Research Paper

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Correlation Between Anxiety and Alpha Appearance Time in Young Individuals

Medical Science

KEYWORDS : Anxiety, Alpha Appearance Time, Alpha Index, EEG

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ABSTRACT

The present era is an era of anxiety and stress. This limitation of time, learn to more and perform to more have given rise to more anxiety. Study of electrical activity of the cerebral cortex provides an ideal measure of anxiety state and anxiety affects EEG in a predictable way. Purpose of this study is to explore correlation between anxiety and delay in alpha appearance in EEG of young medical students. Sampling is random and sample size is 120 young medical students. Present study shows correlation between delayed alpha appearance time in EEG and anxiety score.

Introduction-

Stress to perform is ever increasing both mentally and physically in our modern era of throat cut competitions. The present era is an era of anxiety and stress. With the encroachment of knowledge, the need to learn more and retain more in limited life span has put on lots of significance. This limitation of time, learn to more and perform to more have given rise to more anxiety. "Anxiety is the individual's reaction to the invasion of his conscious mind by irrational forces and images from the collective unconscious which serve as a threat to the orderly, stable existence of the individual", said Jung(1956)in his definition of anxiety.

Some psychologists conducted studies relating anxiety with academic performance with special reference to the stimulus of drive and taking into account its vitalizing utility in their theory, they concluded that high anxiety groups are undoubtedly superior in academic performance to the low anxiety groups.

Since Freud's conceptualization of anxiety in 1894, frequent researches on anxiety have been done. There are two different aspects to measure the anxiety. One is psychological tests which are used with statements based on symptoms experienced during anxious states and another is physiological tests that use physiological parameters such as changes in heart rate, blood pressure, respiratory rate, cardiac output, forearm blood flow, pulse volume and rate etc. The psychological tests measure self-estimated subjective anxiety scores while physiological changes indicate the person's reactivity to stressful conditions.

Electroencephalography is an electrophysiological monitoring method to record electrical activity of brain. EEG measures voltage fluctuations resulting from ionic current within neurons of brain. It is typically noninvasive technique, with the electrodes placed along the scalp. In clinical context, EEG refers to the recording of brain's spontaneous electrical activity over a period of time, as recorded from multiple electrodes placed on the scalp. Since all electrical activity of cerebral cortex directly related with mental activity of brain hence mental ability is the function of cerebral cortex and stress is one of the most common mental activity. Anxiety state is a type of the most common stress. It is logical therefore, to have a measure of anxiety from cortical function. Study of electrical activity of the cerebral cortex provides an ideal measure of anxiety state and anxiety affects EEG in a predictable way; hence observations are reproducible, qualitatively and quantitatively. Occurrence of alpha wave and alpha occurrence in unit time (alpha index) is related to mental relaxation. So, reduced alpha index or absence of alpha wave or, delay in appearance of alpha after beginning to relax mentally should give us measurement of anxiety state. In trials, alpha index measurement involved long and cumbersome computations as compared to alpha appearance time measurement i.e. time for alpha pattern to appear after closure of eyes. Alpha appearance time is very simple to measure and involves only one time measurement.

Objective of Study

Purpose of this study is to explore correlation between anxiety and alpha appearance time of EEG in young medical students.

Material and Method:

The present work was undertaken in department of physiology, N.S.C.B. Medical College, Jabalpur, M.P. The subjects comprised of both male and female 120 young medical students of age group 18 to 21 years, selected randomly, studying in first M.B.B.S.classes.

Anxiety Test: For discriminating anxiety-prone, anxious and hyperanxious students from the normal students in the study group, students were given Sinha's Comprehensive Anxiety Test (SCAT) booklets on a separate day. Nature of test was explained to them. There was no time limit for anxiety test. The test booklet contained 90 questions, each of which was to be answered in Yes or No only. The students were explained that no answer was completely right or wrong. They were requested to be honest in their approach, to answer the question in yes or no only; and to answer all the questions.

At the end test booklets cum answer sheets were collected from students, and then evaluated. To each question, for which the response was 'yes' in an answer, a score of (1) was allotted, whereas to each such question for which the response was 'No' in answer, a score of (0) was given. Then total score was calculated. Based upon their scores, various levels of anxiety of students were determined as follows

MALES	FEMALES	ANXIETY LEVEL/ STATUS
Upto	Upto	
12	13	Extra low anxiety
15	16	Low anxiety
23	25	Normal
29	28	High anxiety
30 & above	29 & above	Extra high anxiety

EEG RECORDING FOR ALPHA APPEARANCE TIME:

For recording of EEG, Medicare 8-channel EEG Machine was

used. Students were instructed to come with certain preparations. They were requested to wash their hair and scalp with soap or preferably shampoo and not to apply any oil to their hair or scalp on the day their EEG was to be done.

The EEG of students was recorded on Medicare 8-channel EEG Machine using 10/20 international system of electrode placement over scalp. EEG recording was done for 1 minute, with the subject's eyes open. Then the subject was asked to close his eyes. The genesis/appearance of alpha wave was studied in the posterior i.e. occipital lobes bilaterally. Calculation of alpha appearance time was done as follows:

Because EEG paper moved at a speed of 5 cm = 50 mm in 1 second i.e. 1000 milliseconds. Therefore, 1 mm distance on EEG paper represented 20 milliseconds. Distance on EEG paper from the point of closure of eyes to appearance of alpha wave was measured. This distance in mm when multiplied by 20 gave the alpha appearance time, in EEG, in milliseconds

Observation:

Table- 1

Table showing anxiety score in whole sample, male and female groups

Cases	Number	Mean Anxiety	t value	p value
Total Male Female	120 62 58	23.08±14.09 24.76±15.34 21.29±12.53	1.36	>.05

From the above it is apparent that there is no significant difference in the anxiety status of male or female subjects

Table- 2

Table showing mean alpha appearance time in all cases, male and female groups

Cases	Number	Mean Alpha Appearance Time (in milli seconds)	t value	p value
Total Male Female	120 62 58	573.46±311.78 606.29±318.86 538.36±302.83	1.20	>.05

Here again, table is clearly depicting that there is no significant difference in Mean Alpha Appearance Time in either sex group.

Table- 3

Table showing correlation coefficient between alpha appearance time and anxiety

	Mean Value	No. of Cases	Correlation Coefficient	t-value	Significance
Anxiety Score	23.08±14.09	120	.5818	7.770	p< .00001
Alpha Appearance Time	573.46±311.78				

From the above it is apparent that there is very high significant correlation between alpha appearance time and anxiety state.

Discussion and Conclusion :-

The subjects chosen for this study (n= 120) were young medical students having a mean age of 18.90±0.95 years. Males (n= 62) among them were averaging 19.01±1 years and females (n= 58) averaged 18.78±0.88 years. There was no statistically significant age difference between male and female groups; and they formed a single age group.

Anxiety scores of all subjects had a mean of 23.08±14.09, while males had a mean anxiety score of 24.76±15.34 and females had a mean anxiety score of 21.29±12.53. The difference between mean anxiety scores of male and female subjects was statistically insignificant at 0.05 level of probability. Hence, here too, the entire study group can be treated as single [Table 2].

Alpha appearance time of whole group was 573.46±311.78 milliseconds while that of male and female groups were 606.29±318.86 milliseconds and 538.36±302.83 millisecsond, respectively. The difference in mean alpha appearance time in male and female groups at 0.05 level of probability was statistically insignificant; once again confirming that the entire group can be treated as single [Table 3].

Sinha's Comprehensive Anxiety Test, showed statistically significant correlation with anxiety and Alpha appearance time in EEG had a statistically significant correlation with anxiety., [r= .5818 and P< .00001].

The results of the present study show that alpha appearance time in EEG parallels the anxiety score measured by Sinha's Comprehensive Anxiety Test [r= 0.5818] [Table-3]. Thus alpha appearance time measurements can be used to judge the anxiety state of an individual.

REFERENCE

1. Basowitz, H; et al Anxiety and stress.New York, McGrew Hill, 1955. | 2. Berger, H Hans Berger on the electroencephalogram of man. 1931. English translation by P. Gloor in Electroenceph. Clin.Neurophysio, 1969; suppl. 28: 133-150. | 3. Euler quoted by Upadhyay, Sripathy, Anxiety, a multidimensional study, Rupa Psychology Centre, First Edition, 1978; 128. | 4. Iyer Rajan, A., Correlation of Anxiety& EEG Pattern in Young Adults , IJAR Volume : 4 Issue : 2 Feb 2014 ISSN - 2249-555X | 5. Iyer Rajan, A., Effect of Short Term Shavasan Practice on EEG Pattern in Young Adults, IJSR Volume : 3 Issue : 2 February 2014 ,ISSN No. 2277 – 8179. | 6. Iyer, A., A study of correlation of anxiety, cold presser test response, EEG pattern | and memory in young healthy adults and effect of Shavasan on them-Thesis for | M.D. Med College Jabalpur 1996- Personal communication. | 7. Kaye, D. et al The effect of test anxiety on memory span in a group test situation- J. Consult; Psychol.- 1953; 17: 265-266. | 8. Korchin, S. et al Visual discrimination and the decision process in anxiety- Arch. Neuro. Psychiat- 1957; 78: 425-431. | 9. Moldowsky, S. and Moldowsky, Patricia C. Digit span as an anxiety indicator- J. Consult.Psychol- 1952; 16: 115-118. | 10. Mundy-Castle, A. C., The relationship between primary- secondary function and the alpha rhythm of the electroencephalogram, J. Nat. Inst. Personnel Res, 1978; 6, 95-102. | 11. Snyder, C.R. and Katahan, M. The relationship of state-anxiety, feedback and ongoing self-reported affect to performance in complex verbal learning- Am. J. Psychol, 1970; 83:2:237-247. | 12. Spence, K. W. and Haggard, quoted by Upadhyay, Sripathy, Anxiety a multidimensional study, Rupa Psychology Centre, First Edition, 1978; 65-66. | 13. Spence, K. W. and Taylor, J. Psychology of Learning and Motivation, Mc Graw Hill, First Edition, 1971; 13. | 14. Spielberger, C.D. The effect of anxiety on complex learning and academic achievement-In Charles D. Spielberger's [Ed]-Anxiety and Behaviour- New York; Academic press- 1966. | 15. Ulette, G.A. et al, Psychiatric screening of flying personnel: Development of empirical scales for the prediction of anxiety proneness from the EEG- Sch. Aviat. Med. Rep. 1953 a, Proj. No 21- 0202-0007 No 4. | 16. Ulette, G.A. et al, Psychiatric screening of flying personnel: Further studies towards the development of an EEG screening technique- Sch. Aviat. Med. Rep. 1953 b, Proj. No 21-0202-0007 No 5. | 17. Ulette, G.A. et al, The EEG and reaction to photic stimulation as an index of anxiety proneness- Electroenceph. Clin. Neurophysio, 1953 c, 5: 23-32. | 18. Venkatramaiah, S.R. Exploratory study of manifest anxiety in mental patients- D.M. and S.P.-Dissertation- Bangalore University, 1960. | 19. Walker, Ronald E. and Spence, Janet Taylor Relationship between digit span anxiety- J. Consult. Psychol, 1964; 28[3] 220-223. |