ABSTRACT:
The cerebral cortex contains huge numbers of neurons. Activity of these neurons is to some extent synchronized in regular firing rhythms ('brain waves'). Many researchers have investigated the effect of various events to the EEG signals such as meditation and classical music. EEG signals from subjects at rest, as well as in different cognitive states; listening to Quran recitation and listening to low and hard music are measured and analyzed. Statistical analysis using graph pad prism software was performed in order to test the validity of obtained data. The analysis results from this study show that listening to Quran recitation can generate alpha wave and can help a person to be in a relax condition as compared with resting and listening to slow and hard rock music.

KEY WORDS:
EEG, Quran Recitation, Slow and Hard Music, Alpha Wave

INTRODUCTION:
Human brain waves were first measured in 1924 by Hans Berger. Today, the electroencephalogram (EEG) has become one of the most useful tools in the diagnosis of epilepsy and other neurological disorders. The fact that a machine can read signals from the brain has sparked the imaginations of scientists, artists and researchers. The cerebral cortex contains huge numbers of neurons. Activity of these neurons is to some extent synchronized in regular firing rhythms (brain waves). Electrodes placed in pairs on the scalp can pick up variations in electrical potential that derive from this underlying cortical activity. EEG signals are affected by the state of arousal of the cerebral cortex, and show characteristic changes in different stages of sleep. EEG signals are also affected by stimulation from the external environment, and brain waves can become entrained to external stimuli (ADinstruments, 2010).

The human brain is the center of the human nervous system and is a highly complex organ. Enclosed in the cranium, it has the same general structure as the brains of other mammals, but is over three times as large as the brain of a typical mammal with an equivalent body size (Abdullah and Omar, 2011).

Listening to music plays an important role among higher brain centers (Sakharov et al., 2005) With regards to music, brain plasticity likely occurs in different stages. The tonal arrangements in vocal and instrumental music (interval, melody, and harmony) generate physiologically coherent oscillations in the nervous system that is perhaps biological and evolutionary in nature, reminding the organism of the maternal lullaby of infancy and the mating calls of songbirds, thus capturing the listener/player’s attention. Listening, playing and practicing music activate selected ensembles of neurons and their connected regions repetitively in the manner of acquisition of learning and formation of memory. The learning-related changes in the brain are further reinforced by the emotion inducing effects of music. This property of music is perhaps due to the
arrangement of musical notes in a hierarchical structure that in some ways are parallel to the anatomical layout of the nervous system (Azizi, 2009).

Physiologically, music is apt to influence assemblies of neurons in a way that ultimately set in motion the pleasure and pain centers in the brain – probably the dopaminergic cells in the pathways of nucleus accumbens-septal circuits and amygdala – thus accounting to the happy or sad feelings evoked by music. Finally, repetitive playing of a significant piece of music generates familiarity with the tonal arrangements that makes a recognizable piece of music more palatable to the listener (Trainor, 2008). Music may have started as a spandrel of communication, however, its use in human communal rituals – for example, primal ceremonies, religious liturgy, military training – has allowed it to evolve as an independent activity and acquire a prominent place in human culture (McDermott, 2008). Music as a mechanical stimulator of the nervous system not only has the ability to evoke a spectrum of emotions and move individuals and/or groups, but also can leave a lasting imprint on the nervous system of individuals; and the band plays on (Azizi, 2009).

Human emotion and its relationship with brain activity in EEG are still partly understood. It is often noted that perception of music and affiliated emotions are highly culture-bound. As complex emotions, characterization of music feelings goes beyond the classic arousal, hedonic, and dominance dimensions. We have thus created a new music affective rating scales (MARS) to differentiate the musically induced moods. Chen and Zhao, (2008) examined whether happy and sad emotions would differentially influence the spectral EEG field powers.

Beta wave varying within the range of 13 Hz to 30 Hz is the usual waking rhythm of the brain associated with active thinking, intention or solving concrete problems. Normally it is found in normal adult. Rhythmic beta activity is encountered chiefly over the frontal and central region. The amplitude is normally under 30 µV and less than 20 µVpp (Abdullah and Omar, 2011).

This study was performed to evaluate the effect of temporal EEG signals while listening to Quran recitation. In order to strengthen the findings, hard rock music was compared to the Quran recitation.

**MATERIAL AND METHODS:**

Eleven healthy students (from Department of Biology) aged 20–24 years without special musical education took part in the tests. All subjects were right-handers with normal hearing and had the rhythm in the spontaneous EEG. The subjects sat in a special armchair with a headrest in a soundproof chamber. The EEG was derived from 3 leads according to the international system. The Program Powerlab data question system was used.

The appropriate electrode for this research is Ag-AgCl surface electrodes and applied with electrode paste. In this experiment EEG activity was record with two electrodes: a frontal electrode on the forehead, and an occipital electrode on the scalp at the back of the head. A third (ground or earth) electrode was also attached, to reduce electrical interference. In clinical EEG, it is usual to record many channels of activity from multiple recording electrodes placed in an array over the head. Before placing the electrodes, the electrode placement area using EEG abrasive skin prepping gel must be swept. The experiment was conducted at room temperature (25ºC) with air-conditioning. The room environment was under soundproof. Students were instructed to sit as their own comfortable. Then, the student was instructed to rest and listen to a piece of soft, hard music and Quran recitation for three minutes using headphone in opening and closing eye. Periods of EEGs at rest with eyes closed were recorded before and after task. The duration was 30 seconds for each rest. The subject’s eyes were closed while listening to the Quran recitation.

**Statistical Analysis:**

Statistical analysis for this study was performed using the GraphPad Prism software. The t-test correlation, descriptive statistics and analysis of variance (ANOVA) were used. It is important to test for a statistical significance of difference in original data.

**RESULTS AND DISCUSSION:**

These analyses examined the physiological responses to resting, listing to Quran, Soft and hard music during open and closed eye.

Figure 1 shows the magnitude of alpha wave for selected electrode during rest condition, listing to Quran, soft and hard music. The electrodes were chosen because of the electrodes positions that are similar to generate alpha wave of electrical activity in human brain. Eleven subjects were conducted to complete the three minutes of experiment to obtain their brain electrical activities. The highest magnitude for alpha waves are achieving 5.465, 3.952, 3.768, 3.379, 3.952, 2.753, 2.451, 1.640 µV during Resting Opened (RO), Resting Closed (RC) Quran closed eye (QC), Quran Opened (QO), Soft Closed (SC), Soft Opened (SO), Hard Closed (HC) Hard Opened (HO), respectively.
Because alpha waves are one type of brain waves detected by EEG and predominantly originates from the occipital lobe during wakeful relaxation with closed eyes. Alpha waves are reduced with open eyes and drowsiness and sleep. They are thought to represent the activity of the visual cortex in an idle state. Occipital alpha waves during periods of eyes closed are the strongest EEG brain signals. The alpha wave magnitude during listening to Quran recitation was higher compared to rest condition and listening slow and resting then to hard music. It means that Quran recitation produced a significant relaxation which may be due to that Quran has specific effect on human heart which lead to effect some hormone and chemical are responsible for relaxation (Abdullah and Omar, 2011).

REFERENCES:
ADinstruments. 2010. Experimental laboratory for the stuff. www.ADinstruments.com