

## Functioning and depression in patients under cognitive-behavioral psychotherapy

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In the present study we analyzed 30 patients (20 females and 10 males) diagnosed with a severe depressive disorder, mean age  $37.6 \pm 9.3$  years, who were under cognitive-behavioral psychotherapy. The patients were divided into three groups: one group was submitted to group therapy only (group I), the other one to individual therapy (group II), while the third group was submitted to combined individual and group psychotherapy (group III). We applied the Beck Depression Inventory (BDI) scale and Global Assessment of Functioning (GAF) scale at the beginning of treatment and at its end (namely, after 12 months), and again six months later following the one-year period of treatment. At the beginning of treatment the median values of the whole group were noted as follows: BDI 42, and GAF 50.5. After one year of psychotherapy the median values of improvement were registered as follows: in respect of BDI it was recorded as 38, while for GAF it was recorded as 22. GAF score correlated very significantly with BDI (-0.52). Six months after the last individual and group sessions were held all parameters were significantly worsened. At this stage there was a moderate correlation of GAF with BDI (-0.47). Through all the stages BDI value in group I showed a significant correlation with GAF: -0.65 before the introduction of therapy, -0.48 after psychotherapy, and -0.48 after a six-month period without therapy. Similar values were observed in group II: -0.58 before therapy, -0.36 after therapy, and -0.85 six months later, while in group III the following values were observed: -0.58 before therapy, -0.36 after therapy and -0.47 six months later. Conclusion: GAF is most strongly correlated with BDI in all stages, both in the stage of improvement or aggravation of illness and it may be applied as a useful screening test in further psychotherapeutic strategy. The combined individual and group psychotherapy increases the overall functioning rate regardless of a significantly lesser improvement of depression in comparison with the isolated group psychotherapy.

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## Introduction

The Global Assessment of Functioning (GAF) scale is a standard method applied in clinical assessment of the overall level of functioning of a patient, and it includes information about the axis V DSM IV (1). As such, it is widely used as a scale to assess the level of disorder in patients with psychological and psychiatric symptoms, respectively (2). It enables hospital clinicians to examine the patient's immediate functioning, but also the highest level of psychological, social and occupational functioning over a few months in the previous year, and this, in turn, greatly influences the prognostication of therapy outcome (3, 4).

GAF scores are relatively independent of socio-demographic factors (5, 6, 7, 8) so that the level of functioning assessed by the hospital clinicians does not depend on a patient's age, sex or marital status, for that matter. Several studies have proved that there is a connection between the severity of symptoms as stated by the patient and the global assessment of functioning score obtained by the hospital staff (6).

We would like to point out the fact that previous studies were largely based on the conformity of the patient's symptoms with axis V in respect of the level of overall disorder (10, 11, 12, 13, 14), and the latter includes scant information about the patient's social or occupational functioning which is independent of the assessment of the severity of the patient's symptoms by the hospital clinicians (15). Since patients usually return to the previous level of functioning after an episode of acute illness, scoring of the patient's highest level of functioning during the past year has a certain prognostic value.

However, it is surprising that there is relatively little empirical evidence about the appropriateness of GAF in this respect, and as a result, there is no confirmation regarding the validity of the prevalent use of GAF

as a standard part of diagnostic procedures applied by experienced psychiatrist in hospital conditions.

In addition, there is still an outstanding question related to the kind of parameters the level of functioning correlates most strongly with, under various forms of psychotherapy treatment, and in different stages of psychotherapy.

## Aims objectives

The present study was conducted to determine

- the severity of depression and the level of functioning at the beginning of cognitive-behavioral psychotherapy, a year after psychotherapy, and 6 months following the last psychotherapy session;
- the level of improvement and aggravation of the above-mentioned parameters;
- the correlation of the level of functioning with the level of depression both in the stages of improvement and aggravation.

## Patients and methods

The present study included 30 patients (20 females and 10 males) who were diagnosed with a severe depressive disorder. The study was conducted over the course of 18 months. The mean age of examinees was  $37.6 \pm 9.3$  (19-55) years. These patients were placed in three groups (each group consisted of 10 patients). One group was treated with group therapy, the other with individual therapy, while the third group was treated with a combination of group and individual psychotherapy. Cognitive-behavioral therapy (CBT) was used in the treatment of patients and it was organized in the form of group and individual sessions. The observation period lasted from June, 2004 until December, 2005. Individual sessions were performed once weekly, and the total number of sessions was 12-16. After that, we performed one ses-

sion monthly. After 5-12 individual sessions patients were included in group therapy. Groups were of the “open type” and lasted 12 months. Group therapy sessions lasted one hour, and were performed three times weekly at the beginning for one month, after that once weekly over the next two months, and after that once monthly. Each of the two groups consisted of 10 members. Selection of patients for individual or group treatment was random. We measured and compared Beck Depression Inventory (BDI) scores with Global Scale of Functioning (GAF) scores obtained at the beginning of the treatment, one year later, and 6 months after the last psychotherapy session. The correlation of BDI with GAF was also observed in the same intervals. First the parameters were set out for the whole group, but later the patients treated with cognitive-behavioral therapy were analyzed and compared independently. In the statistical analysis we used the Mann-Whitney U test, Wilcoxon test, and Spearman coefficient of correlation.

## Results

### *Comparison of the level of depression with the level of functioning in patients treated with cognitive-behavioral psychotherapy*

Scores of depression and functioning before the beginning of psychotherapy, 12 months after psychotherapy treatment, and 6 months without psychotherapy are shown in Table 1. After a 6-month period without psychotherapy values measured by Wilcoxon test were significantly aggravated: for BDI  $p = 0.002$ , and for GAF  $p = 0.002$ . Correlation rates of all parameters with the scale of global functioning before psychotherapy, after 12 months of psychotherapy and in 6-months follow-up period are shown in Table 2.

BDI and GAF parameters before the beginning of group psychotherapy, 12 months after psychotherapy, and 6 months after the last session are shown in Table 3. Six months

Table 1 The values of Beck Depression Inventory (BDI), and Global Assessment of Functioning (GAF) before and after psychotherapy and 6 months after the last psychotherapy session.

Before psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	52.5	48.5-57.75	29	62
GAF	51.5	42-58	35	60
After 12 months of psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	5.5	5-8.5	3	10
GAF	70	61-79.75	60	81
The improvement				
	Median	Percentile 25-75	Min.	Max.
BDI	48.5	39.25-51.75	24	54
GAF	21	20-24.25	6	34
After 6 months without psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	12.5	9.25-14.5	8	17
GAF	62.5	58.5-72.75	55	75
The aggravation				
	Median	Percentile 25-75	Min.	Max.
BDI	5	3-7	2	12
GAF	-5.5	(-6.75)-(-3.5)	-1	-8

Table 2 Correlation of Global Assessment of Functioning (GAF) with Beck Depression Inventory (BDI) before and after psychotherapy and 6 months after the last psychotherapy session.

Before psychotherapy	
Relation	$r (p=0.001)$
BDI/GAF	-0.58
After 12 months of psychotherapy	
Relation	$r (p=0.003)$
BDI/GAF	-0.52
After 6 months without psychotherapy	
Relation	$r (p=0.005)$
BDI/GAF	-0.50

Comparison of the level of depression with the level of functioning in patients treated with group cognitive-behavioral psychotherapy

after psychotherapy there was an aggravation of BDI ( $p=0,002$ ); the level of functioning measured by GAF was also significantly changed ( $p=0,002$ ). Table 4 shows the correlation rates of GAF with BDI before and after group psychotherapy, and 6 months after the last group psychotherapy session.

Scores of depression and functioning before the beginning of individual psychotherapy, 12 months following psychotherapy treatment, and after 6 months without psychotherapy are shown in Table 5. Six months after individual psychotherapy there was an aggravation of depression measured by BDI ( $p=0.002$ ); the level of functioning measured by GAF was also significantly changed ( $p=0.002$ ). Table 6 shows the correlation rates of GAF with BDI before and after individual psychotherapy and 6 months after the last psychotherapy session.

Scores of depression and functioning before the beginning of combined psychotherapy treatment, 12 months later following psychotherapy treatment, and after 6 months without combined psychotherapy are shown in Table 7. After a 6-month period without combined psychotherapy parameters were significantly aggravated, ( $p=0.002$  for BDI, and  $p=0.002$  for GAF). Table 8 shows the correlation rates of GAF with BDI before and after combined psychotherapy and 6 months after the last psychotherapy session. The relation of importance of improvement of BDI and GAF values after 12 months in patients treated with individual, group, and combined individual and group psychotherapy in contrast to aggravation of the above-mentioned values after 6 months without therapy are shown in Table 9.

Table 3 The values of Beck Depression Inventory (BDI), and Global Assessment of Functioning (GAF) before and after group psychotherapy and 6 months after the last group psychotherapy session.

Before group psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	52.5	48.5-57.75	29	62
GAF	51.5	42-58	35	60
12 Months after group psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	5.5	5-8.5	3	10
GAF	70	61-79.75	60	81
The improvement				
	Median	Percentile 25-75	Min.	Max.
BDI	48.5	39.25-51.75	24	54
GAF	21	20-24.25	6	34
After 6 months without group psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	12.5	9.25-14.5	8	17
GAF	62.5	58.5-72.75	55	75
The aggravation				
	Median	Percentile 25-75	Min.	Max.
BDI	5	3-7	2	12
GAF	-5.5	(-6.75)-(-3.5)	-1	-8

Table 4 The correlation of Global Assessment of Functioning (GAF) with Beck Depression Inventory (BDI) before and after group psychotherapy and 6 months after the last group psychotherapy session.

Before group psychotherapy	
Relation	$r(p=0.049)$
BDI/GAF	-0.65
After 12 months of group psychotherapy	
Relation	$r(p=0.166)$
BDI/GAF	-0.48
After 6 months without group psychotherapy	
Relation	$r(p=0.154)$
BDI/GAF	-0.48

Comparison of the level of depression with the level of functioning in patients treated with individual cognitive-behavioral psychotherapy

Table 5 The values of Beck Depression Inventory (BDI), and Global Assessment of Functioning (GAF) before and after individual psychotherapy and 6 months after the last session of individual psychotherapy.

Before individual psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	36.5	30-56.25	17	60
GAF	51	41-56.5	35	60
12 Months after individual psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	4	2-6.5	1	10
GAF	72	62.5-80	60	81
The improvement				
	Median	Percentile 25-75	Min.	Max.
BDI	33	27.25-48.25	16	56
GAF	22.5	17.75-27.25	3	41
After 6 months without individual psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	8	5.5-10	5	14
GAF	59.5	55.75-72.5	53	79
The aggravation				
	Median	Percentile 25-75	Min.	Max.
BDI	3.5	3-5	2	7
GAF	-5.5	(-10.55)-(-2.75)	-2	-25

Table 6 The correlation of Global Assessment of Functioning (GAF) with Beck Depression Inventory (BDI) before and after individual psychotherapy and 6 months after the last session of individual psychotherapy.

Before individual psychotherapy	
Relation	r (p=0.0878)
BDI/GAF	-0.58
12 Months after individual psychotherapy	
Relation	r (p=0.296)
BDI/GAF	-0.36
After 6 months without individual psychotherapy	
Relation	r (p=0.178)
BDI/GAF	-0.848

Comparison of the level of depression with the level of functioning in patients treated with combined individual cognitive-behavioral psychotherapy and group cognitive-behavioral psychotherapy

Table 7 The values of Beck Depression Inventory (BDI), and Global Assessment of Functioning (GAF) before and after the psychotherapy and 6 months after the last session of combined individual and group psychotherapy.

Before individual and group psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	35	28.25-39.5	18	61
GAF	50.5	46.25-57.25	36	60
12 Months after individual and group psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	2	2-3	0	4
GAF	80	79.25-81.5	71	85
The improvement				
	Median	Percentile 25-75	Min.	Max.
BDI	33	25.25-37.5	18	57
GAF	30	20-34	19	43
After 6 months without individual and group psychotherapy				
	Median	Percentile 25-75	Min.	Max.
BDI	7	5.25-9.5	4	10
GAF	70	69-74	68	77
The aggravation				
	Median	Percentile 25-75	Min.	Max.
BDI	5	3.25-6.75	2	8
GAF	-9.5	(-11.5)- (-5)	4	-14

Table 8 The correlation between Global Assessment of Functioning (GAF) and Beck Depression Inventory (BDI), before and after the psychotherapy and 6 months after the last session of combined group and individual psychotherapy.

Before individual and group psychotherapy	
Relation	r (p=0.08)
BDI/GAF	-0.58
12 Months after individual and group psychotherapy	
Relation	r (p=0.295)
BDI/GAF	-0.36
After 6 months without individual and group psychotherapy	
Relation	r (p=0.178)
BDI/GAF	-0.47

Table 9 The significance of improvement of Beck Depression Inventory (BDI) and Global Assessment of Functioning (GAF) values measured by t-test after 12 months in patients treated with individual, group, and combined individual and group psychotherapy, and the aggravation of the BDI and GAF values after 6 months follow-up period

After 12 months of psychotherapy	
Group/individual psychotherapy	P
BDI	0.196
GAF	0.722
Group/individual and group	P
BDI	0.011
GAF	0.143
Individual/individual and group	p
BDI	0.781
GAF	0.268
After 6 months without psychotherapy	
Group/individual psychotherapy	p
BDI	0.268
GAF	0.614
Group/individual and group	p
BDI	0.807
GAF	0.128
Individual/individual and group	p
BDI	0.298
GAF	0.517

## Discussion

Before the beginning of psychotherapy relatively high scores of depression were registered in all patients, whereas the improvement of all parameters was evident after 12 months of psychotherapy. After a 6-month period without psychotherapy BDI and GAF values were significantly aggravated. Prior to psychotherapy there was a significant negative correlation of all parameters with the scale of global functioning. After 12 months of psychotherapy a connection between depression and functioning was also registered. A similar observation was registered 6 months following the last psychotherapy

session and this is where the only substantive connection with depression exists.

In the group of patients treated with group cognitive-behavioral psychotherapy it is evident that after 12 months of psychotherapy all parameters were significantly improved. Six months after the last psychotherapy session there was an aggravation of depression. The level of global functioning was also significantly changed. Before psychotherapy there was an important negative correlation between GAF and BDI values. After 12 months of improvement of all parameters a correlation between GAF and BDI is evident.

Changes of the BDI and GAF parameters before the first psychotherapy session, a year after therapy, and 6 months after the last session of individual psychotherapy are shown in Table 5. It is interesting to note that 6 months after the last psychotherapy session there was a significant aggravation of GAF.

At the beginning of individual psychotherapy a strong correlation between GAF and BDI was noticed. After 12 months of individual psychotherapy a very slight correlation of GAF with BDI was evident. After 6 months without individual psychotherapy there was a very significant negative correlation between GAF and BDI.

Before the beginning of combined individual and group psychotherapy there was a negative correlation between GAF and BDI. After a 12 month follow-up period there was still a slight negative correlation of GAF with BDI. A very important connection between GAF and BDI existed after the 6 month follow-up period without individual and group treatment of psychotherapy.

There was no significant difference in the improvement of parameters between patients treated with group or individual psychotherapy only, individual and individual and group psychotherapy, but there was a difference in the BDI between patients treated with individual therapy only and combined

individual and group psychotherapy. After 6 months there was no significant change of parameters in patients treated only with group, individual or with combined group and individual psychotherapy.

The data from literature indicate that low GAF scores are connected with depression, suicidal behavior and lack of confidence (10, 12, 13, 14), but also with cognitive disorders (16). It was discovered that the symptoms of cognitive deterioration, hallucination, delusion, suspicion along with an untidy physical appearance in a patient are connected with a more severe psychiatric disturbance (11).

The correlation of GAF scores and the list of social functioning were established, such as a limitation of social communication and a need for support (17, 4, 18), but also the incapability of completing work at a workplace (6). Roy-Byrne and associates (1996) established that GAF is actually focused on social and occupational functioning, but not on clinical symptoms (6).

Numerous studies have proved that the leveling of global functioning done by experienced hospital staff is actually a parameter of convalescence during the treatment and after it (19, 20, 21, 22, 23, 24, 25, 26). However, some research has been conducted into GAF scores during and after the treatment of persons with severe mental illness, observing that higher GAF scores were a moderate predictor of better work output, but also a greater likelihood of longer stay at work, which produces the possibility of higher profit (13; 27). The findings in our study show that after a year of treatment all the analyzed parameters were improved. However, it has been proved that there is a connection between the aggravation of GAF during treatment of schizophrenic patients (28).

The question arises why the correlation changes independently of the level expected with the changes of level of depression? The different correlation of functioning with these parameters after convalescence or ag-

gravation can be explained by the observation made by Gordon et al (1988) reporting that symptoms tend to change more quickly during the treatment than functioning alone (29). In this research we found evidence of increase of functioning even with (lower levels of) disproportional depression.

## Conclusion

The values of Global Assessment of Functioning (GAF) correlate with Beck Depression Inventory (BDI) values in all stages of observation throughout cognitive-behavioral psychotherapy, and they can serve as a useful screening test of either aggravation or improvement of illness. A combination of individual and group psychotherapy in relation to group psychotherapy alone increases functioning, even with a significant, low level of improvement of depression. Considering the very small sample of patients, especially the subgroups, the conclusions must be accepted with caution.

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