Journal of Biology and Today's World

Journal home page: http://journals.lexispublisher.com/jbtw

Received: 10 March 2016 • Accepted: 16 May 2016

Research

doi:10.15412/J.JBTW.01050502

The Effect of Family Guided Visits on the Level of Consciousness in Traumatic Brain Injury

Zohreh Kalani[1], Pourandokht Pourkermanian[2*], Nasrollah Alimohammadi[3]

[1] Research Center for Nursing and Midwifery Care, Faculty of Nursing and Midwifery, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

[2] Faculty of Nursing and Midwifery, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

[3] Nursing and Midwifery Care Research Center, Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

*Correspondence should be addressed to Pourandokht Pourkermanian, Faculty of Nursing and Midwifery, Shahid Sadoughi University of Medical Sciences, Yazd, Iran; Tell: +989132121532; Fax: +989132121532; Email: p.pourkermanian@yahoo.com.

ABSTRACT

Sensory stimulation in patients with a decreased level of consciousness in the intensive care unit (ICU) can affect the level of consciousness. Thus, this study was conducted to determine the effect of family guided visits on the level of consciousness in traumatic brain injury patients admitted to ICU. A cluster randomization design was used. Patients were divided into the two groups. The patients in the intervention group were visited daily by a trained member of a family receiving touch and auditory stimulations for 14 days. The control group met the patients regularly every day for 30 minutes each day. The level of consciousness was measured 30 minutes before and 30 minutes after the visits using the Glascow Coma Scale (GCS). The repeated measured ANOVA results revealed that the mean scores of GCS have significantly increased over time (from the first day to the fourteenth day) in the intervention group ($p<0.001$) and the control group ($p<0.001$). The increase in the intervention group was significantly higher than the control group ($p<0.001$). Structured and guided family meeting could improve the level of consciousness of the comatose patients. It is recommended that the closest family members, with adequate training, perform sensory stimulation program at the proper time.

Key words: Consciousness, Guided Visit, Family, Intensive Care Unit, Glagcow Coma Scale

Journal of Biology and Today's World is published by *Lexis Publisher*; Journal p-ISSN 2476-5376; Journal e-ISSN 2322-3308.

1. INTRODUCTION

One of the most common injuries, especially the ones caused by accidents and incidents in everyday life, is injury to the head. In today's modern world, these injuries are increasing so that approximately one hundred million people are annually affected by these damages, and over a hundred thousand people suffer permanent disability due to them (1). In the early twentieth century, head injuries significantly led to death. While today, most of these patients can survive for months or years even in the vegetable state. Gaining consciousness and improved cognitive, physical, and mental functions in patients is a great challenge for caregivers. Sensory deprivation is one of the factors that are faced by patients in the Intensive Care Unit (ICU). So sensory stimulation should be considered as a treatment method that aims to reduce the risk of sensory deprivation and facilitate recovery responses in patients with a decreased level of consciousness. This theraputic method causes improved brain recovery and reorganization by stimulating the reticular activating system of the brain (2). Among all sensory stimulations, auditory stimulation has received more attention than other senses. Because, it is the latest sense that disappears and, on the other hand, unlike other senses, there is no barrier to stimulate this sense (3). Touch is the most powerful and most primitive sense that effectively communicates and expresses the feelings of peace and security. As a result, the stimulation of these two senses can be used in all aspects of patient care and the response can be observed (4). Ehsaei et al. have shown that sensory stimulation, especially if done at the beginning of admission, can reduce hospitalization in the intensive care unit (5). Hinson & Hasuk state that in order to facilitate the healing process and prevent sensory deprivation in comatose patients with traumatic brain injury, sensory stimulation programs organized in the early stages after brain injury can be very useful (6). Application of sensory stimulation program for comatose patients increases

peripheral stimulation for the part of the brain that controls the level of consciousness, attention and concentration. If the sensory stimulation have enough intensity and are repeated appropriately and accurately, it is possible to obtain a level of consciousness quickly and have a higher performance in patients (7). Sensory stimulation interventions by close relatives can be one of the rehabilitation methods that are used for increasing the activity of the grid system and wakefulness (8, 9). Thus, long-term rehabilitation of patients in the intensive care unit can be associated with the patient's family efforts (10). Unfortunately, because of the structure and philosophy of this section of hospitals, the presence of family members is banned and visits are severely restricted. Therefore, family cooperation is not possible and the family members are placed away from the patients. ICU nurses are in an ideal position to help their families because they are constantly in clinical practice and are a mediator between the patient, family, and health care team. They can prepare a good situation in order to improve the relationship between the patients and their family (11). The intensive care unit nurse may suggest the family members what to say or what to do for the patient when they are near him or her (12). Family encouragement to participate in the sensory stimulation program can lead to acceleration of the improvement of cognition and it can also improve prognosis in the patients as their sensory stimulus is familiar to the patients (2). Therefore, this study was conducted to determine the effect of family visits on the level of consciousness of the patients admitted to the ICU.

2. MATERIALS AND METHODS

This clinical trial was done with cluster randomization design to investigate the effect of guided visits of families as an independent variable on the level of consciousness of patients. The participants were divided into the two groups of intervention and control. This study was conducted in the ICU of Ayatollah Kashani and Alzahra hospitals in Isfahan. According to act ethics, each of two ICUs was considered as intervention or control group. At the first stage, patients of the intervention group were selected from one ICU and the patients in control group were chosen from another one. In the next phase, the position of ICUs were changed. This process continued until the completion of the sample size. Sixty four patients were selected under consideration of inclusion criteria: focal damage on the head, GCS 5-8, age of 18-65 years, in the firsr 24 hours of admission in ICU; and exclusion criterion of the study: no previous history of hospitalization in ICU. If a patient was discharged from hospital or expired before fourteenth day of admission, transferred to another hospital or surgery was done and cerebral edema occurred, the patient was excluded from the study. The informed consent of the patient's family were obtained. Daily conducted family meeting in intervention group was 45 minutes to an hour (at 16-17) for 14 days. Before the beginning of the visits, In a training session, one of the family members with more emotional relationship with the patient, who was fixed at 14 days received the necessary informatation about ICU (eg. general description of the condition and the ICU equipment, explanations on meeting the infection control during the meeting and sensory stimulation can be used to improve and repair the lesion). In this session the family member was informed on how to meet the patient according to below items:

- Introducing oneself to the patient;
- Notifying him of the time and place;
- Explaining what happened;
- Description of the memories of the past;
- Reading the Koran, the book of prayers or patients' favorites poems;
- Playing voices of family members and friends;
- Playing favorite music or prayers using headphones;
- Having skin contact with the patient during care;
- Arranging the appearance of his/her hair and nails;
- Moisturizing the lips and wet cleaning his/her nose and eyes with sterile gauze;
- Applying an emollient cream on hands and foots of the patient;
- Moving the joints of the hands and feet with the patient's nurse permission

The control group received the usual meeting in accordance with the appointment rules of the hospitals and ICUs. Visiting hours for the control group were 15-15.30 three times a week. All of the subjects in the intervention group were tested 30 minutes before and 30 minutes after the intervention. The control group was also tested before and after the visits. For data analysis, SPSS software version 20 was used. In order to compare the level of consciousness in the two groups, independent samples t-test and repeated measure ANOVA were used. The Ethics Committee of the Shahid Sadughi University of Medical Sciences approved this project and the project was registered with the code of IRCT2014091719208N1 in the site of Iranian Randomized Clinical Trial (IRCT).

3. RESULTS AND DISCUSSION

The mean ages of the intervention group (15.7 + 37.3) and the control group (15.4 + 38.1) were not significantly different (P = 0.84). Statistical tests, according to

Table 1, showed that these two groups were similar in terms of gender, hospital and cerebral injury (epidural hematoma, subdural hematoma, subarachnoid hemorrhage, cerebral contusion or mix damage).

Table 1. Distribution (Percent) of patients according to gender, hospital and brain injury

		Intervention (n=32)	Control (n=32)	Total (n=64)	p-value
Gender	male	25 (78.1)	26(81.2)	51 (79.7)	0.75
	female	7 (21.9)	6 (18.8)	13 (20.3)	
Hospital	Kashani	15 (46.9)	14 (43.8)	29 (45.3)	0.80
	Al-Zahra	17 (53.1)	18 (56.2)	35 (54.7)	
Brain lesion	subdural hematoma	9 (28.1)	7 (21.9)	16 (25)	0.81
	epidural hematoma	10 (37.2)	8 (25)	18 (28.1)	
	subarachnoid hemorrhage	5 (15.6)	7 (21.9)	12 (18.8)	
	Cerebral Contusion	4 (12.5)	5 (15.6)	9 (28.1)	
	Mix damage	4 (12.4)	5 (15.5)	9 (28.1)	

The independent sample t-test results showed that the GCS scores on the first day in both intervention and control group were not significantly different (p=1). ANOVA showed GCS increase in fourteenth day of admission in ICU. Comparison of changes in the level of consciousness of the patient, on the first and the fourteenth day of admission, showed significant increase over time in both intervention ($p<0.001$) and control ($p<0.001$) groups. This increase was statistically higher in intervention group compared with the control group ($p <0.001$). The results showed that after fourteenth day, the GCS in the intervention group were significantly higher compared with the control group. Urbenjaphol et al. also suggested that sensory stimulation in the patients with brain injury, with the participation of the patient's family members, within 14 days significantly increases in the GCS (13). Since the place of brain injury can affect the responses to sensory stimulation, in the aforementioned and the present study the type of the brain injury was also considered. In a study done recently to determine the effect of the family voices on the consciousness level of comatose patients admitted to ICU, the researchers also obtained similar results (14). Goudarzi et al. have also shown that auditory stimulus by familiar voices cause a significant increase in the GCS of the patients (3). In the above study, the intervention was with the auditory stimulation by voice recordings two times (each time 5-15 minutes) per day for fourteen days. The long duration of meetings for the patients' families (45 minutes to an hour), and the other positive effects of family presence on the patients were the innovations of the present study. Davis & Gimenez in their study used the auditory stimulations for comatose patients for 6 days (Table 2,

Table 3).

Table 2. Comparison of average score of GCS in the first and fourteenth days in the intervention and control groups

GCS scores	Intervention mean (SD)	Control mean (SD)	P-value (T-test)
GCS score on the 1st day	6.6 (0.9)	6.6 (1)	1
GCS score on the 14th day	12.8 (1.6)	7.6 (0.9)	<0.001
differences of GCS scores (1st and 14th days)	6.2	1	<0.001

Table 3. The mean of GCS score between the two groups on days of study

	intervention group mean (SD)	control group mean (SD)	P value
The first day (pre-intervention)	6.5 (0.9)	6.5 (0.9)	<0.001
2nd day	6.7 (0.9)	6.3 (0.9)	
3rd day	7.3 (1.1)	6.1 (0.9)	
4th day	7.9 (1.3)	6.2 (0.9)	
5th day	8.5 (1.6)	6.3 (0.9)	
6th day	9.2 (1.8)	6.4 (1.0)	
7th day	9.5 (2.0)	6.5 (1.0)	
8th day	10.3 (2.0)	6.9 (0.9)	
9th day	10.7 (1.9)	7.0 (0.9)	
10th day	11.2 (1.8)	7.0 (0.9)	
11th day	11.8 (1.7)	7.5 (0.9)	
12th day	12.2 (1.8)	7.6 (0.9)	
13th day	12.6 (1.6)	7.6 (0.9)	
14th day (end of intervention)	12.7 (1.6)	7.6 (0.9)	

The differences of the mean GCS at baseline and at discharge in intervention and control group were 3.3 and 1 respectively. An improvement in the consciousness score in the two groups was shown. Although there was not a statistically significant difference between the two groups ($p = 0.14$) (15). The number of days of stimulations was less than fourteen days while indication of the effects of sensory stimulations required more than two weeks (6). In the present study, the rising trend of the daily mean scores of the patients' consciousness level in the intervention group during the 14 days and also the lower changes of the daily mean scores of the patients' consciousness level in the control group showed a positive impact of guided meetings of patients' families on improving the comatose patients' consciousness level. Targeted selection of family member that had a better relationship with patient and taught him what to do is a strength of this study. The patients were evaluated every half an hour before and after each visit. According to GCS score, there were no significant differences in the level of consciousness in the two times, which may be related to the mechanism of recovery of brain injury and repairing axonal injury. The results also showed that the changes in GCS were significant over time in two groups and there was a significant interaction effect of time in both groups. In this study, the researchers had no control on the unpleasant sensory stimulations in the environment of ICU. This was one of the limitations of this study.

4. CONCLUSION

Guided and targeted meetings by the patient's family is effective for improving the level of consciousness in comatose patients. Therefore, it is suggested that the meeting patient with his close family with adequate training and with doing some sensory stimulations at the right time and provides the conditions for increasing the level of consciousness.

ACKNOWLEDGMENT

The researchers would like to express their deepest gratitude to all the families of the patients participated in the study and all the ICUs' nurses, supervisors and the dear management of Al Zahra and Ayatolla Kashani hospitals in Isfahan city who helped us in conducting this study.

FUNDING/SUPPORT

This paper is extracted from a Master's thesis in Shahid

Sadoughi University of Medical Sciences, Yazd.

AUTHORS CONTRIBUTION

Conception or design of the work: Zohreh Kalani, Pourandokht Pourkermanian, Nasrollah Alimohammadi
Data collection: Pourandokht Pourkermanian
Data analysis and interpretation: Zohreh Kalani, Pourandokht Pourkermanian
Drafting the paper: Pourandokht Pourkermanian
Critical revision of the paper: Zohreh Kalani, Pourandokht Pourkermanian
Final approval of the version to be published: Zohreh Kalani

CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this paper.

REFERENCES

1. Lippert-GrÜner M, Wedekind C, Klug N. Outcome of prolonged coma following severe traumatic brain injury. Brain Injury. 2003;17(1):49-54.
2. Gerber CS. Understanding and managing coma stimulation: are we doing everything we can? Critical Care Nursing Quarterly. 2005;28(2):94-108.
3. Goudarzi F, Basampoor S, Zakeri-Moghadam M, Faghih-Zadeh S, Rezaie F, Mohamad-Zadeh F. Changes in level of consciousness during auditory stimulation by familiar voice in comatose patients. Iran Journal of Nursing. 2010;23(63):43-50.
4. Boyek K, Watson R. A touching story. Elderly care. 1994 May-Jun;6(3):20-1. PubMed PMID: 8004069. Epub 1994/05/01. eng.
5. EHSAEI M, BAHADOR KGR, SAMINI F, ETEMAD RH. REHABILITATION OF SEVERE TRAUMATIC HEAD INJURED PATIENTS (DEEP COMA) BY TACTILE, THERMAL, VISUAL AND AUDITORY STIMULATION. 2004.
6. Oh H, Seo W. Sensory stimulation programme to improve recovery in comatose patients. Journal of Clinical Nursing. 2003;12(3):394-404.
7. Megha M, Harpreet S, Nayeem Z. Effect of frequency of multimodal coma stimulation on the consciousness levels of traumatic brain injury comatose patients. Brain injury. 2013;27(5):570-7.
8. Vahedian-Azimi A, Ebadi A, Jafarabadi MA, Saadat S, Ahmadi F. Effect of Massage Therapy on Vital Signs and GCS Scores of ICU Patients: A Randomized Controlled Clinical Trial. Trauma monthly. 2014;19(3).
9. Tobiano G, Chaboyer W, McMurray A. Family members' perceptions of the nursing bedside handover. Journal of clinical nursing. 2013;22(1-2):192-200.
10. Ghiyasvandian S, Abbaszadeh A, Ghojazadeh M, Sheikhalipour Z. The effect of open visiting on intensive care nurse's beliefs. Research Journal of Biological Sciences. 2009;4(1):64-70.
11. Leon AM, Knapp S. Involving family systems in critical care nursing: challenges and opportunities. Dimensions of critical care nursing. 2008;27(6):255-62.
12. Urden LD, Stacy KM, Thelan LA, Lough ME. Thelan's critical care nursing: diagnosis and management: Mosby Inc; 2006.
13. Urbenjaphol P, Jitpanya C, Khaoropthum S. Effects of the sensory stimulation program on recovery in unconscious patients with traumatic brain injury. Journal of neuroscience nursing. 2009;41(3):E10-E6.
14. Tavangar H, Shahriary-Kalantary M, Salimi T, Jarahzadeh M, Sarebanhassanabadi M. Effect of family members' voice on level of consciousness of comatose patients admitted to the intensive care unit: A single-blind randomized controlled trial. Advanced biomedical research. 2015;4.
15. Davis AE, Gimenez A. Cognitive-behavioral recovery in comatose patients following auditory sensory stimulation. Journal of Neuroscience Nursing. 2003;35(4):202-9.