IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 6, Issue 5 Ver. IX. (Sep. -Oct .2017), PP 79-87
www.iosrjournals.org

The Effect of Listening to Qur'an on Physiological Responses of Mechanically Ventilated Muslim Patients

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Abstract
Purpose: *To investigate the effect of listening to Qur'an on physiological responses of mechanically ventilated Muslim patients.* ***Design:*** *A quasi-experimental study was conducted in three trauma intensive care units (ICUs) affiliated to a university hospital. A convenience sample of sixty adult Muslim patients receiving mechanical ventilation was randomly assigned to either Qur'an listening group or control group.* ***Results:*** *Significant differences in heart rate, respiratory rate, systolic blood pressure, diastolic blood pressure and central venous pressure were found between the two groups. There was a significant increase in James' adaptation of Glasgow Coma Scale immediately after listening to the Qur'an (Mean ± SD 12.86±0.68).* ***Conclusion:*** *Listening to Qur'an is an effective intervention for improving hemodynamic parameters, respiratory functions and level of consciousness in mechanically ventilated Muslim patients.* ***Implications for Practice:*** *The study findings may be useful as an empirical reference for critical care nurses caring for patients with Islamic background.*
Keywords*: Listening to Qur'an, mechanically ventilated Muslim patients, physiological responses, ICU*

Date of Submission: 23-10-2017 Date of acceptance: 07-11-2017

I. Introduction

Mechanical ventilation is the most common procedure performed in ICUs.(1) Patients may require mechanical ventilation to improve respiratory function and maintain adequate blood oxygen level.(2) However, it is a stressful intervention that increases patients' anxiety level.(3) The literature highlighted a wide range of stressors that can affect mechanically ventilated patients, such as experience of pain, invasive procedures, being connected to machines and equipment, lack of sleep, inability to communicate with others, the stressful intensive care setting and fear of death.(2,3,4,5)

Unrelieved pain and stress induce a generalized sympathetic response including increased heart rate (HR), blood pressure (BP) and respiratory rate (RR), and heightens anxiety.(5,6) These symptoms can interfere with recovery and healing process.(6) It is a challenge for critical care nurses to promote patients' healing, and enhance their ability to cope with their critical illness as well as the stressful ICU environment. Hence, to provide appropriate care, critical care nurses need to be culturally competent and able to understand patients' religious beliefs, values and ways of coping.(7)

Perception of health, illness, cure and death may vary from one culture to another and from one religion to another. Muslims believe that God or *Allah* (the name of God in Islam) has full control of their lives, and that health and illness are under Allah's divine will.(8) There are five pillars of Islam that shape the Muslim life. They are the declaration of faith, prayer, giving zakat (Charity or support of the needy), fasting during the month of Ramadan, and the pilgrimage to Makah.(9) Muslims pray 5 times per day. Daily prayer is an essential part of the daily life of Muslims, particularly during illnesses and stressful events.(10)

Qur'an is the religious book of Muslims. It represents the words of *Allah* and the laws that shape Muslims' life. Hence, praying and reading the verses of the Qur'an are favorable daily practices for most Muslims. They are also perceived as methods of coping and spiritual healing. (10,11,12) It is also seen as a means of producing peace and comfort for patients at end-of-life period.(11) Muslims believe that illness could be a test from Allah(13) for their faith and patience, but give glad tidings for those who patiently persevere (Soura Al-Baqarah 2:155).

Hence, during illness, Muslim patients submit to *Allah* and engage more in prayer and recitation of the Qur'an to alleviate suffering, and enhance coping and recovery.(11,14) It is clear that spiritual health is an essential aspect of the Muslims' health.(15) Therefore, spiritual care is an important component of Muslim patients' nursing care.(10,15) Spiritual nursing care refers to "nurses' actions to meet the spiritual needs of patients and their families".(10) Nurses caring for Muslim patients have obligations to support their religious healing practices, such as prayers and reading the verses of the Qur'an.(15)

The Qur'an listening intervention can be then used by critical care nurses to reduce mechanically ventilated Muslim patients' physiological stress response, and promote their healing and recovery. Recent

studies were conducted to investigate the effect of the Qur'an on labor pain,[16,17] anxiety level,[18,19] galvanic skin response,[20] mental health,[21] and preterm newborn.[22] However, studies which explored the effect of the Qur'an on mechanically ventilated patients are scarce. Hence, the aim of this study was to investigate the effect of listening to the Qur'an on physiological responses of mechanically ventilated Muslim patients.

Hypothesis

We hypothesized that listening to Qur'an would improve physiological responses in Muslim patients who are receiving mechanical ventilation.

II. Methods

Design

A quasi experimental design was used to investigate the effect of listening to Qur'an on physiological responses of Muslim patients receiving mechanical ventilation.

Setting

This study was conducted in three trauma ICUs in a public teaching hospital in Egypt. The three ICUs include 20 beds and they provide services for approximately 130 patients with trauma problems each month. According to the hospital's records, approximately, 60% of the patients admitted to the trauma ICUs require mechanical ventilation.

Sample

All patients admitted to the above mentioned ICUs between February and July 2014 were reviewed for potential enrollment in the study. A convenience sample of sixty adult Muslim patients was recruited in the study. Inclusion criteria were age 18 years or older, intubation and mechanical ventilation started for at least 72 of enrolment, with James' adaptation of the Glasgow Coma Scale (JGCS) (James & Trauner, 1985) [23] score from 9 to 12 on the first day of data collection, and with a stable hemodynamic status. Patients were excluded from the study if they were deaf, or if they had any condition that could affect hearing (e.g. brain stem death, basilar skull fracture and temporal bone fracture). Patients who were on muscle relaxants were also excluded.

Measures

Demographic Data and Clinical Profile

Participants' demographic data (age, gender, education & occupation) and clinical profile were obtained from medical records (tables 1 & 2).

Cardiopulmonary Measures

Existing bedside monitoring systems were used to continually measure HR, systolic blood pressure (SBP), diastolic blood pressure (DBP), main arterial blood (MAP), Oxygen saturation (SpO2) and central venous pressure (CVP). Before commencing the study, the accuracy and precision of the equipment and machines used for measurements were checked. Observations and physical examination were employed to assess the use of accessory muscles in respiration.

Neurological Response

Participants' neurological responses (pupil size and reaction and consciousness level) were routinely assessed twice daily throughout the study period for all sample.

James' Adaptation of Glasgow Coma Scale

The Glasgow Coma Score[24] was not suitable for this study due to the inability to evaluate the verbal response in patients receiving mechanical ventilation.[25,26,27] The JGCS[23] was adopted in this study to assess the level of consciousness. This scale was originally designed for young children. It consists of 3 main graded items; eye opening response (from 1 to 4 score), motor response (from 1 to 6 score), and grimace response (from 1 to 5 score). The level of consciousness is evaluated by accumulating patient's scores of the three items following a verbal command or a painful stimulation. The highest score of the JGCS is 15 whereas the lowest score is 3. The number of "15" refers to a fully conscious patient, "13-14" refers to minor consciousness disturbance, "9-12" refers to moderate disturbance, "8" refers to severe disturbance, and "3-7" refers to coma. Tatman et al. (1997) [25] and Warren (2000) [27] found that the grimace score is more reliable than the verbal score.

A pilot study was conducted on 6 patients who were receiving mechanical ventilation to evaluate the clarity and the applicability of the measures prior to data collection.

Ethical Considerations

The study proposal was independently reviewed and approved by the Research Ethics Committee of the Faculty of Nursing, University of Mansoura. Patients were unable to provide informed consent because of their critical conditions. Hence, informed consent was obtained from the patient's closest kin (husband, wife, son or daughter), who was available during the visiting hours, after explaining the aim and details of the study. The families were assured that refusal to allow their patients to participate in the study would not affect the treatment or care they receive. To enhance confidentiality, codes were used on data documents instead of recording patients' identifying information (e.g., name & address).

Intervention

Eligible patients were randomly assigned to two groups; the intervention group (n= 30) and the control group (n =30). The investigator collected patients' demographic data and clinical profile, and performed an initial assessment of the baseline data (cardiopulmonary measures and level of consciousness) for the two groups.

The study procedure started immediately after the two groups received the morning care usually between 6 and 8 am. Post-intervention data (HR, RR, BP, CVP, MAP, use of accessory muscles, SpO2, pupil size and reaction, and the level of consciousness) were collected by the second investigator who was blind to intervention condition (Quran group versus control group). For the intervention group, patients wore headphones attached to MP3 player. Then patients received one session of the Qur'an recitation of Surah Al-Bakra for 60 minutes without interruptions. Surah Al-Bakra is the second and longest chapter of the Qur'a. For the control group, patients rested quietly without wearing earplugs for one hour. Then, afterwards, the physiological parameters for the two groups were assessed immediately after the intervention, then after 10 minutes, 20 minutes and 30 minutes respectively. Patients were excluded from the study if they received any care or treatment during the study procedure.

Data Analysis

The collected data were analyzed by using the Statistical Package for the Social Science version 21.0 (SPSS Inc, Chicago, IL). Data were presented as numbers and percentages. The normality of data was first tested with one-sample Kolmogorov-Smirnov test. The Chi-Square test was used to find the association between categorical variables. Continuous variables were presented as mean ± SD (standard deviation) for parametric data. The comparison between 2 means was done by Student t-test while comparison between Paired 2 groups was done using Paired t-test.

Level of significance

For all used statistical tests, the threshold of significance is fixed at 5% level (*p-value*).The results were considered non-significant when the probability of error was more than 5% ($p > 0.05$). The results were considered significant when the probability of error was less than 5% ($p \leq 0.05$). The results were considered highly significant when the probability of error was less than 0.1% ($p \leq 0.001$).

III. Results

Table 1 presents socio-demographic data for the Qur'an group and the control group. When comparing the two groups, differences were not significant for age (X^2=0.544; *P*=0.909), gender (X^2=0.287; *P*=0.592), education (X^2=0.429; *P*=0.934) or occupation (X^2=0.278; *P*=0.598).

Table 2 illustrates participants' clinical profile. The majority of patients had no past medical or surgical history. Most patients were diagnosed with head trauma and others were admitted either with chest trauma or polytrauma. No significant differences were detected between the two groups for past medical history (X^2=0.933; *P*=0.817) or surgical history (X^2=3.158; *P*=0.206). The majority of patients in both groups were on SIMV mode (46.7% of Qur'an group; 53.3% of control group).

Table 3 compares the respiratory functions between the two groups. Statistical significant differences *(P=0.001)* were noted in RR, SpO2 and the use of accessory muscles between the two groups over time (immediately after intervention, and after 10, 20 and 30 minutes). For the Qur'an group, listening to the Qur'an decreased RR and increased SpO2 immediately after intervention and then over time (after 10, 20 and 30 minutes). However, the use of accessory muscles was noted in one patient in the Qur'an group after 30 minutes of the intervention. Patients in the control group had a significantly greater increase in RR and decline in SpO2 after resting quietly for 60 minutes. Moreover, the use of accessory muscles in respiration had significantly increased immediately after resting quietly and over time.

Table 4 presents the hemodynamic parameters of the two groups. There was a significant difference (*P*=0.001) in HR, SBP, DBP, MAP and CVP between the two groups. For the Qur'an group, cardiac parameters had improved over time after listening to the Qur'an. On the contrary, for the control group who rested quietly

for one hour, cardiac parameters had significantly increased over time which indicated a decline in cardiac functions.

Table 5 compares the neurological function between the two groups. Statistical significant differences were observed for neurological parameters over time after intervention, and between the Qur'an group and the control group. The group who received one hour of Qur'an session showed significantly greater improvement in pupil size (after 30 minutes: Mean ± SD 4.23±0.56) than in the group who rested quietly for one hour (after 30 minutes: Mean ± SD 8.73±0.52, *P*=0.001). The difference in JGCS was also significant over time after intervention, and between the two groups (*P*=0.001). There was a significant increase in JGCS immediately after listening to the Qur'an and over time (after 10, 20 and 30 minutes) which indicated improvement in patients' level of consciousness (after 30 minutes of intervention: Mean ± SD 12.86±0.68). A significant decline in JGCS was evident in the control group immediately after resting quietly for 60 minutes and over time which indicated decrease in patient's level of consciousness (after 30 minutes: Mean ± SD 6.93±0.44). Similarly, the Qur'an group showed significantly greater increase in pupil reaction to light over time than did the control group (*P*=0.001). After 30 minutes of listening to the Qur'an, all patients in the Qur'an group had their pupil reactive to light, while for the control group, only 66.7% of patients had their pupil reactive to light.

Table 1: Participants' socio-demographics characteristics

Patient's characteristics	Groups		Test (P)
	Study (n = 30)	Control (n = 30)	
	No. %	No. %	
Age (in years)			
• 18 – 30	9 (30 %)	10 (33.3 %)	χ^2 =0.544 p=0.909
• 31-40	10 (33%)	10 (33.3%)	
• 41 – 50	6 (20%)	4 (13.3 %)	
• 51-60	5 (16.7%)	6 (20 %)	
Mean ± SD	35.73±11.23	34.13±11.54	t= 0.544 p=0.589
Gender			
• Male	18 (60%)	20 (66.7%)	χ^2 =0.287 p=0.592
• Female	12 (40%)	10 (33.3%)	
Occupation			
• Employed	17 (56.7%)	19 (63.3%)	χ^2 =0.278 p=0.598
• Unemployed	13 (43.3%)	11 (36.7%)	
Education			
• High	8 (26.7%)	6 (20%)	χ^2 =0.429 p=0.934
• Medium	9 (30%)	9 (30%)	
• Low	7 (20%)	7 (23.3%)	
• Illiterate	8 (23.3%)	8 (26.7%)	

X^2: Chi-square test *Significant ($p< 0.05$)

Table 2: Participants' clinical profile

Patient's characteristics	Groups		Test (P)
	Study (n = 30)	Control (n = 30)	
	No. %	No. %	
Past medical history			
• Hypertension	2 (6.7%)	1 (3.3%)	χ^2 = 0.933 p=0.817
• Diabetes mellitus	1 (3.3%)	1 (3.3%)	
• Heart disease	6 (20%)	4 (13.3%)	
• No past medical history	21 (70%)	24 (80%)	
Past surgical history			
• Lung surgery	2 (6.7%)	0 (0%)	χ^2 =3.158 p=0.206
• Eye surgery	1 (3.3%)	0 (0%)	
• No past surgical history	27 (90%)	30 (100%)	
Patient's diagnosis			
• Head trauma	20 (66.7%)	18 (60%)	χ^2 =0.391 p=0.822
• Chest trauma	6 (20%)	8 (26.7%)	
• Polytrauma	4 (13.3%)	4 (13.3%)	
Use of psycho-stimulant medications			
• Yes	13 (43.3%)	15 (50%)	χ^2 =0.268 p=0.605
• No	17 (56.7%)	15 (50%)	
Ventilation mode			
• Spontaneous	6 (20%)	7 (23.3%)	χ^2 =2.228

• SIMV	14 (46.7%)	16 (53.3%)	p=0.694
• PSV	7 (23.3%)	4 (13.3%)	
• CPAP	2 (6.7%)	3 (10%)	
• CMV	1 (3.3%)	0 (0%)	

SIMV: Synchronized Intermittent Mandatory Ventilation PSV: Pressure Support Ventilation
CPAP: Continuous Positive Airway Pressure CMV: Control Mandatory Ventilation
X^2: Chi-square test *Significant ($p< 0.05$)

Table 3: Comparing respiratory functions between groups

Patient's respiratory data	Time	Group		t test	P
		Study (n = 30)	Control (n = 30)		
Set respiratory rate (b/m)					
• Mean ± SD	Before	8.76±4.94	8.70±5.01	0.052	0.959
	After	8.76±4.94	8.70±5.01	0.052	0.959
	10 m.	8.40±4.73	9.73±5.58	0.997	0.323
	20 m.	8.13±4.69	12.13±4.19	3.478	0.001*
	30 m.	7.93±4.55	12.80±4.57	4.129	<0.001**
	Paired t-test (P)	5.00 (<0.001**)	9.202 (<0.001**)		
• **Patient's respiratory rate (b/m)** Mean ± SD	Before	13.26±4.14	12.80±6.86	0.319	0.751
	After	13.03±4.08	23.30±2.87	11.260	<0.001**
	10	12.40±3.99	26.20±3.12	14.903	<0.001**
	20	12.36±3.93	27.43±3.14	16.377	<0.001**
	30	12.23±3.92	28.73±3.05	18.172	<0.001**
	Paired t-test (P)	6.36 (<0.001**)	15.297 (<0.001**)		
O2 saturation (%)	Before	93.01±2.93	93.93±1.65	2.808	0.084
• Mean ± SD	After	95.70±2.70	91.13±1.94	7.509	<0.001**
	10	96.53±2.75	90.80±1.71	9.695	<0.001**
	20	97.43±2.48	90.06±1.22	14.543	<0.001**
	30	98.70±1.20	88.63±0.88	36.754	<0.001**
	Paired t-test (P)	15.463 (<0.001**)	20.834 (<0.001**)		
Use of accessory muscles		**No. %**	**No. %**	**X^2**	**P**
	Before	0 (0%)	0 (0%)	-	-
	After	0 (0%)	9 (21%)	10.588	0.001*
	10	0 (0%)	10 (33.3%)	12.00	0.001*
	20	0 (0%)	10 (33.3%)	12.00	0.001*
	30	1 (3.3%)	11 (36.7%)	10.417	0.001*

b/m: breath per minute X^2: Chi-square test
*Significant ($p< 0.05$)

Table 4: Comparing hemodynamic parameters between and within groups

Patients' physiological data	Time	Group		t- test	P
		Study (n = 30)	Control (n = 30)		
HR	Before	91.33±5.05	90.86±4.79	0.367	0.715
• Mean ± SD	After	85.66±3.82	110.63±14.58	9.069	<0.001**
	10	83.76±4.60	115.23±13.37	12.182	<0.001**
	20	82.10±4.56	119.57±10.11	18.490	<0.001**
	30	80.50±4.16	121.60±8.74	23.233	<0.001**
	Paired t-test (P)	13.312 (<0.001**)	17.071 (<0.001**)		
SBP	Before	126.73±10.80	124.36±9.03	0.920	0.361
• Mean ± SD	After	118.07±11.17	141.00±6.26	9.803	<0.001**
	10	117.53±11.24	144.40±4.62	12.106	<0.001**
	20	117.37±10.29	145.13±3.98	13.776	<0.001**
	30	116.20±10.01	146.10±3.07	15.631	<0.001**
	Paired t-test (P)	9.319 (<0.001**)	15.79 (<0.001**)		
DBP	Before	82.06±8.78	80.86±7.16	0.580	0.564
• Mean ± SD	After	80.73±8.41	91.91±5.69	4.216	<0.001**
	10	78.50±6.78	93.75±4.88	7.069	<0.001**
	20	77.70±6.18	96.08±3.75	9.570	<0.001**
	30	75.73±5.00	97.00±2.69	13.854	<0.001**
	Paired t-test (P)	7.547 (<0.001**)	8.271 (<0.001**)		

MAP	Before	97.00±8.66	97.33±8.12	0.115	0.909
• Mean ± SD	After	93.20±8.72	95.83±7.30	0.922	0.362
	10	91.53±7.64	110.58±3.70	8.213	<0.001**
	20	90.86±6.94	112.25±2.73	10.286	<0.001**
	30	89.26±6.19	113.33±2.10	13.070	<0.001**
	Paired t-test (P)	11.612 (<0.001**)	8.408 (<0.001**)		
CVP	Before	11.33±2.00	11.08±1.67	0.381	0.705
• Mean ± SD	After	10.63±1.90	13.76±1.50	7.081	<0.001**
	10	10.03±2.37	14.40±1.27	8.884	<0.001**
	20	9.90±2.44	15.30±1.08	11.071	<0.001**
	30	9.50±2.16	15.66±0.95	14.283	<0.001**
	Paired t-test (P)	6.858 (<0.001**)	8.437 (<0.001**)		

HR: Heart Rate SBP: Systolic Blood Pressure
DBP: Diastolic Blood Pressure MAP: Mean Arterial Pressure
CVP: Central Venous Pressure
*Significant (p< 0.05)

Table 5: Comparing neurological functions between and within groups

Patients' neurological data	**Time**	**Group**		**t- test**	**P**
		Study (n = 30)	**Control (n = 30)**		
Pupil size (mm)	Before	6.96±1.12	6.66±1.53	0.915	0.364
• Mean ± SD	After	6.13±1.07	7.53±1.40	12.722	<0.001**
	10	5.66±1.06	8.26±1.04	17.306	<0.001**
	20	4.86±0.89	8.60±0.72	26.596	<0.001**
	30	4.23±0.56	8.73±0.52	39.802	<0.001**
	Paired t-test (P)	-21.739-.000	12.665-.000		
Consciousness level (JGCSS)	Before	8.90±1.39	9.20±1.12	0.861	0.393
• Mean ± SD	After	11.50±1.16	8.06±0.90	4.330	<0.001**
	10	12.13±1.00	7.96±0.85	9.546	<0.001**
	20	12.33±0.84	7.16±0.64	17.709	<0.001**
	30	12.86±0.68	6.93±0.44	31.973	<0.001**
	Paired t-test (P)	17.241 (<0.001**)	8.306 (<0.001**)		
Pupil reaction		**No. %**	**No. %**	**X^2**	**P**
	Before				
	• React	25 (83.3%)	27(90%)	0.577	0.448
	• Not react	5 (16.7%)	3(10%)		
	After				
	• React	28 (93.3%)	23(76.7%)	3.268	0.071
	• Not react	2 (6.7%)	7(23.3%)		
	10				
	• React	29 (96.7%)	22(73.3%)	6.405	0.011*
	• Not react	1(3.3%)	8(26.7%)		
	20				
	• React	30 (100%)	21(70%)	10.58	0.001*
	• Not react	0 (0%)	9(30%)		
	30				
	• React	30 (100%)	20 (66.7%)	12.00	0.001*
	• Not react	0 (0%)	10 (33.3%)		

JGCS: James' Glasgow Coma Scale mm: millimeter

IV. Discussion

This study investigated the effect of listening to Qur'an on physiological responses of mechanically ventilated Muslim patients. It was hypothesized that patients who listened to Qur'an would show improved in physiological response in comparison to patients in the control group. The results of the study showed significant differences between the Qur'an group and the control group in all physiological measures during the study procedure. The differences were largely driven by the improvement of physiological parameters in the Qur'an group and the substantial decline in the physiological parameters in the control group. The physiological changes in the control group could be due to the effect of noise as patients rested quietly for 60 minutes without

wearing earplugs. Noise is a significant problem in ICU.[28] Sources of noise in the ICU include machine alarms, staff conversation and new admissions.[29] One study reported that noise in the ICU may increase patients' HR and BP.[30] The findings of this study indicate that listening to Qur'an had improved respiratory functions in mechanically ventilated Muslim patients. Similarly, hemodynamic parameters improved in the Qur'an listening group immediately after listening to Qur'an and over time including reduction in HR, SBP, DBP, MAP and CVP compared to the control group. The results also showed that listening to Qur'an had positive effects on patients' level of consciousness, pupil size and pupil reactivity to light.

Many studies were conducted to investigate the effect of the Qur'an on human body. Most of these studies were carried out in Iran and published in Persain language.[31,32,33,34] Only the abstracts were published in English. Due to language issues, the results and conclusions were not accessible. However, there has been little research on the effect of Qur'an that was published in English language. Some other studies reported the positive effect of Qur'an on physiological stress response among Muslim patients in ICUs [35], brain waves, [36] and anxiety level and vital signs before anesthesia.[37] However, these studies did not provide detailed information in order to make judgment about their conclusions. Ariff, Mai Ashikin, Maryamjameelah, Bushr and Wan Azman (2013) [38] conducted a pilot study to explore the effect of Surah Yasiin recitation on the hemodynamics of mechanically ventilated patients. They found that the hemodynamic parameters were not affected by Yaasiin recitation. The authors highlighted factors that could have affected their results, such as the small sample size, patient's terminal stage of illness, medications and the interruption of the Qur'an session by medical procedures. Nasiri, Fayazi and Karimvand (2015) [39] reported the positive effect of recitation of the word *Allah* on respiratory rate and SpO2 of patients after coronary artery bypass graft surgery. Similarly, Eskandari et al. (2012) [22] found that 20 minutes of Qur'an recitation for preterm newborns led to a significant decline in HR and RR, and an increase in SpO2. Mottaghi et al. (2011) [19] reported that listening to the Qur'an verses was an effective method for reducing anxiety in athletics before competition. Bayrami and Ebrahimipour (2014) [16] concluded that listening to Qur'an relives pain, shortens the duration of the first stage of delivery, improves vital signs and increases the infant's APGAR score. Despite the fact that these studies were conducted in different settings on patients with different health conditions and different age groups, they clearly support our findings that listening to the Qur'an has positive effect on human body.

Limitations of the Study

This study had few limitations that must be acknowledged. The sample size was relatively small which limits the ability to generalize the findings. Also, attempts were made to avoid noises during the Qur'an sessions. However, sometimes it was not possible to control noises due to medical emergencies in ICUs. Only a single 60 minute session of listening to Qur'an was investigated. Studying the influence of several sessions of listening to Qur'an would provide more evidence about its effect on mechanically ventilated Muslim patients.

V. Conclusion And Implications For Practice

In conclusion, our results suggest that listening to Qur'an is an effective intervention for improving hemodynamic parameters, respiratory functions and the level of consciousness for mechanically ventilated Muslim patients. Listening to the Qur'an is a simple, noninvasive intervention. Additionally, it is a favorable practice for most Muslims. Hence, critical care nurses should consider integrating this intervention in the plan of care for mechanically ventilated Muslim patients to improve their physiological parameters, and enhance their coping and recovery. Critical care nurses must be educated about the religious beliefs and spiritual needs of Muslim patients in order to provide appropriate spiritual care. Student nurses need to understand the impact of religious beliefs on patients' physiological and psychological health. Hence, religious beliefs and healing practices must be integrated in undergraduate nursing curriculum. There is a need for further large scale studies to investigate the influences of several sessions of listening to the Qur'an on physiological stress responses in mechanically ventilated Muslim patients.

Acknowledgement

The authors would like to thank critical care nurses in the study setting for their cooperation and support during data collection period.

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