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EVIDENCE BASED CARE



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## The Effects of Scheduled Visitation on the Physiological Indices of Conscious Patients Admitted at intensive Care Units

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### Abstract

**Background:** Visitation of patients admitted at intensive care units (ICUs) is a controversial issue in the field of health care. It is commonly believed that the presence of family members might bring about physiological changes, such as tachycardia and hypertension, in ICU patients.

**Aim:** This study aimed to evaluate the effects of scheduled visitation on the physiological indices of conscious patients at the ICU.

**Method:** This experimental study was conducted on 90 conscious patients admitted at the ICU of Ganjavian Hospital in Dezful, Iran in 2014. Patients were randomly divided into two groups of intervention and control. In the control group, patient visits were carried out in accordance with normal procedures of the ward. In the intervention group, patients were visited by relatives and family members for 30 minutes, preferably in evening shifts. Physiological indices of the patients were recorded before, during and after scheduled visitation. Data analysis was performed in SPSS V.18 using independent T-test and one-way ANOVA with repeated measures.

**Results:** In this study, mean age of patients in the intervention and control groups was  $42.1 \pm 19.1$  and  $39.4 \pm 19.6$  years, respectively. In the intervention group, systolic blood pressure had a more significant reduction at 10 and 30 minutes after visitation compared to the control group (independent T-test,  $P < 0.05$ ). However, no statistically significant difference was observed in other physiological indices of the study groups (independent T-test,  $P > 0.05$ ).

**Implications for Practice:** According to the results of this study, scheduled visitation by family members caused no significant differences in the physiological indices of ICU patients. It is recommended that future studies be conducted as to confirm this finding and revise patient visitation policies in hospitals.

**Keywords:** Intensive care unit, Physiological indices, Visitation

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## Introduction

Admission at the intensive care unit (ICU) is a stressful process for patients and their families. ICU admission involves immobility, sleep and sensory deprivation, turmoil caused by the use of medical equipment, fear of diagnostic procedures and separation from friends and family members. These factors may induce anxiety in patients and negatively affect their physiological functions (1).

First and foremost, ICU patients need family support, safety and optimal quality of care (2). Family support plays a pivotal role in the effective treatment of different patients, and many health experts have emphasized the remarkable importance of this parameter in the well-being of patients (3-5).

In modern medicine, the health care environment encompasses patients and their families, and holistic patient care involves the support of both these groups. Under certain circumstances, participation of the family in patient care may not be possible (6). Such example is admission in the ICU, which forbids the presence of family members and limits patient visit times owing to the unique structure of this medical unit (7).

Family visits have a positive effect on the outcome and well-being of patients. Regular visits give patients strength, diminish the sensory deprivation caused by ICU admission and remind patients of their normal life outside of hospital (8). In a systematic review of literature, Smith et al. stated that visitation reduces stress in patients, as well as their family members (9). Furthermore, the presence of visitors at the ICU positively affects patients' satisfaction and accelerates treatment (10). Unfortunately, visitation of patients by family members is impeded by several factors in hospital (8).

Today, there are three approaches to visit the patients who are admitted at the ICU: 1) supervised or limited visitation, in which only a few family members or friends are allowed to visit the patient for a specific amount of time determined based on hospital policies; 2) "open" or unlimited visitation, in which the patient could be visited by family members or friends at any time and 3) scheduled or flexible visitation (11).

In recent years, plausible recommendations have been put forward in favor of unlimited patient visitation (2); however, they are not yet practiced in many countries. According to the literature, 2-70% of adult ICU patients in different countries receive unlimited visitation, and the highest rate of unlimited ICU visitation belongs to Sweden (70%). This rate has been reported to be 10-32% in the U.S., 22% in the U.K., 14% in the Netherlands, 7% in France, 3.3% in Belgium and 2% in Italy (12).

In Iran, few studies have evaluated the existing policies regarding family visitation of ICU patients. For instance, one study by Haghbin et al. (2011) was performed at the ICUs of different hospitals in Shiraz (Iran), and the results indicated that 39.4% of ICU patient visitations were restricted, while 15.5% lasted for 1.5-2 hours daily. In addition, 23.9% of the units allowed only one hour of family visits from behind the window glass due to lack of space and equipment (13).

Open visitation is an urgent need for ICU patients and their families. Clinical guidelines in many countries consider the policy of open visitation to be in line with family-centred care for patients admitted at the ICU (14). However, it is commonly believed that the presence of family members might increase the risk of infections, disrupt patient recovery and cause physiological changes (e.g., tachycardia, arrhythmia, hypertension and anxiety) (3, 15-17). Evidence is inadequate as to confirm the adverse effects of visitation on the physiological indices of patients admitted at the ICU.

In the review of Iranian medicine literature, only a one-group study by Mehrnejhad et al. (2013) has assessed the effects of visitation on the physiological indices and cortisol serum concentration of ICU patients. Other studies conducted in this regard have evaluated patients admitted at cardiac care units (CCUs) proposing conflicting results. For instance, in a study by Rahmani et al. (2013), it was claimed that in addition to affecting physiological indices, scheduled visitation could reduce systolic and diastolic blood pressure, heart rate, respiratory rate and dysrhythmia in patients (19).

On the other hand, findings of Salavati et al. (2013) were indicative of no significant difference in the physiological indices of patients in the intervention group before, during and after visitation (20). Moreover, the results obtained by Kamrani et al. (2011) showed that physiological indices of patients increased upon visitation and declined at the end of visitation; however, these differences were not clinically significant (21).

Considering the limited number of studies in Iran on the role and challenges associated with patient visitation at the ICU, this study aimed to evaluate the effects of scheduled visitation on the physiological indices of conscious patients admitted in the ICU.

## Methods

This empirical study was conducted using a two-group pretest-posttest approach. Study population consisted of all conscious patients admitted at the ICU of Ganjavian Hospital in Dezful, Iran in 2015. Sample size was determined based on the comparison of two means formula with the effect size of five, confidence interval of 95%, and test power of 90%. Standard deviation of systolic blood pressure was estimated at seven millimeters based on previous studies, and sample size of was determined at 41 patients in each group. Considering the possibility of sample loss, 45 patients were allocated to each group, and in total, 90 patients were randomly divided into two groups of intervention and control. Participants were selected by purposive sampling including conscious patients admitted at the ICU who met the inclusion criteria of the study. Random allocation of the participants was carried out using the minimization method (22).

Initially, the patients were categorized based on key variables, such as age and gender. Afterwards, from the patients who met the inclusion criteria, the first participant was placed in the intervention or control group by coin flip, and other participants were allocated to the study group with lower total of variables (age and gender). In case of equality, random allocation was repeated.

Inclusion criteria of the study were as follows: 1) favorable condition of the patient for visitation with permission of the related physician; 2) age of >18 years; 3) no fever or pain before visitation; 4) lack of hypertension; 5) being conscious and alert about time, place and visitors; 6) ability for verbal or non-verbal communication; 7) ICU admission for more than 24 hours and 8) no history of ICU admission. Exclusion criterion was drastic changes in the vital signs or condition of the patient (e.g., increased heart rate and respiratory rate, sweating and restlessness).

The ICU of Ganjavian Hospital is a public section with 12 beds, and admissions include patients with different conditions (e.g., neurosurgical, internal-neurological, internal or cardiovascular disorders, and general surgery). In this section, beds are placed in isolate units separated by walls, and patients cannot see each other. Method of visitation in the ICU of this hospital is limited, and visitors are allowed to see the patients from behind the window glass.

In the control group, visitations were carried out based on the routine policies of the hospital. In the intervention group, in addition to routine visits, patients were granted another scheduled visitation for 30 minutes, preferably in the evening. For scheduled visitation, the researcher would meet with the family members of patients in the intervention group in the morning (preferably with the person requested by the patient to visit). Objectives and process of the experiment were explained to the visitors, and after obtaining written informed consent, evening visitation times were determined. Setting the time of evening visitation depended on the conditions of the unit so that it would not interfere with nursing care procedures or resting time of the patients.

During the intervention, family members were allowed to help the patient with personal tasks (e.g., washing hands and face) while visiting; however, they could not meddle in medical care procedures. After the visits, physiological indices were evaluated and recorded for each patient separately at 10 minutes before the visitation, during visitation (10 minutes after the start of visitation), and 10, 30 and 60 minutes after the end of visitation.

Data were collected using demographic questionnaires (age, gender, marital status, and length of ICU stay) and checklists to record physiological indices of the patients. Checklists were prepared for each study group separately, and physiological indices were recorded at specific times.

Content validity was used to determine the validity of the demographic questionnaire and checklists. In addition, validity of the cardiac monitor was measured based on the instructions of manufacturer using standard tools and calibration. Systolic and diastolic blood pressure of the patients was assessed via non-invasive methods using the related monitor, and the results were automatically recorded on a screen.

To evaluate arterial oxygen saturation, the cardiac monitor (Saadat, model: Alborz B9) was attached to the fingers of the patients. Before sampling, calibration certificate of the cardiac device was provided by a medical equipment engineer, and the device was used to determine the reliability of physiological indices of all the patients. Moreover, axillary body temperature of the patients was measured using a thermometer, and respiratory rate was recorded by observing chest movements and counting for 60 seconds. Recording of all indices was performed by an assistant researcher.

In this study, no sample loss occurred in the study groups. In the intervention group, if a family member refused to visit the patient, the patient would be replaced by another sample, and none of the participants withdrew from the study. Patients in the control group had no scheduled visitation, and none of them had to leave the experiment.

Ethical considerations of this study included obtaining permission from the Research Deputy of Rafsanjan University of Medical Sciences and hospital authorities. Additionally, written informed consent was obtained from patients and their family members for participation. Objectives of the research were fully explained to the family members, and patients were assured of confidentiality terms regarding the preservation and publication of medical data.

Data analysis was performed in SPSS V.18 using descriptive statistics (mean and standard deviation), one-way ANOVA with repeated measures, independent T-test, Chi-square and Mann-Whitney U test.

## Results

In this study, the intervention group consisted of 27 male (60.0%) and 18 female patients (40.0%) with mean age of  $42.1 \pm 19.1$  years, and mean length of admission was estimated at  $3.1 \pm 1.7$  days in this group. The control group consisted of 28 male (62.2%) and 17 female patients (37.8%) with mean age of  $39.4 \pm 19.6$  years, and mean length of admission was estimated at  $2.9 \pm 1.8$  days in this group. Both study groups were homogenous in terms of demographic characteristics (Table 1).

**Table 1: Comparison of Demographic Characteristics of Patients in Intervention and Control Groups**

Demographic Characteristics		Intervention Group N (%)	Control Group N (%)	Test Results
Age (year)	15-40	25 (55.6)	25 (55.6)	*P=1
	40-60	11 (24.4)	11 (24.4)	
	>60	9 (20)	9 (20)	
Gender	Male	27 (60)	28 (62.2)	**P=0.82
	Female	18 (40)	17 (37.8)	
Marital Status	Married	38 (84.4)	30 (66.7)	**P=0.051
	Single	7 (15.6)	15 (33.3)	
Length of ICU Stay (hours)	24-48	21 (46.7)	29 (64.4)	*P=0.11
	48-72	11 (24.4)	9 (20)	
	72-96	8 (17.8)	1 (2.2)	
	>96	5 (11.1)	6 (13.4)	

\*Mann-Whitney U test; \*\*Chi-square test

Physiological indices of the patients, including systolic blood pressure, diastolic blood pressure, heart rate, body temperature, respiratory rate and arterial oxygen saturation, were compared using independent T-test and mean and standard deviation at five different times (before visitation, during visitation, and 10, 30 and 60 minutes after visitation). With the exception of systolic blood pressure, the results of independent T-test were indicative of no statistically significant difference in the physiological indices of patients in the intervention and control groups ( $P > 0.05$ ).

At 10 minutes after the visitation, mean and standard deviation of systolic blood pressure had a significant difference in the intervention ( $120.8 \pm 13.1$ ) and control groups ( $126.1 \pm 01.4$ ), with the mean value being lower in the intervention group (independent T-test,  $P = 0.04$ ). Moreover, at 30 minutes after the visitation, mean and standard deviation of systolic blood pressure had a significant difference in patients of the intervention ( $119.8 \pm 12.6$ ) and control groups ( $125.4 \pm 12.2$ ), with the mean value being lower in the intervention group (independent T-test,  $P = 0.03$ ). However, no statistically significant difference was observed in this index at 60 minutes after the visitation (independent T-test,  $P = 0.12$ ).

Intra-group evaluation of physiological indices was performed using repeated measures ANOVA, and the results were indicative of no significant difference between the groups, with the exception of arterial oxygen saturation index ( $P = 0.01$ ) (Table 2).

With respect to the index of arterial oxygen saturation, results of paired comparison were indicative of a significant difference before and during the visitation ( $P = 0.006$ ), as well as during and 10 minutes after the visitation ( $P = 0.001$ ). However, no significant difference was observed in this index at other times ( $P > 0.05$ ). Also, interaction effect of time and groups was evaluated using repeated measures ANOVA, and the results were indicative of no significant difference in the physiological indices of the patients ( $P > 0.05$ ).

**Table 2: Comparison of Mean Demographic Characteristics of Patients in Intervention and Control Groups**

Physiological Indices	Groups	Time of Evaluation			Results of Repeated Measures ANOVA			**P-value
		10 Minutes before Visitation	During Visitation	10 Minutes after Visitation	30 Minutes after Visitation	60 Minutes after Visitation		
		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD		
Systolic Blood Pressure	Intervention	119.2±13.1	121.3±13.3	120.8±13.1	119.8±12.8	119.9±12.2	0.07	
	Control	124.3±12.1	124.5±10.7	126.1±10.4	125.4±12.2	123.8±11.7		
	*P-value	0.05	0.21	0.04	0.03	0.12		
Diastolic Blood Pressure	Intervention	73.8±8.9	75±9.9	74.4±9.3	74.5±8.9	74.8±7.9	0.29	
	Control	75±7.7	75.7±8.2	77.2±8.1	75.8±9.6	75.4±8.4		
	*P-value	0.51	0.70	0.13	0.49	0.74		
Heart Rate	Intervention	88.1±13.4	89.2±15.7	88.3±14.4	88.1±14.2	88.4±13.9	0.67	
	Control	86.9±16.8	86.7±16.5	86.7±16.1	86.6±16.3	87.7±16.5		
	*P-value	0.73	0.45	0.62	0.64	0.82		
Respiratory Rate	Intervention	22.3±5.4	22.6±5.3	22.4±5.3	22.2±5.2	22.2±5.2	0.71	
	Control	22.42±7.03	22.28±7.13	22.15±7.44	22.44±7.39	22.4±7.2		
	*P-value	0.96	0.80	0.82	0.85	0.89		
Body Temperature	Intervention	37.1±0.3	37.2±0.3	37.2±0.3	36.9±1.5	37.2±0.3	0.29	
	Control	37.1±0.3	37.1±0.3	37.2±0.3	37.2±0.3	37.2±0.3		
	*P-value	0.45	0.89	0.97	0.28	0.75		
Arterial Oxygen Saturation	Intervention	98.1±1.8	98.2±1.8	97.7±1.9	97.7±1.8	97.7±1.8	0.01	
	Control	97.7±2.1	97.6±2.1	97.6±1.8	97.8±1.9	97.7±2.1		
	*P-value	0.55	0.18	0.74	0.78	0.74		

\*Independent T-test (Intra-group Comparison)

\*\*Repeated Measures ANOVA (Inter-group Comparison)

## Discussion

The present study aimed to evaluate the effects of scheduled visitation on the physiological indices of conscious patients admitted at the ICU. According to our findings, physiological indices were homogenous and had no significant difference in the intervention and control groups before visitation. In addition, no significant difference was observed in the physiological indices of patients during the visitation, and 10, 30 and 60 minutes after the visitation. However, systolic blood pressure of the patients had a statistically significant difference in both study groups at 10 and 30 minutes after the visitation.

The findings of the current study indicated that systolic blood pressure had a more significant difference in the intervention group at 10 and 30 minutes after the visitation compared to the control group. In this regard, Fumagalli et al. (2006) evaluated factors such as microbial contamination of the environment, infectious and cardiovascular complications, and stress hormones reactions (e.g., thyroids) in the ICU patients who received open and limited visitation. According to the results, microbial contamination of the environment was more frequent in patients receiving open visitation, while the rate of infectious complications was similar between the two groups. Furthermore, risk of cardiovascular complications was twice higher in patients receiving limited visitation. As for the patients receiving open visitation, anxiety had a more significant reduction, and thyroid-stimulating hormone had a less significant increase from admission to discharge compared to patients receiving limited visitation (1).

The results obtained by Salavati et al. (2013) are consistent with the findings of the present study, which indicated that mean of diastolic blood pressure had no statistically significant difference at 10 minutes before visitation, during visitation (10 minutes after the start of visitation), and 10 minutes after the visitation. However, there was a statistically significant difference between the mean of systolic blood pressure at 10 minutes before the visitation and 30 minutes after the visitation (20).

The results of the current study were indicative of no significant difference in the mean of respiratory rate before, during and after the visitation. Similarly, Salavati et al. (2013) reported no significant difference in the mean of respiratory rate before, during and after the visitation (20). It is noteworthy that the study by Salavati et al. (2013) was conducted on patients admitted at the CCU, whereas the

sample size of our study included patients admitted at the ICU, which is known to have more restrictions regarding patient visitation.

On the same note, findings of Gerber (1996) were indicative of no statistically significant difference in the mean of respiratory rate before, during and after patient visitation (23).

In the present study, intra-group evaluation of the patients revealed that except for the arterial oxygen saturation index, which improved during the evaluation, other physiological indices had no significant difference during the evaluation. It is noteworthy that for this index and other indices, the interaction effect was not significant; in other words, no improvement or deterioration was observed. In this regard, the results obtained by Mehrnejhad et al. (2013) were in line with the findings of the present study, indicating no statistically significant difference between the cortisol concentration, systolic and diastolic blood pressure and heart rate of patients before and after visitation (18).

The findings of Gerber (1996) and Bickert & Kleman (1993) were also consistent with the results of the present study, suggesting that there was no statistically significant difference in the systolic and diastolic blood pressure of patients before, during and after visitation (23, 24). Furthermore, the results obtained by Kamrani et al. (2011) demonstrated that mean of systolic and diastolic blood pressure and heart rate of patients increased 10 minutes after the start of visitation, and 30 minutes after the end of visitation, the aforementioned variables decreased to the level before the visitation (21).

Inconsistent with the current study, the findings of Rahmani et al. (2013) suggested that systolic and diastolic blood pressure of the intervention group reduced three days after the scheduled visitation compared to the first day, and the difference was considered to be statistically significant (19). In explanation, it should be noted that samples in the study by Rahmani et al. (2013) were patients admitted at the CCU, and evaluation of indices was performed during three days, while in the current study, indices were assessed during one day.

Iranian people are deeply devoted to traditions, and there are strong emotional bonds between family members. As such, individuals are commonly influenced by family circumstances and have serious commitment to each other (25). Visiting patients is considered as an honorable behavior in the Iranian culture owing to our religious beliefs. Therefore, policies revolving around limited visitation of patients may appear as a challenge between nurses and family members of patients (8).

One of the major concerns of nurses is that visitation by family members may lead to hemodynamic disorders in patients (26). According to the findings of the present study, no significant changes occurred in the physiological indices of patients after visitation, and although changes in blood pressure were statistically significant in patients of the intervention group, they held no clinical significance.

The results of the current study could disseminate a more positive attitude towards the subject of patient visitation at the ICU. Therefore, it is recommended that future studies be conducted as to confirm these findings.

One of the limitations of the present study was the non-blinded assignment of groups for recording the indices due to the presence of visitors. Furthermore, we had access to a limited number of studies evaluating ICU patients, which restricted the possibility of comparison.

### **Implications for Practice**

According to the results of this study, presence of family members leads to no significant changes in the physiological indices of patients admitted at the ICU. Therefore, it is recommended that similar studies be carried out in other units of general intensive care in different hospitals of the country in order to confirm these results, as well as to revise visitation policies of ICU patients, so that patient visits could be less restricted in these health care sections.

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### **Conflict of interest**

The authors declare that there is no conflict of interest.

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