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Effectiveness of sensory stimulation among semi-conscious and unconscious patient admitted in ICU: One group pre-test post-test research study

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Abstract
Background: Sensory stimulation is the application of environmental stimuli by an external agent to promote arousal and behavioural responsiveness. Formalized sensory stimulation programs as a treatment for patients in a coma or vegetative state became popular in the 1980s despite a lack of scientific evidence proving or disproving their effectiveness. The programs varied in intensity and frequency of intervention, as well as targeted senses.
Aims: The study aim to assess the effectiveness of sensory stimulation among semi-conscious and unconscious patient admitted in ICU.
Materials and methods: This study consist of – quantitative study with one group pre-test post research design which consist of 45 semi-conscious and unconscious admitted in ICU at Rahman Hospital Pvt. Ltd. were recruited as sample of the study using convenient sampling technique. Demographic Performa, Standardize tool: Glasgow Coma Scale and Ranchos Los Amigos Scale, were used to collect the data.
Result: The findings reveals that majority (48.90%) of the sample belong to age group more than or equal to 48 years, (64.54%) were male, (51.1%) belongs to Muslim community, (48.9%) reason for admission was CVA, (57.8%) were semi-conscious, (44.4%) patient was supported with artificial airway: mechanical ventilator, and (62.2%) patient was on sedation.
Conclusion: The results showed improvement in the level of consciousness after the sensory stimulation.

Keywords: Effectiveness, Level of consciousness, sensory stimulation, semi-conscious and unconscious

Introduction
Unconsciousness is a state of unawareness of oneself, environment and decrease response to an external stimuli. Semi-consciousness is a state of decrease level of consciousness, confusion and is able to respond to external stimuli. Sensory deprivation is one of the very common complications of patient with decrease level of consciousness admitted in ICU. Sensory stimulation provided early can improve the level of consciousness and keep the sensation intact. GCS and RLA scale is a standardize tool useful to assess the level of consciousness [2].

Methodology
The objectives of the study were to assess the pre-interventional level of consciousness, effectiveness of sensory stimulation among semi-conscious and unconscious patient, and to find out association between levels of consciousness with selected demographic variable. Formal permission was obtained from each patient's guardian. Every participant was assured of his/her privacy and confidentiality.

Sample size
The sample size was 45 semi-conscious and unconscious patient admitted in ICU at Rahman Hospital Pvt. Ltd.

Sampling technique
Non-probability purposive sampling technique

Tools for data collection

The tools used in study were:
Section I: Demographic performa
Section II: Glascow Coma Scale
Section III: Rancho Los Amigos Scale

Methodology: Observational checklist of GCS and RLA were used for data collection

Procedure for data collection

The data was collected for one month from the semi-conscious and unconscious patient admitted in ICU at Rahman Hospital Pvt. Ltd. The purpose of the study was explained to the patient's guardian and pre-test was conducted by using GCS and RLA scale to assess the level of consciousness.

Tactile and auditory stimulation was administered twice a day for 8 mins for a week i.e. 5 mins auditory stimulation and 3 mins tactile stimulation. Tactile stimulation was applied on the dorsum of the hand, chest, and foot, using a rubber brush twice a day for 3 mins for a week. Auditory stimulation using voice recording of patient's dear/close one was played for listening using earpiece twice for 5 mins a day for a week. An interval of 8 hours duration was maintained between each stimulation per day. On the same day, pre-test and post-test were conducted using Glasgow Coma Scale and Rancho Los Amigos Scale to assess the level of consciousness of semi-conscious and unconscious patients admitted in ICU.

Result

Table 1: Frequency and percentage distribution of demographic variable of semi-conscious and unconscious patient admitted in ICU

n=45

Sl. No	Demographic variables	Sub-Group	Frequency	Percentage
1.	Age in year	18-27 years	10	22.2
		28-37 years	7	15.6
		38-47 years	6	13.3
		48 years and above	22	48.9
2.	Sex	Female	16	35.6%
		Male	29	64.4%
		Others	0	0%
3.	Religion	Hindu	21	46.7%
		Muslim	23	51.1%
		Christian	1	2.2%
		Others	0	0%
4.	Reason for admission	Brain tumor	5	11.1%
		CKD with Left basal ganglia	1	2.2%
		CVA	12	26.7%
		Recurrent appendicitis with SLE	1	2.2%
		RTA	3	6.7%
		TP Hematoma	1	2.2%
		Traumatic brain injury	22	48.9%
5.	Pre-interventional level of consciousness	5 – 8	26	57.7%
		9 – 12	19	42.3%
6.	Patient supported with artificial airway	Mechanical ventilator	20	44.4%
		Tracheostomy	11	24.4%
		None	14	31.1%
7.	History of any central nervous injury	Yes	18	40.0%
		No	27	60.0%
8.	Patient was on sedation	Yes	28	62.2%
		No	17	37.8%

Table 2: Frequency and percentage distribution of level of consciousness among semi-conscious and unconscious patient admitted in ICU determine by GCS

n=45

Category	Level Of Consciousness			
	Pre-test (Day 1 morning)		Post –test(Day 7 evening)	
	Frequency	Percentage	Frequency	Percentage
Semi-conscious	26	57.8%	32	71.11%
Unconscious	19	42.2%	13	28.89%

Table 3: Frequency and percentage distribution of level of consciousness among semi-conscious and unconscious patient admitted in ICU determine by RLA

n=45

Category	Level Of Consciousness			
	Pre-test (Day 1 morning)		Post-test (Day 7evening)	
	Frequency	Percentage	Frequency	Percentage
No response	3	6.67%	3	6.67%
Generalized response	28	62.2%	20	44.4%
Localized response	6	13.33%	4	8.89%
Confused & agitated	6	13.33%	4	8.89
Confused, inappropriate, non-agitated	1	2.22%	1	2.22%
Confused, appropriate	0	0%	3	6.67%
Automatic appropriate	1	2.22%	4	2.22%
Purposeful, appropriate: stand –by assistance	0	0%	4	8.89%
Purposeful, appropriate: stand-by assistance on request	0	0%	2	4.44%

Table 4: Paired t- test for the comparison of pre-test and post-test interventional score of level of consciousness among semi-conscious and unconscious patient admitted in ICU determine by GCS.

Category	Mean	Mean Difference	't' value	Df	p-value
Pre –test (Day 1 morning)	8.27	-1.78	10.79	44	<0.001**
Post –test (Day 7 evening)	10.04				

(**significant at p<0.05; tabulated value =2.015)

Table 5: Paired 't' test for comparison of pre-test and post-test interventional score of level of consciousness among semi-conscious and unconscious patient admitted in ICU determine by RLA.

Category	Mean	Df	't' value	p-value
Pre –test (Day 1 morning)	2.511	44	7.31	<0.001**
Post –test (Day 7 evening)	3.822			

(**significant at p<0.05; tabulated value =2.015)

Discussion

The study revealed that level of consciousness improved on the third day after the sensory stimulation which showed that the mean score of level of consciousness after the implementation of sensory stimulation was significantly higher than the mean score of level of consciousness before the implementation of sensory stimulation. (t =10.79, p = < .001) So it is evident that sensory stimulation was found effective in improving the level of consciousness among semi-conscious and unconscious patients admitted to ICU.

This finding is supported by a study conducted by Tavangar H, Kalantary MS, Tahereh Salimi T, Jarahzadeh M, and Sarebanhassanabadion M to determine the effect of family members' voice on the level of consciousness of comatose patients admitted to the intensive care unit, where the findings during ten days showed the changes in the level of consciousness in the intervention group from the 4th day of the study were more in the mean daily GCS scores. This study indicated that family members' voice can increase level of consciousness of comatose patients with acute subdural hematoma [3].

Conclusion

The following conclusion was drawn from the findings of the study.

- 26 of sample were semiconscious and 19 samples were unconscious before the intervention of sensory stimulation according to GCS. After sensory stimulation 32 sample were semi-conscious and 13 sample were unconscious according to GCS.
- 62.22% of patient has generalized response before the intervention of sensory stimulation according to RLA scale. After the intervention of sensory stimulation
- 44.22% of patient has generalized response according to RLA scale.

Therefore the study concludes that the sensory stimulation was effective in enhancing the level of consciousness among the semi-conscious and unconscious patients admitted in ICU.

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