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Does the systematic use of stimulus reduction shorten hospitalization in acute mania? A pilot study

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Abstract

Objective: Bipolar disorder (BD) is a serious mental disorder causing not only suffering and disability, but also substantial economic burden. Costs of hospitalization represent the largest share of direct illness cost. Several clinical guidelines recommend stimulus reduction (SR) during the treatment of patients hospitalized for mania. To date, however, no clinical trials have investigated the efficacy of SR in mania. In this pilot study, we examined the effect of training inpatient staff to use systematic SR on length of stay (LOS) of our patients.

Method: This was a controlled intervention study of adult patients hospitalized due to an acute manic episode (ICD-10 criteria). Treatment as usual (TAU) (N=37) was compared with treatment after systematic training of staff in SR (N=34). LOS was the primary outcome. Young Mania Rating Scale (YMRS), Montgomery-Åsberg Depression Rating Scale (MADRS) and Clinical Global Impression (CGI) at admission and discharge were also measured.

Results: During hospitalization the YMRS, MADRS and CGI improved significantly in both groups, indicating symptom remission during treatment. The LOS in the TAU was 26.9 days (SD 12.2) and in the SR 28.4 days (SD 11.7). No significant differences emerged in LOS or in clinical outcome measures between the groups.

Conclusions: To our knowledge, this is the first study evaluating the use of SR during hospitalization for acute manic episode. Systematic training of staff in SR did not shorten LOS. Effectiveness of SR during hospitalization remains unclear, and further studies are needed to clarify the role of SR in treatment guidelines.

Bipolar disorder (BD) is a serious and long-lasting mood disorder causing considerable suffering and disability (1). Hospital admission is generally required in both acute manic episode and severe depressive episode with suicidal ideation or plans (2). Although BD patients spend a longer time in depression than in mania during the course of their illness (3,4), from an economic standpoint mania appears to be the primary cost driver in BD hospitalizations (2). Therefore, any intervention in manic patients that could reduce the need for hospitalization, or shorten the length of stay (LOS) during inpatient treatment, would have a major effect on diminishing the suffering of patients and costs of hospitalization (5).

When treating mania or hypomania, several treatment guidelines recommend a calm environment and stimulus reduction (SR) (6,7,8). SR includes, for instance, increasing the amount of sleep and limiting activity. To date, however, no studies have investigated the effectiveness of SR in patients hospitalized due to acute manic episode.

The aim of our pilot study was to perform a controlled intervention trial to investigate the effect of training staff in the use of systematic SR (SSR group) in treating hospitalized patients with an acute manic episode, and to compare this with treatment as usual (TAU group) during acute manic episode. We hypothesized that the use of SR in treatment would shorten LOS in the inpatient ward.

Patients and methods

The study was conducted in Aurora Hospital (Helsinki, Finland), which provides secondary psychiatric inpatient care services to all residents of Helsinki (612 664 inhabitants in 2014). This controlled intervention study was carried out in two time periods: August 2013-August 2014 and November 2015-August 2016. Participants comprised patients hospitalized and diagnosed with an acute manic episode (ICD-10). The primary outcome was length of hospitalization.

Study design

The study was conducted over two time periods during which different patients suffering from acute manic episode were evaluated. First, data from a cohort of patients hospitalized due to an acute episode of mania and receiving TAU was collected from between 27 August 2013 and 27 August 2014. Altogether, 37 patients agreed to participate, 6 patients refused and 19 patients had inadequate data and were excluded. This group (TAU) received standard inpatient treatment consisting of acute-phase pharmacotherapy based on published guidelines, regular assessment by a multidisciplinary team and some elements of SR, although SR was not systematically used.

After data from the first cohort had been collected, one-day training was provided to the staff of the inpatient ward. The training was in the systematic use of SR for the treatment of hospitalized patients suffering from acute manic episode. In addition, a checklist (Appendix) covering the basic elements of the SR treatment was provided. After the training, data from the second cohort was collected of patients hospitalized due to acute episode of mania (SSR-group) between 26 November 2015 and 31 August 2016. During their hospitalization, the SSR group received standard treatment (e.g. use of acute-phase pharmacotherapy) and as an adjunctive treatment, systematic SR. During the daily and weekly ward rounds the use of systematic SR was supervised by the head nurse and chief assistant doctor. Altogether, 34 patients hospitalized due to acute manic episode agreed to participate in the study with systematic SR, 6 patients declined to participate and 9 patients had incomplete data.

At the start of the study in August 2013, there were three wards with 36 beds for patients suffering from affective disorder, but during the study one inpatient ward was closed. The second part of the study comprised two inpatient wards for patients with affective disorder with 24 beds.

All patients provided written informed consent before participation. The study protocol was in accordance with the Helsinki Declaration and was approved by the Ethics Committee of the Helsinki and Uusimaa Hospital District. A research permit was granted by the City of Helsinki, Social Services and Health Care.

Stimulus reduction in acute manic episode

The psychoeducation manual for BD presents guidelines for the treatment of hypomanic/manic decompensation (7). The authors recommend, for instance, increasing the number of sleeping hours to at least 10. They also recommend limiting daily activities and spending a maximum of 6 hours being active. Physical exercise must be minimized and stimuli reduced: exposure to highly stimulating environments as well as stimulating beverages should be avoided and a relaxing environment (quiet, minimal lighting, few people) provided. The authors also recommend removal of, or restricted access to, credit cards to avoid (over)spending.

Based on these psychoeducation guidelines, the inpatient ward staff were trained in the systematic use of SR by the authors. In addition, a checklist covering the basic elements of the SR treatment was used to ensure adherence.

The systematic SR consisted of ensuring that patients 1) had adequate sleep (8-10 hours) and 2) received acute-phase pharmacotherapy according to evidence-based guidelines. In SR, daily activities and stimuli should be kept to a minimum. We therefore 3) limited the number of visitors (maximum one visitor per day) and 4) restricted night-time use of a phone/computer, and during the day minimal use was recommended (e.g. 15 minutes twice a day). The SR also included 5) restricted use of other stimuli (e.g. pens, papers and books). 6) The possibility of spending brief periods (starting from 15-30 minutes per day) outdoors was carefully evaluated (if it calmed or stimulated the person), and was kept to a minimum in the acute phase. 7) Group activities were not allowed. 8) During hospitalization access to credit cards was denied. 9) A clear agreement between the patient and the inpatient ward staff was reached to ensure the treatment followed the systematic SR routine according to the check-list. 10) The use of SR was supervised daily by the head nurse and weekly during ward rounds by the head nurse and the assistant chief doctor.

Patients and assessments

The inclusion criterion was hospitalization due to acute manic episode. The clinical diagnosis was assigned by a resident or a consultant specialist based on assessment according to the ICD-10 (F30, F31 and F25). Psychometric evaluations were conducted within the first days following hospital admission and included the following scales to assess the intensity of mania and coexisting depression symptoms: Young Mania

Rating Scale (YMRS) (9), Montgomery-Åsberg Depression Rating Scale (MADRS) (10) and Clinical Global Impression (CGI) (11). The assessments of YMRS, MADRS and CGI were conducted weekly and at discharge by trained psychiatric nurses. LOS collected from medical records served as the primary endpoint. Sociodemographic and illness history data were collected from patients with a self-report questionnaire.

Statistical analysis

Data were analysed using the statistical software SPSS for Windows version 21.0 (SPSS Inc., Chicago, IL, USA). The significance of differences between the TAU group and the SSR group was analysed with the two-tailed independent samples t-test for continuous variables, and Chi-square or Fisher's exact test for categorical variables. The LOS data were normally distributed. Two-tailed P-values <0.05 were considered statistically significant. We were unable to conduct power calculations to estimate sample size because, in the absence of previous studies, it was not known how much the use of systematic SR would potentially shorten inpatient stay.

Results

We analysed and compared two groups hospitalized for acute manic episode during two time periods: the first group receiving treatment as usual (TAU) during the first time period and the second group using systematic SR (SSR) after educational training was provided to staff during the second time period. The demographic and clinical data of both groups are presented in Table 1. During the inpatient stay the YMRS, MADRS and CGI scores of both groups improved significantly, indicating that the symptoms of mania were in remission. Contrary to our hypothesis, training in the systematic use of SR failed to shorten LOS. The average LOS in the TAU group was 26.9 (12.2) days and in the SSR group 28.4 (11.7) days. No significant differences in LOS or clinical outcome scores between these two groups were detected (Table 1).

Table 1. Demographic and clinical characteristics of the sample.
Values are means (standard deviations) or percentages (YMRS=Young Mania Rating Scale, MADRS=Montgomery-Åsberg Depression Rating Scale, NS=non-significant)

Variable	Treatment as usual (N=37)	Systematic stimulus reduction (N=34)	Significance between groups
Age, years (SD)	43 (13.8)	39 (14.8)	NS
Male gender, N (%)	15 (40.5)	16 (48.5)	NS
Female gender, N (%)	22 (59.5)	17 (51.5)	NS
Living alone, N (%)	15 (44.1)	17 (53.1)	NS
Primary/secondary education only, N (%)	9 (25.7)	8 (25.0)	NS
Bipolar disorder (F31), N (%)	24 (62)	28 (84.8)	NS
First mania (F30), N (%)	10 (27)	2 (6)	NS
Schizoaffective disorder (F25), N (%)	3 (8.1)	3 (9.1)	NS
Previous hospitalizations, N (%)	5.8 (9.0)	8.3 (19.6)	NS
Audit score (SD)	9.8 (8.2)	6.89 (7.81)	NS
Preceding suicide attempts, N (%)	21 (61.8)	19 (59.4)	NS
YMRS score baseline (SD)	21.8 (9.2)	23.1 (7.4)	NS
YMRS score final (SD)	2.8 (3.9)	2.8 (3.2)	NS
MADRS score baseline (SD)	9.6 (6.49)	8.0 (6.1)	NS
MADRS score final (SD)	4.0 (3.6)	3.0 (3.1)	NS
CGI baseline (SD)	5.57 (1.0)	5.3 (0.95)	NS
CGI final (SD)	2.0 (1.0)	1.89 (0.93)	NS
Length of stay (SD)	26.9 (12.2)	28.4 (11.7)	NS

Discussion

To our knowledge, this is the first study to evaluate the effect of SR during inpatient stay of patients suffering from acute manic episode. We compared length of stay (LOS) of manic patients between two time periods. Contrary to our expectations, the systematic training of staff in SR did not shorten LOS compared with treatment as usual (TAU).

Bipolar disorder is associated with a significant psychological burden not only to service users, but also to families and carers (12,13). To maximize the health benefit for people with BD, efficient use of available healthcare resources is required. Bipolar disorder is a disabling illness due to its early onset, chronicity and severity. It is important that resources be directed towards improving the coverage of evidence-based interventions (14), and this underlines the importance of identifying the most efficient treatments.

Research into chronotherapeutics has yielded promising results. Intriguing initial studies have shown that long dark nights (6 p.m. to 8 a.m.) can stop rapid cycling (15,16) or diminish manic symptoms (17). The discovery of the blue light-sensitive retinal photoreceptor responsible for signalling daytime to the brain suggests that light to the circadian system could be inhibited by using blue-blocking orange-tinted glasses. Blue-blocking (BB) glasses have shown promising results in the treatment of manic episode in one case study (18). The effectiveness of BB glasses in hospitalized patients with bipolar mania was examined in one randomized placebo-controlled trial (RCT). The results imply that BB glasses may be effective and feasible as add-on treatment for bipolar mania (19).

The evidence for efficacy of any non-pharmacological intervention in the treatment of acute mania is scarce. In a study by Dennehy and colleagues (20), the use of acupuncture was investigated in the treatment of hypomania. Almost half of the patients dropped out from the treatment group and the six persons who completed the study showed similar results to the control group. The effect of transcranial magnetic stimulation in mania also failed to show any beneficial effect (21). Psychosocial therapies alone are generally not useful treatments for acute mania (22). Frank and colleagues investigated the use of interpersonal and social rhythm therapy (IPSRT) in combination with pharmacotherapy, and compared this group with clinical management plus pharmacotherapy (22). The IPSRT was not associated with a faster time to recovery from manic episode in this study (23). However, it has been suggested that regularity of social rhythms may have some benefits because of their relation to circadian rhythms (24), but no studies confirm this.

The length of hospital stay in our study was fully in accordance with previous reports. In a study conducted in Spain, the mean LOS in bipolar manic episode was 22.9 (SD 15.5) days (25). In a Swedish study, the average LOS in bipolar disorder was 29.9 days and in mania 29.2 days (2). In our study, the average LOS in TAU was 26.9 (12.2) days and in SSR 28.4 (11.7) days. Manic episodes represented almost half the numbers of bipolar disorder admissions in Sweden (2). When investigating the factors contributing to LOS, mixed episodes (2), poor insight and existence of psychotic features (25) were associated with longer LOS in BD. In acute mania, prior hospitalizations and depressive symptoms at the beginning of the treatment of the acute manic episode increased LOS (26).

Psychoeducational guidelines recommend the use of SR in treating acute manic episode. We hypothesized that the systematic use of SR would shorten the inpatient stay. Surprisingly, the training of staff in the systematic use of SR failed to shorten LOS. However, the effects of systematic use of SR were not necessarily seen due to the small sample size, also consisting of patients with schizoaffective disorder, and the extremely disabling acute episode. In addition, an important issue to be considered is that the treatment of the TAU and SSR groups might not have been sufficiently different, since some elements of SR were also used in TAU. Moreover, on average the patients had had many previous hospitalizations, leading most likely to longer hospitalizations. In the TAU group, there were many first manias, suggesting shorter hospitalizations (26). However, the difference did not reach statistical significance. One issue to be considered is that possibly the elements of SRR should have focused on stabilizing the circadian rhythm and diminishing the most important stimuli (light) during the period from 6 p.m. to 8 a.m. There is an urgent need for (adjunctive) investigation of all psychosocial elements (e.g. SR, BB glasses) that might lessen the burden of inpatient stay in acute manic episode.

This study has several limitations that warrant discussion. First, the number of patients was limited. In the absence of previous studies, power analyses were difficult to conduct. Post hoc power analyses indicate that the study was adequately powered only for large, over eight-day differences in LOS. However, given no observed differences in estimates, the finding is clearly negative. Second, the patients had been diagnosed clinically and not with a standardized clinical interview. Although all of the patients had an acute manic episode, they suffered not exclusively from BD but also possibly from schizoaffective disorder, and because of the small sample size, we were unable to investigate the LOS in BD and schizoaffective disorder separately. Third, the duration of sleep or motor activity was not measured with actigraphy. In addition, during this study one ward was closed, possibly leading to more patients suffering from acute mania in one ward at the same time during the second time period (SSR group), which may have somewhat influenced our findings. Restricting stimuli in these conditions was difficult. Finally, we were unable to estimate the reduction in LOS after the systematic use of SR, and thus, only post hoc power calculations could be conducted.

The main strength of our study is that, to our knowledge, it is the first study to investigate the systematic use of stimuli reduction in hospitalized patients with acute manic episode. The study is also representative of usual treatment. The patients

were suffering from an acute severe episode of mania, hospitalized and treated at the ordinary secondary-level psychiatric inpatient setting and the symptoms of acute mania were systematically measured with YMRS.

Conclusions

In this pilot study, we found no evidence that the training of inpatient ward staff in using SR would have shortened LOS in acute mania patients. Given the current treatment guidelines, there is an urgent need for studies investigating the overall efficacy and possible mediating essential components, if any, of SR in inpatient treatment of acute manic episodes of BD patients.

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Conflict of interest

The authors have no commercial associations that might pose a conflict of interest in connection with this manuscript.

Appendix

Checklist for the reduced stimuli treatment

- the treatment lines are defined by the multidisciplinary team
- the decisions are made at the treatment meetings with the patient
- before the meetings, the multidisciplinary team discusses shortly about the treatment lines
- the treatment lines and decisions are in writing
- the restrictions are made with respect to the patient
- it is vital to ensure enough sleep
- the staff of the ward reacts fast if something unexpected happens
- it is useful that the patient with a manic episode has short discussions with two nurses.
- the patient knows in advance, when is the next discussion.
- the decisions of the multidisciplinary team are respected: the ward staff should have clear unanimous treatment lines
- one should not be provoked

Remember to make an agreement:

- medication - the medication must be used accordingly
- the phone - a clear agreement made: mostly not in use of the patient: clear restriction if needed
- the computer - a clear agreement made: mostly not in use of the patient: clear restriction if needed
- visitors - a clear agreement made: mostly 1 visitor per day
- outings - in the beginning indoor treatment is recommended or short outings with a staff member
- money - make sure the patient is not able to freely use his/her bank account in the ward
- the stimuli can be added gradually
- sometimes it is useful to address all the patients with an acute manic episode on the ward to discuss about the general rules of the ward

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