

## Original Article

# Touching, Music Therapy and Aromatherapy's Effect on the Physiological Situation of the Patients in Intensive Care Unit

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### Abstract

**Objectives:** Various studies concerning the treatment of patients in the Intensive Care Unit using complementary therapies have been carried out. But, no reports on the use of three different therapies these patients. This study aimed to investigate the effect of physical touch, music therapy, and aromatherapy on the hemoglobin levels, pulse rates, blood pressure values, and respiratory rates of the patients in the Intensive Care Unit (ICU).

**Methods:** The study was designed quasi-experimentally. Seventy-two patients were included in the study. The data were collected by physical touch on the first day, applying music therapy on the second day and applying lavender oil through respiration for three days in the study group. Before and after each application, the pulse, systolic, diastolic, and respiratory values of the patients were measured. In addition, the hemoglobin levels of the patients were measured during expressive physical touch.

**Results:** The hemoglobin levels of the patients increased after physical touch, while the pulse rates reduced after music therapy and aromatherapy.

**Conclusions:** The study provides a foundation for future studies on the effect(s) of complementary therapy methods on the psychological and physiological status of patients in the ICU. The results of this study may assist health professionals to prepare complementary therapy programs for patients admitted to the ICU.

**Key Words:** Intensive Care Unit, music therapy, aromatherapy, expressive physical touch, complementary therapy, nursing

### Introduction

Intensive care unit (ICU) is different from the other sections of a hospital for treatment methods used, technical equipment, physical conditions, and sensorial environment. Excessive noise, light, and traffic in the ICU may lead to a sensorial burden in the patients. On the other hand, reduced sensory input due to monotonous sounds produced by the medical equipment, immobilization, and silence may cause sensorial losses (Kacmaz 2002; Mollaoglu 1997; Kutlu and Yildirim 2001). Patients may suffer from psychological problems (such as temporary

perceptual, motor coordination, and/or orientation disorders, anxiety, depression, cerebral failure, delirium, and ICU syndrome) when sensory deficiency and burden problems are not prevented through planned sensory input. Sensory deficiency and burden problems may also develop associated with disorders in the physiological parameters such as blood pressure, pulse, and respiration (Kacmaz 2002; Daffurn et al 1994; Hewitt 2002). Furthermore, such problems may also negatively affect the life of patients after their discharge from the ICU (Daffurn et al 1994). Problems related to senses

such as increased sensorial burden and sensory deficit can be prevented by the use of complementary therapy methods (Kacmaz 2002; Mollaoglu 1997). Therefore, nurses should also practice complementary therapy methods in order to manage the sensory problems of ICU patients. Complementary therapy is used as an adjunct to medical treatment (Johnson G. 2000). Physical touch, music therapy, and aromatherapy are the complementary methods that can be used to manage sensorial burden and sensory deficiency problems in ICU patients and may have positive affects their sensory perceptions (Kacmaz 2002; Mollaoglu 1997).

Physical touch is a method of demonstrating one's feelings by touch and does not require a special training (Carpetino 1999). Thus, nurses can easily practice this method. Physical touch provides the patients with a feeling of self-value, increases the patient-nurse interaction, reduces the severity of psycho-social problems, and affects physical recovery positively by decreasing blood pressure and pulse of patients (Adomat and Killingworth 1994; Meehan 1998). Physical touch has been shown to lower the physiological parameters such as the pulse rate, blood pressure, and respiratory rate (Cinar and Khorshid 2003; Gleeson and Timmins 2005) as well as increase the hemoglobin level (Ozer and Citlik 2007; Movaffaghi et al 2006).

Music therapy is defined as controlled form of music physically and psychologically affecting patients during treatment (Chlan and Tracy 1999). The effect of music depends on the vibration and beat of sound waves. Low-beat music activates parasympathetic system, thus lowering the rates of physical parameters such as blood pressure, pulse, and respiration (Updike 1990; McCaffrey and Locsin 2002). In earlier studies, music therapy has been found to lower blood pressure level and pulse rate (Chan et al 2006; Almerud and Petersson 2003) as well as the respiration rate (Chan et al 2006; Lee et al 2005). Chlan evaluated the anxiety effect of music on patients receiving ventilatory support and found reduced pulse and respiratory rates in

the patients in music therapy group. Aromatherapy is another complementary therapy used in management of sensory input problems. It involves the use of herbal extracts and oils (Dunn et al 1995; Buckle 2001). A commonly used substance, lavender oil, has been claimed to have the lowest risk of toxicity and allergic effects among other herbal substances (Dunn et al 1995). Aromatherapy had physiological effects such as increasing attention, reducing anxiety, and soothing as well as physiological effects on parameters such as blood pressure and pulse and respiratory rates (Cooke and Ernst 2000; Saeki and Shiohara 2001).

This study aimed to investigate the effect of physical touch, music therapy, and aromatherapy on the hemoglobin levels (only for physical touch), pulse rates, blood pressure values, and respiratory rates of the patients in the Intensive Care Unit (ICU).

#### **Materials and Methods**

A quasi-experimental design was used to achieve the aim of this study. Seventy two adults (Study group 36, control group 36) were studied. Criteria for inclusion in the convenience sample were age 18 years or over, at least 24-hour hospitalization time in the ICU, and requirement for minimum of 3-day hospitalization in the ICU. It was carried out in the ICU of Anesthesiology and Reanimation Department of Aziziye Research Hospital, Suleyman Demirel Medical Centre (Ataturk University, Erzurum, Turkey) at 2007.

The data collection questionnaire had two sections. The demographic data form including questions on age, marital status, education, gender, reason for hospitalization and the physiological measurement form on which the haemoglobin (only for physical touch), pulse, blood pressure, and respiratory values of the patients were recorded. The researcher collected the data by being present in the ICU for 7 days a week until the planned number of patients for the study was hospitalized, while observing the patients that met the study criteria. In data

collection for the study group, hemoglobin levels, pulse rates, systolic-diastolic blood pressure, and respiratory rates of the subjects were measured before physical touch therapy was applied and after a 15-minute physical touch therapy was applied once on the first day of the study. On the second day of the study, before the application of music therapy and after the 30 minute application of music therapy pulse rate, systolic-diastolic blood pressure, and respiratory rates were measured. On the final day of the study, before the aromatherapy and a 15 minute aromatherapy was applied through inhalation pulse rate, systolic-diastolic blood pressure, and respiratory rates were measured.

Data were recorded on the physiological measurement form. Physiological parameters measured in study group were also recorded as pre and post test in the control group receiving routine nursing care at the same intervals without any intervention.

A 15-20 minute touch on the hand has been reported to be effective (Cinar and Khorshid 2003; Routasalo 1999). One of the researchers applied expressive physical touch on the hands of the patients. The researcher was seated on a chair by the head of the bed, and without considering the consciousness status of the patient, called the name of the patient and held his/her hand intimately as if hand shaking. The researcher also introduced herself to the patient. She informed the subjects that she would apply physical touch on the hands of the patient for 15 minutes. It was made sure that the physical touch on the hand was at a level to be sensed without applying too much pressure and that the hands of the researcher were at normal body temperature before the physical touch application.

Studies have shown that 25-30 minute music therapy is effective in the management of patients in the ICUs (Chan et al 2006; Almerud and Petersson 2003) In this study, in order to determine the music type to be used, a specialist from the Music Sciences Department of Fine Arts School of Ataturk University was consulted.

In addition, the Research and Publicity Group for Turkish Music (TUMATA) was also consulted. In the light of their recommendations, the following Turkish music modes were selected: Segah mode, Huseyni mode and Rast mode (Ak 1994). The researcher recorded a 30-minute music CD containing this kind of music and loaded the music on an mp3 player with the same music.

The study group listened to this music using an mp3 player, and to prevent external noise interference, the ears of the patients were plugged with a set of earphones. As with expressive physical touch, the consciousness levels of the patients were disregarded, and the patient was informed on the reason for having them listen to the music, the method of application, and time of therapy. Lavender oil has been suggested in the literature for its use in aromatherapy because of its soothing effects as well as the lowest risk of toxicity and allergic reactions (Kirk-Smith 2003; Lemon 2004).

Thus, in this study, lavender oil (Kardelen Agricultural Products, in accordance with the cosmetics legislation of 03. 24.2005 with code number 5324) was used for aromatherapy. Lavender oil is recommended for use through respiration and for only a 15-min period (Saeki and Shiohara 2001 Gedney and Glover 2004). The patients in the study group were applied a gauze pad with 5 drops of lavender oil on their chests and each patient was informed on the procedure before the intervention regardless of patient's consciousness state.

The study protocol was approved by the Ethics Committee of Health Sciences Institution, Ataturk University. The data were analyzed using SPSS software, version 10. Descriptive statistics were used to describe the sample. Chi-square test was used to compare the descriptive characteristics of the patients in the study and control groups. Independent- samples t test was used to compare the results of the study and control groups. The statistical significance level was considered 0.05.

## Results

The demographic characteristics of the subjects of the study are presented in Table 1. There were no statistically significant differences between the two groups for demographic characteristics (Table 1). The comparisons of the mean values of the measurements for the study group before and after physical touch, music therapy, and aromatherapy are shown in Table 2.

The mean pulse rate before physical touch was 107.38 (SS=19.96) and after physical touch, 102.69 (SS=15.84). The difference between the

two values was statistically significant ( $p < 0.05$ ). The comparisons of the mean values of the measurements before and after music therapy in the study group showed no statistically significant differences between the mean values for the pulse, systolic and diastolic blood pressure, and respiratory rate ( $p > 0.05$ ). On the other hand, the mean pulse rates of the study group were 97.13 (SS=21.85) before aromatherapy and 91.86 (SS=15.35) after aromatherapy. The difference was statistically significant ( $p < 0.05$ ).

**Table 1. Characteristics of the sample**

Variable	Control		Experimental		Total	
	n	%	n	%	n	%
<b>Age</b>						
50 age and under	8	22.2	13	36.1	21	29.2
51 age and over	28	77.8	23	63.9	51	70.8
Total	36	100.0	36	100.0	72	100.0
$X^2=1.681, Sd=1, p>0.05$						
<b>Sex</b>						
Female	13	36.1	15	41.7	28	38.9
Male	23	43.9	21	58.3	44	61.1
Total	36	100.0	36	100.0	72	100.0
$X^2=.629, Sd=1, p>0.05$						
<b>Marital status</b>						
Married	28	77.8	32	88.9	60	83.3
Single	8	22.2	4	11.1	12	16.7
Total	36	100.0	36	100.0	72	100.0
$X^2=1.600, Sd=1, p>0.05$						
<b>Educational level</b>						
No formal education	16	44.4	8	22.2	24	33.3
Primary school	8	22.2	16	44.4	24	33.3
Secondary school	12	33.3	12	33.3	24	33.3
Total	36	100.0	36	100.0	72	100.0
$X^2=5.333, Sd=2, p>0.05$						
<b>Reason of acceptance</b>						
Cardiovascular system	10	27.8	9	25.0	19	26.4
Respiratory system	17	47.2	19	52.8	36	50.0
Cerebrovascular system	9	25.0	8	22.2	17	23.6
Total	36	100.0	36	100.0	72	100.0
$X^2=.223, Sd=2, p>0.05$						
<b>Conscience level</b>						
CS* under 8	19	52.8	12	33.3	31	43.1
CS 8 and 8+3	17	47.2	24	66.7	41	56.9
Total	36	100.0	36	100.0	72	100.0
$X^2=2.776, Sd=1, p>0.05$						

\*Coma Score

**Table 2. Comparison of measurement averages of experimental group before and after applications ( n= 36)**

			X	SD	P value	
EXPRESSIVE TOUCHING	Hemoglobin	B.T	13.07	2.86	t=- .238 sd=35 p= .813	
		A.T	13.10	2.54		
	Pulse	B.T	107.38	19.96	<b>t=3.127 sd=35 p=.004</b>	
		A.T	102.69	15.84		
	Systolic pressure	B.T	117.13	25.53	t=-.644 sd=35 p=.524	
		A.T	117.91	23.86		
	Diastolic pressure	B.T	66.58	14.24	t=-.191 sd=35 p=.850	
		A.T	66.75	13.55		
	Respiratory rates	B.T	23.97	3.15	t=.932 sd=35 p=.358	
		A.T	23.72	2.49		
	MUSIC THERAPY	Pulse	B.M	95.61	21.92	t=.974 sd=35 p=.337
			A.M	93.11	17.99	
Systolic pressure		B.M	123.52	24.40	t=1.625 sd=35 p=.113	
		A.M	121.55	27.13		
Diastolic pressure		B.M	66.33	16.19	t=-1.793 sd=35 p=.082	
		A.M	68.11	16.17		
Respiratory rates		B.M	23.05	2.46	t=-.741 sd=35 p=.464	
		A.M	23.33	2.94		
AROMA THERAPY		Pulse	B.A	97.13	21.85	<b>t=2.424 sd=35 p=.021</b>
			A.A	91.86	15.35	
	Systolic pressure	B.A	117.66	25.12	t=1.628 sd=35 p=.113	
		A.A	115.25	24.64		
	Diastolic pressure	B.A	64.91	13.35	t=-1.300 sd=35 p=.202	
		A.A	63.50	11.78		
	Respiratory rates	B.A	23.44	2.89	t=-.702 sd=35 p=.487	
		A.A	23.66	2.59		

**Table 3. Comparison of measurement averages of experimental group after applications and post test measurement averages of control group ( Experimental Group n= 36, Control Group n=36)**

		Groups	X	SD	P value
EXPRESSIVE TOUCHING	Hemoglobin	E	13.10	2.54	<b>t=-1.995 sd=70 p=.050</b>
		C	11.94	3.16	
	Pulse	E	102.69	15.84	t= .495 sd=70 p= .622
		C	105.13	25.05	
	Systolic pressure	E	117.13	23.86	t= -.232 sd=70 p=.817
		C	116.55	25.83	
	Diastolic pressure	E	66.75	13.55	t= -.363 sd=70 p=.718
		C	65.44	16.76	
Respiratory rates	E	23.72	2.49	t= -1.233 sd=70 p=.222	
	C	22.77	3.86		
MUSIC THERAPY	Pulse	E	93.11	17.99	<b>t=2.096 sd=70 p=.040</b>
		C	104.58	27.46	
	Systolic pressure	E	121.55	27.13	t= -.945 sd=70 p=.348
		C	115.72	25.21	
	Diastolic pressure	E	68.11	16.17	t= -.861 sd=70 p=.392
		C	64.77	16.66	
	Respiratory rates	E	23.33	2.94	t= .467 sd=70 p=.642
		C	23.38	4.16	
AROMA THERAPY	Pulse	E	91.86	15.35	<b>t= 2.143 sd=70 p=.036</b>
		C	102.41	25.26	
	Systolic pressure	E	115.25	24.64	t=-1.136 sd=70 p=.260
		C	117.52	25.52	
	Diastolic pressure	E	63.50	11.78	t=.717 sd=70 p=.475
		C	65.75	14.67	
	Respiratory rates	E	23.66	2.59	t=.209 sd=70 p=.835
		C	23.83	4.01	

Intergroup comparisons of the mean values obtained after physical touch, the mean haemoglobin level of the study group (13.10; SD=2.54) was statistically significantly higher than that of the control group (11.94; SD=3.16) ( $p<0.05$ ). In the comparisons of the mean pulse rate (104.58; SD= 27.46) of the control group and the study group (93.11; SD=17.99) after music therapy, a statistically significant difference was determined ( $p<0.05$ ). The mean pulse rates of the study group (91.86; SD= 15.35) and the control group (102.41; SD= 25.26) after aromatherapy were statistically significantly different ( $p<0.05$ ) (table 3).

## Discussion

Literature presents various studies evaluating the effects of physical touch, music therapy, and aromatherapy on the physiological findings of patients and healthy individuals (Movaffaghi et al 2006; Engle and Graney 2000; Hadfield 2001). However, few studies have evaluated the effects of physical touch, music therapy, and aromatherapy on the physiological findings of ICU patients (Updike 1990; Gleeson and Timmins 2005; Chlan 1998; Dunn et al 1995).

Thus, the results of our study were compared to the findings of earlier studies. In our study, the mean pulse rate of the study group after physical

touch was statistically significantly lower than the mean pulse rate before physical touch. In the pre-post test study by Ozer and Citlik, patients in the cardiology ICU were applied 20-min physical touch on the hands on the 2nd and 3rd day in the ICU, and the hemoglobin levels, blood pressure values, and pulse rates of the patients were measured and recorded 15 minutes before and after the intervention.

The authors did not find a statistically significant difference in the mean pulse rates of the study and control groups before the intervention. However, the mean pulse rate of the study group was significantly lower after the intervention compared to the rate before the intervention (First day, the pulse rate of the study group:  $75.10 \pm 18.89$ ; of the control group =  $77.02 \pm 13.09$ ; second day, study group =  $73.13 \pm 14.33$ ; control group =  $75.26 \pm 12.77$ ).

The studies investigating the effects of complementary therapy in various groups of patients other than those in the ICU have revealed that physical touch reduce the mean pulse rate (Engle and Graney 2000). Engle and Graney applied therapeutic physical touch on student nurses and found a significant reduction in the mean pulse rate of the students.

Literature review has shown that in the study by Kreiger, physical touch was found to increase haemoglobin levels of inpatients (Meehan 1998).

In our study, although no statistically significant differences were found between the mean haemoglobin values of the study group before and after physical touch, the mean haemoglobin level of the study group was higher than that of the control group. This finding is compatible with the results of the study by Ozer and Citlik, in which the authors found a statistically significant difference between the mean haemoglobin levels of the study group before and after physical touch on the first and second days ( $p = 0.000$ ).

The comparisons of the mean systolic/diastolic blood pressure, and respiratory rate of the study

group before and after aromatherapy did not indicate any statistically significant differences ( $p > 0.05$ ), while the mean pulse rates before and after aromatherapy in the study group were statistically significantly different ( $p < 0.05$ ). In the study by Oh et al, aromatherapy did not affect the blood pressure of healthy individuals, but reduced their respiratory and pulse rates. Yi, in a study on patients scheduled for an operation, found significant differences in the systolic/diastolic blood pressure and pulse rates of the study and control groups preoperatively.

Hadfield determined that aromatherapy did not have any effects on the anxiety and depression in cancer patients, while it reduced their systolic and diastolic blood pressure and respiratory and pulse rates by affecting the autonomous system through relaxation. In the control group, however, no statistically significant differences were found between the mean systolic/diastolic pressure and respiratory and pulse rates of the control group before and after the intervention ( $p > 0.05$ ).

Comparisons of the pre and post test mean values for haemoglobin levels, systolic/diastolic pressure and respiratory and pulse rates of the control group (1st, 2nd, and 3rd days), no statistically significant differences were found. Furthermore, no statistically significant differences were found between the mean values of the study group before the intervention and the pretest means of the control group. However, this finding is to be expected because no complementary therapy methods were applied in the study group, before the intervention and in the control group, during pretest and posttest periods. In the comparisons of the mean haemoglobin levels of the study group after physical touch and the control group (posttest), the mean haemoglobin level of the study group was statistically significantly higher than that of the control group ( $p < 0.05$ ).

In the study by Ozer and Citlik, the mean haemoglobin levels were significantly different on the 2nd day ( $p = 0.049$ ), while it was higher in

the study group on the 1st day (study group=  $15.32 \pm 2.14$ ; control group:  $14.66 \pm 1.59$ ). Movaffaghi et al. evaluated student nurses with anaemia in groups and determined a statistically significantly higher haemoglobin level in the group that was applied mimic and therapeutic touch than in the control group. In our study, the mean pulse rate of the study group after music therapy was statistically significantly lower than the mean pulse rate of the control group in the post-test. Updike (1990) noted significant reductions in the mean pulse rate and systolic/diastolic blood pressure of ICU patients after music therapy.

Chlan evaluated the effects of music therapy on anxiety experienced by ICU patients on ventilation and found significant reductions in the pulse and respiratory rates of these patients. Lee et al measured the physical values of ICU patients before and after musical therapy and determined significantly lower values of pulse and respiratory rates as well as of systolic/diastolic blood pressure. In another study by Chlan (1999), music therapy was found to reduce the pulse and respiratory rates of patients on mechanical ventilation. In our study, the mean pulse rate of the study group after aromatherapy was statistically significantly lower than that of the control group in the post-test ( $p < 0.05$ ). Similarly, Dunn et al (1995) in their experimental study on ICU patients, found that aromatherapy and massaging reduced both the pulse rate and systolic blood pressure. Woolfson and Hewitt (1992) reported that aromatherapy reduced the pulse and respiratory rates as well as the blood pressure in ICU patients. In a pre and post-test study on patients in terminal stage, Louis and Kowalski determined reductions in the pulse rate and systolic/diastolic blood pressure after aromatherapy.

### Conclusion

According to the results of this study, it was observed that in the study group after the physical touch therapy and aromatherapy pulse rate decreased that haemoglobin level increased

in the study group among the groups and that pulse rate decreased after music therapy and aromatherapy. Despite the positive results, the current study needs to be replicated using a larger sample.

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