

RESEARCH ARTICLE

ALPHA BRAIN WAVE ACTIVITY DURING LISTENING OF SURAH AL-INSYIQAQ USING ELECTROENCEPHALOGRAPHY (EEG)

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ABSTRACT

Background: More than 30 times earthquake occurred in Indonesia in the periode 2016-2017 and 23 times occurred in 2018. It made people more anxious. This is also a warning of the coming of the doom which is explained in several verses of the Qur'an. One of them is surah al-Insyiqaq. Understanding the meaning of this surah is expected to increase anxiety or feelings of surrender. These emotions can affect brain activity and can be recorded with Electroencephalography (EEG). To date, there has been no specific study of alpha wave activity when surah al-Insyiqaq is played between groups who understand the meaning of the surah and those who do not understand.

Objective: Comparing the alpha brain wave activity during listening surah al-Insyiqaq in the control group and the treatment group.

Method: This research is a study using experimental methods conducted on 20 subjects using simple random sampling. Subject were divided into two groups, the control

group and the treatment group. The treatment group was given a booklet, video and lecture about the contents of the surah. Brain wave activity was measured before and after the intervention using EEG during the subject listens to murottal of the surah.

Results: There is a significant difference in understanding the meaning of Surat al-Insyiqaq between the results of the post test control group and the treatment group that was previously given the intervention ($p=0,041$). The significance value of the difference in alpha wave activity in the two groups was performed using the Independent t test and obtained $p=0.033$.

Conclusion: Understanding surah al-Insyiqaq creates a feeling of calm and surrender to God. This can lead to greater alpha brain wave activity when listening to surah al-Insyiqaq than those who are not given an understanding of the meaning of surah al-Insyiqaq.

Keywords: alpha wave, electroencephalography, qur'an, surah al-Insyiqaq

BACKGROUND

From the data of the Meteorological, Climatological and Geophysical Agency (BMKG) in recent years, there has been a significant and destructive increase in earthquakes in Indonesia. In the 2016-2017 period, 31 earthquakes were recorded in several regions in Indonesia¹. In 2018 it increased with the recording of 23 earthquake that were classified as severe.² This makes people become more anxious. In the Qur'an, one of the surah that tells about earthquakes and doomsday events is surah al-Insyiqaq. Surah Al-Insyiqaq which consists of 25 verses tells the surrender of nature to the authority and command of Allah SWT. The earth and sky split up spewing all its contents so that the earth becomes empty when the Day of Judgment comes. In addition, also described the human condition on

that day and the accountability of his actions.³ By understanding the meaning of Surah Al-Insyiqaq, then listening to this surah can cause anxiety and discomfort. But it can also create feelings of calm and surrender to God.

One way to find conditions that are relaxed and calm is to use a device known as Electroencephalography (EEG). Relax condition will be described as Alpha waves. Alpha waves are brain waves that form at a frequency of 8-13 Hz. These waves are recorded primary in the posterior brain, especially in the occipital region and is known as posterior dominant rhythm (PDR). The amplitude and frequency of these waves are maximal in the occipital lobe and are attenuated by opening the eyes and can be maximized during relaxation and eyes closed. In this condition a person's brain will produce the hormones serotonin and endorphins which cause a person to feel comfortable, calm, and happy. If the

patient is tense, the PDR will not be recorded.^{5,6}

These waves are the result of differences in the electrical potential that exists in the cerebral cortex. The electrical potential comes from the thalamus which is emitted to all parts of the brain, especially in the cerebral cortex through the thalamocortical system. The presence of charging electrical activity in the membrane of neurons in the cerebral cortex is then recorded from the scalp through the EEG leads, producing images of brain waves with different frequencies.⁴ When the eyes are closed, the waves are dominant in the parietal region of the brain. These waves can also be recorded when the subject is awake or in relaxed condition. This wave is often said to be an indicator of general intelligence. The more waves, the smarter that person is.⁷

Murottal al-Qur'an is a Qur'an reading technique that has a melody. Some psychologists and nurses have learned many things about the effects of the Qur'an and report that listening to the Qur'an can reduce patient pain and anxiety.⁸ Thus, murottal al-Qur'an becomes one of the media that can affect emotional states or moods. Several previous studies have shown that someone who listens to the murottal of the Qur'an consciously can increase the relative strength of alpha, in contrast to the resting conditions. The research conducted by Abdullah (2011) showed that alpha waves when listening to murottal al-Qur'an are higher than resting condition while listening to music.⁹ This proves that one can relax and calm while listening to the Qur'an.

In this study, we want to find out the differences in the EEG acivity of alpha wave results in groups that have a better understanding of the meaning of surah al-Insyiqaq.

METHOD

This research is a study that uses an experimental method using 20 research subjects obtained through random

sampling techniques. Subjects were divided into 2 groups. In the treatment group, intervention was carried out 5 times (lecture method and discussion 2 times, giving a booklet about the meaning of surah al-Insyiqaq 3 times). Every intervention is monitored to find out the results. The sampling technique used is simple random sampling. The study was conducted from May to September 2018.

Research instrument uses multiple choice questions and essays questionnaire about the meaning of surah al-Insyiqaq verses 1-25, audio player, electroenphalography, and statistical analysis application.



Fig 1. Electroencephalography (EEG) recording process

Data collection and analysis

Data collection is done by assessing the results of the pre-test and post-test regarding the contents of surah al-Insyiqaq. Alpha wave activity is obtained from EEG recording in O1-O2 leads of the occipital region. The subject in the supine position opened his eyes while listening to surah al-Insyiqaq verse 1-25 from the recorded voice of Mishary Rashid Al-Afasy. All the data is transferred and processed using the SPSS 23.

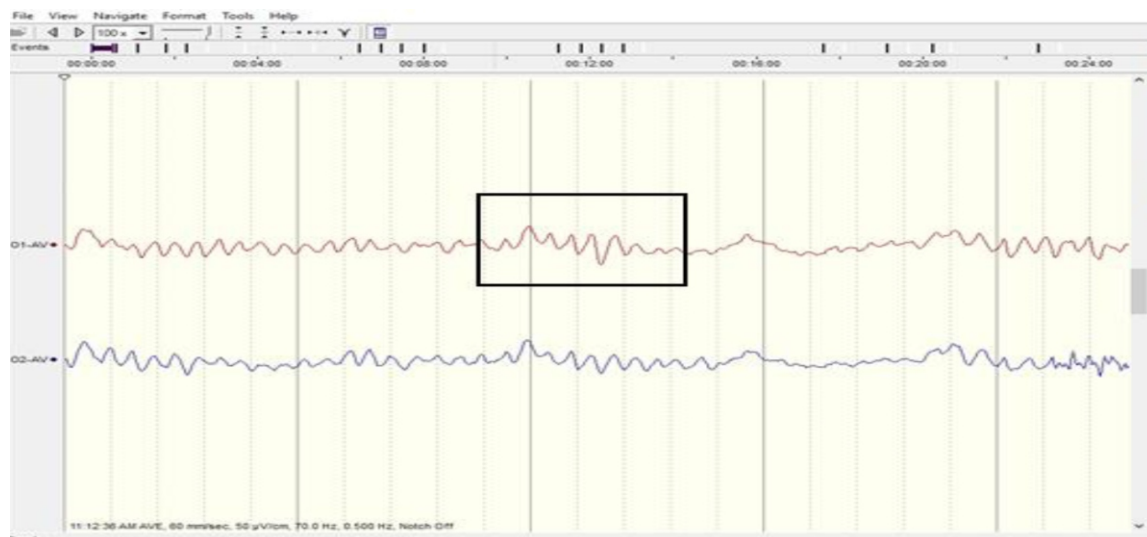


Figure 2. The alpha wave of electroencephalography

RESULT

a. Understanding of surah al-Insyiqaq

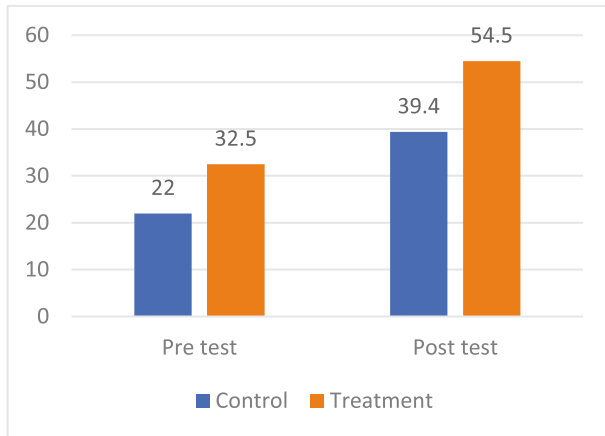


Fig 3. The understanding score in two groups before and after treatment

The pre-test results on understanding the meaning of Surah al-Insyiqaq in the control group were 22 and in the treatment group was 39.4. In the post test results there was an increase in both groups so that it became 32.5 in the control group and 54.5 in the treatment group. Normality test on the results of the post-test of the two groups using the Shapiro Wilk Test obtained p values of 0.380 and 0.208 which indicate a normal distribution. The results of the post-test of both groups after the unpaired t-test showed a significance value of 0.041. This means that there are significant differences between the results of the control group post test and the treatment group that was previously given the intervention. Thus the intervention provided by researchers can be said to be successful.

b. Alfa waves activity

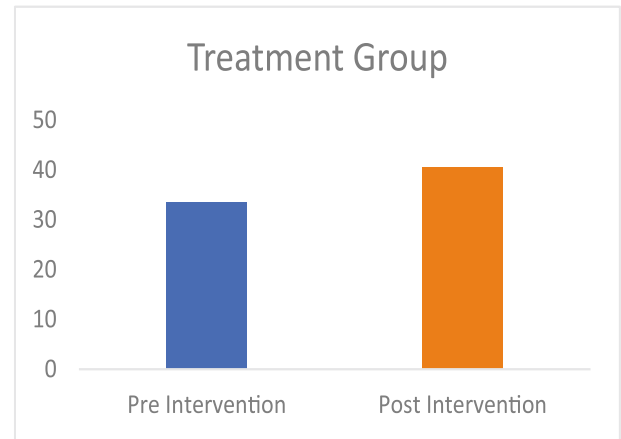
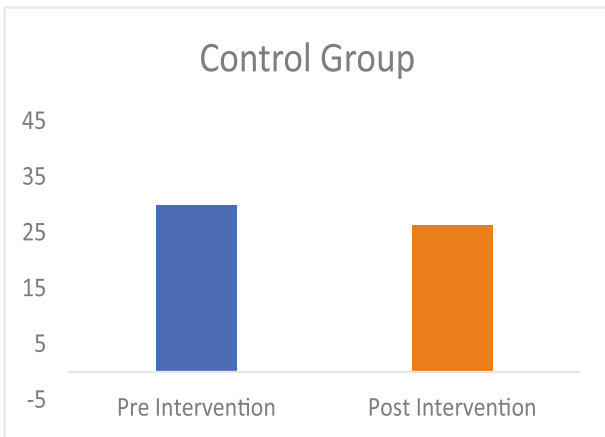


Fig 4. The activity of alpha waves in the two groups before and after treatment

The first measurements of alpha wave activity from the control and treatment groups were 29.9 and 33.5. In the second measurement that is after the intervention in the treatment group showed alpha wave activity increased in the treatment group to 40.5. Whereas in the control group it decreased to 26.2. The normality test showed a normal distribution in both groups (p value 0.041 in the control group and 0.425 in the treatment group). The significance value of the difference in alpha wave activity in the two groups was performed using the Independent t test and obtained $p = 0.033$. This shows a significant difference between the control group and the treatment group that was previously given the intervention. It can be concluded that the group that was given an intervention understanding the meaning of Surah al-Insyiqaq verses 1-25 can activate alpha waves.

DISCUSSION

From the results of the study showed a significant difference between the control group and the treatment group on understanding the meaning of the surah and also the alpha wave activity. This difference can occur because of the memory of knowledge about the meaning of the surah in the treatment group. When listening to Surah al-Insyiqaq, the sound waves are captured by the outer ear and then pass through the ear canal (meatus acusticus externa). This will vibrate the tympanic membrane which converts sound energy into mechanical energy. Mechanical energy in the tympanic membrane that occurs will vibrate the bones of the middle ear (maleus, incus, stapes) then vibrate the oval window. This will move the fluid in the inner ear and then move the hair cells in the cochlea. The movement of deep hair cells in the cochlea graded potential changes and changes in the rate of action potentials generated in auditory nerves. This hearing electrical impulse in the form of an action potential will deliver the auditory message to the cerebral cortex through the thalamus. Thalamus as a

transmitter station, which will also stimulate the limbic system, especially the amygdala as a place to store memory.¹⁰ This memory is about the contents of Surah al-Insyiqaq which is about the end of world life, humans will live level by level, the believers will receive their books from the right side and the ungodly receive their books from behind.³

When the research subject in the treatment group remembers the contents of Surah al-Insyiqaq, he recalls God. Emotional changes governed by the limbic system relaxes the mind and stimulates alpha wave formation. As explained in Surah Ar-Rad verse 28 which reads:

الَّذِينَ آمَنُوا وَتَطْمَئِنُّ قُلُوبُهُمْ بِذِكْرِ اللَّهِ أَلَا بِذِكْرِ اللَّهِ
تَطْمَئِنُّ الْقُلُوبُ ﴿٢٨﴾

“Those who have believed and whose hearts are assured by the remembrance of Allah. Unquestionably, by the remembrance of Allah hearts are assured.”³

The formation of alpha waves can also be caused by the surah chanting of the voice of Mishary Rashid Al-Afasy. This chanting triggers a feeling of relaxation or calm that will form Alpha waves. Recitation of the Qur'an is like a form of music that contributes to the release of endorphins by stimulating alpha waves.¹¹ Several previous studies have shown that someone who listens to the murottal of the Qur'an consciously can increase the relative strength of alpha, in contrast to the resting conditions. Research by Sekha (2013) shows that the highest alpha waves are obtained when listening to the Qur'an compared to Beethoven and Rock music both in opening eyes or closing eyes.¹² The same results when compared between listening to the Qur'an and classical music.¹³

CONCLUSION

Understanding Surah al-Insyiqaq creates a feeling of calm and surrender to God. This can lead to greater alpha brain wave activity when listening to Surah al-Insyiqaq than those who are not given an understanding of the meaning of Surah al-Insyiqaq.

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