



Effectiveness of coma arousal therapy on level of consciousness among patients with head injury in selected hospitals, Salem: a quasi-experimental study

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Abstract

Background: Head injury is a major cause of mortality and long-term disability and frequently results in impaired consciousness requiring intensive neurological care. Coma Arousal Therapy (CAT), a structured multisensory stimulation programme, may enhance cortical activation and promote recovery of consciousness. However, evidence regarding its effectiveness in Indian clinical settings is limited.

Objective: To evaluate the effectiveness of Coma Arousal Therapy on the level of consciousness among patients with head injury admitted to selected hospitals in Salem, Tamil Nadu.

Methods: A quantitative quasi-experimental, non-randomized pretest-posttest control group design was adopted. Sixty patients with head injury were selected through purposive sampling and assigned to an experimental group (n=30) and control group (n=30). The experimental group received CAT in addition to routine nursing care, while the control group received routine care alone. CAT for 20–25 minutes twice daily for seven consecutive days. Level of consciousness was assessed using the Glasgow Coma Scale (GCS) and Coma Recovery Scale (CRS). Descriptive and inferential statistics were used, with significance set at $p < 0.05$.

Results: The experimental group showed greater improvement in consciousness than the control group. Mean GCS scores increased from 5.50 ± 1.10 to 11.06 ± 1.43 in the experimental group, compared with 5.10 ± 0.77 to 8.60 ± 1.41 in the control group. Mean CRS scores increased from 6.56 ± 1.60 to 14.90 ± 2.88 in the experimental group and from 5.86 ± 0.97 to 10.73 ± 1.91 in the control group. The paired t-test demonstrated a statistically significant improvement in GCS scores in the experimental group ($t = 23.19$, $p < 0.05$).

Conclusion: Coma Arousal Therapy was effective in improving the level of consciousness among patients with head injury. Structured multisensory stimulation may be incorporated into routine neurocritical nursing care as a simple, non-invasive and cost-effective supportive intervention.

Keywords: Head injury, coma arousal therapy, Glasgow Coma Scale, Coma Recovery Scale, level of consciousness, sensory stimulation, critical care nursing

Introduction

India's tribunal system has repeatedly generated the same constitutional anxiety: bodies created to exercise judicial or quasi-judicial power have often remained administratively dependent on the executive departments whose decisions they review. Head injury refers to the damage to the head caused by external mechanical forceful bump, blow or jolt. Head injury can cause temporary or permanent impairment with brain functions such as cognition, communication, sensory perception and problems with behavioural and mental health. Acute head injuries can cause immediate damage to the brain. Other changes in the brain may develop gradually over the period of hours, days or weeks following damage, making them chronic. Head Injury is a leading cause of morbidity, mortality and socio-economic loss in India. (Walter J. Koroshetz, 2024) Globally, approximately 5.48 million head injuries were reported in 2021, resulting from 20.84 million incidents. Over the period from 1990-2021, males were disproportionately affected by head injuries compared to females. Notably, Eastern and Central European countries experienced the highest rates of Years Lived with Disability and age -

standardized prevalence. In 2021, falls emerged as the leading cause of head injuries worldwide, followed by traffic accidents, physical violence and exposure to mechanical forces. (Junqing yan *et.al.*, 2025) Coma recovery programs aim to provide multi sensory stimulation to patients in coma or vegetative state. Coma arousal therapy is believed to provide the sensory stimulation needed to activate the reticular system, which is responsible for maintaining consciousness. These procedures are appropriate for any individual who is in coma or vegetative state and is 4medically stable. It involves repetitive tactile, auditory, visual, taste, kinaesthetic and olfactory stimulation. (Dr. Ganesan Arumugam, *et.al.*, 2013) Coma-stimulation therapies have been administered to patients with decreased levels of consciousness or loss of memory for decades in rehabilitation settings to prevent sensory deprivation and promote recovery. They may be administered through any sensory modality, with tactile and auditory stimuli being the most common. The rationale for this class is that sensory stimulation may enhance neural processing, support neuro plasticity, and thus promote re-emergence of consciousness. (Eldow BL, *et.al.*, 2021)

Materials and methods

A quantitative quasi-experimental, non-randomized pretest–posttest control group design was adopted. The study was conducted at Thiru Neuro Multi speciality Hospital and Neuro Foundation Hospital, Salem, Tamil Nadu. A total of 60 head injury patients were selected by non-probability purposive sampling and assigned to experimental (n=30) and control (n=30) groups. Patients with a Glasgow Coma Scale (GCS) score of 3–8, admitted to the ICU for more than 24 hours after head injury, staying in the hospital for a minimum of 7 days, and undergoing cranial surgery such as craniotomy, craniectomy or burr-hole evacuation were included. The experimental group received Coma Arousal Therapy (CAT) along with routine nursing care, while the control group received routine care alone. CAT included visual, auditory, tactile, olfactory, gustatory and kinaesthetic stimulation

for 20–25 minutes, morning and evening, for 7 days. GCS and Coma Recovery Scale (CRS) were assessed before and after the intervention. Ethical approval and written informed consent were obtained before data collection. Data were analysed using descriptive and inferential statistics, including paired and unpaired t-tests and chi-square test, with $p \leq 0.05$ considered statistically significant.

Results

A total of 60 patients with Head Injury participated in the study, with 30 patients each in the experimental and control groups. Baseline assessment showed that both groups were comparable between the both groups. Following the implementation of the CAT, the experimental group showed a significant improvement in Level of consciousness compared with control group ($P \leq 0.05$).

Table 1: Comparison of mean, Standard Deviation (SD) and ‘t’ value on post scores on Level of consciousness according to their Glasgow Coma Scale in experimental group and control group.

S.No	Group	Mean	SD	df	Unpaired ‘T’ Value	Table Value
1.	Experimental Group	11.1	1.46	58	7.36*	2.01
2.	Control Group	8.6	1.4			

The above table 1 showed that in experimental group mean score was 11.1 ± 1.46 and in control group 8.6 ± 1.4 . The calculated ‘t’ value is 7.36 which is greater than table value

2.01. Thus, it Hence, the CAT was effective in Level of consciousness among patients with head Injury in experimental group than control group.

Table 2: Comparison of Mean, Standard Deviation and ‘t’ Value on Post-Test Scores of Level of Consciousness According to Coma Recovery Scale in Experimental and Control Group.

S.No	Group	Mean	SD	df	Unpaired ‘T’ Value	Table Value
1.	Experimental Group	14.9	2.88	58	7.26*	2.01
2.	Control Group	10.73	1.91			

The above table 2 showed that in experimental group mean score was 14.9 ± 2.88 and in control group 10.73 ± 1.91 . The calculated ‘t’ value is 7.26 which is greater than table value 2.01. Hence, The CAT was effective in Level of consciousness among patients with Head Injury in

experimental group than control group ($P \leq 0.05$). There is significant Association between only type of Head Injury in pre-test& post test scores on Level of Consciousness according to the CRS among patients with Head Injury in Experimental group.

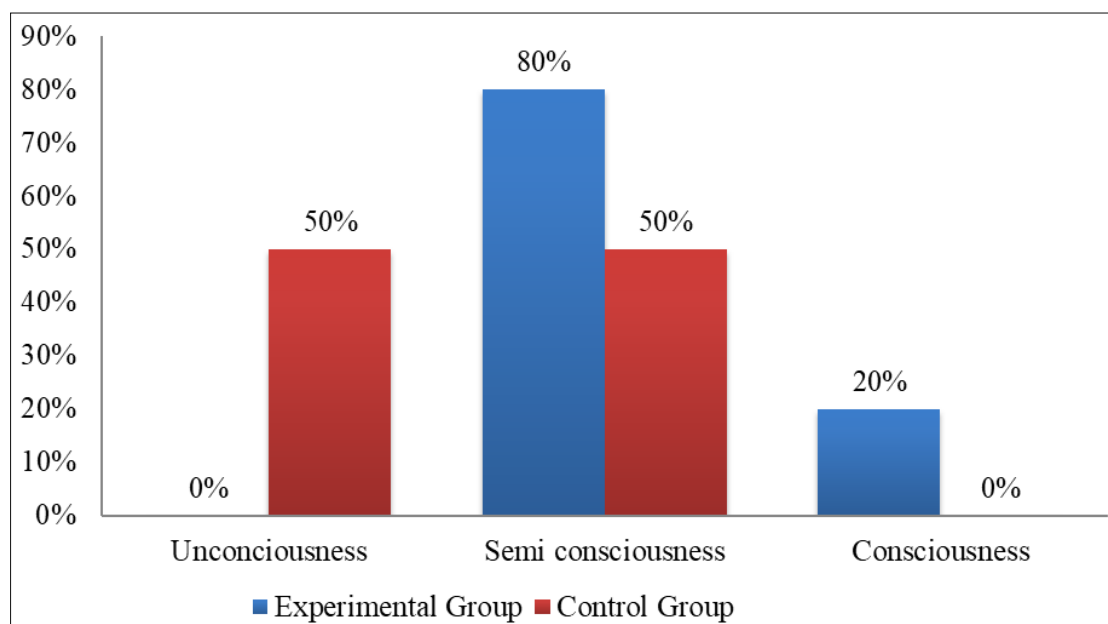


Fig 1 : percentage distribution of patients according to their pre test and post test scores on GCS Level of consciousness according to their GCS in experimental and control group.

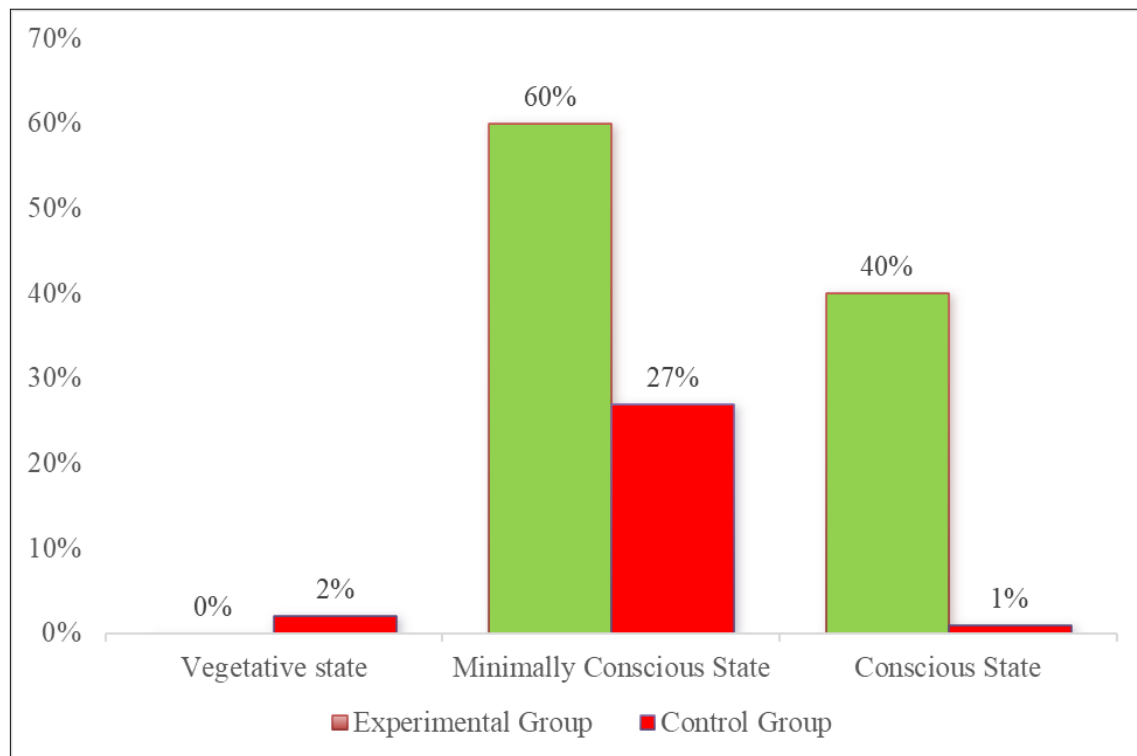


Fig 2: Percentage distribution of patients according to their pre-test and post test scores on Level of Consciousness according to their CRS in experimental and control group.

Conclusion

The findings of this study demonstrated that CAT was effective in improving the level of Consciousness among patients with Head Injury. Patients who received CAT showed significantly greater improvements in level of Consciousness than those receiving routine care alone. These findings support the integration of CAT into routine to enhance level of consciousness, Increase Arousal & awareness, prevent sensory deprivation, regulate the encourage the Neural reconnection & promote responses to external stimuli and improve the quality of Nursing care. Further research involving Larger Samples, randomized designs and long term follow up is recommended to determine its effects on sustained neurological and functional recovery.

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