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Thanking you,

Yours' sincerely,

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The Effect and Determinants of Listening To Quran on Blood pressure among Adult Hypertensive Patients Attending Gwaiza primary health care center (PCC) in Jeddah city 2016.

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Abstract

Background: Listening to Quran is a sort of prayers which is considered, according to the Islam heritage, as remedy for ailments which are potentially related to stress. It is well accepted that hypertension is partly related to stress, therefore, the current study aim at testing the possible effect of listening to Quran on blood pressure among hypertensive patients.

Subjects and Methods: Through a pre post intervention study, 103 hypertensive patients were selected randomly from attendants of the chronic disease clinic in Qwaiza center, where their blood pressure and heart rate were measured at baseline, after five minutes, and after listening to Quran for 10 minutes. Main outcome was the difference between the second and third readings, that was tested by paired sample t test at a level of significance <0.05 .

Main Results: There was significant reduction in blood pressure after listening to Quran, the systolic blood pressure was reduced from 135.1 ± 13.41 at baseline down to 129.4 ± 13.08 , and diastolic blood pressure declined from 77.2 ± 9.97 to 73.6 ± 9.84 . Also, the heart rate dropped significantly from $81.0/\text{minute}$ at baseline to $76.0/\text{minute}$ $p<0.05$. The differences were significant among all participants regardless of their age, smoking status, BMI categories, duration of hypertension, comorbidities or the number of medications $p<0.05$.

Conclusion and recommendations: Listening to Quran is effective in imminent lowering of blood pressure and heart rate of hypertensive patients, further controlled trials are recommended to prove its effect and to ensure its benefits on the long term.

1. INTRODUCTION

In Saudi Arabia the community believes that the Quran has positive effect on health, this research is to prove this effect on the patient after listening to Quran.

1.1 BACKGROUND

Hypertension is the most common clinical disorder, more than one billion individuals are affected with hypertension worldwide.(1) A considerable proportion of these patients suffer from cardiovascular as a complication of hypertension, in USA, it had been reported that up to 72% of the hypertensive patients experienced stroke, and the mortalities from these complications accounted for almost 15% of all mortalities, which ranks hypertension as one of the most common leading causes of death.(2)

The life time risk of hypertension necessitate therapy with minimal adverse outcome, nevertheless, most of the therapies introduced in the past few decades are not perfect and often associated with side effects, because most of these therapies are indiscriminately block receptors leading to unwanted effects,(3) for these reasons, there is a growing concern about shifting towards alternative medicines that apparently have low or no observed side effects.(4)

Most of the alternative and complementary modalities, which often used by hypertensive patients had been directed towards herbs and acupuncture.(5) Nevertheless, the recent trends in complementary treatment, has made benefit of the scientific base about potentiating factors accentuating hypertension, these trends are usually targeting alleviation of stress by different modalities of relaxation.(6)

Because most of the trials targeting alleviation of stress had been suggested in the western countries, so, listening to music was the commonest approach tested in several research for its effect on relieving stress and eventually lowering the blood pressure.(6–10) For example, in an extensive Meta-analysis of 11 RCTs comparing the effect of music on blood pressure and heart rate to control group showed more reductions in music group with mean difference -2.6 in Systolic blood pressure (SBP) and -1.1 in diastolic blood pressure (DBP) compared to control group.(10)

Another study conducted on 80 surgical patients one day pre-op, average age was 43 years, listened to relaxing music through the day before the operation, different outcomes were measured, one of them was blood pressure before and after listening to music, SBP decreased from 125.4 to 121.5 $p < 0.05$.(11)

Despite of the remarked effect of listening to relaxing music in reducing blood pressure in hypertensive patients mediated by relieving stress, the review of literature showed that there is no study for examining the potential relaxing effect of listening to Quran in Muslims on blood pressure.

Muslims believe that the Quran has positive effect on health, but this effect was not proved nor measured until this day, this research is to test this effect on blood pressure in hypertensive patients. However it remains a new field for studies.

The researcher selected the blood pressure as an outcome as its measurable health outcome, in addition to its high prevalence in Saudi Arabia.

This study aimed to scientifically investigate the effect of listening to Quran on blood pressure and use it as an additional intervention to help in controlling high blood pressure. To estimate the effect of listening to Quran on blood pressure among adult hypertensive patients attending Gwaizah PCC in Jeddah city during September 2016. To determine the differences in the effect of listening to Quran on blood pressure according to characteristics of the hypertensive patients.

3. Materials and Methods

A pre-post interventional study included one group of hypertensive adult patients aged 18 years and older attending Gwaizah PCC in Jeddah city September 2016.

a. Inclusion criteria

- Known hypertensive patients aged ≥ 18 years.
- Following up in chronic disease clinic in Gwaizah PCC.

b. Exclusion criteria

patients with hearing defects.

Sample size was calculated based on the expected mean difference in blood pressure after intervention (effect size) recorded in previous studies. From previous researches, a reduction in blood pressure in hypertensive patients by a mean ≈ 3 mm Hg is considered significant effect size.(17) Therefore, in the current study, a sample size of 103 was found to be sufficient for detecting effect size of 11.1 with a confidence level of 95% and power of 80% with $SD \pm 0.4$.

The researcher attended the selected primary health care center, where he explained the aim of the study to the hypertensive patients who attend the chronic diseases' clinic; those who fulfilled the inclusion criteria, and agreed to participate in the study, were subjected to the designed intervention.

Data collection tools (instruments)

- Aneroid sphygmomanometer was used for measuring the blood pressure at baseline, after relaxed for five minutes and soon after listening to Quran.
- Noise cancelling headphones were used to stop extraneous sounds that could alter exclusive hearing to Quran.
- Data collection form was used to record demographic characteristics of the participants in addition to the readings of the measurements of the blood pressure.

Data Collection technique

One group of hypertensive adult patients attending Gwaizah primary health care center in Jeddah city September 2016. Each time, the patient sit in a room in the same PCC and blood pressure was measured by the researcher using mercury sphygmomanometer and recorded first at the beginning and second reading after 5 minutes of setting, then using noise cancelling headphones the patient listened to 10 minutes of the same sound clip of Serenity Verses (Ayat Alsakinah), blood pressure was measured soon after finishing listening and recorded.

The choice of the clip of Quran Serenity Verses to be listened by the patients, was based on what had been cited by Alhouseini et al (2015) who argued that some verses read by preferable reciters have more psychological impact than other verses.(22) Therefore, it was decided to choose the used verses after enquiry from different pertinent personnel.

A form containing patient name, age SBP and DBP before and after intervention was used for data recording.

Headphones were carefully cleaned between patients using alcohol swab.

To ensure reliability, the same aneroid sphygmomanometer was used to measure the blood pressure at all settings.

Data entry and statistical analysis

The Statistical Package for Social Sciences (SPSS, version 21) was used for data entry and statistical analysis. Qualitative data were presented as frequency distributions, and quantitative data were presented as means and standard deviations. Paired sample t test was used to assess significance in the changes in the readings of the blood pressure between the second reading (after relaxing for 5 minutes) and third reading (after listening to Quran for 10 minutes). P- value < 0.05 was considered as an indications for statistical significance.

All necessity ethical approvals were obtained (approval from the regional IRB, Informed consent of the participants). All collected data are considered confidential and would not be disclosed except for the study purposes. The study was self-funded.

Results

4.1 Characteristics of the patients

Table 1 shows that the great majority of participating hypertensive patients (n=103) were males (86.4%). The mean age of the patients accounted for 55.8 ± 8.5 years, which ranged between 37 and 79 years, with more than one quarter of them (29.1%) aged 60 years or older. Smokers constituted 20.4% of the patients, and obese formed collectively 79.6%, out of them there were 15.5% who were categorized as morbid obesity.

More than one third of the hypertensive patients (38.8%) had the disease for 5-10 years, and 15.5% had the disease for more than 10 years [Table2]. Regarding associated comorbidities, the table demonstrates that 17.7% of the patients were also diabetic, and 11.7% were diabetic with dyslipidemia. Most of the patients (72.8%) were using two or more medications, the most frequently used medications were Amlodipine (66%), Simvastatin (42.7%), Hydrochlorothiazide (40.8%) and Captopril (22.3%).

Table1 : Characteristics of the study group (n=103).

Characteristics	No.	Percentage
Gender:		
Males	89	86.4
Females	14	13.6
Age:		
<50 years	26	25.2
50-<60 years	47	45.6
≥60 years	30	29.1
<i>Mean±SD</i>	55.8±8.5 years	
<i>Range</i>	37-79 years	
Smoking status:		
Smoker	21	20.4
Non smoker	82	79.6
BMI categories:		
Within normal	4	3.9
Overweight	18	17.5
Obese I	39	37.9
Obese II	26	25.2
Obese III	16	15.5

Table2 : Clinical profile of the patients.

Characteristics	No.	Percentage
<i>Duration of hypertension:</i>		
<5 years	47	45.6
5-10 years	40	38.8
>10 years	16	15.5
<i>Comorbidities:</i>		
None	33	32.0
Diabetes mellitus	18	17.5
Dyslipidemia	40	38.8
Combined diabetes mellitus and dyslipidemia	12	11.7
<i>Medications:</i>		
Amlodipine	68	66.0
Simvastatin	44	42.7
Hydrochlorothiazide	42	40.8
Captopril	31	30.1
Preindopril	23	22.3
Atorvastatin	16	15.5
Atenolol	9	8.7
Bisoprolol	6	5.8
Irbesartan	3	2.9
Losartan	3	2.9
Rosuvastatin	3	2.9
Enalapril	1	1.0
Valsartan	1	1.0
<i>Overall number of medications:</i>		
One medication	28	27.2
Two or more medications	75	72.8

4.2 Changes in blood pressure and heart rate after listening to Quran for 10 minutes

From **Table 3**, it was evident that there was significant reduction in blood pressure after listening for Quran, the systolic blood pressure was reduced from 135.1 ± 13.41 at baseline down to 129.4 ± 13.08 , and diastolic blood pressure declined from 77.2 ± 9.97 to 73.6 ± 9.84 . Also, the heart rate dropped significantly from 81.0/minute at baseline to 76.0/minute after listening to Quran $p < 0.05$.

Tables 4,5 and 6 demonstrate that there was significant decreases in the systolic and diastolic blood pressure in addition to lowering of the heart rate in all the respondents regardless of their age, smoking status, BMI categories, duration of hypertension, comorbidities or the number of medications $p < 0.05$, except for lowering the heart rate in those who had normal BMI, where the lowering in heart rate is not statistically significant $p > 0.05$.

Table 3: Changes in blood pressure and heart rate after intervention.

Measurements	Phase		Paired difference mean	P*
	Pre mean \pm SD	Post mean \pm SD		
Systolic blood pressure	135.1 \pm 13.41	129.4 \pm 13.08	5.7 \pm 3.10	<0.001**
Diastolic blood pressure	77.2 \pm 9.97	73.6 \pm 9.84	3.6 \pm 2.49	<0.001**
Heart rate	81.0 \pm 12.02	76.1 \pm 10.91	4.9 \pm 5.79	<0.001**

* Based on Paired sample t test ** Statistically significant

Table 4: Changes in systolic blood pressure after intervention according to characteristics of the patients.

Characteristics	Phase		Paired difference mean	P*
	Pre mean \pm SD	Post mean \pm SD		
Gender				
Males	136.2 \pm 12.95	130.4 \pm 12.60	5.8 \pm 3.22	<0.001**
Females	128.4 \pm 15.42	123.4 \pm 14.88	5.0 \pm 2.15	<0.001**
Age group				
<50 years	139.1 \pm 11.30	134.0 \pm 10.78	5.1 \pm 3.75	<0.001**
50-<60 years	138.1 \pm 12.07	132.1 \pm 11.69	6.0 \pm 3.02	<0.001**
\geq 60 years	126.9 \pm 13.84	121.4 \pm 13.69	5.5 \pm 2.58	<0.001**
Smoking status				
Smoker	142.4 \pm 8.91	137.1 \pm 9.43	5.3 \pm 3.92	<0.001**
Non smoker	133.2 \pm 13.76	127.5 \pm 13.21	5.7 \pm 2.87	<0.001**
BMI categories				
Within normal	135.0 \pm 15.38	126.3 \pm 17.44	8.7 \pm 3.30	0.013**
Overweight	127.4 \pm 14.04	122.4 \pm 13.40	5.0 \pm 3.23	<0.001**
Obese I	135.1 \pm 13.17	129.2 \pm 12.35	5.9 \pm 3.12	<0.001**
Obese II	135.4 \pm 12.99	130.2 \pm 13.13	5.2 \pm 2.53	<0.001**
Obese III	143.4 \pm 9.39	137.6 \pm 9.61	5.8 \pm 3.49	<0.001**
Duration of hypertension				

<5 years	138.0±11.13	132.9±10.96	5.1±3.10	<0.001**
5-<10 years	135.3±14.72	128.9±13.83	6.4±3.28	<0.001**
≥ 10 years	126.0±12.84	120.7±13.35	5.3±2.36	<0.001**
<i>Comorbidities</i>				
None	134.9±12.24	129.2±11.83	5.7±2.80	<0.001**
DM	136.9±12.30	131.1±12.70	5.8±3.89	<0.001**
Dyslipidemia	132.6±13.77	127.5±13.43	5.1±3.12	<0.001**
DM and Dyslipidemia	141.3±16.05	134.3±15.70	7.0±2.26	<0.001**
<i>Number of medications</i>				
One medication	133.1±13.24	127.9±11.86	5.2±3.11	<0.001**
Two or more medications	135.8±13.49	130.0±13.53	5.8±3.10	<0.001**

* Based on Paired sample t test

** Statistically significant

Table 5: Changes in diastolic blood pressure after intervention according to characteristics of the patients.

Measurements	Phase		Paired difference mean	P*
	Pre mean±SD	Post mean±SD		
Gender				
Males	78.1±9.47	74.4±9.57	3.7±2.55	<0.001**
Females	71.4±11.41	68.5±10.36	2.9±1.98	<0.001**
Age group				
<50 years	80.0±8.58	75.9±8.12	4.1±2.59	<0.001**
50-<60 years	79.1±9.08	75.5±8.97	3.6±2.08	<0.001**
≥60 years	71.8±10.59	68.6±10.94	3.2±2.96	<0.001**
Smoking status				
Smoker	82.8±8.41	78.9±8.08	3.9±2.34	<0.001**
Non smoker	75.8±9.87	72.2±9.82	3.6±2.53	<0.001**
BMI categories				
Within normal	77.5±4.44	72.0±7.83	5.5±3.42	0.049**
Overweight	73.7±10.64	70.7±10.52	3.0±3.15	0.001**
Obese I	77.2±10.56	73.8±10.25	3.4±2.32	<0.001**
Obese II	76.3±8.48	72.9±9.02	3.4±2.33	<0.001**
Obese III	82.7±9.62	77.9±9.32	4.8±1.64	<0.001**
Duration of hypertension				
<5 years	78.9±9.21	75.1±8.76	3.8±2.23	<0.001**
5-<10 years	77.4±10.10	73.8±10.39	3.6±2.73	<0.001**
≥ 10 years	71.8±10.43	68.8±10.49	3.0±2.63	<0.001**
Comorbidities				
None	76.5±8.06	72.3±7.46	4.15±2.46	<0.001**
DM	79.4±7.87	75.9±7.79	3.5±2.38	<0.001**
Dyslipidemia	75.5±11.70	72.3±11.60	3.2±2.52	<0.001**
DM and Dyslipidemia	81.8±10.4	78.0±11.08	3.8±2.67	<0.001**
Number of medications				
One medication	75.9±8.92	72.3±8.38	3.6±2.28	<0.001**
Two or more medications	77.7±10.34	74.1±10.34	3.6±2.58	<0.001**

* Based on Paired sample t test

** Statistically significant

Table 6: Changes in heart rate after intervention according to characteristics of the patients.

Measurements	Phase		Paired difference mean	P*
	Pre mean±SD	Post mean±SD		
Gender				
Males	81.7±11.94	76.5±10.99	5.2±5.94	<0.001**
Females	76.6±12.06	73.8±10.42	2.8±4.26	<0.001**
Age group				
<50 years	85.1±13.77	79.5±12.76	5.6±4.96	<0.001**
50-<60 years	84.1±8.93	78.7±8.27	5.4±6.68	<0.001**
≥60 years	72.5±10.59	69.0±9.82	3.5±4.76	<0.001**
Smoking status				
Smoker	85.1±13.28	79.7±11.34	5.4±5.86	<0.001**
Non smoker	79.9±11.53	75.2±10.67	4.7±5.79	<0.001**
BMI categories				
Within normal	78.0±5.42	69.0±8.41	9.0±7.75	0.103
Overweight	70.9±8.69	68.2±8.96	2.7±5.51	0.047**
Obese I	82.6±11.05	77.6±9.82	5.0±6.65	<0.001**
Obese II	81.7±11.49	76.3±10.14	5.4±4.08	<0.001**
Obese III	87.9±13.42	82.7±12.12	5.2±5.58	0.002**
Duration of hypertension				
<5 years	82.9±12.16	78.0±11.33	4.9±5.58	<0.001**
5-<10 years	82.5±11.20	77.0±10.07	5.5±7.08	<0.001**
≥ 10 years	71.5±9.45	68.1±8.37	3.4±5.46	<0.001**
Comorbidities				
None	81.4±9.89	76.4±9.40	5.0±5.37	<0.001**
DM	81.7±11.42	77.2±11.07	4.5±6.50	0.009**
Dyslipidemia	80.5±13.66	76.0±12.16	4.5±4.56	<0.001**
DM and Dyslipidemia	80.5±13.78	73.8±11.17	6.7±9.12	0.028**
Number of medications				
One medication	78.8±11.78	74.5±10.96	4.3±5.02	0.009**
Two or more medications	81.8±12.08	76.7±10.90	5.1±6.06	<0.001**

* Based on Paired sample t test

** Statistically significant

Discussion

Hypertension is an important global clinical disorder which affects almost 31.1% of adult population in the world,(23). In Saudi Arabia, the age adjusted prevalence of hypertension accounted for 36%.(24) Hypertension has serious long-term cardiovascular consequences, and necessitate long life treatment.(3) Most of the used therapeutics have unwanted side effects, which resulted in shifting of many patients towards alternative and complementary treatment.(5)

The used alternative and complementary treatments are mostly sharing the same target, which is relieving stress as there is strong belief for the association between stress and increased levels of blood pressure.(5) Although that most of the used interventions in this context had been subjected to scientific researches, listening to Quran was not investigated before for its effect on stress and consequently lowering the blood pressure.

Therefore, the current study aimed at investigating the effect of listening to Quran for 10 minutes on lowering blood pressure of hypertensive patients. The results showed that there was significant reduction in blood pressure after listening for Quran, where the systolic blood pressure was reduced from 135.1 ± 13.41 at baseline down to 129.4 ± 13.08 , and diastolic blood pressure declined from 77.2 ± 9.97 to 73.6 ± 9.84 . Similar results were reported in other studies which tested other relaxing modalities such as music, (6,7,10) mind-body relaxing response (17) and Yoga(18).

To understand the observed link between relaxing interventions such as listening to Quran recitation and lowering blood pressure, it is important to recall the physiological background for the complex neurovascular relation between stress and cardiovascular system, in this respect, Steptoe and Kivimäki (2012) pointed that the physiological reaction to stress, involve the hypothalamic–pituitary–adrenocortical and sympatho-adrenomedullary axes.(25) The stimulation of these axes produce a large amount of vasoconstricting hormones which increase blood pressure; and the repeated elevation of blood pressure elevations, may eventually lead to hypertension.(26)

Relaxing interventions not only stop the physiological reactions to stress, with its consequent effect on blood pressure, but it also enhance generation of alpha waves in the brain.(20) Alpha waves, according to what had been argued by Huang and Charyton (2008), are believed to relieve various mental symptoms such as pain and stress, (27) in addition, EEG alpha activations, would retain heart brain synchronicity, which help in the recovery of the physiological synchrony following a period of homeostatic depletion.(28)

Also, the current study showed that the heart rate dropped significantly from 81.0/minute at baseline to 76.0/minute after listening to Quran recitation. This finding is partly come in agreement with what had been found in other studies which used other methods for relaxation such as mental relaxation (16) and Yoga(16).

In Malaysia in 2014, the researchers examined the effects of listening to Quran recitation on forty four ICU Muslim patients. The results showed that there was no statistically significant change in blood pressure or heart rate, however, over time, only heart rate showed significant changes, the researchers recommended listening to Holy Quran to promote psycho-spiritual comfort for Muslim mechanically ventilated patients as it reduces the patients' HR.

The observed lowering of blood pressure and slowing of heart rate after listening to Quran recitation in the current study were significant among all participated hypertensive patients, regardless of their age, smoking status, BMI categories, duration of hypertension, comorbidities or the number of medications $p < 0.05$. Which comes in agreement with what had been addressed by Mahjoob and his colleagues (2016) that listening to Quran recitation improves mental state and achieve better state of calm regardless of the gender of the listener.(19)

In this respect, it is worth mentioning, in " QURAN SURAH YUNUS 57", Allah Said " O mankind! there hath come to you a direction from your Lord and a healing for the (diseases) in your hearts,- and for those who believe, a guidance and a Mercy."(29)

Conclusion

Listening to Quran recitation for ten minutes is effective in imminent significant lowering of blood pressure and heart rate of hypertensive patients. These effects occur irrespective of the differences in the characteristics of the patients namely: gender, age, BMI, duration of hypertension, comorbidities or the number of used medications. Listening to Quran recitation is recommended to be advised to hypertensive Muslim patients as a conjunct intervention besides the therapeutic treatment for imminent lowering of blood pressure. Further controlled trials are recommended to prove the effect

of listening to Quran recitation on lowering blood pressure and reducing heart rate in hypertensive patients both at short and long term..

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