EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 3
Issue: 5
319-321
Year: 2016

ELECTRODERMAL ACTIVITIES OF THE PROFESSIONAL TEACHER TRAINEES OF YOGA AND PHYSICAL EDUCATION

[1]*T. K. Bera, [2]A. K. Barik, [3]Manasi Bera, [4]R. Biswas, [5]Vinod Kumar and [6]S. U. Shete

[1]Principal, Bharati Vidyapeeth Deemed University College of Physical Education, Dhankawadi, Pune-411 043 (India).
[2]Director of Research, VTIPE'S Research Centre for Human Excellence, Education and Health Sciences, Garhbari, Nazir Bazar, Kismat Bajkul (Purba Medinipur), West Bengal -721 655 (India).
[3]Principal, Kadambini Women's College of Education, Garhbari, Nazir Bazar, Kismat Bajkul (Purba Medinipur), West Bengal -721 655 (India).
[4]Medical Officer, VTIPE'S Research Centre for Human Excellence, Education and Health Sciences, Garhbari, Nazir Bazar, Kismat Bajkul (Purba Medinipur), West Bengal -721 655 (India).
[5]Research scholar, Master of Philosophy, Bharati Vidyapeeth Deemed University College of Physical Education, Dhankawadi, Pune-411 043 (India).
[6]Research Asst. (Biochemistry), Scientific Research Department, Kaivalyadhama Yoga Research Institute, Kaivalyadhama, Lonavla-410 403, Maharashtra (India).

***Corresponding Author: Dr. T. K. Bera**
Principal, Bharati Vidyapeeth Deemed University College of Physical Education, Dhankawadi, Pune-411 043 (India).

Article Received on 28/02/2016 **Article Revised on 19/03/2016** **Article Accepted on 10/04/2016**

ABSTRACT
The Electrodermal activity (EDA) covers updated information on brain imaging techniques, which provide further insight into the brain mechanisms facilitating autonomic function, emotional balance, cognitive processing etc. The present investigation aims at assessment of electrodermal activity of the teacher trainees of yoga and physical education that can predict the cognitive states, arousal, emotion and attention level. The EDA (unit: microsiemns) on sixty teacher trainees (n=60; yoga trainees: 30 and physical education trainees: 30) were assessed by Biopac machine (invented by Jean Charcot in the Russian scientific research Laboratory, validity: 0.95 and reliability: 0.98). The yoga teacher-trainees were from Kaivalyadhama yoga research institute (Lonavla, India), whereas the physical education teacher-trainees were from Bharati Vidyapeeth University's College of Physical Education (Pune, India). The EDA scores of yoga trainees and physical education trainees were compared employing t-test. The result revealed that the peripheral skin resistance of yoga group was lower and it was found higher in the physical education group ($t=12.372$, $p<0.01$). This, in turn suggests that yoga is better than physical education in dealing with psychophysiological relaxation that might have lowered peripheral skin resistance in attributing a balanced state of cognitive aspects, arousal, emotion and attention level that are important for human to live a peaceful life.

KEYWORDS: electrodermal activities, yoga, physical education.

INTRODUCTION
Electrodermal activity (EDA) is one of the most frequently used psychophysiological evaluations.[1] The Electrodermal activity covers updated information on brain imaging techniques such as PET and MRI, which provide further insight into the brain mechanisms underlying EDA. The discovery of electrodermal activity on the electrical changes in human skinbetgan was done over 100 years ago in the laboratory of Jean Charcot, the French neurologist, who was famous for his work on hysteria and hypnosis. Vigouroux (1879) through a collaborated of Charcot measured tonic skin resistance level from various patient groups as a clinical diagnostics sign.[2] In the same laboratory, Fere (1888) found that by passing a small electrical current across the two electrodes placed on the surface of the skin, the skin became momentarily a better conductor of electricity.[3] After that, the Rushian physiologist Tarchanoff (1890) reported that one could measure changes in electrical pontenial between two electrodes placed on the skin without applying on external current.[4] Hence, Fere and Tarchanoff are said to have discovered the two basic methods of recording electrodermal activity in use today. In terms of peripheral mechanisms, Vigouroux proposed what become known as "vascular theory" of EDA, which reveals that changes in skin resistance depend on the changes in the blood flow.

Nilsson, Hultmen, and Wiesel (2006) revealed that the patients with schizophrenia have reduced sensitivity and

lower electrodermal activity (EDA) that indicates slower vasodilation reaction in the patients.[5] Psychod (1998) indicates that the patients with many obstetric complications had lower levels of electrodermal activity and many investigators supported the similar findings.[6,7] Moreover, brain activities assessed by functional magnetic resonance imaging (fMRI), are associated with the individual differences in electrodermal responses.[8] Further, chronic fatigue syndrome (CFS) is a common symptom of depression was evaluated by bilateral electrodermal and skin temperature responses in dextral females.[9] Thus, EDA has been closely linked to autonomic, emotional and cognitive processing and it is a widely used as a sensitive index of the emotional processing and sympathetic activity. This coupling between cognitive states, arousal, emotion and attention enables EDA to be used as an objective index to evaluate emotional states. Such emotional states, in fact, differ from person to person and profession to profession. In this investigation, EDA of professional teachers of yoga and physical education have been evaluated, which will help them to transact better teaching learning process in enhancing as well as controlling cognitive states, arousal, emotion and attention. The objectives of this study were to assess the EDA (electrodermal activities) of professional teachers of yoga and physical education and to compare the EDA of professional teachers of yoga and physical education.

MATERIALS AND METHOD

The population of this study was the male Indian teacher-trainees, age ranges from 20-30 yrs, studying in the areas of yoga and physical education. Sixty (n=60) male teacher-trainees (i.e., 30 from yoga and 30 from physical education) of the same age group, who are consented and willing to participate in this investigation, were identified using purposive sampling technique, where age, body weight and height were matched**.** The yoga teacher-trainees belonged to Kaivalyadhama yoga research institute (Lonavla, India) and physical education teacher-trainees from Bharati Vidyapeeth University's College of Physical Education (Pune, India) participated in this investigation.

Inclusion and Exclusion Criteria

Only male healthy students, who are regular in the courses (yoga and physical education) were included. However, the trainees, who are not clinically healthy and not consented to participate, were excluded.

Measurement of Electrodermal Activity (EDA)

Electrodermal Activity (EDA) has been studied by using Biopac instrument (Fig.1) invented by Jean Charcot in the Russian scientific research laboratory in 1995. The validity and reliability co-efficients of the instrument were 0.95 and 0.98 respectively. The unit of EDA measurement is microsiemns.

The data on EDA was recorded for the subjects on March 14-16, 2014 at 10:00 a.m. to 12:00 noon. The reading of each subject was taken in the supine laying position after placing one electrode strip on the right wrist and two electrode strips on both legs near the Ankle (Fig.2). Readings were taken from every individual subject in a complete resting position. The value of EDA reading was taken in Microsiemens units (Fig.3). The EDA was measured in a semi-sound proof room, where room temperature was mostly identical.

Fig.1 Biopac instrument

Fig.2 Measuring EDA

Fig.3 Computerized EDA signals

Statistical Analysis

Independent t-test was used to analyze and compare the EDA data of two types of teacher trainees (viz., yoga and physical education).

RESULTS AND DISCUSSION

The results as presented in Table 1 revealed that the mean EDA values of yoga group and physical education group were 0.74 microsiemns (± 0.09) and 1.73 microsiemns (± 0.16) respectively.

Table 1 Comparison of mean electrodermal activities (EDA) between the teacher trainees of Yoga and Physical Education.

Sr. No.	Subjects	No. of Sample	M	SD	SEM	df	t-value
1.	Yoga	30	0.74	0.09			
2.	Physical Education	30	1.73	0.16	0.03	58	12.372*

Tabulated t (58)=2.002

The comparative findings also indicate that the calculated t-value is 12.372 which is greater than the tabulated value 2.002, hence there exists statistically significance difference in the EDA between the teacher trainees of yoga and physical education (t=12.372, p<0.01). Moreover, the mean values of EDA reveal that teacher trainees of yoga had less electrical resistance in the surface of skin than the trainees of physical education. This result, in fact, helps to interpret that yoga trainees possess lower skin-resistance. Appearance of such results, in turn, suggest that yoga teacher trainees possess better relaxation which in turn results into less anxiety, low depression as well as less tension, balanced autonomic function indicating proper brain activity and facing minimum problems in cognitive aspect etc. Further, since the yoga trainees possess lower skin-resistance, they might have increased peripheral blood circulation that leads to vasodilation and supports the vascular theory.[10, 11]

On the contrary, the mean score of EDA of the trainees in physical education was significantly higher than yoga trainees. This infers that peripheral skin resistance is higher among the trainees of physical education and, therefore, they feel higher level of anxiety, depression, workload-tension, problems in cognitive aspect etc., at the time of any competition or any muscular work. The rise of such affective psychological determinants, in turn, results into restriction in blood flow to muscles of various physiological organs and reached a state of vasoconstriction. It seems physical education teacher trainees possess poor relaxation ability which in turn results into more anxiety, higher depression as well as excessive tension, imbalanced autonomic function indicating improper brain activity and facing maximum problems in cognitive aspect etc. Appearance of such result suggests for warm up activities prior to participate in a tough muscular event in games and sports, which improves vaso dilation and minimize skin resistance.

CONCLUSION

The above findings indicate that the skin is a selective barrier that serves the function of preventing entry of foreign matter into the body and selectively facilitating passage of materials from the bloodstream to the exterior of the body. It aids in the maintenance of water balance and of constant core body temperature, functions accomplished primarily through dilation. In this connection, electrodermal activities of yoga teacher trainees were found better than the teacher trainees of physical education.

REFERENCES

1. Boucsein, Wolfram. Electrodermal activity. Plenum: Medical science Press, 1890; 23(3): 442.
2. Dawson ME, Shell AM, Fillion DL. The electrodermal system. In handbook of Bouscein Electrodermal Activity, 2007; 34(3): 160-174.
3. Dube A, Duquette M, Roy M, Lepore F, Duncan, G, Rainville, P. Brain activity associated with the electrodermal activity to acute heat pain. Neurology Med., 2009; 45(1): 169-180.
4. Fere. Small electric current passing across the two electrodes. In handbook of Bouscein Electrodermal Activity, 1888; 34(3): 113-123.
5. Nilsson BN, Hultmen CM, Wiesel FA. Niacin skin-flush response and electrodermal activity in patients with schizophrenia and healthy controls, prostaglandins, leukot essent fatty acids, Epub, 2006; 74(5): 339-46.
6. Pazderka-Robinson H, Morrison JW, Flor-Henry P. Electrodermal dissociation of chronic fatigue and depression: evidence for distinct physiological mechanisms. International Journal of Psychophysiology, 2004; 53(3): 171-182.
7. Psychod, J Abnorm. Electrodermal activity and obstetric complication in Schizophrenia, US national library of Medicine, National institute of Health, 1998; 107(2) 228-37.
8. Roth WT, Goodale J, Pfefferbaum A. Auditory event related potentials and electrodermal activity in medicated and unmedicated schizophrenics. Biological Psychiatry, 1991; 29(6): 585-599.
9. Tarchanoff. Method of recording electrodermal activity. Plenum: Medical science, Press, 1890; 23(2): 127-132.
10. Turpin G, Grandfield T. Electrodermal activities. 2nd ed., UK: University of Sheffield, Encyclopedia of stresses, 2007; 39(2): 899-902.
11. Vigouroux. Electrodermal activity. In handbook of Bouscein Electrodermal Activity, 1879; 43(5): 242.