

Effects of Listening to Quran Recitation and Nature Sounds on Preoperative Anxiety Among Patients Undergoing Surgery

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This study aimed to compare the effectiveness between listening to Quran and nature sounds on preoperative anxiety and physiological parameters. Using systematic random sampling, a randomized controlled trial study was conducted among 81 patients, which comprised of male and female patients allocated into three equal groups, that is, Quran recitation group, nature sounds group, and a control group. Preoperative state anxiety was measured using the State-Trait Anxiety Inventory (Embong, 2018), and physiological parameters were recorded before and after the intervention. After the intervention, the analysis within-subjects showed significant improvement in heart rate, respiratory rate, and state anxiety. However, post-hoc test showed that reduction in the mean state anxiety scores in all groups was the only significant factor. Paired analysis showed that only mean state anxiety level of nature sounds group has a significant reduction in comparison to control group; whereas there was nonsignificant difference in state anxiety of other paired groups when compared between both intervened groups and between Quran group and control group. The result concluded that listening to either the Quran or nature sounds were effective in reducing preoperative anxiety, however head-to-head comparison found no significant difference.

Keywords. Preoperative anxiety, physiological parameters, listening Quran recitation, nature sounds

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Surgery can be perceived as a stressful and worrying event for patients who undergo surgery. It leads to an expected response which is preoperative anxiety that can be described as an annoying feeling of tension due to the patient's uneasiness about the surgical operation. Anxiety is also a response to internal and external stimuli that may project behavioral, emotional, physical and cognitive symptoms (Videbeck, 2014). Patients can be afraid because of many reasons such as postoperative pain, not waking up after surgery (fear of death), being nauseous and vomiting postoperatively, needles and drains, being sleepy for hours postoperatively, improper postoperative care, unsuccessful anesthesia, waking up during surgery, being paralyzed because of anesthesia, and admission to the intensive care unit (Mavridou et al., 2013).

Several studies on preoperative anxiety have been conducted in the past; for instance, Mohammadi et al. (2014) reported that people undergo surgery generally experiencing preoperative anxiety and pain. Another study found that there was significant preoperative anxiety in day-care patients and inpatients (Wetsch et al., 2009) and prevalence of preoperative anxiety among patients undergoing surgery reached more than half of the patients (Menel et al., 2018). Management for preoperative anxiety can be classified into pharmacological and non-pharmacological treatment.

Preoperative anxiety can lead to complications such as pain, nausea, vomiting, cardiovascular disturbances and increased risk of infection (Mulugeta et al., 2018). Common parameters include temperature, pulse rate, blood pressure, respiratory rate, urine output, peripheral oxygen saturation and pain scores are measured postoperatively to monitor the complications (Akhtar et al., 2013). Anxiety has the potential effects on induction, preoperative visit, perioperative and recovery periods (Laufenberg-Feldmann & Kappis, 2013). However, anxiety is not systematically being assessed during the preoperative visit and is not commonly practiced by anesthesiologists due to restrictions of time and workload or because patients' concerns are underestimated or overlooked. Hence, routine use of questionnaires might help anesthesiologists to assess and explore anxiety among preoperative patients (Laufenberg-Feldmann & Kappis, 2013).

Moving towards a comprehensive medical intervention, the emergence of alternative therapy other than pharmaceutical therapy may bring vast differences and benefits to the medical field. It has been reported that music is recognized as efficient multimodal therapy that possesses a healing effect in human physical and mental health and helps in avoidance of unwanted painful stimuli (Bauer et al.,

2011). A reduction of preoperative anxiety level and physiological parameters in general surgical patients can be achieved by implementing music therapy as non-coercive therapy. Beyond that, it is time-saving, widely accessible and affordable without major risk relatively to drug-based therapy (Mohammadi et al., 2014). Several studies were done about the effect of nature sounds on preoperative anxiety and physiological parameters. For example, Mohammadi et al. (2014) observing significant difference in state anxiety, before and after listening to the music. Additional evidences showed that music listening resulted, on average, in an anxiety reduction (Bradt et al., 2013); lower numerical pain scores (Aris et al., 2019); and lower intraoperative heart rates (Rahman et al., 2020).

Quran rhythmic tone and spiritual recitation are applicable for the non-pharmacology approach for reduction of anxiety pre-test (Ramazani et al., 2014). There are studies suggesting that Quran recitation offers a lot of therapeutic effects in managing stress and mental disorders (Alhouseini et al., 2014). Similarly, Ghiasi and Keramat (2018) reported that the state of tranquility can be achieved by listening to Quranic recitation and decrease in anxiety level after listening to Quran recitation in the trial group. Rahman et al. (2017) asserted that patients exhibited a significant reduction in state anxiety score after listening to Quran before the surgical procedure started; while, Babaii et al. (2015) reported Quran has a calming effect which significantly reduces patients' anxiety post-intervention.

There are various ways to evaluate anxiety either directly, such as plasma cortisol level and catecholamines or indirectly by blood pressure and heart rate (Matthias & Samarasekera, 2012). As anxiety may affect physiological parameters, anxiety relief as one of the factors may give a similar outcome. A study revealed that listening to the voice of the Quran is effective in reducing diastolic blood pressure reported (Ghiasi & Keramat, 2018). Shirvani et al. (2013) reported that the mean diastolic blood pressure had significant differences compared to before intervention among unconscious patients in ICU.

Of date, there are only a small number of studies on preoperative anxiety being conducted in Malaysia, and no previous studies compared the effects of Quran recitation and nature sounds. This study would provide the information on the effects of Quran recitation and nature sounds on preoperative anxiety and physiological parameters among patients undergoing surgery in the International Islamic University Medical Centre (IIUMC). Being in a Muslim majority community has raised the curiosity of which non-pharmacological alternative is suitable for patients. Hence, the main objective of this research is to fill the information gap of comparing

the effects of both Quran recitation and nature sounds to preoperative anxiety and physiological parameters.

Hypotheses

The following hypotheses were formulated:

1. Participants in the Quran recitation group will express lower anxiety levels and better physiological parameters than the participants in the control group.
2. Participants in the nature sounds group will display lesser anxiety levels and enhanced physiological parameters than the participants in the control group.
3. Participants in the Quran recitation group will show lower levels of anxiety and improved physiological parameters than the participants in the nature sounds group.

Method

Sample

A systematic random sampling method was used to determine the intervention used for each patient. The first patient in the operation theatre list would be given Quran recitation; the second patient would be given nature sounds; the third patient would be in the control group, and the same pattern repeated for all patients. A total of 81 patients were conveniently selected from the operation theatre list. There were three main groups based on the intervention, which were nature sounds ($n = 27$), Quran recitation ($n = 27$), and control group ($n = 27$) which the participants were evenly divided in each group. The inclusion criteria was based on comprising all patients who were 18 years old and above, consented and achieved STAI (Embong, 2018) scores higher than 20 were included in the trial. On the other hand, exclusion criteria were based on not including the patients who were unable to read or speak in Malay or English, had psychosis, central neurological impairment, and were given anti-anxiolytic medications were excluded from being enrolled in the study. Details of demographics of subjects is given in Table 1.

Table 1
Demographic Characteristics of Nature Sounds, Quran and Control Groups

Characteristics	Nature Sounds	Quran	Control
	(<i>n</i> = 27)	(<i>n</i> = 27)	(<i>n</i> = 27)
	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)
Age (Years)			
18-35	10 (37.00)	8 (29.60)	7 (25.90)
35.1-50	3 (11.10)	3 (11.10)	5 (18.50)
50.1-65	8 (29.60)	10 (37.00)	11 (40.70)
> 65	6 (22.20)	6 (22.20)	4 (14.80)
Gender			
Male	10 (37.00)	16 (59.30)	13 (48.10)
Female	17 (63.00)	11 (40.70)	14 (51.90)
Educational Level			
No Schooling	1 (3.70)	0 (0)	1 (3.70)
Primary	4 (14.80)	2 (7.40)	2 (7.40)
Secondary	9 (33.30)	8 (29.60)	12 (44.40)
Tertiary	13 (48.10)	17 (63.00)	12 (44.40)
Occupation			
Working	12 (44.40)	12 (44.40)	10 (37.00)
Not Working	9 (33.30)	7 (25.90)	8 (29.60)
Retired	6 (22.20)	8 (29.60)	9 (33.30)
Previous Episode of Surgery			
Yes	15 (55.60)	10 (37.00)	17 (63.00)
No	12 (44.40)	17 (63.00)	10 (37.00)
ASA Classification			
Class 1	18 (66.70)	16 (59.30)	14 (51.90)
Class 2	9 (33.30)	7 (25.90)	12 (44.40)
Class 3	0 (0)	4 (14.80)	1 (3.70)
Type Of Operation			
Major	3 (11.10)	3 (11.10)	6 (22.20)
Minor	24 (88.90)	24 (88.90)	21 (77.80)
Type Of Anesthesia			
General	16 (59.30)	12 (44.40)	15 (55.60)
Local	11 (40.70)	15 (55.60)	12 (44.40)

Note. ASA = American Society of Anesthesiologists.

Instrument

Demographic data (age, gender, ethnicity, level of education, occupational status), previous surgical history, type of surgery, type of anesthesia and The American Society of Anesthesiologists (ASA) classification were collected. Preoperative state anxiety was measured using the State-Trait Anxiety Inventory (Embong, 2018) that has been

validated in Malay which the Cronbach's alpha for state anxiety and trait anxiety subscale was high with values of .94 and .84, respectively. An adapted version STAI (Embong, 2018) in Malay language comprising of 40 items with 20 items each to assess trait anxiety and state anxiety was used. Respondents could express their level of anxiety on a 4-point Likert scale and higher anxiety levels are positively connected with higher scores. To ensure a standardized method was maintained, the same machine was used to measure blood pressure, heart rate and the same investigator measured the respiratory rate manually.

Procedure

The selected patients were approached, briefly apprised about the purpose and procedure of the study. Formal written consents were obtained from those willing to participate. All patients filled out the questionnaire with the help of investigators one hour preoperatively or prior to receiving premedication, whichever was earlier. The patient's state and trait anxiety level were measured using STAI (Embong, 2018) before the intervention and scores obtained were immediately evaluated by the researchers. All patients who obtained STAI scores higher than 20 were enrolled in the trial (Mohammadi et al., 2014). The investigators measured and recorded the patient's blood pressure, respiratory rate, and heart rate before intervention. Patients enrolled were ensured not to be given routine preoperative Midazolam. Then, systematic random sampling was used to determine the intervention used for the patients. The first patient in the operation theatre list would be given Quran recitation; the second patient would be given nature sounds; the third patient would be in the control group and subsequently. MP3 players and earphones were used. Each MP3 contained audio files of Quran recitation from Surah Yasiin and natural sounds (e.g. sea, rain, and water) with a duration of 20 minutes (Mohammadi et al., 2014). The investigators then allow the patients to listen to the audio file using the earphones. The loudness was maintained at the same level (Alipour et al., 2013). Meanwhile, the control group was allowed to rest in bed for 20 minutes. The investigators measured and recorded the patient's blood pressure, respiratory rate, and heart rate post-intervention. The patient was instructed to complete a second STAI (Embong, 2018) questionnaire immediately after the intervention and was recorded. Apart from Quran recitation and natural sounds, no other relaxation technique was used.

Ethical Considerations

Participation in this research is entirely voluntary and participants may refuse to take part in this study at any time. A short briefing on the purpose of the survey was given, and formal written consent was obtained from the respondents. Confidentiality of their information was preserved, and they were all well-informed to have their absolute rights whether to participate or not. The study was granted permission by the Kulliyah Research Committee of Kulliyah of Medicine, IIUMC Research Ethics Committee and IIUMC Centre Research Committee to be conducted. Ethical approval was obtained from the Ethical Committee of International Islamic University Malaysia. Before conducting the study, approval from the Head of Department of Anesthesiology and Intensive Care Unit of IIUMC was obtained.

Results

There were three main groups based on the intervention made, namely nature sounds, Quran recitation and control group which the participants were evenly divided in each group. A repeated measures ANOVA performed for systolic blood pressure demonstrated no group difference ($F(1,78) = 0.07, p = .78$) and no time \times group interaction ($F(1,78) = 0.42, p = .65$). Similarly, no group differences ($F(1,78) = 1.17, p = .28$) and no time \times group interactions were found for diastolic blood pressure data ($F(1,78) = 2.74, p = .07$).

The mean heart rate differed statistically significant between pre-intervention and post-intervention ($F(1,78) = 9.19, p = .00$) with mean of 78.88 ($SD = 1.19$) beats per minute vs 73.88 ($SD = 1.18$) beats per minute, respectively. Meanwhile, mean respiratory rate statistically reduced after intervention ($F(1,78) = 8.71, p = .00$) with mean of 19.38 ($SD = 1.13$) breath per minute vs mean of 18.78 ($SD = 1.12$), respectively. The mean state anxiety within group differed statistically significant from pre-intervention to post-intervention ($F(1,78) = 29.33, p = .00$) with mean of 32.51 ($SD = 0.78$) vs mean of 28.59 ($SD = 1.13$), respectively (Table 2).

Table 2

Mean State Anxiety and Physiological Parameters Scores Pre- and Post-Intervention Within Subjects

Variables	Pre-intervention	Post-intervention	<i>p</i>
	<i>M (SD)</i>	<i>M (SD)</i>	
State anxiety	32.51 (0.79)	28.59 (1.13)	.00
Systolic blood pressure (mmHg)	129.49 (1.17)	129.08 (1.16)	.79
Diastolic blood pressure (mmHg)	78.01 (10.64)	79.04 (10.03)	.28
Heart rate (per minute)	78.88 (1.20)	73.88 (1.19)	.00
Respiratory rate (per minute)	19.38 (1.14)	18.78 (1.13)	.00

Post-hoc test using Bonferroni correction is further applied to confirm the differences that occurred between groups. Results showed that reduction in the mean state anxiety scores is the only significant factor. While, Post-hoc tests using Bonferroni correction showed nonsignificant reduction in both heart rate and respiratory rate of patients listening to Quran recitation, natural sounds, and control group. However, there is significant reduction in state anxiety scores of post-intervention between groups (Table 3).

Table 3

Mean Differences in Physiological Parameters and State Anxiety Among Groups

Variables	<i>df</i> intervention	<i>df</i> error	<i>F</i>	<i>p</i>
Systolic blood pressure (mmHg)	2	78	0.27	.76
Diastolic blood pressure (mmHg)	2	78	0.23	.81
Heart rate (per minute)	2	78	0.64	.53
Respiratory rate (per minute)	2	78	0.01	.99
State anxiety	2	78	4.32	.02

All three groups had a significant reduction in anxiety scores. Among the three groups, the nature sounds group had the most reduction in anxiety scores post-intervention, followed by the Quran recitation group and control group (Table 4). Findings depicted that all interventions given to the patient are able to reduce mean state anxiety scores. However, the effect of nature sounds in reducing mean state anxiety scores is greater compared to other interventions.

Table 4
Mean State Anxiety Scores for Each Intervention Group

Variables	Type of Intervention	Pre-intervention	Post-intervention	<i>p</i>
State anxiety	Nature Sounds	36.57 (1.34)	30.05 (1.30)	.00
State anxiety	Quran	33.55 (1.30)	28.99 (1.27)	.00
	Control	27.99 (1.30)	26.86 (1.31)	.23

State anxiety is further analyzed with a pairwise comparison between each group and finding depicts significant reduction in scores of nature sounds and the control group. On the contrary, nonsignificant change in anxiety level is found between the Quran group and the control group as well as between the Quran group and the nature sounds group (Table 5).

Table 5
Pairwise Comparison on Mean Differences of State Anxiety Score Intervention Group

Intervention (<i>i</i>)	Intervention (<i>j</i>)	<i>D(i-j)</i>	<i>SE</i>	<i>p</i>
Nature Sounds	Quran	1.06	1.07	.00
	Control	1.21	1.07	.02
Quran	Nature Sounds	-1.06	1.07	.00
	Control	1.14	1.07	.17
Control	Nature Sounds	-1.21	1.07	.02
	Quran	-1.14	1.07	.17

Discussion

This study was conducted to determine and compare the effect of Quran recitation and nature sounds on preoperative anxiety and physiological parameters on patients who underwent surgery. The current study setting, IIUM Medical Centre, is a semi-private university hospital with fees that are lower than a private hospital but higher than a government hospital and accepts Guarantee Letters from

those who are working in the government or pensioners. Hence, these features are believed to be attractive to those from the middle-class working group, as seen in this study (see Table 1). These socio-demographic factors have been seen in other studies to be associated with lower anxiety levels (Menel et al., 2018; Woldegerima et al., 2018). This concurred with the pre-intervention anxiety score ranging from 28 to 36, which is classified under the moderate anxiety group. Despite that, there is reduction in the anxiety levels in all groups, whether they were in the Quran recitation, nature sounds or control group after 20 minutes of intervention, with the steepest reduction shown in the nature sounds group and followed by the Quran group.

The hypotheses targeted that both interventions, which are Quran recitation and nature sounds, are expected to have an improvement on preoperative physiological parameters. Contrary to that, results depicted all mean scores of physiological parameters with nonsignificant improvement post-intervention for the result between the subject's effects. Only anxiety has shown reduction for both within-subject and between-subject effects, whereas, for physiological parameters, only heart rate and respiratory rate demonstrated statistical differences of means within-subject. The same result has been found by Yadak et al. (2019), revealing nonsignificant difference in blood pressure, heart rate and respiratory rate among patients who weaned with and without Holy Quran recitation. In addition, Ebneshahidi and Mohseni (2008) revealed similar results in regard to the effect of nature sounds on the physiological responses among patients in caesarean section surgery. Despite this study depicted differently on physiological parameters, there are some studies such as Mansouri et al. (2017) and Mohammadi et al. (2014) who have proven otherwise as they found significant positive changes in the vital signs upon intervening with either Quran recitation or music.

According to Saadatmand et al. (2013), this result can be due to the influence of background noise in multiple-bedded settings such as in the waiting area before entering the operation theatre that might interrupt the intervention process. On the other hand, Largo-Wight et al. (2016) also considered that small sample size as one of the factors that caused a lack of significant mean differences as compared to other studies. Furthermore, the short duration of listening to the interventions might influence the insignificant results. According to Yadak et al. (2019), different reaction times are needed to produce any clinical or psychological effect to listening to Quran recitation. There were differences among these studies that may be due to variation in patient selection techniques and environmental or cultural conditions.

Findings also yielded that Quran recitation has significantly reduced a patient's mean state anxiety score. This finding correlates with several other studies such as Rahman et al. (2017) highlighted that the level of anxiety among patients who were going for general surgery showed a significant level of reduction of anxiety preoperatively due to the calming effect of listening to the Quran. Babaii et al. (2015) asserted that the reduced anxiety level among patients who listened to the Quran could be because they focused their thoughts on remembering Allah and diverted their negative thoughts; hence, making the patient more resilient to anxiety. According to Nanbaskh (2009, as cited in Babamohamadi et al., 2015) listening to the Quran can be a form of positive reinforcement that would further induce joyous and pleasant feelings.

Results also showed that nature sounds had the most reduction in anxiety scores post-intervention among the three groups in this study. Various studies have shown that nature sounds induced a significant decrease in vital signs and anxiety (Amiri et al., 2017; Largo-Wight et al., 2016). Davis and Nussbaum (2008) stated that the involuntary canters in the central nervous system can be stimulated by sounds that are transmitted to the higher levels of the brain and influence emotional and abstract thought. Alvarsson et al. (2010) demonstrated significant skin conductance level recovery after a psychological stressor in those who listened to natural sounds. In addition, restoration effects of nature sounds in mood recovery among respondents exposed to nature sounds concurrent with anxiety-reducing effects (Benfield et al., 2014); and reduction in sympathetic activity and an increase in parasympathetic activity (Alvarsson et al., 2010; Annerstedt et al., 2013)

Demographically, all participants in this study were Malays except for one Indian, but all were Muslims. This reason could be because the surrounding population is mostly Malays, and the hospital itself is affiliated with the International Islamic University, which naturally would attract more Muslim patients. Therefore, it was expected that the Quran recitation would most influence the reduction of anxiety. Despite that, the level of anxiety within the Quran group in this study is significantly reduced, but the anxiety score showed nonsignificant difference when compared between the Quran and control group as well as between Quran and nature sounds group. One of the main reasons for this could be that Arabic is not the patients' main language, and incomprehensibility might be a major barrier in appreciating the Surah that has been used. This finding is incongruent with Shafie et al. (2011), as cited in Ghiasi and Keramat (2018), which demonstrated those listening to the Quran without translation

into their mother language had nonsignificant mean differences compared to the controlled group. One might argue that direct understanding is not essential, and that the melody of the recitation might be the one contributing to the calming effects of the Quran. Similarly, Zaidah and Imaduddin (2018) deliberated that the psychological effects of listening to Quran can vary based on the melody of recitation and certain forms of technique and melody in the Quran's recitation could affect the anxiety level differently.

The different effects of listening to the Quran may suggest the difference of outcome to this study expectation. As postulated by Gultepe and Coskun (2016), it can be due to different perceptions on the recitation of the Quran and a person would perceive sound and music differently from another person, which in turn, affect emotion and feelings. *Surah Yassin* has been chosen in this study because it is widely used in other studies in many different types of occasions and situations. Hence, the perception of this *Surah* might differ from patient to patient as it could have increased the courage in some patients while, in others could make them more subdued. Apart from the perception of the *Surah* itself, a patient's own degree of belief might be an influence. Babaii et al. (2015) also suggested that the result may differ from one person to another because each person has a different level of belief that would lead to different reactions when the person listens to the Quran.

Limitations and Suggestions

The study has several potential limitations. For instance, this study used a questionnaire that is based on a self-reporting system, and therefore, it is subjected to reporting and recall bias. The other limitations are that some patients may be disturbed by the visiting relatives, pain and anesthetist review which might produce bias as well. A specific age group has been catered in this study (18 years old and above), and most of the patients are Malay and Muslims that may lowered the generalizability of the results to other populations. It is suggested that future studies should be conducted within a larger sample size that may influence the significance value. In addition, longer duration of intervention and isolation of patients during the intervention to limit background noise, visiting relatives, pain and anesthetist review should be considered in future studies. To achieve the greatest extent of generalizability, it is suggested that a similar study be conducted in other settings and different age groups to test the applicability of the findings.

Implications

Although the preeminence between either Quran recitation or nature sounds could not be highlighted in this study, the study outcome showed that both interventions positively improve preoperative anxiety. This would drive the healthcare in exploring and offering patients a holistic and pioneering approach to preoperative anxiety management aside from pharmacological treatment. Furthermore, in Muslim belief, we believe that our holy Quran recitation holds a special healing element indirectly towards mankind, and it would be important to incorporate spiritual entities with scientific evidence. This research is hopefully helpful for future researchers as a reference for understanding alternative approaches to preoperative anxiety and as a catalyst to plan a more constructive and innovative study.

Conclusion

This study could not conclude on the superiority of Quran recitation over nature sounds in reducing preoperative anxiety, and vice versa. The results showed nonsignificant difference when compared Quran recitation and nature sounds. Without comparison, both methods reduced anxiety significantly on their own, with anxiety levels in the nature sounds group having the most reduction.

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