier et al., 2015). Common key elements of recovery were identified in a systematic review (Leamy, Bird, Le Boutillier, Williams & Slade, 2011), where a framework is formulated: *Connectedness, Hope, Identity, Meaning and Empowerment* (CHIME).

In an international review, Le Boutillier et al. (2011) attempted to get clarification about what constitutes recovery support and how recovery orientation could be operationalized in practice. They identified four practice domains: promoting citizenship, organizational commitment, supporting personally defined recovery, and working relationship between patient and provider. Le Boutillier et al. (2011) recommend an empirical investigation of the relationship between practices and outcomes on recovery. According to Green et al. (2008) recovery-oriented care assumes that the mental health care provider is able to influence the recovery of the patient; they can facilitate or hinder the process. The importance of competencies needed to adequately work with patients with severe mental illness has been shown by several studies (Clasen, Meyer, Brun, Mase & Cauley, 2003; Young, Forquer, Tran, Starzynski & Shatkin, 2000) and by the perspectives of professional associations (American Psychological Association, 2014; Hoge, Tondora & Marrelli, 2005). There is ample research that supports the importance of the therapeutic relationship conditions in contributing to positive therapeutic outcomes (e.g., Horvath, 2005; McCabe & Priebe, 2004; Strupp, 1996; Watson & Geller, 2005). Fundamental to the new understanding of recovery is the importance of the patients' involvement and control over the psychiatric treatment (Mueser, 2012), which implies a need for attitudinal changes in mental health care providers (Mead & Copeland, 2000). Patients and providers both indicate that the role of providers is essential in influencing the recovery process (Deegan, 1997; Minkoff, 1987; Orrin, 1996). This does not merely involve *what* providers do, but mostly *how* they do it (Davidson, Tondora, O'Connell, Lawless & Rowe, 2009). Mental health care providers have a powerful position in relation to patients' hope (Hicks, Deane & Crowe, 2012). It is widely assumed that providers affect personal recovery, but the evidence base is nonetheless lacking (Slade, et.al, 2015).

In recent years, more research has been conducted to increase the evidence base on the impact of the patient-provider relationship on personal recovery. An empirical study of Russinova, Rogers, Ellison and Lyass (2011) demonstrated that providers are crucial in promoting recovery from severe mental illness through attitudes and specific strategies that acknowledge patients' personhood and enhance their hopefulness, empowerment and illness management. Moran et al. (2014) investigated the relation between working alliance, providers' recovery competencies and personal recovery. The results highlight that providers' recovery strategies positively impact the working alliance, which, in turn, positively impact patients' recovery. These studies emphasize the relationship between patient and healthcare providers as a basis for therapeutic changes in the context of recovery of severe mental illness.

However, a cluster-randomised controlled trial (*REFOCUS*; Slade et al., 2015) found no significant effect of the intervention on recovery in patients with psychosis compared with usual treatment. The program involved a one-year team-level intervention targeting staff behaviour to increase focus on values, preferences, strengths, and goals of patients with psychosis, and staff-patient relationships, through coaching and partnership. The primary outcome was personal recovery and was assessed with the Questionnaire about Processes of Recovery (QPR). The most likely explanation for the lack of improvement in recovery is insufficient implementation. The qualitative analysis of the process (staff experience) showed that there were implementation barriers at multiple levels, e.g., at the level of the individual, team and organization. A higher participation was associated with an increase in staff recovery promoting behavior and patient-reported recovery in the QPR interpersonal subscale. The authors concluded that the *REFOCUS* intervention has the potential to be an effective recovery promotion

intervention if the implementation barriers can be addressed, wherein attention should be paid to organizational engagement.

Additionally, a study of Wilrycx et al. (2015) aimed to measure the indirect effect of a recovery-oriented training program for providers (focusing on staff values, knowledge and partnership) on personal recovery in patients. Furthermore, the study aimed to investigate whether patients recognized the relationship with the provider to be more recovery-oriented after the providers had completed the training program. The results indicated that providers were able to empower patients, and could stimulate the patients' autonomy. However, patients did not experience the relationship with their provider as more recovery-oriented after the training program. As the previous discussion highlights, the evidence in favour of the use of recovery-promotion interventions is still limited. Yet, mental health policy in many countries is oriented towards recovery.

Most of the principles of recovery-oriented care have been generated in outpatient settings (Salyers & Tsemberis, 2007; Comptom, Reed, & Broussard, 2014; Whitley, Gingrich & Lutz, 2009). It is recognized that inpatient settings should work according to the principles of recovery-oriented care, which are intended to make an effective impact on the life course of the patient with severe mental illness (Glick, Sharfstein & Schwartz, 2011). An inpatient setting offers acute stabilization in crisis and access to proper treatment and therapy, the fulfilment of the most basic needs, and assistance with employment and training. These are mentioned as recovery-enhancing patient factors in the study of Onken, Dumont, Ridgway, Dornan and Ralph (2002). However, within this population people often suffer from substance abuse, traumatic experiences, lack of opportunities for taking valued social roles, stigma, and shame (i.e. obstacles to recovery; Onken et al., 2002). A review of Waldemar, Arnfred, Petersen and Korsbek (2016) on recovery-oriented practice in mental health inpatient settings included eight studies. Results show that staff in inpatient settings had a positive attitude toward the values and principles of recovery-oriented practice, however, there was ambiguity among staff members about what personal recovery and recovery-oriented care entails and how to implement this in practice. Overall, there seemed to be little engagement, and poor communication and collaboration between patients and providers in the inpatient settings. Competitive requirements (i.e. other tasks assigned to the providers) for providers negatively impacted recovery-oriented care for the patients. Rapid patient turnover, high bed occupancy and a tradition of crisis care focusing on medical stabilization were described as the underlying reasons. In addition, buildings and structures within organizations are not recovery-promoting. Providing recovery-oriented care in these institutions seemed hardly possible due to capacity and organizational structures. These findings revealed the limited extent to which the recovery oriented practice is integrated into these settings and raise the question whether recovery-oriented practice can be an approach used in inpatient settings.

Given the growing interest in the role of patient-provider relationships on personal recovery, which is reflected in the above-mentioned studies, and the limited evidence base for recovery oriented practice, especially in inpatient settings, this study aimed to investigate to what extent patients with severe mental illness in an inpatient setting could benefit from recovery-oriented care. The goal of this study was to examine the effect of mental health care providers' recovery-promoting competence on personal recovery of involuntarily admitted patients with severe mental illness

We addressed the following research questions in this study:

1. To what extent are recovery-promoting **competencies** of professionals associated with the degree of personal recovery?
2. To what extent are recovery-promoting **competencies** of professionals associated with a change in personal recovery?

Our associated hypotheses were:

1. Higher recovery-promoting competencies of professionals are associated with a higher degree of personal recovery. (H₀: There is no relation between degree of recovery-promoting competencies of professionals and the degree of personal recovery.)
2. Higher recovery-promoting competencies of professionals are associated with a greater improvement in personal recovery over time. (H₀: There is no relation between the degree of recovery-promoting competencies of professionals and change in personal recovery over time.)

Methods

Participants

In this study, patients suffering from severe mental illness residing in a high-secure psychiatric hospital in *Duurzaam Verblijf (Durable Stay)* and the forensic psychiatric clinic of *GGZ Drenthe*, institute of Mental Health Care in the Netherlands were approached to participate. These patients pose a danger to themselves, others or society and are involuntarily admitted to a psychiatric hospital through a court authorization. **The clinical**

environment includes locked wards with limited leave, which was based on the risk-assessment associated with the patients. The length of stay varies from several months to lifetime. The majority of the patients reside in the clinic for multiple years. In general, the staff did not receive mandatory training in recovery oriented practices.

Inclusion criteria for this study were: (1) suffering from severe mental illness; (2) being involuntarily admitted to a psychiatric hospital. Exclusion criteria were: (1) insufficient knowledge of the Dutch language; (2) incompetent to act for oneself; (3) no signed informed consent prior to the assessments.

Procedure

According to the regional Medical Ethical Committee (METC) of the University Medical Center Groningen (UMCG) ethical approval for Research Involving Human Subjects Act (WMO) was not required. Prior to the start of the assessments, mental health care providers of *Duurzaam Verblijf* and the forensic psychiatric clinic of GGZ *Drenthe* were informed about the aim and procedure of this study. Providers were asked to motivate their patients to participate in this study with a letter to inform patients about this study. Two weeks later an independent researcher approached patients individually to participate in this study (T0). The patients that were willing to enrol, signed an informed consent form prior to the assessments and completed the translated Questionnaire about Processes of Recovery (QPR) and Recovery Promoting Relationship Scale (RPRS) in the presence of the independent researcher, who could provide clarification about the questions. Completing the questionnaires took about 15-20 minutes. Subsequently, the patient's mental health care provider completed the Health of the Nations Outcome Scale (HoNOS) within two weeks. Six months later, at the second measurement (T1) the same independent researcher approached all participants to complete the NHS and RPRS questionnaires again. Their provider completed a HoNOS again within two weeks.

Measures

Questionnaire about the Process of Recovery (QPR). The *Nationale Herstel Schaal (NHS)* is a Dutch translation of the QPR (Neil, et. Al., 2009), supplemented with four items based on concept mapping. The QPR measures the concept of personal recovery and most closely maps to the CHIME framework of recovery (Shanks et al., 2013). The psychometric properties of the original QPR are satisfactory: the convergent validity (r) was 0.73, the test-retest reliability (measured with the intraclass correlation coefficient, ICC) was 0.74 and sensitivity to change (r) was 0.40 (Williams et al., 2015). The Dutch version of the questionnaire contains a total of 26 items, including the four items based on concept mapping. Patients score their mental health and recovery on a 5-point scale. For our dependent variable, we summed the score of all 26 items of the NHS. This scale therefore ranged between 26 and 130.

Recovery promoting relationship scale (RPRS). The RPRS (Russinova, Rogers & Ellison, 2006) measures the competencies of professionals to promote the recovery of persons with severe mental illness from the patients' perspective. It is a self-report questionnaire. The original RPRS has high internal consistency (Cronbach's α : 0.88 - 0.98), acceptable test-retest reliability (ICC: 0.61 - 0.72), and acceptable convergent (r : 0.50 to 0.79) and criterion validity (r : 0.58 to 0.60) (Russinova et al. 2013). The RPRS is a psychometrically sound measure of mental health providers' overall recovery-promoting competence and consists of two subscales of recovery promoting strategies. The psychometric properties of the Dutch RPRS were investigated by Wilrycx, Croon, van den Broek and van Nieuwenhuizen (2012). Cronbach's α for the two subscales was 0.93 and 0.87. Based on applicability and psychometric properties, Wilrycx et al. (2012) concluded that this instrument is suitable for use in research into the recovery enhancing relationships with professionals who work with people suffering from severe mental illness. In our analysis, we used the omnibus score combining the two scales (i.e. recovery-related strategies and the providers' skills to enhance patients' self-acceptance), since Russinova et al. (2013) mention that the subscales need to be considered with caution. In this study, the participants were asked about their primary caregiver, usually being a nurse. The 22 RPRS items are rated on a 4-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). The score 5 is used to indicate the question is not applicable. The summed value of all RPRS questions (non-applicable scores were replaced by the average score on the other items, with a maximum of five missing items) was used as our predictor of interest. This scale therefore ranged between 22 and 88.

Health of the Nations Outcome Scale (HoNOS). The HoNOS was designed in England for Routine Outcome Monitoring (Wing et al., 1998) and measures behavioral problems, disabilities, social problems and symptoms. The instrument contains 12 items with a 4-point scale and is scored by trained mental health care providers. Studies report the internal consistency of HoNOS to be moderately high (Cronbach's α = 0.59 - 0.76; Pirkis 2005). Similarly, the test-retest reliability was reported to be moderately high (Cohen's kappa: 0.55-0.82; Orrell 1999), while the interrater reliability was reported to be acceptable (ICC: 0.59; Amin et al. (1999). The HoNOS is

1 sensitive to changes in the condition of patients with severe mental illness (McClelland, Trimble & Fox, 2000;
2 Slade, Beck & Bindman, 1999; Page, Hooke & Rutherford, 2001). The Dutch version includes three additional
3 items that cover medication adherence, treatment motivation and manic disinhibition. The examined reliability and
4 validity of the Dutch version were reported to be sufficient (Mulder et al., 2004). The internal consistency
5 (Cronbach's α) was high at 0.78 and interrater reliability (ICC) was high with a measured value of 0.92 for the total
6 scale (Mulder et al., 2004). The five HoNOS items about drug/alcohol problems, social relationships (with family,
7 friends, fellow patients and providers), activities of daily living, treatment motivation and medication adherence are
8 used as confounding variables in this study.
9

10 11 **Statistical analysis**

12 The study design was prospective observational. Two measurements (T0, T1) were performed during a time
13 period of six months. The primary outcome variable was the degree of personal recovery (NHS-score). The main
14 predictor was a score (i.e. the RPRS-score) reflecting the recovery promoting competencies of professionals from
15 a patients' perspective. As personal recovery may be affected by other factors as well, we assessed if the
16 inclusion of several confounding variables (potentially interacting with the RPRS score) was required. These
17 confounding variables were age, gender drug/alcohol problems, social relationships, activities of daily living,
18 treatment motivation and medication adherence. The reason we included these confounding variables was based
19 on previous studies (i.e. age and gender; Cale, Deane, Kelly & Lyons, 2015; Wilrycx et al., 2012) and experience
20 stories (Onken et al., 2002).

21 R 3.4 was used to analyse the data (R Development Core Team, 2008). Means and standard deviations were
22 calculated for age, level of education, NHS-score (personal recovery), RPRS-score (providers' competencies) and
23 HoNOS scores on the items drug/alcohol problems, social relationships, activities of daily living, treatment
24 motivation, and medication adherence.

25 To investigate our first research question *To what extent are recovery-promoting competence of professionals*
26 *associated with the degree of personal recovery?* we used linear mixed-effects regression modelling (LMER) with
27 participant as a random-effect factor (Pinheiro & Bates, 2000). This approach allowed us to take the structural
28 variability associated with each participant into account (i.e. most patients are measured twice, once at T0 and
29 once at T1, and the two series of measurements of one patient are obviously not independent). In our analysis,
30 personal recovery was used as the dependent variable. We tested the effect of the main predictor of interest,
31 providers' competencies, on personal recovery at both T0 and T1. After this first, hypothesis-testing model, we
32 fitted a second exploratory model, which was the best-fitting model on the basis of testing all predictors (i.e. the
33 RPRS-score and all confounders: age, gender, drug/alcohol problems, social relationships, activities of daily
34 living, treatment motivation, and medication adherence) as well as their interactions for inclusion. This two-step
35 approach allows us to evaluate if the effect of the providers' competencies found in the first hypothesis-testing
36 model is not substantially affected by the other predictors. We explicitly tested the interactions, as these may
37 provide additional insight into our data (i.e. for some groups, higher providers' competencies may be more
38 beneficial than for others). Given the exploratory nature of this best-fitting model, the main point to note is that it
39 primarily serves to evaluate the effect of the providers' competencies in the presence of confounding variables. Of
40 course, interesting patterns in the exploratory model (involving the confounding variables) may serve to inspire
41 new hypotheses.

42 Besides using the significance values of the individual predictors (i.e. the RPRS score as well as the
43 confounders – which in the context of a regression model are included as predictors) in the model summary, we
44 used model comparison to assess the inclusion of each predictor (i.e. including confounders). Specifically, we
45 compared the AIC (Akaike Information Criterion; Akaike, 1974) values between two models (one without and one
46 with an additional predictor). A lower AIC indicates a better model (Akaike, 1974). On the basis of the AIC values
47 the evidence ratio can be calculated which expresses the relative probability that the model with the lowest AIC is
48 more likely to provide a more precise model of the data. The evidence ratio is related to the AIC difference
49 (evidence ratio = $e^{(0.5 * \text{AIC difference})}$). For example, if the AIC difference is 2 (our minimum threshold to opt for a
50 more complex model; see Blankevoort et al., 2013), then the more complex model is 2.7 times more likely to
51 provide a precise model of the data.

52 Our second research question *To what extent are recovery-promoting competence of professionals*
53 *associated with a change in personal recovery?* was investigated using a linear regression model. In this model,
54 we predicted the difference in the personal recovery score (i.e. delta NHS) between T1 and T0, while using both
55 the competence score at T0 (RPRS-0) as well as the difference between the competence scores at T1 and T0
56 (i.e. delta-RPRS) as predictors. We use these two predictors instead of using the competence scores at both T0
57 and T1, as RPRS-0 and RPRS-1 were highly correlated ($r = 0.71$). Similarly as for the analysis associated with
58 the other research question, we conducted a two-step approach. Our first hypothesis-testing model included
59 RPRS-0 as well as delta-RPRS, whereas the second (exploratory) model was the best-fitting model assessing the
60

inclusion of the aforementioned predictors, but also the confounding variables (age, gender, drug/alcohol problems, social relationships, activities of daily living, treatment motivation, and medication adherence). We further assessed the inclusion of the personal recovery score at T0 (NHS-0). The reason for this final confounding variable is that patients who already report a high personal recovery at T0 may show less improvement than those who report a low personal recovery score at T0 (i.e. as there is less room for improvement for those scoring higher).

In all analyses, we used two-tailed tests and a significance threshold (α) of 0.05. All numerical predictors were centred to facilitate the interpretation of potential interactions.

Results

Sample characteristics

At the first measurement point (T0) of this study, 218 patients were approached to participate. Ten patients were immediately excluded because their knowledge of the Dutch language was insufficient. A total of 133 patients (64%) were willing to participate in this study, whereas 75 patients were not able or interested. Six participants were excluded because their mental health care provider did not return the HoNOS questionnaire (as they moved from the clinic within two weeks after the first assessment). All 127 remaining participants gave informed consent prior to the assessments and completed a questionnaire on their degree of personal recovery (NHS) and a questionnaire on the degree of recovery-promoting competence of their mental health care providers (RPRS). After six months, at the second measurement point (T1), the participants completed both the questionnaires about personal recovery and providers' competencies again. The number of included responses at T1 was lower than at T0. The reasons for this are that 20 patients moved from the hospital, and 8 refused to participate again. The flowchart in Figure 1 summarizes the participation at T0 and T1. Note that for one participant the HoNOS scores were missing at T1, but this participant was included as the data for T0 was available.

Table 1 describes the characteristics of the participants ($N = 127$) and non-participants ($N = 99$) in this study at T0. Among the participants there were 102 male (80.3%) and 25 (19.7%) female patients. The average age was 42.2 years (range of 21-69 years; $SD: 10.01$). The non-participants consisted of 77 male (84.6%) and 14 female (15.4%) patients. The average age was 40.9 years (range of 21-67 years; $SD: 9.21$). The level of education of both groups was assessed on a seven-point scale ranging from 1 (i.e. lower than primary school) to 7 (university master's degree). While there was a significant difference, $t(216) = 2.0$, $p = 0.04$, between the participants ($M = 3.3$, $SD = 1.86$) and non-participants ($M = 2.8$, $SD = 1.44$) in the time in years that they have resided in the psychiatric hospital, the difference was only small (6 months; Cohen's $d: 0.28$). The psychiatric disorders are listed according to the DSM IV-TR: Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition—Revised (American Psychological Association, 2000). Most patients had multiple diagnoses (i.e. comorbidity).

Prediction of personal recovery by mental health care providers' recovery-promoting competence. Table 2 shows the hypothesis-testing mixed-effects regression model (explained variance of full model: 86%, explained variance by fixed-effect predictor (providers' competencies) only: 26.5%). This model shows that the providers' recovery competence ($\beta = 0.45$, $t = 8.4$, $p < 0.001$) are significantly associated with the degree of personal recovery. Table 3 shows that the best-fitting exploratory mixed-effects regression model (AIC decrease of 6.8 compared to the hypothesis-testing model; explained variance: 88%, explained variance by fixed-effect predictors only: 32.1%) additionally included interaction effects between the RPRS score and drug/alcohol problems ($\beta = 0.10$, $t = 2.7$, $p < 0.01$), and motivation for treatment ($\beta = -0.18$, $t = -4.5$, $p < 0.001$). More problems with drugs and alcohol are associated with increases of the providers' competencies on personal recovery significantly. By contrast, more problems with motivation for treatment reduce the effect of competencies on recovery significantly. The residuals of both the hypothesis-testing and the exploratory model followed a normal distribution, as assessed via a normal-quantile plot.

Prediction of change in personal recovery by mental health care's provider recovery-promoting competence. Before running this analysis, we excluded a single extreme difference between the NHS score at T0 and T1. The excluded observation had an NHS delta score of 84, whereas all other values ranged between -26 and 37. Table 4 shows the best linear regression model (explained variance: 16.7%). This model shows that providers' competence at T0 has a statistically significant positive impact on the improvement in personal recovery from T0 to T1 ($\beta = 0.15$, $t = 2.3$, $p = 0.02$). Furthermore, it shows that the difference between the recovery promoting competence at T1 versus T0 (delta RPRS) has an additional positive significant effect ($\beta = 0.39$, $t = 4.6$, $p < 0.001$) on the improvement in personal recovery after 6 months. Consequently, this indicates that the increase in personal recovery over time is positively influenced by a higher providers' competence score.

Table 5 shows the best-fitting exploratory linear regression model (explained variance: 34.4%; reduction in AIC of 22 compared to the hypothesis-testing model). The only co-variate which reached significance was the personal recovery score at T0. The negative estimate ($\beta = -0.35$, $t = -5.1$, $p < 0.001$) indicates that those patients with a higher personal recovery at T0 show less improvement going to T1. This is unsurprising given that patients who report a higher personal recovery also have less room to improve their personal recovery. The main results remained the same as in the hypothesis-testing model (significant positive effect of mental health care providers' recovery promoting competencies as well as the difference in recovery promoting competencies between T1 and T0). While the residuals of both the hypothesis-testing and the exploratory model did not completely follow a normal distribution (the residuals were heavy tailed), fitting the data with a generalized linear regression model using the scaled- t family, resulted in appropriate residuals and similar results as reported in Tables 4 and 5.

Discussion

The goal of the present study was to determine the relation between recovery-promoting competencies of mental health care providers and the degree of personal recovery of involuntarily admitted patients with severe mental illness. The second goal was to determine the relation between these competencies and change in the degree of personal recovery over time.

In this prospective observational study, we confirmed our hypothesis that positive effects of recovery promoting competencies were related to personal recovery in a sample of inpatients with severe mental illness. These results are in line with other studies that highlighted the crucial role providers play in enhancing recovery from severe mental illness (Russinova et al., 2011). In addition to the relation between competencies of providers and personal recovery, this study also demonstrated that recovery promoting competencies of providers are positively associated with a change in personal recovery over time. We found that a change in competencies over time seemed to have an additional effect on personal recovery.

Besides testing our hypotheses, we conducted exploratory analyses to determine whether additional factors affected the influence of providers' competence on personal recovery. We identified a moderating effect of drug and alcohol problems on the relationship between providers' competencies and personal recovery. More drugs and alcohol problems increased the beneficial effect of providers' competencies on personal recovery. By contrast, a negative moderating effect was found between problems with motivation for treatment and providers' competencies on personal recovery of patients. The competencies of providers have significantly less impact on personal recovery in patients who have more motivation problems. These findings correspond with earlier work, such as the review of Drake et al. (2004) about psychosocial interventions for patients with severe mental illnesses and co-occurring substance use disorders (dual diagnoses). With regard to motivation problems, Ziedonis and Trudeau (1997) found that patients are often not motivated to manage their own illness, even when they are engaged in treatment. A study by Mulder, Koopmans and Hengeveld (2005) showed that lack of motivation for treatment is a common phenomenon among severely mentally ill patients in emergency psychiatric services. There are difficulties in establishing and maintaining a good therapeutic alliance with such patients (Honea-Boles and Griffin, 2001; Snyder and Anderson, 2009). Few studies have investigated the effects of involuntarily hospitalization on motivation for treatment. It appears that motivation is adversely affected by involuntarily admission when compared with voluntary admission in some studies, while other studies showed no differential effects (Kallert, Glöckner, Schützwahl, 2007), which is partly explained by differences in patients with regard to their admission as justified and treatment as beneficial.

While patients may have viewed their health care providers more positively over six months due to their longer relationship with them, and have improved their personal recovery regardless of the type of treatment, we do not believe this to be a likely explanation for our findings. The reasons for this are that participants were residing in an inpatient setting already for a few years and thus the relationship with their health care providers would not have improved very much just due to the passing of time, and furthermore their clinical symptoms hardly decreased over these six months.

The results in this study suggest that recovery promoting competencies are important to facilitate the recovery process of involuntarily admitted patients in an inpatient setting with severe mental illness. These findings increase the evidence base that recovery-oriented practice can and should be an approach used in (involuntary) inpatient settings. Efforts to improve these competencies could bring benefits to the patient. It is not clear how to improve recovery promoting competencies in providers in a sustainable way. As mentioned earlier, several studies (Slade et al., 2015; Wilrycx et al., 2015) showed no effect between several interventions to promote providers' recovery competencies and the individual recovery process of patients. In particular, the *REFOCUS* intervention (see introduction) has been developed and intends to increase the support for recovery provided by community mental health teams, and may also have relevance in inpatient settings (Slade et al., 2015). The *REFOCUS* intervention facilitated a mutual and open collaborative relationship between patients and providers. Patients found that providers got to know them as individuals. The intervention led to a greater awareness of

patients' strengths and values, which led to a more positive self-image and improved hope and empowerment. The tools are a means, but not an end. The importance of individualized use is emphasized and the recommendation is that recovery-focused tools are integrated in care planning (Wallace et al., 2016). In addition, recovery-focused interventions such as Wellness Recovery Action Plans (WRAP) (Fukui et al., 2011), peer-led education (Cook et al., 2012), recovery workbooks (Barbic, Krupa and Armstrong, 2009), and strength-based case management (Barry, Zeber, Blow and Valenstein, 2003) can be used to increase hope and empowerment of patients. Recovery-supporting tools can support the development of a recovery-promoting relationship, which can contribute to positive outcomes for individuals (Wallace et al., 2016). To increase the recovery-promoting competencies of the providers in inpatient settings it seems necessary to integrate recovery oriented care practice in those settings. It is recommended to pay attention to organizational engagement and organizational structures to facilitate recovery-oriented care. Further research will need to show whether these and other possible interventions have a sustaining effect on enhancing the personal recovery of inpatients.

Limitations

The present study has several limitations. First, this is a prospective observational study and therefore has inherent limitations in terms of susceptibility to bias and confounding, thereby restricting the ability to determine causality. However, the strengths include that it reflects daily clinical practice more closely than randomized controlled trials (RCTs) in terms of the heterogeneous patient population that is included. Second, the questionnaires used to measure the key outcomes are self-report measures. To the best of our knowledge there is no measure available in Dutch with good psychometric characteristics that measures recovery competencies from another point of view that could help deal with possible bias in the reported association. Third, the possibility of the patients current level of mental wellness is not considered as something which might impact on how they complete the questionnaires. Based on our literature review, a choice was made about which confounding variables to include. Of course, there are other variables that might influence personal recovery, such as mental state, trauma and stigma, which were not included in this study. Additionally, out of all the patients who were approached to participate in this study (218), 7% (16) were not able (insufficient Dutch or relocation) and 34% (75) were not interested to participate in this study. We suspect that this group may be less affected by recovery-promoting competencies of mental health care providers. Consequently, the strength of the actual effect (if all contacted patients would have participated) would presumably have been lower. Further research on confounding variables and patient characteristics may contribute to an improved understanding about whether recovery oriented care is effective for all inpatients suffering from severe mental illness.

Conclusion

This study shows that recovery-promoting competencies of mental health care providers are positively related to the personal recovery of involuntarily admitted patients and are also positively related to personal recovery of inpatients over time. The positive relationship with recovery-promoting competencies on personal recovery of involuntarily admitted patients increased when patients experienced problems caused by alcohol and drugs, whereas the strength of the relationship decreased when there were problems with motivation for treatment. Further research is necessary to assess a causal relationship between recovery-promoting competencies of mental health care providers and the personal recovery of involuntarily admitted patients, but also on how to organize recovery-oriented care in inpatient settings and how to enhance providers competencies in a sustainable way.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Acknowledgements

We thank J. van Gestel-Timmermans for sharing the NHS, Ch. van Nieuwenhuizen for sharing the Dutch version of the RPRS, all patients of *Duurzaam Verblijf* and the forensic psychiatric clinic *GGZ Drenthe* who participated in this study. Furthermore, we thank all mental health care providers to complete the questionnaires, and A. Bergsma for her assistance in taking measurements. Finally, we thank J. Bastiaansen and F. Jörg for comments which helped to improve this manuscript substantially.

Conflict of interest

The authors report no conflict of interest.

References

- Akaike, H., (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control* 19, 716.
- Anthony, W. A. (1993). Recovery from mental illness: the guiding vision of the mental health system in the 1990s. *Psychosocial Rehabilitation Journal*, 16,11-23.
- American Psychological Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- American Psychological Association & Jansen, M. A. (2014). *Recovery to Practice Initiative Curriculum: Reframing Psychology for the Emerging Health Care Environment*. Washington DC: American Psychological Association.
- Amin, S., Singh, S. P., Croudace, T., Jones, P., Medley, I., & Harrison, G. (1999). Evaluating the Health of the Nation Outcome Scales. Reliability and validity in a three-year follow-up of first-onset psychosis. *British Journal of Psychiatry*, 174, 399-403.
- Barbic, S., Krupa, T., & Armstrong, I., (2009). A randomized controlled trial of the effectiveness of a modified recovery workbook program: preliminary findings. *Psychiatric Services*, 60, 491-497.
- Barry, K. L., Zeber, J. E., Blow, F. C., & Valenstein, M. (2003). Effect of strengths model versus assertive community treatment model on participant outcomes and utilization: Two-year follow-up. *Psychiatric Rehabilitation Journal*, 26(3), 268-277.
- Blankevoort, C. G., Scherder, E. J., Wieling, M. B., Hortobágyi, T., Brouwer, W. H., Geuze, R. H., & van Heuvelen, M. J. (2013). Physical predictors of cognitive performance in healthy older adults: a cross-sectional analysis. *PLOS ONE*, 8(7), e70799.
- Cale, E. L., Deane F. P., Kelly, P. J., & Lyons, G. C. B. (2015). Psychometric properties of the Recovery Assessment Scale in a sample with substance use disorder. *Addiction Research Theory*, 23(1), 71-80.
- Clasen, C., Meyer, C., Brun, C., Mase, W. & Cauley, K. (2003). Development of the Competency Assessment Tool-Mental Health, an Instrument to Assess Core Competencies for Mental Health Care Workers. *Psychiatric Rehabilitation Journal*, 27(1), 10-17.
- Compton, M. T., Reed, T. & Broussard, B. (2014). Development, implementation, and preliminary evaluation of a recovery-based curriculum for community navigation specialists working with individuals with serious mental illnesses and repeated hospitalizations. *Community Mental Health Journal*, 50, 383-387.
- Cook, J. A., Steigman, P., Pickett, S., Diehl, S., Fox, A., Shipley, P., & ... Burke-Miller, J. K. (2012). Randomized controlled trial of peer-led recovery education using Building Recovery of Individual Dreams and Goals through Education and Support (BRIDGES). *Schizophrenia Research*, 136(1-3), 36-42.
- Davidson, L., Tondora, J., O'Connell, M. J., Lawless, M. S., & Rowe, M., (2009). *A Practical Guide to Recovery-Oriented Practice: Tools for Transforming Mental Health Care*. Oxford University Press, New York.
- Deegan, P. (1997). Spirit breaking: When the helping professions hurt. In L. Spaniol, C. Gagne & M. Koehler (Eds.). *Psychological and social aspects of psychiatric disability* (pp. 348-357). Boston: Boston University, Centre for Psychiatric Rehabilitation.
- Degen, K., & Nasper, E. D. (1996). *Return from madness: Psychotherapy with people taking the new antipsychotic medications and emerging from severe, lifelong, and disabling schizophrenia*. Lanham, MD, US: Jason Aronson.

- 1
2
3 Del Vecchio, P. (2015). Bringing Recovery to Practice: Improving Provider Competencies and Promoting Positive
4 Outcomes. *Psychiatric Services*, 66, 750-752.
- 5 Drake, R.E., Mueser, K. T., Brunette, M. F., & McHugo, G. J. (2004). A Review of Treatments for People with
6 Severe Mental Illnesses and Co-Occurring Substance Use Disorders. *Psychiatric Rehabilitation Journal*,
7 27(4), 360-374.
- 8 Fukui, S., Starnino, V. R., Susana, M., Davidson, L. J., Cook, K., Rapp, C. A., & Gowdy, E. A. (2011). Effect of
9 Wellness Recovery Action Plan (WRAP) participation on psychiatric symptoms, sense of hope, and
10 recovery. *Psychiatric Rehabilitation Journal*, 34(3), 214-222.
- 11
12 Green, C. A., Polen, M. R., Janoff, S. L., Castleton, D. K., Wisdom, J. P., Vuckovic, N., Perrin, N. A., Paulson, R.,
13 & Oken, S. (2008). Understanding how clinician-patient relationships and relational continuity of care affect
14 recovery from serious mental illness: STARS study results. *Psychiatric rehabilitation Journal*, 32(1), 9-22.
- 15
16 Glick, I. D., Sharfstein, S. S., & Schwartz, H. I. (2011). Inpatient psychiatric care in the 21st century: the need for
17 reform. *Psychiatric Services*, 62, 206-209.
- 18
19 Gwinner, K., Ward, L. (2013). What treatment do we provide? Current descriptions of the function of intensive
20 care for inpatient psychiatric health care. *Mental Health Review Journal*, 18, 128–143.
- 21
22 Hicks, A. L., Deane, F. P., & Crowe, T. P. (2012). Change in working alliance and recovery in severe mental
23 illness: An exploratory study. *Journal of Mental Health*, 21(2), 127-134.
- 24
25 Hoge, M. A., Tondora, J., & Marrelli, A. F. (2005). The fundamentals of workforce competency: Implications for
26 behavioral health. *Administration and Policy in Mental Health*, 32(5-6), 509-531.
- 27
28 Honea-Boles, P. & Griffin, J. E. (2001). The court-mandated client: does limiting confidentiality preclude a
29 therapeutic encounter? *TCA Journal*, 2, 149-160.
- 30
31 Horvath, A. O. (2005). The therapeutic relationship: Research and theory - An introduction to the Special Issue.
32 *Psychotherapy Research*, 15(1-2), 3-7.
- 33
34 Kallert T.W., Glöckner, M., & Schützwohl, M. (2007). Involuntary vs voluntary hospital admission: a systematic
35 literature review on outcome diversity. *European Archive Psychiatry Clininal Neuroscience*, 258,195–205.
- 36
37 Kidd, S.A., Mckenzie, K.J., & Virdee, G. (2014). Mental health reform at a systems level: widening the lens on
38 recovery-oriented care. *Canadian Journal of Psychiatry*, 59, 243-249.
- 39
40 Kidd, S.A., McKenzie, K., Collins, A., Clark, C., Costa, L., Mihalakakos, G., & Paterson, J. (2014). Advancing the
41 recovery orientation of hospital care through staff engagement with former clients of inpatient units. *Psychiatric*
42 *Services*, 65, 2, 221-225.
- 43
44 Leamy, M., Bird, V., Le Boutillier, C., Williams, J., & Slade, M. (2011). Conceptual framework for personal
45 recovery in mental health: Systematic review and narrative synthesis. *The British Journal of Psychiatry*,
46 199(6), 445-452.
- 47
48 Le Boutillier, C., Leamy, M., Bird, V. J., Davidson, L., Williams, J., & Slade, M. (2011). What does recovery mean
49 in practice? A qualitative analysis of international recovery-oriented practice guidance. *Psychiatric Services*,
50 62, 1470-1476.
- 51
52 Le Boutillier, C., Slade, M., Lawrence V., Bird, V. J., Chandler, R., Farkas M., Harding, C., Larsen, J., Oades, L.
53 G., Roberts, G., Shepherd, G., Thornicroft, G., Williams, J., & Leamy, M. (2015). Competing Priorities: Staff
54 Perspectives on Supporting Recovery. *Administration and Policy in Mental Health*, 42, 429-438.
- 55
56 McCabe, R., & Priebe, S. (2004). The therapeutic relationship in the treatment of severe mental illness: A review
57 of methods and findings. *International Journal of Social Psychiatry*, 50(2), 115-128.
- 58
59 McClelland, R., Trimble, P., & Fox, M. L. (2000). Validation of an outcome scale for use in adult psychiatric
60 practice. *Quality in Health Care*, 9, 98-105.

- 1
2
3 Mead, S., & Copeland, M. E. (2000). What recovery means to us: Consumers' perspectives. *Community Mental*
4 *Health Journal*, 36(3), 315-328.
- 5 Minkoff, K. (1987). Resistance of mental health professionals to working with the chronic mentally ill. *New*
6 *Directions for Mental Health Services* (33), 3-20.
- 7
8 Minkoff, K., & Stern, R. (1985). Paradoxes faced by residents being trained in the psychosocial treatment of
9 people with chronic schizophrenia. *Hospital and Community Psychiatry*, 36(8), 859-864.
- 10
11 Moran, G., Mashiach-Eizenberg, M., Roza, D., Bermann, Y., Shalev, A., Kaplan, Z., & Epstein, P. G. (2014).
12 Investigating the anatomy of the helping relationship in the context of psychiatric rehabilitation: The relation
13 between working alliance, providers' recovery competencies and personal recovery. *Psychiatric Research*,
14 220, 592-597.
- 15 Mueser, K. T. (2012). Evidence-based practices and recovery-oriented services: Is there a relationship? Should
16 there be one? *Psychiatric Rehabilitation Journal*, 35(4), 287-288.
- 17
18 Mulder, C.L., Koopmans, G.T., Hengeveld, M.W. (2005). Lack of motivation for treatment in emergency
19 psychiatric patients. *Social Psychiatry Psychiatric Epidemiology*, 40, 484-488.
- 20
21 Mulder, C. L., Staring, A. B. P., Loos, J., Buwalda, V. J. A., Kuijpers, D., Sytema, S., & Wierdsma, A. (2004). The
22 Health of the Nation Outcome Scales (HONOS) in Dutch translation as an instrument for Routine Outcome
23 Assessment. *Tijdschrift voor Psychiatrie*, 46(5) 273-28.
- 24
25 Neil, S. T., Kilbride, M., Pittb, L., Nothard, S., Welford, M., Sellwood, W., & Morrison, A. P (2009). The
26 questionnaire about the process of recovery (QPR): A measurement tool developed in collaboration with
27 service users. *Psychosis: Psychological, Social and Integrative Approaches*, 1(2), 145-155.
- 28
29 New Freedom Commission on Mental Health. (2003). *Achieving the promise: Transforming mental health care in*
30 *America*. Final report. (No. SMA-03-3832) Rockville, MD: Author.
- 31
32 Onken, S. J., Dumont, J. M., Ridgway, P., Dornan, D. H., & Ralph, R. O. (2002). *Mental health recovery: What*
33 *Helps and What Hinders? A National Research Project for the Development of Recovery Facilitating System*
34 *Indicators. Phase One Research Report: A National Study of Consumer Perspectives on What Helps and*
35 *Hinders Mental Health Recovery*. National Association of State Mental Health Program Directors
36 (NASMHPD) National Technical Assistance Center (NTAC), Alexandria, VA.
- 37
38 Orrell, M., Yard, P., Handysides, J., & Schapira, R. (1999). Validity and reliability of the Health of the Nation
39 Outcome Scales in psychiatric patients in the community. *British Journal of Psychiatry*, 174, 409-412.
- 40
41 Orrin, D. (1996). Recovering from mental illness: Vignettes of the benefits of psychotherapy. *Psychiatric*
42 *Rehabilitation Journal*, 19(4), 89-91.
- 43
44 Page, A. C., Hooke, G. R., & Rutherford, E. M. (2001). Measuring mental health outcomes in a private psychiatric
45 clinic: Health of the Nation Outcome Scales and Medical Outcomes Short Form SF- 36. *Australian and New*
46 *Zealand Journal of Psychiatry*, 35, 377-381.
- 47
48 Pinheiro, J. C., & Bates, D. M. (2000). *Mixed-effects model in S and S-PLUS*. New York: Springer.
- 49
50 Pirkis, J. E., Burgess, P. M., Kirk, P. K., Dodson, S., Coombs, T. J., & Williamson, M. K. (2005). A review of the
51 psychometric properties of the Health of the Nation Outcome Scales (HoNOS) family of measures. *Health and*
52 *Quality of Life Outcomes*, 3, 76.
- 53
54 R Development Core Team (2008). *R: A language and environment for statistical computing*. R Foundation for
55 Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL.
- 56
57 Russinova, Z., Rogers, E. S., & Ellison, M. L. (2006). Conceptualization and measurement of providers' recovery-
58 promoting competence. Paper presented at the 16th Annual Conference on State Mental Health Agency
59 Services Research, Baltimore, Maryland, February 12-14.
- 60
61 Russinova, Z., Rogers, E. S., Ellison, M. L., Cook K. F., & Lyass, A. (2013). Conceptualization and Measurement
62 of Mental Health Providers' Recovery-Promoting Competence: The Recovery Promoting Relationships Scale
63 (RPRS). *Psychiatric Rehabilitation Journal*, 36(1) 7-14.

- Russinova, Z., Rogers, E. S., Ellison, M. L., & Lyass, A. (2011). Recovery-promoting professional competencies: Perspectives of mental health consumers, consumer-providers and providers. *Psychiatric Rehabilitation Journal*, 34(3) 177-185.
- Salyers, M.P., & Tsemberis, S. (2007). ACT and recovery: integrating evidence based practice and recovery orientation on assertive community treatment teams. *Community Mental Health Journal*, 43, 619-641.
- Shanks, V., Williams, J., Leamy, M., Bird, V. J., Boutillier, C. Le., & Slade, M. (2013). Measures of Personal Recovery: A Systematic Review. *Psychiatric Services* 64(10), 974-980.
- Slade, M., Beck, A., & Bindman, J (1999). Routine clinical outcome measures for patients with severe mental illness: cansas and honos. *British Journal of Psychiatry*, 174, 404-408.
- Slade M., Bird, V., Le Boutillier, C., Farkas, M., Grey, B., Larsen, J., Leamy, M., Oades L. & Williams, J. (2015). Development of the REFOCUS intervention to increase mental health team support for personal recovery. *The British Journal of Psychiatry*, 207, 544-550.
- Slade, M., Bird, V., Clarke, E., Le Boutillier, C., McCrone, P., Macpherson, R., & ... Leamy, M. (2015). Supporting recovery in patients with psychosis through care by community-based adult mental health teams (REFOCUS): A multisite, cluster, randomised, controlled trial. *The Lancet Psychiatry*, 2(6), 503-514.
- Snyder, C., & Anderson, S. (2009). An examination of mandated versus voluntary referral as a determinant of clinical outcome. *Journal of Marital and Family Therapy*, 3, 278-292.
- Strupp, H. H. (1996). The tripartite model and the Consumer Reports study. *American Psychologist*, 51(10), 1017-1024.
- Torrey, W. C., & Wyzik, P. F. (2000). The recovery vision as a service improvement guide for community mental health center providers. *Community Mental Health Journal*, 36, 209-216.
- Waldemar, A. K. Arnfred, S. M., Petersen, L., & Korsbek, L. (2016). Recovery-Oriented Practice in Mental Health Inpatient Settings: A Literature Review. *Psychiatric Services*, 67, 596-602.
- Wallace, G., Bird, V., Leamy, M., Bacon, F., Le Boutillier, C., Janosik, M., MacPherson, R., Williams, J., & Slade M. (2016). Service user experiences of REFOCUS: a process evaluation of a pro-recovery complex intervention. *Social Psychiatry Psychiatric Epidemiology*, 51,1275-1284.
- Walsh, J., Boyle, J. (2009). Improving acute psychiatric hospital services according to inpatient experiences: a user-led piece of research as a means to empowerment. *Issues in Mental Health Nursing* 30, 31-38.
- Watson, J. C., & Geller, S. M. (2005). The relation among the relationship conditions, working alliance, and outcome in both process-experiential and cognitive-behavioral psychotherapy. *Psychotherapy Research*, 15(1-2), 25-33.
- Williams, J., Leamy, M., Pesola, F., Bird, V., Le Boutillier, C., & Slade, M. (2015). Psychometric evaluation of the Questionnaire about the Process of Recovery (QPR). *The British Journal of Psychiatry*, 207(6), 551-555.
- Wilrycx, G. K.M.L., Croon, M. A., van den Broek, A. H. S., & van Nieuwenhuizen, Ch. (2012). Psychometric properties of three instruments to measure recovery. *Scandinavian Journal of Caring Sciences*, 26(3), 607-614.
- Wilrycx, G. K. M. L, Croon, M. A., van den Broek, A. H. S., & van Nieuwenhuizen, Ch. (2015). Evaluation of a recovery-oriented care training program for mental healthcare professionals: Effects on mental health consumer outcomes. *International Journal of Social Psychiatry* 61(2), 164-173.
- Wing, J. K., Beevor, A. S., Curtis, R. H., Park, S. B., Hadden, S., & Burns, A. (1998). Health of the Nation Outcome Scales (HoNOS). Research and development. *British Journal of Psychiatry*, 172, 11-18.
- Whitley, R., Gingerich, S., & Lutz, W. J. (2009). Implementing the illness management and recovery program in community mental health settings: facilitators and barriers. *Psychiatric Services*, 60, 202-209.

1
2
3 Young, A. S., Forquer, S. L., Tran, A., Starzynski, M., & Shatkin, J. (2000). Identifying clinical competencies that
4 support rehabilitation and empowerment in individuals with severe mental illness. *Journal of Behavioral Health*
5 *Services & Research*, 27(3), 321-333.

6 Ziedonis, D. M., & Trudeau, K. (1997). Motivation to quit using substances among individuals with schizophrenia:
7 Implications for a motivation-based treatment model. *Schizophrenia Bulletin*, 23, 229–238.
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For Peer Review

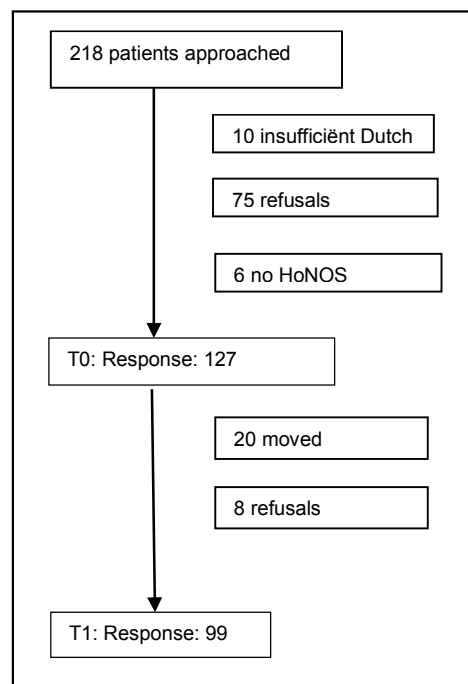


Figure 1. Flow chart of study inclusion.

Table 1. Patients' Characteristics.

	Participants		Non-participants	
	Mean (SD)	N (%)	Mean (SD)	N (%)
N		127 (100)		91 (100)
Male		102 (80.3)		77 (84.6)
Female		25 (19.7)		14 (15.4)
Age	42.2 (10.01)		40.9 (9.21)	
Age: Range	21-69		21-67	
Education				
Below average (1,2,3)		19 (15.0)		21 (23.1)
Average (4,5)		95 (74.8)		62 (68.1)
Above average (6,7)		13 (10.2)		8 (8.8)
Psychiatric disorders				
Schizophrenia or psychotic disorder		78 (61.4)		62 (68.1)
Anxiety or mood disorder		18 (14.2)		11 (12.1)
Substance abuse		104 (81.9)		79 (86.8)
ADHD		12 (9.4)		8 (8.8)
Autism Spectrum Disorder		9 (7.1)		4 (4.4)
Sexual disorder		16 (12.6)		4 (4.4)
Personality disorder		60 (47.2)		41 (45.1)
Mental retardation		30 (23.6)		25 (27.5)
Time in setting (years)	3.3 (1.86)		2.8 (1.44)	
RPRS	71.1 (19.1)			
NHS	99.2 (16.9)			
HoNOS				
Drug/alcohol problems	1.28 (1.38)			
Social relationships	1.50 (1.07)			
Activities of daily living	1.09 (1.13)			
Motivation for treatment	1.51 (1.17)			
Medication adherence	0.59 (0.94)			

Table 2. Hypothesis-testing Linear Mixed Effects Regression Model Predicting Personal Recovery.

Fixed effects	Estimate	Std. error	t-value	p-value
(Intercept)	99.45	1.18	84.0	< 0.001
RPRS-score (centred)	0.45	0.05	8.4	< 0.001

Table 3. Best-fitting Linear Mixed Effects Regression Model Predicting Personal Recovery.

Fixed effects	Estimate	Std. error	t-value	p-value
(Intercept)	99.27	2.77	56.0	< 0.001
RPRS-score (centred)	0.62	0.09	7.3	< 0.001
Drug/alcohol problems (for mean RPRS-score)	-0.73	0.69	-1.1	0.29
Motivation for treatment (for mean RPRS-score)	0.28	0.87	0.3	0.75
RPRS-score * Drug/alcohol problems	0.10	0.04	2.7	< 0.01
RPRS-score * Motivation for treatment	-0.18	0.04	-4.5	< 0.001

Table 4. Hypothesis-testing Linear Regression Model Predicting the Improvement of Personal Recovery over Time.

Fixed effects	Estimate	Std. Error	t-value	p-value
(Intercept)	-0.33	1.05	-0.3	0.75
RPRS-score (T0; centred)	0.15	0.06	2.3	0.02
Delta RPRS (centred)	0.39	0.09	4.6	< 0.001

Table 5. Best-fitting Linear Regression Model Predicting the Improvement of Personal Recovery over Time.

Fixed effects	Estimate	Std. Error	t-value	p-value
(Intercept)	-0.36	0.93	-0.4	0.71
NHS-score (T0; centred)	-0.35	0.07	-5.1	< 0.001
RPRS-score (T0; centred)	0.30	0.06	-4.8	< 0.001
Delta RPRS (centred)	0.39	0.08	5.1	< 0.001

For Peer Review