

# Childhood adversities in UK treatment-seeking military veterans

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## ABSTRACT

**Introduction** The long-term consequences of adverse childhood experiences (ACEs) on adult physical and mental health are well documented in the literature. The current study sought to examine this relationship in a sample of UK treatment-seeking military veterans.

**Methods** The data were collected through a cross-sectional self-report survey from military veterans who have sought help for mental health difficulties from a veteran-specific UK-based charity. The response rate was 67.2% (n=403) and the effective sample for this study consisted of 386 male veterans. Participants' history of ACEs and current mental/physical health difficulties were assessed. A latent class analysis was conducted to categorise participants into subgroups based on their ACEs and the relationship of these to the mental and physical health outcomes was examined.

**Results** Five classes of veterans with different combinations of ACEs were identified. A total of 97% reported at least one ACE. There were minimal differences between the classes on mental and physical health outcomes, but the total number of ACEs was related to aggression, common mental health problems and post-traumatic stress disorder (PTSD).

**Conclusions** No combination of ACEs was specifically predictive of adverse mental/physical health difficulties in our sample. Instead, those with a higher number of ACEs may be more prone to developing problems with aggression, common mental health problems and PTSD. Assessing the history of childhood adversities in military veterans is therefore important when veterans are seeking help for mental health difficulties, as some of these may be related to childhood adversities and may need to be addressed in treatment.

## INTRODUCTION

The effects of adverse childhood experiences (ACEs) on different domains of one's adult life have been well documented in the literature, particularly in civilian samples.<sup>1</sup> There exists a dose–response relationship between the number of ACEs and negative physical and mental health outcomes, with a higher number of ACEs being associated with more complications.<sup>1,2</sup> The theory behind this relationship suggests that early childhood trauma and stress alter the brain's development and re-organise its structure and functioning in a way that changes one's behaviour and makes one more susceptible to developing physical and psychiatric disorders.<sup>3</sup>

In recent years, studies have begun to examine ACEs in military personnel and veterans.<sup>4–7</sup> They found that ACEs are more prevalent in the serving military personnel and in the military veteran

## Key messages

- Adverse childhood experiences are common in our sample of male UK treatment-seeking veterans.
- There are subgroups of veterans with similar types of adverse childhood experiences, but these subgroups do not differ substantially in mental/physical health problems.
- Total number of different types of adverse childhood experiences is predictive of common mental health problems, post-traumatic stress disorder symptoms and levels of aggression.
- Clinicians should assess the history of adverse childhood experiences in military veterans as these may exacerbate mental health problems post-service.

populations compared with civilians,<sup>4,5</sup> and it has been suggested that enlistment may serve as an escape from adversity for some individuals.<sup>6</sup> Other studies have shown that ACEs are a significant risk factor for developing negative physical and mental health outcomes in this population.<sup>7</sup>

Experiencing multiple types of ACEs has been associated with a greater risk of negative mental health outcomes than experiencing a single incident or a repeated exposure to the same type of ACE.<sup>8</sup> Moreover, single occurrences of ACEs are much less common than the occurrence of multiple types of ACEs.<sup>8,9</sup> To date, limited research has examined the effects of different combinations of ACEs on health outcomes, focusing instead on cumulative exposure (ie, count). In one relevant study,<sup>10</sup> conducted with a representative sample of US military veterans, subgroups of veterans characterised by different combinations of ACEs were found to be vulnerable to different mental health conditions. Those exposed to the greatest variety of ACEs were at greatest risk for developing post-traumatic stress disorder (PTSD), major depressive disorder (MDD) and generalised anxiety disorder (GAD). In addition, the risk for PTSD and GAD was greater for veterans who reported childhood maltreatment (sexual, physical, emotional) than those who grew up in a dysfunctional household, while the latter group were at greater risk for MDD.<sup>10</sup>

To extend this research, the current study examined whether any specific combination of different types of ACEs make military veterans particularly vulnerable to physical and mental health difficulties post-service. We hypothesised to find several subgroups of veterans characterised by different



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probabilities of endorsing different ACE types. Second, we hypothesised to find differences between these subgroups on health outcomes, such that veterans with greater probabilities of endorsing different ACEs will have more negative health outcomes and they will be more likely to be unemployed and not in a relationship. Looking at the effects of different combinations of ACEs is important as these may require different treatment approaches.

## METHOD

### Participants and procedure

The data were collected using a cross-sectional self-report questionnaire administered to a sample of military veterans who attended at least one appointment with Combat Stress—a UK veteran-specific mental health charity—between 31 January 2015 and 1 February 2016. Out of 3335 individuals attending their appointment, a subsample of 667 (20%) was randomly selected. The final sample consisted of 600 veterans who were alive at the time of data collection and for whom full postal address was available. These individuals were mailed a questionnaire over three waves, followed by phone calls to elicit responses. A total of 403 veterans returned completed questionnaires (67.2% response rate). Due to the small number of women in the final sample ( $n=17$ ), only men were included in the current study, yielding an effective sample size of 386.

### Measures

#### Adverse childhood experiences

Childhood adversity was assessed with 17 items, 16 of which were previously used in an epidemiological study of health and well-being in UK military personnel.<sup>7</sup> One item enquiring about childhood sexual abuse was added to the questionnaire in the current study. The items were presented as true or false statements and higher total scores indicated greater adversity (range, 0–17).

#### Mental health

Aggression was measured with four items developed by the Walter Reed Army Institute of Research.<sup>11</sup> Two additional items enquiring about hitting one's spouse/partner and hitting another family member were added in the current study. All items were rated on a five-point Likert scale (0–4). Higher total scores indicate more aggression (range, 0–20).

Functional impairment was measured with the five-item Work and Social Adjustment Scale,<sup>12</sup> which assesses the difficulties of carrying out day-to-day activities due to one's health problems using a nine-point Likert scale (0–8). For participants who do not work, the missing value on the work-related item was substituted with a mean score from the remaining items. Higher total scores indicate greater impairment (range, 0–40).

Alcohol use was assessed with the Alcohol Use Disorders Identification Test.<sup>13</sup> Eight items use a five-point Likert scale (0–4) and two items use a three-point Likert scale (0, 2, 4) for responses. Higher total scores indicate more alcohol problems (range, 0–40).

Common mental health problems (ie, anxiety and depression) were assessed with the 12-item General Health Questionnaire-12.<sup>14</sup> Bimodal scoring (0, 0, 1, 1) was used and higher total scores indicated greater difficulties (range, 0–12).

PTSD symptoms were assessed with the 20-item PTSD Checklist for DSM-5,<sup>15</sup> which uses a five-point Likert scale (0–4) for responses. Higher total scores indicate greater symptomatology (range, 0–80).

#### Physical health

Participants were presented with a list of 14 health conditions (eg, diabetes, heart problems, chronic pain), including 'other' and were asked to indicate which ones they suffer from. Higher total scores indicated more health problems (range, 0–14).

#### Risky behaviour

A compound binary variable (present/not present) representing risky behaviours was created from variables related to smoking, drug use and dangerous driving. Risky behaviour was coded as 'present' if participants indicated smoking  $\geq 20$  cigarettes a day, and/or any drug use in the previous month, and/or driving more than 10 mph above the limit in built-up areas, and/or driving more than 20 mph above the limit on the motorway. These cut-offs have been used in previous studies.<sup>16 17</sup>

#### Demographics

Relevant for the current analyses were employment status and relationship status variables coded as 'employed' versus 'not employed' and 'in relationship' versus 'single/separated/divorced/widowed'.

### Analyses

The data were prepared in SPSS V.25 and analysed in Mplus V.7.3. Seventeen binary-coded childhood adversities were used as indicators in the latent class analysis (LCA), a statistical technique that categorises individuals into different unobserved subclasses, based on their responses to observed variables (here different types of ACEs). Latent class models with increasing numbers of classes were estimated, using the robust maximum-likelihood estimator. To select the optimal model, we used the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC) and the sample-size-adjusted BIC (SSABIC), along with the Lo–Mendell–Rubin adjusted likelihood ratio test (LMRA) and the bootstrapped likelihood ratio test (BLRT). Entropy values were considered to get an indication of the accuracy of categorising participants into latent classes. In addition, parsimony, meaningfulness and interpretability were considered when deciding on the optimal model.<sup>18</sup>

Covariates were then added to the optimal model to examine differences between latent classes using the three-step approach. First, aggression, functional impairment, alcohol use, common mental health problems, PTSD symptoms and physical health problems were added as continuous variables and equality tests of means across latent classes (Wald  $\chi^2$  tests) were conducted using the Bose–Chaudhuri–Hocquenghem (BCH) procedure.<sup>19</sup> Risky behaviour, employment and relationship status were added as binary distal outcomes and the probabilities of these across the latent classes were examined using the DCAT option in Mplus (Wald  $\chi^2$  tests).<sup>19</sup>

The missing data were minimal (<1%). The EM algorithm in SPSS was used to estimate the missing values on ordinal/continuous variables. Full information maximum-likelihood method in Mplus was used to estimate the missing values on the childhood adversity indicators. Finally, listwise deletion ( $n=11$ ) was used when examining the association of risky behaviours with the latent classes.

## RESULTS

### Descriptive statistics

Participants were aged between 22 and 92 years ( $M=50.93$ ,  $SD 12.74$ ), the majority were in a relationship ( $n=267$ , 69.17%) as opposed to being single/divorced/separated/widowed, 123

**Table 1** Positive endorsements of adverse childhood experiences (ACEs) in the full sample and each latent class

ACE type	Full sample N (%)	Class 1: High adversity n (%)	Class 2: Family unit problems n (%)	Class 3: Physical abuse n (%)	Class 4: School problems n (%)	Class 5: Low adversity n (%)
Fighting/abuse between parents	124 (32.7)	57 (70.4)	18 (33.3)	36 (81.8)	6 (7.6)	7 (5.8)
Parental drug/alcohol problems	96 (25.3)	42 (51.9)	19 (35.2)	18 (40.9)	6 (7.6)	11 (9.1)
Not from close family	118 (30.6)	78 (96.3)	34 (63.0)	3 (6.8)	3 (3.8)	0 (0)
Family did not do things together	121 (31.3)	62 (76.5)	43 (79.6)	13 (29.5)	0 (0)	3 (2.4)
Did not feel valued by family	124 (32.1)	81 (100)	28 (51.9)	10 (22.7)	3 (3.8)	2 (1.6)
Could not talk to family	158 (40.9)	68 (84.0)	43 (79.6)	18 (40.9)	11 (13.8)	18 (14.2)
Played truant from school	163 (43.0)	57 (70.4)	24 (44.4)	24 (54.5)	50 (63.3)	8 (6.6)
Physical fights at school	176 (46.4)	60 (74.1)	22 (40.7)	28 (63.6)	51 (64.6)	15 (12.4)
Suspended/expelled from school	90 (23.8)	40 (49.4)	4 (7.4)	8 (18.6)	33 (41.8)	5 (4.1)
Problems reading/writing at school	93 (24.6)	27 (33.3)	14 (25.9)	14 (31.8)	15 (19.0)	23 (19.2)
Got shouted at	181 (48.0)	78 (96.3)	26 (48.1)	42 (95.5)	20 (25.3)	15 (12.6)
Hit/hurt by parent/caregiver	103 (27.1)	62 (76.5)	0 (0)	35 (79.5)	5 (6.3)	1 (0.8)
Inappropriate sexual contact	56 (14.8)	33 (40.7)	6 (11.1)	5 (11.4)	7 (8.9)	5 (4.1)
Spent time in care services	24 (6.3)	12 (14.8)	6 (11.1)	1 (2.3)	5 (6.3)	0 (0)
No one looked out for them	105 (27.8)	18 (22.2)	12 (22.2)	8 (18.6)	25 (31.6)	42 (34.7)
No thing/activity made feel special/proud	287 (75.9)	58 (71.6)	36 (66.7)	37 (84.1)	60 (75.9)	96 (80.0)
Trouble with police	177 (46.7)	51 (63.0)	25 (46.3)	25 (56.8)	67 (84.8)	9 (7.4)

Frequencies and percentages are based on the most likely class membership for each participant. Presented are within-class valid percentages.

(31.87%) were employed and the majority had served in the Army ( $n=328$ , 84.97%), with the rest having served in the Navy ( $n=29$ , 7.51%) or the Royal Air Force ( $n=29$ , 7.51%). Participants served between 1 and 43 years ( $M=13.52$ ,  $SD$  8.50), and left the service between zero and 71 years ago ( $M=18.87$ ,  $SD$  13.13).

Participants reported between 0 and 15 different types of ACEs ( $M=5.82$ ,  $SD$  3.64). Eleven (2.85%) participants reported no ACEs, 32 participants (8.29%) reported one ACE, 45 (11.66%) reported two ACEs and the remaining 298 participants (77.20%) reported three or more ACEs. The most commonly endorsed ACE was *Having no thing/activity that made one feel special/proud* ( $n=287$ , 75.9%) and the least commonly endorsed ACE was *Spending time in care services* ( $n=24$ , 6.3%). **Table 1** shows the endorsements of all ACEs in the full sample and each latent class.

### Latent class analysis

As shown in **Table 2**, the fit indices did not point to a single model as superior (for the interpretation of fit indices, see online supplementary material). AIC and BLRT pointed to the six-class model, BIC pointed to the three-class model, SSABIC to the five-class model and the LMRA to the two-class model as optimal.

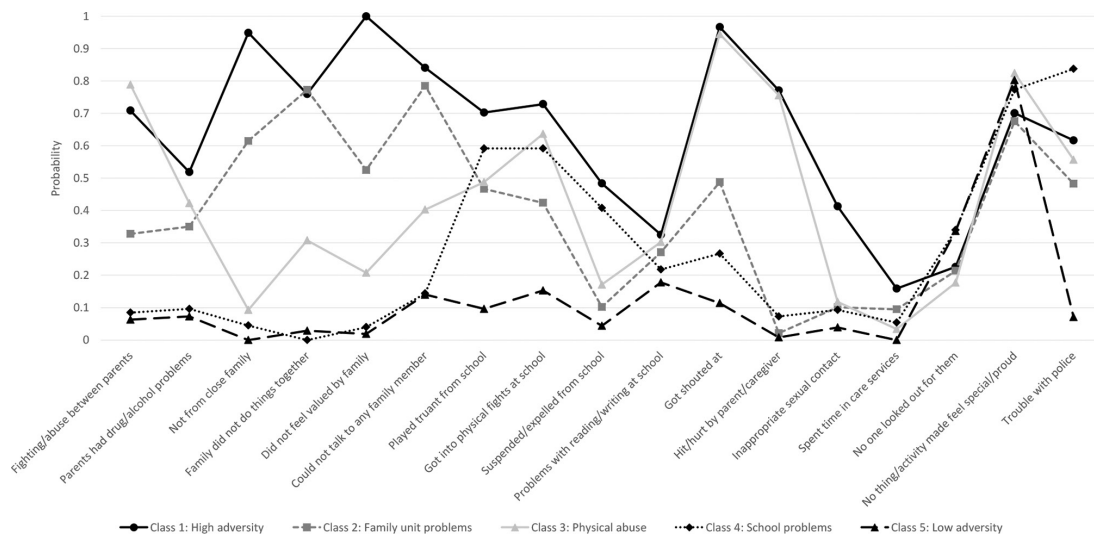
The visualisation of the six-class model was difficult to interpret, but the more parsimonious five-class model yielded meaningful classes and was therefore selected as optimal. It had an entropy value of 0.825, which is above the recommended cut-off, thus indicating clearly delineated classes.

The five-class model is depicted in **Figure 1**. Based on the most likely class membership, class 1 consisted of 81 participants (21.0%) who, on average, reported relatively high endorsements of all ACE indicators. It was named *High adversity* class. Class 2 had 54 participants (14.0%) and showed moderate endorsements of the ACE indicators, particularly those related to family issues. It was named *Family unit problems* class. Class 3 ( $n=44$ , 11.4%) also showed moderate endorsements of the ACE indicators, with elevated endorsements of physical abuse-type indicators, such as parental fighting, getting into physical fights at school, being physically hurt by caregivers, but also being shouted at. The class was named *Physical abuse* class. Class 4 ( $n=80$ , 20.7%) was characterised by low endorsements of the majority of indicators, but elevations on the school problems. It was named the *School problems* class. Class 5 was the largest class ( $n=127$ , 32.9%) and showed, on average, low probability of endorsing almost all of the ACE indicators. It was named *Low adversity*

**Table 2** Fit indices of the latent class models

Number of classes	AIC	BIC	SSABIC	LMRA (p value)	BLRT (p value)	Entropy
1	7633.095	7700.344	7646.405	–	–	1
2	6699.915	6838.369	6727.318	<0.001	<0.001	0.891
3	6611.658	6821.318	6653.155	0.068	<0.001	0.814
4	6544.654	6825.518	6600.243	0.054	<0.001	0.808
5	6507.675	6859.744	6577.358	0.559	<0.001	0.825
6	6488.858	6912.133	6572.634	0.317	<0.001	0.832
7	6480.786	6975.266	6578.655	0.173	0.103	0.855

AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; BLRT, bootstrapped likelihood ratio test; LMRA, Lo–Mendell–Rubin adjusted likelihood ratio test; SSABIC, sample-size-adjusted BIC.



**Figure 1** Probability of endorsing different types of adverse childhood experiences in the five latent classes.

class. Interestingly, participants in all classes had a high probability of endorsing the item *There was no thing/activity that I did that made me feel special/proud*.

### Differences between latent classes

Table 3 presents the results of Wald  $\chi^2$  tests. There were some differences between the classes in mean levels of aggression and physical health problems, and in the probability of engaging in risky behaviours and being employed, but after correcting for multiple testing (Bonferroni adjustment), only the following remained significant: the number of physical health problems was higher in the *Low adversity* class compared with the *School problems* class; participants in the *School problems* class had a greater probability of engaging in risky behaviours than those in the *Low adversity* class; participants in the *Family unit problems* class had a higher probability of being employed than participants in all other classes.

### Multivariate regression

Since the differences between latent classes were minimal, we conducted a multivariate regression analysis with the total ACE score as a predictor and the mental/physical health problems as outcome variables using the full sample to see if a relationship exists between these constructs. The results showed that the total ACE score significantly predicted aggression ( $\beta=0.101$ ,  $SE=0.05$ ,  $p=0.047$ ), common mental health problems ( $\beta=0.148$ ,  $SE=0.05$ ,  $p=0.003$ ) and PTSD ( $\beta=0.200$ ,  $SE=0.05$ ,  $p<0.001$ ), but not functional impairment, alcohol use or physical health problems ( $p_s>0.05$ ).

### DISCUSSION

To the best of our knowledge, the current study is the first to examine typologies of ACEs in male UK treatment-seeking military veterans. As hypothesised, LCA revealed several subclasses characterised by high, moderate and low endorsements of

**Table 3** Descriptive statistics of the full sample and each latent class and differences between latent classes

Covariate	Full sample	Class 1: High adversity	Class 2: Family unit problems	Class 3: Physical abuse	Class 4: School problems	Class 5: Low adversity	$\chi^2$ P value*
<b>M (SE)</b>							
Aggression	4.25 (0.25)	4.79 (0.38)	3.29 (0.55)	4.36 (0.58)	5.52 (0.58)	3.44 (0.41)	0.018
Functional impairment	24.47 (0.53)	25.77 (1.21)	24.21 (1.68)	24.96 (1.65)	24.81 (1.19)	23.34 (1.00)	0.638
Alcohol use	8.62 (0.66)	7.96 (1.13)	9.71 (1.39)	10.01 (1.64)	10.20 (1.20)	6.96 (0.86)	0.174
Common mental health problems	6.44 (0.22)	7.33 (0.46)	6.68 (0.60)	5.50 (0.71)	6.51 (0.54)	6.06 (0.44)	0.174
PTSD	52.75 (1.01)	56.89 (1.94)	52.68 (2.58)	52.23 (3.25)	54.35 (1.97)	49.16 (1.77)	0.064
Physical health problems	2.52 (0.12)	2.66 (0.25)	2.37 (0.34)	2.76 (0.38)	1.81 (0.22) <sup>1</sup>	2.89 (0.21) <sup>1</sup>	0.016
<b>Probability</b>							
Risky behaviour—no/yes	0.69/0.31	0.65/0.36	0.67/0.33	0.76/0.25	0.51/0.49 <sup>1</sup>	0.80/0.20 <sup>1</sup>	0.015
Employment status—employed/not employed	0.32/0.68	0.27/0.71 <sup>1</sup>	0.61/0.39 <sup>1234</sup>	0.26/0.74 <sup>2</sup>	0.28/0.72 <sup>3</sup>	0.21/0.79 <sup>4</sup>	<0.001
Relationship status—in relationship/single, separated, divorced or widowed	0.69/0.31	0.70/0.30	0.64/0.36	0.63/0.37	0.71/0.29	0.73/0.27	0.809

Classes that share the same superscript within a particular row are significantly different from each other using Bonferroni-adjusted alpha level of 0.005.

\*P value for the omnibus test.

PTSD, post-traumatic stress disorder.

different ACEs: *High adversity* class, *Family unit problems* class, *Physical abuse* class, *School problems* class and *Low adversity* class. However, contrary to our hypotheses, these classes did not differentially predict post-service mental and physical health outcomes. The only differences included a higher number of physical health problems in the *Low adversity* class relative to the *School problems* class, a higher probability of engaging in risky behaviours for those in the *School problems* class relative to those in the *Low adversity* class, and a higher probability of those in the *Family unit problems* class to be employed relative to those in all other classes. Looking at all participants together, however, there was a positive relationship between the total ACE score and aggression, common mental health problems and PTSD. Taken together, these findings suggest that in UK treatment-seeking military veterans, no combination of ACEs is specifically predictive of negative mental health outcomes.

These results differ from previous studies, which found differential relationships between ACE typologies and a variety of health outcomes both in the general,<sup>1</sup> and in the military veteran populations.<sup>10</sup> However, one study conducted with female military veterans found that the health outcomes of women with childhood adversities, but without negative military experiences, resembled the outcomes of women in the low overall adversity class,<sup>20</sup> which is similar to the current study. It is also possible that there were no differences between the latent classes due to the treatment-seeking nature of our sample, as all participants had a certain level of difficulties prior to seeking help. Finally, the measure of ACEs used in the current study differed from those used in previous studies in that it assessed potentially less severe experiences and focused more on family cohesiveness and school-related problems rather than abuse and neglect, so the findings are not directly comparable with previous studies.

The current study found an association of class membership with engagement in risky behaviours; veterans in the *School problems* class had a greater probability of engaging in risky behaviours than veterans in the *Low adversity* class. This finding supports previous longitudinal studies which have found a relationship between externalising behaviours in childhood and a propensity for risk exposure later in life, including heavy smoking and substance abuse.<sup>21 22</sup>

An interesting finding was the higher probability of participants in the *Family unit problems* class to be employed as opposed to unemployed, when compared with all other classes, where the probabilities were reversed. The explanation for this finding is not clear, but one previous study conducted with a representative sample of 4341 US adults found that those whose parents got divorced when they were a child had higher levels of self-confidence than those from intact families.<sup>23</sup> It could be speculated that having survived parental divorce or other family cohesion-type adversities could make one more resilient and self-reliant, thus leading to a higher employment rate. It is, however, also possible that other variables, not assessed here, were at play.

Also interesting was the finding that veterans across all latent classes had a high probability of endorsing the item *There was no thing/activity that I did that made me feel special/proud*. It is possible that this was one of the primary reasons why individuals signed up for military service in the first place. Veterans often report being proud to have served and being treated as heroes by their compatriots is likely to make them feel special. One study found that out of a number of economic and non-economic variables, pride in service was the strongest predictor of how likely US junior enlisted personnel were to remain in the military.<sup>24</sup> Wanting to feel special could therefore be one of the primary motives for enlistment in UK veterans. A comparative

study with the general population would be useful to examine this hypothesis.

### Implications

The most important finding of the current study is that ACEs are common in treatment-seeking military veterans, as they were reported by 97.15% of our sample, with the majority (77.20%) reporting three or more ACE types. Even though we found no major differences in mental health outcomes between latent classes consisting of veterans with similar types of ACEs, existing research shows that the effects of ACEs can be long lasting.<sup>1</sup> The current study supports this research, as we found significant relationships between the total number of different ACE types reported by veterans and current levels of aggression, common mental health problems and PTSD symptoms. It is therefore important to assess the history of ACEs in military veterans when they are seeking help for current mental health problems, as it is possible that some of the problems are related to their history of ACEs and this may need to be addressed in treatment.

### Limitations

Several limitations of the current study need acknowledged. First, data were collected through self-report measures and there is a possibility of memory bias when recalling events that happened in childhood. Research has shown that people tend to underestimate their experiences of childhood adversities in retrospective reports.<sup>25</sup> Second, we used a male treatment-seeking sample of UK veterans and the results may therefore not generalise to other populations. Third, the measure of ACEs used in the current study was different from that used in previous studies, which does not allow for direct comparisons. The high rates of ACEs found in our sample could be due to the types of adversities assessed by the measure and replications of this study are therefore needed. Finally, the risky behaviour variable was composed of drug use, smoking and dangerous driving, as these behaviours were assessed in our questionnaire. Other studies may have used different definitions of risky behaviour and comparisons should therefore only be made with caution.

### CONCLUSION

Childhood adversities are common in male UK treatment-seeking veterans, with three quarters (77.20%) of our sample reporting having experienced three or more different types of such adversities. Veterans could be divided into different subclasses based on different combinations of ACEs, but there were no differences between these classes on mental health outcomes, with only some differences found in engagement in risky behaviours, physical health problems and employment status. The reason for this could be the treatment-seeking nature of the sample, as all veterans were presenting with mental health problems. Nevertheless, we found that the total number of different ACEs reported by participants predicted aggression, common mental health problems and PTSD symptoms. The results therefore point to the importance of screening for a history of childhood adversities in military veterans, as these can exacerbate mental health problems post-service.

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