THE EFFECT OF TAUBAH AND BIOFEEDBACK BASED DRUG ADDICTION INTERVENTION PROGRAM AMONG SCHOOL STUDENTS

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ABSTRACT

Nowadays, drug addiction is a severe problem for the family, society as well as all over the world which is spreading rapidly, especially among the adolescent. Though Malaysia is a peaceful country, but it is not an exception of this social disease. To date, there has not been much research conducted on the use of taubah protocol and biofeedback technique to reduce the drug addiction. According to Islamic law, drug addiction is a sin and the Muslim who used it, is a sinner. In Islam, spiritual activity such as through taubah a connection can be made by the Almighty, which is performed to the perfection of an individual's mind. In psychological and psychophysiological research arena, biofeedback is one of the rising and versatile research techniques. To reduce this social disease taubah and biofeedback could be an effective alternative than the commonly used intervention programs such as motivational program, clinical study and training. In this study, 40 male school students aged 13-18 from different schools in Kuantan area, Pahang, Malaysia were randomly selected as the intervention group and control group, where the number of respondents in each group was 20. They were treated with taubah protocol to change their psychophysiological responses which had been measured through biofeedback (GSR and HRV). Each intervention participant received five steps of taubah protocol of 30 minutes. Results of two-way repeated measures ANOVA indicated that there were significant group x time interaction effects of attention and cognitive flexibility. The intervention participants also showed significant reduction on depression, anxiety, and stress (all p < p0.01). Within-group improvements were also found for the training participants psychophysiological and emotional performance. Moreover, the intervention group showed a significant increase in ACS, LF activity, and GSR percentage change. Similar significant results did not exist in the control group. The findings of this study depicted that taubah and biofeedback effects significantly changed the cognitive, emotional and psychophysiological conditions which eventually reduced the addiction.

ABSTRAK

Pada masa kini, ketagihan dadah yang merebak cepat di kalangan remaja merupakan beban besar kepada kaum keluarga, masyarakat dan dunia amnya. Walaupun Malaysia merupakan sebuah negara yang aman, namun ia tidak terkecuali daripada penyakit sosial ini. Sehingga kini, kajian masih kurang dijalankan dengan menggunakan protokol taubat dan latihan biofeedback bagi mengatasi masalah ketagihan dadah. Menurut Peraturan Udang-undang Islam, ketagihan dadah merupakan satu kesalahan yang disebut sebagai dosa. Sesiapa yang terlibat di dalam masalah ketagihan dadah dianggap sebagai berdosa. Di dalam Islam, aktiviti kerohanian menerusi taubat merupakan suatu hubungan secara langsung dengan Maha Pencipta yang mampu membina kesempurnaan minda individu. Di dalam arena kajian psikofisiologi, biofeedback merupakan salah satu teknik penyelidikan yang semakin berkembang dan versatil. Bagi mengatasi penyakit sosial ini, taubat dan biofeedback mampu menjadi satu alternatif yang efektif berbanding program pemulihan yang sedia ada seperti motivasi, kajian klinikal dan seumpamanya. Di dalam kajian ini, seramai 40 pelajar lelaki daripada pelbagai sekolah yang berbeza di Kuantan, Pahang, telah dipilih secara rawak sebagai kumpulan eksperimen (n=20) dan kawalan (n=20). Mereka telah dilatih menggunakan protokol taubat dan biofeedback (GSR dan HRV) untuk mengubah tindakbalas fisiologi. Di dalam setiap latihan, peserta mengikuti lima langkah protokol taubat selama 30 minit. Hasil kajian yang menggunakan ukuran berulang dua hala ANOVA menunjukkan terdapatnya hubungan signifikan di antara kumpulan x dengan kesan masa interaksi bagi fleksibiliti tumpuan dan kognitif. Peserta intervensi menunjukkan penurunan dalam tahap kemurungan, kerisauan dan tekanan (keseluruhan p < 0.01). Perubahan di dalam kumpulan juga berlaku kepada peserta latihan secara fisiologi dan pencapaian emosi. Kumpulan latihan menunjukkan peningkatan yang signifikan di dalam aktiviti ACS, LF dan peratusan perubahan GSR. Hasil kajian signifikan yang sama tidak wujud di dalam kumpulan kawalan. Penemuan kajian menggambarkan bahawa kesan taubah dan biofeedback secara signifikannya mengubah keadaan emosi dan fisiologi, yang akhirnya mampu mengurangkan tingkahlaku penagihan di kalangan responden.

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LIST OF ABBREVIATIONS

AA Alcoholics Anonymous Association for Applied Psychophysiology and Biofeedback AAPB ACS Accumulated Coherence Score ADHD Attention-deficit Hyperactivity Disorder ANOVA Analysis of Variance BCIA Biofeedback Certification Institute of America BPM Beat Per Minute BRS Baroreflex Sensitivity CHD Coronary Heart Disease CP Concentration Performance DASS Depression, Anxiety & Stress df Degree of Freedom ECG Electrocardiogram Electro Dermal Responses EDR EE **Environmental Enrichment** EEG Electroencephalogram FV **Finishing Value**

GSR	Galvanic Skin Response
HF	High Frequency
HRV	Heart Rate Variability
Hz	Hertz
Ι	Current
IDU	Injection Drug Users
ISNR	International Society for Neurofeedback and Research
LF	Low Frequency
μS	microSiemens
MI	Motivational Interviewing
MDD	Major Depressive Disorder
NA	Narcotics Anonymous
NADA	National Aeronautics and Space Administration
NADA	National Anti- Drug Agency
PPG	Photoplethysmography
PPT	Photoplethysmography optical sensor
R	Resistance
RCNb	Reading Color Names Printed in Black
RCNd	Reading color names where the color of the print and the word are different

- SCL Skin Conductance Level
- SD Standard Deviation
- SEMG Surface Electromyogram
- SV Starting Value
- TS TouretteSyndrome
- V Voltage
- VLF Very Low Frequency
- WHO World Health Organization

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

In the latest global peace index Malaysia has been placed the most peaceful and the fourth safest country in the Asia Pacific zone (The Star Online, 2011). According to the survey of Sydney-based Institute for Economics and Peace, Malaysia places 19th safest and the most peaceful out of 153 countries in the globe (Borneo Post Online, 2011). Like other developing countries, Malaysia is also facing some social problems. One of them is drug addictions, which has long been recognized as a serious problem since the early 1970s (Nazar et al., 2005). Drugs were considered as nation's number one enemy and the battle against drug addiction was conducted seriously to increase the awareness throughout all age levels (Ibrahim et al. 2011).

According to Malaysian Psychiatric Association (2006) drug misuse has been known as the nation's most severe health problem as it strains the health care system which has a negative effect on family, society and the country's overall economy. Moreover, this severe problem spreads very fast with the country's social development and it becomes a serious threat in Malaysia (Fauziah et al., 2011). According to the National Anti-Drug Agencies of Malaysia a total of 12079 people were involved with drugs in January to June 2010. However, this serious disease of addiction is not limited in Malaysia only; rather it spreads

all over the world. Drug use has now been reported in more than 140 countries, with an estimated number of 13.2 million injection drug users (IDUs) worldwide. Of these, more than three-fourths live in developing countries; 3.1 million live in Eastern Europe and Central Asia, 3.3 million in South and South-east Asia, while 2.3 million live in East-Asia and the Pacific (Aceijas et al., 2004). The study stated that perhaps the most prominent change in the pattern of drug abuse among young generation around the world since 1990s, and it has been increased vastly due to the popularity of "party drugs" which is resisted by the coming out of a new dance club culture (Parker et al., 1998; Wijngaart, 1999; Weber, 1999and Parker et al., 2002;). This Western party drug and dance club culture is spreading so rapidly to Asian societies, for instance, Tokyo, Kuala Lumpur, Hong Kong and other countries (Hunt, 2003).

Drug abuse, and particularly heroin addiction, has been spreading in Pakistan at a fast rate since the late Seventies. It has now become a serious social problem. The increase of 10,000 addicts per year has become an alarming issue of the society (Ghulam, 2003). The trafficking and the use of illicit drugs are significant social issues in Vietnam (OSI, 2009). Over the previous two decades, the use of drugs such as smoking opium, heroin injecting, methamphetamine and other psychotropic substances had increased rapidly (Reid et al., 2006). The reasons behind rapid increment of drug addiction among adolescents were interpreted by British scholars, Howard Parker and his co-worker (1998, 2002). They found that drug misuse had become more widespread in conventional English adolescences of a different social upbringings based on the data from a nine-year study of British high school students. Moreover, Brook and his co-worker (2001) stated that high school students had inadequate knowledge on drug misuse and they become more generous with the age increases. Other researchers also indicated that certain variants increase the risk of drug abuse which was more prone to teenager (Royo-Bordonada et al., 1997). In addition, the most vulnerable youth group (age 12-25 years old), highlighted the threats linked to the family, school and peer groups. It is considered that consumption of illegal drug, to a certain extent is a complex problem.

1.1.1 Cause of Addiction among Adolescents

Nowadays, drug addiction becomes a crucial issue for the adolescents of different countries in the world. Teenagers normally use drugs, out of curiosity or to experiment (Sani, 2010). 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 (Cirakoglu and Isin, 2005).

1.1.2 Impact of Drug Addiction

In personal, family, friends and social life, drug addiction has many effects. A 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 include that it disturbs family life and make a destructive example of codependency. Individuals face various problems such as isolation, depression, irritability, fatigue, weight loss, memory loss, and changes in mood after taking drugs (Lloyd, 1993; Cirakoglu and Isin, 2005).

Vulnerability to addiction is supposed in consequence of complex relations among drugs, vulnerable genotype and environment (Piazza and Le Moal, 1996; Kreek et al., 2005). The term "environments" includes a various factors that include peer relationships, socioeconomic conditions of family and exposure to pollutants, etc. From a didactic point of view, the environmental factors may be possible to put on a scale from risk to protection (Jessor and Jessor, 1980; Kodjo and Klein, 2002). Negative factors such as, low socioeconomic status, poor family, peer relationships and complications at school have some adverse effect in life (Sinha, 2001; De Bellis, 2002). Pessimistic life experiences are closely associated with activation of stress responses and after certain time it become controllable (McEwen, 2007). In laboratory, it has been widely demonstrated that

experience to different forms of stress intensifies the vulnerability of drug addiction (Sinha, 2001; Goeders, 1997; Goeders, 2002; Marinelli and Piazza, 2002; Kreek et al., 2005; Koob, 2000 and Koob, 2008). Figure 1.1 states the vulnerability of addiction is directly correlated with the individuals' behavior and neurology. Therefore, to reduce this serious problem it is logical to focus the possible techniques which are related to behavioral and neurological phenomena.



Figure 1.1: The continuum functions stress and environmental enrichment (EE) from risk to protective factors for the vulnerability of drug addiction (Source: Solinas et al., 2010).

1.1.3 Biofeedback Techniques for Miscellaneous Treatment

Biofeedback is an area of rising attention in medicine and psychological field since it has proved as an effective technique for a number of physical, psychological and psychophysiological problems (Association for Applied Psychophysiology and Biofeedback (AAPB), Lehrer et al., 2000 and Nestoriuc et al., 2008). The fundamental goal of biofeedback therapy is to support a patient in realizing their self-ability to regulate the specific psychophysiological procedures. Mobyen and his co-worker (2011), made a system as a tool for the clinician in a clinical environment as well as it is also used by the normal users during everyday circumstances for health reasons. Moreover, one of the advantages of the suggested system is that it can reduce the set up time such as, time for parameter estimation for a biofeedback session and also limited the time involvement of the clinicians. Recent research also indicates that biofeedback has been used successfully to treat a number of disorders and their symptoms, including migraine headaches, anxiety, sleep disorders, depression, traumatic brain injury, chronic pain, epilepsy, and attention-deficit hyperactivity disorder (ADHD) (Peper et al, 2009; Peper et al., 2006; Yucha, et al., 2008).

Biofeedback technique may be one of the important options to treat the addiction in a suitable way, especially by assessing the psychophysiological changes (Miller, 1994). It has been used by the National Aeronautics and Space Administration (NASA) to treat astronauts whose autonomic nervous system is disrupted during severe space sickness (Robbins, 2000). According to the medical dictionary, biofeedback techniques have also been adapted to the Scientists from the University of Tennessee to treat the individuals who are suffering from severe nausea which is related to the autonomic nervous system dysfunction. Illnesses that may be triggered stress are also targeted by biofeedback therapy. Certain types of headaches, high blood pressure, teeth grinding, post-traumatic stress disorder, eating disorders, substance abuse, and some anxiety disorders may be treated successfully by teaching patients the ability to relax and release both muscle and mental tension (Tsai et al., 2007). Biofeedback technique is often just one part of a comprehensive intervention program for some of these disorders.

1.3.4 Drug Addiction and Religiousness

In Islam, drug addiction is a sin and the Muslim who used it, is a sinner. The application of spiritual and religious themes within health psychology research is an emerging field (Larson et al., 1998; Levin, 1996). Though there is much literature examining different aspects of spirituality and religiousness on mental and physical disorders (Koenig et al., 2001), but comparatively little attention has been observed to incorporate the spirituality and religiousness in the treatment of drug addiction studies (Miller, 1993). There is a debate among the researchers that spirituality and religiousness is a relevant factor to include in addiction treatment (Avants et al., 2001; Brizer, 1993; Gorsuch, 1994; Kendler et al., 1997; Mathew et al., 1996; Page and Andrews, 1996; Pardini et al., 2000). Pardini and coworkers (2002) found that 237 individual recovered from addiction had higher level of spiritual and religious faith. Moreover, Kendler et al. (1997) reported in a study over 2000 female twins that current smoking and drinking as well as alcoholism and nicotine were closely related with personal devotion such as praying and spiritual comfort. In other studies it is found that religion and spirituality as potential resources for recovery sometimes may be underutilized by some clinicians who treat addicted individuals (Goldfarb et al., 1997; Miller, 1998). Individuals coming to addiction treatment sometimes show low levels of spiritual and religious involvement compare to the common people (Hilton, 1991 and Larson et al., 1998).Nevertheless, till date no study was found for the intervention of drug addiction through taubah and biofeedback based program. Taubah or repentance is to plead guilty to the Almighty one's sins and to apologize for such a task. Make your mind firmly to discharge all the rights of others. This objective should be instantly made in the mind and subsequently; the real fulfillment of such human rights and duties put into action. Another Islamic approach, seeker is also considered with the comprehensive table protocol. Zikir is the physical and mental act accelerates from reflection, attitude and behavior until the process of life that reminds of God (Tönük. 2011). It is able to calm the mind and plays a role in determining a person's character. It is also the best traditions of worship and most pleasing to Allah, the lightest and most easily done by not having certain conditions and rules. It can be done at any time, any place and at any state.

1.2 PROBLEM STATEMENT

In Malaysia the main means for confronting drug addiction was imposed rehabilitation in detention centers. The current drug intervention program is mainly the education programs based on a social-influence model, peer pressure resistance training, conservative norms, co-curricular activities, etc. But these activities have not significant impact on the use of drugs or on the intentions to take drugs (Schaps et al., 1981). However, the increasing trends of addictions crucially indicate that the new intervention program is necessary where the techniques should be easily adaptable to the addicted individuals. Malaysia is not residing out of the globe and so as a severe social problem of drug addiction; it is also facing the challenges to rehabilitate the drug addicts. Federal state and government have taken this issue seriously and spend billions of ringgit for drug addiction interventions. Although many critics think that such programs are not sufficient and underfunded, this amount is still a great deal of money (Fauziah et al., 2011).

Religiousness has long been considered as an important element of retrieval from addiction (Miller et al., 2008). Miller and his co-worker (2008) reported that spirituality showed unexpectedly significantly less improvement on anxiety and depression, relative to intervention as usual controls. Early researches recommended that degree of religious orientation and religious experience exercise an effective inspiration on the course, etiology and outcome of drug related disorders (Mathew et al., 1996 and Miller, 1998). Religion intervention and retrieval support clusters were found to be suitable for many persons (Arnold et al., 2002; Winzelberg and Humphreys, 1999), and these religious oriented interventions shown long-term retrieval outcomes to secular, evidence-based clinical procedures (Project MATCH Research Group, 1998). Therefore, spirituality and Islamic techniques are applied for drug addiction intervention in many studies. However, the

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According to Malaysian Psychiatric Association (2006) drug misuse has been known as the nation's most severe health problem as it strains the health care system which has a negative effect on family, society and the country's overall economy. Moreover, this severe problem spreads very fast with the country's social development and it becomes a serious threat in Malaysia (Fauziah et al., 2011). According to the National Anti-Drug Agencies of Malaysia a total of 12079 people were involved with drugs in January to June 2010. However, this serious disease of addiction is not limited in Malaysia only; rather it spreads

all over the world. Drug use has now been reported in more than 140 countries, with an estimated number of 13.2 million injection drug users (IDUs) worldwide. Of these, more than three-fourths live in developing countries; 3.1 million live in Eastern Europe and Central Asia, 3.3 million in South and South-east Asia, while 2.3 million live in East-Asia and the Pacific (Aceijas et al., 2004). The study stated that perhaps the most prominent change in the pattern of drug abuse among young generation around the world since 1990s, and it has been increased vastly due to the popularity of "party drugs" which is resisted by the coming out of a new dance club culture (Parker et al., 1998; Wijngaart, 1999; Weber, 1999and Parker et al., 2002;). This Western party drug and dance club culture is spreading so rapidly to Asian societies, for instance, Tokyo, Kuala Lumpur, Hong Kong and other countries (Hunt, 2003).

Drug abuse, and particularly heroin addiction, has been spreading in Pakistan at a fast rate since the late Seventies. It has now become a serious social problem. The increase of 10,000 addicts per year has become an alarming issue of the society (Ghulam, 2003). The trafficking and the use of illicit drugs are significant social issues in Vietnam (OSI, 2009). Over the previous two decades, the use of drugs such as smoking opium, heroin injecting, methamphetamine and other psychotropic substances had increased rapidly (Reid et al., 2006). The reasons behind rapid increment of drug addiction among adolescents were interpreted by British scholars, Howard Parker and his co-worker (1998, 2002). They found that drug misuse had become more widespread in conventional English adolescences of a different social upbringings based on the data from a nine-year study of British high school students. Moreover, Brook and his co-worker (2001) stated that high school students had inadequate knowledge on drug misuse and they become more generous with the age increases. Other researchers also indicated that certain variants increase the risk of drug abuse which was more prone to teenager (Royo-Bordonada et al., 1997). In addition, the most vulnerable youth group (age 12-25 years old), highlighted the threats linked to the family, school and peer groups. It is considered that consumption of illegal drug, to a certain extent is a complex problem.

1.1.1 Cause of Addiction among Adolescents

Nowadays, drug addiction becomes a crucial issue for the adolescents of different countries in the world. Teenagers normally use drugs, out of curiosity or to experiment (Sani, 2010). 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 (Cirakoglu and Isin, 2005).

1.1.2 Impact of Drug Addiction

In personal, family, friends and social life, drug addiction has many effects. A 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 include that it disturbs family life and make a destructive example of codependency. Individuals face various problems such as isolation, depression, irritability, fatigue, weight loss, memory loss, and changes in mood after taking drugs (Lloyd, 1993; Cirakoglu and Isin, 2005).

Vulnerability to addiction is supposed in consequence of complex relations among drugs, vulnerable genotype and environment (Piazza and Le Moal, 1996; Kreek et al., 2005). The term "environments" includes a various factors that include peer relationships, socioeconomic conditions of family and exposure to pollutants, etc. From a didactic point of view, the environmental factors may be possible to put on a scale from risk to protection (Jessor and Jessor, 1980; Kodjo and Klein, 2002). Negative factors such as, low socioeconomic status, poor family, peer relationships and complications at school have some adverse effect in life (Sinha, 2001; De Bellis, 2002). Pessimistic life experiences are closely associated with activation of stress responses and after certain time it become controllable (McEwen, 2007). In laboratory, it has been widely demonstrated that

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The major aim of this work is to develop an effective and easily applicable taubah protocol to treat the drug addicted school students. In this research, the psychophysiological conditions of the respondents were assessed through GSR and HRV biofeedback. With this view, to determine the feasibility of Islamic worship approaches for improving the psychophysiological conditions, a preliminary study was performed based on the common Islamic approaches (taubah and Holy Quran recitation) on non-addicted undergraduate students of Universiti Malaysia Pahang, Gambang, Kuantan. Fortunately, the finding of this preliminary study improved the psychophysiological condition of the participants, which indicated the development of the expected protocol of this study. Accordingly, an integrated Islamic approach (taubah protocol) was developed by comprising five steps and its internal validity was also analyzed by the experts. This taubah protocol was applied in the pre-categorized control and treatment group. In addition, the subjects were randomly categorized by following the Nijmegen Questionnaire. The emotional and cognitive performances of the participants were conducted before and after applying the protocol through d2 Attention Test and stroop test. Analysis of the outcomes of this emotional and cognitive performance revealed the effectiveness of the protocol in the intervention group. Moreover, the data collected from different steps and various groups were analyzed by different statistical tests with the help of Statistical Package of Social Sciences (SPSS) /16.0 (Copyright SPSS Inc.). Furthermore, a multi-medium was developed to focus on drug addiction and its negative impact on life as well as how the taubah protocol can positively change the psychophysiological condition of the participants. Finally, after watching the multimedia it was highly appreciated by the participants as it helped them to realize the bad effects of addiction.

3.2 PRELIMINARY STUDY

A primary study was conducted to determine the feasibility of Islamic worship approaches for improving the psychophysiological conditions of the participants. The study is summarized and eventually described in Figure: 3.1.



Figure 3.1: The flow chart of data collection in different steps of the preliminary study

In this study the effect of Islamic worship approaches through GSR biofeedback was assessed among 25 male and female undergraduate students aged between 20-25 years old,

were selected from Universiti Malaysia Pahang. To perform this task, the participants were asked to recite any verses from the holy Quran and in that case most of the participants were interested to recite Surah Ya-Sin (chapter 36 of the holy Quran) as they knew these verses very well which has a positive significant effect on life. Consequently, Surah Ya-Sin (chapter 36 of the holy Quran) was selected, and listened to 5 minutes.

Data was collected for three times such as at normal condition, after listening to the holy Quran recitation and taubah of the participants in this study. The subjects were allowed to relax for 10 minutes and requested them to put their two fingers (index and middle) on the GSR sensing plates. Once the contact impedance reached to a steady level, which was seen from the display system, data acquisition was started. The subjects were ready to listen to the recitation of the Quran with closed eyes to avoid interruption. Recordings were used up to about 5 minutes for each participant. Physiological power of GSR through taubah was studied during this research. While making taubah participants should have a degree of self-control in the case of remembering the sins, they have committed. Then, they remembered the sins they have made in their past life and apologies to Almighty Allah to forgive them. Thereafter, individuals made taubah in their mind. The preliminary surroundings were the same as with the intention of prior experiments. When the GSR response became constant the subject was allowed to make taubah and the corresponding response was recorded for 5 minutes.

3.3 DEVELOPMENT OF TAUBAH PROTOCOL

3.3.1 Impact of Taubah on Psychophysiological Condition

Taubah is the great noble and cherished custom of submission to the Almighty Allah. He loves those who regretted and tests them with their sins. Therefore, Almighty can shower His blessings upon the individuals after they regret. Repentance is a unique form of worship. Allah is enormously pleased when his creation repents. This happiness has a wonderful influence on the heart of the person who is repenting. Thereafter, the repentant