

Effectiveness of Coma Arousal Techniques to Improve the Sensory Stimulation in Unconscious Patient's

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Abstract

Background: Coma arousal technique has evidence it suggest that early and regular administration of coma arousal technique helps to improve sensory function of unconscious patients. It involves tactile, auditory, verbal and motor sensory stimulation.

Aims: This study intended to determine the effectiveness of coma arousal technique to stimulate sensory stimulation in unconscious patients.

Materials and Methods: In this study quasi experimental one group pre-test and post-test design was used. Purposive sampling technique was used to assign 35 unconscious patients due to any pathology. Coma arousal technique was given to the participants for 30 minutes twice a day in the interval of 1 hour for 15 days. The level of consciousness was assessed with the help of Glasgow Coma Scale and sensory function was assessed by using Coma recovery scale-Revised. Data were analysed by paired t-test and chi-square.

Results: The findings of the study were overall pre-intervention mean of Glasgow coma scale was 4.28 and Standard deviation was 1.27 and pre-interventional mean of Coma recovery scale-revised was 4.14 and standard deviation was 2.56. The post interventional score of Glasgow coma scale was 9.65 and standard deviation was 1.08 which reveals that there was significance effective in improving sensory function. Researcher calculated the 't' value was 3.24 for Glasgow coma scale and 2.40 for Coma recovery scale-revised and the tabulated value was at the level of significance $p < 0.05$. On comparison it reveals that, the calculated value was greater than the tabulated value that means there was a significant change in the post interventional score of

participants.

Conclusion: This study concluded that, application of coma arousal technique is an effective therapy to improve sensory functions in unconscious patients.

Keywords: Unconsciousness, sensory stimulation, coma arousal technique, Glasgow coma scale, coma recovery scale-Revised, critical care unit.

Introduction

Coma arousal technique is also known as coma arousal program. It's an approach mainly based on sensory stimulation of unconscious persons various sense such as hearing, touch, smell, taste and vision.¹ It's having a greater impact in recovery of unconscious patients. Unconsciousness is the period in which a patient can remain for a longer time and that will affect the morbidity, mortality and socioeconomic issues in India.² Unconsciousness affects the individual's ability of functioning like physical, mental and psychosocial status. It also disturbs the patient's ability to work within the environment in normal ways.³ It not only affects the patient's health but also affect family in forms of socioeconomic losses.

Coma recovery scale (CRS-R) also known as the JFK coma recovery scale-revised, is a technique used to assess patients with a disorder of consciousness, most commonly coma. It may be used to differentiate disorders of consciousness (DOC).⁴

Disorders of consciousness (DOC) are classified into coma, vegetative state (VS), minimally conscious state (MCS), and emergence from the minimally conscious state. Many studies have reported that 37-43% of patients were misdiagnosed in Vegetative state.⁵

The identification of level of consciousness in patients with disorders of consciousness. Patients who have nonresponsive wakefulness syndrome have not any sign of awareness with their environment, while minimally conscious state (MCS) patients have reproducible but fluctuating signs of awareness.⁶

The Glasgow coma scale was first introduced in 1974 at the university of Glasgow by neurology professors Graham Teasdale and Bryan Jennett is used to identified by level of consciousness in all types of disorder of consciousness.⁷

Glasgow coma arousal and the full outline of unresponsiveness (FOUR) scale are tools widely used in emergency department and intensive care units in patients with impaired consciousness.⁸ JFK coma recovery scale-revised (CRS-R) is used to identified and diagnosed comatose patients.⁹

Traumatic brain injury is a major factor that affects the chronic disability and unconsciousness. Traumatic brain injury has many causes such as behavioural problems, mood, memory, attention,

orientation and cognition etc are affected by traumatic brain injury. Traumatic brain injury is classified into primary and secondary which causes temporary and permanent impairment of brain, it has effect in isolation from society and decrease quality of life.¹⁰

It is estimated that about 10 million people affected yearly by traumatic brain injury. 150-170 per 1,00,000 incidence is related to traumatic brain injury and 106 per 1,00,000 due to road traffic accident when compared to a global rate.¹¹ Studies that were conducted in developed countries shows yearly incidence of unconscious is approximately 50 per 100,000 in the general population. Yet, studies that were conducted in developing countries indicate that this estimation is nearly double that at 100 per 100,000. The incidence of unconscious patient in worldwide is 300 per 100,000 per year 0.3% of the population. The World Health Organization [WHO] figure out that 5million death takes place in every year in Intensive Care Units. Admissions of unconscious patient occurs 3.2 million every year in India in Intensive care units. These incidents describe for near about 1% of hospital admissions. Unconscious is an emergency medical condition. Level of consciousness can be disturbed by many causes like traumatic brain injury, hypoxia, accidents, low blood sugar, administration of poison, any severe Medical and surgical condition ,severe alteration in vital signs etc. This unconscious state can be classified into mild, moderate and severe by administering the Glasgow Coma scale. The incident of mild cases are 131 cases per 10,0000 people, Moderate are 15 cases per 10,0000 people and in severe condition incidence is 14 cases per 10,0000 people. World health organization has given estimate of about 50 lakhs people that have lost their lives due to injury or accident during the year 2002. Total deaths are 9% due to injury. Mortality rate due to injury among male is estimated as 98/10,000 population and in female population mortality rate is 128/10,00000 (38 lakhs death) and 67/10,0000 (19 lakhs death).¹² It is calculated that about 1.5 to 2 million persons are injured and about 1 million yield to death every year in India ,road traffic accident is one of the most leading cause of injury that causes prolonged unconsciousness.¹³

Coma arousal technique is one of the important method that is useful to improve the level of consciousness and sensory stimulation in unconscious patient's. Glasgow coma scale scoring from 3-15 is used to assess the level of consciousness.¹⁴ By applying the coma arousal technique we can improve the health of individual and it also reduces the stay of hospital thus we can save the patient's going into deep coma.¹⁵ Traumatic brain injury is common cause of unconsciousness. JFK coma recovery scale-revised is tool that assess the improvement in patient's level of consciousness who have received coma arousal techniques. It stimulates the patient's auditory, visual, tactile and kinetic functions. Those patient's are able to receive coma arousal technique whose Glasgow coma

scale (GCS) are less than 8 and are admitted in ICU due to any pathological condition.

Scoring of Glasgow Coma Scale was mild, moderate and severe based on 13-15, 9-12 and 3-8 respectively. The highest score of Glasgow coma scale (GCS) is 15. If the score indicates 3 means a person is in deep coma.¹⁶ Coma recovery scale-revised has scoring of vegetative state, minimally conscious state and conscious state based on <7, 12-18 and 19-23 respectively.¹⁷

Literature Review

A.J.Prins et al (2020) has conducted a study on sensory stimulation for nursing –home residents: systematic review and metaanalysis of its effect on sleep quality and rest activity rhythm in dementia. A systematic literature search was performed for this study and all studies was examined the effect of sensory stimulation on rest-activity rhythm (RAR) and /or nocturnal restlessness in nursing home residents with dementia were included. DRS ($p<0.05$)and SSAM($p<0.05$) scores at baseline and at discharge were found significantly different.Result says that sensory stimulation improves nocturnal behavioural restlessness as well as sleep duration and continuation.¹⁸

Pinto Joana et. al (2020) conducted study on sensory stimulation programs in Dementia: a systematic review of methods and effectiveness. The objectives of this study is to review the characteristics of sensory stimulation programs in dementia and its effectiveness. Twenty studies were included and evaluated for this study. Most of studies compared with pre and post interventional assessment; in that some studies performed follow up assessment.The results revealed that patients with brain damage who were treated with the sensory stimulation program will shows higher SSP scores than the non-treatment group was not supported (3rd week.: $U=13.000,p=.014$).Additional repeated measures analysis showed that here were no significant differences in recovery trends in control group($F=1.945,p=.159$).The study concluded that a sensory stimulation program was effective in promoting recovery of the integrity of the sensory pathway of patients with brain injury.¹⁹

Jit Panya Chanokporn (2020) has conducted a study on effects of two sensory stimulation models on recovery in adults with severe traumatic brain injury. The aim of present study was to find out the effectiveness of a specific sensory stimulation (4 modalities) when compared with another sensory stimulation (5 modalities) for recovery of comatose patients after traumatic brain injury. This study was performed within three groups. Both sensory stimulation models were compared with one control group. Forty five participants were selected from surgical ward. Outcome of this study was determined by coma recovery scale- revised (CRS-R). Data were analysed by using analysis of variance for across over design ($F=1.653,p=.069$).The findings of study shown that

those who have received sensory stimulation program (4 modalities) has higher significantly CRS-R scores ($P < 0.001$) after 5 days when compared with other groups.²⁰

Moseda Ana et al (2018) a study on multisensory stimulation and individualized music sessions on older adults with severe dementia that effects on mood, behaviour and biomedical parameters were conducted. Randomized control trial of 21 patients aged ≥ 65 years randomly was assigned for two groups. Interventions were given in two-weekly sessions for 30 minutes for a period of 12 weeks. Total duration of study was one month and 4 weekly Glasgow Coma Scale Scores were recorded for the two groups (14.76 Vs 8.72, respectively, $p < .05$). Result shows both groups had positive effects on mood and behaviour.²¹

Cheng Li Juan et al (2018) conducted a study on, do sensory stimulation programs have an impact on consciousness recovery? The objectives of this study were considering sensory stimulation programs (SSP) as a treatment and early recovery for disorders of consciousness in unconscious patients is still debated today. A withdrawal design was used for this study. To assess behavioural alterations, coma recovery scale-revised (CRS-R) was introduced by independently on a weekly basis. Twenty nine patients were selected for this study. Data analysed was (13.22 ± 1.92 vs 2.9 ± 1.96 , $p < .01$). Result shows that higher CRS-R total scores were observed in treatment group as compared with no treatment group.²²

Mc Nett Molly M. Et al (2016) has conducted a study on a comparative study of Glasgow coma scale and full outline of unresponsiveness scores for predicting long-term outcome after brain injury. The aim of this study was to compare predictive ability of hospital GCS scores and scores obtained by using FOUR scale. In this study prospective cohort study was used. GCS and FOUR scores were assigned at 24 and 72 hours and at hospital discharge. The sample size was 107. Spearman correlations were comparable and strongest among discharge GCS and FOUR score and 12 months of outcome ($r = .73$, $p < .000$, $r = .72$, $p < .000$).²³

StromBenedicte et.al (2016) conducted a study on sensory stimulation for persons with dementia: a review of the literature. Objectives of this study were to provide an overview of available sensory stimulation interventions, and their effect on persons with dementia. Design for this study was effect on persons with dementia. Design for this study was systematic search and review of the literature with description of the content and an evaluation of theoretical and methodological approaches. Systematic searches were searched by various sources. Result shows fifty five studies were included in this study. It was found that the mean (and standard deviation) age in the intervention and control groups was 40.22 ± 14.3807 and 36.40 ± 11.80 , respectively, implying no significant difference between the two groups in terms of age. Other five studies assessing quality of

life and wellbeing.²⁴

Priya R. Sathiya, S.Lavanya (2014) was conducted a study to evaluate the effectiveness of sensory stimulation to improve the level of consciousness among traumatic brain injury patient's with GCS 7-10. The purpose of present study was to prospectively examine the effects of an sensory stimulation on recovery in unconscious patients with traumatic brain injury. Quasi-experimental research design with pre-test and post-test control group designs. Total 40 samples were selected. Samples were divided into 20 experimental group and 20 in control group. post-test was conducted on the 8th day by using GCS in both groups. The GCS score mean score of intervention group was 1.25 and it was 1.33 data for the control group, while the standard deviation was 2.15 for the intervention group and 2.54 for the control group ($\alpha = 0.05, \beta = 0.1$) findings of this study show that sensory stimulation has a significant effect in improvement in level of consciousness in experimental group rather than control group.²⁵

Abbate Carlo et al (2014) a study was conducted on sensory stimulation for patients with disorders of consciousness: From stimulation to rehabilitation. The aim of this study is to evaluate if the main characteristics of sensory stimulation method would still be sufficient. The data shows (mean difference 2.17, 95% confidence interval 1.67–2.66) of patients who received therapy. The result suggested some possible modifications in the sensory stimulation method which allow for improvements in new findings.²⁶

Jaddoua Batool A. Et al (2013) was conducted a study on assessment of nurses knowledge concerning Glasgow coma scale in neuro surgical wards. The objectives of this study was to assess nurses knowledge concerning Glasgow coma scale (GCS) and to find out the relationship between nurses knowledge. A descriptive study was performed at three hospitals. Non probability (purposive) samples of 100 nurses were used for data collection. Total 25 items based questionnaire was established. The data shows ($t_{(27)} = 1.53, p = 0.14; \chi^2(1)\chi(1)2 = 0.96, p = 0.33;$ and, $\chi^2(1)\chi(1)2 = 1.65, p = 0.2$, respectively). The findings of this study reveal that knowledge of nurses about Glasgow coma scale was inadequate. The result was evaluated by questionnaire of 25 items.²⁷

Methods and materials

1.Study population:

This was quasi experimental one group pretest posttest²⁸ design performed in department of critical

care medicine of trauma center 5th floor in King George's medical university Lucknow, U.P during the month of March to April 2021. It was estimated that a sample size²⁹ of at least 35 participants were required to detect effect of coma arousal technique on sensory stimulation. Glasgow coma scale was used to assess level of consciousness and coma recovery scale-revised was used to identify effectiveness of coma arousal technique. We included 35 unconscious patients age 18 years and above, patients on ventilator who has not under sedation for last 6 hours, patients who are unconscious due to any pathology, patients with the GCS between 3-8. Subjects those were excluded from the study are participant's age less than 18 years, patients currently under sedation, patient hemodynamically unstable, patient with GCS of more than 8.

2.Measures:

Quasi experimental one group pretest and posttest was used in present study. Participants in one group have received intervention and evaluated for better outcome after 15 days of intervention.

3.Assessment tool:

Researcher measured and recorded level of consciousness and sensory function. Glasgow coma scale (GCS) is a reliable and acceptable tool for measurement of level of consciousness which consists of eye opening, verbal response, and motor response. The coma recovery scale- revised (CRS-R) tool was used to measure sensory function of unconscious patients who received coma recovery technique. Coma recovery scale- revised (CRS-R) includes vegetative state, minimally conscious state and conscious state with maximum score of 23.

4.Intervention:

The demographic details includes age in years, gender, religion, educational level, marital level, area of residence, monthly income, stay of hospital in days along with diagnosis and vitals were recorded in a data sheet form. All the eligible participants were purposively assigned for intervention. Coma arousal technique was given to 35 subjects for 15 days after assessing level of consciousness. Intervention was given for 30 minutes twice a day with interval of 1 hour. Intervention was given in following steps:

- First of all Avoid extra visitors in the ward and avoid noise and distracting activities to make intervention successfully.
- Then prepare the patients room through decreasing number of visitors, close door and provide privacy by using curtains and make sure patient surroundings as quite as possible.

- Then document the changes in patient's condition through assessing physical parameters such as temperature, pulse, respiration, heart rate, BP, oxygen saturation, Central venous pressure and blood glucose level.
- Give position to the patient by elevating head of the bed (semi fowler's position). Then stand in front of the patient within the patient's visual field.
- At starting of the session, talk to the patient slowly by asking patient's name, age, time so that we can understand the level of consciousness of patient.
- Then start the intervention by providing stimulations for only one modality at a time (no talking while administering technique).
- First assess auditory function then visual function, Motor function, verbal function and at last assess arousal scale.
- **Auditory stimulation:** Item used to assess the auditory functions are ring bell, familiar voices. Try to stimulate the patient by calling his/ her by name if patient is not responding then use ring bell and familiar voices for 5 minutes in each side twice, take a break for 3 seconds in between each stimulus when repeat.
- **Visual function:** Perform this by using familiar faces objects and photographs of family members, show these items to the patient for 5 minutes, twice with 3 seconds of break in between each stimulus in front of patient's eyes then move object to upper and lower quadrant within visual field.
- **Kinetic stimulation:** It includes movement of upper extremities, movement of lower extremities, and movement of head.
 - ✓ **Movement of upper extremities-** supports the patient's arm at the elbow and hand. After that arm is slowly moved above the head as far as it goes. Then hold it there for 3 seconds then lowered back the arm, keep elbow as straight as possible. Perform this technique twice a day for 6 minutes.
 - ✓ **Movement of lower extremities-** patient's leg is supported at the knee and ankle after that bend it slowly toward the chest as far as it goes. And then it is hold for 3 seconds and leg is lowered down, to straight out the knee. Perform this technique twice a day for 6 minutes.
 - ✓ **Movement of head-** turns the head side to side, and stretch as far as it goes. Perform this technique twice a day for 3 minutes.
- **Tactile stimulation:** Item used are cloth, sand papers, cotton balls. Tactile stimulation is performed for 5 minutes twice a day, with 3 seconds breaks between each stimulus, it is

repeated to right and left upper extremities and then again performs on right and left lower extremities.

- All steps to be followed twice a day with the interval of one hour.
- This intervention is performed about 30 minute once for 15 days and then will apply the coma recovery scale- revised (CRS-R) to assess the improvement in patient's condition.
- Document all the findings.

Data analysis

The collected data were analysed using descriptive and inferential statistics using the following steps: Descriptive Statistics: Frequency and Percentage distribution was used to analyze the selected demographic variables.³⁰ Mean and standard deviation were used to assess the improvement in sensory stimulation. Inferential Statistics: used to assess the effectiveness of coma recovery techniques to improve consciousness.³¹ Paired t-test³² and chi-square³³ were used to assess the association between post test of coma recovery scale and selected demographic variables.

Results

Table-1. Distribution of demographic variables of unconscious patients admitted at Critical care medicine department.

n=35

| S.N | DEMOGRAPHIC VARIABLES | FREQUENCY (f) | PERCENTAGE (%) |
|-----|------------------------|---------------|----------------|
| 1. | Age (in years): | | |
| | 18-40 years | 27 | 77.14 |
| | 41-50 years | 2 | 5.72 |
| | 51-60 years | 4 | 11.42 |
| | 61-70 years | 2 | 5.72 |
| 2. | Gender: | | |
| | Male | 8 | 22.86 |
| | Female | 27 | 77.14 |
| 3. | Religion: | | |
| | Hindu | 30 | 85.72 |
| | Muslim | 5 | 14.28 |

| | | | |
|-----------|-----------------------------------|----|-------|
| | Others | 0 | 0 |
| 4. | Educational level: | | |
| | Illiterate | 23 | 65.72 |
| | Educated | 12 | 34.28 |
| 5. | Marital level: | | |
| | Married | 35 | 100 |
| | Unmarried | 0 | 0 |
| 6. | Area of residence: | | |
| | Rural | 31 | 88.58 |
| | Urban | 4 | 11.42 |
| 7. | Monthly income: | | |
| | None | 29 | 82.87 |
| | <5000 | 0 | 0 |
| | 6,000-15,000 | 2 | 5.71 |
| | 16,000-25,000 | 2 | 5.71 |
| | 26,000-35,000 | 2 | 5.71 |
| | 36,000- 45,000 | 0 | 0.00 |
| | Above 46,000 | 0 | 0 |
| 8. | Stay in hospital (in days) | | |
| | 1-20 days | 24 | 68.57 |
| | 21-40 days | 10 | 28.57 |
| | 41-60 days | 1 | 2.86 |
| | 61 or above | 0 | 0 |

Table-1 shows the demographic characteristics of participants n=35. In that most participants belongs to 27 (77.14%) were between the age group of 18-40 years, 2 (5.72%) between the age group of 41-50 years, 4 (11.42%) between the age group of 51-60 years and 2 (5.72%) were in the age group of 61-70 years among participants. Majority of the patients 27 (77.14%) were females, 8 (22.86%) were males in study group. Almost 30 (85.72%) of patients were Hindu, 5 (14.28%) were Muslim and others 0 (0%) from sample. Nearly 23 (65.72%) patients were illiterate, 12 (34.28%) were educated among participants. All 35 (100%) patients were married, 0 (0%) were unmarried in study group most of the 31 (88.58%) patients were in rural area, 4 (11.42%) were urban area in

study group. It shows mostly 29 (82.87%) patients have no income, 0 (0%) were under <5,000rs, 2 (5.71%) were under 6,000-15,000rs, 2 (5.71%) were under 16,000-25,000rs, 2 (5.71%) were under 26,000-35,000rs, no one have income under 36,000-45,000 and no one have income above 45,000 in this study. Near about 24 (68.57%) patients were under 1-20 days during hospital stay (in days), 10 (28.57%) comes under 21-40 days, 1 (2.86%) under 41-60 days and 0 were under 61 or above in study group.

Table- 2: Comparison between pre and post-interventional GCS score of sensory stimulation of unconscious patient on the basis of Glasgow coma scale in the aspect of mean, standard deviation and level of significance.

n=35

| GCS score | Mean | Mean Difference | Standard Deviation | t-value |
|---------------------|------|-----------------|--------------------|---------|
| Pre-interventional | 4.28 | 5.37 | 1.27 | 3.24 |
| Post-interventional | 9.65 | | 1.08 | |

Df=34 (p <0.05=3.002)

Table-2 reveals that pre-interventional score and post-interventional score of mean and standard deviation according to Glasgow coma scale (GCS). Pre-interventional mean score is 4.28 and post-interventional mean score is 9.65, mean difference is 5.37, standard deviation is 1.27 and 1.08 respectively and t-value is 3.24 and P-value is significant at the level of <0.05.

Table-3: Comparison between pre and post-interventional score of sensory stimulation of unconscious patient on the basis of Coma recovery scale- revised in the aspect of mean, standard deviation and level of significance.

n=35

| CRS-R score | Mean | Mean Difference | Standard Deviation | t-value |
|---------------------|------|-----------------|--------------------|---------|
| Pre-interventional | 4.14 | 4.74 | 2.89 | 3.40 |
| Post-interventional | 8.88 | | 2.56 | |

Df=34 (p <0.05=3.002)

Table-3 illustrates that pre- interventional score and post-interventional score of mean and standard deviation according to coma recovery scale- revised (CRS-R). Pre-interventional mean score is 4.14 and post-interventional mean score is 8.88, mean difference is 4.74, standard deviation is 2.28 and

2.56 respectively and t-value is 3.40 and P-value is significant at the level of <0.05 .

Table-4: Association between pre-intervention score of sensory stimulation of unconscious patients on the basis of Glasgow Coma Scale with their selected demographic variables.

n=35

| Demographic variables | Frequency (n) | Percentage (%) | GCS SCORE | | | Chi' square X ² value | Critical value |
|---------------------------|---------------|----------------|--------------|---------------|---------------|----------------------------------|----------------|
| | | | Un-conscious | Pre-conscious | Con-conscious | | |
| Age (in years): | | | | | | | |
| 18-40 years | 27 | 77.14 | 25 | 0 | 0 | 0.99 df=6 | 12.59 NS |
| 41-50 years | 2 | 5.72 | 4 | 0 | 0 | | |
| 51-60 years | 4 | 11.42 | 4 | 0 | 0 | | |
| 61-70 years | 2 | 5.72 | 2 | 0 | 0 | | |
| Gender: | | | | | | | |
| Male | 8 | 22.86 | 10 | 0 | 0 | 0.94 df=2 | 5.99 NS |
| Female | 27 | 77.14 | 25 | 0 | 0 | | |
| Religion: | | | | | | | |
| Hindu | 30 | 85.72 | 30 | 0 | 0 | 0.94 df=4 | 9.49 NS |
| Muslim | 5 | 14.28 | 5 | 0 | 0 | | |
| Others | 0 | 0 | 0 | 0 | 0 | | |
| Educational level: | | | | | | | |
| Illiterate | 23 | 65.72 | 23 | 0 | 0 | 0.95df=2 | 5.99 NS |
| Educated | 12 | 34.28 | 12 | 0 | 0 | | |
| Marital level: | | | | | | | |
| Married | 35 | 100 | 35 | 0 | 0 | 0.34 df=2 | 5.99 NS |
| Unmarried | 0 | 0 | 0 | 0 | 0 | | |
| Area of residence: | | | | | | | |
| Rural | 31 | 88.58 | 30 | 0 | 0 | 7.94 | 5.99 S* |

| | | | | | | | |
|----------------------------------|----|-------|----|---|---|-------|-------|
| Urban | 4 | 11.42 | 5 | 0 | 0 | df=2 | |
| Monthly income: | | | | | | | |
| None | 29 | 82.87 | 29 | 0 | 0 | 0.99 | 12.03 |
| <5000 | 0 | 0 | 0 | 0 | 0 | df=12 | NS |
| 6,000-15,000 | 2 | 5.75 | 2 | 0 | 0 | | |
| 16,000-25,000 | 2 | 5.71 | 2 | 0 | 0 | | |
| 26,000-35,000 | 2 | 5.71 | 2 | 0 | 0 | | |
| 36,000- 45,000 | 0 | 0.00 | 0 | 0 | 0 | | |
| Above 46,000 | 0 | 0 | 0 | 0 | 0 | | |
| Stay of hospital(in days) | | | | | | | |
| 1-20 days | 24 | 68.57 | 24 | 0 | 0 | 17.05 | 15.03 |
| 21-40 days | 10 | 28.53 | 10 | 0 | 0 | df=6 | S* |
| 41-60 days | 1 | 2.86 | 1 | 0 | 0 | | |
| 61 or above | 0 | 0 | 0 | 0 | 0 | | |

Table-4 shows there will be significant association between pre-interventional scores with area of residence, stay of hospital in days on the basis of Glasgow Coma Scale with their selected demographic variables.

Table-5: Association between pre-intervention score of sensory stimulation of unconscious patients on the basis of Coma recovery scale-revised with their selected demographic variables.

n=35

| Demographic variables | Frequency (n) | percentage (%) | CRS-R SCORE | | | 'Chi' square X ² value | Critical value |
|------------------------|---------------|----------------|-------------|-----|----|-----------------------------------|----------------|
| | | | VS | MCS | CS | | |
| Age (in years): | | | | | | | |
| 18-40 years | 27 | 77.14 | 25 | 0 | 0 | 0.99 | 12.59 NS |

| | | | | | | | |
|---------------------------|----|-------|----|---|---|-------|----------|
| 41-50 years | 2 | 5.72 | 4 | 0 | 0 | df=6 | |
| 51-60 years | 4 | 11.42 | 4 | 0 | 0 | | |
| 61-70 years | 2 | 5.72 | 2 | 0 | 0 | | |
| Gender: | | | | | | | |
| Male | 8 | 22.86 | 10 | 0 | 0 | 0.94 | 5.99 NS |
| Female | 27 | 77.14 | 25 | 0 | 0 | df=2 | |
| Religion: | | | | | | | |
| Hindu | 30 | 85.72 | 30 | 0 | 0 | 0.94 | 9.49 NS |
| Muslim | 5 | 14.28 | 5 | 0 | 0 | df=4 | |
| Others | 0 | 0 | 0 | 0 | 0 | | |
| Educational level: | | | | | | | |
| Illiterate | 23 | 65.72 | 23 | 0 | 0 | 0.95 | 5.99 NS |
| Educated | 12 | 34.28 | 12 | 0 | 0 | df=2 | |
| Marital level: | | | | | | | |
| Married | 35 | 100 | 35 | 0 | 0 | 0.94 | 5.99 NS |
| Unmarried | 0 | 0 | 0 | 0 | 0 | Df=2 | |
| Area of residence: | | | | | | | |
| Rural | 31 | 88.58 | 30 | 0 | 0 | 0.94 | 5.99 S* |
| Urban | 4 | 11.42 | 5 | 0 | 0 | df=2 | |
| Monthly income: | | | | | | | |
| None | 29 | 82.87 | 29 | 0 | 0 | 0.99 | 21.03 NS |
| <5000 | 0 | 0 | | 0 | 0 | df=12 | |
| 5,000-15,000 | 2 | 5.71 | 2 | 0 | 0 | | |
| 16,000-25,000 | 2 | 5.71 | 2 | 0 | 0 | | |
| 26,000-35,000 | 2 | 5.71 | 2 | 0 | 0 | | |
| 36,000- 45,000 | 0 | 0.00 | 0 | 0 | 0 | | |
| Above 46,000 | 0 | 0 | 0 | 0 | 0 | | |

| Stay of hospital(in days) | | | | | | | |
|---------------------------|----|-------|----|---|---|---------------|----------|
| 1-20 days | 24 | 68.57 | 24 | 0 | 0 | 15.06 df=6 | 12.59 S* |
| 21-40 days | 10 | 28.57 | 10 | 0 | 2 | | |
| 41-60 days | 1 | 2.86 | 1 | 0 | 0 | | |
| 61 or above | 0 | 0 | 0 | 0 | 0 | | |

Table-5 reveals there will be significant association between pre-interventional scores with area of residence, stay of hospital (in days) on the basis of Glasgow Coma Scale with their selected demographic variables.

Discussions

Data were obtained and entered into the Microsoft excel sheet for tabulation and statistical processing. The descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics ('Chi'- square, paired 't' test) were used to analyze the data, and to test the study hypothesis. The study found that selected demographic variables age (in years), gender, religion, educational level, marital level, area of residence, monthly income, stay in hospital (in days) were statistically significant at $p < 0.05$ level.

A study that supported this study was conducted by S chandrasekaran, Ameya C Nanivadekar and Lee E Fisher (2020), to find out the sensory stimulation to increase the intensity on the level of consciousness and functional outcome of patients with traumatic brain injury. Sixty-eight patients (age 18-65 years) with moderate-to-severe TBI were selected in the study. They were randomized into high (1-hour/day) or control (30-minute/day). Intensity stimulation programs was given for 20 days after the injury. The findings of the study revealed that patients in the high intensity group than in the control group who received a maximum total score was (47% vs. 19%, $p = 0.015$) than in the control group and a maximum Glasgow Outcome Scale score at the second (28% vs. 8%, $p = 0.034$).The study concluded that early sensory stimulation program may improve the level of consciousness and functional outcome of patients with TBI in the early months post-injury.³⁴

A Cross sectional study that supported was conducted by Salmani F et.al. (2017), to evaluate the effects of family centered effective stimulation on brain injured on brain injured comatose patients with brain injuries. In this study three group double blinded randomized controlled trial design was

used. 90 comatose patients with traumatic brain injuries whose GCS score is between 5-8 were selected for this study. Patients were randomly selected for experimental, placebo and control group using per muted block randomization. Affective stimulation intervention was given by family members for 7 days twice a day. In placebo group, a sensory stimulation program was done by trained person who was unfamiliar with the patients. Patients in the control group received only sensory stimulation which was routinely given to all patients. Result reveals that level of consciousness in the experimental group was significantly higher (9.1 ± 2.1) than the placebo (7.2 ± 1.1), the control group (0.6 ± 1.7) ($p < 0.001$), subsequently and has positive impact on sensory function.³⁵

Conclusion

The present study is designated to evaluate the effectiveness of coma arousal techniques to improve the sensory stimulation in unconscious patient's admitted in Critical care medicine. The findings of the present study were discussed in terms of the study are compared and differentiated with those of other similar studies conducted in different setting.

Quasi-experimental research design was used for study, one group pre-test, post-test design. The tool consists of demographic variables, Glasgow coma scale and coma recovery scale-revised. Tools were developed for the study on the basis of the objectives. It was considered to be most appropriate instruments for assessing the level of consciousness sensory functions in unconscious patients.

Limitations and Future Studies

The limitations of the present study were:

- Study is limited to only 35 patients.
- Intervention is limited to twice per day for 20 min with interval of one hour for 15 days.
- Study is limited to only unconscious patients with GCS <8.
- This study is limited to only one study group there is no control group to compare effectiveness of coma arousal technique.

Recommendation For Further Study

Keeping in view the findings of the present study some of the recommendations are prepared. On the basis of the findings of the present study, the following recommendations have been

made for the further study:

1. Similar study can be replicated on quasi experimental study with two groups (experimental and control) to generalize the findings.
2. Similar study can be undertaken by taking a larger sample.
3. Similar study can be conducted on any other chronic conditions whose GCS is less than 8.
4. Similar study can be replicated by using structured program on coma arousal therapy or session on coma arousal techniques.
5. A similar study can be performed with multiple time series design.
6. Similar study can be done by increasing the time period of intervention of sensory stimulation more than 15 days.
7. Similar study can be repeated on intervention given by family members along with nurses.
8. Similar study can be performed on only two or more than two aspects of sensory function among auditory, visual, tactile, kinetic taste and arousal.
9. Similar study can be undertaken by increasing the frequency of coma arousal techniques more than two times per day.
10. Similar study can be conducted by using only one tool.
11. Similar study can be done by using another readymade tool to assess level of consciousness or to find out improvement in sensory functions rather than GCS or CRS-R.
12. A comparative study can be repeated with other techniques & therapy for Sensory Stimulation to know about the effectiveness of the intervention.
13. A survey can be performed to assess the knowledge and attitude of nurses working in intensive care unit or nursing students towards various types of sensory stimulation therapies.
14. A similar study can be done to assess the attitude of patients and their family members regarding coma arousal techniques.

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