

Empirical Evidence-based Policy for Islamic Psycho-spiritual Intervention: Using Electroencephalography for Post-Traumatic Stress Disorder

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Abstract

Providing empirical evidence in an experimental study with randomized control trials design has been considered as a gold standard among the scientific community. Islamic psycho-spiritual study is currently categorized as pseudo-science; hence deserve a more scientific approach to substantiate its proposition. Despite clinical psychology is considered as more scientific, studies indicate that post-traumatic stress disorder (PTSD) has often been misdiagnosed and thus the treatment may not be effective. Therefore, we proposed a more scientific instrument using Electroencephalography (EEG) to measure the effectiveness of Islamic Psycho-spiritual Intervention (IP-SI) among PTSD subjects who were victims of the massive flood 2014/2015 in Malaysia. **Objective:** This study aims to suggest an empirical evidence-based policy on the effectiveness of the Islamic Psycho-spiritual intervention. The general objective of this study is to test the effect of the Islamic Psycho-spiritual intervention on PTSD subjects who were victims of the massive flood. **Method:** The gold standard method of randomized controlled trials design was adopted in this experimental study. Sample ($n = 73$) were selected from two different location of transits houses in Kampung Tualang, Kuala Krai, Kelantan, randomly assigned to experimental and control groups. The experimental group received psycho-spiritual treatment of group psycho-education and listening to surah Yasin while wearing EEG cap. The control group did not listen to surah Yasin while wearing the EEG cap. Data were collected using Mindo wireless 32-channels EEG. PTSD was assessed using instrument parallel to Diagnostic Statistical Manual (DSM-5). The collected data was analysed with t -test to examine the significant difference in EEG signals between pre and post of experimental group and control group. **Result:** The findings indicated there were significant differences in EEG signals with medium effect sizes between pre and post-treatment times for experimental group, $t(35) = 3.43, p = .002$, and between control and experiment groups at post treatment time, $t(35) = 2.569, p = .009$. Thus, the findings provide an empirical evidence to support for the effectiveness of IP-SI. Accordingly, policies for empirical evidence-based Islamic psycho-spiritual intervention are recommended for the government and the related agency.

Introduction

In Islam, knowledge is light (Freely, 2015). It guides and shows the path for the knowledge seeker to see the truth. According to Oxford Dictionary (2016), knowledge is defined as “*facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject*”. In order to understand a subject matter, science is used as a method to acquire knowledge and the acquired knowledge (*ilmu aqli*) has to be evidence-base (Dzulkhairi, Zairina, Noorah & Yunus, 2015). The Holly Quran stated “*Say bring forth your proof if you are telling the truth!*”(27:64). Laliwala (2005) noted that knowledge has to reach a certain level of certainty (*yaqeen*). Providing empirical evidence help increase the quality of knowledge from the stage of *Ilm al-Yaqeen* (the stage of conviction derived through knowledge) to the second level of certainty known as *‘Ain al-Yaqeen* (the conviction of truth derived through seeing it). As stated in the Holly Quran, *No indeed; did you know with the knowledge of certainty* (102:5) and “*Again, you shall surely see it with the eye of certainty*” (102:7). Knowledge is certainty and not speculation. Therefore, Islam and science is not antagonistic.

Psychology has long been debatable as either science or pseudo-science (Morgan, 1998). The scientific community does not give a general cloak claim but depend on which specialization of psychology. Clinical psychology is considered as among the most advance scientific field and parapsychology is considered as pseudo-science. Nevertheless, the gap between the two seems to be narrowed in psychology. Profuse of literatures regarding spirituality and religiosity has been published in the main stream of psychology.

To date, studies on the Islamic psycho-spiritual treatment remain at descriptive levels, with very few exceptions (Hamjah & Akhir, 2014). For the advancement of Islamic psychology, it has to be considered as scientific knowledge by the scientific community (Ali & Chisti, 2015). The rigorous scientific method has to be adhered and gold standard has to be adopted. Therefore, it is important for Islamic scholars to distinguish between science and pseudo-science. Accordingly, the following section delineates science versus pseudo-science.

Despite clinical psychology is considered as more scientific, studies indicate that PTSD has often been misdiagnosed (Armour, Ghazali & Elkit, 2012); and thus the treatment may not be effective. Hence, we proposed a more scientific instrument by using Electroencephalography (EEG) among the flood victims in Malaysia to measure the effectiveness of Islamic Psycho – spiritual Intervention (IP-SI) on PTSD. Accordingly, this study attempts to provide empirical evidence on the effectiveness of the Islamic Psycho-spiritual intervention for post-traumatic stress disorder (PTSD).

Science and Pseudo-science

A scientific theory is based on empirical evidence through observation and experimentation. It is always subject to falsification if new evidence is presented. Therefore, no theory is ever considered the only truth and 100 % certain or correct as science accepts the concept of fallibilism (Zachar, 2014). Scientists could be wrong about their beliefs, expectations, or their

understanding of a phenomenon, and yet their incorrect claim may be justified with evidence. Unless, new evidence is provided, the incorrect assumptions remain. Therefore, hypothesis testing is to falsify the null. The scientific method involve the following various steps with various continuous loops as show in Figure1. A theory is considered scientific when it is has undergone the following proses.



Figure1: Process of formulating scientific theory
 Source: Conservapedia (2016).

Characteristics of Pseudo-science:

According to Zachar, (2014), pseudoscience is a claim, proposition, or practice that seems to scientific, how lack of scientific rigor. The proposition and claim:

- (1) Cannot be tested
- (2) Has been tested and always failed the test
- (3) Contradictory to well established and well tested science

The Gold Standard: Randomized Controlled Trials Design

The classic true experimental design, nowadays, is better known as randomized controlled trial design. This research design is considered as gold standard among the scientific community. Three basic conditions of gold standard are:

- 1. Random assignment. Participants are randomly assigned to either experimental group without any qualification. A minimum sample size of 30 is required for each group in order to conduct inferential statistic.
- 2. At least one control group. Beside treatment group, there must be another group that receives the same treatment of the experimental group. In classic experimental design

usually, the control group received no treatment at all. Nowadays, the treatment group received treatment as usual.

3. At least two trials. The outcome measures are compared in at least two times and two group comparisons (2 X2t-test data analysis).
 - (i) Pre and post of experimental group
 - ii) Pre and post of control group
 - iii) Pre experimental group and pre control group
 - iv) Post experimental group and post control group

PTSD among Flood Victim in Malaysia

Malaysian Meteorology Department and Department of Irrigation and Drainage reported the increment of 60 % rainfall within three years for all the states in Malaysia from 2,500 to 4,000 mm. Hence, it may position Malaysia as one of the countries with the heaviest rainfall in the world. Following the flood, there has been increased mortality, psychological morbidity, socio-economic disruption and the global burden of disease. Studies provide evidence post-traumatic stress disorder (PTSD) levels of between 5 to 71% were found among individuals following flood disasters around the world (Radzi et al., 2015).

Commonly, the traumatic episode of flood may co-occur with pathological reactions and undesirable outcomes such as depression, anxiety, cognitive disruption, fear and emotional suppression (Radzi et al., 2015). Numerous studies have highlighted the life-threatening dangers of Post-traumatic Stress Disorder (PTSD) and have established its physiological etiology in the cerebra of those suffering from the phenomenon (Armour, Ghazali &Elkit, 2012). Essentially, PTSD is related with irregularities in brain functioning across a range of instruments. The resultant effect of the phenomenon include, but not limited to hyper-vigilance, hyper-responsiveness and intrusive trauma-related memories (Daufesh et al., 2014). The timely identification of PTSD among flood victims is vital to the improvement of its long-term psychological co-morbidity, both financial and social impact on society. Yet gaps in knowledge hamper the progression of the effectiveness of treatment and helping relationships for PTSD subjects.

Treatment of PTSD

Numerous studies have shown that religiosity is positively associated with different criteria's of psychological well-being (Hamjah &Akhir, 2014; Daufesh et al., 2014). Research has found a relationship between religiosity and PTSD. Individuals with PTSD were more likely to report changes in their religious beliefs than those who did not develop phenomenon and religious coping is positively associated with PTSD severity. Study also suggests that negative and positive religious coping is largely associated with negative and positive psychological adjustment to stress respectively. Basically, several studies have reported that religious affiliations, among other factors, can reduce suicidal behavior in PTSD patients.

Based on literatures, various treatments for PTSD exist. Some of these include psychotherapies, particularly cognitive behavioral therapy, different types of relaxation, methodical desensitization, eye movement desensitization, reprocessing, (EMDR) medication and various forms of biofeedback (Daufesh et al., 2014). However, there is lack of studies on Islamic psycho-spiritual treatment on PTSD subjects.

Electroencephalography (EEG) and Knowledge Gap

There is lack of study uses EG in the reaffirmation of the self-report of post-traumatic stress disorder in Malaysia and among flood victim. Recent systematic review on PTSD suggests considering another framework, to better understand the patho-physiology of PTSD and to determine possible PTSD biomarkers, specifically EEG. It is crucial to investigate posttraumatic stress disorder (PTSD) as a spectrum that ranges from normal to pathological. This dimensional approach is especially important to aid early PTSD detection and to guide better treatment options (Armour et al., 2013). Despite the scarcity of Islamic psycho-spiritual treatment, there is an experimental study on the effect of Muslim Prayer (Salat) on an EEG and its relationship with Autonomic Nervous System Activity (Daufesh et al., 2014). Nevertheless, the samples of the study were 30 healthy Muslims man. This study, however investigates the Islamic psycho-spiritual activities on victims of flood who suffered with PTSD. This study, therefore, contribute the existing body of knowledge on PTSD and its comorbidities by using EEG to diagnose PTSD and examine on the progression of the flood victims with Islamic psycho-spiritual treatment.

Research Objectives

This study aims to provide empirical evidence on the effectiveness of the Islamic Psycho-spiritual intervention. The general objective of this study is to test the effect of the Islamic Psycho-spiritual intervention on PTSD subjects who were victims of the massive flood 2014/2015 in Malaysia.

Specifically, this study aims to test the following hypotheses:

- H1: There is no significant difference in PTSD between experimental and control groups at pre-treatment time.
- H2: There is no significant difference in EEG signals of experimental group between pre- and post-treatment times.
- H3: There is no significant difference in EEG signal of control group between pre and post treatment times.
- H4: There is no significant difference in EEG signal between experimental and control groups at post-treatment time.

Method

Site and Sample

The sites of the samples were two neighboring villages of flood victims located at Kampung Tualang, Kuala Krai. One site was Mercy's transit House Village and another one was MAIK's Transit House Village. Kuala Krai was chosen for this study because it was one of the places

that were seriously affected by the flood December 2014-January 2015 in Malaysia. As suggested by Cohen (1988), n=30 per group to fulfill the power analysis requirement. A total of 72 participants were recruited base on their score of PTSD above mean, 36 participants were randomly assigned to experimental group and another 36 participants to control group. The details of the demographic background of the participants in term of sex, marital status and employment status are shown in Table 1. The age of the selected participants was ranged between 16-60 years old and the income ranged between RM100-1500 per month.

Table 1: Distribution of Demographic Background of the Participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	35	48.6	48.6	48.6
Female	37	51.4	51.4	100.0
Single	17	23.6	23.6	23.6
Married	43	59.7	59.7	83.3
single mother	10	13.9	13.9	97.2
single father	2	2.8	2.8	100.0
Student	11	15.3	15.3	15.3
Employed	21	29.2	29.2	44.4
Unemployed	40	55.6	55.6	100.0

Inclusive and Exclusive Criteria

Inclusive: Age ranged between 16 to 60 and PTSD score above mean.

Exclusive: Neurotic, psychotic, physically ill and weak due to post-partum or chronic diseases

In addition to the inclusive and exclusive criteria, the subjects were compared on their PTSD scores at the preliminary analysis to ensure, the experimental and control group were equal and affecting as a confounding factor.

Data Collection Procedure

First, an approval of ethic committee was obtained from Ministry of Higher Education for conducting this research with referenced number FRGS /1/2015/SS02/UPM/02/0. In addition, a letter of permission was received from the District Officer of Kuala Krai. Then, prior to data collection each participants signed an inform consent to participant in this experimental study. Data were collected on 16th February 2016 until 21st February 2016 at the above mentioned sites. Accordingly, 150 questionnaires consisted of five parts were distributed. Due to limitation of space, this study focused only Part A (Demographic Variables) and Part B (Post Traumatic Disorder) of the questionnaire.

Instrumentation

Post-traumatic Stress Diagnostic Scales (PSD; Armour, Ghazali & Elkit, 2012) measures sleeping difficulties, irritability/anger and concentration difficulties form a separate, re-experiencing and

hyper arousal. In this study, reliability, $\alpha=.82$, PCA Construct Validity = 50.96% total variance explained.

Mindo EEG 32 Channel Wireless EEG system (Mindo, National Chia Tung University Brain Research Center, Taiwan) was used to measure the EEG signals. It was a spring-loaded dry electrode was arranged according to the international 10-20 system and the sampling frequency was 250 Hz. Among 32 channels, EEG activities of eight electrodes, namely F3, F4, C3, C4, P3, P4 and O1 and O2 were used for data analysis. EEG brain signals were recorded before, during and after listening activity. However, for the purpose of this study, only pre and post treatment was data were analyzed.

Treatment

The subjects were gathered at the surau (prayer hall) briefing were given on this research project and psycho-education on post-traumatic stress disorder was delivered. The briefing and the psycho-education session last for 1.5 hours. The treatment and recording session took 25 minutes for each subject. The data collection was started with three minutes resting state with eye open followed by five minutes state baseline recording with eyes close. Twelve minutes of EEG signals were recorded while subjects were listening to the surah Yasin recitation and were allowed to keep their eyes open. Surah Yasin is the 36 th surah in the Holy Quran and it consists of 83 verses. Subjects listened to the recitation using an earphone with comfortable volume to them.

To avoid cross-contamination of the treatment, the experimental group received treatment Islamic psycho-spiritual (Yasin recitation) at Mercy’s Transit House Village and the control group received no treatment on Yasin recitation MAIK’s Transit House Village. Instead of listening to the recitations, the control group subjects were asked to remain seated without doing anything. At the final step, EEG data were recorded for five minutes with the eyes closed. The protocol of the treatment is illustrated through block diagram as shown in Figure 3.

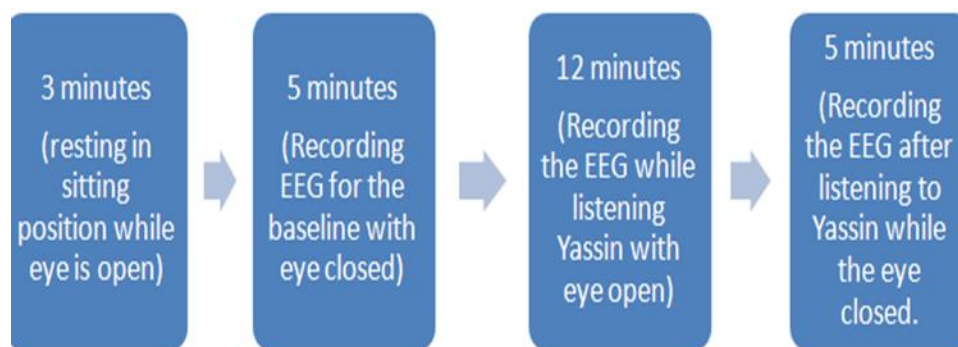


Figure 2: Treatment EEG Protocol

Results

Preliminary Analysis

A preliminary data analyses indicate that the data is normal according to the cutoff point for skewness is ± 3 and kurtosis ≤ 10 (Steven, 2012). The data of this study shows skewness = 1.76 and kurtosis = .474. Levene test indicates that, equal variance assumption was assumed, $F = .307$ and $p = .582$. In addition, the subjects were compared in their PTSD. The following hypothesis was tested.

There is no significant different in PTSD between experimental and control group at screening session

The results as shown in Table 2, indicated that there was no significant difference in PTSD at $\alpha < .01$, between experimental and control group $t(70) = 2.45, p = .017$. Therefore, this indicated that the experimental and control group were equally high in total PTSD mean score before the screening session. Thus, there was no issue of unequal PTSD as the confounding factor for the effectiveness of the treatment to experimental and control group.

Main Analysis

H1: There is no significant difference in EEG signals between experimental and control groups at pre-treatment time.

The results as shown in Table 3, at $\alpha < .01$, that there was no significant difference in EEG signals at pre-treatment between experimental and control group $t(35) = .301, p = .783$. Therefore, null hypothesis, H1 was retained, this indicated that the experimental and control group were equal in EEG signals mean score before the treatment.

Table 2: Preliminary Analysis Independent *t*-test of PTSD between Experimental and Control

Group Statistics					
	Compare	N	Mean	Std. Deviation	Std. Error Mean
PTSD	Experimental	36	49.7778	8.85796	1.47633
	Control	36	44.5000	9.37931	1.56322
	Levene Test	F	sig		
		.307	.582		
	Independent t-test	t	df	Mean Difference	Std. Error Difference
		2.455	017	5.27778	2.15016

Table 3: Main Data Analysis Result of Paired t-test EEG Signals

Pair	Mean	Std. Deviation	Std. Error Mean	t	Sig. (2-tailed)
Experiment and control pre	.36750	2.43923	1.21961	.301	.783
Experiment pre and post	1.58750	2.27087	.46354	3.425	.002
Control pre and post	-.49750	4.60381	2.30191	-.216	.843
Experiment and control post	-1.16000	2.07996	2.03998	-2.569	.009

H2: There is no significant difference in EEG signals of experimental group between pre- and post-treatment times.

The results as shown in Table 3, at $\alpha < .01$, that there was a significant difference of experimental group between pre- and post-treatment time, $t(35) = 3.43, p = .002$. Therefore, null hypothesis, H3 was rejected. This indicated that there was significant change in EEG signals after the treatment for experimental group. Next, we need to examine the degree of changes according to the effect size. According to Cohen (1988, p. 20) and Cohen (1992), the effect size of for t -test is as the following;

$$(2.2.1) \quad d = \frac{m_A - m_B}{\sigma}$$

Therefore, the effect size of this experiment was $d = 1.59 / 2.28 = 0.69$. According to Cohen (1988, p. 40), effect size guideline, small: $d = .20$, medium: $d = .50$ and large: $d = .80$. We conclude that the effect size was medium.

H3: There is no significant difference in EEG signal of control group between pre-treatment and post treatment times.

The results as shown in Table 3, at $\alpha < .01$, that there was no significant difference of control group between pre- and post-treatment time, $t(35) = -.216, p = .843$. Therefore, null hypothesis, H3 was retained. This indicated that there was no significant change in EEG signals after the treatment for control group.

H4: There is no significant difference in EEG signal between experimental and control groups at post-treatment time.

The results as shown in Table 3, at $\alpha < .01$, that there was a significant difference in EEG signals at post-treatment between experimental and control groups, $t(35) = 2.569, p = .009$. Therefore, null hypothesis, H1 was rejected, this indicated that the experimental and control group were not equal in EEG signals after the treatment. Therefore, the effect size of this experiment was $d = 1.16 / 2.07 = 0.56$. According to Cohen (1992; 1988, p. 40), effect size guideline, small: $d = .20$, medium: $d = .50$ and large: $d = .80$. We conclude that the effect size was medium.

Discussion

The results of the preliminary showed that prior to the treatment, both experimental and control group are equally high in term of their PTSD. Similarly, their EEG signals also equal prior to treatment according to the second hypothesis (H2) testing. The results indicated that both groups were similar and if there is any the difference occurred after the treatment, thus, most likely is due to the treatment.

In this study, the change that was measured after the treatment was the EEG signals. The result of the third hypothesis (H3) testing showed that there was significant difference in EEG signals between experimental and control group at post treatment time. Similarly, there was a significant difference in EEG signals of experimental group between pre and post treatment as shown in the fourth hypothesis (H4) testing.

Finally, the last hypothesis (H5) testing showed that there was no significant difference in EEG signals of group between pre and post treatment. Therefore, we can conclude at 1 % significant level (1% of committing mistake of rejecting the null) the changes of the EEG signals in the experimental group was due to the treatment given. The experimental group received the the Yasin recitation and control group did not.

The promising result of our findings is in line with (Doufesh et al., 2014), the EEG signal specifically, alpha brain wave, improved when the participants were treated with psycho-spiritual treatment. Moreover, Yasin recitation has been regularly practiced by the participants every Thursday at the prayer hall in their villages. Thus, when they were treated with something familiar and known to be soothing to the ears and the heart of the participants the brain may have reacted to it positively at the very first treatment of this study. Nevertheless, with any of scientific study, the finding of this study is subject to fallibilism (Zachar, 2014). Therefore, we suggest future study to replicate our experiment with other population and sampling frame.

Policy Implication

Ultimately, this study aims to suggest an empirical evidence policy on the effectiveness of the Islamic Psycho-spiritual intervention. We humbly propose the principle of action to be adopted regarding to the Islamic psycho-spiritual treatment for government.

1. Ministry of Higher education is to prioritize grant offering to Islamic psycho-spiritual intervention topic that adopted the gold standard of experimental study. Publication fees are to be offered for publication not only in ISI (JCR) index journal but also SCOPUS, when it is related to Islamic psycho-spiritual study. This is to ensure that Malaysia become the leader in scientific knowledge of Islamic psycho-spiritual intervention. Malaysia has become the world leader in Islamic economic and finance, thus Malaysia also will be the leader in this field when the recommended policy is adopted by the government.
2. JAKIM and State Department of Religious affair such as MAINS is to adopt intervention of Islamic psycho-spiritual that has been back up by empirical evidence that follow the gold standard of experimental study. The intervention that is not tested empirically using the gold standard has to go through the rigorous proses of experimentation to ensure the intervention is really effective to help solve the related problems of the society. The benefits of Islamic psycho-spiritual intervention not only will be benefited by the Muslim society but also to non-Muslim population. Provided the intervention conducted was really back-up by the empirical evidence with rigorous proses adopting the gold standard research design and methodology.

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