A study of cofactors implicated in response to electroconvulsive therapy in patients with psychotic disorders

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Background
Electroconvulsive therapy (ECT) is an effective treatment for psychotic disorders with relatively few side effects and rapid onset of action. Factors that may predict patients' responses to ECT need to be explored.

Objective
The aim of the study was to investigate the responses of an inpatient group of psychotic (schizophrenia and schizoaffective disorder) patients to ECT administration and the factors favoring better response.

Participants and methods
Eighty patients with schizophrenia and schizoaffective disorder indicated to receive ECT were selected from among the inpatients of El-Minia Psychiatry Hospital. Psychiatric examination by completion of a psychiatric sheet, full medical examination, and necessary investigations for anesthesia fitness were conducted for all patients. The Brief Psychiatry Rating Scale was used to assess patients' symptoms before initiation of ECT, after undergoing three sessions, and after termination of the ECT course (6–8 sessions).

Results
Response to ECT was similar among different age groups in both male and female patients. Patients' responses to treatment differed according to their specific diagnosis and according to the duration of the current episode or exacerbation of psychotic illness before ECT administration.

Conclusion
Age and gender of patients with schizophrenia and schizoaffective disorder do not play a role in determining their response to treatment with ECT. Patients' specific diagnoses and the duration of the current episode or exacerbation of psychotic illness before ECT administration are important factors in determining the response of psychotic patients to ECT.

Keywords:
duration of current episode of illness, electroconvulsive therapy, psychotic disorders, schizoaffective disorder, schizophrenia

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Introduction

Psychosis is perhaps the best-established predictor of electroconvulsive therapy (ECT) response (Kellner, 2008). The American Psychiatric Association Task Force reported that the rapid onset and high probability of improvement with ECT makes it particularly valuable for patients with psychosis (American Psychiatric Association, 2001). However, effort is required to clear this treatment from the negative effect of bad publicity (Joshi, 2009).

Sackeim (2003) studied predictors for ECT response in schizophrenia and reported predominant positive symptoms, shorter duration of exacerbating episodes, perplexity, and catatonia to be associated with good ECT outcome. In contrast, the presence of negative symptoms, premorbid cluster A personality traits, and chronic schizophrenia was associated with poor ECT outcome.

Üçok and Çakir (2006) reported short duration of the psychotic episode before the first acute session of ECT to be predictive of good short-term response. In addition, according to American Psychiatric Association guidelines, psychotic symptoms with abrupt or recent onset and a history of good response to ECT predict a favorable response to ECT (Chanpattana, 2007).

Aim of the study

The current study aimed at identifying the different factors that may be implicated in the response of psychotic patients to ECT and at detecting the ones with a significant effect on treatment results.

Participants and methods

This study was carried out for 6 months from the beginning of April 2011 to the end of September 2011.

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The patients included were 80 hospitalized patients who had schizophrenia or schizoaffective disorder (either acute or chronic). Patients were diagnosed according to the Diagnostic Criteria for Research of the ICD-10 (World Health Organization, 1994). The study participants were selected from among the inpatients at Bani Ahmed Psychiatric Hospital, Minia Governorate, with a total inpatient capacity of 60 beds. A special protocol for cooperation was developed between the hospital and the Psychiatry Department of the Faculty of Medicine, Minia University, allowing the hospital staff to benefit from a continuous teaching and supervision program.

The patients included in the study were between 18 and 40 years of age and comprised both male and female patients presenting with psychotic disorders (including acute and chronic cases with exacerbation) according to the ICD-10 Diagnostic Criteria for Research. A clear conscious level, written consent from the patient or from his or her family (according to the age and severity of illness), and medical fitness for anesthesia (as indicated by medical investigations and the decision of the internist and the anesthesiologist) were all prerequisites. All patients were indicated for receiving ECT (either for the first time or for subsequent times).

Procedures of the study

The study was carried out in Bani Ahmed Psychiatric Hospital from the beginning of April 2011 to the end of September 2011. The number of psychotic patients who were indicated for ECT administration and who gave consent to participate in the study during that period was 80 (54 male and 26 female). For those who were not eligible to give consent by themselves, formal parental or spousal consent was taken. The procedures of ECT and those of the study were explained as clearly as possible to the patients and/or to their families. Modified ECT under general anesthesia was administered to all patients using a muscle relaxant on a three times weekly schedule.

All selected patients were subjected to the following.

History taking

Full psychiatric history was recorded using a psychiatric interview sheet, with stress on the items of cofactors that might affect response to ECT in patients with psychotic disorders.

Clinical examination

General and medical examination: all patients underwent medical assessment by an internist, who also conducted investigations including ECG and CBC evaluation in addition to other laboratory tests as indicated for medical fitness for anesthesia before receiving ECT.

Neurological examination.

Psychiatric examination: a full psychiatric clinical examination was performed for every patient.

Psychometric assessment

All patients underwent an interview based on the Brief Psychiatric Rating Scale (BPRS). BPRS is a widely used instrument for assessing the positive, negative, and affective symptoms of individuals who have psychotic disorders, especially schizophrenia, in addition to documenting the efficacy of treatment in patients who have moderate to severe disease (Overall and Gorham, 1988). BPRS was initially designed to measure symptom change in patients with psychotic illnesses (Bech *et al.*, 1993).

The BPRS provides a continuous total score. Also considered is the individual's behavior over the previous 2 or 3 days, which can be reported by the patient's family (Overall and Gorham, 1962). Two versions of the BPRS exist, the 18-item and the 24-item versions (Ventura *et al.*, 1993). The 24-item BPRS version was adopted in this study.

The 24-item BPRS version was applied three times (stations) to every patient:

First, before the beginning of ECT sessions; second, after completion of three sessions; and the third, after the end of sessions (range from six to eight sessions). The BPRS interview with every patient lasted about 60–90 min on average, which varied according to the patient's condition, degree of cooperation, and symptoms.

Electroconvulsive therapy administration and technique

ECT was administered three times per week with a constant current and a brief pulse stimulus using a Mecta spectrum 4000M (Mecta Corporation, Tualatin, OR, USA) device. All patients were treated with bilateral electrode placement. At the first treatment session, seizure threshold was determined using the empirical titration procedure (Sackheim *et al.*, 1987). An adequate seizure was defined as at least 30 s of tonic–clonic motor activity. One adequate seizure was obtained at each treatment. Electrical dosage was titrated in accordance with the schedule included in instruction manual of the device.

Thiopental (1.5–2.5 mg/kg) was used for anesthesia (Saito *et al.*, 2000) and succinyl choline (0.75–1.5 mg/kg) as a neuromuscular blocker and muscle relaxant (Fredman *et al.*, 1994). At least one member of the research team attended all steps, from the introduction of the intravenous cannula until the patient had gained his or her consciousness.

Statistical analysis

Data were checked, coded, entered, and analyzed using SPSS version 15.0 software (SPSS Inc., Chicago, Illinois, USA). Results were collected and presented in tables with special reference to significant differences between groups using 0.05 as the significance level.

Results

Patients in the study ranged in age from 18 to 40 years (mean ± SD of 30.6 ± 6.1). Male patients represented two-thirds of the sample (54, 67.5%). Most of the sample patients came from rural areas (61, 76.3%); 14 were illiterate (17.5%), whereas 46 and nine (57.5 and 11.3%),

respectively, were preuniversity and university graduates. Most of the patients were single (49, 61.3%) and unemployed (65, 81%). These figures are shown in Table 1.

With regard to patients' specific diagnoses, the most frequent was paranoid schizophrenia (26, 32.5%), followed by manic-type schizoaffective disorder (16, 20%); the least prevalent was depressive-type schizoaffective disorder and catatonic schizophrenia (seven and six patients, 8.75 and 7.5%, respectively), as shown in Table 2.

The entire duration of illness in the patients of the sample ranged between 0.5 and 240 months (Table 3), whereas the duration of the current episode or exacerbation was between 3 and 330 months (mean ± SD, 46.4 ± 37). Eighteen patients had a positive family history of psychotic illness (22.5%).

A positive and significant correlation was found between the duration of the current episode or exacerbation of illness and the BPRS scores after the third and last ECT sessions, meaning that the shorter the duration, the lower the BPRS scores at these two stations (Table 4).

Comparison between patients of the study sample with regard to their BPRS scores at different study stations according to their gender (Table 5), marital status (Table 6), and employment (Table 7) did not reveal any statistically significant differences.

Patients with schizoaffective disorders ($N = 23$) scored significantly higher than those with schizophrenia before initiation of ECT treatment ($P = 0.042$), with no similar significant differences after the third or last ECT sessions (Table 8).

Table 9 shows that patients of different diagnostic subgroups improved significantly as regards their BPRS scores at the end of their ECT course. However, the degree of statistical difference varied across subgroups ($P = 0.018$ for depressive schizoaffective disorder and < 0.0001 for paranoid and undifferentiated schizophrenia).

Most variables in the BPRS improved significantly when patients' scores were compared before and after undergoing the ECT course. However, not all BPRS variables improved to the same extent ($P = 0.92$ for somatic concern, 0.026 for mannerisms and posturing, and < 0.001 for the rest of the variables). These results can be reviewed in Table 10.

Table 1 Sociodemographic characteristics of the study patients

Sociodemographic characteristics	Study group ($N=80$)
Age (years)	
18–25	15 (18.8)
26–35	44 (55)
36–40	21 (26.2)
Range	18–40
Mean ± SD	30.6 ± 6.1
Gender	
Male	54 (67.5)
Female	26 (32.5)
Residence	
Rural	61 (76.3)
Urban	19 (23.7)
Education level	
Illiterate	14 (17.5)
Read and write	11 (13.7)
Preuniversity	46 (57.5)
University	9 (11.3)
Marital status	
Single	49 (61.3)
Married	18 (22.5)
Separated	2 (2.5)
Divorced	11 (13.7)
Occupation	
Unemployed	65 (81)
Employed	15 (19)

Table 2 Specific diagnoses of the study patients

Specific diagnosis	*N* (%)
Paranoid schizophrenia	26 (32.5)
Hebephrenic schizophrenia	12 (15)
Undifferentiated schizophrenia	13 (16.25)
Catatonic schizophrenia	6 (7.5)
Schizoaffective disorder, manic type	16 (20)
Schizoaffective disorder, depressive type	7 (8.75)
Total	80 (100)

Discussion

ECT has been demonstrated to be an effective and safe treatment modality for many psychiatric disorders including psychotic disorders related to schizophrenia, such as schizophreniform disorder and schizoaffective disorder (American Psychiatric Association, 2001). Unfortunately, the number of ECT clinics is likely to continue to decrease and psychiatrists may have decreasing experience in treating patients with ECT (Bickerton *et al.*, 2009).

Studies have tried to determine predictors for ECT response in schizophrenia (Sackeim, 2003). This is critical to delimiting ECT use. In our study, ECT was administrated to patients with psychotic disorders to explore cofactors that might predict response to ECT.

Discussion of methodology

The present study was conducted on 80 patients of both gender types from among the inpatients at El-Minia Psychiatric Hospital to determine factors implicated in

Table 3 Illness variables and family history of the study patients

Variables	Study group ($N=80$)
Entire duration of illness (months)	
Range	0.5–240
Median	78
Mean ± SD	92.2 ± 65.1
Duration of current episode or exacerbation (days)	
Range	3–360
Median	30
Mean ± SD	46.4 ± 37
Order of the current episode or exacerbation	
Range	1–16
Mean ± SD	5.4 ± 3
Family history of psychotic disorders	
Positive	18 (22.5)
Negative	62 (77.5)

Table 4 Correlation between psychiatric history and patient response to ECT at the different stations of the study among group A patients

	At first station		At second station		At third station	
Psychiatric history	*r*	*P*	*r*	*P*	*r*	*P*
Entire duration of illness (months)	0.06	0.69	0.05	0.7	0.12	0.38
Duration of current episode or exacerbation (days)	0.12	0.41	0.27	0.047*	0.33	0.015*
Order of current episode or exacerbation	0.04	0.76	0.07	0.64	0.14	0.31

Spearman's correlation for categorical and nonparametric quantitative data.
First station, before first session of ECT; second station, after three sessions of ECT; third station, after completing the ECT course.
ECT, electroconvulsive therapy.

Table 5 Comparison of BPRS scores between male and female patients of the study at different study stations

Study station	BPRS score, male patients (*N*=54)	BPRS score, females patients (*N*=26)	*P*
Before first session			
Range	85–55	54–84	0.79
Median	68.5	68.5	
Mean ± SD	69.8 ± 6.2	69.4 ± 7.5	
After third session			
Range	53–30	30–58	0.93
Median	38	38	
Mean ± SD	39.1 ± 5.4	39.3 ± 6.7	
After session termination			
Range	25–36	26–37	0.81
Median	29	29	
Mean ± SD	29.1 ± 2.2	29.3 ± 3.1	

BPRS, Brief Psychiatry Rating Scale.

Table 6 Comparison of BPRS scores between married and unmarried patients of the study at different study stations

Study station	BPRS score, married (*N*=18)	BPRS score, unmarried (*N*=62)	*P*
Before first session			
Range	61–84	54–85	0.73
Median	69	68	
Mean ± SD	69.6 ± 4.9	69.7 ± 7.1	
After third session			
Range	32–49	30–58	0.35
Median	38	39	
Mean ± SD	37.6 ± 4	39.6 ± 6.2	
After session termination			
Range	26–33	25–37	0.15
Median	29	29	
Mean ± SD	28.3 ± 1.7	29.4 ± 2.7	

BPRS, Brief Psychiatry Rating Scale.

Table 7 Comparison of BPRS scores between employed and unemployed patients of the study at different stations of the study

Study station	BPRS score, employed (*N*=15)	BPRS score, unemployed (*N*=65)	*P*
Before first session			
Range	55–84	54–85	0.24
Median	70	68	
Mean ± SD	70.9 ± 7.3	69.4 ± 6.5	
After third session			
Range	30–43	30–58	0.14
Median	38	38	
Mean ± SD	36.8 ± 3.9	39.7 ± 6.1	
After session termination			
Range	25–29	27–37	0.12
Median	28.6	29	
Mean ± SD	28.3 ± 1.8	29.6 ± 2.5	

BPRS, Brief Psychiatry Rating Scale.

the early response to ECT administered three times weekly in a wide variety of psychotic patients including those with acute and chronic cases of schizophrenia and schizoaffective disorders. This differed from the study by Suzuki *et al.* (2006), which was conducted on only seven patients with first-episode schizophrenia and schizophreniform disorder.

The three times weekly design matched the study by Chanpattana *et al.* (1999), who examined the factors

Table 8 Comparison of the BPRS parameters between the two patient subgroups (schizophrenia and schizoaffective disorders) at different stations of the study

Study station	BPRS score, group A schizophrenia ($N=57$)	BPRS score, group B schizoaffective disorders ($N=23$)	P
Before first session			
Range	54–85	62–84	0.042*
Median	67	70	
Mean ± SD	68.7 ± 6.7	71.4 ± 6	
After third session			
Range	30–53	34–58	0.22
Median	37	39	
Mean ± SD	38.7 ± 5.8	40.2 ± 5.9	
After session termination			
Range	25–37	26–37	0.85
Median	29	29	
Mean ± SD	29.2 ± 2.5	29.2 ± 2.6	

Group A, schizophrenia; group B, schizoaffective disorder patients.
BPRS, Brief Psychiatry Rating Scale.
*Significant if P-value < 0.05.

Table 9 Comparison between BPRS parameters at first and third stations of the study in individual diagnostic subgroups

Psychiatric subgroups	Before first session	After session termination	P
Paranoid schizophrenia ($N=26$)			
Range	54–81	25–33	<0.001*
Median	66.5	28	
Mean ± SD	66.2 ± 5.7	22.8 ± 1.6	
Hebephrenic schizophrenia ($N=12$)			
Range	67–85	28–34	0.002*
Median	70.5	29.5	
Mean ± SD	72.7 ± 5.8	30.3 ± 2	
Undifferentiated schizophrenia ($N=13$)			
Range	60–82	27–35	0.001*
Median	66	29	
Mean ± SD	68.5 ± 7.2	29.5 ± 2	
Catatonic schizophrenia ($N=6$)			
Range	67–81	28–38	<0.001*
Median	75	31	
Mean ± SD	72.6 ± 5.7	30.4 ± 2.6	
Schizoaffective disorder, manic type ($N=16$)			
Range	60–84	26–32	<0.001*
Median	70	29	
Mean ± SD	70.7 ± 5.5	28.8 ± 1.8	
Schizoaffective disorder, depressive type ($N=7$)			
Range	64–82	27–37	0.018*
Median	69	29	
Mean ± SD	71.6 ± 6.3	29.6 ± 3.5	

BPRS, Brief Psychiatry Rating Scale.
*Significant if P-value < 0.05.

implicated in early response in schizophrenia, as ECT administration three times weekly accelerates response faster compared with twice weekly administration.

The procedure of ECT and the study were both explained as clearly as possible to the patients. This is important as it could improve the patients' perspective of ECT and decrease their sense of being coerced (Rose *et al.*, 2005).

Patients of the current study received ECT that ranged from six to eight sessions. The number of sessions was determined by the treating psychiatrist and according to individual patient's clinical response; no fixed number of ECT treatments was prescribed for the patients. This agrees with the recommendation of the National Institute for Clinical Excellence (2003) on the use of ECT in treating patients with schizophrenia, which reported that there was little evidence to support the routine prescription of a fixed number of treatment sessions per course of ECT. It is also in line with the review of Bickerton *et al.* (2009), which reported the number of ECT applications per course of treatment to range between 5.3 and 5.8 from 1999 to 2009, with a slight tendency to decline over time.

In the current study, we chose to apply the BPRS after completion of three sessions. Most of the patients responded early to ECT after three sessions, and when patients of our study showed early marked improvement on ECT their condition did not worsen during the rest of the ECT course. This is against the results of the study by Abrams (1997), who advised cessation of further ECT when the patient showed marked improvement early during the ECT course.

Discussion of the results

The results of this study are discussed by exploring the relationship of different sociodemographic characteristics and clinical factors with the response to ECT treatment.

Table 10 Comparison between patients' individual symptoms on the BPRS before ECT course initiation and after ECT course termination

BPRS symptoms	Before first session (mean + SD)	After sessions termination (mean + SD)	*P*
Somatic concern	1.0 ± 0.6	1.0 ± 0.01	0.92
Anxiety	3.5 ± 1.4	1.1 ± 0.2	<0.001*
Depression	1.8 ± 1.2	1.04 ± 0.2	<0.001*
Suicidality	1.5 ± 1.2	1.0 ± 0.01	<0.001*
Guilt	1.3 ± 1.0	1.0 ± 0.01	0.006*
Hostility	4.9 ± 1.3	1.4 ± 0.6	<0.001*
Elevated mood	1.9 ± 1.5	1.04 ± 0.3	<0.001*
Grandiosity	3.0 ± 2.6	1.5 ± 1.0	<0.001*
Suspiciousness	6.6 ± 0.9	3.1 ± 0.6	<0.001*
Hallucinations	3.8 ± 2.18	1.1 ± 0.3	<0.001*
Unusual thought content	5.4 ± 1.05	2.0 ± 0.4	<0.001*
Bizarre behavior	2.2 ± 1.4	1.01 ± 0.1	<0.001*
Self-neglect	3.05 ± 1.5	1.34 ± 0.6	<0.001*
Disorientation	1.3 ± 0.9	1.03 ± 0.2	0.002*
Conceptual disorganization	3.81 ± 1.2	1.1 ± 0.4	<0.001*
Blunted affect	3.7 ± 1.3	1.5 ± 0.8	<0.001*
Emotional withdrawal	3.6 ± 1.4	1.1 ± 0.3	<0.001*
Motor retardation	1.19 ± 0.8	1.03 ± 0.2	0.026*
Tension	3.2 ± 1.5	1.08 ± 0.3	<0.001*
Uncooperativeness	3.0 ± 1.5	1.11 ± 0.4	<0.001*
Excitement	3.7 ± 1.4	1.01 ± 0.11	<0.001*
Distractibility	2.3 ± 1.0	1.08 ± 0.15	<0.001*
Motor hyperactivity	3.0 ± 1.3	1.05 ± 0.19	<0.001*
Mannerisms and posturing	1.3 ± 1.0	1.05 ± 0.3	0.026*

BPRS, Brief Psychiatry Rating Scale.
*Significant if *P*-value < 0.05.

In this study, there was good and early response to ECT in all three age groups. A significant difference was found between BPRS scores at the three stations (before the first session of ECT, after the third session of ECT, and after termination of ECT sessions) for the three age groups. No patient in the current study, however, was older than 40 years of age; thus, we could not really assess the effect of old age on the response to ECT in our native setting. Older age is a factor shown to be associated with favorable ECT response, as elderly patients often have the most difficulty in tolerating the adverse effects of psychotropic medications (O'Connor *et al.*, 2001).

Stein *et al.* (2004) reported that the greater improvement among adults might reflect the significantly greater percentage of adult patients who received ECT for psychomotor agitation, compared with adolescents, and a significantly greater percentage of adults than adolescents showed improvement with ECT. In the study by Stein *et al.* (2004), the adolescent group showed a lower improvement rate from ECT compared with the adult group; in addition, less favorable short-term ECT outcome was seen among adolescents. However, there were no patients below the age of 18 in our study; thus, comparison with their results was not possible.

With regard to gender, an early good response to ECT was found in both male and female patients of the current study. In contrast, one study reported a better response among male patients (Hamilton, 1982). Two other studies reported significantly better results among female patients (Coryell and Zimmerman, 1984; Mansour, 1997). However, some investigators, such as Godfroid (1999), consider ECT to be gender free, as they concluded that gender does not affect response to ECT, which was the case in our study.

Swartz (1993) considered diagnosis an essential and significant predictor for ECT response. Khoweiled (2000) further emphasized and explained the importance of diagnosis as a predictor of response to ECT. In our study the BPRS scores for schizoaffective disorders (group B) reduced more evidently than those for schizophrenia (group A) after the third ECT session, indicating greater and more rapid improvement in group B than in group A (although the drop in the BPRS score was statistically significant in both cases).

In the present study, a positive correlation was found between the duration of the current episode or exacerbation and BPRS scores after the third session in group A and group B (the shorter the duration of the current episode or exacerbation, the lower the BPRS scores, indicating a good response), and these correlations were statistically significant. These results agree with the studies by Chanpattana and Somchai Chakrabhand (2001), who found that episode duration had a much more powerful predictive value of response to ECT compared with illness duration. Üçok and Çakir (2006) reported that short duration of the psychotic episode before the first ECT session predicts a good response to ECT. In addition, long duration of psychotic episode before the first ECT session was found to predict a poor response to ECT (Abrams, 2002; Suzuki *et al.*, 2003; Dombrovski *et al.*, 2005; Suzuki *et al.*, 2006).

With regard to specific clinical diagnosis, there was significant clinical improvement in response to ECT in this study when comparing BPRS results of the first and

third stations of the study regardless of the type of psychotic disorder. However, depressive-type schizoaffective disorder had lower response to ECT compared with other diagnostic subgroups as there were fewer statistically significant differences between the BPRS scores at the three stations. These results disagree with those of Maletzky (1989), who concluded that patients with depressive features responded best to ECT, compared with patients with manic features.

With regard to specific symptoms in the current study, some BPRS symptoms responded to ECT better compared with other symptoms in group A, such as hostility, excitement, unusual thought content, conceptual disorganization, hallucinations, emotional withdrawal, anxiety, suspiciousness, motor hyperactivity, tension, blunted affect, uncooperativeness, self-neglect, and grandiosity. These results agree with the studies by Hickie *et al.* (1990) and Loo *et al.* (2011), who reported that some symptoms may respond more than others to ECT, or even be positively associated with ECT response.

Chanpattana and Somchai Chakrabhand (2001) suggested that treatment with ECT resulted in no improvement in or in worsening of negative symptoms. This last statement is discordant with our results in which some negative symptoms, such as emotional withdrawal, blunted affect, and self-neglect, had good response to ECT.

In the present study, the BPRS factors of suspiciousness, unusual thought content, and hallucinations were markedly improved. This may be in line with the results of Chanpattana (2007), who suggested that preoccupation with delusions and hallucinations was a significant predictor of positive clinical outcome of ECT administration.

Conclusions

Age and gender of patients with schizophrenia and schizoaffective disorder do not play a role in determining their response to treatment with ECT. Patients' specific diagnoses and the duration of current episode or exacerbation of psychotic illness before ECT administration are important factors for determining the response of psychotic patients to ECT.

Recommendations

(1) Further study is needed on factors implicated in the response to ECT therapy on a wider scale and at a multicentric level.
(2) ECT administration as a monotherapy needs to be studied in comparison with administration of psychotropic medications alone in psychotic patients.
(3) Young psychiatrists should be trained on ECT indications and administration, and ECT machines and necessary equipment should be provided and cared for in psychiatric hospitals and facilities.
(4) Every measure should be taken to reduce the stigma associated with ECT administration to enhance the public acceptance of such a useful therapeutic procedure.

Limitations

(1) The sample of the study comprised only patients with psychotic disorders; hence, the results cannot be generalized to other groups of psychiatric disorders indicated for ECT.
(2) Outpatients were not involved in our sample, but this was intended to reduce the number of patients who dropped out.
(3) BPRS version 24 has no cutoff point.
(4) Patients were on psychotropic medications that varied from one patient to another.
(5) No short-term or long-term follow-up was adopted.

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Conflicts of interest

There are no conflicts of interest.

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