

# Post-traumatic growth among the UK veterans following treatment for post-traumatic stress disorder

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## ABSTRACT

**Introduction** The aim of this paper was to examine levels of post-traumatic growth (PTG) in a sample of the UK veterans who had received treatment for post-traumatic stress disorder (PTSD).

**Methods** The study followed-up 149 UK veterans after they had completed standardised treatment for PTSD provided by Combat Stress. Data had previously been collected on a range of mental health outcomes before treatment, and then repeated 6 months after the end of treatment. For the current study, participants completed the post-traumatic growth inventory (PTGI) measure. Analysis was conducted to explore levels of PTG and whether there were any relationships between pretreatment and post-treatment ratings of mental health and PTG.

**Results** The mean score on the PTGI was 32.6. Evidence of a treatment effect on levels of PTG was observed. There appeared to be a relationship between improvements in symptoms of PTSD and depression and higher levels of PTG.

**Conclusions** This study observed the presence of PTG following exposure to traumatic events within a sample of the UK veterans following their treatment for PTSD. PTG scores were moderately low in comparison to similar studies in the USA.

## INTRODUCTION

As a result of the conflicts in Afghanistan and Iraq, there has been increased awareness about post-traumatic stress disorder (PTSD) within military populations.<sup>1 2</sup> This has led to an array of literature exploring the negative impacts of trauma.<sup>3–8</sup> Less attention has been paid to the possible positive impacts of exposure to difficult events. A growing body of literature has explored this topic in non-veteran populations.<sup>9 10</sup> Literature has demonstrated positive changes following exposure to traumatic events across a range of dimensions, which has been termed post-traumatic growth (PTG).<sup>9 11 12</sup>

PTG has been shown to be linked to exposure to traumatic events<sup>13</sup> and it has been argued that PTG and PTSD are separate constructs and, as such, growth post-trauma develops in its own right rather than as a result in changes in severity of PTSD symptoms.<sup>14</sup> In US veterans, PTG has been found to be common and persistent at different time points.<sup>15</sup> A meta-analysis of PTG reported that optimism, social support and having coping strategies in place to cope with mental health difficulties were associated with higher levels of PTG.<sup>16–18</sup> Higher socioeconomic status, higher levels of

## Key messages

- ▶ This is the first study in the UK to explore post-traumatic growth in a sample of help-seeking UK veterans treated for post-traumatic stress disorder (PTSD).
- ▶ Evidence was found to suggest the presence of growth within this sample.
- ▶ Our findings suggest a difference in the endorsement of the domains of growth between the UK and the US veterans.
- ▶ An association was found between better treatment response and higher reported levels of post-traumatic growth.

education and younger age have also been shown to be predictors for higher levels of PTG.<sup>11</sup> Researchers have observed that individuals who report higher levels of PTG appear to have better mental health outcomes in some cases.<sup>12 19–21</sup> This has been demonstrated in a meta-analysis study that explored the impact of PTG on mental health and reported that higher growth scores were associated with lower rates of depression and higher levels of well-being.<sup>10</sup> The same meta-analysis found that higher growth scores were related to more intrusive and avoidant thoughts. PTG has also been found to be a protective factor against suicidal ideation in combat-exposed military service members.<sup>22</sup> Looking specifically at PTSD, a study of assault survivors observed that individuals with no or high levels of PTG reported fewer PTSD symptoms.<sup>21</sup> The authors of this study found a curvilinear association between PTSD severity and PTG, which could indicate that there may be an optimum level of trauma-related distress that facilitates growth.<sup>21</sup>

Studies of US veterans with a diagnosis of PTSD using confirmatory factor analysis have reported that measures of PTG are appropriate to use within military samples<sup>23</sup> and that PTG was higher in the US veterans with a diagnosis of PTSD than veterans without.<sup>24</sup> This suggests that while PTG may not always be associated with trauma experiences that results in PTSD, exposure to these difficult events facilitates growth above what may be expected in the general military population. Furthermore, it has been observed that within the US veterans with PTSD, higher levels of PTG were associated with better functioning and general health.<sup>24</sup>

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Less is known about PTG in UK veterans who have been diagnosed with PTSD. In this paper, we report on the magnitude of PTG within a sample of UK veterans who had been exposed to at least one traumatic event that meets criteria for PTSD and subsequently received a diagnosis. This was done by following-up a group of the UK veterans who had received a standardised treatment for PTSD. These veterans were then invited to complete a measure of PTG and their scores analysed and compared with measures of mental health pretreatment and post-treatment and demographic characteristics.

## METHODS

### Setting

The sample for this study was recruited from individuals who had been offered treatment for symptoms of PTSD by Combat Stress (CS). Since 2011, CS has been funded to provide a treatment programme for PTSD by the NHS. This intervention is offered as a 6-week residential intensive treatment programme (ITP) that is manualised to ensure high levels of treatment fidelity. We have previously published findings to demonstrate that the ITP is effective at reducing the severity of PTSD symptomology.<sup>3</sup> A fuller description of the programme has been published elsewhere.<sup>3</sup>

### Participants

Inclusion criteria for the ITP included being a veteran, having been exposed to a military trauma and having a diagnosis of PTSD. In the UK, a veteran is defined as an individual who has completed one full day of service.<sup>25</sup> Exclusion criteria included being actively suicidal, actively psychotic, actively dependent on alcohol or a diagnosis of a personality disorder.

The study sample included 226 individuals who had been consecutively referred for treatment between late 2012 and 2014 and then successfully followed-up 6 months after the end of their treatment. Prior to referral for treatment, individuals had been assessed by a psychiatrist and given a diagnosis of PTSD. In addition, those treated with psychotropic medication had to be stable on their medication and remain on the same dose throughout the ITP. Alcohol and illegal substance use was forbidden during the ITP. No data were available on the nature of participants' traumas. The majority of participants reported that this was the first time they had received psychological treatment for PTSD.

### Measures and procedure

Data for this study were collected at multiple time points. At the start of treatment, participants were asked to complete a questionnaire. This collected sociodemographic data related to age, sex, relationship status, employment status, educational achievements and the date they left the military. In addition, a range of health outcomes were administered. Participants were then contacted 6 months after the end of treatment and invited to attend a review appointment at which time they were asked to repeat these health outcomes. This sample was then followed-up immediately and additional data were collected to explore PTG. This involved sending questionnaires to participants to ask about PTG. Participants were sent this second questionnaire three times in the post to elicit a response. At each of these mail outs individuals were given an 'opt out' option.

### Primary outcomes measure

The primary outcome measure for this study was the post-traumatic growth inventory (PTGI).<sup>9 11</sup> The PTGI is a 21-item measure that explores positive outcomes reported by those who

have experienced a traumatic event. Each item is scored using a 6-point Likert scale and scores range from 0 to 105 with higher scores indicating higher levels of PTG. The PTGI consists of five dimensions: new possibilities, relating better to others, personal strength, spiritual change and appreciation of life. The five dimensions consist of different numbers of items for each dimension and are scored by taking the mean score, resulting in a standardised score ranging from 0 to 5.

### Secondary outcome measures

These included a range of outcomes that explored mental health. Symptoms of PTSD were measured using the PTSD Symptom Scale Interview (PSS-I). The PSS-I is a structured interview that is completed by a clinician and consists of 17 items based upon the DSM-IV diagnostic criteria for PTSD and assessed the presence and severity of symptoms;<sup>26 27</sup> a cut-off of 20 or more has been proposed to define whether individuals meet case criteria or not.<sup>26</sup> The Patient Health Questionnaire (PHQ-9) was used to explore the presence of symptoms of depression; the PHQ-9 is a 9-item measure and the cut-off for meeting case criteria has been suggested to be if individuals score 10 or above.<sup>28–31</sup> The generalised anxiety disorder assessment (GAD-7) was used to assess for symptoms of anxiety with a score of 8 or more on the seven items suggested as indicating meeting case criteria.<sup>32</sup> The 5-item Dimensions of Anger Reactions was used to assess for problems with anger—to meet case criteria individuals had to score 12 or more.<sup>33</sup>

### Analysis

The first stage of the analysis was to explore whether any health differences were present between participants we were able to contact to collect PTG data from those we were unable to contact. This was done by using Mann-Whitney U tests to compare post-treatment health data between these two groups. Following this, the mean total PTGI score and the mean scores of the five dimensions that form the PTGI were calculated. The mean PTGI scores were calculated for the different sociodemographic characteristics of the sample. The next stage of the analysis was to explore the relationships between pretreatment and post-treatment health outcomes and scores on the PTGI. Regression models were fitted and  $\beta$  co-efficient and 95% confidence intervals (CIs) calculated to explore whether there was relationship between meeting case criteria on a range on health outcomes before treatment and the impact on PTGI scores. These models were refitted to look at the relationships between meeting case criteria for the mental health measures at 6 months post-treatment and PTGI scores. The final stage of the analysis was to explore whether changes in symptom severity between pre-treatment and post-treatment on the mental health outcomes was associated with different PTGI scores. For each health outcome, a new variable was constructed to give change in score following treatment. This was calculated by subtracting the post-treatment scores from the pretreatment scores. Tertile ranges were then calculated for the changes in scores and the new variables were re-coded as either 1, 2 or a 3 to indicate the tertile that the change score represented, 3 being the greatest change in scores. Regression models were then fitted and  $\beta$  co-efficient and 95% CIs were calculated to examine whether changes in health scores following treatment was associated with higher PTGI scores. The above regression analyses were adjusted for time since treatment, educational achievement, age group, current relationship status and current employment status. This is because these covariates had been identified a priori within the literature as influencing PTG and were found

to improve the fit of the models using likelihood ratio tests. All analyses were conducted using Stata V.13 (StataCorp LP, College Station, TX, USA).

### Ethical approval

Ethical approval for this project was granted by the CS ethics committee.

### RESULTS

In total, 149 of the sample of 226 (66%) were successfully contacted and completed the additional PTGI measure: 19% of responders were aged <35 years, 34% aged between 35 and 44 years and 47% were aged >45 years. Overall, 99% of the sample was male, 76% reported currently being in a relationship as opposed to being single and 52% reported having current financial difficulties. Most (84%) had been in the Army, 9% in the Royal Navy, 7% in the Royal Air Force and 80% reported having held a combat role in the military. About one-third (34%) reported having left the military between 1 and 9 years ago, 30% between 10 and 19 years ago, 28% between 20 and 29 years ago and 8% had left the Forces at least 30 years ago.

No differences in the proportion of participants meeting case criteria on a range of health outcomes were observed between the 149 participants who responded to the second questionnaire collecting data on the PTGI and the individuals who did not respond (Table 1), which is reassuring and suggests there is no evidence of a non-responder health bias. Table 2 describes mean scores on the PTGI for the sample. The mean PTGI score observed was 32.6, which corresponds to a mean score of 1.55 per item. There was variation on how the five dimensions on the PTGI were endorsed by participants. The dimension 'relating to others' was most strongly endorsed followed by being 'open to new possibilities'. 'Personal strength' and 'appreciation of life' were the next most commonly endorsed dimensions and 'spiritual change' was the least. Overall, 37% of the sample endorsed moderate growth on at least one of the five dimensions on the PTGI. Those under the age of 35 appeared to have higher scores on the PTGI and participants who reported having a higher level of educational achievement, currently working and being in a relationship seemed to report higher mean PTGI scores. There appeared to be a relationship between increasing length of time since leaving the military and lower PTGI scores.

The relationships between meeting case criteria for a range of mental health outcomes pretreatment or post-treatment and

PTGI scores are reported in Table 3. Being a case on the PSS-I, PHQ-9 and GAD-7 at pre-treatment was not associated with differences in PTGI scores. However, meeting case criteria for having problems with anger was associated with reporting lower PTGI scores ( $\beta=-8.82$ ; 95% CIs -16.1 to -1.52). Post-treatment, there was a significant relationship between meeting case criteria for PTSD ( $\beta=-11.4$ ; 95% CI -19.1 to -3.77) and depression ( $\beta=-9.09$ ; 95% CI -18.3 to 0.00) and reporting lower PTGI scores. This seems to suggest that improvements in these outcomes were associated with higher levels of PTG. The final stage of the analysis was to explore this by looking at changes in severity of health outcomes between pretreatment and post-treatment (Table 4). While not significant, there appeared to be a trend towards greater reductions post-treatment in measures of PTSD and depression severity and higher levels of PTG. For example, for the PSS-I, the first tertile of change in score between pretreatment and post-treatment was the reference group and second tertile of change group reported higher PTGI scores compared with the first tertile reference group ( $\beta=2.26$ ) and the third tertile of change group reported even larger PTGI scores compared with the reference group ( $\beta=8.05$ ). As stated above, these changes were not significant, but this could have been because of the modest sample size and then lack of power to detect these differences.

### DISCUSSION

In this paper, we reported levels of PTG within a UK veteran population who had completed a standard treatment for PTSD

**Table 1** Comparing meeting case criteria on a range of health outcomes between responders and non-responders

|            | Responders<br>N* (%) | Non-responders<br>N* (%) | p Value |
|------------|----------------------|--------------------------|---------|
| PTSD       |                      |                          |         |
| PSS-I      | 93/149 (62%)         | 47/77 (61%)              | 0.84    |
| Depression |                      |                          |         |
| PHQ-9      | 106/134 (79%)        | 48/64 (75%)              | 0.52    |
| Anxiety    |                      |                          |         |
| GAD-7      | 108/134 (80%)        | 51/64 (80%)              | 0.88    |
| Anger      |                      |                          |         |
| DAR-5      | 44/133 (44%)         | 23/64 (36%)              | 0.69    |

\*N may not add up to 226 because of missing data.

DAR, Dimensions of Anger Reactions; GAD, generalised anxiety disorder; PHQ, Patient Health Questionnaire; PSS-I, PTSD Symptom Scale Interview; PTSD, post-traumatic stress disorder.

**Table 2** Descriptions of PTGI scores by sociodemographic characteristics

|                              | Mean score | 95% CI       |
|------------------------------|------------|--------------|
| Overall PTGI score           | 32.6       | 29.1 to 36.1 |
| PTGI subscales               |            |              |
| Open to new possibilities    | 1.49       | 1.30 to 1.69 |
| Relating to others           | 2.38       | 2.11 to 2.64 |
| Personal strength            | 1.12       | 0.96 to 1.27 |
| Spiritual change             | 0.46       | 0.39 to 0.53 |
| Appreciation of life         | 1.07       | 0.94 to 1.20 |
| Age group (years)            |            |              |
| <35                          | 38.0       | 29.9 to 46.2 |
| 35-44                        | 28.4       | 22.6 to 34.2 |
| >45                          | 33.4       | 28.0 to 38.8 |
| Financial difficulties       |            |              |
| No                           | 32.8       | 27.4 to 38.2 |
| Yes                          | 33.2       | 28.4 to 38.1 |
| Educational attainment       |            |              |
| Low (O level or below)       | 32.2       | 28.4 to 35.9 |
| High (A level or above)      | 37.1       | 24.9 to 49.2 |
| Employment status            |            |              |
| Working                      | 36.3       | 28.3 to 44.4 |
| Not working                  | 31.2       | 27.2 to 35.2 |
| Relationship status          |            |              |
| In a relationship            | 34.2       | 30.1 to 38.3 |
| Single                       | 27.7       | 20.8 to 34.7 |
| Years since leaving military |            |              |
| 1-9                          | 36.56      | 30.0 to 43.1 |
| 10-19                        | 32.5       | 25.4 to 40.0 |
| 20+                          | 29.1       | 23.4 to 34.4 |

PTGI, post-traumatic growth inventory.

**Table 3** Exploring relationships between meeting case criteria on range on health outcomes and mean PTGI scores pre-treatment and at 6-month follow-up

|            | Pretreatment        |      |                 |                | Post-treatment                |      |                 |                |
|------------|---------------------|------|-----------------|----------------|-------------------------------|------|-----------------|----------------|
|            | Admission mean PTGI |      | Adjusted model* |                | Six-month follow-up mean PTGI |      | Adjusted model* |                |
|            | Not case            | Case | $\beta$         | 95% CI         | Not case                      | Case | $\beta$         | 95% CI         |
| PTSD       |                     |      |                 |                |                               |      |                 |                |
| PSS-I      | 29.4                | 32.7 | 3.87            | -15.7 to 23.4  | 39.9                          | 28.2 | -11.4†          | -19.1 to -3.77 |
| Depression |                     |      |                 |                |                               |      |                 |                |
| PHQ-9      | 40.8                | 31.4 | -8.98           | -21.3 to 3.32  | 39.0                          | 30.5 | -9.09†          | -18.3 to 0.00  |
| Anxiety    |                     |      |                 |                |                               |      |                 |                |
| GAD-7      | 43.6                | 31.6 | -11.1           | -25.9 to 3.66  | 37.2                          | 30.7 | -8.04           | -17.9 to 1.85  |
| Anger      |                     |      |                 |                |                               |      |                 |                |
| DAR-5      | 35.7                | 28.9 | -8.82†          | -16.1 to -1.52 | 34.0                          | 28.4 | -7.87           | -16.3 to 0.53  |

\*Adjusted for time since treatment, age group, education, relationship status and employment status.

†Denotes significance at 0.05.

DAR, Dimensions of Anger Reactions; GAD, generalised anxiety disorder; PHQ, Patient Health Questionnaire; PSS-I, PTSD Symptom Scale Interview; PTGI, post-traumatic growth inventory.

and had been followed-up 6 months later (mean score 32.6). Variation was observed in the five dimensions within the PTGI. Growth scores were highest for relating to others and lowest for spiritual change. With the exception of problems with anger, no relationships were observed between individuals who reported higher levels of pre-treatment mental health difficulties and higher PTGI scores. A different picture emerged post-treatment. At 6-month follow-up, individuals who no longer met case criteria for PTSD and depression reported significantly higher scores on the PTGI. Not being a case for problems with anger at 6-month follow-up and reporting higher PTGI scores also approached significance. While not significant, analysis of

changes in mental health scores between baseline and 6-month post-treatment follow-up suggested that reductions in PTSD and depression scores were associated with higher scores on the PTGI. The prevalence of PTG in this population indicates that it persists over time and is common among veterans, which is in agreement with findings for the US veterans.<sup>15</sup>

The data presented observed that there was no relationship between severity of pre-treatment PTSD symptomatology and post-treatment PTG scores. While at 6-month follow-up, there appeared to be a relationship between a reduction in PTSD severity and higher levels of PTG. This suggests a relationship between PTG and improvements in PTSD symptoms. As such, individuals whose PTSD symptoms reduced following treatment were more likely to report higher levels of PTG. This could be interpreted as meaning that PTG resulted from exposure to trauma and also as a result of treatment. This leads to the question, is PTG a unique construct or does growth result from an individual overcoming their symptoms of PTSD and a resumption of an individual's premorbid psychological position after treatment?<sup>34</sup> It has been argued that while a reduction in PTSD may support the development of PTG, they are independent constructs.<sup>14</sup> Furthermore, a recent randomised controlled trial of survivors of road traffic accidents reported that there were no differences in levels of PTG between individuals offered cognitive behavioural therapy for symptoms of PTSD and those not offered therapy even though there was a reduction in PTSD severity in the former group, suggesting that PTG does not result simply as a result of a reduction in PTSD.<sup>35</sup> This finding is in contrast to numerous other studies that, in a similar fashion to the current study, have reported a treatment effect between levels of PTG and improvements in PTSD severity.<sup>17 36 37</sup>

The level of growth reported on the PTGI appeared to be lower within this sample of the UK veterans compared with previously documented levels within the US veterans.<sup>23 24 38</sup> A recent study that included data from 348 US veterans who met criteria for lifetime PTSD reported that 72% of this sample reported moderate PTG.<sup>24</sup> These findings contrast with the current study where only 37% of veterans reported moderate PTG. Differences also emerged for which of the PTGI dimensions were most frequently endorsed—both the US and current study's UK veteran samples frequently endorsed growth in the

**Table 4** Exploring relationships between changes in health outcomes between admission and 6-month follow-up and post-traumatic growth inventory scores

|               | Adjusted model* |                |
|---------------|-----------------|----------------|
|               | $\beta$         | 95% CI         |
| PSS-I changes |                 |                |
| 1st tertile   | 1.00            |                |
| 2nd tertile   | 2.26            | -6.53 to 11.2  |
| 3rd tertile   | 8.05            | -0.77 to 16.9  |
| PHQ-9 changes |                 |                |
| 1st tertile   | 1.00            |                |
| 2nd tertile   | -0.04           | -8.94 to 8.86  |
| 3rd tertile   | 9.14            | -0.66 to 18.95 |
| GAD-7 changes |                 |                |
| 1st tertile   | 1.00            |                |
| 2nd tertile   | -3.12           | -12.2 to 5.98  |
| 3rd tertile   | 2.10            | -7.90 to 12.1  |
| DAR-5 changes |                 |                |
| 1st tertile   | 1.00            |                |
| 2nd tertile   | 3.58            | -5.87 to 13.0  |
| 3rd tertile   | 2.66            | -6.85 to 12.2  |

\*Adjusted for time since treatment, age group, education, relationship status and employment status.

† Denotes significance at 0.05.

DAR, Dimensions of Anger Reactions; GAD, generalised anxiety disorder; PHQ, Patient Health Questionnaire; PSS-I, PTSD Symptom Scale Interview.

dimension of 'relating to others', however, as opposed to the US veteran study, in the current study, growth connected to 'appreciation of life' and 'spiritual change' were the two least endorsed PTGI subscale dimensions. In particular, scores on the 'spiritual change' subscale were low within the current study. This suggests it may be helpful to perform a confirmatory factor analysis for the PTGI for the UK veterans with PTSD to see whether it is appropriate to include 'spiritual change' within measures of PTG for the UK ex-service personnel. The level of PTG reported within the current study seems similar to the UK studies not restricted to veteran populations. In a study of the UK assault survivors, the mean PTGI score per item reported was 1.59 and which is similar to the mean score per item of 1.55 reported within the current study.

The current study profited from using a clinical sample of veterans who had all received the same standardised treatment which ought to have ensured high levels of treatment fidelity. Using a naturalistic design should mean the observed results have good ecological validity. Limitations need to be considered when interpreting the reported findings. PTG was collected retrospectively and this could have introduced bias by creating the potential that individuals whose symptoms of PTSD reduced more following treatment reported higher levels of PTG as a result of improvements in their mental health functioning. Researchers have argued that PTG and PTSD are separate constructs which may have acted to reduce bias.<sup>14</sup> Because no randomisation was used to select the sample, there could have been other factors that we were unable to control for that may have influenced levels of PTG. For example, the personality trait 'optimism' has been identified to positively impact on levels of growth.<sup>12 18</sup> In addition, no data were available in relation to the nature of traumas that participants had been exposed which may have introduced bias as distinct types of trauma may affect experiences of PTG differently. The study employed a modest sample size and examination of the 95% CIs could provide evidence that several of the analyses were underpowered.

## Conclusions

Overall, in this paper we observed evidence of PTG in a sample of UK veterans following their treatment for PTSD. While limitations exist, this study has shown that levels of PTG are higher for individuals who respond better to treatment. This suggests there may be a relationship between successful PTSD treatment outcomes and higher levels of PTG. The direction of causality in this relationship is unclear; with some studies suggesting that improvement in measures of growth occur as a result of reductions in PTSD severity, while others have observed that levels of PTG are not influenced by treatment. The data from this study suggest within this population therapy focusing on alleviating symptoms of PTSD may also promote PTG. Overall, it appears that levels of PTG are lower in help-seeking UK veterans populations with PTSD than the US veterans with PTSD. Evidence has been presented that implies that the levels of PTG reported within this study seem to be comparable with other UK trauma-exposed groups that are not restricted to veterans.

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