

Drug Addiction Students and Heart Rate Variability Biofeedback: A Study on Solat Effect

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Abstract: - Nowadays, addiction is a common problem of all over the world and its severity is increasing day by day. The most alarming fact is that addiction is going to be famed among youths. To address this social disease heart rate variability biofeedback (HRV BFB) may be one of the simple approaches, which analyzes the joint time/frequency of the beat-to-beat changes in the heart rate or rise and fall of heart rate. HRV BFB is used as a tool for self-regulating physiological conditions to improve the psycho physiological interfaces. On the other hand, *Salah* is a very significant Islamic repentance to the Muslim. Consequently, it has an extraordinary power to decrease effectively the anxiety and stress from the mind of human being. In addition, it can be used as the therapeutic agents in several cases. In this work, authors selected 17 male students among 23 students from secondary school, Malaysia and they were treated with *Salah* as a psychophysiological stimulant, through heart rate variability (HRV) which was an objective method to realize the changes of emotional response. The results of this study indicated that the effect of *Salah* and HRV BFB improved the physiological conditions and a significant correlation was also observed between the *Salah* and BFB, which is necessary to intervene the addiction.

Key-Words: - Heart rate variability, biofeedback, *Salah*, repentance, youth and psychophysiology

1 Introduction

Drug Addiction is a controversial matter for the teenagers of many countries in the world. Nowadays, the major problem in society is adolescent drug abuse which also affects our daily lives. Basically, drugs are a pain killer which someone uses to prevents physical and emotional pain; and giving the user an illusionary and transitory escape from or a means to cope with the realities. In reality, serious problems are created by abusing the drugs. To cure the unwanted feelings someone takes drugs. The sedating effects of drugs or alcohol influence a person to use this second or third time. The excessive use of physiologically habit-forming drugs or alcohol resolves the original symptoms of discomfort. Adolescent usually take or abuse drug just a tendency to experiment or out of curiosity which may be an expression of his revolution against established authority or a way of gaining recognition among friends.

1.1 Effect of Drug Addiction

Drug addiction has various effects on personal, family, friends and social life. Person who takes alcohol and drugs has an extensive physical effect

owing to his/her alcohol and drug addiction which he/she had never projected. The effects of drug addiction on the health of individual are sickness, withdrawal and a way out to a life of crime. The additional effects of drug addiction includes that it disturb family life and make destructive example of codependency. Liddle, H. (2008), mentioned in his research paper named "Drug Abuse in Teenagers", adolescents face the problems such as isolation, depression, irritability, fatigue, weight loss, memory loss, changes in mood after taking drugs [1].

1.2 *Salah*

Salah is an Arabic word. It is the form of worship of Allah performed by Muslims. It is one of the most significant of the 5 pillars of Islam. Praying *Salah* needs one to be clean in all respects, such as the physical self, the intent or the surroundings. It is important that a person make sure the surrounding is clean and free from sins where he/she aim to offer *Salah*. *Salah* is the ritual prayer. It is compulsory on all believers in all situations which cannot be neglected in any circumstance [2]. This compulsion should not be regarded a burden rather it should be appreciated and respected. It is believed that a pious

person always enjoys his prayers. In the Hadith, it is stated that the prophets' most beloved three things were his wife, perfume and prayer. Moreover, gaining the spiritual benefit by performing the *Salah*, individual may also attain psychological and physical advantage [3]. In a Hadith (Ibn Majah), prophet Muhammad (SAW) stated that prayer is a heal for many diseases.

1.3 Heart Rate variability

Heart rate variability (HRV) Biofeedback is an important tool which is used for self-regulating physiological responses to progress psycho physiological interactions. It is termed as a joint time/frequency study of the beat-to-beat responses in the heart rate. It shows the quality of a good health which has the relevance for emotional, physical and mental function [4]. According to Lehrer, reduced HRV is an evidence of vulnerability to physical and psychological stressors, and sickness. It is found that higher HRV is connected with creativity, psychological flexibility, and a more developed capacity to adjust cognitive, affective, and physiological responses to stress. In contrast, low HRV is associated with anxiety disorders, depression, and cardiovascular disease [5].

Current researchers have found the consequence of HRV biofeedback to the development of some cognitive functions in both simulated and real industrial operators [6]. Patients with coronary heart disease (CHD) have psychological stress exhibit decreased vagal control of heart rate (HR), which is measured by spectral analysis of HR variability (HRV). Various factors can cause increase in specific rhythms of heart including emotions, anxious thinking, breathing, pressure sensors in the arteries, and other behavioral and physiological changes [7].

The autonomic nervous system (ANS) is to manage the human organs to keep optimum performance of the organism inclined by various internal and external factors [8]. There are two divisions of the ANS such as the sympathetic and the parasympathetic nervous systems. Heart rate variability (HRV) is a very important appraise in assessing the ANS function. In the inter-beat interval, HRV denotes the beat to-beat changes [9]. Each R-wave signifies a contraction of the heart which interconnects to the pulse and the beat-to-beat variability is affected by ANS movement. The scientists stated that the contact at the heart is a reflection of ANS balance or imbalance in the body. The decreased HRV is an evidence of weakness to physical and psychological stressor and disorder. In

contrast, amplified HRV is thoroughly associated with creativity, psychological flexibility and the ability to control emotion, cognitive, and physiology of stress [10]. A well heart doesn't beat with complete regularity. A certain amount of variability is required so that it can adapt to life's routine challenges. In recent years, potential prognostic value of HRV has been given forethought due to association between HRV parameters and several physical and psychological health problems. Reduced HRV is an indicator of cardiovascular problems, generalized anxiety disorder, panic disorder and post-traumatic stress disorder [11]. Consequently, the optimum variability is important. The heart rate variability is due to the synergistic action of the two divisions of the ANS. Changes in heart rhythms also have an effect on the brain's capacity to improve information about problem-solving, creativity and decision-making. High vagal tone is associated with the capacity of self-regulation which has better behavioral elasticity and flexibility in a varying atmosphere. In contrast, low vagal tone is related with poor self-regulation which has lack of behavioral elasticity. Consequently, the study of HRV is a very influential and non-invasive device to assess neurocardiac function which reflects heart to brain's connections and ANS [9]. Therefore, the study of HRV may be used to investigate the connections among mental, physiological, emotional and behavioral processes [12, 13].

In this work, a simplistic and easily cope able addiction intervention procedure based on *Salah* repentance and HRV biofeedback was developed and applied among the secondary school students of Kuantan, Malaysia for changing the respondents mind-body conditions effectively.

2 Methodology

Twenty three respondents were selected by the teacher who is in charge of drug addiction intervention from secondary school and were assigned to the intervention and control group. Two participants were unable to register and four subjects in control group dropped out before completion. Among them seventeen participants were confessed that they were using drugs. The subjects were selected between the age group of 14-18 years. Finally, seventeen respondents were used for analysis, 10 in training group and 7 in control group, who went through both pre and post training assessment. Each participant read and signed the consent form and a 6 minute physiological assessment was conducted individually. The percentage of accumulated coherence score was

recorded during 3-minute baseline, 3- minute after doing *Salah*. Afterward, individuals in the both groups performed the tests (d2 Attention Test). The post evolution was done one week after the training. The subjects received four sessions of weekly HRV biofeedback and *Salah* training of 25 minute. The control group also attended the four sessions and also monitored physiologically without receiving any instructions. Physiological measurement was also conducted through the biofeedback device.

Session 1: Distribute the full processes of how to perform *Salah* to the participants. Afterward, discuss about the movements, posture and also explain the actual meaning of *Salah*.

Session 2: Teach the standard way of recitation of Quran and correct the mistakes during recitation. To make the respondents mind free from stress and anxiety, they should learn how to breathe during recitation. The trainees were trained to practice the relaxed abdominal breathing during recitation. They were also asked to practice the breathing to inhale through nose and exhale through mouth and the exhalation should be longer than inhalation.

Session 3: Show the respondents how to offer *Salah*. After completion of ablution, first of all the individuals should stand facing towards the direction of QIBLAH and Say Allahu Akbar" it means, Allah is the Greatest. In the beginning of the prayer while standing, bowing, prostrating, and sitting, the respondent should say, subhaanallaahwal-hamdulillaahwalaailaahailallaahuwallaahuAkbar which means Allah is great. This can be said in respondents own language. Finally, finish the prayer by turning the head right and the left each time saying as-salamualaikum.

Session 4: In the second session, explain the importance and the benefits of *Salah*. The individuals were requested to perform *Salah* so attentively as if they were very near to the Almighty. Respondents mind –body will connect with the most merciful Allah through *Salah*.

2.1 Data collection procedure with the HRV devices

The experiment was directed to connect with the *Salah* and its effects on HRV which was done by measuring the accumulated coherence score of respondent in this research. Therefore, the percentage of accumulated coherence scores (ACS) of the respondent before and after performing the *Salah* was recorded. To conduct this task two rakat *Salah* was performed by the subject 3-6 minutes. To measure the ACS an ear-clip sensor was being used

on the right or left earlobe of the individual. When the sensor was fixed correctly then the data collection was started. The main concern was to offer *Salah* attentively and make the mind free from all kinds of trouble.

3 Results and discussion

Table 1 to 3 contains the d2 attention test data of two pairs, where pair 1 (Biofeedback BFB) and pair 2 (Control Group CG) showed Pre-Training and Post-Training data respectively. At pre and post-training state of BFB group, the statistical means are 89.10 (SD=5.51) and 146 (SD=23.42), respectively. On the other hand, for pair 2, at the same stages the means are 104.14 (SD=5.27) and 122.00 (SD=6.27), respectively. Table 2, depicts the correlation data for pair 1 (0.33) and pair 2 (0.88), indicates that a remarkable changes of performances is observed for BFB group than the CG. Table 3 shows the paired sample test data, where it is possible to say that due to the training the performance of the respondents under BFB group ($t=-8.21$, $df=9$ and Sig. (2-tailed) <0.005) is increased significantly than that of the CG ($t=-15.91$, $df=6$ and Sig. (2-tailed) <0.005).

Likewise, the accumulated coherence score (ACS) of HRV responses for the same groups are summarized in table 4 to 6, where in pair 1 the baseline and after *Salah* responses of BFB group are included and in pair 2 baseline and after follow of *Salah* responses to CG are integrated. In table 4, the mean and standard deviation (SD) for the change of HRV at baseline (6.00 to 25.00 and SD=5.71 to 9.70) and its changes due to *Salah* (5.71 to 6.28 and SD=5.34 to 4.38) was observed. Since, the *Salah* promotes the mental satisfaction resulting in the response was found to be increased, and it settles around 25.00 (SD=6.28). Specifically, a group of subject was chosen, and everyone performed to the same type of *Salah*. Thereafter, due to this activity their positive reception levels should constitute an ordinary distribution. Therefore, ACS of HRV should also represent a normal delivery, and there was a proactive impact on an emotional level in the case of *Salah*. The increasing trend of ACS in HRV, point towards the degree of the response can be considered as an indication to the emotional level due to the *Salah*. Table 5 and 6 contain the data for paired samples correlations and tests, respectively. The correlation values for pair 1 (0.98) and pair 2 (0.97), indicate that due to the application of *Salah* and its following to CG, the change of ACS in HRV values was not varied in a wide range to the CG but a complete opposite impact was observed for BFB group. In Table 6, the mean differences and t values

for pair 1 (-1.90, -5.32) and pair 2 (-0.57, -0.79) indicate that after *Salah*, the subjects were a bit distressed than baseline stage. Moreover, it was also clear that the response increased remarkably due to the *Salah* and the analysis based on the effect of *Salah* was significant (Sig. (2-tailed) < 0.005 for pair 1).

In the case of *Salah*, sensory perception was used as a stimulus and the subject enthusiastically participates in the control of his heart/mental state and ACS of HRV. This may be as an acceptable basis why *Salah* gives a significant response than base line stage. Therefore, if *Salah* technique is used as the methods to reduce anxiety and stress, it may prove to be an effective on the average subject.

4 Conclusion

The effect of *Salah* and HRV biofeedback was applied on the drug addicted secondary school students, Kuantan, Malaysia for changing their psychology in positive ways. The respondents were well familiar with the *Salah* technique so they could easily cope with the technique; resulting to the significant response was observed from them. Additionally, respondents were trained with the HRV training and the results of psychophysiological conditions were improved due to the applied protocol based on *Salah repentance* and HRV biofeedback. Therefore, the applied protocol could be used for the intervention of drug addicted youths.

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Appendix-1

Table 1: Paired Samples Statistics (for d2 attention test)

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Training Biofeedback Group	89.10	10	5.51	1.74
	Post-Training Biofeedback Group	146.80	10	23.42	7.41
Pair 2	Pre-Training Control Group	104.14	7	5.27	1.99
	Post-Training Control Group	122.00	7	6.27	2.37

Table 2: Paired Samples Correlations (for d2 attention test)

		N	Correlation	Sig.
Pair 1	Pre-Training Biofeedback Group & Post-Training Biofeedback Group	10	0.33	0.35
Pair 2	Pre-Training Control Group & Post-Training Control Group	7	0.88	0.01

Table 3: Paired Samples Test (for d2 attention test)

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Pre-Training Biofeedback Group - Post-Training Biofeedback Group	-57.70	22.21	7.02	-73.59	-41.81	-8.21	9	0.00
Pair 2	Pre-Training Control Group - Post-Training Control Group	-17.85	2.96	1.12	-20.60	-15.11	-15.91	6	0.00

Appendix-2

Table 4: Paired Samples Statistics (for ACS in HRV)

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Baseline- Biofeedback Group	6.00	10	5.71	1.80
	After <i>Salah</i> - Biofeedback Group	25.00	10	9.70	3.06
Pair 2	Baseline -Control Group	5.71	7	5.34	2.02
	After Follow <i>Salah</i> - Control Group	6.28	7	4.38	1.65

Table 5: Paired Samples Correlations (for ACS in HRV)

		N	Correlation	Sig.
Pair 1	Baseline- Biofeedback Group & After <i>Salah</i> - Biofeedback Group	10	-.008	.982
Pair 2	Baseline -Control Group & After Follow <i>Salah</i> - Control Group	7	.942	.001

Table 6: Paired Samples Test (for ACS in HRV)

	Paired Differences					t	df	Sig. (2-tailed)	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	Baseline- Biofeedback Group - After <i>Salah</i> - Biofeedback Group	-1.90	11.30	3.57	-27.08	-10.91	-5.32	9	.00
Pair 2	Baseline -Control Group - After Follow <i>Salah</i> - Control Group	-.57	1.90	.72	-2.33	1.18	-.79	6	.46