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Effects of nursing comfort care integrating with the daily Islamic rituals on comfort among mechanically ventilated Muslim patients: A randomized clinical trial

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ABSTRACT

Background & Aim: Most mechanically ventilated patients reported decreasing comfort during their treatments, especially in Muslim patients. Nursing comfort care needs to be addressed by integrating daily Islamic rituals to fulfill the spiritual need and promote holistic comfort of Muslim patients with mechanical ventilation. This study aimed to investigate the effect of nursing comfort care integrating with the daily Islamic rituals on comfort among mechanically ventilated Muslim patients.

Methods & Materials: A pretest-postest with control group design was used. Fifty-six participants recruited from intensive care units of three public hospitals in Indonesia were randomly assigned into either the intervention group (n=28) or control group (n=28) by matching technique based on gender, age, and duration using a ventilator. Those in the intervention group received nursing comfort care developed based on Kolcaba's Theory of Comfort integrating with the daily Islamic rituals, while those in the control group received usual care. Comfort was measured on the first day before receiving the intervention and on the second day after the intervention was completed by using Comfort Questionnaire for Mechanically Ventilated Patients (CQMVP).

Results: Data analysis using an independent t-test found no significant difference between the intervention and control groups at baseline (t = .134, p .894). The mean of comfort score of patients in the intervention group after receiving the intervention was significantly higher than those in the control group (t=6.70, p< .05).

Conclusion: Nursing comfort care integrated with daily Islamic rituals increased comfort in Muslim patients while receiving mechanical ventilation. Thus, this nursing comfort care program can be recommended to use in practice.

Introduction

Nearly 5 million patients are admitted to the hospital with the critical illness each year, and approximately 71% of those patients received mechanical ventilation treatment (1). Mechanical ventilation is lifesaving and frequently used as a treatment modality of medical diagnoses and is also the primary reason for admission to the critical care unit (2). Despite this fact, mechanical ventilation may be a distressing experience for the patients and may decrease comfort (3). The previous study has estimated that around 96% of mechanically ventilated patients reported their lowest comfort level during mechanical ventilation treatment (4). This condition can be happened by many causes, such as the experience of pain and feeling of thirst and dry mouth, anxiety, sleep disturbance, or feeling of loneliness (5). Consequently, feelings of panic, depression, agitation, and delirium can occur (6).

Patients' comfort may increase if comfort needs can be met by the appropriate nursing care (7). In the Theory of Comfort, Kolcaba identified the comfort needs of patients in four contexts of comfort, namely physical, psychospiritual, environmental, and sociocultural. Therefore, in order to increase

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patients' comfort within these four contexts, nurses can provide care by entails three types of comfort interventions, including standard comfort interventions, coaching intervention, and comfort food for the soul intervention (8).

Making patients comfortable was the role of a good nurse and determining factor of the nurse's ability and character. Nurses' ability to help patients attain comfort was positive and sometimes related to improving the patient's condition (9). Furthermore, comfort is an important goal of care in mechanical ventilation patients because greater comfort may reduce the need for sedation and improve overall patient satisfaction (10)

Some studies described nursing care intervention to promote comfort and reduce discomfort in patients during ventilator treatment (11). A nurse may apply the intervention to promote comfort independently without a physician order. To address this comfort, in addition to drugs and psychotherapy, alternative therapies have been used such as relaxation massage (12), and music therapy (13).

Nevertheless, a previous study has found that Muslim patients with mechanical ventilation reported an increased spiritual need due to the difficulty of performing their daily ritual such as praying (salat) five times per day and reciting the Holy Qur'an (14). From the Islamic perspective, following the principles of religion can bring comfort, pleasure, and confidence for Muslims, especially when they are sick (15). This perspective was emphasized in the verses from the Holy Qur'an, such as "Remembrance of Allah certainly brings comfort to all hearts" (Surah Ra'd verse 28) and "Help ourselves (in your affairs) with patience and prayer" (Surah Al-Baqara verse 45). However, according to the literature review, e is a rare study focused on the intervention to integrate this Islamic belief and daily rituals for Muslim patients with mechanical ventilation. Therefore, the nurses must highlight the basic principles of Islam in caring for Muslim patients receiving mechanical ventilation that may affect improving patients' comfort.

In this regard, integrating holistic interventions related to the spiritual and cultural aspects of the patients in clinical practice can be a great deal to attention. Facilitating the daily rituals of Muslims can be an efficient way to increase patients' spirituality and handle their cultural background (16). Thus, the nursing comfort care of this study was a brief intervention designed based on Kolcaba's Comfort Theory and integrated with the daily Islamic rituals to promote holistic comfort of Muslim patients with mechanical ventilation.

The purpose of this intervention study was to investigate the change of comfort among mechanically ventilated Muslim patients after receiving nursing comfort care integrating with the daily Islamic rituals.

Methods

Study design

The study used an intervention with pretest-posttest design with a control group. The intervention group received nursing comfort care provided for two days; the control group received usual care.

Setting and sample

The participants were recruited at the intensive care unit (ICU) from three public hospitals in West Sumatra, Indonesia, from February to March 2017.

A sample of 23 participants was estimated based on effect size (Cohen's d) .80 from the previous study to achieve an alpha of .05 power (p) of .80. To prevent type II error of this study, allowing attrition of 20 % for each group (17). Thus, this study used 28 Muslim participants with mechanical ventilation in the intervention group and 28 participants in the control group. The inclusion criteria were (1) Muslim patients on mechanical ventilation; (2) age more than 18 years; (3) fully conscious; (4) able to write and read in the Indonesia language; (5) no hearing or

cognitive impairments; and (6) stable hemodynamics. Exclusion criteria were; (1) receiving continuous intravenous sedative and/or analgesic agents, and (2) having a history of mental health problems.

The potential participants who met the inclusion criteria occurred through the ICU's of these three hospitals; the ICU nurses were selected and approached the potential participants to ascertain their interest in this study. Then, participants who consent to participate were randomly assigned by using a lottery to each intervention group or control group. Additionally, eligible participants were matched based on gender (male and female), age (±5 years), and duration using mechanical ventilation (±1 day). If the first patient was assigned to the control group, then the next patient who was matched based on the characteristic of the first patient was assigned to the intervention group. This technique was continued until the researcher obtained the total number of the sample in each group.

Interventions

Nursing comfort care consisted of seven nursing comfort care interventions as presented in table 1. The first researcher provided the interventions for two days in the intervention group and the duration of the interventions in each day ranged from 45 to 60 minutes.

Table 1. Nursing Comfort Care

Types of Kolcaba's comfort care	Nursing comfort care intervention
Standard comfort intervention	(1) Monitoring stability of the patients' hemostasis by assessing vital signs which consists of the stability of heart rate (HR), blood pressure (BP), respiratory rate (RR), body temperature (BT), and oxygen saturation (SpO_2). (2) Assessing patients' comfort scale by using Comfort Rating Scale (CRS) and pain intensity by using Pain Rating Scale (PRS). (3) Maintaining physical function of the patients by providing nursing interventions including patients positioning, suctioning, mouth care, and the administration of analgesic and sedative therapy as prescribing by physicians.
Coaching intervention	(4) Advocating the patients and family members to communicate comfort needs of the patients through the uses of communication media such as pen and paper or communication board to convey patients' comfort needs. (5) Reassuring the patients and the family members that the researcher (the first author) will pay attention for any verbal and nonverbal response of the patients during the intervention period.
Comfort food for the soul	(6) Collaborating with the family in preparing the patients to prayer (*salat*) based on Muslim rituals, by; • Involving the family to help the patients to ablution (*wudhu*) before performing the prayer (*salat*) which consists of washing the exposed body parts including the mouth, nose, face, head, ears, arms, and feet with sterile water by using bottle spray • Facilitating the patients to perform prayer (*salat*) while lying down on the bed (7) Providing a session to listen the Holy Qur'an recitation (Surah Al Fatihah and Surah Yassin) that was recited by a *Qari* through headphone from MP3 recorder for 15 minutes

Measurements

Comfort Questionnaire for Mechanically Ventilated Patients (CQMVP) was used to measure comfort in this study. This tool was modified by the researchers from the shortened version of the General Comfort Questionnaire (Kolcaba, 2003) to fit with the patients receiving mechanical ventilation. The 16 items of CQMVP cover all contexts of comfort, comprising 4 items related to physical comfort, five items related to

psychospiritual comfort, 3 items related to environmental comfort, and 4 items related to sociocultural comfort. The sum of scores is determined where the minimum score is 16 and the maximum score is 96. The higher score indicates a higher level of comfort. The contents of this tool were validated by a panel of three experts. The scale content validity index (S-CVI) of the CQMVP was .92, and its reliability test found the Cronbach's alpha coefficient was .81.

Comfort Rating Scale (CRS) and Pain Rating Scale (PRS) were used as follow-up instruments to monitor the participants' comfort scale, and pain intensity before and after receiving nursing comfort care each day. The CRS was derived from the original version by Kolcaba (2003). CRS is a visual analog scale that presented numbers 0 to 10 in the vertical line, with 0 equaling no comfort to 10 equaling the highest possible comfort (8). The PRS was developed to evaluate patients' pain intensity in various settings (18). Same with the CRS, the participants were asked to choose a number between 0-10 to rate their pain, with 0 equaling no pain and 10 equaling the worst possible pain.

Data collection

The study flow was illustrated in figure 1. The researcher collected demographic data and follow-up data. A research assistant was recruited from each ICU to collect pre-test and post-test data with CQMVP. Before beginning data collection in both intervention and control groups, the researcher began collecting demographic data from participants' medical records, including age, sex, marital status, medical diagnosis, ventilator mode, current medication, duration using mechanical ventilation, and other technological devices used. Afterward, the research assistant continued to collect pre-test data on the first day (Day 1) with CQMVP in both groups. Then, the researcher gathered follow-up data during two days of the intervention period, including the measurement of patients' comfort by using the Comfort Rating Scale (CRS), pain intensity by using the Pain Rating Scale (PRS), and vital signs except on BT. On the last day (Day 2) of the intervention period, the RA re-collected post-test data using CQMVP after the intervention was completed in both groups.

Ethical considerations

Ethical approval was given by the Ethics Research Committees of a university in Thailand and a university in Indonesia where the study was conducted. An informed consent form was provided to declare the willingness and understanding of the participants to participate in this study. Verbal consent was obtained due to the alteration of the physical capability of the participants to sign the consent. Then, the first researcher asked the family members to sign the consent for the participants. To prevent the potential risks, the researcher assessed the conditions of the participants prior to providing the interventions and constantly observed the participants during the intervention period.

Data analysis

Descriptive statistics were used to analyze and describe the demographic and clinical characteristics of the participants. Pearson Chi-Square test, Likelihood test, and independent t-test were performed to determine the significant differences in the participants' demographic and clinical characteristics in both groups. Since the data were met the assumption (normality and homogeneity), paired t-test was performed to detect any within-groups effect between before and after the intervention, and an independent t-test was used to analyze any significant differences between the two groups.

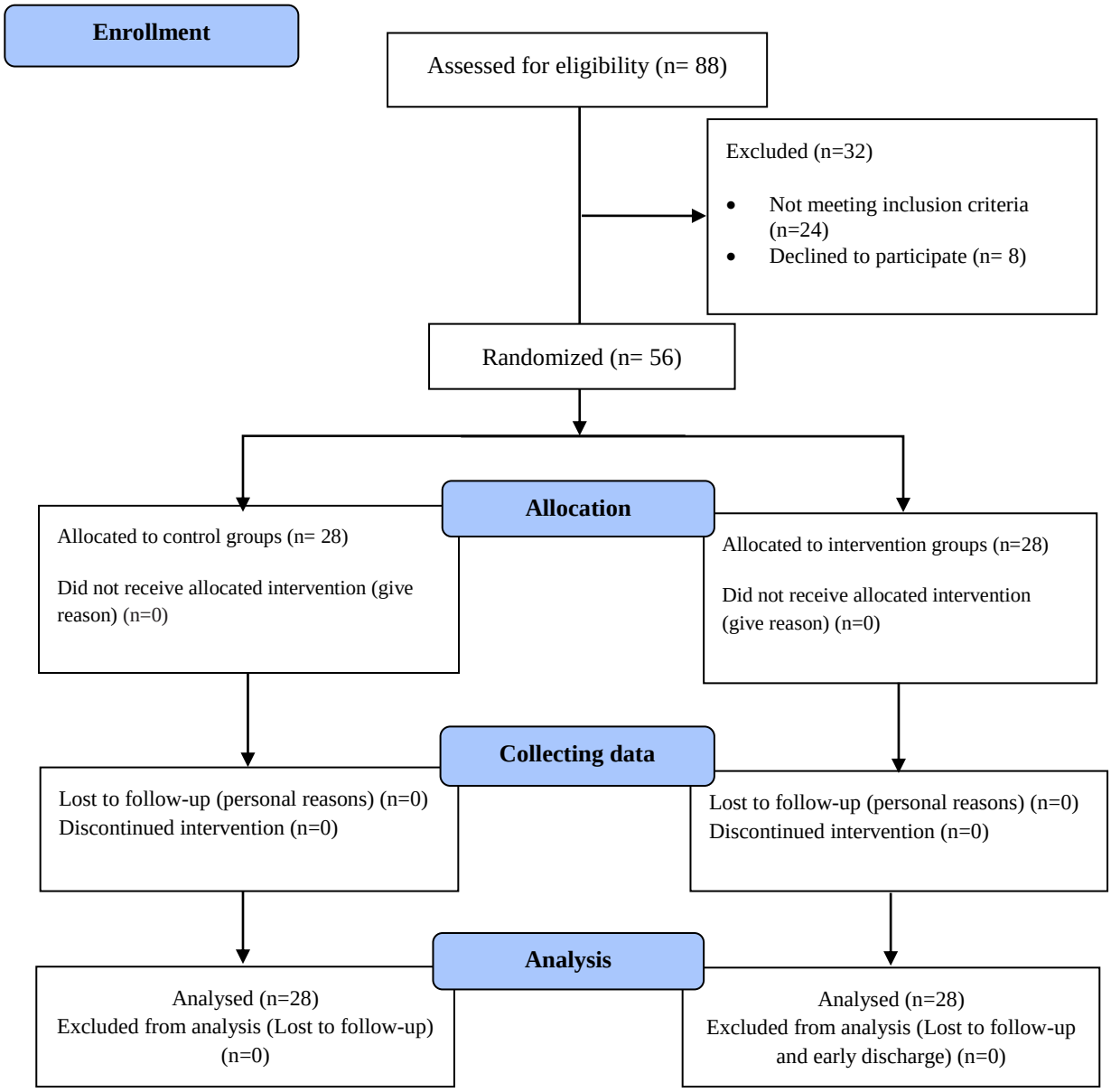

Figure 1. The flow diagram of the study, based on the Consort statement 2012.

Results

Demographic and clinical characteristics of participants

The demographic and clinical characteristics of the participants were shown in table 2. All demographic data and clinical characteristics of the participants between the two groups were not different statistical significantly.

Moreover, during two days of the intervention period, the stability of vital signs, comfort scale, and pain intensity of the participants in the intervention group was monitored before and after receiving the interventions, as shown in table 3. On day 1 of the intervention period, there were no significant differences in the participants' vital signs in the intervention group. Nevertheless, there were significant differences on the comfort scale by CRS ($t=-3.81$, $p<.05$) and pain intensity by PRS ($t=3.62$, $p<.05$) between before and after the participants receiving the intervention.

On the second day of the intervention period, participants' heart rate was decreased significantly ($t=4.40$, $p<.05$), and oxygen saturation were increased significantly ($t=2.20$, $p<.05$) after receiving the

intervention. Moreover, the mean comfort scale (t=11.18, p<.05) and pain intensity (t=6.41, p<.05) of the participants in the intervention group also showed statistically significant differences before and after receiving the intervention.

Table 2. Demographic data and clinical characteristics of the participants (N =56)

Characteristics	Intervention group (N=28)		Control group (N=28)		Statistic value	P-value
	N	%	N	%		
Age (years) (Min-Max = 20-73)	M = 51.07	SD = 12.88	M = 53.18	SD =11.59	.64[t]	.52
Gender					.00[a]	1.00
Male	16	57.1	16	57.1		
Female	12	42.9	12	42.9		
Marital status					1.90[b]	.59
Single	5	17.9	2	7.1		
Married	16	57.1	19	67.9		
Widow/Divorced	7	25.0	7	25.0		
Educational level					1.92[b]	.75
Elementary school	3	10.7	4	14.3		
Junior school	6	21.4	5	17.9		
Senior high school	11	39.3	10	35.7		
Diploma/Bachelor	8	28.6	9	32.1		
Current medical diagnosis					2.85[b]	.83
Respiratory diseases	9	32.1	6	21.4		
Congestive heart failure	3	10.7	4	14.3		
Chronic kidney diseases	1	3.6	1	3.6		
Eclampsia	1	3.6	2	7.1		
Ischemic strokes	-	-	1	3.6		
Post-surgery	12	42.9	13	46.4		
Trauma	2	7.1	1	3.6		
Ventilator mode					1.582[b]	.66
BiPAP	15	78.6	13	46.4		
CPAP	9	17.9	10	35.7		
SIMV	4	3.6	4	14.3		
CMV	-	-	1	3.6		
Current medications					.868[b]	.83
None	10	35.7	9	32.1		
Analgesic drugs	14	50.0	14	50.0		
Analgesic + sedative drugs	4	14.3	7	17.9		
Duration of using mechanical ventilator (days)					.451[b]	.80
1 – 3	22	78.6	22	78.6		
4 – 6	5	17.9	4	14.3		
>6	1	3.6	2	7.1		

M = Mean, *SD* = Standard Deviation, [a] = *Chi-Square*, [b] = *Likelihood Ratio*, [t] = *Independent t-test* a = Chi-Square, b = Likelihood Ratio, c = Fisher's Exact Test, BiPAP = Bilevel Positive Airway Pressure, CPAP = Continuous Positive Airway Pressure, SIMV = Synchronize Intermittent Mechanical Ventilation, CMV = Controlled Mandatory Ventilation.

The effect of nursing comfort care on comfort

Results demonstrated no significant difference in the mean of comfort score, including each context of comfort between the participants in the intervention group and control at baseline (Table 4).

The mean of comfort scores of the participants in the intervention group after receiving the interventions (M=67.82, SD=8.65) was significantly higher than those in the control group (M=54.29, SD=5.94) (t=6.70, p<.05) as presented in table 4.

Additionally, the mean score of each context of comfort including physical (t=5.28, p<.05), psychospiritual (t=10.18, p<.05), environmental (t=5.88, p<.05), and sociocultural comfort (t=9.01, p< .05) were significantly increased after the participations in the intervention group following the interventions (Table 6). The psychospiritual comfort and sociocultural comfort of the participants in the intervention group was significantly higher than the other contexts of comfort.

Table 3. The comparison means and standard deviations of vital signs, comfort scale, and pain intensity of the intervention group during the intervention period (N = 28)

Variables	Before		After		t	P-value
	Mean	SD	Mean	SD		
Day 1						
Vital signs						
Heart rate	105.61	15.30	103.75	12.89	1.89	.07
Systolic blood pressure	125.71	7.19	125.57	5.82	.34	.74
Diastolic blood pressure	75.86	11.75	77.14	9.20	-.68	.09
Oxygen saturation	99.21	.83	99.21	.74	.00	1.00
Comfort scale (CRS)	4.11	1.07	4.68	.91	-3.83	.00*
Pain intensity (PRS)	6.29	1.12	5.71	1.18	3.62	.00*
Day 2						
Vital signs						
Heart rate	102.93	11.42	96.79	8.60	4.40	.00*
Systolic blood pressure	125.50	6.23	126.86	4.46	-1.85	.76
Diastolic blood pressure	80.75	7.96	83.54	6.63	-1.94	.06
Oxygen saturation	99.32	.72	99.86	.56	2.20	.03*
Comfort scale (CRS)	4.79	1.10	6.25	.93	-11.18	.00*
Pain intensity (PRS)	5.14	.97	4.21	1.03	6.41	.00*

***p* value < .05**

Table 4. The comparison of the mean of pre-test comfort scores and each context of comfort between the intervention group and control group (N =56)

Comfort	Intervention group (N=28)		Control group (N=28)		t	P-value
	Mean	SD	Mean	SD		
Total comfort	49.82	6.55	49.61	5.33	.13	.89
Context of comfort						
Physical comfort	12.11	2.51	11.96	2.60	.21	.84
Psychospiritual comfort	14.96	3.04	15.54	2.60	.76	.45
Environmental comfort	9.11	2.32	8.61	2.53	.77	.44
Sociocultural comfort	13.64	2.54	13.50	2.13	.23	.82

Table 5. The comparison of the mean of comfort scores within the intervention and control groups (N=56)

Groups	Pre-test		Post-test		t-test	P-value
	Mean	SD	Mean	SD		
Intervention group	49.82	6.55	67.82	8.65	12.38	.00
Control group	49.61	5.33	54.29	5.94	5.34	.00

Table 6. The comparison of the mean of post-test comfort scores and each context of comfort between the intervention group and control group (N=56)

Comfort	Intervention group		Control group		t	P-value
	Mean	SD	Mean	SD		
Total comfort	67.82	8.65	54.29	5.94	6.70	.00*
Context of comfort						
Physical comfort	14.82	2.11	13.43	2.06	2.50	.01*
Psychospiritual comfort	22.32	4.36	17.00	2.49	5.60	.00*
Environmental comfort	12.11	2.73	9.50	2.47	3.75	.00*
Sociocultural comfort	18.32	2.69	14.36	2.22	6.01	.00*

***p* value< .05**

Discussion

The results revealed that the mean comfort score of the participants in the intervention and the control group was significantly increased from the baseline, indicating increased comfort scores. However, after comparison these comfort scores between two groups, it found that participants in the intervention group had significantly higher comfort scores after receiving the intervention than those the participants in the control group who received usual care ($t=6.70$, $p< .05$). These findings reflect that nursing comfort care based on Kolcaba's Comfort Theory integrating with daily Islamic rituals in the comfort food for the soul care was significantly effective in promoting comfort in Muslim patients while receiving mechanical ventilation.

Consistently, numerous studies have applied Kolcaba's comfort care as the guiding framework of the study, and it is effective in promoting patient comfort in a variety of settings (3). Nevertheless, related literature encompasses a limited number of studies about Kolcaba's comfort care effect in mechanically ventilated patients. For example, a study by Çiftçi and Öztunç (2015) was conducted a quasi-experimental study to identify the effect of music on comfort, anxiety, and pain in patients with mechanical ventilation. The study results showed a significant decrease in the mean scores of anxiety and pain scale and found that the general comfort level was increased significantly after listening to music. Moreover, there was a statistically significant relationship among the comfort levels before listening to music and after the periods with and without music. Based on these findings, Çiftçi and Öztunç (2015) have concluded that music as a type of therapy which contributes to the experience of comfort of mechanically ventilated patients by decreasing the pain and anxiety (13).

Specifically, the design of nursing comfort care in this study has been composed of three types of comfort care: seven nursing comfort care interventions. Firstly, the standard comfort intervention in this study divided into; assessing vital signs of the participants; assessing patients' comfort scale and pain intensity; and providing nursing interventions including positioning, suctioning, mouth care by collaborating with the ICU nurses and the administration of analgesic and sedative therapy as prescribed by physicians.

Assessing participants' vital signs that were intended to monitor the stability of the hemostasis during the intervention period. The comparison of HR, BP, and SpO2 during two days showed participants' HR was significantly decreased, and SpO2 was significantly increased more than before receiving the interventions on day 2 of the intervention period, except on the participants' BP (systolic and diastolic). The finding of decreased HR was consistent with the previous studies among mechanically ventilated patients after receiving music intervention (19).

Furthermore, monitoring of comfort scale and pain intensity was also measured by using CRS and PRS at four times (before and after each day of the intervention period). Statistically, there was a significant difference in the participants' comfort scale and pain intensity in the intervention group. The Comfort scale was significantly increased during two days. As well as, the pain intensity of the participants in the intervention group appeared slightly decreased after receiving the intervention. Based on this additional finding, it can be estimated that nursing comfort care can also reduce pain in mechanically ventilated patients. The literature indicates that pain is directly correlated to patient's comfort (18). Lombardo et al. (2013) found that pain is the most significant source of discomfort among patients with mechanical ventilation (20).

Secondly, coaching intervention in this study was meaningfully provided. The researcher advocated for the participants and their family related to communicate strategy to convey the participants' comfort needs in the intervention group by using communication board or pen and paper as the communication media. Basically,

communication in mechanically ventilated patients is essential to meet physiological and psychological needs and convey decisions, wishes, and desires regarding care plans (21). Appropriate communication strategies need to advocate in patients with mechanical ventilation and their family members (22). Mårtensson and Fridlund (2002) found the use of pen and paper as a communication method in patients with mechanical ventilation is always a great strategy for the nurse and patient to communicate with each other (23).

Lastly, the intervention of comfort food for soul in this study related to collaborating with the family members in preparing the participants to prayer (salat) and provide a session to listen to the Holy Qur'an recitation. Basically, prayer (salat) is a pillar of religion for Muslims that is embedded in the well-being of mind, body, and soul (24). Thus, prayer (salat) is needed to facilitating the participants in the intervention group to fulfill the need for daily rituals of their religion. The researcher also involved family participation in helping the participants to pray (salat) within two days of the intervention period. Prayer has been reported as the means for comfort and consolation of human spirits and souls and can improve healing when sick (25). A systematic review study by Simao et al. (2016) claimed that prayer is a widely used activity and can be used as an adequate therapy and intervention in healthcare to help patients cope in terms of illness and crisis. Moreover, the involvement of family members' participation in this study also can facilitate social interaction between the patients with the loved ones (26).

The Holy Qur'an recitation in the nursing comfort care was provided as comfort food for the soul. Consistently, several studies had been conducted to examine the effect of the Holy Qur'an recitation in the variety of settings, including in critically ill patients. A study by Bakar (2014) evaluated the effect of the Holy Qur'an recitation on stress responses of mechanically ventilated patients by measuring the change of physiological responses, including HR, BP, RR, and SpO2. The result found that there were no significant differences in physiological responses after listening to the Holy Qur'an recitation except on the patient's HR. However, the change of HR could be associated with the response of relaxation (27).

Listening to the holy Qur'an recitation for 15 minutes during two days may increase total comfort of the participants, particularly on the psychospiritual and sociocultural comfort of the participants who are Muslims. Accordingly, Muslims believe that the sound of the Holy Qur'an recitation can be used as an intervention to recover from sickness and enhancing health, and also gave soothing and comforting effects to the listener (28). Zulkarnain et al. (2012) investigated and compared the effects of listening to the Holy Qur'an recitation and classical music on human brain waves by using an Electroencephalogram. Results of the study demonstrated the percentage of alpha brain wave was significantly increased with the greater value when listening to the Holy Qur'an recitation compare to the listening of classical music. Increased alpha brain wave implies that the Holy Quran recitation can affect some hormone and chemical are responsible for relaxation due to the Holy Quran has a specific effect on Muslims (29).

The ultimate goal of nursing comfort care is to enhance patients' comfort holistically from the baseline assessment (8), and it can be demonstrated by the increase of each context of comfort in the intervention group following the interventions in this study. Interestingly, the participants' psychospiritual comfort and sociocultural comfort in the intervention group were significantly higher than in another context of comfort. The greater increase of psychospiritual and sociocultural comfort can be related to the integration of the spiritual and cultural aspects in the nursing comfort care by helping the participants to pray (salat) and listening to the Holy Qur'an recitation, and also the involvement of family participation in this study.

The result of this study also showed that in the control group, there was a statistically significant difference in the mean score of comfort between pre-test and post-test, and the post-test had a significantly higher score. The improvement of comfort score in the participants in the control group can be caused by received usual care from the ICU nurses, and medical staff included some routine nursing care and medication treatment. Coyer et al. (2007) stated that routine nursing care activities could promote comfort or reduce discomfort during mechanical ventilation. However, both nursing care and pharmacological interventions still need to be designed appropriately in caring for mechanically ventilated patients (30).

Conclusion

Based on the results, it is concluded that the nursing comfort care grounded on Kolcaba's comfort theory was increased patient's comfort, including each context of the comfort of mechanically ventilated Muslim patients. This study also has effectively integrated spiritual and cultural aspects into nursing comfort care congruently with the psychosocial and spiritual needs of Muslim patients.

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Conflict of interest

The authors have declared no conflict of interest.

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