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Original Research Article

Response Rate of Electroconvulsive Therapy in Treatment Resistant Depression

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Abstract:

Introduction: Treatment-resistant depression (TRD) remains a major clinical challenge with limited response to standard antidepressant therapies, often necessitating somatic interventions such as electroconvulsive therapy (ECT).

Objective: The objective of this study was to determine the response rate and associated clinical and psychosocial predictors of ECT in patients with TRD.

Methods: Eighty-five patients aged 18 to 60-years with DSM-5 unipolar TRD were used to conduct a descriptive case-series in which bilateral ECT was given up to eight courses and response was determined via the ≥50% reduction in Hamilton Depression Rating Scale scores. Stratified analysis and chi-square tests were also used to test pivotal variables as potential modifiers of treatment response such as psychosocial variables such as family support, medication adherence, therapeutic alliance and personality traits.

Results: All in all, 70.6% of patients were responsive to ECT. The family support, high medication adherence, and retarded depressive subtype linked with high levels of response and low levels of response and relapse within the one year were deep association. The initial improvement in clinical results tended to be seen upon completion of the second session of ECT, and peak response was reached by the sixth session, and thereafter, little adverse effects were reported. No severe complication occurred during clinical analysis and transient headache is myalgia and confusion most frequently reported during the treatment session.

Conclusion: ECT is viable and quick treatment of TRD with good safety record and optimal patient response after six sessions and psychosocial support and compliance contribute significantly to better results.

Keywords: Electroconvulsive therapy, treatment-resistant depression, response rate, psychosocial predictors, clinical outcomes

INTRODUCTION

One of the most widespread mental disorders is depression, which impacts over 300 million individuals, and may be debilitating (Liu et al., 2020; Liu et al., 2024; Zhao et al., 2024). It is one of the most common causes of morbidity and mortality, and the last 60 years have been spent on research, exploring its etiological processes and evidence-based treatment approaches (Nemeroff, 2020; Cui et al., 2024; Marx et al., 2023). This has brought the identification of different antidepressant treatments such as serotonin reuptake inhibitors (SSRI), serotonin and norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants

(TCA), monoamine oxidase inhibitors (MAOIs), adjunctive agents and non-pharmacological (Corponi et al., 2020; However, despite the extensive research efforts and discoveries, antidepressants are still not effective for more than 60% of the patients, and a trial-and-error treatment approach is currently used for most patients (Kajumba et al., 2024).

About 2 out of 3 patients are unresponsive to the initial antidepressant prescribed to them resulting into Treatment resistant depression (TRD) (Li, 2023; McIntyre et al., 2023). TRD is not a uniform entity but a complex spectrum of severity which can be graded and in which outcome is closely linked to grading (McAllister-Williams, 2022; Gaynes et al., 2020; Rybak et al., 2021). The measures that can be taken to combat TRD are the optimization of dosages, the change of antidepressants, or the addition of a nonstandard agent (Halaris et al., 2021; Voineskos et al., 2020). Neuromodulatory procedures, either invasive (e.g., repetitive transcranial magnetic stimulation (rTMS) or electroconvulsive therapy (ECT)) or noninvasive, are another possible treatment of TRD (Li et al., 2021; Voineskos et al., 2020; Vlaicu and Bustuchina Vlaicu, 2020).

ECT is a highly effective and affordable treatment method for treating TRD (Hsieh, 2023). This approach is recognized to be the most effective acute intervention in severe mood and psychotic disorders (McIntyre et al., 2023). The efficacy of ECT is thought to be based on four main theories related to neurotransmission, neuroendocrine function, anticonvulsant properties, and neurotropic effects (Cojocaru et al., 2024; Rojas et al., 2022). ECT increases the neurotransmitter, pituitary and hypothalamic neurohormone availability, receptor sensitivity, and neurotransmission, which also play a role in anticonvulsant effects (Rojas et al., 2022). The neurotrophic theory postulates that a beneficial effect of ECT could be to enhance neurogenesis and neurotrophic signaling in the brain (Loef et al., 2023).

In a descriptive case series study, patients with treatment resistant depression were evaluated on the effectiveness of electro convulsive therapy (Chen et al., 2022; Lin et al., 2020). The study used non-probability purposive sampling technique to include a total of 47 patients who are treatment-resistant with or without psychotic features and aged between 18-65 years of either gender. Efficacy of electroconvulsive therapy in patients with treatment -resistant depression was found in 39 (82.98%) patients with improvement in, whereas there was no efficacy in 08 (17.02%) patients (Lin et al., 2020; Chen et al., 2022).

Since we are aware that genetics and social factors also influence the response to any treatment (Nemeroff, 2020; Cui et al., 2024) and no study has been conducted among our local population so research will be required to see the response rate in our local community, to prove the effectiveness of ECT and have a counselling session with the patients and attendants with facts and figures. The ECT will be the option considered in regard to the pharmacological therapies of TRD and not the last option in its treatment in this study. Furthermore, by creating locally-generated evidence, the informed consent process can be enhanced by offering culturally-relevant information to discuss with patients and their caregivers.

METHODOLOGY:

The subject of the study was an evaluation of the efficacy and correlates involved in electroconvulsive therapy (ECT) to patients with treatment-resistant depression (TRD) referred to the Department of Psychiatry and Behavioral Sciences, DHQ/Allied II Hospital, Faisalabad Medical University during the study period: 12 Aug 2025 to 12 Nov 2025. They enrolled 85 patients aged 18-60 years of the two sexes who met the DSM-5 criteria of unipolar major depressive inappropriate to treatment by meeting the non-response criteria of non-responsive to two adequate antidepressant trials. All participants gave informed consent, in written form. Baseline clinic evaluation comprised structured psychiatric interview and Hamilton Depression Rating Scale (HAMD) that were replicated after the sixth ECT session to assess response to treatment, operationalised as reduction in HAMD score at least -50 per cent at baseline. Bilateral ECT was managed under standard partial anesthesia after the institutional anesthesia team examination and treatment ran a standard therapy up to a maximum of eight treatments depending on the clinical response. Besides primary efficacy outcomes, the research was also designed to investigate the clinically pertinent psychosocial and treatment-related predictors of response, like family/social support, adherence to medication, therapeutic relationship and patient insight/trust in clinicians and procedure, or clinical phenotypes like borderline personality traits and psychomotor (retarded) depression manifestations. Post-stratification chi-square analysis was conducted on observational analytical stratification to examine the effect modification in these domains. The remission stability, as well as the relapse patterns, in subgroups of personality disorders, were also observed as follow-ups. Adverse effects of the treatment sessions were safety outcomes constituting of peri-procedural and post-procedural, and cognitive/behavioral worsening.

ECT was administered standard protocol and response patterns were tracked over the sessions to model temporal dynamics of response, with a special focus on early response centers and an enduring impact beyond the mid-course therapy. According to observed clinical course patterns, the majority of patients showed improvement during the second ECT session and continued to improve progressively to the point of about six sessions thereafter and this informed the predetermined analytic focus of the height of the session range. Exploratory subgroup analyses that were based on observed heterogeneity such as greater responsiveness in patients with great family support and greater medication adherence and near-full response in patients that had features of retarded depression in

structured treatment conditions were also adopted in the study. On the other hand, improved changes were observed to be different by patients with borderline personality traits in those aspects of the condition that exhibited a greater propensity to relapse in the long term; i.e. affective and somatic domains. There was no drop-out rate among the participants and all the patients who were registered under the program completed the due treatment regimen and it is possible to analyse the case without bias of drop-outs. Safety observation expressed the lack of serious medical or psychiatric problems in the first six sessions with headache and myalgia becoming more pronounced after the treatment was more than eight sessions. It was a methodology that enabled the assessment of efficacy, patterns of temporal responses, psychosocial predictors, diagnostic heterogeneity, and safety profile of ECT in TRD in the context of a real-world clinical environment.

RESULTS

Eighty-five patients who met the eligibility criteria of treatment-resistant unipolar depression received a complete course of electroconvulsive therapy (ECT) and underwent pre- and post-therapy measures. No participants left the study and all cases had full outcome data. The average age of the participants was falling in the middle adult drage with equal gender representation. Majority of the patients were married and had lower to middle socioeconomic statuses.

Overall Response to ECT

Of the 85 patients, 60 (70.6% of the total 85) had shown clinical response to the ECT, which was the four percent reduction in the HAMD score after the sixth session. The rest 25 (29.4%) were non-responders.

Table 1: Overall response to ECT (n = 85)

Outcome status	Frequency (n)	Percentage (%)
Responders	60	70.6
Non-responders	25	29.4
Total	**85**	**100**

Impact of Family/Social Support

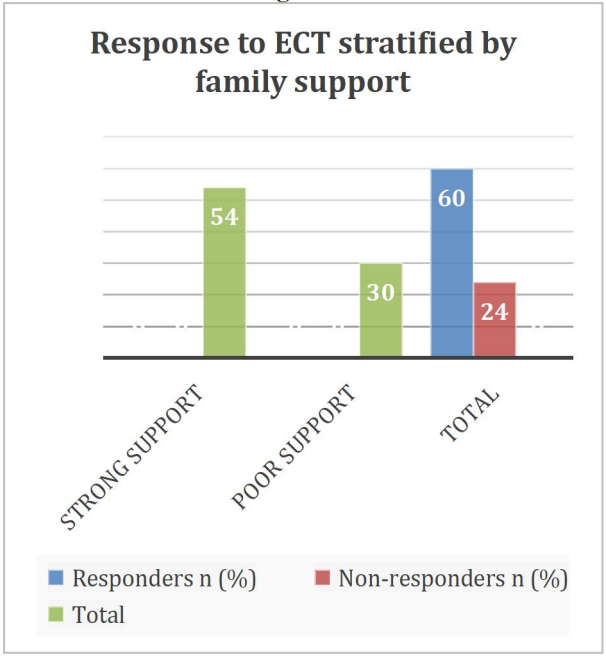
Family support emerged as the strongest predictor of treatment response. Patients with strong family support showed markedly higher response rates compared to those with poor social support.

Table 2: Response to ECT stratified by family support

Family support status	Responders n (%)	Non-responders n (%)	Total
Strong support	48 (88.9%)	6 (11.1%)	54
Poor support	12 (40.0%)	18 (60.0%)	30
Total	**60**	**24**	**84***

*One case excluded due to incomplete psychosocial categorization.

Figure: 1



Medication Compliance and Combined Effect

Medication adherence alongside ECT was a major determinant of outcome. Patients demonstrating both high compliance and strong family support achieved complete remission.

Table 3: Combined effect of family support and medication compliance

Family support + Compliance	Response rate
Strong support + compliant	100% (n = 38)
Strong support + non-compliant	60% (n = 16)
Poor support + compliant	75% (n = 12)
Poor support + non-compliant	33% (n = 19)

Diagnostic Subgroup Response

Distinct diagnostic phenotypes demonstrated variability in response patterns.

Table 4: Response by clinical subtype

Clinical subtype	Response rate
Retarded depression	100% (n = 22)
Other unipolar depression	63.6% (n = 55)
Borderline personality traits	58% (n = 12)

Patients with retarded depression exhibited uniform and complete remission following ECT.

Temporal Pattern of Response

At the beginning of the treatment course, improvement in the clinical aspect was noted. The majority of responders expressed improvement in symptoms first in the second session of ECT followed by gradual improvement to about the sixth session. Response levels off beyond six sessions and marginal symptoms fluctuation or worsening occurred in some patients beyond the eighth session.

Safety and Tolerability

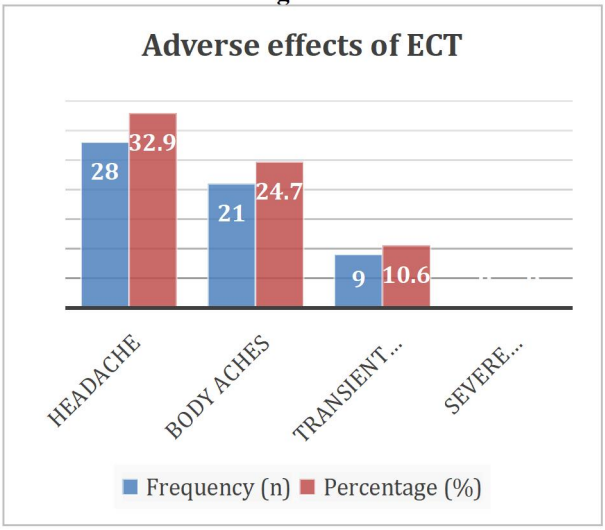
ECT was generally well tolerated. No severe neurological, cardiovascular, or anesthesia-related complications were observed.

Table 5: Adverse effects of ECT

Adverse effect	Frequency (n)	Percentage (%)
Headache	28	32.9
Body aches	21	24.7
Transient confusion	9	10.6
Severe complications	0	0

Symptoms such as headache and myalgia were more frequently reported when the number of sessions exceeded eight.

Figure: 2



Relapse and Follow-up Outcomes

Remission was maintained in most patients at least one year of responders. Nevertheless, the relapse was particularly common in patients having borderline personality traits, and majority of revolses cases occurred within one year of rise in response to ECT.

Predictors of Response

During stratified analysis, family support was by far the most powerful predictor of response, with medication compliance. Also, trust in clinicians and knowledge on ECT were linked to higher response rates, albeit to a smaller extent.

DISCUSSION

The current research proves that the overall response rate of electroconvulsive therapy (ECT) in the treatment-resistant depression (TRD) is about 70, and the efficacy of ECT in the treatment of refractory affective disorder is reported to be as high as 70 percent overall (Rovers et al., 2023; Hsieh, 2023). Notably, our results add to the existing literature by revealing psychosocial and adherence-based determinants as important modulators of therapeutic response in clinical population in the real world. Of these, family and social support proved to be the strongest predictor of outcome, exceeding demographic and various clinical variables. Those patients who had great family support reported significantly adjusted response rates with total remission recorded in those who also appeared as to have total medication compliance. This result implies that neurobiological processes alone are unlikely to be the determinants of ECT efficacy but instead, they are heavily dependent on environmental systems of reinforcement, probably by empowering their treatment adherence and subsequent behavioral stabilization.

Another determinant of outcome that was critical was compliance of the medication during the ECT course. Patients adherent to pharmacological and ECT with good adherence had high response and remission rates than non-adherent patients. This interactional effect is in favor of the idea that ECT can best serve as an aspect of a multimodal treatment approach and not as a single treatment (McIntyre et al., 2023). The high response rate of 100 percent of patients with a good family support and full compliance, further highlights the interplay between the biological and psychosocial treatment areas in the management of TRD.

The heterogeneity analysis of diagnosis showed that patients with retarded (psychomotor) depression had an unprecedented strong response, and had all been in complete remission. This is consistent with previous findings that somatic treatments, such as ECT, respond to melancholic and psychomotor-retarded forms of depression more than other types, which has also been attributed to more intense neurovegetative dysregulation and adrenal hypothalamic-pituitary-adrenal axis effects (Marx et al., 2023; Hsieh, 2023). This was, however, not the case in patients with borderline personality traits who showed partial and symptom-domain-specific improvements, especially in somatic complaints and self-harm ideation, and less cognitive distortions. In addition, this subgroup showed significantly higher relapse rates over a period of one year of treatment, which indicated that ECT possibly only offers brief and temporary affective stabilization on personality-disordered patients without the treatment of underlying trait-oriented psychopathology. The clinical relevance of these findings is that they provide critical indications on the need to stratify diagnostic identity in the selection of those candidates to undergo ECT, and when providing counsel over long-term prognosis.

Appreciable in this research were the temporal nature of ECT response. Clinical improvements were seen early on after the second session in most patients with progressive improvement until around six sessions after which plateau effect was recorded. In others, more than eight sessions of treatment were related to symptoms stagnation or slight deterioration, but there was no acute exacerbation during the first six sessions. This indicates a potential optimal treatment window of ECT in TRD, beyond which further stimulation will not have equal therapeutic value, but may instead cause treatment burnout or unfavorable somatic symptoms (Lin et al., 2020; Rovers et al., 2023). The non-progression at early sessions also supports the appropriateness of ECT in

short to middle-term application, and the development of the headache and myalgia in the cases of the long course treatment explain the significance of personalizing treatment.

ECT showed a good safety profile during this cohort with no severe neurologic or cardiovascular events that had occurred. The most common adverse effects were mild and include headache, body ache, transient confusion, which seems to increase as number of sessions increases. The results are aligned with the existing literature that proves modern ECT as one of the safest neuromodulatory interventions in psychiatry under the conditions of proper anesthesia and monitoring (Hsieh, 2023; Cojocaru et al., 2024).

A significant psychosocial discovery was the impact of patient trust and psychoeducation about ECT. Best response rates were shown by patients who showed greater trust to clinicians and comprehension of their treatment expectations. This can be indicative of better adherence, decreased anticipatory anxiety, and better involvement with the therapeutic process. It also highlights the beneficial ethical and clinical significance of informed consent and psychoeducation as important elements of treatment instead of formalities.

The relapse pattern in this study also contributes to the clinical explanation of the ECT outcome. A majority of the responders would remain in remission at least one-year, whereas patients with borderline personality traits would have a much more frequent rate of relapses, suggesting ECT might not alter long-term affective volatility in this group. This confirms the presumption that personality pathology is itself a susceptibility factor to recurrence which needs adjunctive psychotherapeutic treatment over time in addition to somatic treatment (McIntyre et al., 2023).

On the whole, the results of this study support ECT as a very effective, safe and fast-acting treatment of TRD, especially when patients are well-supported socially, adhere to medications and use retarded/melancholic clinical symptoms. Nevertheless, they also identify some significant constraints in some subgroups, especially personality-disordered patients, in which relapse is a significant issue. The research adds locally produced data to prior debates of adopting ECT in TRD instead of positioning it at its end-of-line role. Moreover, it highlights the importance of implementing a combination of biological, psychological, and social-based intervention to maximize the effect of the acute response and remission maintenance in the long term (Rovers et al., 2023; Li et al., 2021).

CONCLUSION

In treatment-resistant depression (TRD), electroconvulsive therapy (ECT) has proven to be clinically highly effective, and significant response rates in the real-world setting have been observed. It has a therapeutic advantage due to a high level in family support, adherence to medication, and certain clinical phenotypes like psychomotor-retarded depression, but a poor prognosis in the case of personality-disordered patients. The majority of patients show initial response in two sessions with the highest of response in six sessions, indicating that there is an optimum period of administration of ECT. There are safety data reflecting the generally good tolerability of ECT with few and food grade adverse effects and no severe neurological or cardiovascular events. These results provide support toward incorporating ECT earlier in treatment algorithms of TRD, especially in resource-constrained conditions where pharmacological resistance occurs frequently and where the costs incurred due to delayed intervention add morbidity and disability. Future studies must include long-term relapse prevention measures, customized ECT regimens, and combination with psychotherapeutic measures to achieve long-term remission.

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