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RESEARCH

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Electroconvulsive therapy in Oman: a national audit of demographics and standards

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Abstract

Background We aim to address the dearth of knowledge regarding general electroconvulsive therapy practice in Oman, by examining and investigating the electroconvulsive therapy practices at all hospitals providing electroconvulsive therapy across the country, and to compare our local practice against the National Institute for Health and Care Excellence guidelines on the appropriate use of electroconvulsive therapy to inform the development of guidelines locally. Sultan Qaboos University Hospital and Al Masarra Hospital were included in a nationwide audit of all hospitals in Oman that administer electroconvulsive therapy. The demographics, diagnostic and electroconvulsive therapy indications, treatment characteristics, and side-effect profiles of all patients who had electroconvulsive therapy between January 2019 and December 2020 were collected from the hospital's electronic data. A descriptive analysis of the results was performed.

Results The total number of patients was 197 (92 males and 105 females). The most common diagnosis was schizophrenia 32.5%, followed by major depressive disorder 31.5%. The most common immediate side effect was headache 10.2%, followed by dizziness 7.1%, and amnesia 4.1%. Only 57.4% of patients who received electroconvulsive therapy met the NICE guidelines for appropriate electroconvulsive therapy use. Clinical status was assessed after each electroconvulsive therapy session for 66% of patients, and cognitive function monitoring was achieved for only 7.6% of patients.

Conclusions The current audit has indicated that the assessment of the clinical status and cognitive functions of electroconvulsive therapy patients is inadequate. Because there is a significant rate of cognitive dysfunction following electroconvulsive therapy delivery, cognitive assessment before, during, and after therapy should be more rigorously implemented and documented.

Keywords ECT, Audit, NICE guidelines, Side effects, Characteristics, Oman

Background

Electroconvulsive therapy (ECT) is a noninvasive treatment modality that uses an electrical current to induce a brief seizure in the patient. ECT must generate a controlled and monitored seizure lasting between 30 and 90 s to be considered therapeutic, and it is commonly used for patients with acute or treatment-resistant psychiatric disorders [1]. Despite ECT's well-established effectiveness and safety, it is considered to be one of the most underutilized treatment modalities, largely due to stigma and the negative portrayal of ECT by the media [2]. Nevertheless, research has shown that most patients who have undergone treatment with ECT had favorable attitudes and were satisfied with the treatment [3].

Although there are no definite contraindications to ECT, it can cause side effects and may be seriously harmful to some individuals. As a result, all patients must be

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evaluated before ECT for the presence of cerebral or cardiovascular diseases, as these conditions can be linked to an increased risk of complications from general anesthesia and seizure induction [4]. Most patients experience cognitive side effects during and after ECT, such as postictal disorientation, retrograde amnesia, and anterograde amnesia [5]. Objective examinations, on the other hand, show that the cognitive impairments generated by ECT are transient [5]. Headaches, myalgias, nausea, vomiting, drowsiness, and musculoskeletal weakness are some of the other side effects [4].

ECT-related outcomes depend largely on the quality of care and adherence to evidence-based guidelines [6]. As a result, establishing precise quality standards that can be applied to monitor patient safety and program compliance is an essential step toward achieving best practices for ECT safety and efficacy. Treatment standards and guidelines have been developed by the Royal College of Psychiatrists [7] and the American Psychiatric Association [8], and in several countries around the world, practice guidelines have been developed [9]. However, in Oman, there are no policies and guidelines issued and utilized by the mental health services where ECT is performed. Moreover, there is a wide variation in the practice in regards to clinical monitoring and cognitive assessment of ECT recipients, and it is worth noting that there is no specific accreditation system for ECT in Oman, such as the ECT Accreditation Service (ECTAS) in the United Kingdom [5]. That being the case, in this national audit, we aim to examine the clinical characteristics of patients receiving ECT and compare our local practice to NICE guidelines on the appropriate use of ECT. The NICE guidelines provide explicit standards to audit against and are therefore an excellent tool for service improvement. Consequently, this will inform the development of guidelines for the improvement and standardization of the procedure nationally. In Oman, there are only two tertiary hospitals that provide ECT services: Sultan Qaboos University Hospital and Al Masarra Hospital, both of which are located in Muscat, the capital city, and serve approximately 5 million people.

The audit aims the following:

- To determine the characteristics of patients who receive ECT
- To compare the practice of ECT in Oman with the recommendations of the NICE guidelines on the appropriate use of ECT.

Methods

We conducted a retrospective descriptive study to examine the electronic records of all patients aged 18 years and above who received electroconvulsive therapy at all psychiatric institutions providing ECT in Oman. In Oman, there are only two hospitals that offer ECT. These are Al Masarra Hospital and Sultan Qaboos University Hospital; both of these hospitals belong to the governmental sector. All patients in Oman can receive tertiary care either at the Sultan Qaboos University Hospital or Al Masarra Hospital. Sultan Qaboos University Hospital is a teaching hospital affiliated with the College of Medicine and Health Sciences, and ECT services are provided for only admitted patients, and they are offered through the Department of Behavioral Medicine, which has 28 psychiatric beds. On the other hand, Al Masarra Hospital is a specialized psychiatric care hospital, and it provides ECT for both inpatient and outpatient departments; the inpatient unit includes 245 beds.

The study was conducted between January 2019 and December 2020. The electronic records were retrieved from the hospital information system and were then assessed for documentation of the patient's demographics, diagnosis, ECT indications, ECT treatment characteristics, and the immediate as well as long-term side-effect profile (6-month follow-up). The main outcome measure was to determine whether ECT was delivered and monitored per the criteria outlined by the NICE guidelines on the use of electroconvulsive therapy (Table 1) published on April 26, 2003 [10]. According to the NICE guidelines, a number of criteria must be met, and each criterion must meet a predetermined level of standards. Comparing the number of cases in our practice that meet the NICE guidelines' specified standards allowed us to measure the extent of our compliance with the NICE guidelines. Moreover, in this audit, the results were then analyzed using a descriptive approach.

Results

Compliance achieved in relation to NICE guidelines on the use of electroconvulsive therapy

As shown in Table 1, the NICE guidelines were followed, and 100% compliance was achieved in all standards except 5 standards. Only 57.4% of patients who received ECT met NICE guidelines for the appropriate ECT use. Clinical status was assessed after each ECT session for 66% of patients. Cognitive function monitoring was achieved for only 7.6% of patients. A total of 1.5% of patients had a depressive illness and received maintenance ECT, and 32.5% of patients with a schizophrenia diagnosis received ECT.

Patient demographic and treatment characteristics

As shown in Table 2, a total of 197 patients underwent ECT during the study period. The majority of the patients 54.8% were 18–44 years old, followed by 22.8% from the elderly age group (> or equal to 60 years old) and 22.3%

Table 1 Compliance achieved in relation to NICE guidelines on the appropriate use of ECT

Criterion	Standard	Exception	Definition of terms	Compliance achieved
1. The individual receiving ECT has one of the following: a. Severe depressive illness b. Catatonia c. A prolonged or severe manic episode	100% of individuals receiving ECT	None	Local clinicians will have to agree on how and where the indications for ECT are documented for audit purposes	57.4% of individuals receiving ECT
2. ECT is used to achieve rapid and short-term improvement of severe symptoms when an adequate trial of other treatment options has proven ineffective and/or the individual has a potentially life-threatening condition	100% of individuals receiving ECT	None	Local clinicians will have to agree on how severe symptoms and response to other treatment options and potentially life-threatening conditions are documented for audit purposes	100% of individuals receiving ECT
3. An assessment of the risks and potential benefits of ECT for the individual is documented	100% of individuals receiving ECT	None	The documented assessment before treatment should note the following: risks associated with the anesthetic; current comorbidities; anticipated adverse events, including cognitive impairment; and the risks of no treatment	100% of individuals receiving ECT
4. The individual provides consent for each course of ECT treatment	100% of individuals receiving ECT	A. The individual does not have the ability to grant or refuse consent, in which case advance directives are fully taken into account and the individual's advocate and/or carer is consulted B. The individual is detained under the Mental Health Act	Local clinicians should agree on how consent to ECT is documented for audit purposes A course of ECT is usually 6 to 12 sessions, usually given at the rate of two a week. The individual who has had/is having ECT should be asked for his/her views as to whether or not this criterion is being met	100% of individuals receiving ECT
5. The consent process provides that the clinician(s) responsible for treatment carries out all of the following: a. Involves the individual's advocate and/or carer where possible b. Provides full and appropriate information in a suitable format and language to enable an informed discussion c. Explains and discusses the general risks of ECT, risks specific to the individual, and enhanced risks for individuals in specific groups and potential benefits to the individual d. Does not pressure or coerce the individual into consent to the ECT treatment e. Reminds the individual that he/she has the right to withdraw consent at any point	100% of individuals receiving ECT	A. The individual is detained under the Mental Health Act B. The individual does not have the ability to grant or refuse consent but is compliant with treatment, and 5a-e is carried out with an advocate and/or carer	Local clinicians should agree on how the format and language used to communicate the information provided and the involvement of advocates or carers prior to consent to ECT are documented for audit purposes See 3 above for a list of general risks to be discussed Groups of people for whom there may be enhanced risks to be discussed include individuals who are pregnant older or a child or young person The individual who has had/is having ECT should be asked for his/her views as to whether or not this criterion is being met	100% of individuals receiving ECT

Table 1 (continued)

Criterion	Standard	Exception	Definition of terms	Compliance achieved
6. The individual's clinical status is assessed after each ECT session	100% of individuals receiving ECT	None	Local clinicians should agree on what constitutes an assessment of clinical status following an ECT session	66% of individuals receiving ECT
7. The individual's cognitive function is monitored as follows: a. On an ongoing basis b. At a minimum at the end of each course of treatment	100% of individuals receiving ECT	None	Local clinicians should agree on what constitutes monitoring of cognitive function and how monitoring is documented for audit purposes The individual who has had/is having ECT should be asked for his/her views as to whether or not this criterion is being met	7.6% of individuals receiving ECT
8. ECT is stopped if one of the following occurs a. A response is achieved b. There is evidence of adverse effects c. The individual withdraws consent	100% of individuals receiving ECT	None	Local clinicians will have to agree on what constitutes a desired response and evidence of adverse effects for audit purposes The individuals who has had/is having ECT should be asked for his/her views as to whether or not this criterion is being met	100% of individuals receiving ECT
9. A repeat course of ECT is provided only for an individual in either one of the following circumstances a. The individual meets criteria 1 and 2 above and has previously responded well to ECT b. The individual has not responded previously but is experiencing an acute episode, and all other options have been considered and following discussion with the individual and/or where appropriate the carer or advocate of the risks and benefits of such a course of action	100% of individuals receiving a repeat course of ECT	None	Local clinicians will have to agree on what constitutes a good response to ECT for audit purposes See 4 above for definition of course of treatment See 3 and 5 above for reference to risks	100% of individuals receiving a repeat course of ECT
10. ECT is used as a maintenance therapy in depressive illness	0% of individuals receiving ECT	None		1.5% of individuals receiving ECT
11. ECT is used for the management of schizophrenia	0% of individuals receiving ECT	None		32.5% of individuals receiving ECT

Table 2 Patient demographic and treatment characteristics

Characteristic	*n* = 197	(%)
Sex		
Male	92	46.7%
Female	105	53.3%
Age groups		
18–44 years old	108	54.8%
45–59 years old	44	22.3%
> or equal to 60 years old	45	22.8%
Type of ECT treatment		
Index ECT course	189	95.9%
Maintenance ECT course	8	4.1%
Frequency of ECT sessions		
Three times per week	155	78.7%
Two times per week	42	21.3%
Psychotherapy prior to ECT		
Yes	24	12.2%
No	173	87.8%

Table 3 Clinical diagnosis and indication for ECT

Diagnosis	*n* = 197	%
Major depressive disorder	62	31.5%
Bipolar disorder	21	10.7%
Illness anxiety disorder	1	0.5%
Obsessive–compulsive disorder	5	2.5%
Schizoaffective disorder	30	15.2%
Schizophrenia	64	32.5%
Psychotic disorder due to another medical condition	2	1%
Delusional disorder	1	0.5%
Puerperal psychosis	6	3%
Puerperal depression	2	1%
Personality disorder	3	1.5%
Indication		
Severe depressive illness & resistant to antidepressants	84	42.6%
Severe psychotic illness & resistant to antipsychotics	73	37.1%
Suicidal	11	5.6%
Catatonia	13	6.6%
A prolonged or severe manic episode	16	8.1%

from the age group 45–59 years. The majority of patients 87.8% did not undergo psychological therapy before ECT.

Clinical diagnosis and indication for ECT

As Table 3 presents, the most common diagnosis for patients receiving ECT was schizophrenia 32.5%, followed by major depressive disorder 31.5%. The most common indication for ECT use was a severe depressive illness that is resistant to antidepressants 42.6%, followed by a severe psychotic illness that is resistant to antipsychotics 37.1%, a prolonged or severe manic episode 8.1%, catatonia 6.6%, and suicidality 5.6%.

Side effects following ECT

As Table 4 shows, immediate side effects were recorded for 73 patients (37%). The most common immediate side effect was headache 10.2%, followed by dizziness 7.1%, and amnesia 4.1%. One-hundred seventy-two patients out of 197 received outpatient department follow-up after the ECT course, and no long-term side effects were recorded.

Cognitive and clinical status (mood/psychotic symptoms) assessment

As Table 5 shows, 59 patients (29.9%) were assessed for their cognitive functions before the course of treatment, but only 12 patients (6.1%) were assessed on an ongoing basis. However, after the course, only 16 patients (8.1%) were assessed upon discharge. The cognitive functions were assessed using the mini-mental state examination (MMSE) and a clinical interview conducted by the parent team caring for the patients. Meanwhile, mood and psychotic symptoms were assessed regularly after each ECT session for only 130 patients (66%). For those patients, the mood and/or psychotic symptoms were assessed by clinical interviews conducted by the parent team caring for the patient. The number of patients who experienced an improvement in mood/psychotic symptoms was 176 patients (89.3%).

Discussion

This is the first comprehensive audit of ECT practice in Oman. Therefore, this audit can provide a framework for a quality assurance strategy that can be used to monitor ECT procedure safety and effectiveness. In addition, it can lead to future ECT delivery improvements across the country. The audit revealed that our current ECT practice achieves 100% compliance with only half of the standards recommended by the NICE guidelines. We fell short of 5 out of 11 standards, i.e., standard numbers 1, 6, 7, 10, and 11.

Standard 1 requires that individuals receiving ECT have one of the following indications: severe depressive illness, catatonia, or a prolonged or severe manic episode. At this standard, we have achieved a compliance rate of only 57.4%. Of the remaining individuals, 37.1% underwent ECT for a severe psychotic illness that is resistant to antipsychotics, and 5.6% of individuals underwent ECT because they were suicidal. Moreover, standard 11 requires that no individual with a schizophrenia diagnosis receives ECT treatment. Despite that, the most common diagnosis for patients

Table 4 Side effect following ECT

Immediate side effect	***n*** **= 197**	**%**
Headache	20	10.2%
Dizziness	14	7.1%
Amnesia (or we can say loss of memory events before or after ECT)	8	4.1%
Confusion	6	3%
Sore muscles	4	2%
Jaw pain	6	3%
Blood pressure alteration	2	1%
Tooth injury	2	1%
Heart rhythm disturbances	3	1.5%
Pulmonary embolism	1	0.5%
Post ECT fever	2	1%
ECT-related anxiety	1	0.5%
Shortness of breath	1	0.5%
Hyperprolactinemia	1	0.5%
Nausea and vomiting	2	1%
Long-term side effects		
Number of patients who received OPD follow-up for long-term side-effect assessment	172	87.3%
Number of patients who lost follow-up and did not receive long-term side-effect assessment	25	12.7%
Among patients who received OPD follow-up, there was no long-term or permanent loss of memories	0	0%

Table 5 Cognitive and clinical status (mood/psychotic) assessment

Cognitive assessment	***n*** **= 197**	**%**
Cognitive assessment prior to ECT course	59	29.9%
Cognitive function monitored on ongoing basis	12	6.1%
Cognitive function monitored at the end of ECT course	16	8.1%
Clinical status (mood/psychotic) assessment		
Clinical status assessed after each ECT session	130	66%
Number of patients who experienced improvement in mood/psychotic symptoms	176	89.3%

receiving ECT in our sample was schizophrenia 32.5%. NICE guidelines do not recommend the use of ECT for patients with schizophrenia. Because there were no randomized clinical trials that compared the use of ECT to atypical antipsychotics, research suggests that ECT is not more effective than antipsychotic medication and may even be less effective, although there is some indication that ECT combined with pharmacotherapy is more beneficial than pharmacotherapy alone. However, the evidence is not conclusive [11]. Few studies have looked into the link between ECT and suicide rates. Some studies have found that ECT can reduce suicidal ideation [12] and attempts [13]. On the other hand, some other studies have found that ECT is linked to an increased risk of suicide when compared to non-ECT. [14, 15] Because of these discrepancies, the effect of ECT on suicide risk is inconclusive.

Standards 4 and 5 are concerned with obtaining the individual or the career's informed consent before each ECT course. We have successfully met this criterion in full. However, in a recent audit, conducted in England, more than a third of ECT (37%) is still given without consent [16]. In both SQUH and Al Masarra Hospital, the treating teams, which include consultants, specialists, and psychiatry residents, meet all together with the patient and their caregivers. They discuss in suitable and simple language the benefits, general risks, and specific risks related to each patient. The patient and/or his caregiver is then referred to the general anesthesiologist to discuss the risks related to general anesthesia. The patient and/or his carer is then requested to sign a consent form, either electronically or on paper, which is subsequently added to their medical file. The consent document also includes the signatures of the treating psychiatrist, general anesthesiologist, and the designated staff nurse.

Standard 6 recommends assessing an individual's clinical status after each ECT session. The audit revealed that only 66% of the study sample received clinical assessment after each ECT session. It is important to monitor therapeutic responses during ECT by performing a clinical assessment before and after each session, usually within 24 h of the procedure. Treatment should be terminated after a response has been achieved or sooner if there is evidence of adverse effects. Formal clinical rating measurements are available and may be

used in recording therapeutic responses and changes in symptoms.

Standard 7 specifies that the individual's cognitive functions are monitored on an ongoing basis and, at a minimum, at the end of each treatment. Adherence to this standard is particularly important as memory impairment is a well-known side effect of ECT treatment. Both immediately following the delivery of ECT and after a course of treatment, cognitive impairment can occur [17]. Indeed, in our sample following ECT, 4.1% of the sample experienced amnesia, and 3% experienced confusion. However, only 7.6% of those who received ECT were assessed for cognitive impairment. A second audit was carried out in 2019 to evaluate the advancements made since the audits in 2011, 2013, and 2015 with regard to improving the administration of ECT in England. The audit found that there had been marginal decreases in the use of standardized depression scales, down to 30%, and standardized measures of cognitive dysfunction, down to 24%, compared to a previous audit [16]. In our study, patients' cognitive functions were assessed using the mini-mental state examination (MMSE) and a clinical interview conducted by the parent team caring for the patients. Meanwhile, the Montreal Cognitive Assessment, the mini-mental state examination, and the Addenbrooke Cognitive Examination were the three most frequently used validated tests in England to evaluate the cognitive functions of patients receiving ECT [16].

Standard 10 recommends that ECT should not be used as maintenance therapy for depressive illness. However, the results showed that ECT has been used as a maintenance therapy for 4.1% of our study sample, of which 1.5% had received ECT maintenance therapy for a depressive illness. The use of maintenance ECT in depressive illness is discouraged by NICE guidelines because the long-term benefits and risks of ECT use have not been established [10].

The results revealed that the majority of patients 87.8% did not undergo psychotherapy before ECT, probably because they were critically ill and hence unable to participate. An audit that examined thousands of cases where ECT was used in England revealed that only one trust from about 56 National Health Service Trusts could report how many patients received psychological therapy prior to ECT, as required by (NICE) guidelines [16]. Before ECT, psychologists and psychiatrists should aim to ensure that patients are offered evidence-based psychological treatments in their collaborative therapeutic approach. For example, cognitive behavioral therapy, interpersonal therapy, behavioral activation, and psychodynamic psychotherapy are among the NICE recommendations for depression [18].

Recommendations

1. To inform healthcare administrators about the importance of formulating and implementing local guidelines in psychiatric hospitals that adhere to NICE guidelines for the appropriate use of ECT as follows:

    a) To formulate a list of validated scales to clinically monitor the mood and psychotic symptoms on an ongoing basis (e.g., Montgomery–Åsberg Depression Rating Scale (MADRS) & the Hamilton Depression Rating Scale (HDRS)).
    b) To formulate a list of validated scales to assess for cognitive dysfunction and memory loss on an ongoing basis and at the end of the ECT course (e.g., mini-mental state examination (MMSE) & the Montreal Cognitive Assessment (MoCA))
    c) To formulate a list of validated scales to assess immediate- and long-term side effects (e.g., mini-mental state examination (MMSE) & the Six-Item Cognitive Impairment Test (6CIT))

2. To conduct a specialized hands-on training workshop for faculty and resident physicians on delivering, monitoring, and documenting ECT as per the newly developed local guidelines to all hospitals providing ECT in Oman (Sultan Qaboos University Hospital and Al Masarra Hospital)
3. To provide all patients receiving ECT and their carers information leaflets about immediate and long-term side effects with follow-up assessment dates mentioned
4. To reaudit in 3 years after implementing the above steps to monitor improvement in clinical practice

Conclusions

The present study has shown that the assessment of the clinical status and cognitive functions of patients receiving ECT is poorly performed. Identifying these areas of greatest clinical need is a crucial first step in developing guidelines locally. Improving ECT services may be possible through better education for medical students during psychiatry clerkship. In doing so, it is hoped that resident physicians will start working with a better appreciation of the importance of clinical and cognitive assessment. Subsequently, attitudes toward monitoring cognitive functions and mood and/or psychotic symptoms for patients receiving ECT should improve. Moreover, resident physicians and specialist psychiatrists should be encouraged to use precise and scaled assessment methods to monitor clinical status, cognitive functioning, and side effects.

Abbreviations

ECT	Electroconvulsive therapy
HDRS	Hamilton Depression Rating Scale
MADRS	Montgomery–Åsberg Depression Rating Scale
MMSE	Mini-mental state examination
MoCA	Montreal Cognitive Assessment
NICE	National Institute for Health and Care Excellence
SQUH	Sultan Qaboos University Hospital
6CIT	Six-Item Cognitive Impairment Test

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Authors' contributions
TM and NB conceived and designed the study, conducted a literature review, and collected patient data. TM and AH analyzed and interpreted data. TM and SH wrote the initial and final drafts of the article. All authors have critically reviewed and approved the final draft. The authors read and approved the final manuscript.

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Availability of data and materials
All data generated or analyzed during the present study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate.
The medical research ethics committee at Sultan Qaboos University does not require ethical approval for audit projects.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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