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ORIGINAL ARTICLE

Effects of Surah Al-Rehman on pain, oxygen-saturation, and vital signs in post CABG patients: A Pilot Study

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Author`s Contribution

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A B S T R A C T

Objective: The main objective of the study was to determine the effects of Surah Al-Rehman on post CABG patients' pain level, oxygen saturation, and vital signs.

Methodology: A quasi-experimental pre and post-test design was used with a sample size of 60 patients in two tertiary care Hospitals, from July 2018 to September 2018. A non-probability convenient sampling method was used to recruit the participants. Post CABG adult Muslim patients were the study participants. Surah Al-Rehman's recitation in the voice of the Qari Abdul Basit was the intervention for the current study. At a significance level of p-value ≤ 0.05, a repeated measure ANOVA was applied to determine the effects of Surah Al-Rehman on the outcome variables, which were patient's pain level, oxygen saturation level, and vital signs including heart rate [HR], respiratory rate [RR], systolic and diastolic blood pressure.

Results: Overall, Surah Al Rehman had shown statistically significant effects on the participants' pain level ($p<0.001$), oxygen saturation level ($p=0.01$), respiratory rate ($p<0.001$), and diastole blood pressure (DBP, $p=0.04$). A minimum change in the pre and post values of HR and systolic blood pressure (SBP) was also observed, but statistically, this change was insignificant (HR, $p=0.13$ & SBP, $p=0.47$).

Conclusion: Findings of the current study demonstrated that listening to the recitation of Surah Al-Rehman could decrease pain level, RR, DBP and enhance oxygen-saturation in post CABG patients.

Keywords: *Surah Al-Rehman, CABG, pain, SPO_2, vital signs*

Introduction

Cardiovascular Diseases (CVDs) are one of the major disease burdens worldwide.[1] Coronary Artery Diseases (CAD) are one of the CVDs with five times higher risk factors in south Asian Countries as compared to other countries. Coronary Artery Bypass Grafting [CABG] is the most common treatment of the CAD. Nearly 70% of patients having CAD require CABG.[2] In 2016, approximately 11121 CABGs in Bangladesh and 5500 CABGs were performed in Sri Lanka. Whereas 20,000 CABGs were performed in Pakistan.[7] CABG is a complex and prolonged surgery, which requires patient's post-operative management in Intensive Care Unit (ICU). In the ICU patient has multiple invasive and non-invasive lines such as an endotracheal tube, central line, arterial line, chest drain, and folly's catheter; Leg wound and chest wound incision, all of these factors cause severe pain to the patient.[4]

Post-surgical pain after the CABG procedure is a common factor that affects the recovery of the CABG patients[5]. It is an unpleasant sensory and emotional experience of the individuals due to tissue damage. In the CABG procedure pain occurs due to the incision of the tissue, intra-operative tissue retraction, multiple intravascular cannulations, and a chest tube for drainage after the surgery. Hence, these factors cause severe pain in the chest. Due to the chest pain, the patient cannot take

a deep breath, it causes cough that complicates respiratory distress leading towards decreased oxygen saturation level in the body. The decreased oxygen level could hinder the in wound healing. Moreover, unrelieved postoperative pain can lead to immobilization and may result in complications such as deep vein thrombosis, coronary ischemia, pneumonia, insomnia, and demoralization.[4]

Furthermore, pain contributes to the anxiety level of CABG patients in ICU. Pain culminates into anxiety, which can cause tachycardia, helplessness, and loss of confidence decreasing patient immunity against the disease; thus, adversely affect the patient's recovery.[6] Cardiac surgery pain can be treated with pharmacological and non-pharmacological methods. In pharmacological methods, sedatives and analgesics are extensively used to control physiological stress and pain during and after surgery. These medicines are very costly and may lead to prolonged ventilation and delayed recovery, and consequently an increase in the cost of care.[7] In addition to the pharmacological methods, non-pharmacological methods are encouraged.

Non-pharmacological therapies have become very popular due to no side effects. CABG pain can be relieved through some measures such as muscle relaxation, cold gel pack, massage therapy, music therapy and prayer therapy.[8] Music therapy is a simulator that triggers psychological responses from the listener and thus controls the pain.[9] Music therapy is the best protective and safe therapy to control the pain and physiological stress.[9]Music therapy can have significant effects on vital signs and pain level[10] and thus, it help in controlling blood pressure and respiratory rate.

A comparative study of the Quranic recitation and music sound on the anxiety and vital signs of the patients reveals that music and Quran sound had a positive effect on the vital signs and anxiety level.[11] Likewise, Surah Al-Rehman is also known to be effective in treating depression.[7] Although the effect of Surah Al Rehman on pain is not studied, some researchers have reported that other verses of the Quran including Surah Fatiha and Surah Yaseen can decrease the pain.[12] Since Surah Al Rehman is very significant in terms of its name and it is most Rhythmic Surah; therefore, it could be more effective in managing pain. The purpose of the study is to determine the effects of Surah Al-Rehman on patient's post-operative pain, oxygen saturation level and vital signs in post-CABG patients during their hospitalization in ICU.

This study aimed to answer the following research questions:

1. What is the effect of Surah Al-Rehman on post-operative pain in CABG patients during their recovery in the ICU?

2. What is the effect of Surah Al-Rehman on the post CABG patient's vital signs during their recovery in the ICU?

3. What is the effect of Surah Al-Rehman on the oxygen saturation level in the post-CABG patients during their recovery in ICU?

A detailed conceptual framework (Figure 1) was made which is summarizing that how post-CABG pain along with the activation of the sympathetic nervous system lead to delayed wound healing and how these complications can be overcome with the intervention of Surah Al-Rehman. There are multiple factors such as sternum incision, leg incision; the number of grafts, intensive care environment (machines, noises), fear due to uncertain outcome and multiple invasive monitoring lines and drains, which aggravate pain and anxiety.

Pain and anxiety activate the sympathetic nervous system, as the heart rate increases it leads to arrhythmias and due to arrhythmias coronary blood supply is compromised. Similarly, when respiratory rate increases, the patient hyperventilates, wash out carbon dioxide and end up with respiratory alkalosis. Moreover, blood pressure also increases as a result of pain which can increase coronary pressure, and the risk of graft rupturing. Thus, all these changes in the hemodynamics ultimately lead to hypoxemia with poor wound healing, delayed recovery, and rehabilitation. So, with the use of Surah Al Rehman all these complications can be overcome with better recovery.

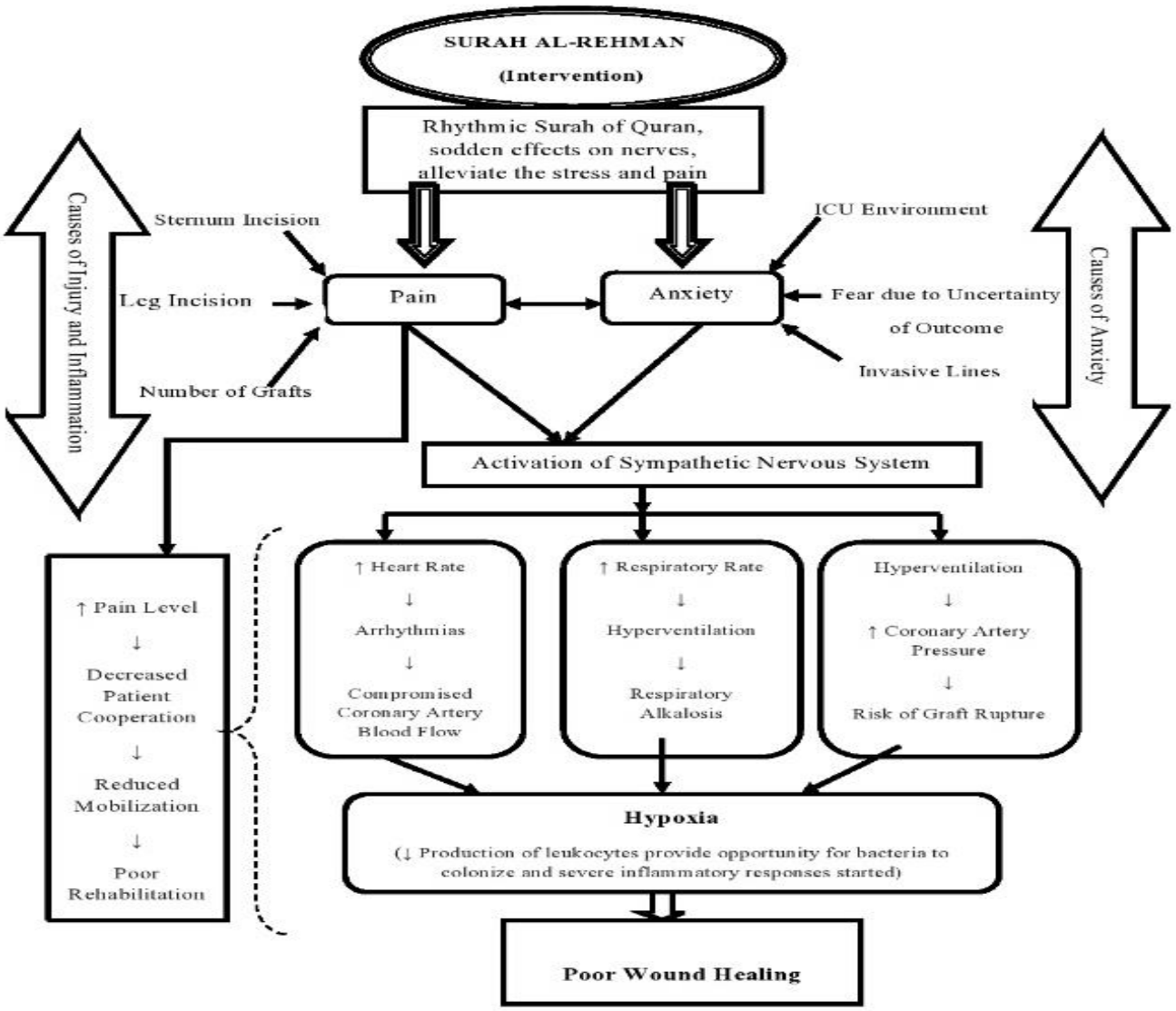

Figure 1: Summary of pain and anxiety complications

Methodology

The study protocol and the informed consent documents were reviewed and approved by the Ethical Review Board. Informed consent was taken from each participant under study. Participation in the study was voluntary. Participants had the right to withdraw from the study at any stage of data collection. All information about the study participants was kept under lock and key, and only the primary investigator was authorized to access it.

A quasi-experimental pretest and post-test interventional design was used in this study.

The study population consisted of post CABG adult Muslim patients while recovering from their surgery in the ICU. Patients were recruited from two tertiary care hospitals in Islamabad of the two, one is a private hospital that was denoted as hospital A and the other hospital, which is a public hospital, was denoted as hospital B. Data were collected from July to September, 2018. All post CABG patients who were admitted in the ICU during this

period met the inclusion criteria and provided informed consent, were recruited in the study. A non-probability convenient sampling technique was used to collect the data, considering the conventional rule for this pilot study, 60 patients were recruited. [13, 14] All Patients were Muslims, adults, awake and alert with GCS 15/15. Patients who have been extubated at least four hours ago, in the stable condition, and rated <7 on the pain scale were recruited. Patients with Mitral, Aortic or both valves replacement and those not willing to sign a written consent were excluded from the study.

Patients were selected through the facilitation of the head nurse of the ICU. The demographic information was taken from the patient's file. Surah Al Rehman recitation was the intervention for the current study. Patients were facilitated to listen Surah Al Rehman in the voice of the Qari Abdul Basit using Nokia A2 Mobile phone and a headphone (SPACER). with. The intervention took 21 minutes, which was repeated three times a day, in the morning at 0800AM to 1000AM, afternoon 1300 hours to 1430 hours and at night 2000 hours to 2200 hours.

A self-developed structured checklist was used for data collection. The checklist was written in the English language, which was filled by the primary researcher. The first part of the checklist was for demographic information of the study participants like age gender, marital status, professional qualification and reading about the Quran. The second part of the checklist was for clinical variables like primary diagnosis, number of grafts during CABG, chest drain insertion, Co-morbidities and pain level of the patient. Third part of checklist was for vital sings of the patient including heart rate, systolic, diastolic blood pressure, respiratory rate, pain level, and oxygen saturation level.

The pain scale was rated in consultation with the patient, whereas the respiratory rate was measured manually for full one minute. Heart rate, Oxygen saturation (SPO2), Systolic and Diastolic BP were observed from the cardiac monitor. While the first and 2nd part of the check list were completed after obtaining consent from the patient, information in the 3rd part of the check list were recorded thrice before and after the intervention.

Statistical Analysis was performed in SPSS software version 20. The descriptive statistics were applied to the demographic variables. In inferential statistics, Repeated Measures ANOVA was run to assess the overall effect of an intervention for three times. Moreover, a Bonferroni pairwise test was applied to compare the mean difference at three different time points.

Results

Overall, 60 patients participated in this study. The participants mean age was 55.95 +8.36 years. The Majority (76.6%) of them were male; all participants were married. Nearly one fourth of the participants were illiterate while most of them have had Middle and Matric level education. Almost all of them (90%) could read the Quran but none of them was Hafiz-e-Quran (people who have memorized the Quran).

Most of the participants (98.3%) have had triple vessels coronary artery disease, and they (76.6%) had three grafts. All of them had a chest drain. With regards to co-morbid, Hypertension (58.3%) and Diabetes Mellitus (45%) were the most common conditions.

Effect of intervention on Outcome Variable: Pain Level

The mean difference of pain level pre and post-intervention is shown in Table 1. Accordingly, the level of pain had reduced after the intervention as compared to pre intervention. Albeit with the slight variations at each time, the mean difference was statistically significant (At time 1, 2 and 3 $p<0.001$). Moreover, the results of Repeated Measures ANOVA also determined an overall significant decrease in the pain level ($F (3.19, 184.24) = 49.28$, ($p<0.001$).

Table 1: Comparison of Pain Level at Pre and Post Interventions

Time	1	2	3
Pre-Intervention Mean ± SD	3.25 ± 1.66	2.50 ± 1.34	2.41 ± 1.22
Post-Intervention Mean ± SD	1.90 ± 1.44	1.38 ± 1.15	1.13 ± 1.19
Difference	1.35	1.11	1.28
P-value	<0.001	<0.001	<0.001

[An overall significant decrease in the pain level $F (3.19, 184.24) = 49.28$, $p<0.001$) *]

Table 2: Comparison of Oxygen Saturation Level at Pre and Post Intervention

Time	1	2	3
Pre-Intervention Mean ± SD	95.73 ± 3.32	94.28 ± 8.63	95.28 ± 2.90
Post-Intervention Mean ± SD	96.65 ± 2.72	95.13 ± 9.17	96.63 ± 2.39
Difference	-0.97	-0.85	-1.35
P-value	0.02	<0.001	<0.001

[An overall significant increase in Oxygen Saturation level (F (1.30, 254.24) = 0.23, p= 0.01)] *

Table 2 illustrates the mean difference of oxygen saturation level pre and post intervention. Hence, the level of oxygen saturation increases post-intervention as compared to the pre-intervention. Though with the slight similarity at each time, the mean difference was statistically significant (Time 1 p=0.02, Time 2 p<0.001 & Time 3 p<0.001). Likewise, repeated measures ANOVA also revealed an overall significant increase in Oxygen Saturation level (F (1.30, 254.24) = 0.23, p=0.01).

Table 3: Comparison of Respiratory Rate in Pre and Post Intervention

Time	1	2	3
Pre-Intervention Mean ± SD	26.76 ± 5.23	27.28 ± 4.27	26.30 ± 3.98
Post-Intervention Mean ± SD	24.60 ± 4.34	25.30 ± 4.17	24.00 ± 3.70
Difference	2.16	1.98	2.3
P-value	<0.001	<0.001	<0.001

[An overall statistically significant decrease in respiratory rate (F (3.05, 495.85) = 14.62, p<0.001]

The mean difference of respiratory rate pre and post intervention is shown in table 3. The respiratory rate was decreased post intervention as compared to the pre intervention. Even though with the little change at each time, the mean difference was statistically significant at (At Time 1, 2 & 3 p<0.001). Similarly, Repeated Measures ANOVA also showed an overall statistically significant decrease in respiratory rate (F (3.05, 495.85) = 14.62, (p<0.001).

Effect of Intervention on Outcome Variable: Heart Rate

There was no significant decrease in heart rate post-intervention as compared to the pre intervention. Even though with very minimum variations at each time, the mean difference was statistically insignificant at time 1, 2 (p=1.0) and 3 (p=0.07). Correspondingly, Results of repeated measures ANOVA also showed an overall statistically insignificant decrease in Heart Rate (F (1.95, 449.55) = 2.08, p=0.13)

Effect of Intervention on Outcome Variable: Systolic Blood Pressure

Tough there was a slight decrease in the values of systolic blood pressure after the intervention as compared to the pre intervention, but no statistical change was detected (At time 1, 2 and 3 p=1.00) at each point. Similarly, repeated measures ANOVA also determined an overall insignificant difference in systolic blood pressure (F (2.81, 442.48) = 0.82, p=0.47)

Effect of Intervention on Outcome Variable: Diastole Blood Pressure

The mean difference of diastole blood pressure in pre and post-intervention was calculated. Though there was a slight increase in diastole blood pressure, but this increase was statically significant at time 1 (p=0.05). However insignificant at times 2 and 3 (p=1.00 & p= 1.00). But on the other side the Repeated measures ANOVA revealed an overall significant increase in diastole blood pressure (F (2.55, 747.58) = 2.95, p=0.04)

Discussion

Overall, Surah Al Rehman had shown statistically significant effects on the participants' pain level, oxygen saturation level, respiratory rate, and diastole blood pressure. The results of the current study confirmed the mitigation effects of Surah Al Rehman on the level of pain in CABG patients. The effects of other Quranic verses, prayers, and recitations on the pain level, have been reported in the literature by other researchers,[15] Fatemeh et al.[11],[16] Beiranvand, et al.[15] found that the pain level was reduced significantly after the pray meditation ('Ya man esmoho davaa va zekroho shafa, Allahomma sale ala mohammad va ale mohammad') in the intervention group as compared to the control group. Likewise, a randomized control study conducted by Fatemeh et al.[16] among ninety

post-surgical patients, found that recitation of the word 'Allah' was effective in decreasing pain after orthopedic surgeries. Similarly, Nasiri et al.[17] reported that recitation of the word 'Allah' had significantly reduced pain in post CABG patients. Although the above-mentioned studies were based on a small sample size, their findings were consistent with the findings of the current study. Post CABG patients may experience pain a few months after their surgery[18], which may interfere with their rehabilitation to normal life activities. Given the findings of the current study, nurses should encourage Muslim patients for listening to the recitation of Surah Al Rehman three times a day to relieve the post-surgical pain. As an alternative use of pharmacological agents in controlling pain, this is a cost-effective intervention, and which has no side effects. Moreover, most people have access to smart phones and on which Surah Al Rehman can be easily downloaded.

The current study found that listening to Surah Al Rehman's recitation had increased the oxygen saturation level in post-CABG patients. A similar effect has been reported by Mirzaein et al.[9] where the intervention was the recitation of Surah Yasin in unconscious patients. Likewise, Mansouri et al.[8] had found that the recitation of Surah Yousaf significantly increased the oxygen saturation level in semi-conscious patients with GCS 8-10. However, Awa [12] found no change in oxygen saturation level after the recitation of Surah Al Fatehah and Surah Yasin in mechanically ventilated patients, which could be due to the sedative effects of medications on the respiratory status of the patients. In the light of above studies, it can be inferred that listening to Quranic recitation can have a relieving effect on the patients breathing and oxygen saturation unless the patient breathing is controlled mechanically, and the patient is kept on sedatives.

While looking for the effect of the intervention on respiratory rate, the results of the current study revealed a significant effect of intervention in decreasing the respiratory rate of post CABG patients. These findings are consistent with Mansouri et al.[8] But, contrary to the findings of other researchers [9, 12] who demonstrated no effect of Quranic Surah recitation on the respiratory rate. As noted in the previous section, this difference could be due to the patient's conscious level and nature of breathing as compared to the current study, both previous studies [9, 12] consisted of unconscious mechanically ventilated patients (Spontaneous versus mechanically controlled). Hence, the effect of Surah Al Rehman can be witnessed in conscious patients to reduce their work of breathing and consequently improving the oxygen saturation level.

The current study has revealed no significant effect of Surah Al Rehman on the patients' heart rate but there was some change in the pre and post values. These findings are in contrast with other studies [8,9, 12] where the researcher reported a decrease in the patients' heart rate after the intervention. In the current study, no change in heart rate was deemed irrelevant with the decrease in respiratory rate after intervention because of the biological plausibility. Therefore, the current study findings suggest that more research work is needed to find out the significant relationship between Surah Al Rehman and heart rate.

In this study, the recitation of Surah Al Rehman had no effect on systolic blood pressure. These findings are in line with the study of Awa[12] where the recitation of Surah Al Fatiha and Surah Yasin was the intervention. In contrast, Mirzaeian et al.[9] in their study, found that the recitation of Surah Yasin had decreased the patient's the systolic blood pressure. Similarly, Monsouri et al.,[8] also reported that the recitation of Surah Yousaf had decreased systolic blood pressure of the patients. These findings provide an inclination that Surah Al Rehman did not have any effect on stable patients' systolic blood pressure as compare to other studies [8, 9] where Quranic Surah were different and patients' condition was unstable like unconscious and mechanically ventilated patients admitted with the medical diagnosis while the current study patients were the post CABG patients.

The current study findings have revealed the increase in diastolic blood pressure of the study participants after the recitation of Surah Al Rehman. These findings are opposite to the results of Mirzaeian et al.[9] and Monsouri et al.[8] studies where the diastole blood pressure had decreased after the intervention in patients with low conscious levels. However, Awa[12] found no change in the diastole blood pressure of the mechanically ventilated patients after the recitation of Surah Al Fatiha and Surah Yasin. Hence, Surah Rehman may be helpful in relaxing the heart for its better perfusion for the hemo-dynamically stable patients after CABG surgery.

In the conclusion of the above discussion there was a significant effect of Surah Al Rehman on the pain level, oxygen saturation level, respiratory rate and diastolic blood pressure in post-CABG patients however, there was no change in heart rate and systolic blood pressure.

This study was only limited to Muslim patients, so the findings cannot be generalized to Non-Muslim patients. This was only a pilot study with 60 patients so the findings should be generalized with caution. The researcher applied the intervention and collected the data before and after the intervention since this study was undertaken as a Master thesis, the researcher and thus, the risk of researcher bias cannot be excluded.[19] Replication of this study with large a sample size and using RCT is recommended.

Conclusion

The findings of this study indicated that Surah Al Rehman was an effective non-pharmacological intervention to decrease the post-surgical CABG patients' pain level and respiratory rate while improved the oxygen saturation level among CABG patients. Moreover, this non-pharmacological intervention has no cost and no side effects.

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