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**Self-Management Competence in Depressed In-Patients:
A Prospective Observational Study**

Nadja Schnierer^{1,*}, Iris Reinhard², Johanna M Doerr³, Urs M Nater⁴, Matthias Bender⁵
and Peter M Wehmeier⁶

¹Goethe University Frankfurt, Medical Faculty, Frankfurt am Main, Germany

²Central Institute for Mental Health (ZI), Mannheim, Germany

³University Hospital of Giessen, Department of Neurology, Giessen, Germany

⁴University of Vienna, Department of Clinical Psychology of the Adult, Vienna, Austria

⁵Vitos Kurhessen, Kassel, Germany

⁶NeuroCentrum Bergen-Enkheim, Frankfurt am Main, Germany

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***Corresponding Author**

Peter M. Wehmeier, NeuroCentrum
Bergen-Enkheim, Frankfurt am Main,
Germany, Tel.: +49- (0)6109-72670,
E-mail: wehmeier.peter@web.de

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Abstract

Background: Studies suggest that good self-management is associated with better coping with chronic mental conditions. However, an encompassing assessment of the relationship between depression and self-management competence is lacking.

Methods: This study assesses the relationship between depressiveness and self-management competence in a sample of 83 depressed in-patients. Beck Depression Inventory II (BDI-II) was used to assess depressiveness. The Self-Management Self-Test (SMST) was used to assess self-management competence. Patient surveys took place at the time of hospital admission (T1) and at the time of hospital discharge or approximately 4 to 6 weeks after (T2).

Results: Self-management competence correlated negatively with depressiveness at T1. Four out of five specific dimensions of self-management competence correlated inversely with depressiveness at T1. Self-management competence differed depending on the severity of the depressive syndrome and was higher the lower the severity of the depressive syndrome was. In the course of clinical treatment, self-management competence increased. Change of self-management competence during clinical treatment was not dependent on the sociodemographic variables gender or age. Competence during clinical treatment predicted the change of depressiveness between hospital admission and discharge (T2 vs. T1) as well as depressiveness at T2.

Limitations: The SMST is a relatively new psychometric instrument that has not yet found widespread use in clinical research.

Conclusion: Our findings offer clinical evidence that in in-patients with depression, self-management competence and depressiveness are associated constructs. These results suggest that self-management competence may be a valuable resource in the treatment of depressive disorders. The findings also suggest that the Self-Management Self-Test (SMST) is an effective psychometric instrument for assessing self-management competence in patients with depression and can be used to assess patient-reported outcome (PRO) in patients with depression.

Introduction

Major depressive disorder (MDD) is a common illness, affecting more than 264 million people worldwide [1]. As a result, depressive disorders are one of the biggest challenges in global mental health, both in terms of diagnostic assessment and delivery of effective treatment [2]. The successful use of self-management strategies may reduce the symptom severity of depression [3], thus being a potentially powerful tool in patients' recovery from depressive disorders. Furthermore, the use of self-management strategies by depressed patients can promote self-efficacy, reduce depressive symptoms and increase the functionality of those affected [4].

Self-management enables patients to actively monitor their symptoms and cope with them using professionally provided interventions such as coping strategies, psychotherapy and psychopharmacotherapy [5]. Self-management can thereby provide patients with additional resources in the course of coping with their disorder. Additionally, in times where professional resources are scarce, self-management strategies can increase the accessibility of professional health care. By using self-management strategies, patients are enabled to take responsibility for the management of their symptoms, which in turn can lead to an enhancement of the efficacy of the therapy received as well as to a decrease of the risk of relapse [6, 7].

In the context of chronic disorders, self-management refers to the ability to cope with symptoms, treatments and physical and psychosocial effects related to the chronic condition [8]. This includes depressive disorders, which can be considered chronic conditions in which self-management competence is compromised [9, 10].

We conceptualize self-management as comprising five dimensions that reflect important domains of most peoples lives, including patients with a depressive disorder. These dimensions comprise (a) the capacity for self-perception and being connected to external reality, (b) being able to sustain relationships with others and maintain social contacts, (c) the ability to set priorities and plan the future, (d) the ability to choose between options and make decisions, and finally (e) the capacity to do what realistically can be done and act effectively [11]. Self-management is closely related to the concept of self-care,

which is important in sustaining mental well-being and the prevention of burnout and depressions [12].

Thus, self-management is crucial for the promotion of mental health and for the recovery from psychiatric disorders. Nevertheless, self-management strategies are still underused in psychiatric patients despite a growing body of evidence for their effectiveness [3] and a detailed and comprehensive investigation of the relationship between depression and self-management competence is lacking. Therefore, investigating the relationship between depressiveness and self-management competence is an important step towards developing new treatment strategies that include interventions to target specific symptoms of depression as well as measures to enhance general self-management competence. These treatment strategies should include a multidimensional approach to self-management in order to facilitate the treatment of patients with psychiatric disorders such as depression [11]. Furthermore, self-management is important in the prevention of work-related stress or burnout, especially in people confronted with extraordinary demands in terms of mental well-being at work [12].

Materials and Methods

Instruments

The Self-Management Self-Test (SMST) was used to assess self-management competence [11]. The Beck Depression Inventory II (BDI-II) was used to assess depressiveness [13]. The Global Assessment of Functioning (GAF) scale was used to assess the patients' global level of psychological, social and occupational functioning [14].

Procedure

$N = 83$ patients hospitalized for treatment of major depressive disorder in two psychiatric hospitals in a rural region in Central Germany filled out the SMST at the time of hospital admission (T1) and approximately 4 to 6 weeks later (T2), which in most cases equaled the day of hospital discharge.

Additionally, patients were asked to fill out the BDI-II at T1 and T2. Experienced psychiatric clinicians filled out the GAF scale at T1. The present study was approved in November

2014 by the Ethics Committee of the locally responsible Medical Board (Landesärztekammer Hessen FF 111/2014) and was carried out in full compliance with the Code of Ethics of the World Medical Association. All participants had given their informed consent before entering the study. Data collection took place between April 2015 and September 2015.

Inclusion Criteria

We included a clinical sample of $N = 83$ adults aged 18 to 65 years who had been hospitalized for the treatment of major depressive disorder according to ICD-10 criteria [15]. Patients with severe mental disorders such as schizophrenia, manic episodes and bipolar disorder were excluded from the study, as mental disorders may impose an additional burden on one's self-management competence and thus could be considered a source of bias. Secondly, patients with psychotic symptoms were excluded because psychotic symptoms may impair people's self-management competence, thereby possibly confounding the interpretation of treatment effects. For the same reasons, patients with severe physical illnesses were excluded.

Statistical Analyses

This study assesses the association of depressiveness and self-management competence in depressed in-patients. Using the data from the clinical sample collected at T1 and T2, the following hypotheses were tested:

Hypothesis 1a: At T1, self-management competence correlated with the extent of depressiveness.

Hypothesis 1b: At T1, solitary dimensions of self-management correlated with depressiveness.

Hypothesis 2: At T1, the three levels of depression severity [13] differed in their average level of self-management competence from one another.

Hypothesis 3: The self-management competence of the patients increased during their clinical treatment.

Hypothesis 4: The change of self-management competence during clinical treatment was dependent on specific sociodemographic variables.

Hypothesis 5: The extent of change of self-management competence during clinical treatment (T2 vs. T1) predicted the

change of depressiveness between T1 and T2.

Hypothesis 6: The extent of change of self-management competence during clinical treatment (T2 vs. T1) predicted depressiveness at T2.

All statistical analyses were performed using SAS (SAS Institute Inc., 2013) or SPSS (IBM Corp., 2017, 2021). With regard to measures of central tendencies and variation, the statistical mean (M) \pm its standard deviation (SD) is reported. The association of depressiveness and self-management competence in the recruited clinical sample was assessed by performing Pearson correlation analysis. Comparisons of the mean between two groups were tested by applying unpaired Student's t -tests. If more than two groups had to be compared, a one-way analysis of variance (ANOVA) including a Bonferroni-corrected post-hoc test was performed. For testing the difference between T2 and T1, a paired t -test was applied. Linear regression analyses were used to predict the value of a dependent variable based on the value of one or more independent variable(s). With all statistical analyses, an alpha level of 0.05 was the basis for statistical significance.

Results

Patients' Characteristics

Eighty-two patients filled out the SMST at T1. Forty-nine patients filled out the SMST at T2. One of these 49 patients filled out the SMST *only* at T2 (not at T1). Thus, the total sample size amounted to $N = 83$ patients. Since only those patients were included in the statistical analyses for whom all required values were available (SMST and/or BDI-II), subsample sizes for each of the hypotheses tested differed from one another with regard to the number of patients included in the respective subsamples. A sample characterization based on sociodemographic variables can be found in *Table 1*. Data on the patients' comorbidities could be obtained for 82 of the 83 patients of the total sample. Fifty percent of the total sample (i.e., 41 patients) suffered from one or more mental comorbidities. The most frequent mental comorbidities are listed in *Table 2*. Collectively, 48 SMST total scores at T1 and T2 were available (subsample $n_{3,4}$). A graphical representation of the SMST total scores at T1 and T2 is displayed in *Figure 1*. Time-dependent BDI-II total scores (T2 vs. T1) are plotted in *Figure 2*. GAF scores (T1) were available for 58 of the 83 patients. At the time of hospital admission (T1), the mean

GAF score of the sample was $M = 36.8$ [%], $SD = 10.1$ [%].

Table 1: Patients' characteristics at the time of hospital admission (T1)

	N	%N	n ₁	%n ₁	n ₂	%n ₂	n _{3,4}	%n _{3,4}	n _{5,6}	%n _{5,6}
Sample size	83		52		50		48		23	
Sex										
male	40	48.2	24	46.2	23	46.0	21	43.8	10	43.5
female	43	51.8	28	53.9	27	54.0	27	56.3	13	56.5
Age										
mean age (years \pm SD)	40.5 ± 11.9		41.7 ± 11.5		41.4 ± 11.6		43.7 ± 10.7		44.1 ± 10.6	
age range (years)	18 - 65		19 - 59		19 - 59		18 - 65		26 - 56	
Marital status										
single	27	32.5	14	26.9	13	26.0	7	14.6	3	13.0
married	31	37.3	20	38.5	20	40.0	20	41.7	12	52.2
divorced/living apart	23	27.7	17	32.7	16	32.0	19	39.6	8	34.8
widowed	2	2.4	1	1.92	1	2.0	2	4.2	0	0.0
SMST (mean \pm SD) at T1	9.2 \pm 3.3*		9.1 ± 3.3		8.9 ± 3.2		9.0 \pm 3.3		8.5 ± 2.8	
BDI-II (mean \pm SD) at T1	28.6 $\pm 10.2^{**}$		28.4 ± 10.3		29.3 ± 9.5		28.8 $\pm 9.9^{***}$		29.8 ± 9.2	

Note: N = total sample. n_k = subsamples. M = mean. SD = standard deviation. * 82 patients filled out the SMST at T1.

** BDI-II total scores at T1 were available for 53 patients.

*** BDI-II total scores at T1 were available for 34 patients.

Table 2: Most frequent mental comorbidities in the total sample (N = 83)

Mental comorbidity according to ICD-10	n
Disorders of adult personality and behaviour (F60 - F69)	21
Mental and behavioural disorders due to psychoactive substance use (F10 - F19)	19
Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders (F40 - F48)	16
Disturbance of activity and attention (F90.0)	5
Eating disorders (F50)	3

Notes: n = number of patients.

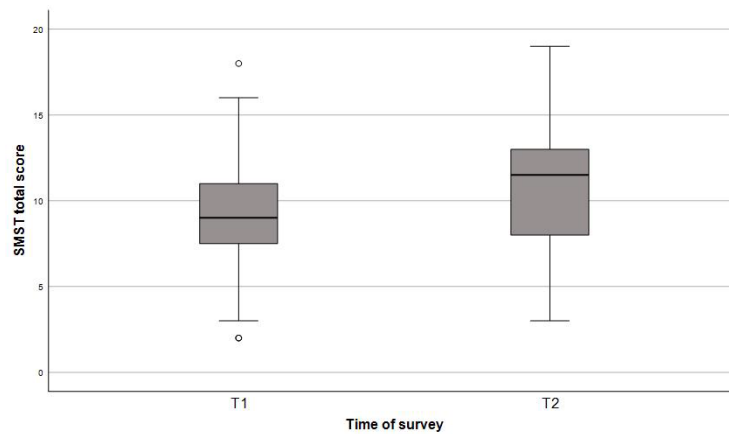


Figure 1: SMST total scores at T1 and at T2, respectively

Note: Subsample size $n_{3,4} = 48$. The boxes show the limits of the first and of the third quartile with the median in their centre (horizontal black line).

The whiskers represent the range of the data with its maximum and its minimum. The empty dots above and below the left box (T1) are outliers

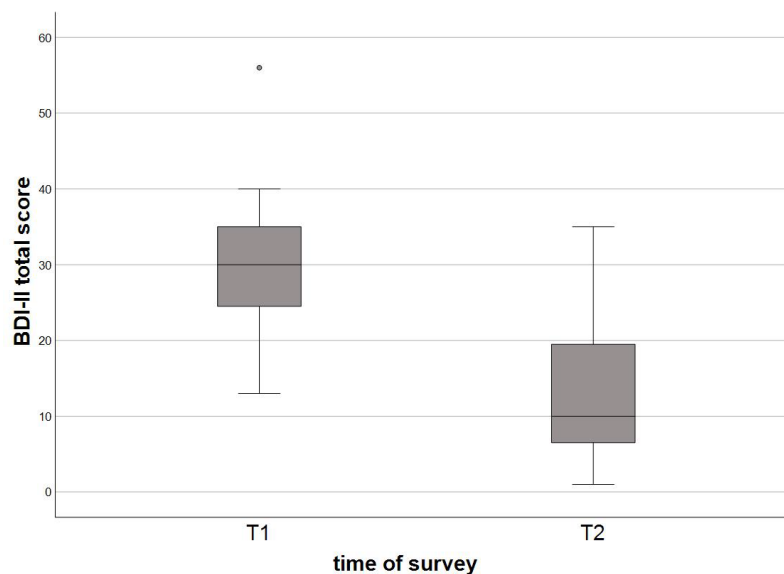


Figure 2: BDI-II total scores at T1 and at T2, respectively

Note: Subsample size $n_{3,4} = 48$. The gray boxes represent the limits of the first and of the third quartile with the median in their centre (horizontal black line). The whiskers show the scattering of the data. The gray dot above the left box (T1) is an outlier.

Hypothesis 1a: Correlation of Self-Management Competence and the Level of Depressiveness at the Time of Hospital Admission (T1)

From a total of $n_1 = 52$ patients, both a SMST total score and a BDI-II total score were available at T1. Beck Depression Inventory II (BDI-II) was used to assess depressiveness. The

Self-Management Self-Test (SMST) was used to assess self-management competence. The association between these two variables was assessed performing Pearson correlation analysis. With the correlation coefficient being $r = .50$ ($p < .001$), the BDI-II total score and the SMST total score showed a statistically significant, strong correlation at T1 [16]. Accordingly, a high level of self-management competence at the time of

hospital admission (T1) was associated with a low level of depressiveness and vice versa. Thus, the hypothesis that the SMST total score (which reflects the individual self-management competence) and the BDI-II total score (which is a measure of depressiveness) correlated with one another at the time of hospital admission could be confirmed.

Hypothesis 1b: Correlation of Solitary Dimensions of Self-Management with Depressiveness at T1

As mentioned above, subsample size for the statistical analysis was $n_1 = 52$. The five items of the SMST reflect the five dimensions of self-management [11]. As with the calculations for Hypothesis 1a, the linear association between the two variables was assessed performing Pearson correlation analysis. Table 3 shows the corresponding correlation matrix. We found that a high degree of depressiveness at the time of hospital admission (T1) was associated with

- (a) a low value for the self-management dimension *awareness*,
- (b) a low value for the self-management dimension *planning*,
- (c) a low value for the self-management dimension *decision-making*,
- (d) a low value for the self-management dimension *action* and vice versa.

The self-management dimension *relationships* did not show a significant correlation with depressiveness at T1 ($p > .05$). Thus, the hypothesis that solitary dimensions of self-management correlated with depressiveness at the time of hospital admission was confirmed for four of the five dimensions of self-management [11].

Table 3: Means, standard deviations and correlations between solitary SMST items, SMST total score and BDI-II total score at the time of hospital admission.

Variable	M	SD	BDI-II total score (T1)	SMST total score (T1)	Awareness (T1)	Relationships (T1)	Planning (T1)	Decision-making (T1)	Action (T1)
1. BDI-II total score (T1)	28.4	10.3	1.0						
2. SMST total score (T1)	9.1	3.3	-.50**	1.0					
3. Awareness (T1)	1.8	0.8	-.30*	.74**	1.0				
4. Relationships (T1)	2.1	0.9	-.27	.77**	.59**	1.0			
5. Planning (T1)	1.7	0.9	-.35*	.75**	.50**	.41**	1.0		
6. Decision-making (T1)	1.7	0.9	-.47**	.76**	.29*	.50**	.47**	1.0	
7. Action (T1)	1.9	0.9	-.51**	.79**	.46**	.46**	.49**	.61**	1.0

Note: Subsample size $n_1 = 52$. M = mean. SD = standard deviation. The respective Pearson correlation coefficients are given in columns four (BDI-II total score at T1) to nine (self-management dimension *action* at T1).

* $p < 0.05$ (two-tailed).

** $p < 0.01$ (two-tailed).

Hypothesis 2: Differences in the Average Level of Self-Management Competence in Dependence on the Level of Depression Severity at T1

We conducted a one-factorial analysis of variance (ANOVA)

in order to assess whether there was a statistically significant difference in the average level of self-management competence was dependent on the level of depression severity at T1. Depression severity levels were categorized according to the BDI-II total score as specified [13].

From a total of $n_1 = 52$ patients, both a SMST total score and a BDI-II total score were available at T1 (see hypotheses 1a and 1b). Two of these 52 patients presented with a BDI-II total score of ≤ 10 points at T1 and could therefore not be assigned to the three degrees of depression severity *mild*, *moderate* or *severe* [19]. After excluding the two patients mentioned above, subsample size for the ANOVA was $n_2 = 50$.

Analysis revealed a statistically significant mean difference between the three groups examined, $F(2, 47) = 3.90, p = .027$. However, a Bonferroni-corrected post-hoc-test showed a statistically significant difference only for the two groups *mild depressive syndrome* ($M = 11.3, SD = 4.0$) and *severe depressive syndrome* ($M = 8.0, SD = 2.9$). The group of patients suffering from a *moderate depressive syndrome* ($M = 9.5, SD = 2.7$) was not significantly different from the two groups mentioned before after the Bonferroni-corrected post-hoc-test.

Thus, the hypothesis that at T1, the three levels of depression severity differed in their average level of self-management competence from one another was confirmed only for the groups suffering from a *mild* depressive syndrome and a *severe* depressive syndrome. The hypothesis could not be confirmed for the group of patients suffering from a *moderate* depressive syndrome.

Hypothesis 3: Increase of the Self-Management Competence of the Patients during their Clinical Treatment

Collectively, 48 SMST total scores at T1 and T2 were available ($n_{3,4}$). We calculated the difference Δ SMST (T2-T1) as a variable measuring the change in self-management competence during clinical treatment. Figure 1 shows the SMST total scores at T1 and T2. At T1, the SMST total score was $M_1 = 9.0, SD_1 = 0.5$. At T2, the SMST total score was $M_2 = 10.9, SD_2 = 0.5$. A paired t-test showed that the increase in self-management competence in the course of the clinical treatment was statistically significant, $t(47) = -3.00, p = .004$.

Hypothesis 4: Dependency of the Change of Self-Management Competence during Clinical Treatment on Sociodemographic Variables

Gender

An unpaired t-test was used to examine whether men and women had improved to different extents in their self-management competence during clinical treatment. The variable *gender* was the independent variable in the analysis. The variable *change in self-management competence during clinical treatment* was the dependent variable. The descriptives are shown in Table 4. The variable *change in self-management competence during clinical treatment* (equalling Δ SMST) showed no statistically significant gender-related difference, $t(46) = -.76, p = .454, n_{3,4} = 48$.

Table 4: Gender difference for Δ SMST (T2-T1) in subsample $n_{3,4}$

	n	Δ SMST (T2-T1)			
		min.	max.	M	SD
female	21	-7	7	1.4	4.5
male	27	-4	17	2.4	4.5

Note: Subsample size $n_{3,4} = 48$. Min. = minimum. Max. = maximum. M = statistical mean. SD = standard deviation. When surveying the patients, they were offered the binary gender categories male and female.

Age

Pearson correlation analysis showed no statistically significant correlation between the variables *age* and *change in self-management competence during clinical treatment*, $r = .03, p = .862, n_{3,4} = 48$. Thus, the hypothesis that the change in self-management competence in the course of clinical treatment was dependent on specific sociodemographic variables was not

confirmed for the variables *gender* or *age*.

Hypothesis 5: Prediction of the Change of Depressiveness during Clinical Treatment by the Extent of Change in Self-Management Competence during Clinical Treatment

The statistical relationship between the predictor (x) *change*

in self-management competence during clinical treatment (Δ SMST (T2-T1)) and the criterion (y) change in depressiveness during clinical treatment (Δ BDI (T2-T1)) was assessed using simple linear regression analysis. From a total of $n_{5,6} = 23$ patients, BDI-II total scores and SMST total scores were available at T1 and T2. Table 5 reports the results of the analysis.

In the subsample examined ($n_{5,6}$), the change in self-management competence during the clinical treatment was a significant predictor for the change in depressiveness during clinical treatment ($b = -1.10, p = .022$). Thus, the hypothesis that an increase in self-management competence would correlate with a decrease in depressiveness during clinical treatment was confirmed.

Table 5: Regression analysis results using change in depressiveness between hospital admission and discharge (T2 vs. T1) as the dependent variable

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.474a	.224	.187	908387

Note: Predictors: (Constant), Δ SMST (T2-T1)

Multiple linear regression: Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t (22)	P	95,0% ConfidenceModel	Interval for B
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-13.545	2.247		-6.029	<.001	-18.217	-8.873
	Δ SMST (T2-T1)	-1.104	.448	-.474	-2.464	.022	-2.036	-.172

Note: Subsample size $n_{5,6} = 23$. ^aDependent Variable: Δ BDI-II (T2-T1)

Hypothesis 6: Prediction of Depressiveness at T2 by the Extent of Change in Self-Management Competence during Clinical Treatment

Multiple linear regression analysis was performed in order to assess the association between the two predictors (x_i) change in self-management competence between T1 and T2 (Δ SMST (T2-T1)) and depressiveness at T1 with the criterion (y) depressiveness at T2. For subsample size and calculation of the difference Δ SMST see hypothesis 5. Table 6 shows the results of the analysis. In summary, the change in self-management competence during clinical treatment was a statistically significant, negative predictor for depressiveness at T2 in the subsample examined ($b = 1.06, p = .008, n_{5,6} = 23$). The higher the change

was in SMST, the lower was the BDI-II at T2. Depressiveness at T1 was a statistically significant, positive predictor for depressiveness at T2 ($b = .40, p = .028, n_{5,6} = 23$). The higher the BDI-II was at T1, the higher was depressiveness at T2. The change in self-management competence played a slightly greater role for predicting depressiveness at T2 than depressiveness at T1. When controlling for the additional variables gender and age, the two predictors (x_i) mentioned above remained statistically significant, whereas the additional variables gender and age showed no statistically significant influence. Thus, the hypothesis that the extent of change in self-management competence during clinical treatment would predict depressiveness at the time of the second survey was confirmed.

Table 6: Regression analysis results using *depressiveness* at T2 (hospital discharge) as the dependent variable

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.637 ^a	.406	.347	7.320
Predictors: (Constant), BDI-II (T1), Δ SMST (T2-T1)				

Note: Predictors: (Constant), BDI-II (T1), Δ SMST (T2-T1)

Multiple linear regression: Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t (22)	p	95,0% ConfidenceModel	Interval for B
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.124	5.346		.771		-7.029	15.276
	Δ SMST (T2-T1)	-1.057	.361	-.504	-2.923	.008	-1.810	-.303
	BDI-II (T1)	.403	.170	.409	2.374	.028	.049	.758

Note: Subsample size $n_{5,6} = 23$. ^aDependent Variable: BDI-II (T2)

Discussion

It is widely known that depressed patients may suffer from functional impairments in various areas of everyday life and in personal abilities and skills [17]. Skills that are known to be affected by depressive disorders and to be impaired in depressed patients include cognitive or executive skills [4, 7, 18, 19]. Cognitive impairments, inhibition of drive, fatigue, exhaustion and feelings of overload can negatively influence the patients' cognitive abilities, planning capabilities, decision-making abilities, as well as the ability to act and interpersonal abilities [20, 21]. Thus, we expected the extent of depressive disorder of the clinical sample to have a negative impact on the five dimensions of self-management, these being *awareness, relationships, planning, decision-making* and *action* [11]. Furthermore, we expected that impairments like the ones described above would be more severe with higher levels of depressiveness.

Our results confirm this assumption (*Hypothesis 1a*) and indicate a correlation between the two variables examined, i.e. patients' individual self-management competence and their lev-

el of depressiveness at the time of hospital admission (T1). Additionally, statistical analyses confirmed that the severity of the depressive disorder of the patients were negatively correlated with four of the five dimensions of self-management (*Hypothesis 1b*), these being *awareness, planning, decision-making* and *action* [11]. These results, underline the results of previous research that found the ability to make decisions to be impaired by the presence of depressive disorders [6].

Thus, our study confirms findings from previous studies in patients with depression [21, 22]. Nevertheless, there was no statistically significant correlation between the SMST item *relationships* and depressiveness at the time of hospital admission. This result does not confirm the observations from previous depression research [23]. This finding may have resulted from the limited sample size. However, the sample size of $N = 83$ was large enough to answer the primary research questions of the study.

The fact that the SMST item *relationships* did not reach statistical significance may have been due to the large proportion of patients whose marital status was *single, divorced/living*

apart or widowed (Table 1). This subgroup of patients may have had no problems arising in their interpersonal relationships shortly before or at the time of hospital admission or they may have played a smaller role than the other four self-management dimensions. Furthermore, the fact that depressive disorders are often accompanied by social withdrawal or social isolation could have culminated in a skewed self-assessment of the patients' interpersonal competence (aggravation or dissimulation of competence) or in a recall bias when retrospectively assessing interpersonal competence.

We also found that the extent of depressiveness or rather the severity of the depressive syndrome seems to be associated with the patients' self-management competence (Hypothesis 2). As previous research shows [11], the ability of patients to make use of their self-management skills is influenced by the current severity of their depressive symptoms, with a higher symptom severity leading to a decrease in self-management skills. The present study allows a similar conclusion. The average self-management competence of the clinical sample differed between groups of patients according to depression severity with a *severe* depressive syndrome leading to a lower level of self-management competence than a *mild* depressive syndrome. In the present study the self-management competence of patients suffering from a *moderate* depressive syndrome did not differ from those suffering from either a *mild* depressive syndrome or a *severe* depressive syndrome (Hypothesis 2).

In the present study, the patients' self-management competence increased in the course of clinical treatment (Hypothesis 3). This result met our previous expectations. Given the fact that in functional neuroimaging, psychotherapeutic interventions have been shown to have regulatory effects on dysregulated cerebral activity patterns in depressed patients [19], we assumed that an increase in the patients' self-management competence would be accompanied by a modification of dysregulated activity in affected cerebral circuits. Not only because of the well-known positive effect that psychopharmacological and psychotherapeutic interventions exert on depressive disorders [19, 24], the increase in self-management competence observed in our study can be considered a direct consequence of clinical treatment.

Fourthly, the increase in self-management competence was found not to depend on age or gender (Hypothesis 4). Previous research in physical disorders has demonstrated age-related

and gender-related differences in self-management competence [5]. However, in mental disorders evidence is limited [3]. An assessment of the effectiveness of cooperative models of care for chronic mental disorders which comprise *patient self-management support* concludes that there are neither age-related nor gender-related differences in clinical effectiveness of these programs [25]. Our findings reflect these results. Future research should investigate this topic further and focus on examining a larger sample in order to provide a solid evidence base for making informed decision on future treatment strategies.

In our sample, the change in self-management competence in the course of the clinical treatment was a significant predictor for the change in depressiveness in the same period of time (Hypothesis 5).

The extent of change in self-management competence predicted depressiveness at T2, i.e. at the time of hospital discharge or shortly thereafter (Hypothesis 6).

The extent of change in self-management competence played a slightly greater role in predicting depressiveness at T2 than the extent of depressiveness at hospital admission (Hypothesis 6). This finding is not only of value for psychotherapists involved in the treatment of depressed patients but also for the patients themselves whose expectation of self-efficacy can be strengthened when being presented with this result of our study.

Previous research has shown (a) that self-management programs and the use of self-management strategies both may positively affect depressed patients and (b) that the severity of depressive symptoms can be mitigated by the successful use of self-management strategies [26, 27]. In the therapy of chronic physical disorders, interventions enhancing self-management competence have been shown to be effective in reducing comorbid depressive symptoms [5, 9].

Self-management skills can be considered a personal resource which can be developed, shaped and actively worked on during psychotherapeutic interventions [3]. Our finding that an increase in self-management competence led to a decrease in depressiveness in our clinical sample (Hypothesis 5) implies that the (psychotherapeutic) interventions to improve self-management competence of depressed patients hold significant potential to further promote the recovery of patients with de-

pressive disorders. In line with previous research [3], our results suggest that self-management competence can be a powerful resource for recovery from mental disorders. Thus, self-management competence as a resource could be an important and effective component in the treatment of depressive disorders.

Limitations

This study has several limitations. These include the limited sample size and the limited geographical area served by the hospitals where we recruited the study participants at. We used the self-report scale BDI-II to assess the depressiveness of the patients. Clinical assessment of the patients according to ICD-10 criteria was provided by the clinician. The second limitation of our study arises from the fact that no additional diagnostic instruments had been used to validate the clinical diagnosis. Future research on this topic should confirm clinical diagnoses with a diagnostic inventory for mental disorders, such as the SCID-5-CV or the SCID-5-PD. Thirdly, the specific clinical interventions received by the patients during their clinical treatment (e. g., pharmacological, psychotherapeutic) were not recorded because the specific type and extent of clinical interventions were not part of the study design. They were not relevant for testing the hypotheses that were investigated. However, all patients received treatment according to current guidelines as well as international standards of care.

One further limitation of this study is the focus on patient reported outcome measures rather than clinician-rated scales or questionnaires to assess depressive symptoms. However, good concordance between both the clinician-rated Montgomery-Åsberg Depression Rating Scale (MADRS) and the Hamilton Depression Rating Scale (HADRS) against the Beck Depression Inventory (BDI-II) as a patient reported outcome measure suggest that all three scales or questionnaires are robust in terms of assessing depressive symptoms in treatment resistant depression [28].

Lastly, we assessed self-management competence by using the Self-Management Self-Test (SMST), which is a relatively new psychometric instrument that has not yet found widespread use in clinical research. However, the SMST has been used in a suicide prevention study [29] and is currently being used in a large online psychotherapy study in patients with depression [30].

Conclusion

The present study investigates the association of depressiveness and self-management competence in a clinical sample of in-patients with depression. Unfortunately, individual self-management competence has played a minor role in clinical research and in the therapy of depressive disorders. Our findings offer clinical evidence that in depressed in-patients, self-management competence and depressiveness are associated constructs. The results of this study indicate that self-management competence and depressiveness are closely associated constructs in patients with depression. Our findings suggest that self-management competence is an important resource in the treatment of depressive disorders. The Self-Management Self-Test (SMST) is an effective psychometric instrument for assessing self-management competence in patients with depression. The SMST can also be used to assess the global level of psychological, social and occupational functioning [14]. Interventions to enhance self-management competence are an important part of treatment and are likely to improve patient-reported outcome (PRO) in patients with depression.

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