

**Efficacy of Electroconvulsive Therapy (ECT) in Psychiatric Patients**Pranaw Kumar<sup>1</sup>, Nilesh B. Shah<sup>2</sup><sup>1</sup> Senior Resident(MD Psychiatry), Department of Psychiatry, Lokmaanya Tilak Municipal Medical College and General Hospital, Mumbai, Maharashtra, India<sup>2</sup> Professor and HOD, Department of Psychiatry, Lokmaanya Tilak Municipal Medical College and General Hospital, Mumbai, Maharashtra, India

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Conflict of interest: Nil

**Abstract****Aim:** The aim of the present study was to evaluate the efficacy of electroconvulsive therapy (ECT) in psychiatric patients.**Methods:** The Prospective cohort study was conducted in the Department of Psychiatry, Lokmaanya Tilak Municipal Medical College and General Hospital, Mumbai, Maharashtra, India for the period of One year. Sample consists of patients are started on ECT for various indications and attending the psychiatry OPD or admitted in ward was included over a period of one year (n=144).**Results:** Out of Total of 144 patients 74 (51.39%) patients was of Schizophrenia, 45 (31.25%) patients was of MDD, 19 (13.19%) patients was of BMD in Mania, 6 (4.17%) patients was of OCD and PANSS scale, HAM-D 17 item scale, YMRS scale, Y-BOCS scale was applied respectively before the start of ECT (Baseline score) and End score was taken after one week of last ECT. Change of 51.53 Mean point (PANSS), 13.78 Mean point (HAM-D 17 item), 28.52 Mean point(YMRS) and 2.83 Mean point (Y-BOCS) occurred during the course of ECT.**Conclusion:** The present Prospective cohort study was conducted in a tertiary care hospital to study the efficacy of ECT. ECT has been considered the most effective intervention for different psychiatry diseases but not in common practice, there may be variety of factors that contribute to the low and uneven rate of ECT use. Perhaps the most important considerations are the stigma associated with receiving the treatment on the part of patients and in recommending or administering the treatment on the part of professionals. In the study we find Change of 51.53 Mean point(PANSS) occurred during the course of ECT in Schizophrenia group, Change of 13.78 Mean point (HAM-D 17 item) occurred in MDD group, Change of 28.52 Mean point (YMRS) occurred in BMD in Mania group and only Change of 2.83 Mean point occurred in OCD group. Indicating good acute response to the ECT in Schizophrenia (51.53 Mean point PANSS), MDD (13.78 Mean point HRSD 17 items), BMD in Mania (28.53 Mean point YMRS) and poor response in OCD (2.83 Mean point Y-BOCS) symptoms.**Keywords:** ECT, efficacy, psychiatric patients

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**Introduction**

Electroconvulsive therapy (ECT) was introduced in its current form by Cerletti and Bini in 1938.[1] Electroconvulsive therapy (ECT) may be an effective treatment for patients with treatment-resistant severe psychiatric disorders. It may be life-saving in the treatment of severe suicidality, psychosis, mania, and catatonia.[2,3] Although ECT is considered an effective and a safe treatment, albeit more commonly used in adults than in adolescent patients, limited experience and sparse literature about ECT in adolescents are a significant barrier for its optimum use in this age group.[4–8] More specifically, barriers that limit its use in adolescents include lack of experience and/or unwillingness of child and adolescent psychiatrists to use ECT,

absence of large-scale studies, legal restriction regarding young patients, and erroneous beliefs pertaining to the safety or the effectiveness of ECT among some mental health professionals.[8–10] Methodological limitations of previous studies involving adolescents include small sample size, a lack of diagnostic clarity, and the lack of use of diagnosis-specific outcome measures other than Clinical Global Impression Scale (CGI).[9–12]

The death associated with ECT occurs one time for 80 thousand of ECT sessions or 1 in every 10 thousand of patients treated with ECT.[13] The only definite contraindication to electroconvulsive therapy is the increase of intracranial pressure. Relative contraindications are, among others, heart

attack within the last 3 months, uncompensated heart failure, unstable angina pectoris, complex arrhythmias, aortic aneurysm, uncontrolled diabetes mellitus or renal failure, metabolic disorders, severe lung disease, retinal detachment, stroke within the last 4 weeks, intracranial tumor. Usually the improvement of mental state is observed after at least 6–7 sessions in the course of 10–12 ECT series, it happens, however, that the first ECT procedure brings relief of depressive symptoms. The number of sessions depends on the mental state of the patient and the tolerance of treatment. Sometimes 14–16 sessions are required, or in the case of early remission treatment is reduced to 8–9 sessions. Currently as an effective ECT session is considered the session, during which the seizure activity lasts at least 30 seconds, but some researchers believe that even ECT with the seizure time more than 15 seconds may cause clinical improvement.[14,15]

The aim of the present study was to evaluate the efficacy of electroconvulsive therapy (ECT) in psychiatric patients.

### Materials and Methods

The Prospective cohort study was conducted in the Department of Psychiatry Lokmaanya Tilak Municipal Medical College and General Hospital, Mumbai, Maharashtra, India for the period of One year. Sample consists of patients are started on ECT for various indications and attending the psychiatry OPD or admitted in ward was included over a period of one year (n=144).

### Inclusion Criteria:

Patients attending OPD were included if:

- a. Patients who require ECT treatment as per opinion of psychiatrists and anaesthetically fit.
- b. All patients and/or relatives willing to participate after informed consent
- c. All the patients with adequate and reliable objective data

### Exclusion Criteria:

Following patients were excluded:

- a. Patients lacking objective data

### Ethics Permission:

The study was initiated after obtaining approval from the institutional ethics committee.

### Methodology:

Study Procedure:

One hundred forty four patients (n=144) who fulfilled the inclusion criteria mentioned above were selected for the study. A detailed history including the demographic profile, clinical profile, DSM 5 diagnosis and indication to start ECTs were elicited

for each patient and duly recorded in the case record form (Annexure I). Consent was taken from each patient for participation in the study after explaining the protocol to the patient in the language that the patient best understood.

### Collection of samples:

Ethics committee approval was obtained from the institutional ethics committee. Informed consent was taken in the attached proforma and following data was collected:

1. The demographic profile was collected in the semi-structured proforma.
2. The patients and relatives were explained the nature of the study.
3. An informed consent was taken from the patient and relatives.
4. Prior to study, patients were informed of the research objectives and assured of the confidentiality of their responses.
5. Patients diagnosed with Schizophrenia, Major Depressive Disorder, Bipolar mood disorder and obsessive-compulsive disorder using the DSM 5 criteria then interviewed. Data collected by asking questions regarding presenting complains and baseline score calculated using different scales regarding psychiatric illnesses he was suffering; their improvement was calculated using scales after one week of last ECT .
6. Severity of illness was evaluated by using Hamilton Depression Rating Scale (HDRS), Positive and Negative Syndrome Scale (PANSS), Young Mania Rating Scale (YMRS) and Yale-Brown Obsessive-Compulsive Scale (YBOCS) scales according to the illness before starting ECT (Baseline score).
7. The effectiveness of electroconvulsive therapy was evaluated by using the different scales after one week of last ECT (End score), for most of case after 12th ECT.

Positive and Negative Syndrome Scale (PANSS) is a medical scale used for measuring symptom severity of patients with schizophrenia.

Hamilton Depression Rating Scale (HDRS) is a multiple item questionnaire used to provide an indication of depression, and as a guide to evaluate recovery. The questionnaire is used to rate the severity of their depression by probing mood, feelings of guilt, suicide ideation, insomnia, agitation, or retardation, anxiety, weight loss and somatic symptoms. Young Mania Rating Scale (YMRS) is an eleven-item multiple choice diagnostic questionnaire which is used to measure the severity of manic episodes in children and young adults.

Yale–Brown Obsessive Compulsive Scale (Y-BOCS) is a test to rate the severity of obsessive – compulsive disorder (OCD) symptoms. The scale determines severity of OCD and to monitor improvement during treatment. This scale measures obsessions separately from compulsions, specifically measures the severity of symptoms of obsessive–compulsive disorder without being biased towards the type of content of obsessions or compulsions present.

#### Statistical Analysis:

Data were entered into Microsoft Excel Worksheet. Statistical analysis was performed using IBM Statistical Package for the Social Sciences version 20 (SPSS v20, IBM). Categorical variables between two groups were compared with Paired t test and Annova test. A p value of <0.05 was considered statistically significant.

#### Results

**Table 1: Efficacy of ECT in schizophrenia in the study (n=74)**

Schizophrenia [30 – 210]	Baseline Score	End Score	Efficacy	p value
Minimum	81	35	-	<0.001 [very very significant]
Maximum	152	111	-	
Mean	116.15	64.62	51.53	
SD	18.97	18.15	-	

Out of Total of 144 patients 74 (51.39%) patients was of Schizophrenia and PANSS scale was applied before the start of ECT (Baseline score) and End score was taken after one week of last ECT. Minimum Score change from 81 point to 35 point. Maximum Score change from 152 point to 111

point. Mean of Baseline score is 116.15 and Standard deviation of 18.97 (Mean  $\pm$  2SD = 116.31  $\pm$  37.94). Mean of End score is 64.62 and Standard deviation of 18.15. (Mean  $\pm$  2SD = 64.62  $\pm$  36.30). Change of 51.53 Mean point (PANSS) occurred during the course of ECT.

**Table 2: Efficacy of ECT in MDD in the study (n=45)**

MDD [0 – 52]	Baseline Score	End Score	Efficacy	p value
Minimum	17	3	-	<0.001 [very very significant]
Maximum	38	28	-	
Mean	27.09	13.31	13.78	
SD	4.41	6.12	-	

Out of Total of 144 patients 45 (31.25%) patients was of MDD and HAM-D 17 item scale was applied before the start of ECT (Baseline score) and End score was taken after one week of last ECT. Minimum Score change from 17 point to 3 point. Maximum Score change from 38 point to 28 point.

Mean of Baseline score is 27.09 and Standard deviation of 4.41 (Mean  $\pm$  2SD = 27.09  $\pm$  8.82). Mean of End score is 13.31 and Standard deviation of 6.12 (Mean  $\pm$  2SD = 13.31  $\pm$  12.24). Change of 13.78 Mean point (HAM-D 17 item) occurred during the course of ECT.

**Table 3: Efficacy of eECT in mania in the study (n=19)**

Mania [0 – 60]	Baseline Score	End Score	Efficacy	p value
Minimum	27	5	-	<0.001 [very significant] very
Maximum	57	22	-	
Mean	39.63	11.11	28.53	
SD	8.62	4.68	-	

Out of Total of 144 patients 19 (13.19%) patients was of BMD in Mania and YMRS scale was applied before the start of ECT (Baseline score) and End score was taken after one week of last ECT. Minimum Score change from 27 point to 5 point. Maximum Score change from 57 point to 22 point.

Mean of Baseline score is 39.63 and Standard deviation of 8.62 (Mean  $\pm$  2SD = 39.69  $\pm$  17.24). Mean of End score is 11.11 and Standard deviation of 4.68 (Mean  $\pm$  2SD = 11.11  $\pm$  9.36). Change of 28.52 Mean point (YMRS) occurred during the course of ECT.

**Table 4: Efficacy of ECT in OCD in the study (n=6)**

OCD [0 – 40]	Baseline Score	End Score	Efficacy	p value
Minimum	16	14	-	<b>&lt;0.001</b> [very significant]      very
Maximum	28	24	-	
Mean	23	20.17	2.83	
SD	4.15	3.37	-	

Out of Total of 144 patients 6 (4.17%) patients was of OCD and Y-BOCS scale was applied before the start of ECT (Baseline score) and End score was taken after one week of last ECT. Minimum Score change from 16 point to 14 point. Maximum Score change from 28 point to 24 point. Mean of Baseline score is 23 and Standard deviation of 4.15 (Mean  $\pm$  2SD = 23  $\pm$  8.30). Mean of End score is 20.17 and Standard deviation of 3.37 (Mean  $\pm$  2SD = 20.17  $\pm$  6.74). Change of 2.83 Mean point occurred during the course of ECT.

### Discussion

Majority of patients i.e. 101 (70.14%) were in the age group 21-40 years, followed by 23 (15.97%) were in the age group of 0-20 years and 20(13.89%) were in the age group of 41-60 years. The mean age of study population was 31.06 $\pm$ 20.38 years. 74 had the diagnosis of Schizophrenia in which 59 in the age group of 21-40 years, followed by 12 were in the age group of 0-20 years, and the lowest number of patients 3 in the age group of 41-60 years. The Mean age group of patients of Schizophrenia is 28.31 years and Standard deviation of 7.84 years (Mean  $\pm$  2SD = 28.31  $\pm$  15.68). 45 had the diagnosis of MDD in which 29 in the age group of 21-40 years, followed by 15 in the age group of 41-60 years and 1 were in the age group of 0-20 years. The Mean age group of patients of MDD is 38.38 years and Standard deviation of 10.31 years (Mean  $\pm$  2SD = 38.38  $\pm$  20.62). 19 had the diagnosis of BMD in Mania in which 11 in the age group of 21-40 years, followed by 6 were in the age group of 0-20 years, and 2 in the age group of 41-60 years. The Mean age group of patients of BMD in Mania is 27.63 years and Standard deviation of 9.93 years (Mean  $\pm$  2SD = 27.63  $\pm$  19.86). 6 had the diagnosis of OCD in which 4 were in the age group of 0-20 years, followed by 2 in the age group of 21-40 years, and nil in the age group of 41-60 years. The Mean age group of patients of OCD is 21 years and Standard deviation of 4.86 years (Mean  $\pm$  2SD = 21.00  $\pm$  9.72).

### Efficacy of ECT in patients of Schizophrenia in the study

Out of Total of 144 patients 74 (51.39%) patients was of Schizophrenia and PANSS scale was applied before the start of ECT (Baseline score) and End score was taken after 1 week of last ECT. Minimum Score change from 81 point to 35 point. Maximum Score change from 152 point to 111 point. Mean of

Baseline score is 116.15 and Standard deviation of 18.97 (Mean  $\pm$  2SD = 116.15  $\pm$  37.94). Mean of End score is 64.62 and Standard deviation of 18.15. (Mean  $\pm$  2SD = 64.62  $\pm$  36.30). Change of 51.53 Mean point (PANSS) occurred during the course of ECT. The change of 51.53 Mean point (PANSS) in the study indicate a good acute response to the therapy as The MCID for PANSS scores using this scale equaled a 15.3 point (34.0%) change from baseline. As per study of Eric D.A. Hermes, M.D., Daniel M. Sokoloff<sup>16</sup> who Established the minimum clinically important difference (MCID) in the Positive and Negative Syndrome Scale (PANSS) and finds that Cross-sectional clinician rated CGI scores of 1 through 7 linked to PANSS scores of 32.4, 42.2, 57.5,74.5, 93.0, 110.9, and 131.0 respectively. The MCID for PANSS scores using this scale equaled a 15.3 point (34.0%) change from baseline. A 1.96 SEM on the PANSS corresponded to a 16.5 point (36.2%) change from baseline. The MCID for a subsample with above-median baseline PANSS scores was 38% higher than a sample with lower baseline scores. With the patient-rated CGI as the anchor, PANSS scores were higher for CGI scores of 1 through 4 and the MCID was lower, 11.2 points (24.6%).

### Efficacy of ECT in MDD patients in the study

Out of Total of 144 patients 45 (31.25%) patients was of MDD and HAM-D 17 item scale was applied before the start of ECT (Baseline score) and End score was taken after 1 week of last ECT. Minimum Score change from 17 point to 3 point. Maximum Score change from 38 point to 28 point. Mean of Baseline score is 27.09 and Standard deviation of 4.41 (Mean  $\pm$  2SD = 27.09  $\pm$  8.82). Mean of End score is 13.31 and Standard deviation of 6.12 (Mean  $\pm$  2SD = 13.31  $\pm$  12.24). Change of 13.78 Mean point (HRSD 17 items) occurred during the course of ECT. Change of 13.78 Mean points (HRSD 17 items/Ham-D17) indicates a good acute response to the therapy as similar finding was obtained by G.B. John Mancini[17] where changes in Ham-D (17-item scales) and QIDS-SR16, a 16-item self-reported version, with the Patient Global Impression-Improvement (PGI-I) scale. They found that the PGI-I score representing "minimally improved" corresponded to changes from baseline as follows: QIDS-SR16(Quick Inventory of Depressive Symptomatology), \_28.5% 6 28.7% change; Ham-D17 of, \_27.1% 6 25.7% change. A

similar finding was obtained by Turkoz I, Fu DJ, Bossie CA, Sheehan JJ, Alphs L<sup>18</sup> where Multiple linear regression models suggested that a 1-point change in the depressive domain of CGI-S-SCA (Clinical global impression-severity-schizoaffective disorder) corresponded to an average 3.6-point (SE=0.2) change in HAM-D-17 score. Clinically meaningful score changes in depressive of CGI-S-SCA corresponded to approximately 4 point score changes on HAM-D-17. Results were confirmed using local and cumulative logistic regression models in addition to equipercentile linking.

#### **Efficacy of ECT in BMD in Mania patients in the study**

Out of Total of 144 patients 19 (13.19%) patients was of BMD in Mania and YMRS scale was applied before the start of ECT (Baseline score) and End score was taken after 1 week of last ECT. Minimum Score change from 27 point to 5 point. Maximum Score change from 57 point to 22 point. Mean of Baseline score is 39.63 and Standard deviation of 8.62 (Mean  $\pm$  2SD = 39.69  $\pm$  17.24). Mean of End score is 11.11 and Standard deviation of 4.68 (Mean  $\pm$  2SD = 11.11  $\pm$  9.36). Change of 28.53 Mean point (YMRS) occurred during the course of ECT. Change of 28.53 Mean points (YMRS) indicates a good acute response to the therapy as similar finding was obtained by Turkoz I, Fu DJ, Bossie CA, Sheehan JJ, Alphs L.[18] Multiple linear regression models suggested that a 1-point change in the manic domain of CGI-S-SCA (Clinical global impression-severity-schizoaffective disorder) corresponded to an average 5.8-point (SE=0.2) change in YMRS score. Clinically meaningful score changes in manic domains of CGI-S-SCA corresponded to approximately 6-point score changes YMRS. Results were confirmed using local and cumulative logistic regression models in addition to equipercentile linking. Our findings were comparable with the study of Mukherjee S, Sackeim HA, Schnur DB[19] in which evidence indicates that ECT is associated with remission or marked clinical improvement in 80% of manic patients and that it is an effective treatment for patients whose manic episodes have responded poorly to pharmacotherapy.

#### **Efficacy of ECT in OCD patients in the study**

Out of Total of 144 patients 6 (4.17%) patients was of OCD and Y-BOCS scale was applied before the start of ECT (Baseline score) and End score was taken after 1 week of last ECT. Minimum Score change from 16 point to 14 point. Maximum Score change from 28 point to 24 point. Mean of Baseline score is 23 and Standard deviation of 4.15 (Mean  $\pm$  2SD = 23  $\pm$  8.30). Mean of End score is 20.17 and Standard deviation of 3.37 (Mean  $\pm$  2SD = 20.17  $\pm$  6.74). Change of 2.83 Mean point

(YBOCS) occurred during the course of ECT. Change of 2.83 Mean points (YBOCS) indicates a poor acute response to the therapy Our findings were comparable with the study of Natália M. Lins-Martins, M.D. Murat Yücel, Ph.D. Fernanda Tovar-Moll, M.D. Erika C. Rodrigues, Ph.D. Leonardo F. Fontenelle, M.D.[56] where they find that OCD symptoms remained resistant to ECT in all patients, i.e., OCD's CGI Improvement Scale was  $\geq 4$  and two patients described transient deterioration of their OCD symptoms following ECT, which led one of them to drop out of treatment before completion and the other to develop de novo obsessions with aggressive and sexual contents.

#### **Conclusion**

The present Prospective cohort study was conducted in a tertiary care hospital to study the efficacy of ECT. ECT has been considered the most effective intervention for different psychiatry diseases but not in common practice, there may be variety of factors that contribute to the low and uneven rate of ECT use. Perhaps the most important considerations are the stigma associated with receiving the treatment on the part of patients and in recommending or administering the treatment on the part of professionals. Nonclinical economic, cultural, and political factors greatly affect the availability and use. In the study mean age of study population was 31.06 $\pm$ 20.38 years mostly working class male and female With Male to Female ratio of 1.32. Mostly lives in Nuclear family in metropolitan city like Mumbai. Mostly are from poor socioeconomic background with low educational qualification. In the study we find Change of 51.53 Mean point (PANSS) occurred during the course of ECT in Schizophrenia group, Change of 13.78 Mean point (HAM-D 17 item) occurred in MDD group, Change of 28.52 Mean point (YMRS) occurred in BMD in Mania group and only Change of 2.83 Mean point occurred in OCD group. Indicating good acute response to the ECT in Schizophrenia (51.53 Mean point PANSS), MDD (13.78 Mean point HRSD 17 items), BMD (28.53 Mean point YMRS) and poor response in OCD (2.83 Mean point YBOCS) symptoms.

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