

The Effect of Increasing Meeting Time on the Physiological Indices of Patients Admitted to the Intensive Care Unit

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Abstract

Background: Most hospitals have restricted visitation time in intensive care units (ICUs) for various reasons. Given the advantages of family presence and positive effect of emotional touching, talking and smiling on nervous system stimulation and vital signs of the patients.

Objectives: The present study aimed to determine the effect of increased visitation time on physiological indices of the patients hospitalized in ICUs.

Materials and Methods: This clinical trial study was conducted in the ICUs of Vail-e-Asr hospital in Arak city, Iran. A total of 60 subjects were randomly assigned to the intervention and control groups with visitation time for 10 minutes 3 times a day and 10 minutes once a day, respectively. Then, the patients' physiological indices were measured before, during, and 10 and 30 minutes after the hospital visiting hours. Data were analyzed using SPSS version 20.

Results: Findings showed no statistically significant differences among mean values of all physiological indices in measurement stages before, during, and 10 and 30 minutes after the visitation times in the control group ($P > 0.05$). While, in the intervention group, systolic blood pressure (SBP) measurements at 9 (previous mean: 126.9, 30 minutes later: 111.9), 12:00 PM (previous mean: 126.9, 30 minutes later: 114.9), and 3:00 PM (previous mean: 125.2, 30 minutes later: 105.8), diastolic blood pressure (DBP) measurements at 9:00 AM (previous mean: 87.4, 30 minutes later: 83.2), 12:00 PM (previous mean: 86.6, 30 minutes later: 81.7), and 3:00 PM (previous mean: 87.1, 30 minutes later: 85.0), heart rate (HR) measurements at 9:00 AM (previous mean: 90, 30 minutes later: 78.4), 12:00 PM (previous mean: 89.8, 30 minutes later: 78.6), and 3:00 PM (previous mean: 89.3, 30 minutes later: 78.3), respiratory rate (RR) measurements at 9:00 AM (previous mean: 20.9, 30 minutes later: 15.0), 12:00 PM (previous mean: 20.6, 30 minutes later: 15.4), and 3:00 PM (previous mean: 21.0, 30 minutes later: 15.9) showed statistically significant differences ($P < 0.05$). However, no statistically significant differences were observed among Oxygen saturation (OS) measurements at 9:00 AM, 12:00 PM and 3:00 PM in this latter group as well ($P > 0.05$).

Conclusions: Increasing visitation time leads to reduced physiological indices' mean values. Hence, it is recommended to extend hospital visiting times in order to improve the condition of patients admitted to ICU.

Keywords: ICU, Physiological Indices, Visitation Time

1. Background

Patients hospitalized in intensive care units (ICUs) perceive high levels of stress and anxiety due to fear regarding diagnosis, aggressive treatments, using different devices, sleep deprivation, motor restriction and also restricted hospital visiting hours (1). Visiting patients admitted to the ICU is entirely forbidden even for family members in all ICUs of all hospitals in Iran for different reasons (2) including the nurses' false beliefs that family members interfere with patient's care, increase the risk of infection, and disturb patient's rest causing the patient's anxiety and stress. However, studies have proven that allowing rela-

tives to visit their beloved ones more are ranked high in the list of important needs of patients hospitalized in ICUs (3). Separating sick people from their beloved ones can cause great suffering for patients just as modern science has concluded (4, 5). Unfortunately, the current knowledge has not been yet successful to change the false beliefs regarding visiting patients in ICUs (6, 7).

In addition to physical problems, patients in the ICU experience psychological reactions such as stress which may lead to increased treatment costs, delay in recovery, cardiovascular complications and increasing mortality rates (8-11). Also, results of the studies on patients with coronary artery diseases reveal positive impact of talking to, looking

at, smiling to and touching conscious patients in stimulating the nervous system, decreasing the heart rate and diastolic blood pressure, and reducing anxiety (12).

Physiological indices (systolic and diastolic blood pressures, mean arterial pressure, respiratory and heart rates) have been recognized as the important factors in improvement of patients' general condition and that of treatment progress (13). In this regard, improved physiological measures resulting from increased visitation time will accelerate weaning of the patients from mechanical ventilation and may help to reduce its complications, length of stay in ICU, and hospital costs (14).

Since few studies have investigated the impact of extending visitation time on the physiological indices of patients hospitalized in the ICU and the importance of the presence of family members next to these patients for more longer periods (15) and the concept of the family-centered care model has been considered by medical staff as a new therapeutic approach, few such surveys in Iran have been carried out as well, mostly on the patients admitted to cardiac ICUs, and have had conflicting results (16-18).

2. Objectives

Thus, the present study seems to confirm the previous findings and provide new suggestions. Therefore, the present study aimed to evaluate the effect of extending visitation time on the physiological parameters of the patients admitted to ICUs.

3. Materials and Methods

In this clinical trial study, 60 subjects were selected through the convenience method (Equation 1) and then were randomly divided into two groups of intervention and control through the simple random method of assigning odd numbers to one group and even ones to the other group. The subjects were selected from the patients admitted to ICUs of Vali-e-Asr hospital in Arak city (surgical ICU and neurology ICU). The following characteristics were required for the participation in the study: (1) being hospitalized in ICU with consciousness level higher than 7.2, (2) having been hospitalized in ICU for at least 24 hours, (3) aged more than 18 and less than 70, (4) not being under complete isolation, (5) agreement of the first degree relatives of the patient toward their participation in the study, (6) having no hearing deficits. Exclusion criteria were (1) simultaneous participation in another study that can interfere with the present one, (2) being under treatment with sedatives, (3) too much sensitivity of family members toward the patient disturbing the treatment process, and (4)

exhaustion of family members due to caring their patient (Figure 1).

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2(S_1^2 + S_2^2)}{(\mu_1 - \mu_2)^2} \quad (1)$$

Data were collected using two questionnaires: first including items concerning demographic characteristics and the second including items concerning 6 physiological indices of systolic and diastolic blood pressures, mean arterial pressure, pulse and respiratory rates, and oxygen saturation (O₂sat). Since the first questionnaire was demographic and the second one only concerned physiological indices, there was no need to establish their validity and reliability.

In order to prevent bias while gathering the data, the researchers acted in a way that the nurses had no idea of the nature of the study. Thus, the presence of the visitors and its effect on physiological indices was not revealed to the nurses measuring these indices. Double-blind procedure was used in this study to prevent the bias, that is, both patients' families and nurses measuring the indices were not informed of the importance of increased visitation time in the study.

The questionnaire of demographic characteristics and health monitoring checklist were used for gathering the data. The cardiac monitoring system's validity was confirmed referring to the manufacture's manual, using standard tools (audio and visual settings and annual control of thermal and pressure sensors using analyzers), selecting devices from leading brands, and calibration certificate issued by a medical equipment engineer before starting sampling. To ensure valid and reliable measurements of the physiological parameters, a single monitoring device, Data Ohmeda (GIMM Company), was used for all participants. The blood pressure of the participants was measured by non-invasive monitoring on the right arm (and on the left arm for amputees, paralyzed patients, etc.) in supine position and 30-degree head-up state and recorded automatically on the cardiac monitor. In order to determine the arterial oxygen saturation, the index finger of the patient's right hand was completely placed into the probe and the digit on the monitor was recorded. Heart and respiratory rates were observed and recorded using cardiac monitoring device and Chest Lead. Sampling was performed during morning and afternoon working shifts. In this study, the ICU patients were considered as the control group and visitors were allowed to visit the patients during the routine hospital visiting time at 3:00 PM in the afternoon for 10 minutes. The patients in neurological ICU were considered as the intervention group and visiting times were at 9:00 AM, 12:00 PM, and 3:00 PM each for 10 minutes. Using a questionnaire, the effect of visitation by relatives

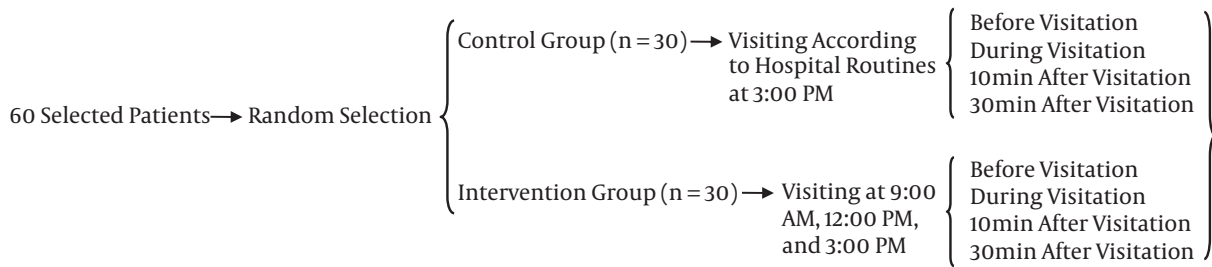


Figure 1. Exclusion Criteria

on the physiological indices of the patients in both control and intervention groups were recorded and assessed 10 minutes before starting the visitation time, during visitation, and 10 and 30 minutes after the visitation. Then, the obtained data were analyzed using SPSS version 20 and descriptive statistic tests (mean and standard deviation) and qualitative data using chi-square test and the means were compared using the independent t-test and repeated measure test.

This study was approved by the ethical code of 93-164-2 in 2 July 2014 and its IRCT code is 2014052617873N1.

4. Results

The chi-square test results showed that the two groups were homogenous in terms of socio-demographic characteristics including age, sex, marital status, hospitalization background, income, etc. before the study ($P > 0.05$).

The results of the repeated measure in the control group (visitation time according to hospital routines) in different times showed that there was no significant difference among physiological statuses measured at 15 pm ($P < 0.05$).

The results of Mauchly's test of sphericity 2 with $P < 0.05$ rejected the sphericity conditions. Therefore, given that sphericity assumption is not held, Greenhouse-Geisser correction 3 was used for conducting the repeated measure test in 4 different measurements for intra-rater effects. The result of the test showed that in the intervention group there was a significant difference among the mean values of the measured indices in three times (9:00 AM, 12:00 PM, and 3:00 PM) and in 4 different measurements ($P < 0.0001$).

Following revealing the significance of the measured indices' mean values in 4 measuring times at 9:00 AM, 12:00 PM, and 3:00 PM, mutual assessing of significant difference among these 4 means was conducted using paired

comparisons (means difference (I - J)) through the Bonferroni post hoc test, as shown in the following tables representing the change occurred in the means of the studied indices.

As the Table 1 indicates, physiological indices of the patients in the control group were evaluated just before 9:00 AM, while these indices of those in the intervention group were measured before, during and 10 minutes and then 30 minutes after visitation. The results suggested that blood pressure parameters (the mean systolic blood pressure: 114.40, mean diastolic blood pressure: 90.4, mean arterial pressure: 113.60, mean heart rate: 99.7, and mean respiratory rate: 25.7) had the highest mean values during the hospital visitation and means' differences were statistically significant in 4 different measurements ($P < 0.05$). No increase, however, was reported in arterial oxygen index during the visitation compared to before visitation (mean difference = -0.34). Given the results of repeated measures, changes in these indices at 9:00 AM in the intervention group suggested improvement in physiological status of the patients after planned hospital visitations (Figure 2, Tables 2 and 3).

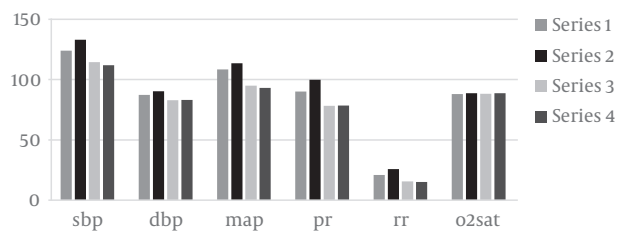


Figure 2. The Physiological Indicators in the Intervention Group at 9:00 AM

Evaluating indices for patients in the control and intervention groups at 12:00 PM indicated that, like the case in 9:00 AM, blood pressure indices (the mean systolic blood pressure: 132.5, mean diastolic blood pressure: 89.6, mean

Table 1. The Results of Comparison of the Mean Values of Physiological Indices in the Intervention and Control Groups at 9:00 AM

Measure/Time	Mean ± Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
SBP			
Before	124.033 ± 2.096	119.746	128.321
During	133.033 ± 1.506	129.953	136.113
10	114.400 ± 1.744	110.834	117.966
30	111.900 ± 1.722	108.379	115.421
DBP			
Before	87.400 ± 0.581	86.213	88.587
During	90.400 ± 0.590	89.193	91.607
10	82.867 ± 0.655	81.527	84.207
30	83.233 ± 0.592	82.022	84.445
MAP			
Before	108.433 ± 0.886	106.621	110.246
During	113.600 ± 0.954	111.650	115.550
10	94.900 ± 0.842	93.178	96.622
30	93.133 ± 0.731	91.637	94.629
PR			
Before	90.033 ± 1.189	87.601	92.466
During	99.767 ± 1.661	96.369	103.165
10	78.233 ± 0.860	76.475	79.992
30	78.400 ± 0.744	76.879	79.921
RR			
Before	20.900 ± 0.451	19.978	21.822
During	25.767 ± 0.449	24.848	26.685
10	15.633 ± 0.260	15.101	16.166
30	15.033 ± 0.242	14.538	15.528
O2sat			
Before	88.033 ± 0.520	86.970	89.096
During	84.767 ± 0.558	83.624	85.909
10	88.167 ± 0.508	87.128	89.205
30	88.667 ± 0.564	87.513	89.820

Abbreviations: DBP, diastolic blood pressure; O2sat, oxygen saturation; RR, respiratory rate; SBP, systolic blood pressure.

arterial pressure: 113.7, mean heart rate: 103.73) had the highest mean values during visitation. However, the arterial oxygen saturation level was not significantly increased compared to before visitation (mean difference: -0.34) ($P > 0.05$). These kinds of changes can be due to the patient's emotions associated with visiting her/ his relatives (Table 4 for 12:00 PM; Tables 5 and 6 and Figure 3).

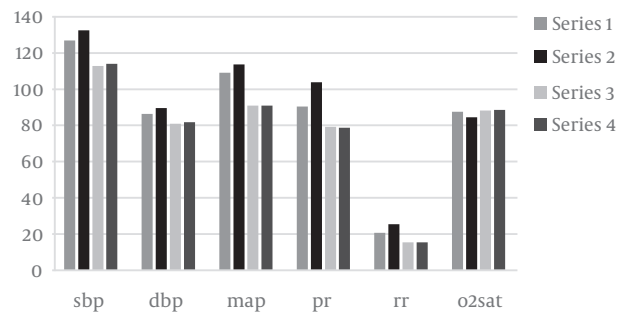


Figure 3. The Physiological Indicators in the Intervention Group at 12:00 PM

Comparison of the patients' physiological indices in the control and intervention groups assessed at 3:00 PM showed that no statistically significant difference was observed in any of the visiting hours ($P > 0.05$), that is, unplanned and limited visitation times did not have much impact on improving patient's physiological characteristics. However, despite increasing the indices in the subjects of intervention group during visitation times, these parameters showed a significant reduction 10 and 30 minutes after the visitation time ($P < 0.05$) (Figure 4, Tables 7 and 8).

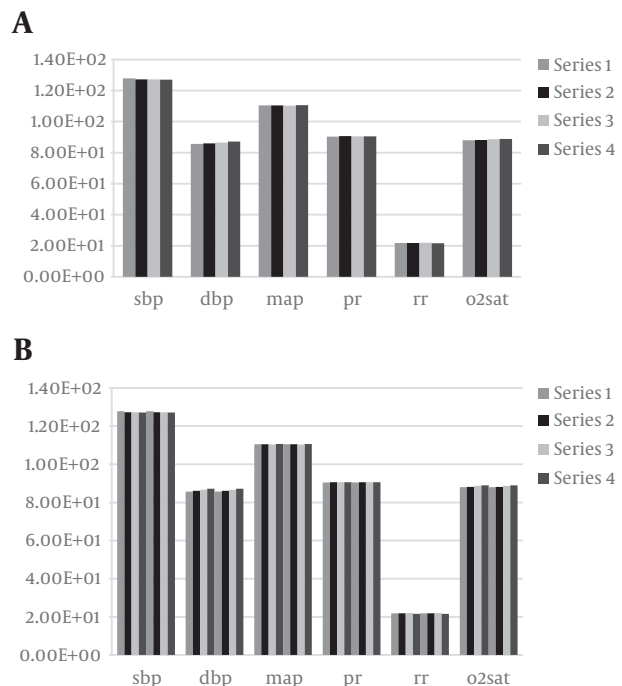


Figure 4. A, The Physiological Indicators in the Control Group at 15 o Clock; B, the Physiological Indicators in the Intervention Group at 15 o Clock

Table 2. [Part 1] The Results of Paired Bonferroni Comparisons of Mean Values of the Physiological Indices in the Intervention and Control Groups at 12:00 PM

Measure/Factor 1 (I)/Factor 1 (J)	Mean Difference (I - J)	Std. Error	P Value	95% Confidence Interval for Difference	
				Lower Bound	Upper Bound
SBP					
Before					
During	-9.000 ^a	1.313	0.0001	-12.718	-5.282
10	9.633 ^a	0.992	0.0001	6.823	12.444
30	12.133 ^a	1.650	0.0001	7.462	16.804
During					
10	18.633 ^a	1.150	0.0001	15.376	21.890
30	21.133 ^a	1.407	0.0001	17.148	25.119
10					
30	2.500	1.314	0.402	-1.220	6.220
DBP					
Before					
During	-3.000 ^a	0.398	0.0001	-4.128	-1.872
10	4.533 ^a	0.621	0.0001	2.775	6.292
30	4.167 ^a	0.638	0.0001	2.360	5.973
During					
10	7.533 ^a	0.669	0.0001	5.639	9.428
30	7.167 ^a	0.692	0.0001	5.208	9.125
10					
30	-0.367	0.347	1.000	-1.350	0.617
MAP					
Before					
During	-5.167 ^a	0.875	0.0001	-7.644	-2.689
10	13.533 ^a	0.966	0.0001	10.799	16.268
30	15.300 ^a	0.983	0.0001	12.517	18.083
During					
10	18.700 ^a	1.015	0.0001	15.826	21.574
30	20.467 ^a	0.969	0.0001	17.722	23.211
10					
30	1.767	0.664	0.075	-0.113	3.646

Abbreviations: DBP, diastolic blood pressure; SBP, systolic blood pressure.
^aSignificant.

The results of the mean values of the measured indices in 4 different times in both groups at 3:00 PM showed that the mean values of SBP, MAP, and RR were significantly different between the two groups ($P < 0.05$), while O₂sat, PR, and DBP were significantly different between the two groups. The results of paired comparison based on post hoc LSD test are provided in [Table 9](#).

Repeated measures analysis of the intervention group's variances at different hours indicated a significant difference in the measured parameters in various hours (9:00 AM, 12:00 PM, 3:00 PM) (the Greenhouse-Geisser test, $P < 0.001$).

Table 3. [Part 2] The Results of Paired Bonferroni Comparisons of Mean Values of the Physiological Indices in the Intervention and Control Groups at 12:00 PM

Measure/Factor 1 (I)/Factor 1 (J)	Mean Difference (I-J)	Std. Error	P Value	95% Confidence Interval for Difference	
				Lower Bound	Upper Bound
PR					
Before					
During	-9.733 ^a	1.073	0.0001	-12.772	-6.695
10	11.800 ^a	0.972	0.0001	9.046	14.554
30	11.633 ^a	1.002	0.0001	8.797	14.470
During					
10	21.533 ^a	1.498	0.0001	17.293	25.774
30	21.367 ^a	1.425	0.0001	17.331	25.402
10					
30	-0.167	0.413	1.000	-1.335	1.002
RR					
Before					
During	-4.867 ^a	0.342	0.0001	-5.834	-3.900
10	5.267 ^a	0.447	0.0001	4.001	6.532
30	5.867 ^a	0.544	0.0001	4.326	7.407
During					
10	10.133 ^a	0.439	0.0001	8.891	11.376
30	10.733 ^a	0.514	0.0001	9.278	12.189
10					
30	0.600	0.274	0.219	-0.175	1.375
O2sat					
Before					
During	3.267 ^a	0.371	0.0001	2.216	4.318
10	-0.133	0.398	1.000	-1.259	0.992
30	-0.633	0.414	0.820	-1.805	0.538
During					
10	-3.400 ^a	0.451	0.0001	-4.678	-2.122
30	-3.900 ^a	0.427	0.0001	-5.109	-2.691
10					
30	-0.500	0.283	0.524	-1.300	0.300

Abbreviations: O2sat, oxygen saturation; RR, respiratory rate.

^aSignificant.

5. Discussion

The results of the present study showed that the two studied groups were homogenous before performing the study regarding age, marital status, life style, education, occupation, income level, sex, diagnosis, underlying diseases, smoking, and alcohol and drugs abuse.

Our results suggested no significant difference in phys-

iological indices of the patients before applying visitation plans in both control and intervention groups ($P > 0.05$) that was consistent with the findings of Comruni (16).

According to the results of the evaluations during the first (9:00 AM), second (12:00 PM) and third visitation stages (3:00 PM), the participants in the intervention group showed improvements in physiological indices (in-

Table 4. The Results of Comparison of Mean Values of the Physiological Indices in the Intervention and Control Groups at 12:00 PM

Measure/Time	Mean \pm Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
SBP			
Before	126.933 \pm 1.744	123.367	130.500
During	132.500 \pm 1.806	128.806	136.194
10	112.800 \pm 1.979	108.752	116.848
30	114.033 \pm 1.817	110.318	117.749
DBP			
Before	86.800 \pm 0.631	85.509	88.091
During	89.633 \pm 0.665	88.273	90.994
10	80.967 \pm 0.704	79.527	82.406
30	81.733 \pm 0.551	80.607	82.860
MAP			
Before	109.133 \pm 0.963	107.163	111.104
During	113.700 \pm 0.791	112.082	115.318
10	90.933 \pm 0.816	89.264	92.603
30	91.000 \pm 0.932	89.093	92.907
PR			
Before	89.833 \pm 1.284	87.207	92.459
During	103.733 \pm 1.762	100.129	107.338
10	79.167 \pm 0.867	77.393	80.940
30	78.667 \pm 0.843	76.942	80.391
RR			
Before	20.667 \pm 0.466	19.714	21.619
During	25.533 \pm 0.552	24.404	26.663
10	15.433 \pm 0.364	14.689	16.178
30	15.400 \pm 0.298	14.791	16.009
O2sat			
Before	87.600 \pm 0.495	86.588	88.612
During	84.567 \pm 0.669	83.198	85.935
10	88.133 \pm 0.502	87.106	89.161
30	88.600 \pm 0.430	87.720	89.480

Abbreviations: DBP, diastolic blood pressure; O2sat, oxygen saturation; RR, respiratory rate; SBP, systolic blood pressure.

cluding heart rate, respiratory rate, systolic and diastolic blood pressures, and mean arterial pressure) during the visitation ($P < 0.05$), but no significant effect was reported on arterial oxygen saturation, namely, the difference was not statistically significant ($P > 0.05$). In the control group, however, mean values of all physiological indices showed no significant difference during the first visitation stage

(9:00 AM), the second one (12:00 PM) where visitation was not allowed, and even in the third step where visitation was allowed ($P > 0.05$). Thus, no remarkable improvement was observed in physiological indices of the patients.

Rahmani et al. (17) concluded that scheduled visitation may decrease physiological parameters and improve treatment results ($P < 0.05$). However, Salavati and Oshvandi (18) found that scheduling time for families and friends to visit the patient makes no clinical significant improvement in cardiovascular indices ($P > 0.05$). In their study, no statistically significant difference was observed between the control and intervention groups, which is completely opposing the results of the present study. Also, findings of the study by Comruni et al. (16) suggested significant improvement in physiological indices of the patients in the intervention group.

In addition, physiological indices of the participants showed statistically significant differences 10 and 30 minutes after visitation ($P < 0.05$) as these parameters decreased, that is, increasing visitation time improved physiological indices of the patients. However, the difference was not significant in the control group.

In the study of Azimi Lolaty et al. (19), increased visitation time significantly improved the feel of comfort, decreased anxiety and enhanced patient's physiological indices (including systolic and diastolic blood pressure, heart and respiratory rates, and O2sat) ($P < 0.001$) that is consistent with the findings of the present study.

Also, the research carried out by Zwernman (20) suggested no statistically significant difference among mean arterial pressures measured before, during and after visitation ($P > 0.05$), while the above-mentioned study proved the positive effect of visiting of relatives on the patient's mean arterial pressure. In addition, Gerber (21) revealed that respiratory rates showed no statistically significant difference in measurements before, during, and after visitation ($P > 0.05$) that was due to the differences in the duration of visitation times. While, increased duration of visitation times significantly improved the respiratory status of the patients in this study.

5.1. Conclusions

Findings of the present study show that increased visitation time can lower the mean values of the physiological indices. Therefore, it is recommended that nurses working in the ICUs plan and schedule visitation times focusing on individual, social, and patient-related factors and do not merely consider the hospital principles. Rather, they can help accelerate the patient's recovery seeking help of their family members.

Although the results of similar studies confirm the results of the present study to a large extent, the indices stud-

Table 5. [Part 1] The Results of Bonferroni Paired Comparison of the Mean Values of the Physiological Indices in the Intervention and Control Groups at 3:00 PM

Measure/Time (I)/Time (J)	Mean Difference (I-J)	Std. Error	P Value	95% Confidence Interval for Difference	
				Lower Bound	Upper Bound
SBP					
Before					
During	-5.567 ^a	0.761	0.000	-7.122	-4.011
10	14.133 ^a	1.504	0.000	11.058	17.209
30	12.900 ^a	1.587	0.000	9.655	16.145
During					
10	19.700 ^a	1.585	0.000	16.458	22.942
30	18.467 ^a	1.631	0.000	15.130	21.803
10					
30	-1.233	0.771	0.121	-2.811	0.344
DBP					
Before					
During	-2.833 ^a	0.622	0.000	-4.105	-1.562
10	5.833 ^a	0.767	0.000	4.264	7.403
30	5.067 ^a	0.785	0.000	3.462	6.672
During					
10	8.667 ^a	0.660	0.000	7.317	10.016
30	7.900 ^a	0.680	0.000	6.509	9.291
10					
30	-0.767 ^a	0.345	0.034	-1.472	-0.062
MAP					
Before					
During	-4.567 ^a	0.598	0.000	-5.790	-3.343
10	18.200 ^a	1.174	0.000	15.799	20.601
30	18.133 ^a	1.211	0.000	15.657	20.610
During					
10	22.767 ^a	1.129	0.000	20.457	25.076
30	22.700 ^a	1.147	0.000	20.354	25.046
10					
30	-0.067	0.503	0.895	-1.095	0.961

Abbreviations: DBP, diastolic blood pressure; SBP, systolic blood pressure.

^aSignificant.

ied here including systolic and diastolic blood pressure, mean arterial pressure, heart rate, respiratory rate, and O₂sat have not been investigated in previous research.

5.2. Limitations

Since intervention studies are conducted on a limited number of subjects, one of the limitations of this study,

like other intervention studies, was low number of subjects. Another limitation of the present study was the reluctance of some nursing staff of the ward to participate in this study. However, they were persuaded to participate in the program being explained the importance of the study and illustrating its benefits for patients and health providers. Therefore, it is recommended that the research

Table 6. [Part 2] The Results of Bonferroni Paired Comparison of the Mean Values of the Physiological Indices in the Intervention and Control Groups at 3:00 PM

Measure/Time (I)/Time (J)	Mean Difference (I - J)	Std. Error	P Value	95% Confidence Interval for Difference	
				Lower Bound	Upper Bound
PR					
Before					
During	-13.900 ^a	1.363	0.000	-16.688	-11.112
10	10.667 ^a	1.600	0.000	7.395	13.939
30	11.167 ^a	1.556	0.000	7.984	14.349
During					
10	24.567 ^a	1.756	0.000	20.975	28.159
30	25.067 ^a	1.786	0.000	21.415	28.719
10					
30	0.500	0.270	0.074	-0.053	1.053
RR					
Before					
During	-4.867 ^a	0.321	0.000	-5.523	-4.211
10	5.233 ^a	0.306	0.000	4.608	5.859
30	5.267 ^a	0.368	0.000	4.514	6.019
During					
10	10.100 ^a	0.456	0.000	9.168	11.032
30	10.133 ^a	0.476	0.000	9.159	11.108
10					
30	0.033	0.182	0.856	-0.340	0.407
O2sat					
Before					
During	3.033 ^a	0.607	0.000	1.791	4.276
10	-0.533	0.495	0.290	-1.546	0.480
30	-1.000	0.523	0.066	-2.070	0.070
During					
10	-3.567 ^a	0.529	0.000	-4.648	-2.485
30	-4.033 ^a	0.607	0.000	-5.276	-2.791
10					
30	-0.467	0.283	0.109	-1.045	0.111

Abbreviations: O2sat, oxygen saturation; RR, respiratory rate.
^aSignificant.

be carried out in other ICUs such as CCU to achieve more definitive results.

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Table 7. The Results of Comparison of the Mean Values of the Physiological Indices in the Control and Intervention Groups at 9:00 AM

Measure/Group	Mean \pm Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
SBP			
Control	127.350 \pm 1.233	124.883	129.817
Intervention	119.600 \pm 1.233	117.133	122.067
DBP			
Control	86.350 \pm 0.735	84.879	87.821
Intervention	86.392 \pm 0.735	84.921	87.862
MAP			
Control	110.483 \pm 0.492	109.498	111.469
Intervention	105.158 \pm 0.492	104.173	106.144
PR			
Control	90.517 \pm 1.165	88.185	92.848
Intervention	87.925 \pm 1.165	85.594	90.256
RR			
Control	21.808 \pm 0.390	21.028	22.588
Intervention	20.075 \pm 0.390	19.295	20.855
O2sat			
Control	88.442 \pm 0.398	87.644	89.239
Intervention	88.783 \pm 0.398	87.986	89.581

Abbreviations: DBP, diastolic blood pressure; O2sat, oxygen saturation; RR, respiratory rate; SBP, systolic blood pressure.

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Table 8. The Results of Bonferroni Paired Comparisons the Mean Values of the Physiological Indices in the Control and Intervention Groups at 3:00 PM^a

Source/Measure	Type III Sum of Squares	df	Mean Square	F	P Value
Group					
SBP	900.938	1	900.938	19.764	0.0001
DBP	0.026	1	0.026	0.002	0.968
MAP	425.334	1	425.334	58.520	0.0001
PR	100.751	1	100.751	2.476	0.121
RR	45.067	1	45.067	9.897	0.003
O2sat	1.751	1	1.751	0.368	0.547
Error					
SBP	2643.900	58	45.584	-	-
DBP	939.160	58	16.192	-	-
MAP	421.552	58	7.268	-	-
PR	2360.010	58	40.690	-	-
RR	264.104	58	4.554	-	-
O2sat	276.177	58	4.762	-	-

Abbreviations: DBP, diastolic blood pressure; df, degree of freedom; O2sat, oxygen saturation; RR, respiratory rate; SBP, systolic blood pressure.

^aTests of between-subjects effects.

Table 9. The Results of LSD Paired Comparisons of the Mean Values of the Physiological Indices in the Control and Intervention Groups at 3:00 PM

Measure	(I) Group	(J) Group	Mean Difference (I - J)	Std. Error	P Value	95% Confidence Interval for Difference ^b	
						Lower Bound	Upper Bound
SBP	Control	Intervention	7.750	1.743	0.0001	4.260	11.240
DBP	Control	Intervention	-0.042	1.039	0.968	-2.121	2.038
MAP	Control	Intervention	5.325	0.696	0.0001	3.932	6.718
PR	Control	Intervention	2.592	1.647	0.121	-0.705	5.889
RR	Control	Intervention	1.733	0.551	0.003	0.630	2.836
O2sat	Control	Intervention	-0.342	0.563	0.547	-1.469	0.786

Abbreviations: DBP, diastolic blood pressure; O2sat, oxygen saturation; RR, respiratory rate; SBP, systolic blood pressure.