

DRUG ADDICTION INTERVENTION FOR ADOLESCENTS WITH RELIGIOUS SPIRITUALITY AND BIOFEEDBACK

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ligious spirituality (taubah, zikir and holy Quran recitation) and biofeedback devices (GSR & HRV) play a vital role in drug addicted school students (aged13-19) of Kuantan, Pahang in Malaysia. Participants were randomly assigned either to a training group (c2 (4) = 34.359, p < 0.001, but not in the control group (c2 (4) 2.322, p > 0.05. It was observed that high levels of religious faith and spirituality were closely related with positive life orientation, better perceived social stance and lower levels of depression, anxiety and stress. The findings of this study confirmed that the effect of religious treatment was related to physiological change. Therefore this study represents the greatest self-report research to assess the relationship between religious faith and uality to recover the drug addiction through GSR and HRV biofeedback devices. Keywords: Religion, spirituality, biofeedback, drug addiction.



Introduction

Drug misuse is one of the important public health problems throughout the world. The involvement of adolescent's drug abuse is increasing globally (The World Drug Report, 2007) Malaysia is not exceptional of this trend and there is an increasing number of teenagers involved with drug misuse. Adolescent usually take o 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 recogn tion among friends. Malaysia is Muslim country and according to Islamic law, drug addiction is a sin and the Muslim who used it, is a sinner. Religious Spirituality and taubah

- ◆In Islam everything is spiritual as all actions should be performed for the ◆This spiritual activity also effectively helps to change the negative behaviors oleasure of God which comes from the view of Muslim's understanding of and traits of Muslim. oneness of God (Tawhid).
- pleasure.

◆ It is confirmed that everything, individual does is in accordance of God's ◆ Some of these programs are offer prayer, remembrance of God, fasting giving charity, meditation, reflecting on creation, recitation of zikir, reading

◆The consciousness is dynamic, not static and God consciousness is based ◆To develop a good character, Prophet Muhammad emphasized the individuon how close the Muslim is with his God. This communication is strength- al to practice all the spiritual activities because these actions change the heart ened and established by going through the activities which have been pre-so the person closer to God and attain His consciousness [1].

◆According to Muslim's faith, taubah is believed to be one of the powerful ◆It is the act of shunning sin and strongly resolving to abstain from the same tools for any person's positive psychological changes and persuades people sin in future; it controls a person from sin. Besides these intentions, a comfrom doing any other misdeeds. plete effort is made to pay off the precedent shortcoming.

◆Taubah (repentance) is known as the regret and sadness that happen in the ◆During taubah, participants should recollect their misdemeanors and offe heart when anyone remembers his or her sin.

◆ Psychologically, it gives a sense of spiritual comfort and it gives a sense of being closer to God [2]

penitence with soul attentiveness to Allah. Apart from this, regular recitation of Holy Quran is another proved mind therapeutic agent.

When a person is more likely to do good deeds such as reciting zikir and re membering Allah, Allah will spare him from committing sins therefore helps forming a good personality within that individual.

◆Besides, reading Holy Quran with voice or loudly can be a stimulant for creating physiological and psychological responses such as mystical music [3].

♦ However, listening to Holy Quran or reading Quran with voice makes a positive physical and psychological change to the mind and body of human being and it proved by the scientist. In Islam, spiritual activity such as through taubah, zikir and holy Quran recitation a connection can be made with the Almighty which is performed to the perfection of individual's mind.

Heart Rate Variability HRV) Biofeedback

In psychological and psychophysiological research arena, biofeedback is one of the rising and versatile research techniques.

◆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].

◆ Currently, the consequence of HRV biofeedback are used to the development of some cognitive functions in both simulated and real industrial operators [6]. Pa tients with coronary heart disease (CHD) have psychological stress exhibit decreased vagal control of heart rate (HR), which is measured by spectral analysis of 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, poten tial 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, th

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 (Task Force, 1996).

◆Therefore, the study of HRV may be used to investigate the connections among mental, physiological, emotional and behavioral processes.

urrent Interventions

n Malaysia the main means for confronting drug addiction was imposed rehabilitation in detention centers (DARA). Current drug intervention program is main the education programs based on a social-influence model, peer pressure resistance training, conservative norms, co-curricular activities etc. * But they have consistently failed to show any impact on the use of drugs or on the intentions to take drugs [12].

* Though substantial development has been made in intervention approaches, still there is a huge vacuum between what studies has provided to be effective procedures commonly used in different schools.

* However, the increasing trends of addictions crucially indicate that the new interventions program is necessary where the interventions techniques should be easily adaptable to the addicted individuals (DARA). About this study

◆ An integrated approach of religious spirituality and biofeedback (HRV) were applied as a potential drug addiction intervention for the adolescents.

♦To intervene this social disease Islamic repentance and biofeedback could be an effective alternative than the commonly used intervention program such as motivational program, clinical studies, trainings, etc.

◆Thus, in this study, taubah zikir and holy Quran recitation are the effective spiritual Islamic activities for real perfection and mental relaxation technique are considered as a research tool with biofeedback devices.

♦ In this context, HRV biofeedback can be considered as the physiological assessment appliance for fulfilling the specific target.

♦Therefore, a simplistic and easily cope able addiction intervention technique was developed based on religious spirituality (taubah, zikir and holy Quran recitation and HRV biofeedback. That technique was also applied among the secondary school students of Kuantan, Malaysia for changing the respondent's psychophys logical conditions effectively.

METHODOLOGY

Twenty eight drug addicted students (all are male) ranging in the age of 13 to 18 years (15.67 ± 1.06 years) were selected from Pahang, Malaysia who met the folwing inclusion criteria: (a) DASS (b) has not treated by any kind of intervention (psychological) technique earlier (c) Nijmegen questionnaire. Even, the selected articipants were not selected for any known medical or psychiatric diagnoses previously. The subjects have no depth knowledge or any training about the addicon hazards and its long-term demerits. Ethical clearance was obtained from the Institutional head of the School, SMK Leper Hillir, Gambang, Kuantan, Pahang, alaysia. The demographic characteristics of the study sample are shown in Table 1.

e nature of the current study is an experimental with single blind study design. Initially, the participants were collected by the help of the Student Councilor of that School thereafter they are screened by Nijmegen Questionnaire and then randomly assigned into two equal groups (N = 14): Experimental Group

The participants (demographic data is shown in Table-1) under this group received a training based on Heart rate variability (HRV) biofeedback and religious spirit-

Design of Study

The participants (demographic data is shown in Table-1) under this group (No Treatment) did not receive any training.

During the first visit students were selected according to the inclusion criteria, completed an informed consent, a demographic questionnaire, DASS and coping elf-efficacy scale. The Nijmegen Questionnaire consists of 16 complaints whose frequency of incidence can be indicated on a five-point ordinal scale (0 = never, = very frequently). The complaints relate to different systems: (a) cardiovascular, e.g. 'palpitations'; (b) neurological, e.g. 'dizzy spells', 'tingling fingers'; (c) respiratory, e.g. 'shortness of breath'; (d) gastro-intestinal, e.g. 'bloated abdominal sensation'; (e) psyche, e.g. 'tense' [13]. The points accompanying each endorsed answer were used for measuring the summation. After responding the questionnaires by the respondents; the baseline measures of HRV were performed by fitting with ethysmographic sensor on the finger. The study was conducted at the School Prayer Room, SMK Leper Hillir, Kuantan, Pahang, Malaysia.

During the study pre and post recording of the following measures were done for both the designed groups. Group 1: Experimental Group

The BFB training protocol was designed by following the Lehrer et al. (2000) for HRV BFB and then applied among the participants. Following the pre-test measements, the participant sat with closed eyes on a prayer-mate for 5 min with hands resting on arm rest in a peaceful room before starting of HRV BFB training In the first session, the subject was asked to take long to short breathe at variable respiratory rates for about 2 min. The subject was then instructed to breathe at a articular rate of stimulus which was convenient to him so that he felt relax. The BFB training and spiritual activities were selected based on previous studies, hich can improve psychophysiological performance [14].Each day they practiced at least 15 minutes. After connecting the photoplethysmograph, earpiece sensor, nich graphed the participant's heart rhythm onto the computer monitor viewing the coherence score. The HRV biofeedback provided a low, medium, and high herence score which reflects the individual's ability to control the emotion and balance the autonomic nervous system (ANS). It was assumed that higher coher ence scores reflect greater ability to control of emotion and balance of ANS [15]. Coherence score at the beginning of each session was the baseline score which flected physiological changes and it was fixed for 3 minutes for each participants. One can assume that higher coherence score reflects greater self-regulation The independent coherence scores reflected the student's ability to control the emotion during the treatment session. Coherence scores of the HRV software were luated at two times during each biofeedback session. Under religious spirituality the participants spent 5 minutes for listening holy Quran recitation then 5 more inutes for zikir "Laila ha illallah" and then 5 minutes for Salah (taubah). Mention that they offer Salah taubah by following the instruction of muttaqun. Com 6].On the other hand, during the religious spirituality they performed the BFB technique also following Lehrer et al (2000). For both groups of respondents the RV biofeedback applied for recording accumulated coherence score (ACS) and the data were recorded before and after performing religious spirituality and bioedback training. The training sessions were instructed for 30 consecutive days for 15 minutes each. Data were collected from the intervention training grow racticed the religious spirituality and biofeedback training for five times in a month (day-1, day-7, day-15, day-21 and day-30). Throughout the training, the subject vas instructed for natural shallow breathing, to avoid hyperventilation, as can be provoked by this technique.

This group did not receive any training. Participants of both groups were allowed to continue with normal practice schedule.

Table 1: Demographic Information of the Study Sample			Table 2: Cut-off Sco	res for Depression, A	nxiety, and Stress Sc	ale of DASS		
Characteristic	Total (N=28)	Biofeedback (N=14)	Control (N=14)	_				
Gender (Male) (%) Age	100	100	100		Category	Depression	Scale Anxiety	Stres
Mean	15.67	15.64	15.71		Normal	0 – 9	0-7	0-14
S. D. Race (%)	1.06	1.00	1.13		Mild	10-13	8-9	15-18
Malay	100	100	100		Moderate	14-20	10-14	19-25
Religion					Severe	21-27	15-19	26-33
Muslim	100	100	100		Extremely Severe	28	20+	34+

Result and discussion

Group 2: Control Group (No Treatment)

The training and control group did not significantly differ (p=0.629 and 0.221 respectively) by age, years of addiction which is shown in Table 3. This finding inc cates that based on these two variables the respondents under both groups are considered equivalent or there is no biasness.

				Std.		P
	Group	N	Mean	Deviation	Error Mean	
Age	Biofeedback	14	15.64	1.00	.26	.629
	Control	14	15.71	1.13	.30	
Years of	Biofeedback	14	2.25	1.06	.28	.221
Addiction	Control	14	2.25	.70	.18	

Table 3: Group equivalence on demographic variables

Group	Session Means (S.D)							
•	1	2	3	4	5			
Biofeedback	5.43	20.57	19.86	21.64	32.93			
Dioleeuback	(4.89)	(11.56)	(12.01)	(12.91)	(12.03)			
Control	6.00	7.00	6.07	6.28	6.42			
Control	(4.15)	(4.24)	(3.66)	(2.72)	(4.38)			
Note. S.D = Standa	rd Deviation,							

Table 6: Results of Friedman	test of the ACS for the biot	feedback and Control grou
	ACS BFB	ACS Control
N	14	14
Chi-square	34,359	2,322
Df	4	4
Asymp. Sig.	,000	,677

Table 4: Normality tests of ACS data for both groups							
Kolmogorov-Smirnov ^a							
	Statistic df Sig.						
ACS1BFB	.311	14	.001				
ACS2BFB	.121	14	.200*				
ACS3BFB	.229	14	.044				
ACS4BFB	.174	14	.200*				
ACS5BFB	.326	14	.000				
ACS1CTR	.191	14	.180				
ACS2CTR	.193	14	.169				
ACS3CTR	.186	14	.200*				
ACS4CTR	.175	14	.200*				
ACS5CTR	.234	14	.037				
a. Lilliefors Significance	Correction						
* This is a lower bound of the true significance							

Stress

15-18

. This is a lower bound of the true significance.

Table 4 shows the normality test of ac cumulated coherence score (ACS) both control and treatment group for five sessions. The obtained K-S test re sult indicates that there is a mixed behavior of normality data observed. some cases the sig. value is more than 0.05 and in other cases it is less than .05 such as for ACS biofeedback group in session one (on day-1), three (on day-1 and five (on day-30) and control group in session five normality was not found (D (14) = 0.311, p = 0.001; D (14) = 0.229, p = 0.044; D (14) = 0.326, p

0.000 and D (14) = 0.234, p = 0.037 respectively) shown in Table 4.

Table 5 depicts the session wise improvement of mean and S.D. percentage of ACS data for training group but it is observed that for control group the session mean values are almost static. The aim of the current study was to examine the effectiveness of religious spirituality as it easily changes the psychophysiolog ndition of the drug addiction student and the HRV biofeedback was used as a stress and anxiety coping tool. The religious spirituality significantly helped the vidual modulate his/her emotion which is measured through the HRV biofeedback as the accumulated coherence score of HRV is increased after following the ligious spirituality. The results of the current study depict that training group showed significant improvement in psychophysiological condition compared to the ontrol group. The effect of reduction in anxiety and stress could be attributed to stimulation of baroreflexes by breathing at one's resonant frequency thro RV biofeedback.

		Mean Rank	Sum of Ranks	Z	p
ACS2 - ACS1	Negative Ranks Positive Ranks	1,00 7,50	1,00 90,00	-3,116 ^a	,000*
	Ties Total	7,50	30,00		
ACS3 - ACS1	Negative Ranks	1,00	•	-3,120 ^a	,000*
	Positive Ranks Ties Total	7,50	90,00		
ACS4 - ACS1	Negative Ranks	1,50		-3,111 ^a	,000*
	Positive Ranks Ties Total	8,50	102,00		
ACS5 - ACS1	Negative Ranks	,00	,00	-3,301 ^a	,000*
	Positive Ranks Ties Total	7,50	105,00		
ACS3 - ACS2	Negative Ranks	6,72	60,50	-1,061 ^a	,321
	Positive Ranks Ties Total	7,62	30,50		
ACS4 - ACS2	Negative Ranks	7,50	45,00	-,035 ^a	,985
	Positive Ranks Ties Total	6,57	46,00		
ACS5 - ACS2	Negative Ranks	,00	•	-3,066 ^a	,000*
	Positive Ranks Ties Total	6,50	78,00		
ACS4 - ACS3	Negative Ranks	7,50	45,00	-,472 ^a	,665
	Positive Ranks Ties Total	7,50	60,00		
CS5 - ACS3	Negative Ranks	1,50	1,50	-3,206 ^a	,000
	Positive Ranks Ties Total	7,96	103,50		
CS5 - ACS4	Negative Ranks	1,00		-3,238 ^a	,000
	Positive Ranks Ties	8,00	104,00		
	Total				

Table 7: Pairwise comparison in ACS for the Biofeedback Group

Table 8: Median and 25 - 75 Quartile for the DASS Scores from Pre to Post Median (25 – 75 Quartile) 15.50 (11.25 - 18.75) 12.50 (10.0 - 13.75) Control 14.50 (11.50 – 19.75) 15.0 (12.00 – 18.75) 9.00(7.25 - 14.75) 6.50(4.25 - 9.00)9.00 (7.25 - 13.75) 9.50 (7.25 - 13.00)15.00 (11.00 – 16.00) 10.00 (9.00 – 14.25) 15.50 (10.00 – 16.00) 15.00 (7.25 – 17.00) some physiological data deviated from normality assumption, Friedma NOVA's test was conducted to compare the ACS variables across fiv ssions. As shown in Table 6, the ACS of the biofeedback participant gnificantly changed over the five sessions (c2 (4) = 34.359, p < 0.001 a

these findings, Wilcoxon test was carried out for each comparison. A nferroni correction was applied and so all effects were reported at a 05/10 comparison = 0.005 level of significance as shown in Table 6 for comparison of the BFB group. able 7 shows the pairwise comparison of ACS data for the biofeedback oup where, the five sessions are denoted as ACS1...ACS5. From this Tae, it is observed that only for the ACS3 - ACS2, ACS4 - ACS2 and ACS4 ACS3 p value is greater than 0.05, indicates that those pairs are not sigificant. Except these pairs rest of the pairs are significantly increased reover, from this pairwise comparison it is possible to say that the reondents' psychophysiological condition was changed effectively after pleting session number 5. As the p values of session ACS 5 with oth

are always less than 0.005, indicates that for getting fruitful physiolog

posed to the control participants (c2 (4) = 2.322, p = 0.677). To follow

es the participants must complete the full sessions.

able 8 depicts Median and 25 – 75 quartile of the each of DASS scores at pre and post-training. The intervention group would report significant reduction on deression, anxiety and stress score than the control group from pre to post. Result of Wilcoxon signed-rank test showed that participants in the biofeedback group re orted significant lower score on depression (Z = -2.826, p < 0.01), anxiety (Z = -3.525, p < 0.001 and stress (Z = -2.985, p < 0.01). On the opposite, the contro oup did not report any significant reduction on DASS-Depression (Z = -1.675, p = 0.094), DASS-Anxiety (Z = -1.894, p = 0.058) and DASS-Stress (Z = -1.12, p =

ndings of the present study also indicate that recovering individuals, religious spirituality is connected with several optimistic mental health outcomes. Religious spi ality was closely associated with better coping, reduction of stress, positive life orientation and lesser levels of anxiety. These outcomes are alike with earlier studie oserving the connection between religion and mental health with individual [17][18][19][20].Likewise, other researchers have also found the optimistic relationship r gion and happiness of life [21] [22]. Moreover, strong religious faith has also been connected with higher levels of perceived social support [23].

The present study was sufficiently focused to examine the effectiveness of HRV BFB linked with religious spirituality as it easily changes the psychophysiological con ition of the drug addicted student. The obtained findings of the current study suggest that HRV BFB linked with religious spirituality training can motivate the mus lim drug addicted students which was confirmed from the responses of DASS test along with psychological measures. The crucial finding which emerged from out omes of the present study was the improvement in the construct of self efficacy after the training which was persistent even after a month as the participants were uched with this holy motivational training. As the psychopsysiological responses of the participants under training group was observed as maximum on day-3 nerefore, HRV BFB linked with religious spirituality may serve as a potential intervention technique in the area of early stage of addiction psychophysiology for notional and cognitive restructuring.

Further research is needed with this emerging field of HRV BFB linked with religious spirituality as it may be associated with the current intervention technique that is the activities in rehabilitation center to become an integral part of performance and rehabilitation psychology in contemporary addiction treatment. REFERENCES

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