Anger and Predictors of Dropout from PTSD Treatment of Veterans and

First Responders

Emily Hinton[1], Zachary Steel[2,3,4], Dominic Hilbrink[3], & David Berle[1,2]

1. Discipline of Clinical Psychology, University of Technology Sydney, Australia.

2. School of Psychiatry, University of New South Wales, Sydney, Australia.

3. St John of God Health Care, Richmond Hospital, Australia.

4. Black Dog Institute, Randwick, Australia.

* Address for correspondence:

David Berle
Discipline of Clinical Psychology
Graduate School of Health
Vicki Sara Building
University of Technology Sydney
67 Thomas Street
Ultimo NSW 2007
Australia
Email: david.berle@uts.edu.au
Ph: +61 2 9514 4278

Abstract

Background. Dropout is an important barrier in treating Post Traumatic Stress Disorder (PTSD) with consequences that negatively impact both clients, clinicians and mental health services as a whole. Anger is a common experience in people with PTSD and is more prevalent in military veterans. To date, no research has examined if anger may predict dropout in military veterans or first responders. *Aims:* The present study aimed to determine the variables which predict dropout among individuals receiving residential treatment for PTSD. *Method:* Ninety-five military veterans and first responders completed pre-treatment measures of PTSD symptom severity, depression, anxiety, anger, and demographic variables. Logistic regression analyses were used to determine if these variables predicted dropout from treatment or patterns of attendance. *Results.* Female gender was predictive of dropout. However, when analysed by occupation female gender was predictive of dropout among first responders and younger age was predictive of dropout in military participants. Anger, depression, anxiety and PTSD symptom severity were not predictive of dropout in any of the analyses. No variables were found to predict attendance patterns (consistent or inconsistent) or early versus late dropout from the program. *Conclusion.* These results suggest that although anger is a relevant issue for treating PTSD, other factors may be more pertinent to dropout, particularly in this sample. In contrast with other findings, female gender was predictive of dropout in this study. This may indicate that in this sample, there are unique characteristics and possible interacting variables that warrant exploration in future research.

Keywords: Posttraumatic stress disorder; PTSD; group psychotherapy; CBT; anger; treatment discontinuation.

A common hindrance in the delivery of psychological therapy is premature termination or "dropout". Whilst dropout is a concern in any treatment setting, particular emphasis in recent times has been placed on the high rates of disengagement that occur in clients with PTSD (Szafranski, Smith, Gros, & Resick, 2017). Reviews of randomised controlled trials indicate that 14-18% of people with PTSD are likely to drop out from treatment (Lewis, Roberts, Gibson & Bisson, 2020). Rates of dropout in PTSD also appear to be higher than several other anxiety-based disorders including Generalised Anxiety Disorder (15.2%), Panic Disorder (15.4%), Obsessive-Compulsive Disorder (16.3%), and Social Anxiety (18.0%; Swift & Greenberg, 2014). Dropout rates from individual studies of PTSD treatment are highly variable and range from 13% to 68% (Garcia et al., 2011; Hundt et al., 2018), suggesting rates of dropout may be influenced by a multitude of factors including sample characteristics and methodological processes. A review paper specifically focusing on the treatment of military veterans found the rate of dropout to be at 36% from studies that primarily used trauma-focused therapies (Goetter et al., 2015).

There are a broad range of negative impacts of dropout that can be seen to affect the whole mental health system in one way or another (Berke et al., 2019). Clients who dropout can experience demoralisation and reticence regarding further help-seeking (Berke et al., 2019). Therapists may experience reduced productivity and low morale, with clinicians reporting that dropouts are often seen as therapeutic failures (Scamardo, Bobele, & Biever, 2004), while treatment providers may experience loss of revenue and financial waste (Barrett et al., 2008).

It is unfortunate that the progression of the literature in this area has been limited by inconsistent definitions and operationalisation of dropout used (Barrett et al., 2008). Common operationalisations of dropout used within PTSD research include: attending less than a specified number of sessions (Baekeland & Lundwall, 1975); failure to complete a pre-

determined goal or element of the therapeutic process (e.g. a manualised program or a structured therapeutic intervention; Swift & Greenberg, 2012); failure to attend a scheduled appointment and any future appointments (Hatchett, Han, & Cooker, 2002); ceasing treatment without making clinically significant gains (Hatchett & Park, 2003); and therapists' judgment of clients' reasons for disengagement (Swift & Greenberg, 2012). The Clinical Data Interchange Standards Consortium (CDISC; 2011) advises that dropout should be defined as a participant who "for any reason fails to continue in the trial until the last visit or observation required". Several recent studies have operationalised dropout in line with this recommendation (Berke et al., 2019; Gros et al., 2011; Imel et al., 2013).

While each of these operationalisations has utility, researchers often provide insufficient reasoning for the approach chosen or apply thresholds in a way that is inconsistent with other studies. For example, the specified number of sessions used as the cut-off point for dropout is often not justified or explained and varies tremendously between studies (e.g. dropouts were anyone who attended less than 50% of sessions (Holder et al., 2019); less than 66% of sessions (Jeffreys et al., 2014), and less than 75% of sessions (Rizvi, Vogt, & Resick, 2009)). Thus, where an individual could be counted as a dropout in one study, they would be classed as treatment completer by another study's method. This methodological inconsistency is further exacerbated by studies which fail to define their method of dropout entirely, such as Doran & DeViva (2018) and van Minnen, Arntz, & Keijsers (2002).

A large proportion of PTSD research focuses on military personnel as they have an increased risk of experiencing trauma due to the nature of their work. Rates of PTSD in veterans from the USA, UK, and Australia range from 2% to 35% (Xue et al., 2015). First responders (police, paramedics, fire-fighters, life-savers, and other front-line responders) also have increased trauma risk with the prevalence of PTSD in first responders ranging from 8-

22% (Klimley, Van Hasselt, & Stripling, 2018). Despite this, first responders as a group have been studied relatively little in comparison to military personnel or civilians.

However, first responders who experience occupational trauma – trauma which is directly attributable to someone's occupational activity – can be conceptualised as distinctly different from civilians with personal trauma experiences (Graham, 2012). For first responders, trauma can occur in the workplace under many circumstances including witnessing or experiencing physical violence and being exposed to trauma narratives through working with victims. Four out of five (84%) first responders report experiencing traumatic events as part of their work (Klimley et al., 2018). Additionally, compared to civilians, first responders can be exposed to multiple traumas throughout their careers. Another unique aspect of occupational trauma is the impact that employers can have on how people respond to instances of trauma. For example, police who were given shorter periods of recovery time by employers and police who felt unsupported by their employer were more likely to develop PTSD following an instance of occupational trauma (Marchand et al., 2015). It is surprising that despite these distinct characteristics of first responders, no research to date has explored treatment dropout in this sample.

Research on predictive factors for PTSD dropout in both military and civilians has thus far predominantly focused on demographic variables. Younger age is one of the most consistent predictors of dropout (Garcia et al., 2011; Gros et al., 2011; Rizvi et al., 2009), as is gender, with several studies showing that men have higher dropout rates than women (Lange et al., 2001; Sijbrandij et al., 2007). Marital status has also been found to influence treatment dropout in several studies. Intriguingly, the results have varied from married veterans being associated with greater treatment completion (DeViva, 2014), to single and widowed veterans completing more sessions (Doran & DeViva, 2018). Other demographic variables that have been associated with poorer treatment completion include unemployment

(DeViva, 2014), racial/ethnic minority identity (Doran et al., 2017), and lower levels of education and intelligence (Rizvi et al., 2009).

Clinically relevant comorbid factors for PTSD have also been examined in several different studies and contexts in relation to dropout. Similar to other variables, depression has been found to be both a predictor of treatment dropout (Doran & DeViva, 2018; Garcia et al., 2011), and also not associated with dropout (Clifton, Feeny, & Zoellner, 2017; van Minnen et al., 2002). Alcohol and substance abuse, which commonly occur with PTSD, have also been linked to higher treatment dropouts in some studies (Bedard-Gilligan et al., 2018; Zandberg et al., 2016).

While demographic characteristics and comorbidities offer a degree of explanatory power for dropout, these factors only account for a part of the variance associated with dropout in PTSD treatment (Szafranski et al., 2017). This indicates that there are other characteristics or symptoms particular to the experience of trauma that influences clients' ability to reliably attend treatment.

One such symptom that may be associated with dropout is anger. Anger has been well documented as a problematic emotional response in individuals with PTSD (Taft, Creech, & Murphy, 2017) and has been associated with greater PTSD symptom severity (Taft et al. , 2007). Importantly, when people with high levels of pretreatment PTSD also endorse anger, they're especially likely to show a poor response to treatment (Owens, Chard, & Cox, 2008). As anger has been hypothesised to be an avoidance mechanism (Foa et al., 1995), it follows that clients with intense anger may be more avoidant of their trauma-related emotions. This may be an obstacle to successful exposure therapy and lead to premature termination (Clifton et al., 2017). Aggression and the expression of anger are also observed to create interpersonal difficulties in therapy. In particular, clients with high anger may be less trusting, hence may

have difficulty establishing a therapeutic alliance (Taft et al., 2017). Finally, some researchers suggest that PTSD may invoke a "survival mode" pattern of functioning (Chemtob et al., 1997), whereby reminders of traumatic events – as may arise in therapy – are thought to activate threat-confirmation biases and behaviours which may be counterproductive for ongoing engagement in therapy. For instance, anger may be expressed towards a therapist following an otherwise innocuous trauma reminder, creating additional challenges for the therapeutic relationship and ongoing therapeutic engagement.

It is noteworthy that problematic anger is a potentially modifiable factor so far as treatment is concerned. Thus, to the extent to which anger serves as a predictor of treatment dropout, existing programs could be revised to better identify participants with problematic anger at admission as well as to address prominent anger during the course of therapy.

Compared to civilians, there is a stronger association between anger and PTSD in military personnel (Orth & Wieland, 2006). In help-seeking military veterans, anger was the most commonly reported concern (Rosen, Adler, & Tiet, 2013). There could be several reasons for this relationship: anger can be advantageous in military training and combat which may reinforce its presence (Forbes et al., 2008); the nature of military trauma and moral injury may evoke more anger (Litz et al., 2009); or military veterans with PTSD may have co-morbid issues such as chronic pain which exacerbate anger (Cash et al., 2018). In several studies, greater levels of anger have been found to interfere with treatment leading to poorer outcomes (Forbes et al., 2008; Lloyd et al., 2014).

To date, three studies have examined anger as a predictive factor for dropout, each with varying results. van Minnen and colleagues (2002) failed to find an association between anger and dropout in civilians seeking PTSD treatment. In contrast, anger did predict dropout among female sexual assault survivors receiving prolonged imaginal exposure therapy, yet no

such effect was found for those who received cognitive processing therapy (Rizvi et al., 2009). In the most recent study of civilians, there was a moderate association between anger and fewer sessions completed (Clifton et al., 2017). Despite the findings that military veterans with PTSD have higher rates of anger compared to civilians, no research to date has examined if anger is predictive of dropout in military participants. This is an important gap in the literature given that anger has otherwise been associated with non-response to therapy among veterans (Forbes et al., 2003).

This study aims to examine pre-treatment predictors of dropout from a group PTSD treatment in a mixed sample of military veterans and first responders. It is hypothesised that as the expression of anger is a potential avoidance mechanism (Foa et al., 1995) and may be linked with interpersonal difficulties and distrust (Taft et al., 2017) that it would be predictive of dropout. In particular, it is hypothesised that anger would be more predictive of dropout in military participants as there is a stronger relationship between anger and military veterans with PTSD (Orth & Wieland, 2006). Finally, it is expected that there may be differences in the characteristics between military and occupational trauma civilian participants due to the unique nature of each group.

Method

Participants

Participants were adults who were referred to the PTSD treatment program at [blinded for review]. All study participants provided informed consent and the study was approved by the [blinded for review] Human Research Ethics Committee (Ref 839). Participants were assessed using the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) and met criteria for PTSD as per the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychiatric Association, 2013). Standard demographic information was

collected as part of the assessment process. Patients who were engaged in the treatment program but declined to participate in data collection were not included in the study. The research sample consisted of 95 participants between the ages of 28 and 64 years (mean age 46 years). Participants were predominantly men ($n = 82$, 86%) with a smaller proportion of women ($n = 13$, 13%). The occupation of participants included military veterans, police, paramedics or other emergency workers, and a very small number of train drivers who had experienced occupational trauma (e.g. witnessing injuries on train tracks). For ease of reporting, participants' occupations are described in two separate groups: military veterans ($n = 38$, 40%), and first responders ($n = 57$, 60%). Referrals to the program were not necessarily restricted to particular occupational groups, however, the predominance of veterans, current serving military and first responders reflects the funding support that was accessible for group attendees (through the Department of Veteran's Affairs, Department of Defence, and a number of worker's compensation agencies aligned with first responders). It is possible that some first responders had military backgrounds, however, data reflect each participant's identified main occupation.

Treatment Procedures

The treatment program is a Department of Veteran Affairs accredited PTSD treatment program. Recruitment took place over a three-year period from 2015 to 2018. The program comprised of a four-week residential phase and two treatment sessions at three months and nine months following the residential phase. The program was developed as a residential program for three reasons: First, to assist with accessibility to the program given the multiple daily sessions across the first four weeks of the program. Second, because program members travel from multiple distant locations across the state to attend. Finally, the location of the Hospital beyond the outer fringes of a major metropolitan area would otherwise require lengthy daily commutes for members to attend. During the residential phase, treatment was

CBT-based and occurred predominantly in group setting with the following interventions utilised: psychoeducation about PTSD; de-arousal strategies; cognitive restructuring; cognitive processing of trauma-related themes such as trust, safety, power, and control; and relapse prevention. The manual for the program ensured broad consistency in content across groups, but the fidelity of adherence to the manual was not monitored. The program included a small amount of content on anger management skills, but typically no more than 2 hours of the initial four-week residential phase. Prolonged exposure was also included in the residential phase and took place during concurrent individual therapy sessions. At three months, participants attended a three-day treatment session which involved a review of clinical progress and therapeutic interventions focused on relationships and communication. Most participants had a partner or family member attend one day of this session for therapeutic work. The nine-month treatment session took place over one day and primarily focused on relapse prevention and recovery needs, as well as reviewing participants' clinical progress.

Dropout and Attendance

Participants completed questionnaires when they attended key time points during the treatment program: the start of treatment, the end of the four-week residential period, the three-month treatment session, and the nine-month treatment session. As all participants completed questionnaires when they attended a session, completion of the questionnaires was used as a record of participants' attendance at each timepoint. Following recommendations on the definition of dropout provided by the CDISC (2011), any participant who failed to attend the treatment program until the last appointment was considered to have dropped out. Conversely, all participants who attended the final session were marked as treatment completers.

Further analysis focused on different patterns of attendance or dropout. Among the participants who completed the program, two patterns of attendance were examined: consistent attendance and inconsistent attendance. Participants were classified as being a treatment completer with consistent attendance if they attended every time point. If a participant completed the program but failed to attend one or more time points during treatment then they were classified as a treatment completer with inconsistent attendance. Dropouts, or treatment non-completers, were also categorised into two distinct groups; early dropouts and late dropouts. Any participant who discontinued treatment during the residential phase was classified as an early dropout, whilst participants who completed the residential phase but dropped out at the three-months or nine-month treatment sessions were counted as late dropouts.

Measures

Participants completed questionnaires in paper-and-pencil format upon attending the group at the start of the residential program, on the final day of the program and at each of their follow-up visits.

Posttraumatic Stress Disorder Checklist-Five (PCL-5)

The PCL-5 is a self-report measure with 20 items that correspond to each of the DSM-5 diagnostic criteria for PTSD. Responses are scored from 0 to 4 with the descriptors "Not at all", "A little bit", "Moderately", "Quite a bit", and "Extremely". A total score ranging from 0 to 80 is obtained by summing all items. The PCL-5 is suitable to use with military and civilians and has been validated in both samples (Blevins et al., 2015; Bovin et al., 2016) . In this sample, the internal consistency was $\alpha = 0.87$.

State-Trait Anger Expression Inventory – Second Edition (STAXI-2)

The STAXI-2 (Spielberger, 1999) is a comprehensive assessment of anger. It is made up of six scales which each measure a different component of anger. This study utilised the Anger Expression Index which is a measure of how much a person expresses their anger externally or attempts to suppress their anger, as well as an inability to control their feelings of anger. The index is made up of 32 items which are rated on a four-point Likert scale from "Almost never" to "Almost always". The STAXI-2 is the most widely used assessment of anger and has been validated in a variety of clinical and non-clinical populations (Lievaart, Franken, & Hovens, 2016). In contrast to the scoring procedures outlined in the STAXI-2 manual, for the present study, we derived a total score by summing all items after all anger control items were reverse-scored. The anger expression index had an internal consistency of $\alpha = 0.91$.

Hospital Anxiety and Depression Scale (HADS)

The HADS (Zigmond & Snaith, 1983) was developed as a means of identifying anxiety and depression in hospital patients and has been used in the general population as well as psychiatric patients (Bjellandet al., 2002). The measure has two separate scales, one for anxiety and the other for depression, each with 7 items. Answers are rated from 0 "Not at all" to 3 "Most of the time", with the responses for each scale summed to give a total score. Despite the relatively high comorbidity between anxiety and depression, the HADS has been shown to have an excellent two-factor structure and has comparable sensitivity to lengthier measures of anxiety and depression (Bjelland et al., 2002). The internal consistency in this sample was $\alpha = 0.79$ for the anxiety scale and $\alpha = 0.73$ for the depression scale.

Additional measures

Additional measures, which were not a focus for the present study, were completed by participants including Perceived Injustice Experience Questionnaire (PIEQ) developed by the

researchers for a separate study, and a range of other measures assessing physical health impacts (e.g. alcohol use), emotional states (e.g. guilt), and social factors (e.g. relationship satisfaction). The majority of these measures, including an additional anger-related questionnaire (the Dimensions of Anger Reactions-5; DAR-5; Novaco, 1975) were administered for program accreditation purposes and so are not able to be analysed or reported as part of the present study. **Data Analysis**

All data preparation and analyses were performed on SPSS Statistics. Participants who completed the required data at baseline, including demographic information and at least 70% of questionnaire data, were included in the analyses. Missing data was imputed for participants missing up to 30% of questionnaire data using the expectation maximisation approach. Collinearity diagnostics identified some multicollinearity was present among the selected predictor variables. We thus used standardised z-scores for all the following regression analyses, which addressed this issue.

Demographic characteristics were summarised for the total sample, as well as for military and first responders separately. Individual samples t-tests were conducted to identify any significant differences between these two groups. Participants were coded as dropouts or treatment completers following the methodology previously outlined, including further grouping based on their pattern of attendance. As a preliminary exploratory analysis, the PCL total scores and changes in PCL total scores from intake to each respective assessment point were compared between treatment completers and non-completers using the "last (available) observation carried forward" (LOCF; Salkind, 2010), to determine whether there were differences in PTSD symptoms or changes in PTSD symptoms between those who did and did not complete treatment.

Point biserial correlations between dropout and the selected demographic and symptom variables were analysed. Three logistic regressions examined the selected demographic and pre-treatment variables (age, gender, occupation, anger, anxiety, depression, and PTSD symptom severity) as predictors of dropout in the following samples: all participants, military participants, and first responder participants. Occupation was not included as a variable in the military or civilian regressions. Two further regressions were conducted to analyse if the selected demographic and pre-treatment variables predicted different patterns of dropout (early or late dropout) and attendance (inconsistent or consistent attendance).

Statistical power for logistic regression analyses are hard to estimate, as it requires assumptions about the probability of a participant dropping out when each of the predictor variables are at their mean value (e.g., see the Stata program Powerlog; Ender, n.d.), as well as the correlation among predictor variables – which are difficult to estimate and which cannot be easily ascertained from previous research. Nevertheless, for a standard linear regression analysis to detect a medium size effect, with a nondirectional alpha rate of .05, 102 participants would be required (Cohen, 1992). This is broadly similar to our final sample.

Results

Sample demographics and characteristics

The overall sample comprised 18 separate groups of mixed occupational background with a mean of 5.94 participants (SD = 1.51) in each. The characteristics of the sample are described in Table 1 which lists sample sizes, means, and standard deviations of the key variables used throughout data analysis. Independent samples *t*-tests between military and first responders were conducted and identified that first responders had significantly higher

depression at baseline pre-treatment (t = 2.04; df = 72.2; p = .045). Results approaching significance (p = .052), showed that a greater proportion of first responders were female. A slightly higher percentage of military participants (63%) dropped out compared to first responders (56%), although there was no significant association between dropout an occupation. No other significant differences were found between participants.

Overall, program participants improved on key symptom-based outcomes across the 9-month program (i.e., reductions in PCL total score from start of treatment to nine-month treatment session p = 0.01), however changes were typically only small to medium in magnitude (mean PCL total score difference of 6.12). Independent samples t-tests were used to compare LOCF data for PCL total scores, as well as PCL difference scores (compared to intake), between completers and non-completers. There were no significant differences at any assessment point (p ≥ 0.05), suggesting that participants who discontinued treatment had similar levels of PCL symptoms and similar levels of improvement in PCL symptoms to those who completed the program.

Rates of attendance and dropout

The rates and numbers of participants who attended or dropped out of treatment are reported in Table 2. Overall, 41% of participants completed the treatment program, whilst 59% of participants dropped out. Amongst the treatment completers, the majority (74%) attended all sessions consistently. Of participants who did not complete the program, only a smaller minority dropped out during the residential phase (23%) with the larger proportion (77%) disengaging treatment during the post-residential treatment sessions.

Correlations

Point biserial correlations were analysed between dropout and the following variables: age, gender, occupation group, PTSD symptom severity, anxiety, depression, and anger. The

results of these correlations are reported in Table 3. Female gender was the only variable that

was significantly correlated with dropout (r = .270; p = .008). First responder occupation

(i.e., non-military) was found to be correlated with greater depression (r = -.212; p = .039)

which aligns with the previous t-test findings that first responders had significantly higher

levels of depression. There was a significant correlation between younger age and anger (r = -

.211; p = .040) and anger was also significantly correlated with depression (r = .235; p =

.022). Greater PTSD symptom severity was significantly correlated with both anxiety (r =

.611; p = < .001) and depression (r = .519; p = <.001). Lastly, there was a correlation

between depression and anxiety (r = .333; p = .001).

Predictors of dropout

The results of three regressions analysing predictors of dropout are summarised in

Table 4. In the whole sample, female gender was found to significantly predict dropout from

treatment (B = 2.45; SE = 1.08; OR = 11.54; p = .024) with female participants found to have

11 times greater odds of dropout. Similarly, amongst first responders, female gender was also

predictive of treatment dropout (B = 2.48; SE = 1.13; OR = 11.94; p = .028) with the odds of

dropout almost 12 times greater for women. Gender was excluded from the regression with

military participants due to the very small number (n = 2) of females in this group. Within

military participants, younger age was identified as a significant predictor of dropout (B = -

1.24; SE = 0.52; OR = 0.29; p = .018) where younger participants had very slight increased

odds of dropout. Occupation group, PTSD symptom severity, anxiety, depression, and anger

were not found to be significant predictors of dropout in any of the three samples (all

participants, military, and civilians).

Predictors of patterns of attendance and dropout

Two further regressions analysed how baseline variables may predict patterns of

attendance and dropout. These results are described in Table 5. In the sample of treatment

completers there was a large gender imbalance (38 men and 1 woman), as such gender was excluded as a variable from this regression. Demographic variables, depression, anxiety, PTSD symptom severity, and anger were not found to be significant predictors of either early/late dropout nor inconsistent/consistent attendance.

Post-hoc analyses: PCL-5 anger item as a predictor of dropout

We also repeated the above regression analyses, but with item 15 of the PCL-5 ("Irritable behavior, angry outbursts, or acting aggressively?") used to predict dropout instead of STAXI-2 Anger Expression subscale score. The results of these analyses are reported in Supplementary Tables 1 & 2. The overall pattern of results was the same as when STAXI-2 was included.

Discussion

Dropout is a critical barrier to treating PTSD that impacts both clients and clinicians negatively (Berke, et al., 2019). This study is the first to investigate dropout from PTSD treatment in first responders. Furthermore, it is also the first study to examine how anger relates to dropout in military veterans and first responders. In contrast to many other studies, we applied the CDISC (2011) recommended definition of dropout wherein any participant who did not remain in treatment until the final session was considered to have dropped out. Rates of dropout from the present sample were high (59%), likely owing to the routine treatment setting in which the program was conducted and the fact that many participants had not benefitted from other interventions previously.

Previously, there have been mixed results surrounding whether anger predicts PTSD dropout in civilian samples (Clifton et al., 2017; Rizvi et al., 2009; van Minnen et al., 2002). We hypothesised that anger would be predictive of dropout in our sample of military and first responder participants, in particular for military as there is a stronger association with anger (Orth & Wieland, 2006). However, in this study, anger was not supported as a predictor of

dropout in either military or first responders. This finding suggests that while anger is a common emotion for people with PTSD – especially military personnel – it is not related to the a person's consistency in attending treatment. One speculative explanation for this is that despite high rates of pre-treatment anger in our participants, de-arousal strategies introduced in treatment were used effectively by participants to manage their anger. This may have reduced anger-related avoidance and interpersonal difficulties that can be damaging to treatment progress (Foa et al., 1995; Taft et al., 2017). Alternatively, it is possible that anger acted as a commonality between participants who felt they had been treated unjustly by their employers and as such became a bonding mechanism for group members. Finally, correlations between anger and PTSD symptoms ($r=.16$) were lower than in previous studies (Bhardwaj et al., 2018; Novaco et al., 2012) and lower than that reported in the meta-analysis of Orth and Wieland (2006). Thus, it is possible that some group participants were experiencing non-PTSD related anger confined to other life domains, such as relationships and family, which may have not necessarily influenced their decision making about persisting with PTSD treatment.

In line with previous research (Garcia et al., 2011; Gros et al., 2011; Rizvi et al., 2009), younger age was found to be predictive of dropout, but only in military participants. Younger age was also significantly correlated with anger. This is consistent with research that has found younger age to be predictive of explosive anger in a sample of civilians exposed to recurrent periods of mass conflict (Silove et al., 2017) and that younger veterans were more likely to display greater verbal and physical aggression (Renshaw & Kiddie, 2012). Given these results, it is likely in our sample that younger military participants who dropped out experienced high levels of anger, despite anger not being directly related to dropout.

In first responders and across the whole sample, female gender was significantly predictive of dropout and was also correlated with dropout. Interestingly, female gender has

previously been linked with remaining in treatment while males were more likely to dropout (Lange et al., 2001; Sijbrandij et al., 2007). This begs the question of why females were more likely to dropout in this sample. Albeit speculative, it is possible that in a male dominant treatment program some women may have felt out of place or uncomfortable sharing their trauma experiences and so were more likely to drop out of treatment. As no other research has previously examined dropout in first responders, it is also possible that women in this group present with different treatment needs and so found it difficult to engage in this group setting. For instance, despite the commonalties of certain occupational environments, there are nonetheless gender-related differences in the rates at which different types of trauma are experienced (Ditlevesen & Elklit, 2012), such that there may be benefit for modifying treatment programs to better allow for this. This study has introduced the first piece of evidence on dropout in first responders, yet substantial future research is needed to build a greater understanding of why these participants discontinue PTSD treatment.

We furthered our analysis by examining different patterns defining how participants attended treatment (consistent or inconsistently) or dropped out (early dropout or late dropout). Although we were unable to find any demographic or symptom-related variables that were predictive of different patterns of attendance or dropout, one interesting finding is that the majority (77%) of dropouts dropped out during the post-residential phase. This could imply that participants considered these sessions to be less important or that they were less willing to travel for shorter 1 to 3 day long sessions as participants lived across the whole New South Wales state.

In line with our hypothesis that there would be some differences between military and first responders, we found that first responders had significantly higher rates of depression than military participants. Depression was also significantly correlated with first responder occupation. In the Australian police force, 37.3% of police personnel were found to be in the

clinical range for depression (Lawson, Rodwell, & Noblet, 2012). With such high rates of

depression in first responders and strong comorbidity between PTSD and depression

(Spinhoven, Penninx, van Hemert, de Rooij, & Elzinga, 2014) it is possible that this may

impact treatment of PTSD for first responders. This is an avenue of research that should be

explored more.

It is noteworthy that the degree of improvement in PTSD symptoms from the program

was small in magnitude when compared to other studies (Beidel et al., 2017; Zalta et al.,

2018). One the one hand, persisting symptoms following completion of the residential phase

may have contributed to lower rates of attendance at the follow-up occasions. On the other

hand, dropout may not be directly associated with symptom persistence and many program

attendees lived significant distances from the hospital, such that attending follow-up

appointments may have been logistically challenging when significant travel was involved.

However, this is speculative and unfortunately, the reasons for dropout from treatment were

not assessed.

The outcomes of this study should be interpreted with respect to some limitations.

First, although our final sample size was reasonably close to that required to detect results of

medium effect size, several of our analyses focused on smaller groups which reduced sample

size and weakened our statistical power. Further, in some analyses we had an unbalanced

distribution of group numbers and also had an unequal gender ratio throughout. Although

some researchers may have elected to exclude women from the analysis to create a uniform

sample, we wanted this study to be a true reflection of treatment for military and first

responders – two fields of work that are generally male dominant. Third, we relied only on

one main measure of anger (STAXI-2 Anger Expression Index). We note that while the

Anger Expression Index has been subject to extensive psychometric validation, it also

includes items which refer to what the developers consider to be the inward "expression" of

anger (such as "I keep things in, I withdraw from people"). However, the inward suppression

of anger as indicated by these items might not in other respects be considered "expression".

Thus, this index might better be considered as a broader construct than simply the external

expression of anger given that incorporates both the internalisation and externalisation of

anger. We also note that while our results were consistent when we used an alternative single-

item measure of anger, there remains a need for further studies to confirm our findings using

multiple measures. Fourth, a small number of persons who commenced the treatment

program declined to participate in this study, thus while we can make inferences about our

sample we are not able to extend these to the treatment program as a whole. Finally, we note

that the 4-week residential format of the present program differed from the delivery format of

most effectiveness studies. Thus, we could not determine the extent to which our high overall

rates of dropout when compared to other programs may have been contributed to by the

residential format of the program.

Despite these limitations, the results of this study have practical value and relevance

for PTSD treatment. As the first study to analyse dropout specifically in first responders, we

identified that female first responders had greater odds of disengaging from treatment. This

implies that clinicians treating first responders should place a greater emphasis on building a

strong therapeutic alliance with female participants. Additionally, it should be explored

whether treatment for female participants conducted in separate groups from men would give

women a greater sense of unity and support. While anger was not found to be predictive of

dropout, the relationship between anger and PTSD should not be discounted as unimportant.

Instead, this opens avenues to explore how military and first responder participants are able

to manage their anger in treatment and what purpose it may serve in group treatment.

Furthermore, the relationship between anger and dropout should continue to be investigated

in other samples to add to the limited evidence-base on this topic. Our sample has unique

characteristics of occupational trauma and it is possible that other civilian samples may find different results. Continuing to build an understanding of who is more likely to drop out from treatment is of vital importance in improving treatment for PTSD, particularly for military personnel and first responders who have greater vulnerability to experiencing trauma.

Data availability statement: The data that support the findings of this study are available from the corresponding author, DB, upon reasonable request.

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Table 1. Demographics, sample characteristics, and *t*-test comparisons between military and first responders.

	All participants (*n*=95)		Military (*n*=38)		First responders (*n*=57)					
	n	%	*n*	%	*n*	%	X^2	*df*	*p*	
Dropout	56	59	24	63	32	56	0.464	1	0.496	
	Male	Female	Male	Female	Male	Female	*t*	*df*	*p*	CI (95%)
Gender (*n*)	82	13	36	2	46	11	1.96	93	0.052	-0.00, 0.28
	Mean	SD	Mean	SD	Mean	SD	*t*	*df*	*p*	CI (95%)
Age	46.2	8.3	46	8.5	46.3	8.3	0.13	78.2	0.893	-3.26, 3.74
PTSD Symptoms (PCL-5)	53.4	11.3	52.9	12.2	53.8	10.8	0.38	72.9	0.701	-3.92, 5.80
Anxiety (HADS)	13.5	3.3	13.6	3.2	13.4	3.4	-0.27	83.9	0.787	-1.55, 1.17
Depression (HADS)	12.6	3.3	11.8	3.5	13.2	3.1	2.04	72.7	.045*	0.03, 2.85
Anger Expression Index (STAXI-2)	49.4	13.6	51.5	14.4	48.1	13.0	-1.20	93	0.23	-9.06, 2.24

HADS = Hospital Anxiety and Depression Scale; PCL-5 = Posttraumatic Checklist for DSM-5; STAXI-2 = State-Trait Anger Expression Inventory-2

Table 2. Number and rates of dropouts and treatment completers.

Dropout		Treatment Completer	
56 (59%)		39 (41%)	
Early Dropout	*Late Dropout*	*Consistent Attendance*	*Inconsistent Attendance*
13 (23%)	43 (77%)	29 (74%)	10 (26%)

Table 3. Correlations between dropout, demographics and symptom measures.

	1	2	3	4	5	6	7
1. Dropout							
2. Military occupation^	.070						
3. Age	-.159	-.014					
4. Female gender^	.270**	-.200	-.134				
5. PTSD symptoms (PCL-5)	.074	-.041	-.158	.021			
6. Anxiety (HADS)	.002	.028	-.137	.073	.611**		
7. Depression (HADS)	.077	-.212*	.023	.129	.519**	.333**	
8. Anger Expression Index (STAXI-2)	.058	.123	-.211*	-.063	.163	.108	.235*

*$p < .05$; **$p < .01$.

^We note that gender and occupation were binary variables and so conducted chi-square tests for these variables with dropout. In line with the correlations shown above, occupation was not associated with dropout ($\chi^2 = 0.464$; $p = .496$) whilst female gender was significantly associated with dropout ($\chi^2 = 6.929$; $p = .008$).

Table 4. Regressions on predictors of dropout

	All Participants			Military			First Responders		
	B	*S.E.*	Exp (*B*)	*B*	*S.E.*	Exp (*B*)	*B*	*S.E.*	Exp (*B*)
Age	-0.28	0.24	0.75	-1.24	0.52	0.29*	0.25	0.33	1.28
Female gender	2.45	1.08	11.54*	-	-	-	2.48	1.13	11.94*
Military occupation	0.64	0.48	1.90	-	-	-	-	-	-
PTSD symptom severity (PCL-5)	0.20	0.33	1.22	0.24	0.52	1.27	0.02	0.46	1.02
Anxiety (HADS)	-0.26	0.29	0.77	-0.79	0.54	0.45	0.19	0.38	1.20
Depression (HADS)	0.15	0.29	1.17	0.56	0.63	1.76	0.05	0.37	1.05
Anger Expression Index (STAXI-2)	0.00	0.24	1.00	0.12	0.45	1.13	-0.12	0.31	0.89

*$p < .05$; **$p < .01$.
HADS = Hospital Anxiety and Depression Scale; PCL-5 = Posttraumatic Checklist for DSM-5; STAXI-2 = State-Trait Anger Expression Inventory-2.

Table 5. Regressions on Predictors of Attendance/Dropout Patterns.

	Early Dropout			Inconsistent Attendance		
	B	*S.E.*	OR	*B*	*S.E.*	OR
Age	-0.23	0.33	0.79	0.54	0.41	1.71
Military occupation	-0.50	0.69	0.61	-0.08	0.76	0.92
PTSD symptoms (PCL-5)	-0.71	0.43	0.49	-0.57	0.51	0.57
Anxiety (HADS)	0.50	0.39	1.65	0.59	0.47	1.80
Depression (HADS)	0.34	0.37	1.40	-0.09	0.41	0.91
Anger Expression Index (STAXI-2)	0.16	0.35	1.17	-0.55	0.37	0.57

*$p < .05$; **$p < .01$.