



## ORIGINAL ARTICLE

## Evaluation and Feasibility of a Comprehensive Program for Post-Traumatic Stress Disorder in Military, Veterans, and First Responders

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### Abstract

**Background:** Healing Invisible Wounds-The Intensive (HIW-I) is a comprehensive program including individual and group therapies designed in the field of community nursing in Canada to expressly target all aspects of Post-Traumatic Stress Disorder (PTSD) for first responders, military personnel and veterans.

**Aim/Question:** The purpose of this pilot study was to evaluate the feasibility and outcomes of HIW-I.

**Method:** In this evaluation, participants completed standardized measures of symptoms of PTSD and sequelae at baseline, post-intervention and five months follow up.

**Results:** Participants (n = 18) reported statistically significant improvements on the severity of PTSD symptoms and many participants also had clinically significant improvements in these symptoms. Statistically significant improvements were also evident in anger, depression, grief and interpersonal problems. Qualitative feedback suggested participants found the comprehensiveness the program helpful.

**Discussion:** This evaluation provides promising preliminary evidence for the effectiveness of HIW-I.

**Implications for practice:** This study revealed that HIW-I was successfully implemented and supports the adoption of this comprehensive program in community settings.

important to them [1]. Traumas that precede PTSD are commonly related to death, injury, or sexual assault [1], and most people who develop PTSD have experienced multiple traumas [2]. Symptoms of PTSD are chronic and include reliving traumatic experiences, avoiding reminders of traumatic incidences, negative changes in thinking patterns, hyperarousal, and increased reactivity that result in functional impairment [1]. About three quarters of Canadians have been exposed to at least one major traumatic event and approximately 9.2% of Canadians will experience clinical levels of PTSD within their lifetime [3]. It is common for nurses to be working with patients with a diagnosis of PTSD [4]; thus, knowing about promising interventions designed to address the symptoms of PTSD may prove beneficial to nursing practice. The purpose for this study was to evaluate the feasibility and outcomes of a nurse-led, comprehensive program for PTSD.

PTSD among veterans and first-responders (a person with specialized training who is often the first to arrive at an emergency and provides assistance) is more prevalent than PTSD among the general population. In Canada, veterans and first responders have a lifetime prevalence of PTSD of 11.1% and 12-23% respectively [5,6]. People in these professions are at risk for developing PTSD as they are exposed to trauma and adversity through their careers [6,7]. They witness war, crime, significant injuries and natural disasters and face actual and threatened harm while on duty. The camaraderie

### Introduction

Post-Traumatic Stress Disorder (PTSD) is a mental health disorder that can develop after a person experiences, is threatened with, or witnesses a traumatic event or learns that such an event has occurred to someone



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built within the military and first-responder cultures can be high- sometimes even likened to kinship [8]; therefore, people engaged in these professions are also at risk of having traumatic events happen to fellow soldiers (comrades) or coworkers who are important to them. Beyond service-related traumas, many military personnel also enter their field of work with pre-existing traumas. Men who volunteered to serve in the military have been reported to have a higher prevalence in all of the measured Adverse Childhood Experiences (ACE) than men who did not choose to serve in the military [9]. Due to these many factors, PTSD is a common and pressing concern among military and first-responder populations.

PTSD symptomatology can severely impact both individuals and society [2]. Many veterans with PTSD experience a sense of moral injury, which includes emotions such as grief, shame, meaninglessness, and guilt about being involved in situations that violated their moral beliefs [10,11]. They may also struggle with processing grief and repress emotions [12]. Many veterans and first-responders with PTSD struggle with anger and aggression [13]. Sleep disturbances are also common among those with PTSD [1] and in veteran populations [14]. In addition, comorbidity of PTSD with other disorders is common [2]. Some of the most common comorbid conditions include major depression and anxiety disorders, substance abuse and psychotic disorders and borderline personality disorder [15]; for example, in Canada an estimated 74% of people with PTSD have comorbid major depressive disorder, 27.8% have comorbid alcohol abuse/dependence, and 25.5% have comorbid substance abuse/dependence [3]. For veterans who have experienced Adverse Childhood Experiences (ACEs), each additional ACE veterans with PTSD have experienced places them at greater risk of suicide attempts [16]. Veterans with PTSD have also been known to struggle with marital difficulties, homelessness, unemployment, job loss, and inability to work due disability [17] and access health care services more often than veterans without PTSD [18]. While estimates for the economic costs of PTSD in Canada is unknown, PTSD in the United States of America has been associated with higher treatment costs than many related mental illnesses [19]. Mental illnesses were estimated to cost Canada \$20.7 billion a year in 2012 in losses to the labour force which does not include costs for treatment and care services, insurance costs for companies, nor the costs born by non-professional caregivers [20]. For active-duty military personnel, veterans, and first responders living with PTSD, daily life can become a struggle which places a major strain on both the individual and society.

PTSD within the Canadian nursing context remains relatively understudied [6]. Nursing care for patients with PTSD may involve pharmacological (e.g. Selective serotonin reuptake inhibitors) or non-pharmacological

(e.g. psychotherapy) interventions [4]; however, the focus of this report is on psychosocial intervention, as described later. Results from a systematic review and meta-analysis suggest that a range of trauma-focused interventions such as cognitive-behavioural therapy, EMDR (Eye Movement Desensitization and Reprocessing), biofeedback, telepsychiatry and psychoeducation may be effective for PTSD [21] and residential programs with trauma-focused cognitive-behaviour therapy may foster long-term benefits [22] though some patients fail to respond to treatment [23]. Moreover, scant research exists for comprehensive programs. The purpose for the present study was to evaluate the outcomes of a pilot program, Healing Invisible Wounds-The Intensive (HIW-I), that was developed for Canadian veterans, active duty soldiers and first-responders experiencing PTSD. The research questions were: Do participants' symptoms improve after the program, and what do participants find helpful about the program?

## Methods

### Participants

HIW-I was made available to veterans, active duty soldiers, first responders and their families. Inclusion criteria were the ability to communicate in English and being an adult (18-years-old or older). Additionally, participants were required to have a diagnosis of PTSD or a related condition, and those with substance dependencies and addictions were required to refrain from using their drug of choice (including alcohol) while participating in the program. Persons diagnosed with personality disorders, schizophrenia, or similar diagnoses were excluded from the pilot program. This evaluation project received institutional clearance from the University of Guelph Research Ethics Board for the collection of self-reported, standardized symptom measures.

### Program

All participants engaged in a mind, body, spirit, 'whole person' non-drug, nurse-led intervention program offered in a community mental health agency. Participants could choose to complete the program online or in person and completed both individual and group therapies. Peer support was also offered to all participants.

The in-person program consisted of two phases that took place over a 9-month period, totalling 20 in-person days. Phase one consisted of 5 weekends over a 4-month period (including an introductory/testing weekend and a family weekend) and comprised mainly complementary approaches to healing, health and well-being. Each participant received two of the following individual therapies: Neuro Linguistic Programming (NLP; an approach to communication and personal development), Reflexology (pressure applied to patients' feet or hands to relieve discomfort), NeurOptimal Neu-

rofeedback (a non-invasive approach to reinforce the brain waves to function optimally), Somatic Experiencing (SE; helping patients to focus on body sensations to relieve symptoms of PTSD), Eye Movement Desensitization and Reprocessing (EMDR; psychotherapist directs eye movement that helps patients access and process traumatic memories and other adverse life experience to bring these to an adaptive resolution), or Emotional Freedom Technique Tapping (EFT; tapping on 'energy meridians' may lower cortisol and stress response). In-person participants had the opportunity to meet one-on-one with a psychologist, doctor of naturopathy (constructs a healthy regimen for example nutrition), a social worker, or a psychotherapist; the remainder of the program was provided in a group context. Group Therapies included equine therapy (activities with horses), art therapy, mindfulness meditation, yoga, breath work, laughter yoga (prolonged voluntary laughter), journaling, music drumming (enjoyment of music participation) and energy healing (healers may channel healing energy). Educational components regarding nature, finances, nutrition and cooking class, skills and occupation, parenting skills, belief systems, spirituality, essential oils, couples' reflexology (teach couples to apply pressure to each other's hand and feet), relationship and family dynamics were also presented in a group format. EFT tapping, energy healing and some practices in NLP were taught in a group context. Group psychosocial education and psychoeducation covered the topics of PTSD, heart and brain correlation, grief, shame, anxiety, self-compassion, handling emotions to reduce stress, addictions and medications, the importance of sleep, nutrition, and exercise, and practices such as living in gratitude, being non-judgmental, forgiveness, walking the Labyrinth, and foot washing. A list of homework was provided for participants to engage in daily practice between weekend sessions. In-person participants were also offered the opportunity to have measurements taken of heart rate variability, neurohormones, neurotransmitters, cortisol, and melatonin levels, and complete a hair analysis through the HIW-I program. Participants had an individual session with a doctor of naturopathy who was also a nutrition specialist where participants were provided with individualized recommendations for diet and supplementation. Supplements were supplied to participants based on these recommendations. These heart, brain and nutrition components were part of the program; these components were not part of the evaluation.

Phase two, the follow-up phase, was available to in-person participants only. This phase took place over a period of 5 months and consisted of 5 to 15 individual in-person sessions in NLP, or online sessions in EFT tapping, Body Talk, or energy healing. Participants had monthly meetings with their case manager and a final meeting with a nurse practitioner. Phase two also included a final 3-day weekend for program review and final testing.

The online program included individual therapies, video-based modules, and a peer group. Individual therapies included NLP, EFT, Energy Healing/Reiki, and Body Talk. Participants were allowed to advance at their own pace through the three online modules over a four-month period. The modules covered the same topics as the in-person group program with the replacement of equine therapy with horticulture (working with plants to bring comfort); the online program did not include a program for participants' children. The peer group was held on a video conferencing platform and moderated by a peer-support trainer who is a reservist with the military and is a trained facilitator.

## Procedures

The external evaluation data consisted of standardized self-report measures to compare pre- and post-program clinical symptoms and psychosocial well-being administered by a trained Research Assistant (RA) at baseline, post-intervention and follow-up. These surveys were administered either in-person at the first and last weekend retreats or over the phone. Post-treatment evaluations were conducted approximately 4 months after the pre-treatment evaluations, and follow-up evaluations occurred about 5 months after the post-treatment evaluations. When participants who were enrolled in the program attended the mental health agency at the start of intervention, they were asked if they would consent to speak with the Research Assistant (RA) to learn about the evaluative study. All participants consented, and the RA described the study, reviewed the consent information for the evaluation for all three evaluation time points, and if consent was obtained, the RA then administered the questionnaire in a clinical room within the agency. The RA transported the evaluation data in a locked briefcase to the research office at the University of Guelph immediately following data collection. Post-program questionnaires were administered on the day of final treatment, and on the follow up appointment.

## Measures

Standardized measures of PTSD symptoms, depression, anxiety, anger, grief-related emotions, sleep quality, quality of life, interpersonal problems and co-variables of trauma were used in this evaluation. The PTSD Checklist for DSM-5 (PCL-5) is a 20-item self-report measure of PTSD symptoms and was used to screen, make provisional diagnosis, and monitor symptom change during and after treatment [24]. Responses are indicated on a scale of 0 = "Not at all" to 4 = "Extremely". Scores can range from 0-80. Preliminary evidence indicates a cut point of 33 or higher for a preliminary diagnosis of PTSD and a decrease in 10 or more points for clinically meaningful improvement [25]. For the purposes of this evaluation, the version of the PCL-5 without a Criterion A component was used. The PCL-5 has been shown to

have construct validity and internal consistency (alpha values ranged 0.75 to 0.95) [25].

Depression was measured with the Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10). Participants rated themselves on a scale of 0 = "rarely or none of the time" to 3 = "all of the time". Total scores can range from 0-30, and total scores of 10 or more is considered "depressed" [26]. The CESD-R-10 has demonstrated good internal consistency (Cronbach's  $\alpha$  = 0.86) and test-retest reliability (I CC = 0.85) as well as high convergent (0.91) and divergent (0.89) validity [27].

Anxiety was measured using the Generalized Anxiety Disorder-7 (GAD-7), a 7-item self-report measure for generalized anxiety. Participants respond on a scale of 0 = "Not at all" to 3 = "Nearly every day". Total scores can range from 0-21. A score of 10 or greater is considered reasonable for identifying a probable generalized anxiety disorder with scores of 5-9 signifying mild anxiety, 10-14 moderate anxiety, and 15 or more severe anxiety. GAD-7 has been shown to have high internal consistency (Cronbach  $\alpha$  = 0.92) and good test-retest reliability (intraclass correlation = 0.83) [28].

Anger was measured using the Dimensions of Anger Reactions (DAR). DAR is a 7-item self-report measure for anger which has been shown to be a reliable and sensitive measure among populations of veterans with PTSD. Responses are provided on a scale from 0 = "Not at all" to 8 = "Exactly so". Total scores range from 0 to 56 with scores of 0-22 representing low acuity, 23-42 representing moderate acuity, and 43-56 representing high acuity. DAR has demonstrated high internal consistency (Cronbach  $\alpha$  ranging from 0.91 to 0.94) and sensitivity to changes that result from PTSD treatment [29].

The Holistic Grief Scale (Emotional Components Subscale) was utilized as a measure of grief-related emotions. The HGS-ECS is a 10-item subscale of the Holistic Grief Scale. Each item is rated on a scale of 1 to 10 with 1 indicating no experience of the emotion and ratings from 7 to 10 indicating severe levels of the emotion. Fireman [30] recommends that individuals seek professional help if they score within the severe range on most or all the subscales (Emotional, Cognitive, Physical, Social and Spiritual components). In this analysis, scores for the HGS-ECS are presented as mean of all individual items and can range from 0-4.

Sleep quality was measured using the Pittsburgh Sleep Quality Assessment (PSQI). The PSQI is a multi-faceted measure; the 19 self-rated items of the PSQI were used for this program evaluation, and scores on these items are used to calculate a score of 0-3 for each of the seven components of the Global PSQI score: Subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. Global PSQI

scores can range from 0-21, and a score of > 5 indicates poor sleep quality and that a person is experiencing severe difficulties in at least two of the components or moderate difficulties in more than three. The PSQI has been shown to have good reliability between the seven components (Cronbach's  $\alpha$  = 0.83) and a high level of test-retest reliability (0.85) [31].

Measurements of quality of life were assessed using the Subjective Quality of Life-12 (QoL-12). The QoL-12 is a 12-item self-report measure that has been shown to be reliable for use in mental health services. Responses are provided on a scale from 1 = "horrible" to 10 = "wonderful" for different aspects of the participant's life [32]. Scores for the QoL-12 in this analysis are presented as a mean of all individual items and can range from 1-10. Add information about its validity here.

Function in interpersonal relationships was measured with the Inventory of Interpersonal Problems-32 (IIP-32). The IIP-32 is a 32-item self-report measure of interpersonal problems with eight sub-scales measuring difficulties in being sociable, assertive, supportive, and involved with others and being too assertive, open, caring, and dependent. Responses are provided on a scale from 0 = "not distressing" to 4 = "extremely distressing". Total mean scores were used in this evaluation. Cronbach's  $\alpha$  for the IIP-32 has been shown to be between 0.86 and 0.90 [33]. An expanded version of the Felitti, et al. [34] Adverse Childhood Experiences (ACE) scale was used to measure the adverse experiences that participants faced in their first 18 years of life. ACE's demonstrate a graded dose response with many adult risk behaviours and diseases [35]. The 10 commonly addressed ACE topics include abuse (emotional, physical and sexual), neglect (emotional and physical), and household dysfunction (substance abuse by household member, parental divorce or separation, mental illness of household member, violent victimization of mother or stepmother, and incarceration of household member) [16,35,36]. Participants responded with a "yes" or "no" to one question for each ACE topic resulting in total scores ranging from 0-10. Add information about its validity here.

Evaluative perceptions of the program were gathered with four open-ended questions and the Client Satisfaction Questionnaire (CSQ-8) written in English. Total scores on the CSQ-8 can range from 8 to 32 with higher scores corresponding with higher satisfaction. The CSQ-8 has been shown to have a coefficient  $\alpha$  of 0.92 and 0.93 [37,38] and to be more effective for use in mental health treatment settings when anonymity is guaranteed to participants [38]. The first three open-ended questions allowed participants to reflect over the whole program to identify areas of the program that they found most helpful, areas that did not work for them, and concerns that were not resolved in therapy. The fourth question provided space for participants to of-

**Table 1:** Baseline characteristics of participants.

Characteristics	All Participants n = 18	In-person participants n = 12	Online participants n = 6
Mean Age, (and SD)	53.20 (8.87)	55.50 (6.69)	48.60 (4.98)
Male (n, (%))	17 (94.4)	12 (100)	5 (83.3)
English as first language, no. (and %)	17 (94.4)	11 (91.7)	6 (100)
Born in Canada, no. (and %)	14 (77.8)	8 (33.3)	6 (100)
First Nations, Inuit or Métis, no. (and %)	1 (5.6)	1 (8.3)	0 (0)
Relationship Status, no. (and %)			
Married	8 (44.4)	6 (50.0)	2 (33.3)
Common Law	4 (22.2)	2 (16.7)	2 (33.3)
Divorced	1 (5.6)	0 (0)	1 (16.7)
Separated	2 (11.1)	2 (16.7)	0 (0)
Engaged	1 (5.6)	0 (0)	1 (16.7)
Single	1 (5.6)	1 (8.3)	0 (0)
Education, no. (and %)			
Some High School	2 (11.1)	1 (8.3)	1 (16.7)
High School	4 (22.2)	4 (33.3)	0 (0)
College or Trades	6 (33.3)	3 (25.0)	3 (50.0)
Bachelors	4 (22.2)	2 (16.7)	2 (33.3)
Masters	1 (5.6)	1 (8.3)	0 (0)
Military training	1 (5.6)	1 (8.3)	0 (0)
Employment, no. (and %)			
Full-time	5 (27.8)	3 (25.0)	2 (33.3)
Leave of absence	2 (11.1)	2 (16.7)	0 (0)
Unemployed or retired	11 (61.1)	7 (58.3)	4 (66.7)
Income (mean, SD)	\$111,687.50 (\$58,057.93)	\$120,909.09 (\$64,800.39)	\$91,400 (\$37,280.02)
ACE (mean, SD)	(3.89, 2.97)	(4.33, 2.87)	(3.88, 3.27)

**Note:** ACE: Adverse Childhood Experiences.

fer any other comments on their experiences with PTSD or with the program that they felt were relevant to the program evaluation. The qualitative responses were analyzed with content analysis where common patterns across participants' responses to the questions were categorized.

### Ethical issues

Participants provided written free and informed consent for the surveys completed in-person, while participants provided verbal free and informed consent for phone interviews with the research assistant.

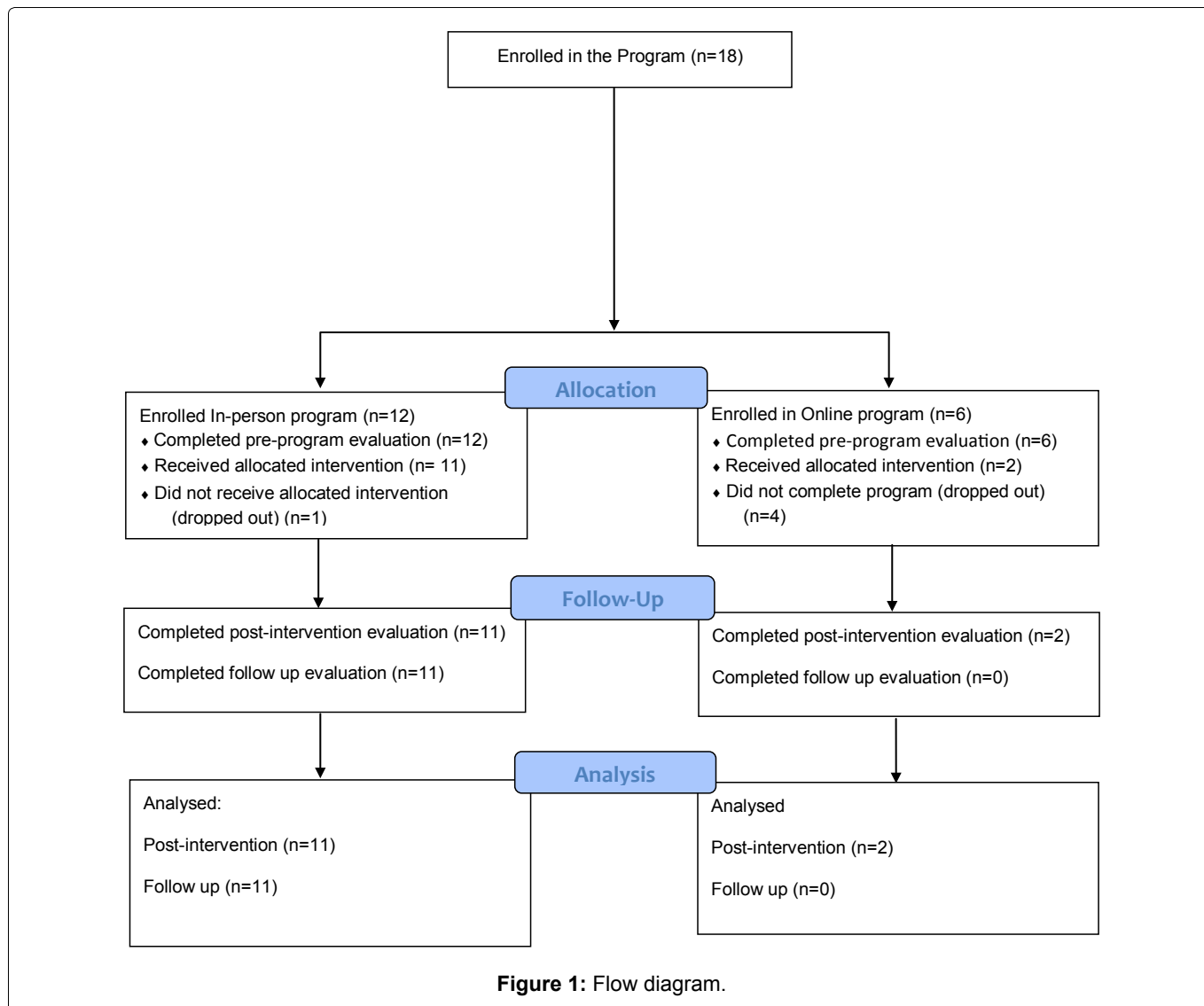
### Results

A total of 18 participants began the program with 12 participating in person through a series of weekend retreats and 6 participating online. Most participants were Caucasian and spoke English as their first language. The majority reported having a high school or college level education, being married or in a common-law relationship, and were either unemployed or retired at the beginning of the program (Table 1). Most (n = 15) were

veterans/military and three were first responders.

Of the 12 in-person participants, 11 completed the in-person program, and 5 completed follow-up program. The demographic and PTSD symptoms scores of the one participant who did not complete the in-person portion of the program were not statistically different from the other in-person participants' scores, and none of his scores reached clinical levels except for his depression and sleep scores. Of the six online participants who completed the pre-program evaluation, one completed all of the online program, one completed the counseling portions of the program, one completed part of the program then dropped out of the program, and three did not complete the program. Post-program evaluation data were collected from 14 participants (11 in-person and 3 online participants). Follow-up data were collected from 11 of the 12 in-person participants (Figure 1).

Participants were offered the chance to complete evaluations whether or not they had completed all of the program. Two participants declined the post-program evaluation and two could not be located for the post-program evaluation; one person declined partici-



pation in the follow-up evaluation.

In addition to Healing Invisible Wounds-The Intensive (HIW-I) program, participants reported accessing an average of 3.07 (SD 1.86) other PTSD-related services between the pre-program evaluation and the final evaluation in which they took part. For the three online participants that time period was between the pre- and post-program evaluation, and for the eleven in-person participants it was the period between the pre-program and follow-up evaluation. Most of these services were already in place before participants began HIW-I and were still in place at the final evaluation. Eleven out of 14 participants regularly accessed some form of counselling services (for example social worker, counsellor, therapist, and psychologist), five had attended another program for PTSD, four had made PTSD-related visits to their family doctors, and five had accessed a psychiatrist.

At baseline, 16 participants were above the cut point of 33 or higher for PTSD based on their PCL-5 scores. With respect to the other symptoms, 14 participants reported depression, 15 participants reported having probable anxiety disorder, nine participants demonstrated

moderate severity of anger, and five demonstrated high acuity of anger. Based on the PSQI, all 18 participants scored at or above 5, indicating poor sleep quality. The mean ACE for all participants was 3.89 (SD 2.97). One of the 18 participants had experienced no ACE's, four had experienced one ACE, and 13 participants had experienced two or more ACEs. The most common ACEs participants reported having experienced were physical abuse (n = 12), emotional neglect (n = 9), and mental illness of a household member (n = 9), emotional abuse (n = 8), and sexual abuse (n = 8).

From pre- to post-treatment, statistically significant decreases occurred in total PTSD symptom severity scores as well as all the subscales (Table 2). No other scales indicated statistically significant change. From post-treatment to follow-up, a statistically significant decrease was evident for the intrusion symptoms subscale of the PCL-5, and an increase of quality of life was also statistically significant (Table 3). Overall results showed statistically significant decreases from pre-treatment to follow-up evaluations for total PTSD symptoms, including all four subscales, as well as for depression (CESD), anger (DAR), grief (HGS-ECS), and interpersonal problems (IIP-32) (Table 4). While six

**Table 2:** Pre- and post-treatment scores on psychological measures.

Outcome Measure	Mean (SD)		t test	p value
	Pre-treatment	Post-treatment		
	n = 14	n = 14		
PCL-5 Total	52.36 (15.07)	42.21 (17.97)	4.11	< 0.01*
Intrusion symptoms	12.43 (3.74)	10.43 (4.27)	2.23	< 0.01*
Avoidance symptoms	5.71 (1.77)	3.64 (2.27)	3.77	< 0.01*
Cognition or mood symptoms	18.14 (7.06)	14.86 (7.45)	3.88	< 0.01*
Arousal and reactivity symptoms	16.07 (4.83)	13.29 (5.30)	2.52	< 0.01*
CES-D-10	18.50 (8.80)	15.71 (6.65)	1.77	0.10
GAD-7	14.07 (5.05)	12.71 (5.48)	1.15	0.27
DAR	32.50 (17.79)	30.64 (17.06)	0.66	0.52
HGS-ECS Mean	5.87 (1.99)	5.6224 (2.24)	0.59	0.56
Global PSQI	13.00 (4.42)	12.36 (5.34)	0.71	0.49
QoL-12 Mean	5.40 (1.53)	4.99 (1.58)	1.70	0.11
IIP-32 Mean	1.54 (0.63)	1.60 (0.67)	-0.53	0.60

\*Statistically significant.

**Note:** SD: Standard Deviation; CES-D-10: Center for the Epidemiological Studies of Depression Short Form; PCL-5: PTSD Checklist for DSM-5; GAD-7: Generalized Anxiety Disorder-7; DAR: Dimensions of Anger Reactions; HGS-ECS: Holistic Grief Scale-Emotional Components Sub-scale; PSQI: Pittsburgh Sleep Quality Assessment; QoL-12: Subjective Quality of Life-12; IIP-32: Inventory of Interpersonal Problems-32.

**Table 3:** Post-treatment and follow-up scores on psychological measures, Mean (SD).

Outcome Measure	Post-treatment	Follow up	t test	p value
	n = 10	n = 10		
PCL-5 Total	45.00 (18.83)	36.30 (13.18)	1.62	0.14
Intrusion symptoms	11.40 (4.14)	8.20 (3.23)	2.29	0.05*
Avoidance symptoms	3.60 (2.50)	2.80 (2.44)	1.24	0.25
Cognition or mood symptoms	16.10 (7.70)	13.10 (6.97)	1.23	0.25
Arousal and reactivity symptoms	13.90 (5.63)	12.20 (3.05)	0.91	0.39
CES-D-10	18.50 (8.80)	15.71 (6.65)	0.49	0.64
GAD-7	12.90 (5.41)	11.60 (4.22)	0.81	0.44
DAR	32.10 (17.72)	25.50 (17.16)	1.89	0.09
HGS-ECS Mean	6.00 (2.35)	4.78 (1.97)	2.06	0.07
Global PSQI	13.30 (5.01)	12.90 (4.46)	0.47	0.65
QoL-12 Mean	4.70 (0.65)	5.91 (1.56)	-2.63	0.03*
IIP-32 Mean	1.64 (0.76)	1.41 (0.53)	1.80	0.10

\*Statistically significant.

**Note:** SD: Standard deviation; CES-D-10: Center for the Epidemiological Studies of Depression Short Form; PCL-5: PTSD Checklist for DSM-5; GAD-7: Generalized Anxiety Disorder-7; DAR: Dimensions of Anger Reactions; HGS-ECS: Holistic Grief Scale-Emotional Components Sub-scale; PSQI: Pittsburgh Sleep Quality Assessment; QoL-12: Subjective Quality of Life-12; IIP-32: Inventory of Interpersonal Problems-32.

out of eleven participants still scored above the cutoff for a provisional diagnosis of PTSD at the follow-up evaluation based on their PCL-5 scores (scores of 33 or higher), eight participants demonstrated clinically meaningful improvement (decrease of more than 10 points), and the mean change for all 11 participants was -17.82 points (SD 13.36).

Eight out of the nine participants who were considered “depressed” on the CES-D-10 (scores over 10) at the pre-program evaluation remained at or above 10

in the follow-up evaluation, while one dropped below 10. The remaining two participants’ scores indicated that they were not “depressed” at either the pre-program evaluation or the follow-up evaluation. According to DAR, three participants remained in the low acuity range (0-22), one remained in moderate acuity range (23-42) and two remained in high acuity (43-56). Two participants’ scores dropped from high to moderate acuity, and three dropped from moderate to low acuity. On average, participants dropped 8.64 points (SD 11.53) on their DAR scores from the pre-program evalu-

**Table 4:** Pre-treatment and follow-up Scores on psychological measures, Mean (SD).

Outcome Measure	Pre-treatment	Follow up	t test	p value
	n = 8	n = 8		
PCL-5 Total	52.55 (17.82)	34.73 (13.55)	4.43	< 0.01*
Intrusion symptoms	12.55 (4.44)	8.09 (3.08)	4.15	< 0.01*
Avoidance symptoms	5.45 (2.21)	2.73 (2.33)	3.41	< 0.01*
Cognition or mood symptoms	18.82 (6.66)	12.36 (7.05)	3.46	< 0.01*
Arousal and reactivity symptoms	15.73 (6.13)	11.55 (3.61)	3.37	< 0.01*
CES-D-10	19.45 (8.89)	13.91 (6.40)	2.82	0.02*
GAD-7	13.45 (6.74)	10.82 (4.77)	1.72	0.12
DAR	32.09 (20.62)	23.45 (17.64)	2.49	0.03*
HGS-ECS Mean	5.95 (2.19)	4.53 (2.05)	2.95	0.02*
Global PSQI	13.45 (4.39)	12.73 (4.27)	1.00	0.34
QoL-12 Mean	5.37 (1.42)	5.91 (1.48)	-1.45	0.18
IIP-32 Mean	1.56 (0.61)	1.32 (0.59)	3.43	< 0.01*

\*Statistically significant.

**Note:** SD: Standard Deviation; CES-D-10: Center for the Epidemiological Studies of Depression Short Form; PCL-5: PTSD Checklist for DSM-5; GAD-7: Generalized Anxiety Disorder-7; DAR: Dimensions of Anger Reactions; HGS-ECS: Holistic Grief Scale-Emotional Components Sub-scale; PSQI: Pittsburgh Sleep Quality Assessment; QoL-12: Subjective Quality of Life-12; IIP-32: Inventory of Interpersonal Problems-32.

**Table 5:** The Client Satisfaction Questionnaire (CSQ-8).

Questions	Mean (SD)	
	Post program, n = 14	Follow-up, n = 11
Total Mean Score	22.79 (4.76)	19.82 (6.24)
1. Quality of service?	2.86 (0.66)	2.73 (0.79)
2. Kind of service you wanted?	3.00 (0.56)	2.64 (0.81)
3. Extent program met your needs?	2.62 (0.51)	2.18 (0.75)
4. Recommend program to friend?	2.62 (0.96)	2.40 (1.17)
5. Satisfaction with the amount of help received?	3.14 (0.66)	2.73 (1.01)
6. Services helped you to deal with problems?	3.14 (0.66)	2.64 (0.81)
7. Overall satisfaction with the service?	3.07 (0.73)	2.36 (1.12)
8. Return to program for help?	2.71 (0.99)	2.36 (0.92)

**Note:** Responses for individual items range from 1-4 (median score is 2.5) with higher scores indicating higher satisfaction; total scores can range from 8-32 (median score is 20).

ation to the post program evaluation. Ten of the eleven participants remained at or above a score of 5 on the PSQI.

### Program feedback

The mean total score on client satisfaction at the post-program evaluation was 22.79 (SD 4.76) out of a possible range of 8-32; at follow-up the mean total score was 19.82 (SD 6.24) (Table 5). At both evaluations, most participants perceived the quality of the program to be “good” or “excellent”. Almost all participants indicated that either “most” or “a few” of their needs had been met through the program.

The aspects that participants most often recalled as most helpful were the peer groups (n = 5), equine therapy (n = 5), staff and volunteers (n = 4), the fact that they were exposed to a broad spectrum of treatments and

tools (n = 3), learning about the impacts of PTSD on the brain and body (n = 3), and Neuro-Linguistic Programming (n = 3). While many participants reported that they perceived benefit from all components of the program, participants reported the following components as not helpful: energy healing (n = 4), medication (n = 3), financial management (n = 3) and “religious content” (n = 2). Suggestions for improvement included attention to continuity or flow in the order of topics (n = 6), and greater content on how to manage emotions (e.g., anger) and the science of PTSD (n = 4). Another area participants (n = 9) thought needed to be addressed was participants’ knowledge of tensions between administration and staff of the program. Lastly, participants (n = 8) indicated that they see great potential in the program especially if it was delivered with greater organization and less content on certain aspects such as energy healing and spirituality.



## Discussion

Both in a statistical and clinical sense, Total PTSD symptomatology and each of the four subscales scores of the questionnaire improved in this pilot program from baseline to follow-up. From baseline to follow-up, statistically significant improvements were also evident in depression, anger, grief-related emotions, and interpersonal problems. Statistically significant improvements were also noted in the intrusion symptoms subscale of the PCL-5 and quality of life from the post-program to follow-up. There were no statistically significant changes in sleep or anxiety throughout the evaluation period. These changes in PTSD symptoms and related measures are noteworthy as they indicate that participants experienced improvement in their experience of PTSD and many related symptoms.

With respect to depression and anger scores, it should be noted that participants' scores suggest that their symptoms were reduced considerably during the program even though some people were still managing these symptoms. This finding highlights the chronic nature of PTSD for some people and that they may need on-going support for these symptoms. It is also concerning that most participants were still experiencing poor sleep quality at post-intervention though poor sleep is common in the adult population; for example, 43% of men and 55% of women report poor sleep [39]. Sleep is critically important for daytime performance, brain functioning, physical health and emotional well-being, and is particularly important for people with depression and PTSD due to its causal relationship with emotional brain function [40]. The findings of the present study suggest that future efforts to treat PTSD should first target sleep since poor sleep affects peoples' ability to adequately regulate and express emotions [40].

The overall feedback gathered during the external evaluation was that the Healing Invisible Wounds-The Intensive has many merits, and participants believe that the program has great potential. Participants appreciated the variety of aids to which they were exposed; however, they also expressed the desire for the program to be focused more on the components that deal with anger, anxiety, grief and psychoeducation specifically related to PTSD and less focused on transcendental aspects.

## Limitations

One main limitation of this study is the small sample size; it is possible that a larger sample size would provide the power to see even small but important changes. Another limitation in comparing this pilot program with other research is that this program consisted of a wide array of conventional and complementary treatments, while many other studies were focused on a single treatment [15,41] or a narrower selection of conventional treatments [42]. For example, there is scien-

tific evidence to support the use of EMDR but the study design was an exploratory feasibility study with a small sample size with a comprehensive program, so the relative contribution to positive outcomes of each component cannot be determined. However, the choice of options participants had with this comprehensiveness Healing Invisible Wounds-The Intensive program may be seen as a clinical strength since many participants reported appreciation of the varied opportunities or components though the comprehensiveness presents challenges with evaluating each component. For example, some participants mentioned medication changes or personal losses between the pre, post, and follow-up evaluations, such as death of a parent or separation from a partner that may very well have impacted their ratings on the scales. It should also be noted that the attrition for the online option was 50% which suggests that it might not be feasible or should only be offered in certain circumstances further research is needed to determine whether an online option should be available and if so for whom. The intent for this project was a pilot evaluation which is consistent with an outcome study. These positive findings suggest this comprehensive program is ready for evaluation with a stronger research design that includes a control group which may control for confounding variables.

## Conclusion

After participating in The Healing Invisible Wounds-The Intensive, program participants reported statistically significant improvements in total PTSD symptoms, including all four subscales, as well as in depression, anger, grief-related emotions, and interpersonal problems and some participants reported clinically significant improvements in PTSD symptoms and anger. The in-person program has great potential to decrease PTSD symptomatology among active-duty military personnel, veterans and first responders. This program evaluation provided some feedback for improvement and suggests that conducting a well-designed randomized controlled trial would be feasible. This evaluation provides promising early evidence for HIW-I, a comprehensive program for PTSD for military personnel, veterans and first responders.

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## Ethical Approval

Ethical clearance was provided by the University of Guelph Research Ethics Board.

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