Post-deployment screening for mental disorders and tailored advice about help-seeking in the UK military: a cluster randomised controlled trial

Roberto J Rona, Howard Burdett*, Mizanur Khondoker, Melanie Chesnokov, Kevin Green, David Pernet, Norman Jones, Neil Greenberg, Simon Wessely, Nicola T Fear*

Summary

Background The effectiveness of post-deployment screening for mental disorders has not been assessed in a randomised controlled trial. We aimed to assess whether post-deployment screening for post-traumatic stress disorder (PTSD), depression, anxiety, or alcohol misuse was effective. We defined screening as the presumptive identification of a previously unrecognised disorder using tests to distinguish those who probably had the disorder from those who probably did not so that those people with a probable disorder could be referred appropriately, and assessed effectiveness and consequences for help-seeking by the odds ratio at follow-up between those receiving tailored help-seeking advice and those who received general mental health advice.

Methods We did a cluster randomised controlled trial among Royal Marines and Army personnel in the UK military after deployment to Afghanistan. Platoons were randomly assigned (1:1 initially, then 2:1) by stratified block randomisation with randomly varying block sizes of two and four to the screening group, which received tailored help-seeking advice, or the control group, which received general mental health advice. Initial assessment took place 6–12 weeks after deployment; follow-up assessments were done 10–24 months later. Follow-up measures were the PTSD Checklist–Civilian Version, Patient Health Questionnaire-9, Generalised Anxiety Disorder-7 scale, Alcohol Use Disorder Identification Test (AUDIT), and self-reported help-seeking from clinical and welfare providers comparing those receiving tailored advice and those receiving only general advice. All participants and all investigators other than the person who analysed the data were masked to allocation. The primary outcomes were PTSD, depression or generalised anxiety disorder, and alcohol misuse at follow-up. A key secondary outcome was assessment of whether post-deployment screening followed by tailored advice would modify help-seeking behaviour. Comparisons were made between screening and control groups, with primary analyses by intention to treat. This trial is registered with the ISRCTN Registry, number ISRCTN19965528.

Findings Between Oct 24, 2011, and Oct 31, 2014, 434 platoons comprising 10 190 personnel were included: 274 (6350 personnel) in the screening group and 160 (3840 personnel) in the control group. 5577 (88%) of 6350 personnel received screening and 3996 (63%) completed follow-up, whereas 3149 (82%) of 3840 received the control questionnaire and 2369 (62%) completed follow-up. 1958 (35%) of 5577 personnel in the screening group declined to see the tailored advice, but those with PTSD (83%) or anxiety or depression (84%) were more likely than non-cases (64%) to view the advice (both p<0·0001). At follow-up, there were no significant differences in prevalence between groups for PTSD (adjusted odds ratio 0·92, 95% CI 0·75–1·14), depression or anxiety (0·91, 0·71–1·16), alcohol misuse (0·88, 0·73–1·06), or seeking support for mental disorders (0·92, 0·78–1·08).

Interpretation Post-deployment screening for mental disorders based on tailored advice was not effective at reducing prevalence of mental health disorders nor did it increase help-seeking. Countries that have implemented post-deployment screening programmes for mental disorders should consider monitoring the outcomes of their programmes.

Funding The US Congressionally Directed Medical Research Programs.

Published **Online** February 16, 2017 http://dx.doi.org/10.1016/S0140-6736(16)32398-4

See **Online/Comment** http://dx.doi.org/10.1016/S0140-6736(17)30073-9

*Joint first authors

King's Centre for Military Health Research, Department of Psychological Medicine (Prof R J Rona FFPH, H Burdett PhD, M Chesnokov MA Cantab, K Green MSc, D Pernet BA, Prof S Wessely FMedSci), **and Academic Department of Military Mental Health, Department of Psychological Medicine** (N Jones PhD, Prof N Greenberg MD, Prof N T Fear DPhilOxon), **King's College London, London, UK; Norwich Medical School, University of East Anglia, Norwich, UK** (M Khondoker PhD); **and Navy Command Headquarter Operational Stress Management/Trauma Risk Management, West Battery, Whale Island, Portsmouth, UK** (K Green)

Correspondence to: Prof Roberto J Rona, King's Centre for Military Health Research, Department of Psychological Medicine, King's College, London, Weston Education Centre, London SE5 9RJ, UK
roberto.rona@kcl.ac.uk

Introduction

The UK deployed more than 220 550 personnel to the Afghanistan and Iraq conflicts between 2001 and March 31, 2014,[1] about 37% of whom were deployed more than once.[2] 632 (0·3%) personnel died and 838 (0·4%) were seriously injured during those conflicts,[3,4] similar percentages, but not absolute numbers, to those of US forces. The intensity of operations and high proportion of the total UK Armed Forces that participated in these conflicts created an expectation that the conflict would have a substantial effect on the mental health of UK service personnel.[5] Although a higher prevalence of mental health problems was noted in personnel in direct combat roles deployed to Iraq and Afghanistan, an estimated 4% of regular UK personnel had post-traumatic stress disorder (PTSD), 20% had psychological distress, and 16% had alcohol misuse,[6] which are similar prevalences to those among personnel who did not deploy to

Research in context

Evidence before this study

On completion of the study on Jan 18, 2016, we searched MEDLINE, Embase, and PsycINFO for studies on post-deployment screening for the terms ("mental disorders" OR "psychological illness" OR "mental health" OR "posttraumatic stress disorder" OR "PTSD" OR "depression" OR "anxiety" OR "alcohol misuse" OR "alcoholism") AND "post-deployment" AND "screening" AND ("RCT" OR "randomised controlled trial") AND "effectiveness", which yielded 11 publications, five of which were duplicates, and none of which were relevant to the aim of this study. We changed the term "post-deployment" to "military", "armed forces", "army", "navy", or "air force" to make our search less restrictive. The amended search provided 68 publications, 16 of which were duplicates, and none of which were considered relevant to our study. We did a similar search, including one of the terms "help-seeking", "treatment seeking", "health service provision", or "service use" for the effects on help-seeking on June 20, 2016. We identified two additional papers from these search criteria, neither of which were relevant to this study. Post-deployment screening for mental disorders was not a consideration in the military until after the Gulf War in 1991. Post-deployment screening for mental disorders was made mandatory by US Congress in 1998, and since 2003 screening has been implemented among US forces and developed and modified during the Iraq and Afghanistan conflicts.

Added value of this study

This is, to our knowledge, the only randomised controlled trial of post-deployment screening for mental disorders. The USA, Canada, Australia, and the Netherlands have implemented post-deployment screening already and are unable to undertake a randomised controlled trial without stopping their current programmes. The disorders explored in our study are those usually assessed in screening programmes for mental disorders. The results of our study should help to develop or modify models of post-deployment screening programmes implemented in countries where screening is mandatory. Armed Forces that are considering the introduction of post-deployment screening could benefit from the findings of our study.

Implications of all the available evidence

Findings from our study suggest that post-deployment screening based on tailored advice is not effective in reducing the prevalence of mental disorders, nor does it promote help-seeking behaviour. This finding is not surprising since in most studies around half of military personnel with a mental disorder do not seek health care, many of those who seek health care do not go beyond the initial assessment, and a large percentage of those who start treatment do not finish it. We found that as many as a third of personnel who were given the opportunity to receive tailored advice chose not to view it. Screening programmes and procedures vary between countries. Each country will need to assess whether differences between their programmes and our study could make a difference to the results presented here. Countries that have implemented post-deployment screening should have a monitoring system in place to assess the psychological and financial effects of their programmes.

Iraq or Afghanistan.[6,7] Even though prevalence of PTSD was not as high as some anticipated,[8] the absolute numbers are substantial. Mental health screening might be one way to address this mental health burden. Several countries have implemented a mental health screening programme on return from deployment. Screening uses simple tests that are not intended to be diagnostic to distinguish between people who might and those who might not have a disorder to try to provide early diagnosis and appropriate treatment for those who might have the disorder and mitigate longer-term health consequences. The US Armed Forces has implemented a post-deployment screening programme for mental disorders, with repeated assessments in the 30 months after the end of deployment.[9] Canada, Australia, and the Netherlands also have post-deployment screening procedures for mental disorders.[10,11] The drive to implement mental health screening arises from findings that at least half of military personnel with a probable mental disorder do not seek help,[8,12] many seek help too late,[13] chronicity is associated with slower recovery,[9] screening might help to overcome stigma associated with mental disorder,[14] and government-supported screening programmes show a commitment to providing preventive services to military personnel returning from deployment.[15] However, so far, no randomised controlled trial has assessed the effectiveness of screening or its effect on help-seeking behaviour. Because the UK has not mandated a post-deployment screening programme for mental disorders, we had the opportunity to do a randomised controlled trial of screening, which would not have been possible in countries where screening was already national policy, in part because of the potential ethical and public opinion effect of discontinuing an established programme. So far, only observational studies have measured the effect of post-deployment screening; such studies showed that only a subset of those screening positive for mental disorders sought and received an adequate number of therapy or treatment sessions.[16] Studies without a randomisation and control element cannot answer the key questions regarding the effectiveness of such a programme or its effect on help-seeking.

We aimed to assess whether offering tailored help-seeking advice after assessment for possible PTSD, depression or anxiety, and alcohol misuse was effective at reducing prevalence of these disorders. The secondary

aim was to assess whether post-deployment screening followed by tailored advice to seek help from welfare or medical sources for those with mental health symptoms would modify help-seeking behaviour or medication use, or both. We also assessed whether screening for PTSD, and other mental health problems, reduces the prevalence of post-concussion symptoms after mild traumatic brain injury (mTBI), and whether there was a difference in subjective functional impairment between the screening and control participants.

Methods

Trial design and participants

We designed the Post Operational Screening Trial (POST) cluster randomised controlled trial to investigate post-deployment screening and help-seeking advice for mental disorders in Royal Marines and Army personnel in the UK military. The trial protocol and modifications are provided in the appendix (pp 7–42). After 7 months of preparation and piloting, the initial assessment of personnel occurred between Oct 24, 2011, and Feb 15, 2013. Follow-up took place between Nov 10, 2012, and Oct 31, 2014. Only platoon members who had recently returned from deployment in Afghanistan at the time of assessment were included. Platoon members who did not deploy, those who deployed but moved to another location before randomisation, reserve personnel (ie, mobilised specifically for an operation), and platoons that were formed specifically for deployment and had dispersed upon return home were excluded.

Participants received written and oral explanations about the study on the day of baseline assessment and provided consent to view the tailored advice. Participants were free to withdraw consent at any time during the study. Written consent to follow-up was requested from all participants and given by those followed up.

Randomisation and masking

The cluster unit of randomisation was the platoon, usually comprising 15–35 service personnel. Platoons were randomly assigned (1:1 for the first deployment and 2:1 for the second and third deployments, see later) to the screening group, which was offered tailored help-seeking advice after an offline computerised self-administered assessment for mental disorders, based on the test results for PTSD, depression or anxiety, and alcohol misuse, or the control group, which completed the same self-administered questionnaire as the screening group, but received only general mental health advice. Randomisation was done on the day of baseline assessment by the Mental Health and Neurosciences Clinical Trial Unit at King's College London (London, UK) based on the list of platoons to be assessed, first selecting the military companies (about 120 personnel) eligible for the study and the platoons (subgroups of companies) stratified by headquarters (largely command and support roles) and fighting components (largely combat and combat support roles). The rationale for such stratification was that there were more commissioned officers and senior non-commissioned officers in headquarter elements. Randomisation was done using stratified block randomisation with randomly varying block sizes of two and four. The Mental Health and Neurosciences Clinical Trial Unit had no knowledge of the platoons other than the numeric identification provided by the fieldworkers preparing the visits to the bases at the time of randomisation. 45 laptops were preloaded with screening (tailored advice) and control (general advice) questionnaires. Fieldworkers knew whether the platoon in the room would be allocated to the screening or control groups, because they had to set up the appropriate offline version of the questionnaire for each group. The person analysing the data (HB), but not the statistician (MK) or principal investigators (RJR, NTF, NG, and SW), was unmasked to the allocation of platoons at the time of analysis. All participants were masked to allocation, at least until after baseline, at which time there is a chance that platoons might compare notes and establish which group they were in. All investigators except HB were masked to allocation.

See Online for appendix

Procedures

We used Zelen's design,[17] which required that each individual in the screening group should give consent to see the tailored advice related to their mental health status, but not those receiving general advice in the control group. The study was designed in this way and presented to the ethics committee as a safe ethical procedure. Zelen's design allowed for participant unwillingness to receive personal advice or management without introducing bias or attrition, which would arise by requesting consent before assessment in the screening group, especially since a cluster design was used. It also allowed us to do a sensitivity analysis on the possible effect of unwillingness to receive tailored advice. The advice, specific or general, appeared at the end of the mental health screening procedure, and a letter re-iterating the advice was posted to everyone assessed at baseline in an envelope marked "Private and Confidential" within 2 weeks of the initial assessment (appendix p 2). Participants who chose not to see their tailored advice at the time of the assessment were invited to contact the study investigators if they changed their minds and wanted to see the advice.

The baseline assessment was done between 6 weeks and 12 weeks after deployment, to avoid interfering with immediate leave after deployment and to minimise dispersion of personnel from the deploying platoons. Reassessment was done between 10 months and 24 months after the initial assessment. We used three modes of administration of identical questionnaires in the follow-up assessment: an offline questionnaire on a laptop (as used in the baseline assessment) for personnel who were still in their original platoons and in their base

on the day of the follow-up visit; an online version uploaded to a secure server for those who were not present to receive an offline questionnaire, but were accessible via email; and a hard copy questionnaire for those who did not have access to the electronic versions or were unwilling to use them. This multi-method approach was necessary to capture data from participants who had changed platoons, were unavailable on the day of the follow-up visit to the base, or had left the Armed Forces between baseline and follow-up assessments. Members of the selected platoon were invited to participate regardless of the length of deployment, including those who returned early because of injury or illness. All personnel previously randomised were included in the follow-up stage regardless of whether or not they had participated in the initial assessment and including those who had left the UK Armed Forces for any reason since screening.

The baseline offline assessment was a short two-stage questionnaire that included measures of PTSD, depression or generalised anxiety disorder (GAD), and alcohol misuse. We previously reported that the two-stage questionnaire reduced resource burden without substantial loss of sensitivity for PTSD.[18] We also included a question from the 36-item Short Form (SF-36) to assess functional impairment[19] and a modified version of the Brief Traumatic Brain Injury Screening schedule exploring possible symptoms associated with injury (loss of consciousness, being dazed or confused, not remembering the injury, and symptoms of concussion [eg, headache and dizziness]).[20] We also recorded sex, age, rank, and service arm.

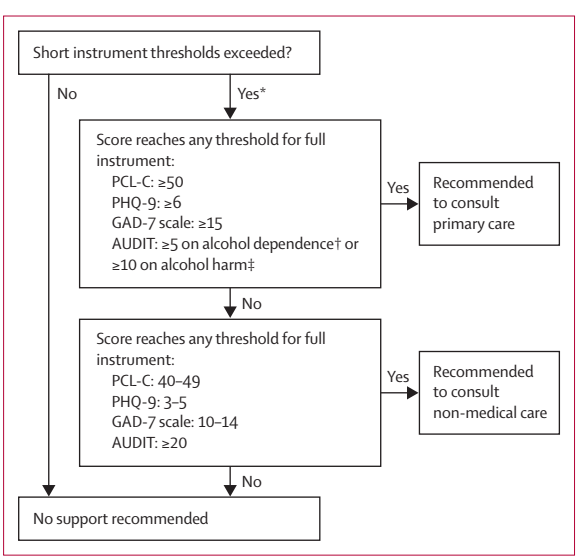

Figure 1: **Decision pathway in the screening group**
AUDIT=Alcohol Use Disorder Identification Test. GAD-7=Generalised Anxiety Disorder-7. PCL-C=Post-Traumatic Stress Disorder Checklist–Civilian Version. PHQ-9=Patient Health Questionnaire-9. *Respondents only directed to full instruments for which they fulfilled the threshold on the short instrument. †Range 0–16. ‡Range 0–12.

The four-item primary care PTSD test (score 0–4)[21] was used in the first stage and if a respondent had a score of two or more, they were directed to complete the PTSD Checklist–Civilian Version (PCL-C; score 17–85).[22] For assessment of depression, the first two items (mood and anhedonia) in the Patient Health Questionnaire-9 (PHQ-9) were used in the first stage; selection of a symptom frequency of "more than half the days" or "nearly every day" for at least one item triggered the use of the full PHQ-9 (score 0–9).[23] The first two items of the Generalised Anxiety Disorder 7-item (GAD-7) scale were used for the first stage; if the participant scored three or more out of a total score of six, the full GAD-7 scale was used (score 0–21).[24] Alcohol use was assessed using the first two items of the Alcohol Use Disorder Identification Test (AUDIT), modified to allow for higher alcohol consumption than that usually included in the scale as extra categories.[25] Any person scoring eight or more, based on a frequency category from zero to four or more times a week and an eight-category scale of increasing consumption, was directed to complete the full AUDIT questionnaire (score 0–40).

After baseline assessment, the tailored advice consisted of one of three recommendations: first, to visit a unit welfare officer (ie, padre, welfare staff, or commander responsible for personnel welfare); second, to visit a medical officer; or third, that no professional support was needed. An example of a tailored advice letter is shown in the appendix (p 2). The general advice stated that there were many ways to get help if needed, from sources such as colleagues, leaders, padres, welfare staff, or medical centres (appendix p 2). Figure 1 provides the decision pathways to seek either primary care, welfare services, or if no support was recommended. If a participant was a case for more than one outcome, the tailored advice was related to the most severe outcome. We used a threshold score of 40 to identify PTSD using the PCL-C to minimise the occurrence of false-negative results, consistent with our definition of screening for presumptive diagnosis only and with the distribution of most disorders that tend to be more common at lower levels of severity than at high levels of severity. Use of this threshold should not affect the results of this trial, because the comparisons between groups were done using the same threshold. We recommended that those with a score of 40–49 visit a welfare officer instead of a medical officer. A welfare officer would be able to advise and help service personnel decide whether they should see a doctor and a mental health specialist. Our expectation was that a consultation with a unit welfare officer might be helpful for personnel experiencing fewer symptoms since unit welfare officers are able to offer general support, and to arrange an appointment with a medical officer if necessary. They would also be able to raise any concerns within the confidential unit welfare committee, where personnel causing concern are regularly discussed.

The follow-up assessment included full versions of the PCL-C, PHQ-9, GAD-7 scale, and AUDIT. The thresholds

for being classified as a possible case were the same as those used in the baseline assessment. The item from the SF-36 assessing the effect of physical or emotional problems on work or social functioning was used as a binary outcome, which compared functional impairment occurring "all the time" or "most of the time" with lower frequency endorsements.[19] Nine possible post-concussion symptoms were assessed: headache, dizziness, feeling tired or having low energy, trouble sleeping, irritability or outbursts of anger, double or blurred vision, forgetfulness, loss of concentration, and ringing in the ears.[26] The follow-up assessment also included questions about the use of medical and welfare services in the previous 12 months, including receipt of prescriptions for antidepressants and hypnotics. The medical service providers category consisted of medical officers, general practitioners, mental health nurses, psychologists, psychiatrists, other health services professionals (eg, nurses and physiotherapists), accident and emergency departments, and military social workers who work directly with military mental health professionals. The welfare service category consisted of unit welfare officers or teams, military chaplains, trauma risk management personnel, online help sources, service charities (eg, Royal British Legion; Soldiers, Sailors, Airmen and Families Association; and Combat Stress) and civilian social workers; the latter were included as welfare providers, rather than medical support, because they do not usually work directly with mental health services in the same way as military social workers who have a dedicated mental health role. A subcategory of mental health services was formed including psychiatrists, psychologists, mental health nurses, and military social workers. Questions on pharmaceutical use asked for drug name and duration of taking antidepressants or sleeping tablets, or both, in the past 12 months. Additionally, free text fields were provided for describing any other medications taken in the past 12 months; textual responses were re-categorised into the existing medication categories.

Outcomes

The primary outcome measures were PTSD, depression or GAD, and alcohol misuse in the screening compared with the control group. Secondary outcomes were assessment of whether post-deployment screening followed by tailored advice would modify help-seeking behaviour or medication use, and functional impairment and symptoms associated with head injury at follow-up between the screening and control groups.

Statistical analysis

At the protocol development stage, a sample size of 6000 personnel recruited over two operational phases was needed to detect a decrease of 20% in the prevalence of PTSD or depression or GAD with 80% power at a 5% level applying an inflation factor because of clustering assuming an intra-class correlation of 1%. However, during the first phase of data collection, about 50% of respondents chose not to see the tailored advice. The protocol was therefore modified on April 30, 2012, to include a third operational deployment and the randomisation ratio between intervention and control groups was increased from 1:1 to 2:1 for the second and third deployments. Thus, the total sample was increased to a minimum of 9000 service personnel estimated from platoon size. The modifications ensured that the sample size requirements were more than satisfied even at the lowest threshold of acceptability for the number agreeing to see the tailored advice. The main analysis (as opposed to the sensitivity analysis) was done by intention to screen, irrespective of whether or not the participant chose to see the tailored advice after the assessment.

Statistical analyses were done using STATA version 11.2. The primary and secondary outcomes were assessed as binary variables rather than continuous variables. The analyses of effectiveness of screening and help-seeking behaviour were done taking into account clustering by platoons and controlling for service type (Royal Marines or Army) as a fixed covariate. The adjustment was needed to account for the change from 1:1 distribution of participants between the intervention and control groups in the first deployment to a distribution of 2:1 in subsequent deployments, because most of the personnel on the first tour were Royal Marines. Potential risk of bias in the estimated screening effect as a result of missing data (eg, data missing because of incomplete questionnaires, missing outcome data at baseline, and missing data because of non-response at follow-up) was handled under missing at random assumption by making additional adjustments for rank, age, and date of deployment, which were associated with probability of missingness (ie, the mechanism or manner by which data are missing from a sample of a population) or non-response; these adjustments also removed the apparent difference in response time between groups, which was primarily a consequence of the change in sampling strategy between first and subsequent deployments. We did intention-to-treat analyses of available data irrespective of whether or not the participant chose to see the tailored advice after the assessment, using random-effects logistic regression models implemented via the STATA command "xtmelogit", with platoon as the clustering variable in unadjusted analyses with further adjustment done as described earlier. We did analyses adjusting for covariates only and then did additional adjustment for any mental health disorder at baseline. We did linear mixed-model analyses without any imputation of missing data, which is appropriate under the missing at random assumption of missing outcome data, provided covariates associated with missing data are accounted for and the analysis is done via mixed models using the maximum likelihood method.[27] We compared personnel in the two groups who reported at least three post-concussion symptoms at follow-up. We also compared any medical

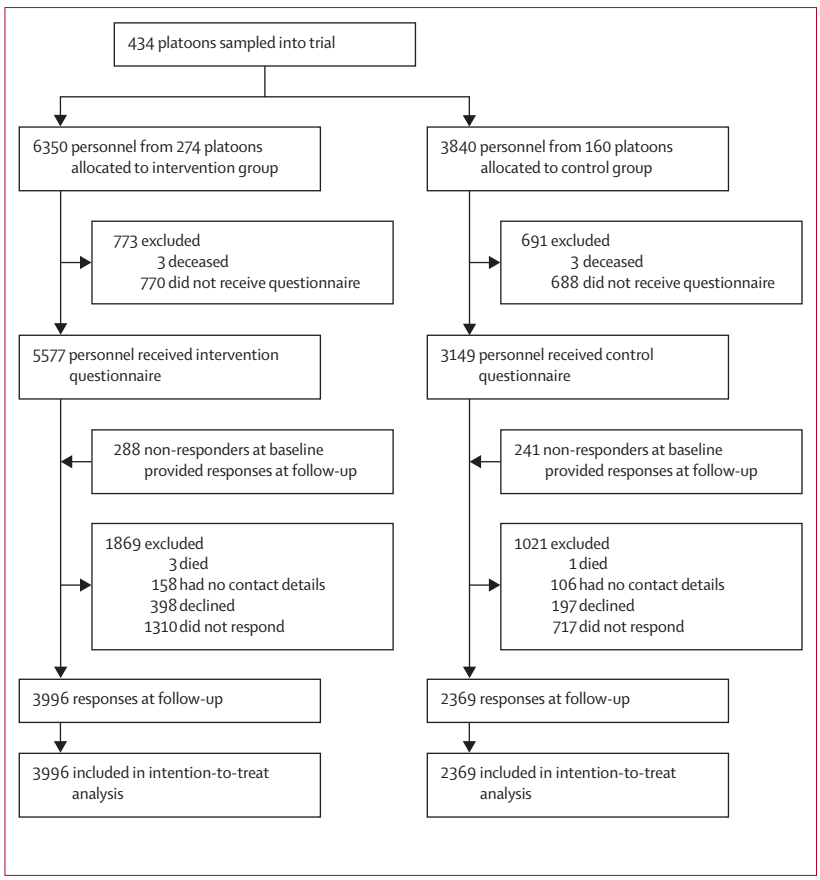

Figure 2: **Trial profile**

or welfare attendance and any use of the defined pharmaceutical categories with no medical or welfare attendance and no use of the defined pharmaceutical categories. When analysing the effect of viewing or not viewing the tailored advice, analyses were done separately for those who would have been advised to seek help (whether medical or welfare) in view of their baseline scores on the various measures; we expected those who were advised that no help was necessary to differ from those advised to seek help. These analyses were done for those advised to seek help for mental health reasons other than alcohol misuse alone, and were then repeated including alcohol, because those with alcohol misuse are less likely to seek help than those with other mental health disorders.[12] The effect of the screening programme on total number of mental health-related visits was analysed using mixed-effects Poisson regression, with random effects at both cluster and observation level to compensate for overdispersion because of excess zeros in the outcome because most personnel have no visits.[28] We also did sensitivity analyses creating five imputation sets using multiple imputation by chain equations, first for imputation of missing covariates only, second for imputation of both covariates and baseline and follow-up outcomes for those responding at follow-up, and third for imputation of the members in the study, irrespective of response at any stage. The reported analyses were decided a priori before seeing any results.

This trial is registered with the ISRCTN Registry, number ISRCTN19965528.

Role of the funding source

The funder required that we submitted quarterly and annual reports informing them about the progress of the project for its duration. They also required that we submitted an annual letter signed by the ethics committees that assured the funder that the study continued to fulfil ethical requirements. The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report, and did not comment on the paper. The funder sent our protocol to reviewers when considering our project for funding and we modified the protocol according to recommendations from the reviewers, which were on points of detail. RJR, HB, DP, and NTF had full access to all the data in the study and RJR, HB, NTF, NG, and SW had final responsibility for the decision to submit for publication.

Results

434 platoons comprising 10 190 personnel were entered into the study: 274 (63%) in the screening group and 160 (37%) in the control group (figure 2). 5577 (88%) of 6350 personnel responded in the screening group compared with 3149 (82%) of 3840 in the control group. 24 questionnaires (18 in the screening group and six in the control group) were incomplete for PCL-C, 35 (25 and ten) for PHQ-9, 34 (26 and eight) for GAD-7 scale, and 33 (24 and nine) for AUDIT.

Baseline participation was higher for tours 2 and 3 than for tour 1, but participation was lower for those platoons in headquarters compared with those not in headquarters, the Royal Marines compared with the Army, and for commissioned officers compared with other ranks (table 1). 926 (97%) of 958 Royal Marines were part of tour 1. 3996 (63%) of the total initial sample of 6350 personnel responded at follow-up in the screening group, including 3708 (66%) of the 5577 who completed the initial assessment; in the control group, these numbers were 2369 (62%) of 3840 and 2128 (68%) of 3149, respectively (figure 2). A higher proportion of commissioned officers than non-commissioned officers and non-commissioned officers than other ranks responded at follow-up (table 1).

Baseline mental health outcomes were not associated with likelihood of response at follow-up (table 1). Age of participants was positively associated with completion of the follow-up questionnaire (table 1). Overall, those in the screening group responded quicker (mean 15·0 months [SD 3·3]) than those in the control group (15·4 months [3·6]); however, we changed the ratio of intervention to control after the first tour, but there were no differences in data collection within deployments. 194 (3%) of

	Control group (n=3840)		Screening group (n=6350)		Odds ratio (95% CI) of response at follow-up*	p value
	Responders at baseline	Responders at follow-up	Responders at baseline	Responders at follow-up		
All	3149/3840 (82%)	2369/3840 (62%)	5577/6350 (88%)	3996/6350 (63%)	0·95 (0·87–1·03)	0·21
Sex						
Male	3073/3491 (88%)	2263/3491 (65%)	5401/5891 (92%)	3816/5891 (65%)	1·00 (0·92–1·09)	0·96
Female	75/87 (86%)	58/87 (67%)	176/184 (96%)	124/184 (67%)	0·97 (0·56–1·66)	0·91
Deployment						
Tour 1	1227/1777 (69%)	1029/1777 (58%)	1412/1959 (72%)	1150/1959 (59%)	0·97 (0·85–1·10)	0·62
Tour 2	978/1082 (90%)	719/1082 (66%)	2076/2213 (94%)	1464/2213 (66%)	1·01 (0·87–1·18)	0·87
Tour 3	944/981 (96%)	621/981 (63%)	2089/2178 (96%)	1382/2178 (63%)	0·99 (0·85–1·16)	0·94
Platoon type						
Headquarters	417/626 (67%)	374/626 (60%)	781/980 (80%)	662/980 (68%)	0·71 (0·58–0·88)	0·001
Non-headquarters	2732/3214 (85%)	1995/3214 (62%)	4796/5370 (89%)	3334/5370 (62%)	1·00 (0·91–1·09)	0·99
Service						
Army	2615/3161 (83%)	1945/3161 (62%)	4920/5516 (89%)	3462/5516 (63%)	0·95 (0·87–1·04)	0·26
Royal Marines	534/679 (79%)	424/679 (62%)	657/834 (79%)	534/834 (64%)	0·93 (0·76–1·15)	0·53
Rank						
Other ranks	1579/1826 (86%)	1094/1826 (60%)	2742/3019 (91%)	1826/3019 (60%)	0·98 (0·87–1·10)	0·69
Non-commissioned officers	1409/1740 (81%)	1098/1740 (63%)	2541/2896 (88%)	1866/2896 (64%)	0·94 (0·83–1·07)	0·36
Commissioned officers	161/253 (64%)	176/253 (70%)	298/415 (72%)	303/415 (73%)	0·84 (0·60–1·19)	0·34
Age (years)						
18–24	..	876/1349 (65%)	..	1525/2442 (62%)	1·11 (0·97–1·28)	0·13
25–29	..	624/941 (66%)	..	1059/1594 (66%)	0·99 (0·84–1·18)	0·95
30–34	..	353/495 (71%)	..	603/869 (69%)	1·10 (0·86–1·40)	0·46
35–39	..	197/254 (78%)	..	356/452 (79%)	0·93 (0·64–1·35)	0·71
≥40	..	73/100 (73%)	..	153/195 (78%)	0·74 (0·42–1·30)	0·30
Baseline PCL-C						
Not a case	..	2016/2985 (68%)	..	3529/5317 (66%)	1·05 (0·96–1·16)	0·28
Case	..	110/162 (68%)	..	174/254 (69%)	0·97 (0·64–1·48)	0·90
Baseline PHQ-9 and GAD-7						
Not a case	..	2081/3084 (67%)	..	3614/5450 (66%)	1·05 (0·96–1·16)	0·27
Case	..	45/63 (71%)	..	89/121 (74%)	0·90 (0·46–1·77)	0·76
Any mental disorder, excluding alcohol misuse, at baseline						
Not a case	..	2000/2961 (68%)	..	3496/5273 (66%)	1·06 (0·96–1·16)	0·25
Case	..	126/186 (68%)	..	207/298 (69%)	0·92 (0·62–1·37)	0·69
Baseline AUDIT						
Not a case	..	1952/2871 (68%)	..	3381/5075 (67%)	1·06 (0·97–1·17)	0·21
Case	..	174/276 (63%)	..	322/496 (65%)	0·92 (0·68–1·25)	0·60
Baseline mild traumatic brain injury†						
Not a case	..	2088/3086 (68%)	..	3632/5472 (66%)	1·06 (0·96–1·16)	0·23
Case without LOC	..	28/42 (67%)	..	50/69 (72%)	0·76 (0·33–1·74)	0·52
Case with LOC	..	10/19 (53%)	..	21/30 (70%)	0·48 (0·14–1·57)	0·22

Data are number responding/number of personnel (%), unless otherwise specified. PCL-C=Post-Traumatic Stress Disorder Checklist–Civilian Version. PHQ-9=Patient Health Questionnaire-9. GAD-7=Generalised Anxiety Disorder-7. AUDIT=Alcohol Use Disorder Identification Test. LOC=loss of consciousness. *For control group (reference is screening group). †Cases included those symptoms associated with injury but not LOC and those with LOC separately.

Table 1: **Characteristics of participants at baseline and follow-up, including response rates**

6365 participants completed the follow-up assessment more than 2 years after the initial assessment. Time variation in the completion of the assessment between the two groups was significant because of a change in randomisation ratio, but was adjusted for in the analysis.

Most participants had scores below any meaningful threshold of possible mental disorder, classifying them as non-cases, and as such most received advice suggesting that no welfare or medical help was needed (table 2). 1450 (61%) of 2369 personnel in the control group and

	Number choosing to view advice (%)	Odds ratio (95% CI)	p value
All consenting to view advice	3619/5551 (65%)	..	..
Sex			
Male	3491/5375 (65%)	Reference	..
Female	112/176 (64%)	0·94 (0·69–1·29)	0·72
Rank			
Other rank	1661/2734 (61%)	Reference	..
Non-commissioned officer	1698/2523 (67%)	1·33 (1·19–1·49)	<0·0001
Commissioned officer	244/294 (83%)	3·15 (2·30–4·31)	<0·0001
Age (years)			
18–24	1527/2453 (62%)	Reference	..
25–29	1045/1591 (66%)	1·16 (1·02–1·33)	0·024
30–34	594/868 (68%)	1·31 (1·11–1·55)	0·001
35–39	304/448 (68%)	1·29 (1·04–1·60)	0·019
≥40	136/194 (70%)	1·43 (1·04–1·96)	0·029
Baseline PCL-C (≥40)			
Not a case	3393/5298 (64%)	Reference	..
Case	210/253 (83%)	2·74 (1·97–3·82)	<0·0001
Baseline PHQ-9 and GAD-7 scale			
Not a case	3502/5431 (64%)	Reference	..
Case	101/120 (84%)	2·93 (1·79–4·80)	<0·0001
Any mental disorder, excluding alcohol misuse, at baseline			
Not a case	3357/5254 (64%)	Reference	..
Case	246/297 (83%)	2·73 (2·01–3·70)	<0·0001
Baseline AUDIT			
Not a case	3233/5057 (64%)	Reference	..
Case, no comorbidity	287/388 (74%)	1·60 (1·27–2·03)	<0·0001
Case, comorbidity PCL-C, PHQ-9, or GAD-7	83/106 (78%)	2·04 (1·28–3·24)	0·003
Baseline mild traumatic brain injury*			
Not a case	3534/5452 (65%)	Reference	..
Case without LOC	47/69 (68%)	1·16 (0·70–1·93)	0·57
Case with LOC	22/30 (73%)	1·49 (0·66–3·36)	0·33

AUDIT=Alcohol Use Disorder Identification Test. GAD-7=Generalised Anxiety Disorder-7. LOC=loss of consciousness. PCL-C=Post-traumatic Stress Disorder Checklist–Civilian Version. PHQ-9=Patient Health Questionnaire-9. *Cases with LOC and those with symptoms associated with injury but not LOC separately.

Table 2: **Characteristics of personnel accepting to see the specific advice in the screening group**

2327 (58%) of 3996 in the screening group used medical services; of 3777 personnel seeking medical services 3353 (89%) reported some contact with a medical officer or general practitioner (table 3). 356 (15%) of personnel the control group and 557 (14%) in the screening group used welfare services, and 318 (13%) and 496 (12%) used mental health services.

3619 (65%) of 5551 personnel in the screening group chose to see the advice provided after assessment (table 2); the remaining 1958 (35%) declined. Higher ranks (compared with other ranks; both p<0·0001) and older personnel (compared with 18–24 years group; all p<0·05) were more likely to choose to see the tailored advice. Compared with non-cases, higher proportions of personnel reporting symptoms related to PTSD (64% *vs* 83%; p<0·0001), depression or GAD (64% *vs* 84%; p<0·0001), and alcohol misuse (64% *vs* 74% [no comorbidity]; p<0·0001) wanted to see the specific advice. The difference for mTBI cases compared with non-cases was not significant (table 2).

The odds ratios (ORs) for any of the mental health outcomes were not significant between the screening and the control groups (table 4). Exclusion of those without baseline information and adjustment for outcome at baseline did not change the results (data not shown). The assessment of symptoms after concussion between the two groups in those with a possible mTBI at baseline was not significant, but the statistical power for inference of this analysis was low.

We noted no significant difference between groups in the adjusted analysis of personnel accessing health providers (table 5). No significant difference in mental health service use was found despite direction to sources of psychological help being the primary intent of the intervention, and there were no differences in pharmaceutical use between groups.

Choosing to see the tailored advice was not associated with absence of effectiveness of screening for any of the outcomes (appendix p 4). Findings from the two adjusted analyses, one excluding and the other including baseline outcomes, were similar.

Among those who would not have been directed to seek help on the basis of mental health outcomes at baseline, the OR of help-seeking in the screening group compared with the control group was similar irrespective of whether or not the individual chose to view the tailored advice (appendix p 5). Among those who would have been advised to seek help, the only significant difference was that of personnel with a suspected mental disorder, including alcohol misuse, who would have received advice to seek help; those who did not view the advice were less likely than the control group to have a mental health visit (appendix p 5). In terms of pharmaceuticals, there were no significant differences between groups for antidepressants or sleeping tablets, irrespective of the form of advice that would have been received (appendix p 5).

Mental health status at follow-up was unrelated to screening and the largest group at follow-up, excluding non-cases, consisted of cases that had developed after initial assessment (appendix p 3). In a post-hoc analysis, we stratified the two groups into four subgroups: not a case, remitted, persistent, and new case. The rationale for this analysis was to verify whether the ineffectiveness of screening might have been due to the heterogeneity of evolution of the disorders in the analyses. None of the results were statistically significant in the stratified analyses (appendix p 3).

Of those qualifying as probable mental health cases (PTSD, or depression or anxiety) at baseline, 45 (36%) of 126 in the control group and 69 (33%) of 207 in the screening group had sought help from a mental health provider in the past 12 months (OR 0·95, 95% CI 0·59–1·54; p=0·85). Of those qualifying as cases at follow-

	Control group					Screening group				
	Number	Number using any health service (%)	Number using medical services (%)	Number using welfare services (%)	Number using mental health services (%)	Number	Number using any health service (%)	Number using medical services (%)	Number using welfare services (%)	Number using mental health services (%)
All	2369	1500 (63%)	1450 (61%)	356 (15%)	318 (13%)	3996	2410 (60%)	2327 (58%)	557 (14%)	496 (12%)
Sex										
Male	2263	1420 (63%)	1374 (61%)	336 (15%)	295 (13%)	3816	2276 (60%)	2196 (58%)	527 (14%)	472 (12%)
Female	58	43 (74%)	42 (72%)	11 (19%)	14 (24%)	124	95 (77%)	93 (75%)	22 (18%)	20 (16%)
Rank										
Other rank	1094	672 (61%)	651 (60%)	186 (17%)	175 (16%)	1826	1073 (59%)	1036 (57%)	267 (15%)	273 (15%)
Non-commissioned officer	1098	688 (63%)	663 (60%)	148 (13%)	123 (11%)	1866	1136 (61%)	1097 (59%)	254 (14%)	207 (11%)
Commissioned officer	176	139 (79%)	135 (77%)	22 (13%)	19 (11%)	303	200 (66%)	193 (64%)	36 (12%)	16 (5%)
Service										
Army	1945	1233 (63%)	1192 (61%)	304 (16%)	286 (15%)	3462	2102 (61%)	2033 (59%)	491 (14%)	440 (13%)
Royal Marine	424	267 (63%)	258 (61%)	52 (12%)	32 (8%)	534	308 (58%)	294 (55%)	66 (12%)	56 (10%)
Age (years)										
18–24	876	513 (59%)	496 (57%)	126 (14%)	133 (15%)	1525	859 (56%)	827 (54%)	202 (13%)	226 (15%)
25–29	624	400 (64%)	387 (62%)	96 (15%)	78 (13%)	1059	649 (61%)	633 (60%)	146 (14%)	123 (12%)
30–34	353	234 (66%)	225 (64%)	57 (16%)	42 (12%)	603	397 (66%)	384 (64%)	99 (16%)	74 (12%)
35–39	197	130 (66%)	126 (64%)	30 (15%)	23 (12%)	356	209 (59%)	200 (56%)	42 (12%)	30 (8%)
40+	73	51 (70%)	49 (67%)	9 (12%)	7 (10%)	153	109 (71%)	105 (69%)	22 (14%)	14 (9%)

Table 3: **Help-seeking and demographic factors**

up, 105 (35%) of 296 in the control group and 141 (29%) of 492 in the screening group had sought mental health care in the past 12 months (OR 0·82, 95% CI 0·59–1·14; p=0·24). Of those seeking help from mental health services in the previous 12 months, 69 (15%) of 469 in the screening group and 45 (16%) of 283 in the control group were cases with a mental health disorder at baseline (OR 0·97, 95% CI 0·64–1·48; p=0·90), and 141 (28%) of 496 in the screening group and 105 (33%) of 318 in the control group were cases at follow-up (0·87, 0·60–1·25; p=0·45). 90 (18%) of 496 personnel with alcohol misuse at baseline and 163 (20%) of 814 at follow-up sought help from mental health services.

We did a post-hoc analysis based on continuous scales of the outcome variables to assess effectiveness of screening, but none of the assessments were significant (appendix p 3).

As shown in tables 2, 4, and 5, there was no evidence that anxiety was associated with the tailored advice. We did not assess whether the questionnaires used in the study over-diagnosed mental disorders. The sensitivity analysis showed similar results to those given in this paper (data not shown).

Discussion

In this cluster randomised controlled trial, screening for mental disorders in UK military personnel and the provision of tailored help-seeking advice between 6 and 12 weeks after return from deployment was ineffective at decreasing the prevalence of PTSD, depression or GAD, and alcohol misuse over a period of 10–24 months. We also found that tailored help-seeking advice linked to the results of mental disorder screening procedures, including potential alcohol misuse, did not influence subsequent help-seeking behaviour. About a third of participants in the screening group did not want to see the tailored advice offered on-screen after completion of the baseline assessment; this group was less likely to access health care. A similar proportion of those who chose to view the help-seeking advice and those in the control group had a mental health visit. Personnel who reported symptoms of mental disorders were more interested in seeing their advice than those who did not.

This is, to our knowledge, the first randomised controlled trial to assess the effectiveness of post-deployment mental disorder screening in the Armed Forces. We found no evidence to support the idea that informing someone that they were experiencing mental health disorder symptoms encouraged them to seek help from mental health-care providers. Only about a third of personnel with symptoms of a mental disorder at baseline had sought help from a mental health provider in the 12-month follow-up period.

In the following discussion we refer mostly to the published work relating to the US screening programme because it is the largest, best developed, and most researched programme. We have previously shown that pre-deployment screening in UK service personnel did not lead to an increase in seeking health care and that the prediction of subsequent psychiatric morbidity including PTSD was modest.[29,30] Findings from a US study indirectly suggested that screening did not promote

	Prevalence	Unadjusted odds ratio (95% CI)*	Adjusted odds ratio (95% CI)†	Adjusted odds ratio, including baseline (95% CI)‡
Primary outcomes				
Post-Traumatic Stress Disorder Checklist–Civilian Version				
Control	271/2363 (11%)	Reference	Reference	Reference
Screening	432/3978 (11%)	0·95 (0·77–1·17)	0·91 (0·74–1·10)	0·92 (0·75–1·14)
Patient Health Questionnaire-9§ and Generalised Anxiety Disorder-7 scale				
Control	150/2359 (6%)	Reference	Reference	Reference
Screening	246/3971 (6%)	0·98 (0·77–1·25)	0·88 (0·69–1·11)	0·91 (0·71–1·16)
Any mental disorder				
Control	296/2363 (13%)	Reference	Reference	Reference
Screening	492/3978 (12%)	1·00 (0·82–1·21)	0·93 (0·77–1·12)	0·95 (0·79–1·16)
Alcohol Use Disorder Identification Test				
Control	288/2360 (12%)	Reference	Reference	Reference
Screening	462/3972 (12%)	0·94 (0·78–1·14)	0·91 (0·76–1·08)	0·88 (0·73–1·06)
Secondary outcomes				
36-item Short Form (case="most of the time" or "all of the time")				
Control	182/2326 (8%)	Reference	Reference	Reference
Screening	295/3899 (8%)	0·96 (0·78–1·19)	0·89 (0·72–1·10)	0·89 (0·72–1·09)
Three or more post-concussion symptoms in those with mild traumatic brain injury				
Controls	29/38 (76%)	Reference	Reference	..
Screening	45/70 (64%)	0·56 (0·23–1·37)	0·53 (0·21–1·36)	..

*Using Stata "xtmelogit" command, with platoon as the nesting variable. †Using Stata "xtmelogit" command, including service arm date of deployment, rank, and age category as fixed effect variables, with platoon as the nesting variable. ‡Using Stata "xtmelogit" command, including baseline outcome (any mental health case for Post-Traumatic Stress Disorder Checklist–Civilian Version and Patient Health Questionnaire-9 and Generalised Anxiety Disorder-7 scale), service arm, deployment, rank, and age category as fixed effect variables, with platoon as the nesting variable. 529 participants at follow-up who were not assessed at baseline were excluded from this analysis. §Not included in the baseline questionnaire.

Table 4: **Mental health, alcohol misuse, and functional impairment prevalence and odds ratios at follow-up between screening and control groups**

help-seeking behaviour among personnel with mental disorders.[31] Conversely, findings from another US study showed that pre-deployment review of those who are already being treated for a mental disorder might have an effect on the prevalence of PTSD in deployed US military personnel by either debarring them from deployment or by providing ongoing monitoring for those already receiving health care.[32] In the UK, Armed Forces pre-deployment review is practised in those receiving treatment for mental disorders. Both UK and US pre-deployment screening methods are different from post-deployment screening, which seeks to identify personnel with a possible mental disorder who have not sought mental health care.

An unexpected finding in this study was that a third of participants in the screening group decided not to receive tailored advice about help-seeking on the basis of screening outcomes. This finding was more common in younger groups and among lower ranks, both of which are risk factors for mental disorders.[6] However, only about 15% of those with a score indicative of a mental disorder declined to see the tailored advice, with the exception of alcohol misuse (~25%). The absence of interest in viewing the tailored advice shown by some UK service personnel occurred despite homecoming briefings being provided as a matter of policy, usually during third location decompression, according to deployment policy; the briefing detailed symptom recognition in oneself and others, and how to access potential sources of mental health support if needed. The unwillingness to view the tailored advice might be because of low interest, mistrust in health services, fear of receiving bad news, or a belief that mental health issues are not personally relevant.[33,34]

One of the criteria for introducing screening for a disorder is that the course of the disorder should be adequately understood. Screening might not work for PTSD because of the diversity of trajectories of the disorder over time,[35,36] even over a short period.[37] 38% of personnel with a mental health disorder at baseline had remitted at follow-up (appendix p 3) and most who were cases at follow-up did not have symptoms at baseline, consistent with our previous results for PTSD.[38] Thus, persistent PTSD symptoms occurred in a small proportion of this and other populations, and those with a tendency to chronicity are not distinguished from the rest in a screening programme.

In our study, prevalence of mental disorders after intervention in the tailored advice group were marginally less frequent for all outcomes, but not significantly so compared with the control group. Screening could potentially be effective in settings with a higher prevalence of PTSD, such as the US military,[8,13,31] but caution is necessary when extrapolating from non-significant differences, especially in a trial as large as ours. The current US screening programme also differs from what was tested in this trial in many ways. For example, since 2012, the US screening programme has included several opportunities for assessment of personnel during the post-deployment period,[9] introduced after the start of our cluster randomised controlled trial in 2011. The US screening programme for most of the duration of the Iraq and Afghanistan conflict assessed personnel between 90 and 180 days after deployment, which would overlap with the upper limit of 90 days after deployment used in our study. The US programme also requires a face-to-face interview with a trained professional who reviews the screening results. This approach might increase the number of cases with a suspected mental disorder starting treatment, but could also include a high percentage of service personnel with short-duration PTSD who might not need treatment, and despite receiving face-to-face advice some individuals might be reluctant to follow the advice. Additionally, knowing that they would have a face-to-face interview if a test suggested a possible mental disorder, some personnel might be more inclined to modify responses to questions in the direction of better health. This viewpoint is supported by a US report that an absence of anonymity in a questionnaire, which by

necessity is the case in a practical programme, significantly decreases the reported prevalence of PTSD and depression.[39] Our study tested both a version of the US programme in place before 2012, but without the mandatory face-to-face interview, and the most likely way a UK screening programme would have been introduced, not least because there were not and still are not sufficient UK personnel or resources to employ so many health professionals at an early stage. Even if such resources were to be made available in future, we are sceptical of an approach that adds an element of compulsion to a screening programme because such an approach might not be well received for many reasons, including privacy, fears related to impeded career progression, reduced military professional standing, and a desire to deal with the problem without external help.

We understand that practitioners, researchers, and policy makers might argue that a more resource-intensive screening programme including repeated assessments over time and face-to-face interviews after each assessment would give different results from those presented in this cluster randomised controlled trial. This could only be confirmed by a new randomised controlled trial, but in the absence of such we point out that findings from US studies have shown that screening identifies fewer personnel who subsequently seek help for mental disorders than other methods such as primary care referral, chain of command directed referrals, and self-referrals,[13,16] and confirm that a large percentage of those identified by screening do not seek help.[12,13] In a 2014 US study, 75% of personnel referred to mental health providers for mental health reasons contacted health providers, but 40% subsequently attended only one or two therapy sessions.[16] In another study,[40] 60% of personnel either did not begin treatment or subsequently received an inadequate course of treatment.[40]

Only a few studies have assessed efficacy of psychotherapy and treatment among military personnel, most of them in ex-military personnel, and the effect sizes between studies vary from negligible to strong effects.[41,42] Many of the studies done to assess the efficacy of psychotherapy in the management of PTSD in clinical settings have limitations because they are observational studies rather than randomised controlled trials, comparison groups with a group receiving psychotherapy consist of patients in a waiting list or being treated as usual, or are randomised controlled trials designed to compare two types of psychotherapy that do not include a true control group or are not analysed by intention to treat.[43,44] No randomised controlled trial has been done to assess the efficacy of management of the outcomes in this study in the UK military. Even if management was highly efficacious, several issues need resolving, such as barriers to seeking care, patients' willingness to adhere to the recommended sessions of psychotherapy, and services that are properly staffed and organised to cope with screening programmes for mental disorders. However, in our study, tailored advice did not affect health-seeking behaviour.

	Number affected (%)	Odds ratio (95% CI)	p value	Adjusted odds ratio* (95% CI)	p value
Any health visit					
Control	1500/2369 (63%)	Reference	..	Reference	..
Screening	2410/3996 (60%)	0·87 (0·78–0·99)	0·028	0·89 (0·79–1·01)	0·060
Medical service use					
Control	1450/2369 (61%)	Reference	..	Reference	..
Screening	2327/3996 (58%)	0·88 (0·78–0·99)	0·030	0·89 (0·79–1·01)	0·068
Welfare service use					
Control	356/2369 (15%)	Reference	..	Reference	..
Screening	557/3996 (14%)	0·92 (0·77–1·09)	0·32	0·90 (0·75–1·07)	0·22
Mental health service use					
Control	318/2369 (13%)	Reference	..	Reference	..
Screening	496/3996 (12%)	0·91 (0·78–1·07)	0·26	0·92 (0·78–1·08)	0·30
Antidepressant use					
Control	67/2336 (3%)	Reference	..	Reference	..
Screening	129/3931 (3%)	1·15 (0·81–1·61)	0·44	1·08 (0·76–1·54)	0·68
Sleeping pill use					
Control	201/2337 (9%)	Reference	..	Reference	..
Screening	312/3294 (9%)	0·92 (0·75–1·13)	0·41	0·91 (0·74–1·11)	0·35

*Adjusted for service, deployment, rank, and age category.

Table 5: **Effect of screening on help-seeking and pharmaceutical use**

We used a high threshold for defining alcohol misuse. The rationale was that the prevalence of alcohol misuse in the UK Armed Forces is high,[6] and those misusing alcohol are less likely to acknowledge functional impairment and a health problem unless they also have a mood disorder or PTSD.[11] Even with this increased threshold, alcohol misuse was a major contributor to mental disorders in our study.

We assessed mTBI at baseline, but we did not offer tailored advice related to this event. In most studies, PTSD is strongly associated with mTBI.[37,45] The contention was that if screening for PTSD and other mental disorders was effective, it should also decrease the number of post-concussion symptoms in those with mTBI. However, the screening programme was not effective in reducing the prevalence of any of the mental health outcomes, so the likelihood of an effect of the programme on post-concussion symptoms is low.

We found no evidence that anxiety was associated with the tailored advice in our study. We did not assess whether the questionnaires used in the study over-diagnosed mental disorders or led to unnecessary investigations, but all measures have been comprehensively validated. We acknowledge that by choosing a high threshold for identifying alcohol misuse we could have given a false sense of security to service personnel with a hazardous drinking pattern or a high-intake drinking problem,[25] but we were concerned not to give the impression that detecting alcohol misuse was the main purpose of this study.

We recognise that addressing the cost-effectiveness of the screening programme is usually advisable in a randomised controlled trial. We collected information on the volume of service and cost of each of the welfare and health services in relation to the use of services reported by the trial participants, and plan to report on this issue separately.

The key strengths of this trial are the high response at baseline, a good response at follow-up, the high reliability of the intervention throughout the study, and the absence of differential attrition for the two groups in the trial: 1869 (34%) of 5577 in the screening group and 1021 (32%) of 3149 in the control group. Contamination between groups is a potential problem in randomised controlled trials, but was less likely to occur in this cluster randomised controlled trial because the unit of randomisation was a platoon not an individual; also, the screening group received individually tailored advice, which was unlikely to be helpful to participants in the control group. Absence of masking is a problem in any randomised controlled trial, but the purpose of this intervention was to modify behaviour in the screening group, and absence of masking between those who received tailored advice and those who received general advice is unlikely to have affected their responses at the reassessment stage of the study.

Anonymity is unachievable in any screening programme, because its aim is to identify individuals with a possible disorder. Some researchers might criticise a study design in which individuals can opt not to see the tailored advice. However, in any randomised controlled trial, consent must be given by participants to receive an intervention even if the intervention is seemingly not harmful. Zelen's design avoids selection bias by randomisation before consent. Our approach both minimised participation losses and allowed us to account for unwillingness to receive tailored advice. Questions regarding help-seeking did not specify the problem for which help was sought, which was necessary to capture maximum information regarding mental health problems and sources of help, and for practical reasons, because those in the control group were given general information not mentioning possible diagnosis of any mental disorder. This method does not affect the interpretation of the results, because this was a pragmatic trial in which the main purpose was to assess whether screening would work in a military context. We relied on self-report at follow-up to obtain data on use of services and pharmaceuticals. We did not ask about what diagnosis might have been made by the providers, since it would have been inconsistent, preferring instead to base diagnosis on self-reported assessments. Recall bias might have occurred, including misclassification of help sources, unwillingness to report, or misremembering of events, but there was no reason to suspect biased reporting between trial groups. The small number of medication users limits the statistical power to properly assess any differences between groups. We had minor errors with the randomisation procedure whereby a small number of participants (fewer than 50) were assessed with a different platoon and received the wrong questionnaire schedule (data not shown). These participants were included in the intention-to-treat analysis. We made a mistake in the algorithm to identify cases of depression in the offline tool at baseline. We identified those with a score of six positive responses instead of five; as a consequence, 16 cases were directed to informal care when their PHQ-9 responses should have caused them to be directed to primary care.

The findings from this study do not support the introduction of this type of post-deployment screening for mental disorders in the UK Armed Forces. Tailored advice offered in a post-deployment screening trial for mental disorders had no significant effect upon help-seeking behaviour. Possible explanations for the ineffectiveness of post-deployment screening include the heterogeneity of evolution of mental disorders over time,[35,37] possible absence of interest in engaging with services in some cases,[16] and potential unwillingness to continue treatment among those who engage with services.[13,16] Previous research suggests that between a third and half of treated personnel do not show meaningful symptom improvement and that those who improve remain above thresholds usually used to define caseness after trauma therapy.[42] One possible alternative to screening might be to undertake case-finding by primary care staff, in a similar way to the US programme Re-Engineering Systems of Primary Care Treatment in the Military (RESPECT-Mil).[46] RESPECT-Mil is a treatment model designed to screen, assess, and treat soldiers on active duty who have depression or PTSD, or both, in primary care. This approach uses a programme proven effective in civilians. However, a 2015 report[46] provided unenthusiastic support for the RESPECT-Mil programme in terms of detection of new cases, willingness of service personnel to see health-care providers, and length of treatment for those who engaged with the care team.

Contributors

RJR, NG, SW, and NTF conceived and designed the study and drafted the protocol. RJR, MC, KG, and DP acquired data. RJR and HB wrote the manuscript. RJR, NG, SW, and NTF obtained funding. RJR, DP, MC, and KG provided administrative, technical, or material support. MK provided statistical supervision. NJ contributed to writing and revision of the paper, and provided information on the UK defence mental health services. HB analysed the data, and all authors interpreted the data and revised the manuscript for important intellectual content.

Declaration of interests

RJR, HB, MC, KG, DP, and NG have received grants from The US Congressionally Directed Medical Research Programs; their salaries were totally or partially paid from this grant. NG has received personal fees from March on Stress, was a full member of the Armed Forces seconded to King's College London at the time this project started, and is the Royal College of Psychiatrists' Lead for Military and Veterans' Health, a trustee of Walking with the Wounded, and an independent director at the Forces in Mind Trust. KG is a former member of the Royal Marines and now works as a Civil Servant in the Ministry of Defence (MoD). NJ was a full-time member of the Armed Forces seconded to King's College London during this project. SW is trustee (unpaid) of Combat Stress and Honorary Civilian Consultant Advisor in Psychiatry for the British Army (unpaid). NTF reports grants from the US Department of Defense

(US Congressionally Directed Medical Research Programs) and the UK MoD; and is a trustee for Warrior. MK declares no competing interests.

Acknowledgments

This study was funded by the US Congressionally Directed Medical Research Programs Award Number W81XWH-10-1-0881. The MoD provides support to the Academic Department of Military Mental Health, and the salaries of NJ, NG, and NTF are covered totally or partly by this contribution. The salary of MK was paid by King's College London, Department of Biostatistics. SW acknowledges financial support from the Department of Health via the National Institute for Health Research Comprehensive Biomedical Research Centre Award to Guy's and St Thomas' National Health Service Foundation Trust in partnership with King's College London and King's College Hospital National Health Service Foundation Trust.

References

1 Ministry of Defence. Defence Statistics (Tri Service). 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/360627/PUBLIC_1411731267.pdf (accessed April 10, 2015).

2 Rona RJ, Jones M, Keeling M, Hull L, Wessely S, Fear NT. Mental health consequences of overstretch in the UK Armed Forces, 2007–09: a population-based cohort study. *Lancet Psychiatry* 2014; **1:** 531–38.

3 Ministry of Defence. Op Herrick casualty and fatality tables: 2014. Afghanistan casualty and fatality tables. https://www.gov.uk/government/statistics/op-herrick-casualty-and-fatality-tables-released-in-2014 (accessed June 3, 2015).

4 Casualty Monitor. Monitoring and analysis of data civilian and British military casualty in Afghanistan and Iraq. 2013. www.casualty-monitor.org/p/iraq.html (accessed June 3, 2015).

5 Rona RJ, Fear NT, Hull L, et al. Mental health consequences of overstretch in the UK armed forces: first phase of a cohort study. *BMJ* 2007; **335:** 603.

6 Fear NT, Jones M, Murphy D, et al. What are the consequences of deployment to Iraq and Afghanistan on the mental health of the UK armed forces? A cohort study. *Lancet* 2010; **375:** 1783–97.

7 Jones M, Sundin J, Goodwin L, et al. What explains post-traumatic stress disorder (PTSD) in UK service personnel: deployment or something else? *Psychol Med* 2013; **43:** 1703–12.

8 Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med* 2004; **351:** 13–22.

9 Lee DJ, Warner CH, Hoge CW. Advances and controversies in military posttraumatic stress disorder screening. *Curr Psychiatry Rep* 2014; **16:** 467.

10 Zamorski MA, Rusu C, Garber BG. Prevalence and correlates of mental health problems in Canadian Forces personnel who deployed in support of the mission in Afghanistan: findings from postdeployment screenings, 2009–2012. *Can J Psychiatry* 2014; **59:** 319–26.

11 Vermetten E, Greenberg N, Boeschoten MA, et al. Deployment-related mental health support: comparative analysis of NATO and allied ISAF partners. *Eur J Psychotraumatol* 2014; **5:** 23732.

12 Hines LA, Goodwin L, Jones M, et al. Factors affecting help seeking for mental health problems after deployment to Iraq and Afghanistan. *Psychiatr Serv* 2014; **65:** 98–105.

13 Milliken CS, Auchterlonie JL, Hoge CW. Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *JAMA* 2007; **298:** 2141–48.

14 Seal KH, Bertenthal D, Maguen S, Gima K, Chu A, Marmar CR. Getting beyond "Don't ask; don't tell": an evaluation of US Veterans Administration postdeployment mental health screening of veterans returning from Iraq and Afghanistan. *Am J Public Health* 2008; **98:** 714–20.

15 Committee on the Assessment of Ongoing Efforts in the Treatment of Posttraumatic Stress Disorder; Board on the Health of Select Populations; Institute of Medicine. Treatment for posttraumatic stress disorder in military and veteran populations: final assessment. Washington: National Academies Press, 2014.

16 Hoge CW, Grossman SH, Auchterlonie JL, Riviere LA, Milliken CS, Wilk JE. PTSD treatment for soldiers after combat deployment: low utilization of mental health care and reasons for dropout. *Psychiatr Serv* 2014; **65:** 997–1004.

17 Torgerson DJ, Roland M. What is Zelen's design? *BMJ* 1998; **316:** 606.

18 Burdett H, Fear NT, Jones N, Greenberg N, Wessely S, Rona RJ. Use of a two-phase process to identify possible cases of mental ill health in the UK military. *Int J Methods Psychiatr Res* 2016; **25:** 168–77.

19 Ware JE, Snow KK, Kosisnki M, Gandek B. SF-36 Health Survey: manual and interpretation guide. Boston, USA: The Health Institute, New England Medical Center, 1993.

20 Iverson GL, Langlois JA, McCrea MA, Kelly JP. Challenges associated with post-deployment screening for mild traumatic brain injury in military personnel. *Clin Neuropsychol* 2009; **23:** 1299–314.

21 Bliese PD, Wright KM, Adler AB, Cabrera O, Castro CA, Hoge CW. Validating the primary care posttraumatic stress disorder screen and the posttraumatic stress disorder checklist with soldiers returning from combat. *J Consult Clin Psychol* 2008; **76:** 272–81.

22 Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA. Psychometric properties of the PTSD Checklist (PCL). *Behav Res Ther* 1996; **34:** 669–73.

23 Spitzer RL, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. *JAMA* 1999; **282:** 1737–44.

24 Kroenke K, Spitzer RL, Williams JB, Monahan PO, Lowe B. Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Ann Intern Med* 2007; **146:** 317–25.

25 Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. AUDIT. The Alcohol Use Disorders Identification Test. Guidelines for use in primary care. Second Edition. Geneva: Department of Mental Health and Substance Dependence, World Health Organization, 2001.

26 Rona RJ, Jones M, Fear NT, et al. Mild traumatic brain injury in UK military personnel returning from Afghanistan and Iraq: cohort and cross-sectional analyses. *J Head Trauma Rehabil* 2012; **27:** 33–44.

27 White IR, Horton NJ, Carpenter J, Pocock SJ. Strategy for intention to treat analysis in randomised trials with missing outcome data. *BMJ* 2011; **342:** d40.

28 Rabe-Hesketh S, Skondral A. Multilevel and longitudinal modeling using Stata, third edn. College Station, TX: STATA Press, 2012.

29 Rona RJ, Jones M, French C, Hooper R, Wessely S. Screening for physical and psychological illness in the British Armed Forces: I: the acceptability of the programme. *J Med Screen* 2004; **11:** 148–52.

30 Rona RJ, Hooper R, Jones M, et al. Mental health screening in armed forces before the Iraq war and prevention of subsequent psychological morbidity: follow-up study. *BMJ* 2006; **333:** 991.

31 Hoge CW, Auchterlonie JL, Milliken CS. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA* 2006; **295:** 1023–32.

32 Warner CH, Appenzeller GN, Parker JR, Warner CM, Hoge CW. Effectiveness of mental health screening and coordination of in-theater care prior to deployment to Iraq: a cohort study. *Am J Psychiatry* 2011; **168:** 378–85.

33 Adler AB, Britt TW, Riviere LA, Kim PY, Thomas JL. Longitudinal determinants of mental health treatment-seeking by US soldiers. *Br J Psychiatry* 2015; **207:** 346–50.

34 Keeling M, Knight T, Sharp D, et al. Contrasting beliefs about screening for mental disorders among UK military personnel returning from deployment to Afghanistan. *J Med Screen* 2012; **19:** 206–11.

35 Bonanno GA, Mancini AD, Horton JL, et al. Trajectories of trauma symptoms and resilience in deployed US military service members: prospective cohort study. *Br J Psychiatry* 2012; **200:** 317–23.

36 Eekhout I, Reijnen A, Vermetten E, Geuze E. Post-traumatic stress symptoms 5 years after military deployment to Afghanistan: an observational cohort study. *Lancet Psychiatry* 2016; **3:** 58–64.

37 Berntsen D, Johannessen KB, Thomsen YD, Bertelsen M, Hoyle RH, Rubin DC. Peace and war: trajectories of posttraumatic stress disorder symptoms before, during, and after military deployment in Afghanistan. *Psychol Sci* 2012; **23:** 1557–65.

38 Rona RJ, Jones M, Sundin J, et al. Predicting persistent posttraumatic stress disorder (PTSD) in UK military personnel who served in Iraq: a longitudinal study. *J Psychiatr Res* 2012; **46:** 1191–98.

39 Warner CH, Appenzeller GN, Grieger T, et al. Importance of anonymity to encourage honest reporting in mental health screening after combat deployment. *Arch Gen Psychiatry* 2011; **68:** 1065–71.

40 Kehle-Forbes SM, Meis LA, Spoont MR, Polusny MA. Treatment initiation and dropout from prolonged exposure and cognitive processing therapy in a VA outpatient clinic. *Psychol Trauma* 2016; **8:** 107–14.

41 Steenkamp MM, Litz BT, Hoge CW, Marmar CR. Psychotherapy for military-related PTSD: a review of randomized clinical trials. *JAMA* 2015; **314:** 489–500.

42 Steenkamp MM. True evidence-based care for posttraumatic stress disorder in military personnel and veterans. *JAMA Psychiatry* 2016; **73:** 431–32.

43 Lee DJ, Schnitzlein CW, Wolf JP, Vythilingam M, Rasmusson AM, Hoge CW. Psychotherapy versus pharmacotherapy for posttraumatic stress disorder: systemic review and meta-analyses to determine first-line treatments. *Depress Anxiety* 2016; **33:** 792–806.

44 Tran US, Gregor B. The relative efficacy of bona fide psychotherapies for post-traumatic stress disorder: a meta-analytical evaluation of randomized controlled trials. *BMC Psychiatry* 2016; **16:** 266.

45 Vasterling JJ, Verfaellie M, Sullivan KD. Mild traumatic brain injury and posttraumatic stress disorder in returning veterans: perspectives from cognitive neuroscience. *Clin Psychol Rev* 2009; **29:** 674–84.

46 Wong EC, Jaycox LH, Ayer L, et al. Evaluating the implementation of the Re-Engineering Systems of Primary Care Treatment in the Military (RESPECT-Mil). Santa Monica, California: RAND Corporation, 2015.

Is screening for the psychological effects of war useful?

ilbusca/Getty

Published Online
February 16, 2017
http://dx.doi.org/10.1016/S0140-6736(17)30073-9

See Online/Article
http://dx.doi.org/10.1016/S0140-6736(16)32398-4

The extensive documentation of the psychological injuries arising as a consequence of conflict in the Middle East[1] highlights the crucial need to establish how this morbidity can be minimised and prevented. A 2014 report from the Institute of Medicine[2] recommended only one evidence-based intervention: mental health screening. The USA, Canada, the Netherlands, and Australia use the approach of post-deployment screening.[3] However, debate about the benefit of post-deployment screening is ongoing.[4]

In *The Lancet*, Roberto Rona and colleagues[5] have addressed this question in a randomised controlled trial of post-deployment screening in the UK for mental disorders in 434 platoons comprising 10 190 Royal Marine or Army personnel after deployment to Afghanistan. At follow-up, 10–24 months after initial assessment, there were no significant differences in prevalence between groups for post-traumatic stress disorder (PTSD; adjusted odds ratio 0·92, 95% CI 0·75–1·14), depression or anxiety (0·91, 0·71–1·16), alcohol misuse (0·88, 0·73–1·06), or seeking support for mental disorders (0·92, 0·78–1·08). However, findings from this study need to be interpreted in the context of the methods used. Both the control and screening groups were administered a two-stage battery of screening questionnaires 6–12 weeks after deployment. The participants who were identified as probable cases in the screening group received tailored advice about seeking assistance from medical and welfare staff, based on their self-reported symptom scores, whereas the control group were given general mental health advice. A potential confounding issue with this study design is that by filling in the self-report measures, both groups had the opportunity to reflect on their obvious levels of symptomatic distress, which would have been apparent by the items they endorsed on the questionnaires. Members of the UK Forces are not naive to the importance of post-deployment symptoms because of their exposure to routine psychoeducation programmes.[3] This effect is similar to the non-specific intervention effect documented in wait-list psychotherapy trials for PTSD.[6] Therefore, the control group in this trial was not a true control in the sense of no screening, which might have minimised the ability to find differences between groups.

About 35% of both groups who met screening criteria for a disorder excluding alcohol misuse sought treatment, reflecting an absence of effect of receiving tailored treatment-seeking advice over general mental health advice. This finding represents a much lower uptake of care than in a cohort of US soldiers who completed a post-deployment screen, in which there was a 75% attendance of those who screened positive for psychological distress.[7] In this 2014 study of US forces, service uptake was substantially higher than the 42% after screening in an earlier 2007 report[8] of US forces. This greater rate of attendance in the more recent US study was due to improvements in the US screening programme[7] and is indicative of what is possible, and contrasts with the lower attendance rate of 35% in the study by Rona and colleagues.[5] The UK context for comparison with the Rona and colleagues' study[5] is better reflected by the rate of seeking mental health care in two studies of the UK military in which 35%[9] and 42% of personnel,[10] respectively, with psychiatric disorders excluding alcohol abuse received any form of professional help. In this context, the similar uptake in the present study to those reported previously[9,10] raises important questions about the adequacy of the intervention providing targeted advice, particularly because uptake was the same as for the control group. Therefore, this study is about the benefits of the type of the advice given rather than the screening itself. The design of Rona and colleagues' study[5] did not allow the question of whether self-screening improved uptake of care to be answered, which is therefore still probable. Also, how perceptions about the usefulness of clinical services offered affected the uptake rate of referral were not examined, an important issue in the context of the higher uptake of services in the USA.[7]

Rona and colleagues' study should be considered in the context of the current discordance between the US Preventative Services Task Force (USPSTF) and the UK NICE Guidelines for the screening of depression.[11] Although the USPSTF concluded that there is sufficient evidence to support the implementation of programmes combining depression screening with adequate care, such programmes are not supported where resources are unavailable.[12] Thus, the quality of routine care for the disorders being screened needs to be

assessed when there are no improved clinical outcomes despite better case detection with screening. Even if an individual did present to mental health services in the UK military as part of Rona and colleagues' study, this did not guarantee that an evidence-based intervention was offered, even when a general practitioner was consulted. This finding has also been reported in another UK study,[13] in which general practitioners often did not refer people with PTSD for treatment after the 2005 terrorist bombings in London. Although data on the adequacy of the UK military mental health services are not available, less than 50% of individuals seeking care in the US veterans system received minimally adequate mental health care.[7,14] Hence, the adequacy of care cannot be assumed for the 35% of personnel in the present study who presented for care. Thus, the absence of differences in clinical outcomes in the second stage of data collection 10–24 months later might reflect the limited provision of evidence-based interventions in a substantial proportion of individuals who presented for care. Another issue is that of delayed-onset PTSD morbidity in post-deployment populations, which would not have been detected in the first stage of the study.[15] These emerging cases could have swamped any intervention effect, with this delayed emergence of symptoms being the premise behind a two-timepoint screening programme in some countries.[3]

In summary, the debate surrounding post-deployment screening remains little closer to resolution because several key questions could not be answered owing to the design of Rona and colleagues' trial, which included the effect of self-screening in the control group. Further research should examine the effects of screening in the setting of advice provided by a clinician rather than a computer and in the setting of a clinical service in which the adequacy of subsequent care is critiqued.

Alexander C McFarlane
Centre for Traumatic Stress Studies, University of Adelaide, Adelaide, SA 5000, Australia
alexander.mcfarlane@adelaide.edu.au

I have received research funding from the Commonwealth Department of Veterans Affairs in Australia and act as a senior advisor in psychiatry. I am an adviser to the Australian Defence Force and hold the rank of Group Captain in the Royal Australian Air Force specialist reserves. I provide expert evidence in civil litigation.

1 Sundin J, Herrell RK, Hoge CW, et al. Mental health outcomes in US and UK military personnel returning from Iraq. *Br J Psychiatry* 2014; **204:** 200–07.
2 Institute of Medicine. Preventing psychological disorders in service members and their families: an assessment of programs. Washington, DC: National Academies Press, 2014.
3 Vermetten E, Greenberg N, Boeschoten MA, et al. Deployment-related mental health support: comparative analysis of NATO and allied ISAF partners. *Eur J Psychotraumatol* 2014; **5**: 23732.
4 Lee DJ, Warner CH, Hoge CW. Advances and controversies in military posttraumatic stress disorder screening. *Curr Psychiatry Rep* 2014; **16:** 467.
5 Rona RJ, Burdett H, Khondoker M, et al. Post-deployment screening for mental disorders and tailored advice about help-seeking in the UK military: a cluster randomised controlled trial. *Lancet* 2016; published online Feb 16. http://dx.doi.org/10.1016/S0140-6736(16)32398-4.
6 Australian Centre for Posttraumatic Mental Health. Australian guidelines for the treatment of acute stress disorder and posttraumatic stress disorder. Melbourne, VIC: ACPMH, 2013.
7 Hoge CW, Grossman SH, Auchterlonie JL, et al. PTSD treatment for soldiers after combat deployment: low utilization of mental health care and reasons for dropout. *Psychiatr Serv* 2014; **65:** 997–1004.
8 Milliken CS, Auchterlonie JL, Hoge CW. Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *JAMA* 2007; **298:** 2141–48.
9 Iversen AC, van Staden L, Hughes JH, et al. Help-seeking and receipt of treatment among UK service personnel. *Br J Psychiatry* 2010; **197:** 149–55.
10 Hines LA, Sundin J, Rona RJ, Wessely S, Fear NT. Posttraumatic stress disorder post Iraq and Afghanistan: prevalence among military subgroups. *Can J Psychiatry* 2014; **59:** 468–79.
11 Thombs BD, Coyne JC, Cuijpers P, et al. Rethinking recommendations for screening for depression in primary care. *CMAJ* 2012; **184:** 413–18.
12 Siu AL, Bibbins-Domingo K, Grossman DC, et al. Screening for depression in adults: US Preventive Services Task Force recommendation statement. *JAMA* 2016; **315:** 380–87.
13 Brewin CR, Scragg P, Robertson M, Thompson M, d'Ardenne P, Ehlers A. Promoting mental health following the London bombings: a screen and treat approach. *J Trauma Stress* 2008; **21:** 3–8.
14 Hebenstreit CL, Madden E, Koo KH, Maguen S. Minimally adequate mental health care and latent classes of PTSD symptoms in female Iraq and Afghanistan veterans. *Psychiatr Res* 2015; **230:** 90–95.
15 Bryant RA, O'Donnell ML, Creamer M, McFarlane AC, Silove D. A multisite analysis of the fluctuating course of posttraumatic stress disorder. *JAMA Psychiatry* 2013; **70:** 839–46.