

ANALYSIS OF THE EFFECT OF *ISTIGHFAR DHIKR* TO ADOLESCENT ANXIETY AT BETA WAVE ACTIVITY USING ELECTROENCEPHALOGRAPH (EEG) EXAMINATION

Alvania Nabila Tasyakuranti, Heni Sumarti*, Hamdan Hadi Kusuma, Istikomah, Irman Said Prastyo

Department of Physics, Faculty of Science and Technology, Universitas Islam Negeri Walisongo Semarang

Jl. Prof. Dr. Hamka Km.1 Kota Semarang, Jawa Tengah 50185, Indonesia

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ABSTRACT

Information related to deviants in the near future is often the case by a group of adolescents. Behavior that deviates from anxiety because of a problem in daily life. One way that is taught by Islam is listed in the Qur'an and hadith to reduce anxiety in a person is to do *istighfar dhikr*. Knowing the beta brain wave activity in anxiety and *istighfar dhikr* condition can be done using an EEG (Electroencephalogram). Beta waves are brain waves that are detected when a person feels anxious. Beta wave measurement method is calculated based on peaks or troughs per second on the beta signal type frequency (13-30Hz). The method in this research is an experiment with quantitative data collection. The sample used in this study were 8 students in Universitas Islam Negeri Walisongo Semarang with an age range of 20-23 years. The data analysis technique used is bivariate with Paired T-test. The results showed that the average beta wave in anxiety condition was 14.213 Hz and *istighfar dhikr* was 13.085 Hz. The result of the Paired t-test showed that $p = 0.002$ ($p < 0.05$) indicating that the decrease in beta waves in the brain is very significant. It shows that *istighfar dhikr* can reduce anxiety in adolescents.

Keywords: *Istighfar; Beta brain waves; Electroencephalography; Adolescent anxiety.*

Introduction

The period from childhood to adulthood is called adolescence. At this time, everyone will experience changes, both in attitude and behavior. In research journals it is written that the age range of adolescents according to the Population and Family Planning Agency (BKKBN) is a population aged 10-24 years and also unmarried.¹ According to an American psychologist, G. Stanly, in his scientific book, he explained that adolescence is a period of a person with conflict disorders and constantly changing moods, thoughts, actions, feelings that will cause anxiety and anxiety until it can be the cause of conflict in the environment.²

From the point of view of Islam, adolescence is an age that should be proud of, in addition to the process of growth and

development, but the most important thing is to prepare adolescents to become successors with religious provisions in integrating technological developments with the values of faith, morals, and knowledge.³ However, it is not uncommon for television to provide information related to behavioral deviations committed by a group of teenagers. Released in the Kompas daily news, that drug consumption by workers is calculated to be less than that of students, which is 2,287,492 while for workers there are 1,514,037.⁴ As explained by Hessler & Katz⁵ regarding several adolescent crises, such as the increasing cases of drug abuse, free sex deviations, and problems in adjusting.

Deviant behavior by adolescents begins with a disturbed mind because of a problem in their life. Feelings of fear and worry that are very deep are called anxiety. According to

*Corresponding author.

E-Mail: heni_sumarti@walisongo.ac.id

Mappiare, anxiety is a condition when a person feels confused from the existence of a problem that threatens him. Based on the data from Riskesdas in 2018, it was explained that depressive disorders have appeared since the adolescent age range, namely 15-24 years with a large presentation of 6.2%.⁶ Therefore, a strategy is needed to control emotions so that they can be directed to positive things. One way that has been taught by Islam and is listed in the Qur'an to reduce anxiety in a person is to do dhikr. Dhikr is an activity to remember Allah SWT that can be done anytime and anywhere. The definition of dhikr has been explained by Hidayat⁷ which is a series of sentences with the aim of remembering Allah SWT so that it can have health and psychological effects because it is influenced by the balance between serotonin and norepinephrine levels so that the heart and mind become calm. Previous research has proven that there is an effect of dhikr relaxation on reducing stress in students at tahfidz houses.⁸ Efforts to do dhikr to reduce anxiety have many types, and one of them is by doing istighfar. Sourced from previous research can prove that repentance and istighfar can reduce anxiety in a person.⁹

The medical world has introduced a tool to determine the activity of brain waves, which is called an electroencephalogram (EEG). EEG is a medical instrumentation invented by a German psychiatrist, namely Hans Berger in 1929.¹⁰ EEG can reflect human brain activity and is physiological data that can be used as a detection and diagnosis system for depression or other disorders.¹¹ To determine the condition of the brain, the EEG tool utilizes electrical activity and produces electrical signals that can detect and process data from brain signals. The brain signals obtained can be known through the intermediary of electrodes attached to the scalp.¹² Brain waves in humans are grouped into five types, namely delta, theta, alpha beta, and gamma waves. Sourced from Amara et al.¹³ for the classification of the frequencies of the types of signals on the EEG are as follows: delta (1-4 Hz), theta (5-8 Hz), alpha (9-12 Hz), beta (13-30 Hz) and gamma (>30 Hz). The action

potential comes from the influence of the magnitude of the intensity on the wave.¹⁴ Beta signals will appear when someone is feeling anxious, worried, and thinking hard.¹⁰ When this wave appears, hormones that can cause stress thoughts, namely cortisol and norepinephrine will be produced.¹⁵

Sourced from research conducted by Kurniasari¹⁶ to analyze the effect of murottal Al-Qur'an in patients at the ICU proving that murottal Al-Quran is able to reduce the patient's anxiety level. Further research conducted by Yunus et al.¹⁷ found that listening to the murottal Al-Qur'an can be taken into consideration in therapy to deal with stress. However, from several previous studies, no one has conducted research on the effect of remembering Allah with dhikr on reducing one's anxiety. Therefore, a study was conducted on several adolescents to determine the effect of istighfar dhikr on anxiety. This research was conducted using EEG medical instrumentation to determine beta wave activity.

Methods

In this study, type of research is quantitative research with an experimental approach. The variable used in this study is beta brain waves with a frequency range between 13 to 30 Hz. This is because beta waves will appear when anxiety. The research procedure as shown in Figure 1 consisted of three steps. The first step is the sample was asked to think about the cause of anxiety and the problems that were bothering his mind to obtain data. The second step is rest. Then the last step is the sample was asked to *istighfar* dhikr in his heart so that data would be obtained after treatment 2. Each treatment was carried out for 1 minute by taking data once each.

The sample is a control subject with criteria for late adolescence, physically and mentally healthy, and does not use drugs. The sample in this study were students of Universitas Islam Negeri Walisongo Semarang with an age range of 20-22 years. Late adolescence is the time when an individual is aged 18-22 years. This period is a period of consolidation

towards the adult period.¹⁸ On experimental research that is strictly controlled, when each group consists of between 8-10 subjects is considered adequate to get good results accurately,¹⁹ so that the sample in this study were 8 students. The sample was asked to fill out an informed consent as proof of consent to participate in this study.

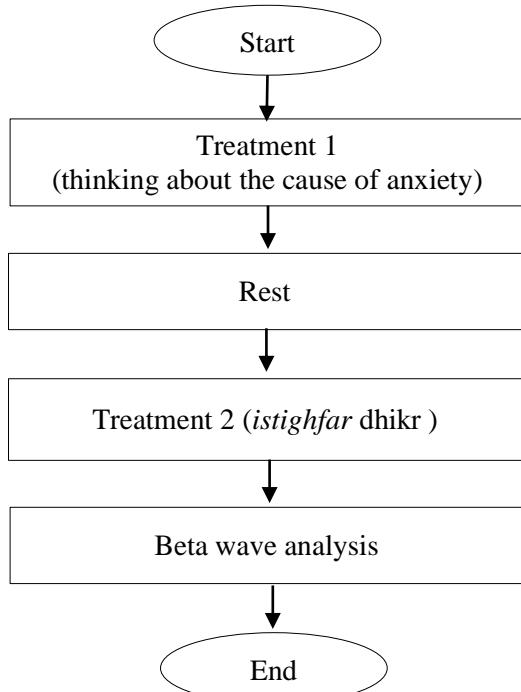


Figure 1. Research procedure

The recording of brain wave activity uses medical instruments KT88 EEG (Electroencephalogram) in Laboratorium Saintek Terpadu (LST), Universitas Islam Negeri Walisongo Semarang. It is equipped with 16 EEG Channels, 12 bit accuracy, 10M input impedance, and 5Vp-p Noise Level. The placement of the electrodes has been set according to international standards with a 10-20 mounting system as shown in Figure 2. The placement of electrodes on the scalp affects the amplitude and frequency of the EEG signal. The placement of electrodes is arranged based on the division of lobes in the anatomy of the human brain, namely Frontal (F), Parietal (P), Occipital (O), and Temporal (T).²⁰

The data analysis technique used in this research is the Paired T-test. The first stage is the data is tested using the Shapiro-Wilk normality test to determine the distribution of

the data. Furthermore, if the data is normally distributed, then the Paired T-test can be done. However, if the data is not normally distributed, then the data is transformed using transmission data before being tested using Paired T-test. Paired T-test is a hypothesis testing method in which the research sample received two different treatments.²¹ Based on the results of paired t-test analysis if the value ($p < 0.05$), then there is significant effect in cases of adolescent anxiety & *istighfar* dhikr. However, if the value ($p > 0.05$), then the *istighfar* dhikr has no effect on cases of adolescent anxiety.

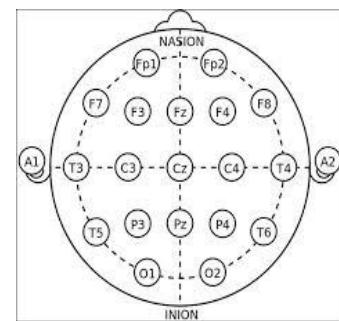


Figure 2. The placement of the electrodes EEG using 10-20 mounting system in

Result and Discussion

The result data retrieval process using EEG was carried out as shown in Figure 3. The research sample was in a relaxed sitting position and eyes closed. The recommended patient position is a relaxed and comfortable position, such as a problem or sitting back. Patients should feel relaxed to avoid disturbances, including muscle contractions of the head and neck muscles can cause artifacts on examination examination.²²⁻²⁴



Figure 3. Data retrieval process using EEG

The results of measuring the beta signal in one of the samples in a state of anxiety and dhikr *istighfar* are shown in Figure 4. Beta wave measurement method is calculated based on peaks or troughs per second on the beta signal type frequency 13-30 Hz.²⁵ There is a decrease in the beta signal from a frequency of 16 Hz to 14 Hz. During the first treatment recording, the sample was asked to think about problems in life with a sitting position and the brain waves that appeared were dominated by beta waves. These are the types of waves in the brain that are detected when a person is thinking hard, solving problems, being alert, and making decisions. The moment this wave appears, hormones that can cause stress, namely cortisol and norepinephrine will be produced.^{10,15,20}

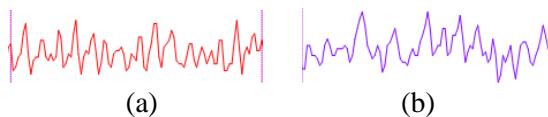


Figure 4. the results of beta wave measurements in conditions of (a) anxiety, and (b) *istighfar* dhikr

The results of the calculation of the average beta waves in conditions of anxiety and *istighfar* dhikr in 8 research samples are shown in Figure 5. The graph shows changes in beta brain waves in each sample decreased from anxiety to *istighfar* dhikr condition. The anxiety has EEG manifestations including a rapid increase in brain wave activity (beta rhythm), especially in the central part of the frontal cortex.²⁶ This means that beta brain waves will decrease with decreasing anxiety.

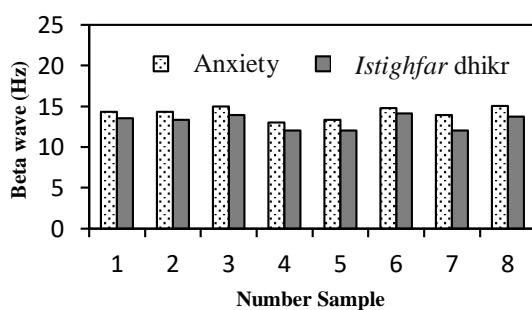


Figure 5. Graph of beta waves in conditions of anxiety and *istighfar* dhikr

The average beta wave in anxiety condition is 14.213 Hz and *istighfar* dhikr condition is 13.085 Hz. The results of the normality test using Shapiro-Wilk before and after transmission data are shown in table 1. The test results data in dhikr condition is not normally distributed because value ($p < 0.05$). Therefore, an attempt was made to convert the data into a normal distribution using the data transmission method. After the data transmission was carried out, the normalization test was carried out again and the data were normally distributed ($p > 0.05$).

Table 1. Normality test using Shapiro-Wilk before and after transmission data

Significance (p)	Anxiety	Dhikr
Before transmission	0.440	0.035
After transmission	0.440	0.075

Table 2 obtained a significance value of correlation of anxiety and dhikr condition. The result is 0.002, which means it has exceeded the critical limit ($p > 0.05$). The analysis test proves that before and after *istighfar* dhikr there is a significant difference. The average activity of beta waves in anxiety condition is higher than *istighfar* dhikr condition. This difference proves that *istighfar* can reduce beta wave activity in the brain at anxiety conditions.

Table 2. Paired T-test correlation of anxiety and dhikr condition

Paired sample test	Anxiety – dhikr
Significance (p)	0.002

In previous studies, adolescents with high stress produced beta waves. In severely stressed subjects, the initial EEG was beta waves but stress EEG examination showed theta waves of frustration and disappointment.²⁷ In this study, the condition of adolescent anxiety did not reach the stage of frustration and disappointment, so only beta waves appeared. After being given

treatment in the form of *istighfar* dhikr, beta waves decreased from 14.213 Hz to 13.085 Hz. This shows that the sample experienced a decrease in beta brain wave activity, which means that anxiety decreased after dhikr *istighfar*. This is in accordance with previous research on the effect of *istighfar* dhikr therapy on adolescent anxiety with a measuring instrument Beck Anxiety Inventory (BAI). The results showed that *istighfar* dhikr therapy has an influence in reducing anxiety levels in adolescents.⁹

Sourced from previous research conducted by Yunus et al.²⁸ with proving that listening to murottal, can help reduce psychological stress levels. The fact is that reducing anxiety levels can also be done with a very simple thing, namely with *istighfar* dhikr. As explained by Herdianto and Anggraini²⁹ that dhikr can reduce a person's stress, both physically, cognitively, emotionally, and behaviorally which can trigger an increase in blood pressure. *Istighfar* dhikr has the meaning of asking for forgiveness or in another sense someone asks Allah to cover or forgive his mistakes.³⁰ This study proves that *istighfar* dhikr can reduce anxiety in adolescence when facing problems in everyday life.

Conclusion

In recording brain signals, the average in anxiety and *istighfar* dhikr condition at beta waves were 14.213 Hz and 13.085 Hz, respectively. Calculation of the average beta wave decreased by 1.128 Hz. The result of Paired T-test show that $p = 0.002$ ($p < 0.05$), it indicate that the decrease in beta waves in the brain is very significant. Research proves that *istighfar* dhikr can reduce anxiety in adolescent when facing problems in everyday life.

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