An Evaluation of the Wave Academy Approach to Reducing Post Traumatic Stress Disorder

Roisin P. Corcoran
School of Education, Johns Hopkins School of Education,
Baltimore, Maryland, United States

Joanne O'Flaherty
School of Education, University of Limerick
Castletroy, Limerick, Ireland

Laura Morrissey
School of Education, University of Limerick
Castletroy, Limerick, Ireland

Steven M. Ross
School of Education, Johns Hopkins School of Education,
Baltimore, Maryland, United States

Alan C. K. Cheung
The Chinese University of Hong Kong, Shatin, Hong Kong

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Abstract

The Wave Academy is a non-profit organization dedicated to communicating the physical and mental benefits of warm water therapy, and increasing the circle of individuals and communities that benefit from this therapy. The initial community on which their efforts are focused is the veterans who have returned from wars in Iraq and Afghanistan who suffer from Post-Traumatic Stress Disorder (PTSD).The Wave Academy implemented and developed a new testing protocol for the first time in 2013. This new testing protocol was evaluated at two consecutive time-points, 2013; 2014. This evaluation is intended to capture results of whether water therapy reduces the symptoms of PTSD in clinically diagnosed veterans, and inform program staff about the contextual variables surrounding full implementation of such an intervention. Twenty veterans from the Army, Navy and Marines who served in Iraq and were clinically diagnosed with PTSD participated in eight weeks of warm water therapy across two time points. To monitor changes in the level of PTSD symptoms, a panel of assessments were administered. Results indicate that warm water therapy may be linked to a reduction in symptoms associated with PTSD, for example better sleep, and pain reduction and lower levels of anxiety. It takes time, however, veterans, on average, did not see results until after four weeks of therapy.

Keywords: PTSD, Wave Academy, Veterans, Warm Water Therapy.

1. An Evaluation of the Wave Academy Approach to Reducing Post-Traumatic Stress Disorder

As many as two thirds of the population may experience a significant traumatic event at some point in their lives, and up to one fifth of people in the United States may experience such an event in any given year (Galea, Nandi & Vlahov, 2005). Post-traumatic stress disorder (PTSD) has been identified as one of the most frequent and debilitating psychological disorders occurring as a result of traumatic events and disasters, therefore making it one of the most commonly studied phenomena (Norris et al., 2002; Galea, Nandi & Vlahov, 2005).

Post-Traumatic Stress Disorder is a psychiatric Disorder first recognized in the Diagnostic and Statistical Manual of Mental Disorders (3rd Edition) (DSM-III) (Galea, Nandi & Vlahov, 2005). Characteristic features can include but are not restricted to; distressing recollections that may reoccur over time, distressing dreams, and psychological distress to cues, individuals seek to avoid particular thoughts, emotions and conversations, psychogenic amnesia, detachment, difficulty with rest and sleep, and difficulty maintaining concentration (Adapted from DSM IV Criteria). In order to satisfy the DSM IV, a number of criteria must be met (American Psychiatric Association, 1980; 1994) including for example, exposure to a traumatic event where an individual feels that their personal safety/life is in danger. Building upon this example, in order to further meet classification criteria an individual must experience a response to the stimuli that results in intense fear, helplessness or horror. Symptoms must be present for at least one month leading to significant distress as well as lower levels of functioning in social, employment or other key areas of life. The publication of the tenth revision of the International Classification of Diseases (World health Orgnisation, 1992), (ICD-10 Classification) revised the necessity for symptoms to be present for one month.

Treatment studies aimed at reduction of symptoms of PDST often include education about and practice of anxiety management strategies (Foa, Rothbaum, Riggs & Murdock, 1991; Echeburúa, de Corral, Zubizarreta & Sarasua, 1997; Foa, Dancu & Hembree, 1999; Glynn et al., 1999; Blanchard et al., 2003; Schnurr et al., 2003; Bradley, Greene, Russ, Dutra & Westen, 2014). One treatment therapy package, Warm Water Therapy was adapted for use with veterans from the Army, Navy and Marines who served in Iraq and were clinically diagnosed with PTSD and now has been used in treatment studies of a variety of PTSD samples. The results of this treatment study across two distinctive cohorts are presented here.

2. *Materials and Methods*

Twenty veterans from the Army, Navy and Marines who served in Iraq and were clinically diagnosed with PTSD participated in eight weeks of warm water therapy. To monitor changes in the level of PTSD symptoms, a panel of assessments were administered. Two cohorts undertook the WAVE Intervention at two time-points. The research was informed by the following research questions:

1. Does warm water therapy reduce the symptoms of PTSD in clinically diagnosed veterans?
2. Is there evidence of symptoms reduction at four or eight weeks?

2.1 Intervention

The Wave Academy implemented a testing protocol for each client starting with an intake session followed by a one-hour water therapy session each week for eight weeks. Twenty clients in total across two time-points completed the therapy. The therapy uses the properties of water to help clients heal from traumas and medical conditions. The client is immersed in water and a licensed aquatic therapist supports and lightly massages the client's body. Clients were recruited via the organization's website, video, flyers, or health care professionals. Case managers conducted preliminary assessments via phone to determine whether potential clients met predetermined inclusion and exclusion criteria. Inclusion criteria included: 18 years of age and older, experienced a traumatic event related to military duty, stable in treatment for PTSD for at least six weeks, willing to track medication changes during the study and willing to not join another intervention during the eight-week study.

Exclusion criteria included: inability to give informed consent, cognitive impairment sufficient to cause inability to complete the protocol, psychotic symptoms, dementia, or other organic mental disorders causing inability to complete the protocol, severe osteoporosis, recent cerebral hemorrhage, acute ligament us instability (following traumatic injury), significant hypersensitivity to vestibular stimulation, deep vein thrombosis, severely compromised cardiovascular system, unpredictable bowel incontinence, perforated eardrums, uncapped tracheotomy, open wound, high fever, or other medical condition adversely affected by movement or submergence in warm water as supported by primary care provider clearance.

2.2 Participants

2.2.1 Study 1. The average age of participants was 28.60 (SD = 4.16) years old. There were four males and one female in the group, (White/Caucasian, N = 5). One client identified as Hispanic. Preliminary assessments confirmed that all of the clients' were clinically diagnosed with depression, two clients' were diagnosed with anxiety, and one was diagnosed with chronic pain.

Clients' self-reported the following: Depressive symptoms (Yes; Y = 3, No; N = 1, Unknown; U = 1); Prescribed antidepressant (Y = 2, No; N = 2; U = 1); Other prescribed medication (Y = 3, No; N = 1; U = 1).

2.1.2 Study 2. The average age of participants was 35.20 (*SD* = 7.35) years old. There were 13 males and two females in the group. The sample included the following ethnic classifications: White/Caucasian (*N* = 11); African American (*N* = 1); Asian Eastern Asia/Pacific Islander (*N* = 2); Mixed (*N* = 1). Five clients identified as Hispanic. Following initial assessments 12 clients were clinically diagnosed with depression; 14 clients were diagnosed with anxiety; and 13 were diagnosed with chronic pain. Clients self-reported the following: depressive symptoms (Yes; Y = 14, No; N = 1); prescribed antidepressant (Y = 10, No; N = 5); other prescribed medication (Y = 9, No; N = 6).

2. 3. Measures

To monitor changes in the level of PTSD symptoms, a panel of assessments were administered during the intervention including the following: Life Events Check List (LEC)(Weathers et al., 2013), which wascompleted at one time point: before therapy was administered; Post Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996), which was administered at four time points: before therapy, week two, week four, and week eight; PTSD Checklist–Military (PCL-M)(Weathers, Litz, Herman, Huska & Keane, 1993), which was administered at four time points: before therapy, week two, week four, and week eight; Functional Assessment Chronic Illness Therapy–Spiritual (FACIT-Sp) (Cella, 2007), which was administered at four time points: before therapy, week two, week four, and week eight; and finally Profile of Mood States (POMS) (Shacham, 1983), administered at four time points: before therapy, week two, week four, and week eight. Nonparametric tests were selected for analysis of quantitative data from the clients' assessments. Medians are reported as a judge of location; it is the center of a distribution, which makes more sense to use with a nonparametric test.

3. *Results*

3. 1 Does warm water therapy reduces the symptoms of PTSD in clinically diagnosed veterans?

The Friedman test was used to investigate whether water therapy reduces the symptoms of PTSD in clinically diagnosed veterans.

3. 1. 1. Study 1. Results indicate the following:

- PTSD symptoms, as measured by the Post Traumatic Growth Inventory (PTGI), did not significantly change over the eight weeks of the water therapy, $\chi^2(2) = 5.16$, $p = .08$.
- PTSD symptoms, as measured by PTSD Checklist–Military (PCL-M), did not significantly change over the eight weeks of the water therapy, $\chi^2(2) = 2.84$, $p = .24$.
- PTSD symptoms, as measured by the Functional Assessment Chronic Illness Therapy – Spiritual (FACIT-Sp), did not significantly change over the eight weeks of the water therapy, $\chi^2(2) = 2.8$, $p = .25$.
- Clients' reported Profile of Mood States (POMS) did not significantly change over the eight weeks of the water therapy, $\chi^2(7) = 4.99$, $p = .66$.

A further analysis of the data reveals some interesting nuances which are lost in this analysis. Wilcoxon tests were used to follow up these findings. It appeared that there was a significant increase in PTGI from baseline (Mdn = 59) to week four (Mdn = 75), z = - 2.02, $p = .04$. Interestingly, there was also a decrease in clients' reported POMS from week four (Mdn = 36) to week five (Mdn = 33), z = - 2.02, $p = .04$. PCL-M and FACIT-Sp did not significantly change from baseline to week four, from baseline to week eight or from week four to week eight.

3. 1. 2. Study 2. Results indicates the following:

- PTSD symptoms, as measured by the Post Traumatic Growth Inventory (PTGI), did not significantly change over the 8 weeks of the water therapy, $\chi^2(3) = .63$, $p = .89$.
- PTSD symptoms, as measured by PTSD Checklist–Military (PCL-M), did not significantly change over the eight weeks of the water therapy, $\chi^2(3) = 7.4$, $p = .06$.
- PTSD symptoms, as measured by the Functional Assessment Chronic Illness Therapy–Spiritual (FACIT-Sp), did not significantly change over the eight weeks of the water therapy, $\chi^2(3) = 2.59$, p = .46.
- Clients' reported Profile of Mood States (POMS) did not significantly change over the eight weeks of the water therapy, $\chi^2(3) = 5.69$, $p = .13$.

Wilcoxon tests were used to follow up these findings. It appeared that there were significant decreases in PCL-M from the baseline (Mdn = 67) to week eight (Mdn = 53), z = - 2.50, p = .01; from week two (Mdn = 63) to week eight, z = - 2.21, p = .03; and also from week four (Mdn = 57) to week eight, z = - 2.38, p = .02. Interestingly, there were decreases in clients' reported POMS from baseline (Mdn = 84) to week eight (Mdn = 60.5), z = - 2.29, p = .02, and from week four (Mdn = 69) to week eight, z = - 2.07, p = .04. PTGI and FACIT-Sp did not significantly change from baseline to week two, from baseline to week four, from baseline to week eight, or week two to week four, or week two to week eight, or week four to week eight.

3. 2 Is there evidence of symptoms reduction at four or eight weeks?

3. 2. 1. Study 1. New variables were computed to calculate the change between time points for each measure. A one sample median test was selected. This is an appropriate measure in this instance as it facilitates us to test whether a sample median differs significantly from a hypothesized value. Therefore, one sample median tests are used to calculate whether that change is significantly different from zero or significantly changing. The results indicate that there is a statistically significant difference in PTGI from week one to week four (p = .043). In other words, the increase in PTGI from week one to week four in this sample does significantly differ from the hypothesized value of 0.

3. 2. 2. Study 2. Once again, new variables were computed to calculate the change between time points for each measure and a one sample median test was used to calculate whether that change was significantly different from zero or significantly changing. The results indicate that there are statistically significant differences in PCL-M from week one to week eight (p = .01), from week two to week eight (p = .03), and from week four to week eight (p = .02). In other words, the decrease in PCL-M from week one to week eight, from week two to week eight, and from week four to week eight in this sample significantly differs from the hypothesized value of 0. In addition, the results report that there are statistically significant differences in clients' reported POMS from week one to week eight (p = .02), and from week four to week eight (p = .04). The decrease of clients' reported POMS significantly differs from the hypothesized value of 0 from week one to week eight, and from week four to week eight.

4. Discussion

Warm water therapy did not have a significant impact until week four when PTSD symptoms reduced, on average, for the participants, indicating that the first four weeks of therapy may aid clients in becoming perhaps more acclimatized to the therapy. After four weeks of therapy, a decrease in scores across two of the measures emerge; the PTSD Checklist-Military (PCL-M)(Weathers et al., 2013)and Profile of Mood States (POMS) (Shacham, 1983). The POMS concentrates on identifying levels of PTSD related symptoms such as Anger/Hostility, Tension/Anxiety and Depression/Dejection. For both tests, a reduction in the score indicates a lessening of PTSD related symptoms. Cloitre (2009) notes that behavioral therapies were among the pioneering interventions used to treat PTSD, thus supporting the rationale of this study. Behavioral interventions work off the principle that exposure to the conditioned stimuli, without the threat of negative consequences diminishes the conditioned emotional response (Foa, Keane & Friedman, 2000).

Intervention treatments of PTSD included exposure interventions that comprised not only external stimuli (in vivo exposure) but the individual's memory of the event (imaginal exposure).In order to truly treat and understand psychopathology, a significant shift in psychological theory emerged known as "cognitive revolution"(Foa, Keane & Friedman, 2000) which acknowledged internal representations of past experience. Cognitive models of trauma sometimes focus on the role of trauma in adversely impacting a person's beliefs (Janoff-Bulma, 1992). Cognitive therapy and exposure have shown to be effective(Keane et al., 1989; Marks et al., 1998; Fecteau & Nicki, 1999; Tarrier et al., 1999; Resick et al., 2002;Bryant, Moulds, Guthrie, Dang & Nixon, 2003; Ehlers et al., 2003; 2005; Başoğlu, Salcioğlu, Livanou, Kalender & Acar, 2005;.Chard, 2005; Foa et al., 2005; Monson et al., 2006; Duffy, Gillespie & Clark, 2007; Mueser et al., 2008). Integrated exposure and cognitive restructuring interventions have demonstrated effectiveness in reducing PTSD symptoms in a variety of trauma populations (Cohen, 1992; Chard, 2005; Monson et al., 2006).

4.1 Conclusions

The key focus in the present paper was to provide evidence of the Wave Academy warm water therapy intervention's promise for reducing the symptoms of PTSD in clinically diagnosed veterans. We will examine in this section considerations relating to the evaluation of this particular study component.

According to the Institute for Educational Sciences, to produce evidence of promise, an evaluation must use a design that is eligible for producing evidence of promise, including a pre-post design without a comparison group. A pre-post design compares outcomes for intervention clients after receiving the intervention to their outcomes before receiving the intervention. An evaluation must also include an outcome measure that meets outcomes standards. For example, the outcomes must be face valid, reliable, and not over-aligned with the intervention. (For more details, see the WWC Procedures and Standards Handbook, Version 3.0, Section III.B.4).

According to these guidelines, the current study meets standards for providing evidence of promise. Further, although it must be rigorous, the evaluation of 'new' interventions also needs to be practical and realistic regarding measureable impacts. Therapists and researchers often erroneously assume that clients know how to use the resources available to them and are able to effectively regulate their own cognition, motivation, and behavior. Expecting new water therapy-based interventions to reduce the symptoms of PTSD in situations where therapists mostly mirror what therapists would otherwise do in the clinic sets expectations that make little sense from a theoretical standpoint while promoting perceptions of failure when reductions in symptoms aren't found. However, mirroring clinic based therapies, where therapists are taught evidence-based practices, seems a worthy contribution, in the use of water therapy.

For example, just as exposure and cognitive restructuring interventions yield comparable reduction in PTSD symptoms, warm water therapy should be expected to yield the same reduction in PTSD symptoms as clinic based therapy. In the present research study, the therapy appeared to have produced some differences in PTSD symptoms and for many clients', stabilized, or even prevented, a further increase in symptoms. If this level of change is possible after only eight weeks, then the therapy may have an even greater effect in subsequent years. Potentially, stabilizing symptoms may be an important first step to take before implementing additional treatments in conjunction with Wave Therapy. The evidence presented here provides early signs that this therapy may make an important difference in the treatment of patients with PTSD. Future research should implement a study based on one of the following two designs: randomized controlled trial (RCT) or quasi-experimental design (QED). In an RCT, clients or other units are randomly assigned to two or more groups that differ in the intervention(s) received. In a QED, clients or other units are divided non-randomly into two or more groups that differ in the intervention(s) received. Then, attrition, baseline equivalence, outcomes and confounds should be assessed.

Overall, the present exploratory study is encouraging. Further, as examined through more qualitative and less direct means, participants indicated that they were pleased with their progress in reducing pain, improving sleep duration and quality, all of which is of interest, both for research and practice.

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