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Effect of an intermittent photic stimulation (IPS) on electroencephalogram (EEG) of females with premenstrual dysphoric disorders (PMDD)

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Many women with regular menstrual cycles report unpleasant physical and/or psychological symptoms just before the menstrual cycle begins. For many women, these symptoms are mild and tolerable. However, for some women, these symptoms can be disabling and may cause significant disruption in their lives and are often reasons for seeking a medical treatment. These symptoms together are called as premenstrual syndrome (PMS), and with the modern concept, the severe form of PMS is named as premenstrual dysphoric disorders (PMDD). The study was conducted on thirty females with PMDD, selected on the basis of inclusion and exclusion criteria, and research criteria, Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV). All the participants were explained about the procedure and written consent was taken. Anthropometric and cardio respiratory variables were recorded followed by EEG recordings with 5, 10, 15, 20, 25, 30 Hz frequencies of intermittent photic stimulation. The first recordings were taken before menses started or during peak of symptoms reported and were repeated immediately after menses were over. EEG recordings were dissected out into its constituent frequency bands by Fast Fourier Transformation. The data of EEG power spectra were non-normally distributed, hence subjected to log transformation and statistical analysis was done. The EEG power spectra were expressed as mean ± standard deviation. Paired sample t test was used to compare the anthropometric, cardio-respiratory variables, and the premenstrual EEG power spectra with post menstrual EEG power spectra. The premenstrual EEG power spectra or the EEG power spectra during the peak of symptoms as compared to the postmenstrual EEG power spectra showed a significant ($p<0.05$) increase in Beta activity over frontotemporoparietal (F3, C3, T3 and P3) area of left hemisphere which concludes that the increased in beta activity at most of the sites of left hemisphere under intermittent photic stimulus before menses or during the peak of symptoms of PMDD is indicative of presence of anxiety, stress, insomnia, and obsessive or negative thought.

Table1. Comparison of EEG power spectrum between premenstrual and postmenstrual recording under various frequency bands.

	Electrode sites		Fp1	F7	T3	T5	F3	C3	P3	O1
5Hz	Premenstrual	Mean ± SD	93.15 ± 120.29	23.91 ± 21.50	28.53 ± 26.88	36.71 ± 26.07	37.31 ± 24.11	44.21 ± 29.12	55.38 ± 31.79	56.64 ± 32.89
	Postmenstrual	Mean ± SD	83.64 ± 66.54	23.83 ± 32.62	15.95 ± 11.06	24.69 ± 16.71	24.08 ± 13.28	28.15 ± 15.28	45.29 ± 37.25	47.45 ± 35.39
		p	NS	NS	0.013	NS	0.007	0.014	NS	NS
10 Hz	Premenstrual	Mean ± SD	140.28 ± 191.37	34.34 ± 31.69	35.01 ± 37.07	50.25 ± 38.44	46.30 ± 35.12	53.22 ± 38.53	69.32 ± 43.46	86.69 ± 55.83
	Postmenstrual	Mean ± SD	120.05 ± 83.62	35.45 ± 49.71	17.17 ± 12.58	28.70 ± 20.01	26.07 ± 14.24	33.78 ± 15.62	50.85 ± 35.87	55.88 ± 34.46
		p	NS	0.003	0.018	0.007	0.029	NS	0.009	NS
15 Hz	Premenstrual	Mean ± SD	270.91 ± 473.88	70.78 ± 91.41	74.11 ± 108.06	73.59 ± 95.17	90.05 ± 105.76	101.54 ± 115.55	109.81 ± 105.14	100.86 ± 76.24
	Postmenstrual	Mean ± SD	221.98 ± 282.28	70.39 ± 126.14	22.70 ± 29.23	31.38 ± 23.88	31.93 ± 22.13	41.87 ± 26.03	61.88 ± 48.59	71.56 ± 66.90
		p	NS	0.002	0.015	0.001	0.002	0.017	0.029	NS
		Mean	214.53	57.88	54.22	68.37	61.36	76.92	96.11	114.80

Biography

Binu Shrestha is an Assistant Professor at Trinity School of Medicine as Instructor in the Department of Neuroscience. Prior to coming to Trinity, she was working in as Assistant Professor at Nepalese Army Institute of Health Sciences, Kathmandu, Nepal. She received her Medical degree (MBBS) from College of Medical Sciences, Bharatpur, Nepal. She completed her three years Residency in Basic and Clinical Physiology from BP Koirala Institute of Health Sciences, Dharan, Nepal. She also had received Advanced Neuroscience Training at Monash University under IBRO. Binu's teaching includes teaching medical students Neuroscience and Cell molecular Biology. After graduating as medical doctor she got interest on academic and research activity more than clinical practice. She is currently working on the research project "Prevalence of Diabetic Neuropathy among the populations of St. Vincent and the Grenadines", "Effect of Personality on Personal Burnout in Trinity School of Medicine Students". She is also doing course on Essential Skills Medical Education. Her research interests are in the field of Neuroscience, Electrophysiology, Medical education.

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