

The Use of Non-Invasive Brain Stimulation (NIBS) Techniques to Treat Non-Affective Mental Health Disorders in the Perinatal Period; A Systematic Review

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INTRODUCTION

While talking therapies can be effective during the perinatal period, they may not be sufficient to treat moderate to severe non-affective mental health illnesses. In addition, pharmacological treatments are often perceived as unacceptable by pregnant women due to concerns about potential adverse effects on the unborn child.

Non invasive brain stimulation (NIBS) techniques have been proposed as an alternative treatment method for people who experience moderate to severe mental health difficulties. NIBS techniques include; repetitive transcranial magnetic stimulation (rTMS), transcranial direct current stimulation (tDCS) and electroconvulsive therapy (ECT). Promising outcomes of these techniques have been found outside the perinatal period. More details are presented in the table below.

AIM

Our systematic review aims to examine the evidence for effectiveness of NIBS techniques for non-affective mental health conditions during the perinatal period as an alternative treatment option.

METHOD

A systematic review was conducted according to the PRISMA guidelines. A search was performed in Psychinfo, Ovid and Medline databases for relevant studies published between 1998 and 2024. We searched NIBS techniques (ECT, rTMS & tDCS) and all non-affective, moderate to severe mental health illnesses as according to the ICD-11.

After screening, 16 papers were accepted and included in this review.

Technique	Brief Description	Evidence Outside the Perinatal Period
Electroconvulsive Therapy (ECT)	ECT uses electric currents to induce a seizure in the patients brain while under anaesthesia.	ECT has been shown to be effective, especially for depressive episodes in women; with 68% showing their symptoms to be “much improved” or “very much improved” on the Clinical Global Impression Scale after ECT treatment (ECTAS 2021).
Repetitive Transcranial Magnetic Stimulation (rTMS)	rTMS involves the stimulation of specific deep brain regions by the production of high and low-intensity magnetic fields which modulates the cortical excitability.	rTMS led to significant improvements in anxiety and depression in GAD patients (SMD = 1.45; P < .001 and (SMD = 1.65; P < .001 respectively) regardless of rTMS parameters. (Cox et al, 2022).
Transcranial Direct Current Stimulation (tDCS)	tDCS passes current through the scalp, skull, and meninges in order to stimulate the brain, generally undetectably. A small electric current (1–2 mA) is delivered to the scalp by a battery-driven device connected to two saline-soaked surface electrodes	The evidence for this technique is more limited. So far, tDCS, active stimulation was not found to be effective for symptoms of GAD and OCD (Hyde et al, Mol Psych (2022).

RESULTS

Of the final 16 studies, 11 were case reports, one was a prospective study, 3 were retrospective studies and one was a nationwide population-based register-study.

ECT

Fourteen studies included ECT as treatment module. Of these, 8 publications included women with psychotic disorders, with 5 reporting a positive effect. The remaining 6 studies included manic patients, with 3 reporting remission of symptoms, one reporting no significant change and 2 reporting increase in symptoms.

The main side effects reported in ECT were vaginal bleeding, uterine contractions, foetal spasms & foetal tachycardia. No long term adverse effects were documented.

tDCS

Only 2 studies included tDCS, both for schizophrenia, of which one study found reduction of symptoms and the other found improvement of symptoms.

No side effects on the parent or baby from tDCS treatment were reported.

rTMS

There were no studies identified related to rTMS.

LIMITATIONS

This review has some limitations. Firstly, the inclusion of mainly case reports makes it vulnerable to reporting bias. Secondly, the lack of published clinical trials regarding the use and efficacy of NIBS techniques like rTMS and tDCS means that the present review cannot draw any conclusions about the effectiveness of the rTMS and tDCS at present.

CONCLUSION

ECT seems to be a viable option for difficult to treat non-affective mental health disorders during the perinatal period. Further studies into the safety and efficacy of NIBS techniques in the perinatal period are needed. RTMS and tDCS are still new methods with little to no evidence for their use in non-affective mental illness in the perinatal period. ECT appears to be an effective technique with an acceptable safety profile though further cohort studies need to be conducted to determine the efficacy of this technique in the perinatal period.

REFERENCES

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