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A study of Electroconvulsive Therapy's Impact on Major Depressive Disorder and Its Possible Causes

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Abstract

Background and Objectives: Electroconvulsive therapy (ECT) has been utilized since 1938 as a viable alternative to chemically induced seizures in the treatment of various psychiatric disorders. Despite encountering historical stigma, controversy, and limited accessibility, ECT has demonstrated its efficacy and utility in cases of severe depression where conventional medications have been found to be ineffective. The main objective of study is to evaluate Electroconvulsive Therapy's Impact on Major Depressive Disorder and (MDD) Its Possible Causes.

Method: In this study, 120 adult participants with MDD and mixed mood disorders had their ECT treatment effects on depressive symptoms examined. The study monitored changes in treatment response over time using standardized assessments and statistical analyses, such as linear mixed modeling. Strict adherence to ethical guidelines guaranteed the rights and welfare of participants. The large sample size and strict ethical supervision of the study improve the validity and relevance of its conclusions.

Result: An investigation into electroconvulsive therapy (ECT) diagnoses of MINI at various stages reveals a high prevalence of depression, stable rates of MDD, and variable rates of bipolar disorder. Percentages for anxiety disorders, PTSD, OCD, and substance use disorders are among the findings. Variations in suicidality levels are observed. Multiple diagnoses, cognitive evaluations (RBANS, TOPF), and baseline differences are all included in the data. The scores of response groups (non-responders, remitters, responders) differ significantly according to the

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WHODAS and BDI-II. After ECT, the study observes a time-dependent effect on WHODAS scores. A correlation between diminished depressive symptoms and diminished disability symptoms is indicated by linear regression. In the table of causes and follow-up, symptoms reported by the sample population are detailed.

Conclusion: The study examines how well electroconvulsive therapy (ECT) works for treating severe depression, with a focus on how it affects major depressive illness. In this study, 120 adults received acute outpatient ECT, and functional disability and depressive symptoms are measured using standardized tests. Findings indicate that ECT successfully reduces depression symptoms, however remission rates differ according to clinical complexity. Although encouraging, the study highlights the need for additional research to determine the variables influencing ECT remission rates, even though it acknowledges ECT's potential as a first-line treatment for depression.

Keywords: Electroconvulsive Therapy, Depression, Outcome,

Introduction

Electroconvulsive therapy (ECT) is distinguished by its exceptional efficacy in the treatment of severe unipolar depression. ECT is more effective than pharmacotherapies, simulated or sham ECT, and placebo treatments, according to research. **(1), (2), (3), (4)** Dierckz et al. performed a meta-analysis which revealed that 50.9% of individuals diagnosed with unipolar depression attained remission. Nevertheless, the reported rates exhibit significant variability, as controlled trials have documented remission rates that vary from 30% to 100%, **(5)** with frequent reports falling between 80-90%. **(6), (7)** In these kind of controlled trials, study participants are chosen to reduce comorbidity, and ECT is administered in optimal conditions.

ECT is being utilized as a first-line treatment for depression more commonly **(7), (8)** and, in practice, is typically administered to severely ill and diagnostically complex patients who have failed to respond to several other treatment interventions. This increased use emphasizes how crucial it is to look into the efficacy of ECT in naturalistic settings where patient characteristics; clinical, demographic, and treatment are more varied than they would be in prospective clinical trials. The term "naturalistic study of ECT" refers to the application of ECT in "real-world" settings without any limitations on the patients observed or the method of administration due to research concerns.

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The effectiveness of naturalistic ECT is the subject of expanding research, which is frequently conducted in community settings. Remission rates in practical settings are generally inferior; a comprehensive multisite community study observed a range of remission rates (30.3% to 46.7%) among a diverse sample of individuals with mood disorders. **(9)** Patients who are referred for electroconvulsive therapy (ECT) usually have depression that is complicated by multiple mental health conditions ("such as anxiety, personality disorders, and trauma history"), sophisticated medications, pre-existing cognitive impairment, and a variety of medical conditions. It has been observed that these conditions have an adverse effect on the efficacy of treatment for affective disorders.**(10), (11), (12), (13), (14)** To what degree this heterogeneity affects ECT's efficacy, however, is still unknown and needs more research.

Aims and Objectives

To study Electroconvulsive Therapy's Impact on Major Depressive Disorder and Its Possible Causes.

Materials and Methods

The research methodology used in this study sought to determine how Electroconvulsive Therapy (ECT) affected depressive symptoms. The adult participants in the study were those who received acute outpatient ECT.

Selection of Participants:

- 120 adult participants with mixed mood disorders, Major Depressive Disorder were included in the study.
- The exclusion criteria included people who couldn't give informed consent.

Evaluation Procedure:

The WHO's Disability Assessment Schedule 2.0 (WHODAS), the Beck Depression Inventory (BDI-II), the Test of Premorbid Functioning (TOPF), and the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) were among the standardized tests used for assessment.

Gathering of Data:

- Information was gathered from an ambulatory ECT clinics, longitudinal study on treatment response in depressed adults receiving ECT.
- The ability to track changes over time in response to ECT treatment was made possible by longitudinal data.

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Analytical Statistics:

- To examine how well ECT treats depressive symptoms and symptoms related to disabilities, linear mixed modeling was used.
- To find out how ECT affected this area, cognitive functioning was evaluated.

Moral Aspects to Take into Account:

- Participants' rights, privacy, and well-being were guaranteed by adherence to ethical standards.
- The goal of the combination of statistical analyses, and standardized assessments, study design was to offer a thorough grasp of how ECT affected depressive symptoms. The study's findings are more valid and applicable because of the wide sample size and strict ethical oversight.

Limitations:

- The study is limited by its relatively small sample size.
- Generalizability may be constrained due to the specific population of psychiatric patients.
- The short-term nature of the study limits the assessment of long-term effects.

Results

Those who were lost to follow-up at post-ECT (n = 43) and those who finished post-ECT testing (n = 77) make up the total sample size (N = 120) in which 78 are Female and 42 are male.

Table: 1 Baseline Characteristic of respondents

Baseline Characteristic	Mean	SD	Valid n	Mean	SD	Valid n	Mean	SD	Valid n
Age (yrs)	**46.2**	10.8	120	43.8	12.3	36	46.9	10.1	84
Education (yrs)	**14.6**	2.3	119	14.1	2.4	35	14.8	2.5	84
BDI-II	**40.5**	9.8	119	43.2	10.2	36	39.8	8.7	83
WHODAS	**25.1**	9.8	113	26.2	9.8	33	23.7	10.1	80

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	% of valid n	Valid n	% of valid n	Valid n	% of valid n	Valid n
Hx of past ECT	21.8	102	4.2	36	32.5	66
Hx of head injury	18.5	92	19.5	24	18.8	68
Currently employed	30.4	96	32.5	30	29.8	66

Features of the Demographics:

Age: With a standard deviation of 10.8, the sample as a whole has an average age of 46.2 years. The results of the subgroup analysis indicate that the second group (Valid n = 36) had a slightly younger mean age (43.8 years), while the third group (Valid n = 84) had a slightly older mean age (46.9 years).

Education: The sample as a whole has an average age of 14.6 years, with a standard deviation of 2.3 years. Subgroup analysis shows a similar pattern, with the second group's mean age of 14.1 years being slightly lower and the third group's mean age of 14.8 years being slightly higher.

Clinical Features:

BDI-II (Beck Depression Inventory-II): The sample as a whole has a mean BDI-II score of 40.5, with a standard deviation of 9.8. This is based on the Beck Depression Inventory-II. According to subgroup analysis, the second groups mean BDI-II score was higher (43.2), while the third group's mean score was slightly lower (39.8).

World Health Organization Disability Assessment Schedule (WHODAS): The sample as a whole has a mean WHODAS score of 25.1, with a 9.8 standard deviation. The results of the subgroup analysis show that the second group had a higher mean WHODAS score (26.2), while the third group had a slightly lower mean (23.7).

Ratio and Authentic Counts:

History of Previous ECT: Of the total sample, 102 people, or about 21.8%, have prior ECT experience. This percentage rises to 32.5% (66 individuals) in the third group, and falls to 4.2% (36 individuals) in the second.

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History of Head Injury: Of the sample as a whole, 18.5% (92 people) have experienced a head injury in the past. In the second group, the percentage rises to 19.5% (24 people), and in the third group, it slightly falls to 18.8% (68 people).

Currently Employed: Approximately thirty-four percent (96 people) of the sample as a whole are currently working. In the second group, this percentage drops to 32.5% (30 people), and in the third group, it drops even more to 29.8% (66 people).

Graph: 1 Graphical representation of Baseline Characteristic of respondents

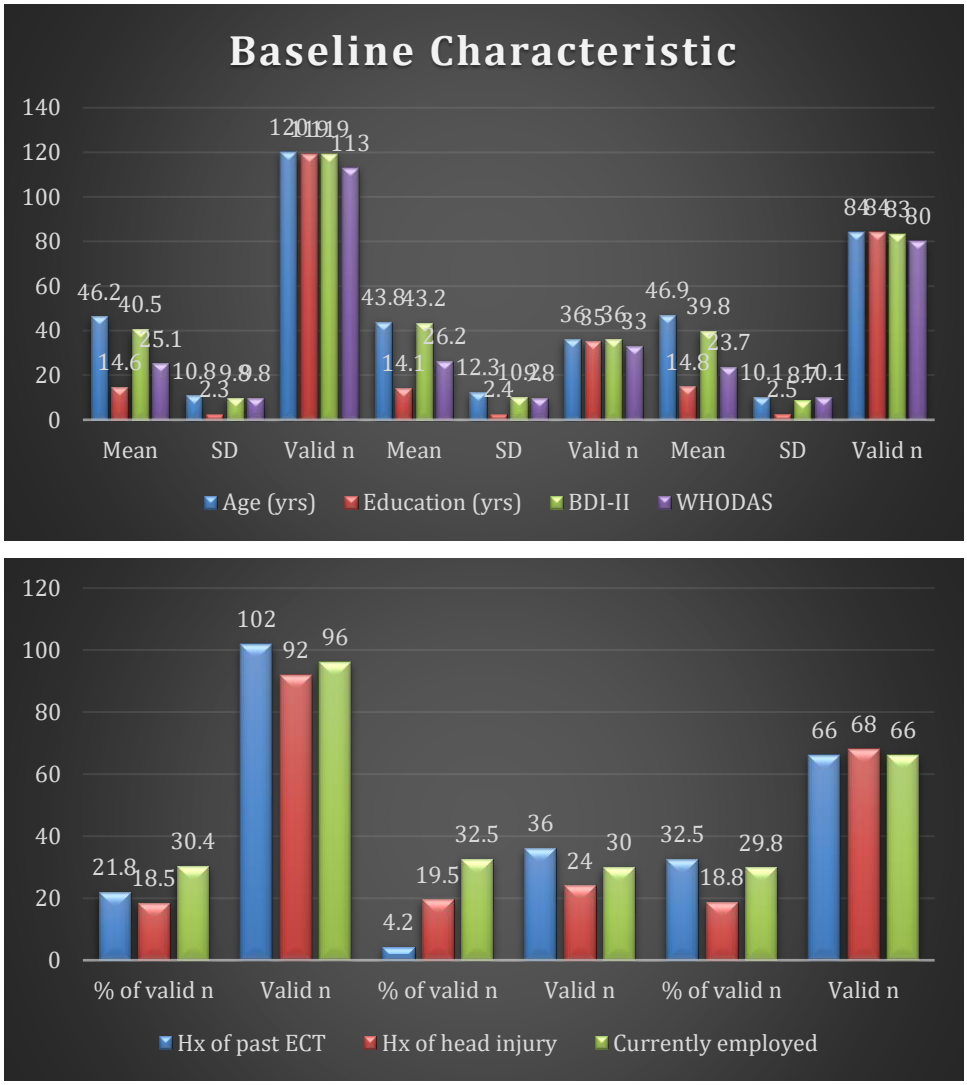

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Table: 2 MINI Diagnoses of Respondents

MINI Diagnoses						
	Total sample (n = 120)		Lost to follow-up at post-ECT (n = 43)		Completed post-ECT Testing (n = 77)	
	% of valid n	Valid n	% of valid n	Valid n	% of valid n	Valid n
Any depressive episode	99.2	116	99.8	34	100	82
MDD	80.7	116	81.6	34	80.3	82
Bipolar	18.3	114	17.2	34	19.1	80
GAD	33	113	34.8	32	31.3	80
AGOR	29.8	115	30.7	33	28.4	82
Panic Dx	28.9	115	29.8	33	28	82
SAD	21.5	115	16.7	33	27.9	82
PTSD	10.1	113	8.6	33	11.9	81
OCD	10.8	114	9.3	33	11.6	82
Alcohol or substance Dx	8.2	114	15.7	33	4.4	82
Psychosis	1.2	110	2.8	33	0.5	77

The accompanying table provides information on the distribution of MINI diagnoses at various stages of a study, including the overall sample size, the number of participants lost to follow-up following electroconvulsive therapy (ECT), and the number of participants who finished post-ECT testing.

All groups have high rates of depression episode prevalence: 99.2% in the sample as a whole, 99.8% among those who were lost to follow-up, and 100% among those who finished post-ECT testing.

Overall, the sample has a high prevalence of MDD (80.7%), with comparatively stable rates among those who were lost to follow-up (81.6%) and those who finished post-ECT testing (80.3%).

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The prevalence of bipolar disorder is lower, at 18.3% in the entire sample. The rates for those who finished post-ECT testing (19.1%) and those who were lost to follow-up (17.2%) are unchanged.

Three-quarters of the sample as a whole have GAD, with a slightly higher prevalence among those who were lost to follow-up (34.8%) than among those who finished post-ECT testing (31.3%).

About 29.8% of the sample as a whole exhibits agoraphobia, with similar percentages among those who were lost to follow-up (30.7%) and those who finished post-ECT testing (28.4%).

About 28.9% of the sample as a whole has a diagnosis of panic disorder; prevalence rates are comparable for those who are lost to follow-up (29.8%) and those who finish post-ECT testing (28%).

The overall sample prevalence of social anxiety disorder is 21.5%; however, among those who finished post-ECT testing, the prevalence was lower (16.7%) than among those who were lost to follow-up (27.9%).

10.1% of the sample as a whole has PTSD, with a marginally lower prevalence among those who finished post-ECT testing (8.6%) than among those who were lost to follow-up (11.9%).

10.8% of the sample as a whole has an OCD diagnosis, with comparable prevalence rates among those who were lost to follow-up (9.3%) and those who finished post-ECT testing (11.6%).

The prevalence of alcohol and substance use disorders varies, averaging 8.2% across the entire sample. Significantly, the percentage of participants who finished post-ECT testing increased (15.7%), whereas the percentage of participants who were lost to follow-up decreased (4.4%).

Among the conditions on the list, psychosis has the lowest prevalence (1.2% in the entire sample); the prevalence increases slightly in those who undergo post-ECT testing (0.5%) and in those who are lost to follow-up (2.8%).

Graph: 2 Graphical representation of MINI Diagnoses of Respondents

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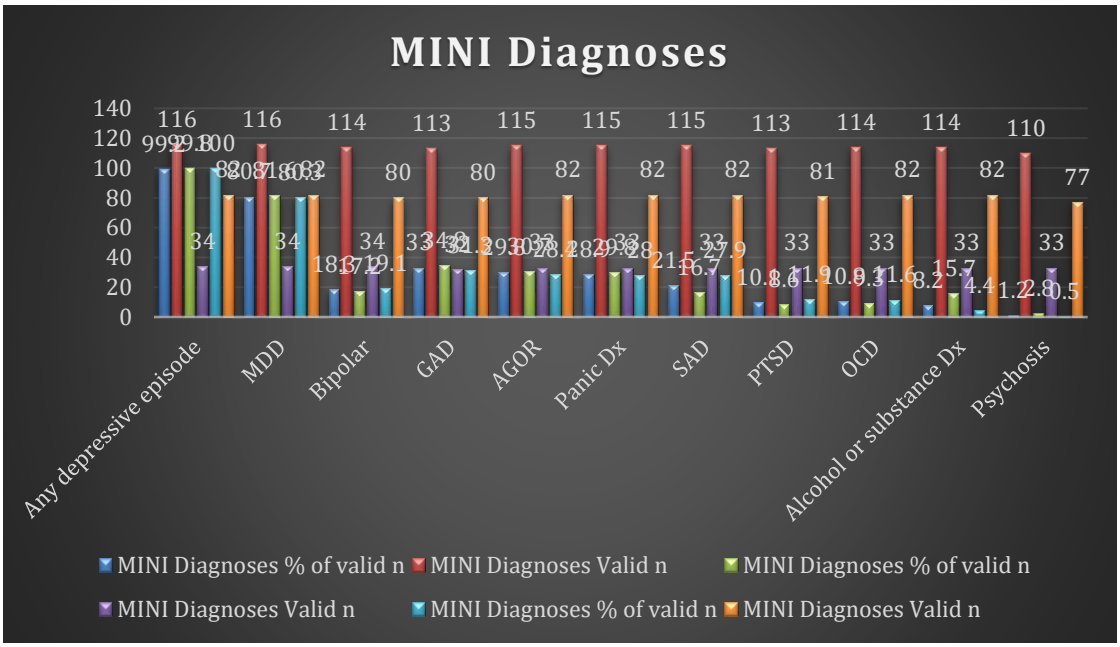

Table: 3 Suicidality among Respondents

Suicidality						
	Total sample (n = 120)		**Lost to follow-up at post-ECT (n = 43)**		**Completed post-ECT Testing (n = 77)**	
	% of valid *n*	Valid *n*	% of valid *n*	Valid *n*	% of valid *n*	Valid *n*
Low	41.6	116	39.3	34	40.7	82
Moderate	15.8	116	8.2	34	18.5	82
High	34.2	116	42.5	34	30.8	82
≥ 2 diagnoses	61.2	116	63.3	34	60.7	82

In the context of a study involving electroconvulsive therapy (ECT), the suicidality table presented offers a breakdown of the distribution of various Suicidality levels.

Of the 116 participants in the sample as a whole, approximately 41.6% have low suicidality. The percentage drops to 39.3%, or 34 people, among those who were lost to follow-up at post-ECT.

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Eighty-two people, or forty.7% of the total, finished their post-ECT testing. This implies that a significant number of participants exhibited low suicidality during every stage of the research.

116 people make up the sample as a whole, and the prevalence of moderate suicidality is 15.8%. Thirty-four people, or 8.2% of the total, were lost to follow-up. On the other hand, the prevalence rises to 18.5% (82 people) for those who finished post-ECT testing. This suggests that the prevalence of moderate suicidality changed during the course of the study.

Of the 116 participants in the sample as a whole, approximately 34.2% display high suicidality. The prevalence rises dramatically to 42.5%, or 34 individuals, among those who are lost to follow-up. On the other hand, the prevalence drops to 30.8% for the 82 participants who finished post-ECT testing. This shows that there may have been variations in the prevalence of high suicidality during the course of the study.

Out of the 116 individuals in the sample, the category of people with two or more diagnoses has a high prevalence of 61.2%. 34 people make up the high prevalence of 63.3% among those who were lost to follow-up. In a similar vein, 82 people, or 60.7% of the population, finished post-ECT testing. This demonstrates that, throughout all research phases, people with suicidality consistently have multiple diagnoses.

Graph: 3 Graphical representation of Suicidality among Respondents

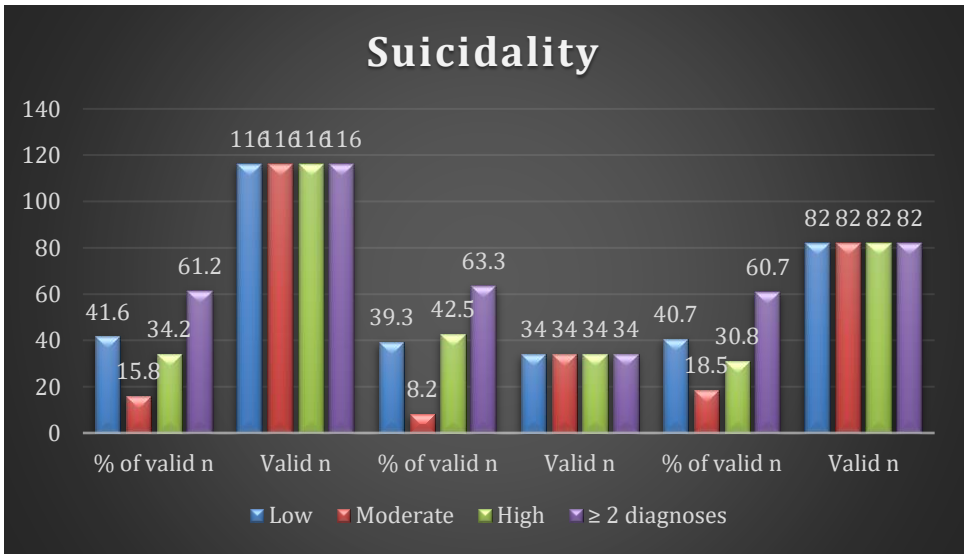

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Table: 4 paired-samples t-tests on Baseline Characteristic (SS)

Baseline Characteristic (SS)						
	Valid n	**M**	**SD**	**Test Statistic**	**P**	**d**
TOPF	120	108.2	11.8	–	–	–
RBANS total	119	92.7	13.9	t(88) = 9.21	< 0.001	1
Attention	118	96.5	14.7	t(88) = 6.12	< 0.001	0.65
Immediate memory	118	94.8	15.3	t(88) = 6.48	< 0.001	0.68
Delayed memory	118	92.2	14.8	-6.32*	< 0.001	–
Visuospatial/constructional	118	98.5	15.8	t(88) = 4.82	< 0.001	0.51
Language	118	94.5	14.7	-5.61*	< 0.001	–

The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) Standardized Scores (SS) and the baseline Test of Premorbid Functioning (TOPF) mean and standard deviation are given. Baseline TOPF SS were significantly higher than each of the individual RBANS index scores as well as the total RBANS score, according to the results of paired-samples t-tests. The baseline Delayed Memory and Language scores were found to be non-normally distributed (P = 0.026) by normality tests using the Shapiro-Wilk test. This led to the use of the Related-Samples Wilcoxon Signed Rank Test to evaluate differences between TOPF SS scores. In accordance, the statistics from the standardized tests are displayed. The acronyms RBANS (Repeated Battery for the Assessment of Neuropsychological Status), SS (Standardized Score), and TOPF (Test of Premorbid Functioning) represent these concepts.

“Differences Between Lost to Follow-up and Post-ECT Sample”

Several statistical tests were used, such as independent samples t-tests for continuous variables, Mann-Whitney U for non-normally distributed variables, and Pearson chi-square for

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categorical variables, to examine potential meaningful differences between participants who concluded the post-Electroconvulsive Therapy (ECT) assessment (n = 84) and those who were lost to follow-up (LTFU; n = 36).

Before treatment, participants in the LTFU group performed significantly worse than those who finished the post-ECT assessment on the RBANS Immediate Memory index, t (108) = -2.17, P = 0.032, d = -0.451, and the Delayed Memory index, Mann-Whitney U = 1,565.0, n_1 = 34, n_2 = 63, P < 0.001. Furthermore, there was a lower likelihood of prior ECT for those in the LTFU group (χ^2 (1) = 7.21, P = 0.008). For every other variable in Table 2, there were no baseline differences between the two groups that were statistically significant (P > 0.05).

T (103) = 0.215, P = 0.830, d = 0.048 showed no significant group differences when the immediate response to ECT (absolute change in BDI-II scores from baseline to mid-ECT) was analyzed.

Table: 5: Differences between Post-ECT Response Groups

	Between-groups comparison			Remitters		Responders		Non-responders	
Baseline characteristic	Test statistic	P	n2	% (Y)		n	% (Y)	% (Y)	
Previous ECT (Yes/No)	x2(=)=0.380	0.831	-	31.5		7-Mar	43.6	31.7	
Employed (Yes/No)	x2(2)=1.986	0.379	-	39.2		8-Mar	50.7	24.8	
100% BIL ECT (Yes/No)	x2(2)=0.729	0.704	-	71.3		6-Jun	67.4	79.1	
#of AC (I/>I)	x2(2)=2.696	0.275	-	88.9		10-Feb	78.5	68.3	
Maintenance ECT (Yes/No)	x2(2)=0.378	0.841	-	30.8		11-Feb	23.6	33.1	
	Test Statistic	P	n2	M	SD	M	SD	M	SD
Num sessions in 1st AC	K-W=0.67	0.748	-	13	2.26	11.4	3	12	3.5

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Age	F(2,60)=0.706	0.498	0.02	44.1	12.5	45.3	3.6	12.1	9.1
Education	F(2,60))=1.20	0.338	0.04	16.1	3.4	15.6	4.1	14.9	3.1
Psychiatric comorbidities	K-W=9.10	0.018*	-	2.0	0.88	3.4	2.4	3	2
Remitter < Responder		0.073							
Remitter < non-Responder		0.010*							
Responder < non-Responder		0.734							
TOPF SS	F(2,55) = 3.14	0.059	0.8	113	8.6	108	15.6	108.4	11.1
Remitter > responder		0.059							
Remitter > non-responder		0.491							
Responder > non-responder		0.336							
BDI-II	F(2,60) = 4.73	0.046	0.21	36	9.9	39.5	8	43.3	8.8
Remitter < responder		0.941							
Remitter < non-responder		0.018							
Responder < non-responder		0.664							
WHODAS	F(2,56) = 3.52	0.046*	0.18	19.8	8.9	27.8	11.6	26.8	11
Remitter < responder		0.23							
Remitter < non-responder		0.057*							
Responder > non-responder		1							
PAI anxiety	F(2,55) = 2.81	0.081	0.06	65.7	13.9	69.5	17.8	74.8	12.6
PAI suicidality	F(2,55) = 1.24	0.323	0.03	79.4	23.4	74.4	18.2	82.4	21.9
RBANS									
Immediate memory	F(2,59) = 0.12.3	0.4	0.02	97.5	13.7	101.6	15.3	98.6	1.5

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Delayed memory	F(2,59) = 0.102.7	0.911	0.009	98.8	12.3	99.3	10.7	97.3	16.5
Attention	F(2,59) = 0.178	0.85	0.03	96.7	11.4	100.3	17.1	98.8	17.7
Visuospatial/constructional	F(2,59) = 0.015	0.999	0.02	99.9	20.9	100.8	12.6	100.7	17.6
Language	F(2,59) = 0.551	0.59	0.03	98.2	10.7	97.6	7.3	95.6	9.7

"Using Pearson chi-square (categorical variables), one-way analysis of variance (continuous variables), or Kruskal-Wallis (non-normally distributed or failing the homogeneity of variance assumption) tests, we looked at baseline differences between post-ECT response groups." (Table 4). Three distinct groups were considered: non-responders, remitters, and responders (those who benefited from ECT but did not remit).

While there are significant differences in BDI-II scores, WHODAS scores, and psychiatric comorbidities, many baseline traits and cognitive variables do not change significantly between remitters, responders, and non-responders. These results shed light on the variables influencing the population under study's response to treatment.

Disability Symptoms

A linear mixed model indicated a noteworthy time-related impact on WHODAS scores, $F(4.32) = 13.35$, $P < 0.001$. In comparison to the baseline ($M = 25.80$, $SE = 1.10$), the average WHODAS scores exhibited a significant decrease at post-ECT ($M = 19.61$, $SE = 1.22$, $P < 0.001$), 6 months post-treatment ($M = 17.00$, $SE = 1.51$, $P < 0.001$), and 12 months post-treatment ($M = 19.47$, $SE = 2.12$, $P < 0.042$).

"Predicting Changes in Disability Symptoms"

The analysis involved calculating the absolute change from baseline to post-ECT for both BDI-II and WHODAS scores. The linear regression results showed a trend where BDI-II change scores ($M = -15.62$, $SD = 14.84$) exhibited a suggestive association with WHODAS change scores ($M = -6.10$, $SD = 12.27$), $F(2,10) = 4.89$, $P = 0.050$, $R_2 = 0.041$. This trend indicated that a more substantial reduction in depressive symptoms tended to predict a greater reduction in disability symptoms. Subsequently, the analysis was rerun after excluding one

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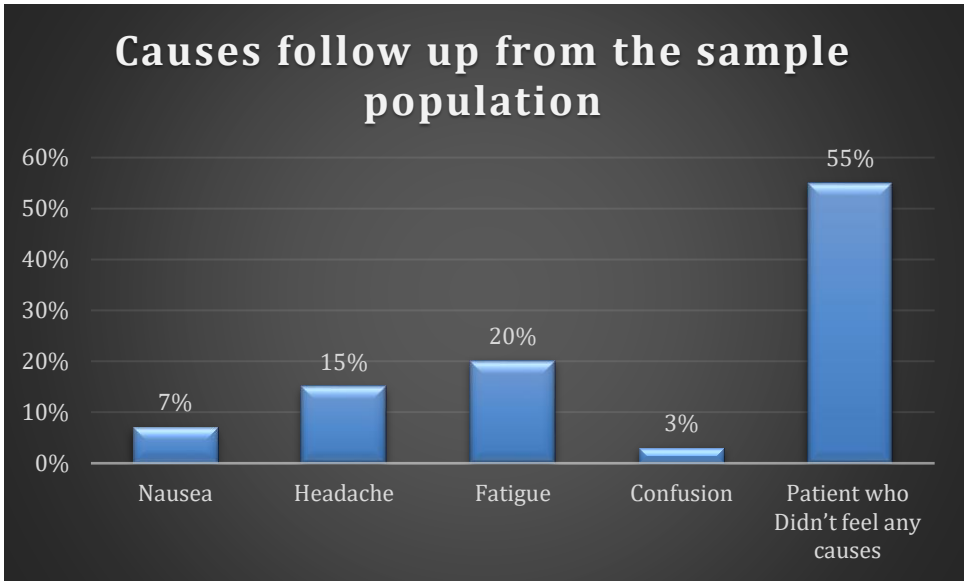
outlier (>3 SD from the mean) from the WHODAS change variable. The revised linear regression analysis demonstrated significance, $F(1, 75) = 3.50$, $P = 0.035$, $R_2 = 0.053$.

Table: 6: Causes follow up from the sample population

Causes follow up from the sample population	
Causes	% of Sample population
Nausea	7%
Headache	12%
Headache	20%
Confusion	3%
Patient who Didn't feel any causes	58%

The above table discusses the Causes follow up from the sample population. 7% of sample population feel Nausea, 12% feel Headache, 20% feel Headache, 3% feel Confusion, and 58% of the sample population didn't fell any Causes.

Graph: 4 Graphical representation of Causes follow up from the sample population



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Discussion

The study focuses on the efficacy of ECT in treating severe depression and examines how ECT affects major depressive disorder and its potential causes. Patients in the current study have a variety of clinical and demographic traits. Acute outpatient ECT was administered to 120 adult participants in the study who had major depressive disorder and mixed mood disorders.

Standardized tests, such as "the World Health Organization Disability Assessment Schedule (WHODAS) and the Beck Depression Inventory (BDI-II)," were used in the study to assess how much ECT affected depressive symptoms and functional disability. We gathered longitudinal data to monitor changes over time. The study evaluated the effect of ECT on depressive symptoms and associated disabilities using statistical analyses, such as linear mixed modeling.

According to the study, ECT was successful in lowering depressive symptoms in a diverse group of participants. Remission rates, however, differed according to the severity and complexity of the patients' conditions. The study's conclusions imply that although ECT can be helpful in lowering depressive symptoms, it may not always result in the anticipated rates of remission, particularly in situations with significant clinical complexity and severity. This emphasizes the necessity of more investigation to identify the variables influencing the variation in remission rates after electroconvulsive therapy.

The cause of ECT, Electroconvulsive therapy (ECT), once thought of as a last resort, is becoming more popular for treating severe mental illnesses such as MDD. According to recent research, it is more effective than conventional treatments, particularly for patients who are not responding to treatment. Studies like C. Liang et al. (2018) and Osler et al. (2018) have reported fewer side effects due to improved anesthesia and apparatus. Although there is promise for ECT as a first-line therapy for depression, especially when other treatments are ineffective, more research is needed to optimize its use.

Effect of ECT on major depressive disorder Found in other studies

Electroconvulsive therapy (ECT) has been considered a last resort treatment for severe mental disorders such as major depressive disorder (MDD) due to its unfavorable procedure and side effects. However, recent research suggests that ECT may have a greater effect than traditional treatments such as antidepressants and psychotherapy, especially for patients resistant to these methods. **(15), (16), (17)** ECT has been shown to be highly effective in ameliorating

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depression symptoms with fewer unwanted effects, **(17), (18), (19)** particularly when improved apparatus and anesthesia are used. **(18), (20)** Additionally, studies have indicated that ECT is relatively safe and effective, and it may be recommended for its ability to prevent relapse in patients who have responded to acute ECT **(21)** without the cost of memory loss found with other treatments. **(22), (23)** However, the mechanism behind the antidepressant effect of ECT remains under investigation, and further research is needed to predict responses in individual patients and enhance the current use of ECT. Overall, ECT shows promise as a potential first-line therapy for depression, especially in cases where traditional treatments have failed.

Conclusion

The study investigated the impact of ECT on major depressive disorder. It included a sample of 120 adults who received ECT at an outpatient clinic. The participants had severe depressive symptoms and multiple psychiatric diagnoses at baseline. The study found that ECT significantly improved depressive symptoms and functional disability, with these improvements sustained up to 12 months post-treatment. However, the clinical remission and response rates were lower than those reported in controlled trials, and participants who lost to follow-up, potentially affecting the reported outcomes. The study highlighted the importance of considering clinical complexity and severity in predicting treatment outcomes. Additionally, the findings underscored the need for further research into the impact of baseline cognitive functioning and stimulus parameters on ECT outcomes. Overall, ECT was found to be effective in reducing depressive symptoms in a heterogeneous sample, according to the study's findings. However, clinical complexity and severity may have contributed to ECT's lower-than-anticipated remission and response rates.

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