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The Effect of Alpha Wave Audio and Theta Wave Audio on Brain Concentration Power in Students of the Faculty of Medicine, Sam Ratulangi University Class of 2019

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Abstract **Original Research Article**

Currently, many studies address the relationship between function and brain waves with medical diseases, psychological disorders, or human capacity to various subjects. One of them is by generating individual potentials using brainwaves. Alpha and theta waves in the learning process can be attributed to this brainwave therapy since these waves can improve brain performance to concentrate more on improving memory power and also intelligence. Alpha and theta waves can be listened to in everyday life, in the form of audio from the sound of music. This research is purely experimental (true experimental design) with a randomized pretest- posttest control group design research design. The subject of the study was a student of the Faculty of Medicine Class of 2019. The test method used is a method of measuring brain concentration power using alpha wave audio equipment and theta wave audio. The respondents in this study were 139 students. It was seen that there was an improvement in test results (brain concentration power) before and after exposure to alpha wave audio, where test scores of 9 (better category) increased from 18 students (12.95%) to 97 students (69.6%). The test results (Brain concentration) before and after exposure to theta wave audio showed an increase, from 20 students (14.38%) to 29 students (20.86%) on test scores of 10 (excellent category). From the T-test, significant results were found with a p-value of < 0.05, which is 0.000, which means that there is a difference before and after exposure to alpha waves and theta waves to brain concentration power. The conclusion obtained from this study is that there is an influence of alpha wave audio and theta wave audio on brain concentration power in students of the Faculty of Medicine, Sam Ratulangi University Class of 2019.

Keywords: Audio wave alpha, audio wave theta, power concentration brain.

INTRODUCTION

There are currently many studies that address the relationship between function and brain waves with medical diseases, psychological disorders, or human capacity in various subjects [1]. One of them is by generating individual potentials using brainwaves [2, 3]. An electroencephalogram (EEG) is a device used to measure and record human brain activity. Electroencephalogram activity is related to amplitude and frequency which is divided into 4 waves, namely alpha waves (8 – 13 Hz), beta waves (13 – 30 Hz), theta waves (4 – 7 Hz), and delta waves (0.5 – 4 Hz) [4]. Alpha waves are related to a relaxed and stressless state, which is related to creativity, relaxation, and visualization. Alpha brain waves (8 – 13 Hz) contrast sharply compared to beta wave conditions. A state of creativity and a feeling of fresh and healthy [2, 5]. Alpha brainwave conditions are ideal for contemplation, problem-solving, and visualization, acting as the gateway to our creativity. Theta waves are concerned with the state in which the mind becomes creative and inspirational [5, 6]. Associated with deep relaxation, meditation, and memory enhancement. Theta brainwave condition (4 – 7 Hz) appears when we dream on light sleep [4]. This Theta frequency is associated with the release of stress and the reminder of long memories. The "twilight" condition can be used for deeper meditation, resulting in improved overall health, sleep deprivation needs, and increased creativity and learning [7]. Alpha and theta waves in the learning process can be attributed to this brainwave therapy since these waves can improve brain performance to concentrate more on improving memory power and also intelligence [8, 9]. Buzzing, frequency, sound, or vibration can be a medium for brain waves according to their frequency. Alpha and theta waves can be heard in everyday life, in the form of audio from the sound of music [5].

MATERIALS AND METHODS

This research is purely experimental (true experimental design) with a randomized pretest-posttest control group design research design. The subject of the study was a student of the Faculty of Medicine Class of 2019 who met the inclusion requirements, namely willing to be a respondent by signing informed consent The Independent variables in this study are alpha wave audio and theta waves while the Dependent variable is brain concentration power. The test method used is a method of measuring brain concentration power using alpha wave audio equipment and theta wave audio. Testing the concentration power of the brain in the study subjects was carried out by providing several mathematical calculation problems before the use of alpha wave audio and theta wave audio and after the use of alpha wave audio and theta wave audio. The results of these calculations are compared in each measurement.

Table 1: Research Variables, Operational Definitions and, measuring instruments

Variable	Definition	Measuring Instruments	Parameters
Brain Concentration Power	In this study, brain concentration power was measured by giving several	math problems (counting)	The standards for measuring brain concentration power in this study are: a. Value 6 = sufficient b. Value 7 = more sufficient c. Value 8 = good d. Value 9 = better e. Value 10 = excellent
Alpha wave audio	Audio sound with a frequency of 8 – 12 Hz which is played using a mobile phone using a headset.	The wave audio used is taken from the https://youtu.be/skZVMB74vSM	
Theta wave audio	Audio sound with a frequency of 4 – 8 Hz which is played using a mobile phone using a headset.	The wave audio used is taken from the https://youtu.be/kaOjFdthxDU	

RESULTS AND DISCUSSION

The respondents in this study were 139 FK students. Data collection using alpha wave Audio taken from https://youtu.be/skZVMB74vSM and theta wave audio taken from https://youtu.be/kaOjFdthxDU.

The following are the results of the analysis of Brain Concentration Power data before and after exposure to alpha waves and theta waves.

Table 2: Descriptive statistical results of brain concentration power test scores before and After Alpha Wave Audio Exposure

Statistics	Before Exposure	After Exposure
Number of Samples	139	139
Lowest Value	6	7
Top Rated	10	10
Mean	8.22	9.02
Deviation Standards	1.04	0.64

In table 2, it can be seen, the scores of the brain concentration power test before and after exposure to alpha waves. The brain concentration power test scores before exposure to alpha waves with the lowest score of 6 and the highest score of 10. The average value is 8.22, while the standard deviation is 1.04. Brain concentration power test scores after exposure to alpha waves with the lowest score of 7 and the highest score of 10. Its average value is 9.02, while the standard deviation is 0.64.

Table 3: Frequency distribution and percentage of test results (Brain concentration power) before and After Alpha Wave Audio Exposure

Test Scores (Categories)	Before		After	
	n	%	n	%
6 (Enough)	7	5.03	0	0
7 (More sufficient)	19	13.67	5	3.6
8 (Good)	72	51.8	12	8.63
9 (Better)	18	12.95	97	69.6
10 (Excellent)	23	16.55	25	17.97
Total	**139**	**100**	**139**	**100**

Table 3 shows the frequency distribution and percentage of test results (Brain concentration power) before and after exposure to alpha wave audio. The results obtained were that before exposure with alpha wave audio, there were still those who got a test score of 6, namely 7 students (5.03%) while after exposure no one got a test score of 6. Before the alpha wave audio exposure, 19 students got a test score of 7 (13.67%), while after the exposure, only 5 students (3.6%) were obtained. In test score 8 there were 72 people (51.8%) before exposure to alpha waves and 12 people (8.63%) after exposure. Furthermore, before exposure to alpha wave audio, 18 people got a score of 9 while after exposure it increased by 97 people (69.8%). Students who scored 10 tests before exposure to alpha wave audio were 23 people (16.55%) and 25 people after exposure (17.97%).

Table 4: Descriptive statistical results of Brain Concentration Power test scores before and After Theta Wave Audio Exposure

Statistics	Before Exposure	After exposure
Number of Samples	139	139
Lowest Value	7	8
Top Rated	10	10
Mean	8.86	9.12
Deviation Standards	0.75	0.54

Table 4 shows the values of the Brain Concentration Power test before and after exposure to theta wave audio. The brain concentration power test scores before exposure to theta waves with the lowest score of 7 and the highest score of 10. The average value is 8.86, while the standard deviation is 0.75. The brain concentration power test scores after exposure to theta waves with the lowest score of 8 and the highest score of 10. Its average value is 9.12, while the standard deviation is 0.54.

Table 5: Frequency distribution and percentage of test results (Brain concentration power) before and After Theta Wave Audio Exposure

Test Scores (Categories)	Before		After	
	n	%	n	%
6 (Enough)	0	0	0	0
7 (More sufficient)	11	7.92	0	0
8 (Good)	17	12.23	13	9.35
9 (Better)	91	65.47	97	69.79
10 (Excellent)	20	14.38	29	20.86
Total	**139**	**100**	**139**	**100**

Table 5 shows the frequency distribution and percentage of test results (Brain concentration power) before and after exposure to Theta wave audio. It was obtained that after exposure to theta wave audio, there was a change in the test results, namely before the wave exposure 11 people got a test score of 7 and after exposure, no one got a test score of 7. In test score 8 there were 17 people (12.23%) before exposure to audio theta waves and after exposure reduced to 13 people (9.35%). The results of test scores of 9 before exposure to theta wave audio were 91 people and after exposure, the number increased to 97 people (69.79%). There were 20 people (14.38%) who scored 10 tests before exposure to theta wave audio and this increased in number to 29 people (20.86%) after exposure to theta wave audio.

The results of the analysis of the influence of alpha wave audio and theta waves on brain concentration power using the T-test, found a p-value result of < 0.05, namely 0.000 which showed that there was an influence of alpha wave audio and theta wave on brain concentration power in students of the Faculty of Medicine, Sam Ratulangi University Class of 2019.

CONCLUSION

Based on the results of research that has been carried out, it can be concluded that there is an influence of alpha wave audio and theta waves on brain concentration power in students of the Faculty of Medicine, Sam Ratulangi University Class of 2019.

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