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Factors Associated With Changes in Community Ability and Recovery After Psychiatric Rehabilitation- a Retrospective Study. --Manuscript Draft--

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Title Page of Article:

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Compliance with Ethical Standards

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Factors Associated With Changes in Community Ability and Recovery After Psychiatric Rehabilitation- a Retrospective Study.

Abstract

One of the key goals of psychiatric rehabilitation is to return individuals with mental illnesses back into the community via restoration of the necessary skills. This retrospective study seeks to evaluate the factors associated with improvement in community functioning after a period of outpatient rehabilitation. 223 individuals enrolled into three broad rehabilitation groups – clinical, vocational and creative therapies/individual sessions – were included in this study. The Multnomah Community Ability Scale (MCAS) and Milestones of Recovery Scale (MORS) were used to evaluate each individual before and after the rehabilitation programme. Across all three groups, there were significant improvements in MCAS scores and MORS ratings. In multivariate models, clinical rehabilitation group was superior to creative therapies/individual sessions in predicting MORS change. The study also revealed a close relationship between recovery gain and improvement in community ability.

Keywords: Recovery, Functioning, Community Ability, Psychiatric Rehabilitation, Schizophrenia

Introduction

The concept of recovery has shaped delivery of psychiatric rehabilitation services over the past few decades. Psychiatric rehabilitation aims to enable individuals to recover and live as normally as possible in the community (Lieberman, 2008). This entails involving service users in making progress towards participation in social relationships, vocational responsibilities and independent living necessary for community inclusion. Several professions, such as occupational therapy, have also revamped their services over the years to adopt a more recovery-oriented approach (Lloyd & Williams, 2009; Nugent, Hancock, & Honey, 2017). The occupational therapy department at a tertiary psychiatric institute runs an outpatient service, which used to provide a range of sheltered workshop activities, transitional employment programmes, independent living skills training and craft activities. In 2012, the service was revamped to adopt a more recovery-oriented framework, through incorporating evidence-based psychiatric rehabilitation programmes and integrating with a supported employment service. It was renamed as 'Occupational Therapy: Activities, Vocation, Empowerment' (OcTAVE). Its current programmes include clinical rehabilitation (Illness Management and Recovery, health management, cognitive remediation etc), vocational training (in retail, food and beverage, cleaning as well as administrative work), creative therapies and individual occupational therapy intervention. Illness Management and Recovery (IMR) has shown positive outcomes in improving coping strategies and fulfilling personal goals (Hasson-Ohayon, Roe, & Kravetz, 2007), while nutrition and exercise programmes have produced physical benefits for persons with psychiatric conditions (Brown et al., 2015). Furthermore, cognitive remediation has also demonstrated efficacy in improving overall functioning when conducted within the context of a psychiatric rehabilitation programme (McGurk, Twamley, Sitzler, Mchugo, & Mueser, 2007; Wykes, Huddy, Cellard, McGurk, & Czobor, 2011). Vocational training involves three to six months training in a café, retail store, cleaning service or library/reception counter, for service users who are unprepared to plunge immediately into competitive employment. Upon completion of training, they are placed in a supported employment service which is integrated with the clinical service. Creative therapies may be used for tasks analysis/task engagement purpose, or to facilitate self-expression for service users. These activities, such as batik painting, glass painting and woodwork serve as mechanisms to promote recovery, as selected service users are engaged to conduct these sessions, which pave the way for them to become peer support specialists in the future. As such, creative work provides active engagement for persons who are not keen for open employment. Lastly, a small number of service users may not be ready for participation in group interventions and prefer individual sessions. Hence,

individual interventions are also offered, which may involve setting rehabilitation goals, joint engagement of community living tasks and wellness education.

The revamped service has a stronger focus on integrating service users back to community through promoting community ability. Community integration is seen as the main goal, as it is a tangible manifestation of personal and/or functional recovery and can be visibly seen and measured (Gibson, Amico, Jaffe, & Arbesman, 2011). Community ability is a broad and complex concept, with several possible dimensions that need to be defined and investigated (Bassani et al., 2009). The Multnomah Community Ability Scale (MCAS) is a clinician-rated tool widely used to measure community ability and is used as an outcome measurement for this service (Barker, Barron, McFarland, Bigelow, & Carnahan, 1994; Multnomah Community Ability Scale Network, 2004). It consists of four factor sub-scales: interference with functioning, adjustment to living in the community, social competence and behavioral problems (Barker et al., 1994). 'Interference with functioning' consists of items involving physical, cognitive, emotional symptoms that may affect overall health and functioning (Multnomah Community Ability Scale Network, 2004). 'Adjustment to living in the community' covers daily living functioning and adjustment to mental illness. 'Social competence' measures the person's ability to engage in interpersonal relationships and meaningful activity. Lastly, 'behavioral problems' measures behaviors that are associated with successful community integration and positive treatment outcomes (Multnomah Community Ability Scale Network, 2004). A study has shown that the reliabilities of the MCAS sub-scales are adequate and there is evidence of their concurrent validity (Barker et al., 1994; Michael Hendryx, Dyck, McBride, & Whitbeck, 2001). However, a number of studies examining the factor structure of MCAS found only partial replication of its hypothesized sub-scales. One study using confirmatory factor analyses retained only three items within each factor to achieve a good fit, while another study found that only the social competence factor was an exact match to the hypothesized sub-scale (Corbière et al., 2002; Michael; Hendryx, Dyck, & McBride, 2001). A separate study using confirmatory factor analysis on a longitudinal sample of individuals could not achieve a good fit of its hypothesized factors (Bassani et al., 2009). Nevertheless, MCAS has been widely used as a programme evaluation tool for community mental health services or to measure community functioning (Aubin, Stip, Gélinas, Rainville, & Chapparo, 2009; Durbin et al., 2004; Velligan et al., 2004) Although studies have attempted to delineate the factors associated with poor community functioning in people with schizophrenia, (Dickinson & Coursey, 2002; Green, Kern, Braff, & Mintz, 2000; Porteous & Waghorn, 2007; Zhornitsky et al., 2013) not many have explored factors associated with change in community functioning after

1 psychiatric rehabilitation. A few studies have suggested that cognitive and activity limitations, relationship
2 status and subjective experiences such as self-esteem may influence rehabilitation outcomes in community
3 functioning (Brekke & Long, 2000; Chang, Helfrich, Coster, & Rogers, 2015; Rispaud, Rose, & Kurtz, 2016).
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5 Therefore, this retrospective study attempted to determine factors which were associated with changes in
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7 community ability vis-à-vis recovery after psychiatric rehabilitation.
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10 11 **Methods**

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15 Data from service users enrolled into OcTAVE in 2014 was retrieved for analysis, as the dataset was the most
16 complete. Besides demographic profile, data such as programmes enrolled, hospitalisations in the year
17 preceding and after enrolment, duration of intervention and duration of unemployment were also collected.
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21 Psychiatric diagnoses were obtained from electronic medical records at the time of enrolment. Community
22 ability was assessed on the MCAS, which was evaluated at baseline and at the end of the programme. To
23 measure recovery milestones from baseline to post-intervention, the Milestones of Recovery Scale (MORS) was
24 used. MORS describes the general parameters of recovery and consists of three underlying dimensions: 1) level
25 of risk, 2) level of engagement with the mental health system and 3) level of skills and supports (Fisher et al.,
26
27 2009). ‘Level of risk’ measures the individual’s likelihood of causing physical harm to self or others, his/her
28 participation in risky behaviors and level of co-occurring disorders. ‘Level of engagement’ refers to is the
29 degree of alliance between the individual and the mental health service providers. Lastly, ‘level of skills and
30 supports’ refers to the combination of the individual’s abilities (which includes independent living skills),
31 support network(s) and the professional staff support required to meet his/her needs (Pilon & Ragins, 2011). It
32 has a good inter-rater reliability of $r = .85$ (CI .81, .89) and test-retest reliability of $r = .85$ (CI .81, .87) (Fisher
33 et al., 2009). Assessments on the MCAS and MORS were performed by trained occupational therapists, using
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48 For descriptive statistics, Fisher’s exact test was used for categorical variables and one-way Anova was used for
49 continuous variables. If the distributions were skewed, Kruskal-Wallis test was used. Changes in MCAS and
50 MORS scores between baseline and after interventions were computed. The interventions were grouped into 1)
51 clinical rehabilitation, 2) creative therapies/individual interventions, and 3) vocational training for the present
52 analysis. Paired t-test was used to evaluate whether there was any difference between baseline and post-
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58 intervention measures for MCAS at each type of intervention. For MORS score, the distributions were skewed,
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therefore Wilcoxon signed-rank test was used. Multiple regression was used to examine the association between the types and duration of interventions, change in MCAS as well as change in MORS scores, adjusting for covariates. The covariates were age, gender, ethnicity, education, marital status and baseline scores. A backward selection method was used to build the two regression models with the change in MCAS score and change in MORS score as outcomes. Variables with p-values less than 0.05 were retained in the final model with adjustment of covariates. Stata version 12.0 was used. Ethics approval for this study was provided by the National Healthcare Group's Domain Specific Review Board (reference number: 2016/01020).

Results

223 service users were enrolled into OcTAVE in the year of 2014. They received one predominant intervention during each enrolment. 55 of them attended clinical rehabilitation, 62 of them participated in creative therapies/individual sessions and 106 of them were involved in vocational training. Their mean age was 37 years (SD = 12). Majority of them were single (80.7%), and had primary or secondary school education (54.6%). Most of them were diagnosed with schizophrenia/schizoaffective disorders (64.4%) and their average duration of intervention was 177 days. There were no significant differences in age, gender, ethnic group, education, psychiatric diagnoses and duration of intervention or employment between the three groups (see Table 1).

There were significant differences in baseline MCAS composite scores among the intervention types ($F(2,154) = 6.20, p = 0.003$). The vocational training group had lower scores when compared to clinical rehabilitation ($p = 0.008$) and creative therapies/individual sessions ($p = 0.019$). However, no significant differences were found in the MCAS baseline domain scores ($p > 0.05$), post-intervention MCAS composite scores ($p = 0.167$) and MCAS change scores ($p = 0.321$).

There were no significant differences in baseline MORS scores among the intervention groups. However, there was a significant difference in post intervention MORS scores ($p = 0.006$) among the three intervention groups, with the clinical rehabilitation group having higher scores compared to creative therapies/individual sessions (p

= 0.001); similarly, vocational training had higher scores compared to creative therapies/individual sessions ($p = 0.005$, see Table 1).

There were significant differences between baseline and post- intervention MCAS scores in clinical rehabilitation ($t = -4.69$, $p < .001$), creative therapies/ individual interventions ($t = -2.42$, $p = 0.021$) and vocational training ($t = -7.42$, $p < .001$). There were also significant differences between baseline and post-intervention MORS scores in clinical rehabilitation ($z = -4.03$, $p < .001$), creative therapies/ individual interventions ($z = -2.76$, $p = 0.006$) and vocational training ($z = -5.71$, $p < .001$).

Independent T-test showed no significant difference in MCAS change and MORS change scores between participants with schizophrenia/schizoaffective disorders and those with other diagnoses ($p > 0.05$). However, regression results revealed that MORS baseline score ($b = 2.64$, $p = .001$) and MORS change score ($b = 3.70$, $p < .001$) had significant effects on the MCAS change score after adjusting for demographics variables and MCAS baseline score. Type of rehabilitation intervention and duration of intervention were not significant factors associated with MCAS change. This model accounted for 35.4% of the variance $F(13, 94) = 5.51$ $P < .001$, see Table 2).

There was a significant effect of intervention ($p < 0.05$) on MORS change score after adjusting for demographics variables and MORS baseline score. Creative therapies/individual interventions had lower change in MORS score compared to clinical rehabilitation ($b = -0.43$, $p = 0.027$). In addition, MCAS change score ($b = 0.05$, $p < .001$) and 'Interference with Functioning' factor score at baseline ($b = 0.10$, $p = 0.024$) had significant effects on MORS change score. Duration of intervention was not a significant factor associated with MORS change. This model accounted for 53.6% of the variance $F(13, 69) = 8.39$ $p\text{-value} < .001$, see Table 3). There was also medium to strong effect size correlation between change in MCAS and change in MORS scores ($r_s = 0.462$, $p < 0.001$).

Discussion

In this study, there was a strong relationship between recovery and community functioning. A previous study on community dwelling older adults also found moderate correlation ($r = .74$) between MORS and MCAS (Hess, Fisher, Pilon, Reynolds, & Ruiz, 2016). Baseline recovery as well as progress in recovery milestones predicted improvement in community ability; likewise, improvement in community ability contributed to recovery.

Community functioning has often been seen as an aspect of clinical and personal recovery, as improved community participation often lead to more empowerment and is associated with improved clinical symptoms (Gibson et al., 2011). It was interesting to note from this study that regardless of intervention, improvement in community functioning occurred when there was progress in recovery. At baseline, the participants had a mean MCAS composite score of 61.3, which was at the higher end of 'medium levels of community ability' (with a range of 48 to 62). Post-intervention, mean MCAS composite score increased to 65.2, which corresponded to 'high levels of community ability' (with a range of 63 to 85) (Multnomah Community Ability Scale Network, 2004). Correspondingly, the participants' MORS scores improved from level 4 (which denotes not coping successfully and not engaged with mental health provider) to level 5 (which denotes not coping successfully but engaged with mental health provider).

However, type of intervention had an effect on recovery, with creative therapies achieving smaller recovery milestones than clinical rehabilitation. As MORS assesses level of engagement as well as level of skills and supports, which includes Clinical rehabilitation programmes such as cognitive remediation and IMR equipped service users with life skills such as overcoming cognitive problems in daily lives and managing their symptoms (Fardig, Lewander, Melin, Folke, & Fredriksson, 2011; Medalia & Saperstein, 2013). These interventions targeted not only discrete symptoms and cognitive deficits, but actively engaged service users in reviewing their coping strategies necessary for recovery. Such life skills enable persons with mental health conditions to rely less on social support in the pursuit of meaningful roles, which is an aspect of recovery that MORS measures. Similarly, vocational training programmes equipped service users with skills necessary for gaining open employment, which might not directly influence community functioning but provided hope for recovery through engagement in valued occupations. While creative therapies facilitated active engagement, it might not have promoted acquisition of skills which led to components of recovery such as self-determination and personal responsibility. Therefore, clinical rehabilitation and vocational rehabilitation were shown to result in significantly higher post intervention MORS scores than creative therapies.

MCAS baseline 'Interference with Functioning' factor score also predicted improvement in MORS score. This dimension consists of 5 items: physical health, cognitive functioning, thought process, response to stress and mood abnormality. As mentioned earlier, the factor structure of MCAS appeared to be unstable, with one study dropping the 'physical health' and 'mood abnormality' items to achieve a good fit of this factor (Corbière et al., 2002). Amongst the items which were retained, cognitive functioning had been shown in studies to be a major contributor to functional recovery, while severity of positive symptoms influenced clinical recovery (Michael Green & Harvey, 2014; Robinson, Woerner, McMeniman, Mendelowitz, & Bilder, 2004). However, the extent of their effects on personal recovery have not been studied, Studies had proposed that personal recovery (e.g., hope, relationships) mediated the relationship between clinical recovery and community integration (Davis, Townley, & Kloos, 2013). Interventions such as clinical rehabilitation and vocational training could have fostered clinical and functional recovery, thereby improving personal recovery factors such as hope and empowerment, leading to greater ability to integrate to the community.

The naturalistic nature of the present study represented a real world rehabilitation setting with individuals with serious mental illness. The present study also compared outcomes of different rehabilitation programmes, which provided valuable information in the subsequent planning of rehabilitation services. However, there were limitations to this study. This study analysed retrospective data of an existing psychiatric rehabilitation service. Therefore, clinical symptoms and cognitive functioning, which were known to predict functioning (Brekke & Long, 2000; M. Green, 1996), were not collected routinely and hence not available for analysis. Further, group assignment into either intervention was not random and might have led to assignment bias. Though we found between-group differences in MCAS scores at baseline, we adjusted for baseline scores in the model. As MORS is a clinician-rated measurement, it might not have captured service users' experience of personal recovery, which is an important dimension in the recovery model. Including self-rated recovery measurements such as Questionnaire about the Process of Recovery (Williams et al., 2015) and Mental Health Recovery Measure (Oliveira-Maia, Mendonça, Pessoa, Camacho, & Gago, 2016) would have added valuable user perspectives in eliciting non-clinical aspects of recovery. Lastly, this study attempted to measure broadly the impact of a psychiatric rehabilitation service on community ability. Interventions such as IMR, health management, vocational training, etc. were not evaluated individually as there was no control group and several studies have already investigated their efficacies. As clinical rehabilitation programmes such as cognitive remediation and IMR were structured and manualised, competency and fidelity of delivery could be better controlled than other

programmes such as creative therapies and vocational training. Proficiency of the therapists across the programmes and their levels of therapeutic alliance were possible factors which could affect outcomes of interventions. Unfortunately, such data was not collected in this naturalistic setting.

In conclusion, clinical rehabilitation programmes (e.g. IMR, cognitive remediation and health management) were associated with greater recovery gains when compared to creative/individual sessions and vocational rehabilitation. Our study suggests that community ability and personal recovery appear to share overlapping dimensions, which require further investigations.

Compliance with Ethical Standards

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Table 1: Description of Study Sample

	Clinical Rehab (N=55)	*Craft creates & Individual sessions (N=62)	Vocational training (N=106)	Total (N=223)	P-value
Age in years, mean (SD)	35.9 (12.0)	38.9 (13.0)	36.7 (11.6)	37.1 (12.1)	0.545
Gender, N (%)					0.606
Female	29 (52.7)	32 (51.6)	48 (45.3)	109 (48.9)	
Male	26 (47.3)	30 (48.4)	58 (54.7)	114 (51.1)	
Education, N (%)					0.584
Primary, Secondary and ITE	27 (51.9)	31 (50.0)	61 (58.7)	119 (54.6)	
Diploma and Degree	23 (44.2)	25 (40.3)	36 (34.6)	84 (38.5)	
Others	2 (3.9)	6 (9.7)	7 (6.7)	15 (6.9)	
Marital Status, N (%)					0.768

Single	41 (77.4)	51 (83.6)	84 (80.8)	176 (80.7)	
Married	6 (11.3)	4 (6.6)	12 (11.5)	22 (10.1)	
Divorced/Separated	6 (11.3)	6 (9.8)	8(7.7)	20 (9.2)	
Primary Diagnoses, N (%)					0.081
Psychosis	33 (61.1)	41 (66.1)	69 (65.1)	143 (64.4)	
Mood and anxiety disorders	15 (27.8)	6 (9.7)	16 (15.1)	37 (16.7)	
Obsessive compulsive disorders	4 (7.4)	5 (8.1)	6 (5.7)	15 (6.8)	
Others	2 (3.7)	10 (16.1)	15 (14.2)	27 (12.2)	
Psychiatric Comorbidities, N (%)					0.697
Yes	5 (9.1)	6 (9.7)	7 (6.6)	18 (8.1)	
No	50 (90.9)	56 (90.3)	99 (93.4)	205 (91.9)	
Duration of intervention (days), mean (SD)	171.5 (140.9)	206.4 (192.8)	164.0 (137.2)	177.3 (155.3)	0.475
Duration of unemployment (months), mean (SD)	58 (84.4)	67.5 (93.9)	38.0 (55.3)	50.7 (75.1)	0.192
MCAS score, mean (SD)					
Baseline Total	63.6 (9.1)	62.8 (8.3)	59.0 (5.6)	61.3 (7.6)	0.003
Interference with Functioning	12.0 (1.8)	11.7 (1.9)	11.4 (1.5)	11.6 (1.7)	0.092
Adjustment to daily life	11.2 (2.4)	10.3 (2.6)	10.7 (1.6)	10.7 (2.1)	0.387
Social competence	9.9 (2.6)	9.3 (1.9)	9.1 (1.6)	9.4 (2.0)	0.225
Behavioral problems	12.9 (1.6)	12.5 (1.4)	12.8 (1.2)	12.7 (1.4)	0.395
Post intervention	67.8 (8.5)	64.8 (10.3)	64.5 (7.4)	65.2 (8.5)	0.167
Change score[#]	4.4 (4.3)	2.3 (5.4)	4.9 (5.0)	4.0 (5.1)	0.321
MORS score, mean (SD)					
Baseline	5.2 (0.7)	4.8 (0.8)	5.0 (0.7)	4.9 (0.7)	0.203
Post intervention	5.9 (0.8)	5.1 (1.1)	5.6 (0.9)	5.5 (1.0)	0.006
Change score[#]	0.7 (0.5)	0.3 (1.1)	0.6 (0.9)	0.5 (0.9)	0.450

*As number of service users involved in individual interventions was very small (n=5), this programme was combined with creative therapies for analyses.

[#] Change scores: post intervention score – baseline scores

Abbreviations: MCAS = Multnomah Community Ability Scale, MORS = Milestones of Recovery Scale, SD = standard deviation.

Table 2: Multiple Regression Model to Identify Factors Associated With MCAS Change

Variables	Adjusted Coefficient (95% CI)	T-value	P-value
Intervention*			0.808
Craft Creates/Individual sessions	0.13 (-2.42 to 2.69)	0.10	0.917
Vocational training	0.65 (-1.57 to 2.87)	0.38	0.705
MORS baseline	2.64 (1.17 to 4.10)	3.56	<i>0.001</i>
Duration of intervention	0.005 (-0.0003 to 0.011)	1.89	0.061
MORS change score	3.70 (2.67 to 4.73)	7.14	<i><.001</i>

*compared to clinical rehabilitation

Model adjusted for age, gender, education, ethnicity, marital status and baseline MCAS score

Model summary: Adjusted R²=35.4%, F(13, 94) =5.51 P<.001

Abbreviations: MORS = Milestones of Recovery Scale

Table 3: Multiple Regression Model to Identify Factors Associated With MORS Change

Variables	Adjusted Coefficient (95% CI)	T-value	P-value
Intervention*			<i><0.05</i>
Craft Creates/Individual sessions	-0.43 (-0.81 to -0.05)	-2.27	<i>0.027</i>
Vocational training	-0.08 (-0.41 to 0.25)	-0.50	0.618
MCAS change score	0.05 (0.03 to 0.08)	3.96	<i><.001</i>
Duration of intervention	-0.0003 (-0.001 to 0.0006)	-0.64	0.521
Interference with functioning factor score	0.10 (0.02 to 0.19)	2.33	<i>0.023</i>

*compared to clinical rehabilitation

Model adjusted for age, gender, education, ethnicity, marital status and baseline MCAS score

Model summary: Adjusted R²=*53.60%*, F(13,69)=8.39 p-value<.001

Abbreviations: MCAS = Multnomah Community Ability Scale

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