

## EFFECTS OF LISTENING TO QURAN ON MATERNAL & NEONATAL OUTCOMES AMONG MOTHERS UNDERGOES CESAREAN SECTION

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**ABSTRACT:** *Aim of the work: was to investigate the effects of listening to Quran on different aspects of maternal & neonatal outcomes among mothers undergoes cesarean sections (CS). Patients & Methods: the study was implemented on 118 patients (60 in Quran group QG & 58 in Non-Quran group NQG). Experimental design was used, a registered randomized controlled study (NCT02589834), conducted at Women Health Hospital, Egypt. We included Muslim women at single term gestation scheduled for elective CS. The eligible participants were randomly allocated to either study group, who listen to Quran recitation, started after induction of spinal anesthesia to mothers undergoes (CS) & continued immediately after the surgery until first 12 hours post CS, by a CD-player through an occlusive headphone, or control group who not listen to Quran recitation. The visual analog scale (VAS) scale was used to measure the pain & satisfaction after . Moreover; the anxiety level was assessed through visual analog scale for anxiety (VASA). Results: No significant differences between the groups for all vital parameters recorded before & after CS ( $p>0.05$ ), except for systolic & diastolic blood pressure immediately postoperative ( $p=0.002$ ). No significant difference regarding the need for additional analgesics or antiemetics postoperatively. All visual analog scales values for pain & anxiety were significantly lower in Quran group. While the mean patient satisfaction scores immediately, 6 hours, 12 hours postoperatively were significantly higher in QG than NQG ( $p=0.0001$ ). Conclusion & recommendations: Listening to Quran recitation decrease the degree of pain & anxiety after CS as well as enhance the level of mother satisfaction. So., we recommend it as a non pharmacological pain & anxiety management technique, as well as improving other parameters including neonatal outcomes. It can become an important issue of the complementary & alternative analgesic therapy for Muslim women undergoing CS.*

**Keywords:** Cesarean Section; Quran Recitation; Quran Listening; Pain; Anxiety; Satisfaction; Apgar Score; Neonatal Intensive Care.

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### INTRODUCTION:

Improve maternal and neonatal outcomes and avoid all potentially life-threatening events is still main goal of community health and midwifery practices all over the world, this outcomes mean any something, or events that happen as a result of an active process (Kornelsen & Ramsey, 2014). The fact now is, the percentage of elective cesareans rates have recently been increased, so health team should focused on promotion of painless as well as less-painful methods for childbirth (Bayrami &

Ebrahimipour, 2014). Throughout the world, it is one of the most common surgeries in obstetrics and gynecology. In contrast to most other surgeries, CS is usually performed in healthy, pregnant women (Hepp et al., 2016). 31.8 % of all births in Germany were by CS ( Statistisches Bundesamt, 2016), similar finding (36.5% ) at Egypt , this percentage was substantially higher than the world health organization recommended rate of 10-15% which necessitate the urgent need to lower the CS practices, and beside that put main rules to improve maternal and neonatal outcomes (Ebrashy et al, 2011).

Mostly, both women and obstetricians see CS as a routine procedure and may be neglecting the potential physical & psychological side effects as pain, anxiety, discomfort & dissatisfaction that will occur (Edwards & Davies, 2001). Sparse measurements already showed that preoperative anxiety is associated with reduced satisfaction and worse recovery from CS (Hobson et al., 2006). With regard to a minimized exposition of the newborn to anesthetics and the parents' desire to witness the birth, the majority of women undergo the operation with regional anesthesia without anxiolytic or sedating medication. Only few studies have elucidated the impact of CS on a certain parameters as pain, anxiety & satisfaction (Hepp et al., 2016).

Postoperative pain management is crucial for surgical patients. Management of postoperative pain entails reducing painful symptoms, improving the quality of recovery & resuming normal daily living activities (White & Kehlet, 2007). In addition to the benefits derived from relieving postoperative pain in women undergoing (CS), prolonged immobility as a result of pain during puerperium is associated with risk of thromboembolic disease (Romero, 2005). Also, pain experience can lead to distress, fear & anxiety about the next pregnancy that increase the negative outcomes for both mothers & fetal (Wall et al., 1999). Postoperative pain has negative physiological & psychological impact on patients' well-beings & delays the postoperative recovery (Yorke et al., 2004). Pain also impair the mother's ability to provide an optimal care for her infant in the immediate postpartum period. Besides that, it also reduces the maternal ability to breast-feed her infant effectively. Effective pain relief should not interfere with the mother's ability to provide care for her infant after delivery, & that it results in no adverse neonatal effects in breast-feeding women (Gadsden et al., 2005). Routine use of pharmacologic drugs as opioids or sedatives may lead to delay recovery of patients & prevent the immediate close contact between the mother & her infant postoperatively besides their known side effects as drowsiness, nausea, pruritus, constipation & urinary retention (Benyamin et al., 2008).

Non-pharmacological techniques for reduction of pain are growing rapidly (Nilsson et al., 2003; Schaffer & Yucha, 2004). Previous studies have suggested a beneficial effect of music listening on postoperative pain & anxiety (Good et al., 2001; Cepeda et al., 2006; Ebneshahidi & Mohseni, 2007). Spiritual intervention with listening to Quran recitations as an adjunctive therapy in the postoperative period is a non- pharmacological technique that is inexpensive, non-invasive & has no side-effects.

Listening to Quran recitation elicits a relaxation response of calmness, mindfulness, & peacefulness in Muslims. Pray therapy results in optimal harmonization, which improves

psychological, social, spiritual, & physical health status (Syed, 2003; Abdel-Khalek & Lester, 2007). Moreover, in a clinical trial conducted on mothers undergoing CS, & concluded that the level of anxiety was reduced in the trial group after hearing the Quran sound through headphones (Mir bagher & Ranjbar, 2010). In a double-blind clinical trial, showed that after playing the Quran sound, the trial group had lower level of pulse & breathing as well as higher oxygen saturation rate compared with the control group & enhance the main points on maternal & fetal outcomes (Keshavars et al., 2009). Therefore, such researches are urgently needed. They will try to test the value of using non-invasive procedures, inexpensive, that had no any side-effects to control pain & anxiety among "Egyptian Moslem" women who undergoes CS. Such information may pave the way to the introduction of Quran Listening as a complementary way to manage pain & stress in midwifery practices. It also a way to enrich midwife's approaches to pain relief & add to women's a positive experience.

### **AIM OF THE WORK:**

The current study aims to investigate the effects of listening to Quran recitation on maternal outcomes as: pain intensity, anxiety, satisfaction level, frequency of vomiting & need for anti-emetics in women subjected to (CS) as well as neonatal outcomes in the form of Apgar score & admission to neonatal intensive care.

### **Research Hypothesis:**

We hypothesized that listening to Quran recitation would improve both maternal & neonatal outcomes in the aspects of reduce pain intensity & anxiety level in women subjected to (CS) as well as enhance satisfaction level, in additions reduce frequency of vomiting & needs for anti-emetics. Also, enhance neonatal & outcomes as Apgar score & decrease the need of admission to neonatal intensive care.

### **PATIENTS & METHODS:**

#### **Study design & settings:**

Experimental design was used. Prospective registered (NCT02589834). Randomized controlled study (RCT), was done at Women Health Hospital, Assiut University, Egypt between the 1<sup>st</sup> of April to the end of August, 2015. This trial was designed & reported according to the revised recommendations of Clinical Trials.

#### **Study participants:**

One hundred twenty-six pregnant Muslim women at term (37-40 weeks) gestation with uncomplicated singleton pregnancy scheduled for elective lower segment cesarean section under spinal anesthesia were included in the study. They were randomly enrolled in to two groups: 63 in each. But, eight patients in both groups were excluded after enrollment because of failure of spinal anesthesia, so; they shifted to general anesthesia. Consequently, the current study was implemented on 118 patients (60 in Quran group QG or study group & 58 in Non-Quran group NQG or control group). All included patients American Society of Anesthesiologists (ASA) physical status was I or

II. Pregnant women with medical diseases, hearing impairment, placenta previa, placental abruption, fetal growth retardation or congenital anomalies, any contraindication to spinal anesthesia, & those who refused to participate in the study were excluded. Patients suffered from preoperative pain & those who received preoperative sedative or analgesic were also excluded from the study.

### **Enrollment & Ethical consideration:**

Informed consent was obtained from all eligible participants included in the study before participation after explaining the nature of the study. On the preoperative day, the study participants were approached by one of our researchers & the following data were collected: age, parity, educational level, socioeconomic status, body mass index, previous CS or other surgeries, previous exposure to anesthesia, frequency of listening to Quran recitation, & the indication of the current CS. The scales were also explained to the participants.

At the initial interview, each mother was informed of the purpose & nature of the study, & the researchers emphasized that every member had the right to participate or refuse to be included in the work. In addition, the confidentiality of the data was maintained, explained & also printed in the questionnaire as follows: collected information will be used only for the purpose of the study without referring to the personnel's participation through anonymity of the subjects that will be assured by the coding of all data.

### **Randomization:**

Randomization was done using computer-generated random table. After acceptance of eligible women to participate in the study, they were assigned randomly to either one of the two groups. Allocation concealment was done using serially-numbered closed opaque envelope. Each envelope was labeled with a serial number & had a card noting the intervention type inside. Once allocation had been done, it could not be changed.

### **Intervention & Data Collection Tools:**

Eligible participants were randomly allocated to one of two groups: Group A (Quran group QG): patients listened to Quran recitation by a CD-player through an occlusive headphone, started after induction of spinal anesthesia & continued throughout the entire CS duration & continued immediately after the surgery until first 12 hours post CS. The chapter of Quran (Surah) & the reciter were the same in each case. Group B (Non-Quran group NQG): patients did not listen to Quran & subjected to operative room noise throughout the surgery.

All patients were instructed to mark postoperative pain level, using the visual analog scale (VAS) which was scored as (0 = no pain & 10 = worst pain imaginable), (Burckhardt & Jones, 2003). Moreover; the anxiety level was assessed through visual analog scale for anxiety (VASA) before admission to the operative room representing their current status. Regarding the scoring system, (VASA) is consisting of a 10 cm horizontal line (with 0 = no anxiety & 10 = worst possible anxiety) (Aitken, 1969). The patient's level of satisfaction with operative condition was assessed also by a 10

cm VAS (with 0 = no satisfaction & 10 = maximum satisfaction), (Burckhardt & Jones, 2003).

In the operative room, the vital parameters; blood pressure, heart rate & respiratory rate were recorded immediately before induction of spinal anesthesia. The anesthetic technique was standardized. Spinal epidural anesthesia was performed at the Lumber 2-3 vertebral interspace, with T8 as the maximum level of sensory blockade. A 10-mg dose of ephedrine dissolved in a water solution was injected if blood pressure decreased to less than 90 mmHg. Intrathecal morphine was not used in any case. All patients were given 75 mg diclofenac intramuscular (Voltaren, Novartis pharma, Egypt) at the end of surgery before discharge from the operative room. The amount of intraoperative blood loss, duration of surgery, occurrence of maternal complications & failure of spinal anesthesia were recorded. Neonatal Apgar score at 1, 5 minutes & any transfer to neonatal intensive care unit (NICU) were also determined.

#### **Follow-up schedule:**

In the postoperative care unit; blood pressure, heart rate & respiratory rate were immediately recorded after discharge from the operative room. The severity of postoperative pain was assessed with VAS as well the anxiety level was assessed by VASA. Frequency of vomiting & demand of antiemetics or additional analgesics was recorded after surgery & on the 6<sup>th</sup> & 12<sup>th</sup> hour postoperatively. On patient request or if vomiting occurred, ondansetron (Zofran, Glaxo SmithKline) 4 mg intravenous was given. Also, diclofenac 75 mg intramuscular were repeated on patient demand if intolerable pain was experienced. All measurements were recorded by an intern, blinded to the study groups, who was trained by the investigators.

#### **Study outcomes:**

The primary outcome measure was the difference in pain intensity scores using VAS between both groups. The secondary outcomes included the patients' level of satisfaction from the intervention, difference in anxiety status, postoperative analgesics & antiemetics consumption. Also, the effect of listening to Quran recitation on the neonatal outcome was studied.

#### **Sample size calculation:**

After pre-study pilot experiment, the sample size was calculated using Power Analysis & Sample Size software 2008 (NCSS, Kaysville, UT, USA) to have 80% power to detect a clinically significant difference at  $\alpha=0.05$  &  $\beta=0.20$ . The required sample size was at least 50 patients in each study arm.

#### **Data collection & analysis:**

The collected data were coded and verified prior to data entry. The entered data were revised before conducting the statistical analysis. Descriptive statistics such as frequencies, percentages, means & standard deviations was done. The data were collected & entered on Microsoft access database to be analyzed using the Statistical Package for Social Science (SPSS Inc., Chicago, version 21). Comparisons between the groups were done using T-test to compare the mean values between groups in scale variables. Chi-square test was used to compare categorical variables. For analysis

P-value <0.05 was considered significant.

## RESULTS:

Figure 1 illustrates the flow chart of the study. It was found that 130 eligible patients were approached to participate in the study. Four women were showed no interest to participate in the study. Thus, 126 women were randomly enrolled to the two groups: 63 in each group. Eight patients from both groups were excluded after enrollment because of failure to spinal anesthesia & shift to general anesthesia or occurrence of intraoperative complications as hemorrhage, urological injuries, they requiring additional surgical procedures. Data for the remaining were 118 patients (60 in QG & 58 in NQG) were considered for statistical analysis.

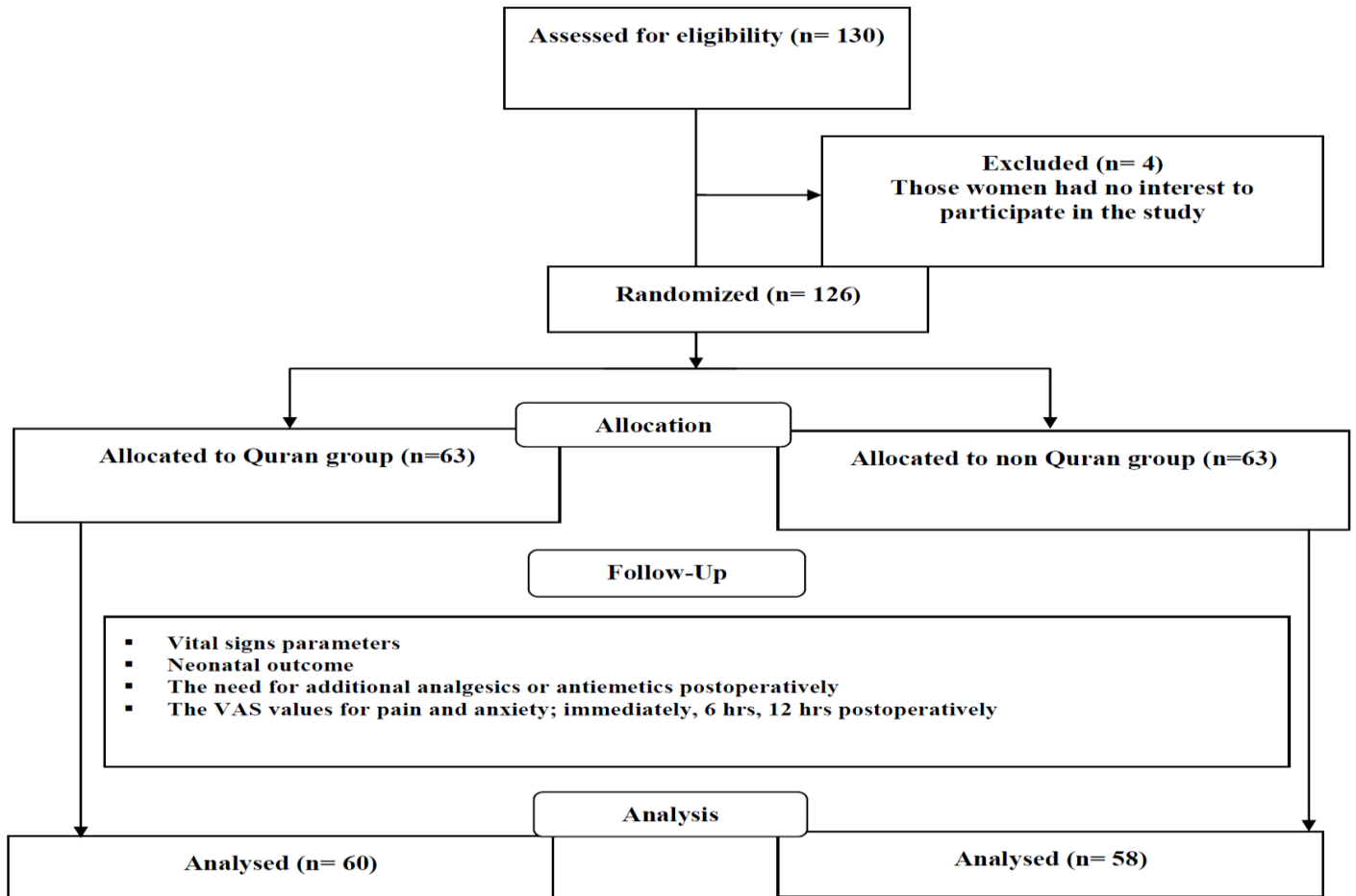
Table 1 indicates the characteristics of the study participants. It was found that the mean age was (25.98 & 26.87) years for QG & NQG groups respectively, while the majority (81.67% & 86.21% respectively) were multigravida among Quran & Non Quran groups. Moreover, no any a significant relation was found between both groups the study & control in the form of different characteristics including age, parity, educational level, socioeconomic status, body mass index, previous CS or other surgeries, previous anesthesia, lifestyle listening to Quran, estimated blood loss during CS & operative time were comparable between groups ( $p>0.05$ ). Table 2 demonstrates more than two thirds (68.6%) of indications to current elective CS were the repeats previous CS.

Comparison between vital parameters of Quran & Non Quran groups are given in table 3. There were no statistically significant differences between the groups ( $p>0.05$ ) for all parameters recorded before, immediately, 6 hours & 12 hours after CS except for mean score for systolic blood pressure (106.93±10.02 mmHg in QG vs 113.22±11.72 mmHg in NQG) & diastolic blood pressure (56.7±11.96 mmHg in QG vs 64.05±13.66 mmHg in NQG) immediately postoperative, which was statistically significant ( $p=0.002$  for both).

Table 4 indicates the effect of listening to Quran on neonatal outcomes. Overall, the mean scores of Apgar score at 1 minute was higher among QG compared to NQG (8.63 & 6.95 respectively). Also, the mean score of Apgar score at 5 minutes was higher among QG (9.92), meanwhile, 9.37 among NQG. The percentage of admission to neonatal intensive care unit were higher 9% of NQG, however, only 1% of QG was admitted. Moreover, there is a statistically significant relation was found at all aspects of neonatal outcomes among QG opposed to NQG, including Apgar score at 1 & 5 minute, as well as admission to neonatal intensive care unit (0.0001, 0.011 & 0.004 respectively).

Regarding the effect of listening to Quran on maternal outcomes table 5 revealed that all VAS values for pain & anxiety; immediately, 6 hrs, 12 hrs postoperatively were significantly lower in QG when compared with NQG. While the mean patient satisfaction scores immediately, 6 hours, 12 hours postoperatively were significantly higher in QG than NQG ( $p=0.0001$ ). There was no significant difference between the groups regarding the need for additional analgesics or antiemetics postoperatively, in spite of that, more patients requested use of those medications in the NQG. Moreover, the total amount of additional diclofenac use in the QG was lower than the control group

( $p=0.003$ ). No statistical significant difference between both groups for frequency of vomiting immediately & 12 hours after CS. Only, the frequency of vomiting was significantly more in the control group 6 hours postoperatively ( $p=0.013$ ).



**Figure 1: The study flow chart**

**Table (1): The Characteristics of the Study Participants:**

Variables	Quran group (n=60)	Non Quran group (n=58)	P. Value
<b>Age (years) <sup>a</sup>:</b>	25.98 ± 4.56	26.87 ± 4.89	0.308
<b>Parity <sup>a</sup>:</b>	1.70 ± 1.86	2.1 ± 1.59	0.208
- <i>Primigravida</i> <sup>b</sup>	11 (18.33)	8 (13.79)	0.323
- <i>Multigravida</i> <sup>b</sup>	49 (81.67)	50 (86.21)	0.308
<b>Educational level <sup>b</sup>:</b>			
- <i>Illiterate</i>	25 (41.67)	28 (48.28)	0.89
- <i>Primary school</i>	29 (48.33)	21 (36.21)	
- <i>Secondary school</i>	3 (5)	7 (12.07)	
- <i>University</i>	3 (5)	2 (3.44)	
<b>♦Socioeconomic status <sup>b</sup>:</b>			
- <i>Low</i>	44 (73.33)	48 (82.76)	0.518
- <i>Middle</i>	16 (26.67)	10 (17.24)	
<b>Body mass index <sup>a</sup>:</b>	29.67 ± 4.31	30.32 ± 4.26	0.756
<b>Previous cesarean section <sup>b</sup>:</b>	41 (68.33)	40 (68.97)	0.145
<b>Previous other surgery <sup>b</sup>:</b>	8 (13.33)	13 (22.41)	0.53
<b>Previous anesthesia exposure <sup>b</sup>:</b>	43 (71.67)	45 (77.59)	0.528
- <i>Spinal</i>	36	32	0.207
- <i>General</i>	2	3	
- <i>Both</i>	5	10	
<b>Lifestyle listening to Quran <sup>b</sup>:</b>			
- <i>Once a day</i>	33 (55)	34 (58.62)	0.667
- <i>Few times a week</i>	22 (36.67)	17 (29.31)	
- <i>Once a week</i>	3 (5)	6 (10.34)	
- <i>Less than once a week</i>	2 (3.33)	1 (1.73)	
<b>Estimated blood loss (ml) <sup>a</sup>:</b>	392.92 ± 77.03	373.75 ± 77.98	0.164
<b>Operative time (min) <sup>a</sup>:</b>	37.67 ± 8.58	37.68 ± 7.07	0.991

- Chi-square test, (\*) Significant at P < 0.05

- (a) Data are expressed as mean ± standard deviation; (b) Data are expressed as number (%)

- ♦Socioeconomic status by (Abd El- Tawab scale, 2004).

**Table (2): Indications of Cesarean Sections among Study Participants:**

Variables	No. (%) (n=118)
- Repeat CS	81 (68.64)
- Breech presentation	12 (10.17)
- CS on request	10 (8.48)
- Cephalopelvic disproportion	8 (6.78)
- Transverse lie	4 (3.39)
- Cephalic non vertex presentation	3 (2.54)

- Chi-square test , (\*) Significant at P < 0.05



**Table (3): Comparison between Vital Parameters of Quran & Non Quran Groups:**

Variables	Quran group Mean Score (n=60)	Non Quran group Mean Score (n=58)	P. Value
<b>Systolic BP (mmHg):</b>			
- Before CS	125.17 ± 11.57	121.33 ± 8.86	0.06
- Immediately after CS	106.93 ± 10.02	113.22 ± 11.72	<b>0.002*</b>
- 6 hours after CS	113 ± 9.26	113.17 ± 8.54	0.919
- 12 hours after CS	116.67 ± 5.1	116.17 ± 7.61	0.673
<b>Diastolic BP (mmHg):</b>			
- Before CS	78.67 ± 7.47	77.5 ± 8.59	0.429
- Immediately after CS	56.77 ± 11.96	64.05 ± 13.66	<b>0.002*</b>
- 6 hours after CS	71.17 ± 8.65	73.17 ± 7.48	0.178
- 12 hours after CS	75.67 ± 5.33	77 ± 6.46	0.22
<b>Heart rate (beats/min):</b>			
- Before CS	91.07 ± 12.85	92.07 ± 9.43	0.628
- Immediately after CS	88.03 ± 5.73	87.7 ± 11	0.836
- 6 hours after CS	85.6 ± 6.38	87.63 ± 7.99	0.126
- 12 hours after CS	86.62 ± 8.15	86.23 ± 6.42	0.775
<b>Respiratory rate (breaths/min):</b>			
- Before CS	19.53 ± 1.14	19.82 ± 1.71	0.288
- Immediately after CS	19.57 ± 1.86	20 ± 2.65	0.302
- 6 hours after CS	19.92 ± 1.39	19.97 ± 2.34	0.887
- 12 hours after CS	20.2 ± 2.09	20.23 ± 2.11	0.931

- (T) test, (\*)Significant at P < 0.05

**Table (4): Effect of Listening to Quran on Neonatal Outcomes:**

Variables	Quran group (n=60)	Non Quran group (n=58)	P. Value
- Apgar score at 1 minute <sup>a</sup>	8.63 ± 1.4	6.95 ± 2.24	<b>0.0001*</b>
- Apgar score at 5 minutes <sup>a</sup>	9.92 ± 0.33	9.37 ± 1.59	<b>0.011*</b>
- Admission to neonatal intensive care unit <sup>b</sup>	1 (1.67)	9 (15.52)	<b>0.004*</b>

(<sup>a</sup>) Data are expressed as mean ± standard deviation; (T) test

(<sup>b</sup>) Data are expressed as number (%); Chi-square test; (\*) Significant at P < 0.05

**Table (5): Effect of Listening to Quran on Maternal Outcomes:**

Variables	Quran group (n=60)	No Quran group (n=58)	P. Value
<b>VAS pain<sup>a</sup>:</b>			
- Immediately after CS	1.6 ± 1.09	2.8 ± 2.15	<b>0.0001*</b>
- 6 hours after CS	2.2 ± 1.38	2.83 ± 1.61	<b>0.022*</b>
- 12 hours after CS	1.93 ± 1.36	3.1 ± 2.11	<b>0.001*</b>
<b>VAS anxiety<sup>a</sup>:</b>			
- Immediately after CS	2.22 ± 1.28	2.98 ± 1.97	<b>0.013*</b>
- 6 hours after CS	2.27 ± 1.3	2.88 ± 1.45	<b>0.016*</b>
- 12 hours after CS	2.1 ± 1.32	2.82 ± 1.6	<b>0.009*</b>
<b>Satisfaction<sup>a</sup>:</b>			
- Immediately after CS	8.22 ± 1.25	6.93 ± 1.64	<b>0.0001*</b>
- 6 hours after CS	8.23 ± 0.99	6.83 ± 1.52	<b>0.0001*</b>
- 12 hours after CS	8.43 ± 1.12	7.1 ± 1.79	<b>0.0001*</b>
<b>Total amount of Diclofenac (mg)<sup>a</sup></b>	58.58 ± 24.17	79.52 ± 62.5	<b>0.003*</b>
<b>Frequency of vomiting<sup>a</sup></b>			
- Immediately after CS	0.02 ± 0.13	0.08 ± 0.28	0.095
- 6 hours after CS	0.48 ± 1.21	1.42 ± 2.59	<b>0.013*</b>
- 12 hours after CS	0.2 ± 0.71	0.45 ± 1.29	0.192
<b>Need for anti-emetics<sup>b</sup></b>			
- Immediately after CS	0	1 (1.73)	0.315
- 6 hours after CS	8 (13.33)	14 (24.14)	0.157
- 12 hours after CS	1 (1.67)	2 (3.44)	0.559
<b>Need for analgesics<sup>b</sup>:</b>			
- Immediately after CS	7 (11.67)	14 (24.14)	0.148
- 6 hours after CS	2 (3.33)	9 (15.52)	0.053
- 12 hours after CS	2 (3.33)	7 (12.07)	0.163

(<sup>a</sup>) Data are expressed as mean ± standard deviation; (T) test

(<sup>b</sup>) Data are expressed as number (%); Chi-square test; (\*) Significant at P < 0.05

## DISCUSSION:

Pain & anxiety after CS is a vital question so they constitute great worrisome events occur in the early postoperative period. Fear of anesthesia & its complications leads to high degree of anxiety in women before CS, hence Cesarean delivery poses as a major stressor. The psychological stress not only affects the cardiovascular system adversely but it also amplifies the pain & anxiety perception (Li & Dong, 2012).

In the current study, the effects of listening to Quran recitation during CS under spinal anesthesia on pain intensity postoperatively were investigated, & we have found that there was a significant decrease in the postoperative pain as well anxiety level & the analgesic use in the first 12 hours after CS. This was the first well designed & registered RCT assessing the effects of Quran recitation on women having CS in Egypt. There are various pharmacologic methods & complimentary therapies for stress & pain alleviation such as music therapy. While pain & auditory pathways demonstrate counter effects, activation of the auditory pathway may play a vital role in confrontation of conduction of nociceptive stimuli (Kissin, 1996). Several studies have proved that music therapy is a

valuable means of stress relief (Evans, 2000; Yung, 2002), however Good et al reported that for music to perform a therapeutic effect only based on that matches of patients' preferences according to their cultural backgrounds (Good et al., 2000).

Our findings indicated that there was a significant difference in pain scores between both groups either immediately postoperative or during the recovery period. Pain score was lower in patients who were exposed to Quran during CS ( $p < 0.05$ ). Also, the total dose of postoperative analgesic consumption was significantly lower in Quran group. Anxiety score was significantly higher in the control group immediately, 6 hrs & 12 hrs after CS ( $p < 0.05$ ). The level of patient satisfaction between the groups was significantly different ( $p = 0.0001$ ) being higher in Quran group. Our results stand in line with a few published studies supporting the role of Quran recitation on stress & pain reduction after CS, as Abdullah & Omar, 2011 who mentioned that, Quran recitation represents a form of meditation for Muslims & some studies have proven its calming & relaxing effect in response to listening to it. Also, Quran recitation was reported to reduce the anxiety score before surgery in adult patients (Majidi, 2004; Khatoni, 1997) & cause improvement of vital parameters (Abadi et al., 2003). Extensive search of the literature revealed that several studies have evaluated the effect of music therapy on anxiety & pain in patients that underwent CS (Laopaiboon et al., 2009), however less than fingers of a hand have compared the effect of Quran recitation on CS pain & anxiety scores (Mirbagher & Ranjbar, 2010; Allameh et al., 2013; Sharifi et al., 2013 & Bayrami & Ebrahimipour, 2014).

The results of our study revealed significant higher Apgar scores at 1 & 5 minutes in newborns of mothers exposed to Quran recitation. Also the frequency of admission to NICU was significantly lower in Quran group. Quran recitation had beneficial effects on the Apgar scores & this is similar to the results obtained before about the beneficial effect of music on newborns Apgar scores (Sen et al., 2009). Also, our finding agree with Eskandari et al., who reported an improvement in short-term physiological responses in preterm newborns subjected to Quran recitation in NICU (Eskandari et al., 2012). Similar findings were reported by Bayrami & Ebrahimipour, 2014, who conducted their study to identify the effect of the Quran sound on labor pain & other maternal & neonatal and reports may positive effects of factors Quran sound on labor pain and neonatal outcomes. The explanation of this effect may be attributed to the mothers' relaxation caused by Quran recitation. Quran sound was considered as the conventional music of Islamic societies (Ansari et al., 2005; Chlan & Tracy, 1999). Therefore, Quran sound can be regarded as a type of religious way match to the music therapy. In addition to all Muslims believes on Allah, consequently, believes on the words of Allah (Quran), also it was wrote on the Holy Quran for the bring a good psychological condition, peace, comfort & pain managements; thus, reduce the adrenalin level and then reduce pulse rate, blood pressure, and respiratory rate. So that both maternal and neonatal outcomes can be improved .

Blood pressure after CS was significantly lower in women exposed to Quran during CS than the control group ( $p = 0.002$ ). This effect may be explained by the influence of Quran listening in lowering

the sympathetic nervous system activity as observed with listening to music in previous studies (McCaffrey & Locsin, 2002; Arslan et al., 2008).

Listening to Quran recitation is simple, convenient, non-invasive, acceptable, not interfering with routine patients' care during surgery, adding no extra charges to patients especially in low & middle income countries as Egypt if compared to analgesics. The main strengths of our study that pain & anxiety scores were evaluated in the immediate postoperative & continued in the early recovery period up to 12 hours after CS. The sample size of our trial is larger than any reported similar studies (Allameh et al., 2013). Our study was a registered randomized clinical trial thus removing any bias.

Some limitations were present in our study. Firstly, the study did not evaluate the effect of repeated exposure to Quran recitation during the postoperative period. Secondly, the duration of listening to Quran was variable according to the operative duration, so further studies are needed to evaluate the optimal duration for exposure to Quran that could alleviate pain effectively. Thirdly, the study was conducted only in one hospital, so generalization of results to different places was not possible & need to be externally validated. Lastly, our patients were only Muslims, so these results could be applied only to this population.

## **CONCLUSION & RECOMMENDATIONS:**

According to the results of the present study we can conclude that: listening to Quran sessions started after induction of spinal anesthesia to mothers undergoes CS & continued immediately after the surgery until first 12 hours post CS, had positive effects on both maternal & neonatal outcomes. So, we recommend the using of new non pharmacological techniques as a way for pain & anxiety management, as well as improving other parameters including neonatal outcomes as Apgar Score. It can become an important issue of the complementary & alternative analgesic therapy for Muslim women undergoing CS. Further researches are needed in to implement the same religious sphere on Non-Muslim women.

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