

# A Cluster Randomized Controlled Trial to Determine the Efficacy of Trauma Risk Management (TRiM) in a Military Population

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*Trauma Risk Management is a peer-support program that aims to promote help-seeking in the aftermath of traumatic events. Prior to its implementation, the British military conducted a randomized controlled trial of Trauma Risk Management against standard care in 12 warships; 6 were randomized to use Trauma Risk Management after collecting baseline measurements. Follow up after 12–18 months found no significant change in psychological health or stigma scores in either group; however, the studied vessels only encountered low numbers of critical incidents. Additionally, measurements of organizational functioning were modestly better in the Trauma Risk Management ships. The authors conclude that within organizations using Trauma Risk Management may be beneficial and may, in time, lead to a valuable cultural shift.*

Traumatic events can lead to the development of psychological distress, lowered morale, and reduced organizational effectiveness (Greenberg et al., 2003; Hoge et al., 2002). Some occupations, including the military, by their nature place employees into psychologically hazardous environments. Although, within Armed Forces of the United Kingdom (UK), developing psychological disorders is the exception rather than the rule (Greenberg, Iversen, Hull, Bland, & Wessely, 2008; Hotopf et al., 2006), as a responsible employer the Ministry of Defence has been keen to explore the development of occupational interventions, which may mitigate the psychological risks of exposure to traumatic incidents.

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Trauma Risk Management is a peer-delivered psychological support process, which aims to ensure that those who develop psychological disorders as a result of being exposed to traumatic events, are assisted to seek help (Greenberg et al., 2008; Jones, Roberts, & Greenberg, 2003). Trauma Risk Management practitioners are volunteer nonmedical personnel who have been trained in psychological risk assessment and provided with a basic understanding of trauma psychology. The training is carried out for service personnel by suitably experienced service personnel who have been trained by military mental health professionals and assessed as competent to deliver the training; training costs are therefore minimal. Trauma Risk Management training takes place over 3 (practitioner courses) to 5 days (team leader courses) depending on the level of training provided. Trauma Risk Management aims to capitalize on the social cohesion available within military units (Bartone, Ursano, Wright, & Ingraham, 1989). After a traumatic event, Trauma Risk Management practitioners are trained to advise commanders about best practice guidelines in relation to traumatic stress (National Institute for Clinical Excellence, 2005) and to carry out structured risk assessments of those exposed to the events to identify whether individuals might benefit from additional social support which is associated with good mental health in both civilian and military populations (Greenberg et al., 2003; Iversen et al., 2008; Thoits, 1989). A further structured risk assessment is carried out after a month and personnel who continue to exhibit significant symptoms are referred on to formal mental health providers. Because practitioners are integral to military units, the Trauma Risk Management process intends to reduce the stigma associated with military culture, which may prevent those who need help, and for whom help is available, from seeking it (Hoge et al., 2004;

Langston, Greenberg, & Gould, 2007). Trauma Risk Management also aims to build on research which has shown that military personnel favor talking about their operational experiences with peers rather than medical or welfare personnel (Greenberg et al., 2003). It is worth noting that, unlike some other models of intervention, Trauma Risk Management does not aim to be a treatment in itself; rather it aims to facilitate peer and unit support in the short term and, where necessary, to direct personnel towards formal sources of help if they do not appear to be following a normal recovery trajectory.

Before 2000 the UK Armed Forces used critical incident stress debriefing (CISD) as a method of dealing with the psychological consequences of exposing personnel to traumatic events. Critical incident stress debriefing is a single-session intervention that aims to prevent those who have been exposed to a traumatic event from developing posttraumatic stress disorder (PTSD). Although it was widely used, CISD has been found to be not only of questionable efficacy, but also potentially harmful (Rose et al., 2004; Van Emmerik, Kamphuis, Hulsbosch, & Emmelkamp, 2002) and the National Institute for Clinical Excellence have warned against its use (National Institute for Clinical Excellence, 2005). As a result the Surgeon General vetoed the use of single-session psychological debriefing in the UK Armed Forces in 2000 based on the evidence which was emerging at that time. Further investigation of CISD has found that those who are most likely to suffer harm as result of being debriefed are those who are distressed at the time they are debriefed (Sijbrandij, Olf, Reitsma, Carlier, & Gersons, 2006).

Trauma Risk Management had been developed within the Royal Marines, elite amphibious warfare troops, for a number of years but had not been subjected to a formal evaluation of effectiveness. Therefore, prior to extending the use of Trauma Risk Management to the rest of the Armed Forces, the Ministry of Defence funded a cluster randomized controlled trial of Trauma Risk Management against the use of standard care in a sample of Royal Navy warships. The primary aim of the trial, reported here, was to determine if the use of Trauma Risk Management led to any change in psychological health of personnel in the trial ships. The secondary aims included (a) examining whether the intervention influenced personnel's stigmatizing attitudes, and (b) whether there was any effect upon organizational functioning.

## METHOD

### Participants

A cluster randomized controlled trial methodology was used to compare the efficacy of Trauma Risk Management versus standard care in the management of individuals following a traumatic event. Twelve Royal Navy warships, matched for crew size and nature of operational duties, were randomly allocated, using a sealed envelope technique, into a six-ship intervention group and a six-

ship control group. The intervention ships, after baseline measurements were complete, had personnel trained in the Trauma Risk Management system.

The number of personnel on the vessels ranged between 63 and 325 and the number of Trauma Risk Management practitioners ranged between 6 and 19; the intervention vessel thus has between 6 and 10% of their complement Trauma Risk Management trained. Intervention vessels were also encouraged to make use of Trauma Risk Management should they encounter a traumatic incident and to "exercise" the system when rehearsing responses to potential incidents (e.g., fires and floods); such exercises are part of a naval vessel's routine. For instance, after exercising the crew to improve their response to a main machinery space fire, the Trauma Risk Management team would have assessed personnel who "for exercise" were deemed to have been exposed to the fire, to have seen colleagues seriously injured or killed, or who might have felt that their life was threatened. The aim of these exercises would be to maintain the skills of the Trauma Risk Management practitioners while they were deployed but also to help inform the ships' crews about how the Trauma Risk Management might be used for real.

### Measures

To assess change, the study incorporated both qualitative and quantitative methods at baseline and follow-up. The quantitative aspect of the assessment was comprised of a questionnaire that enquired into respondents' opinions of stress and stress-related problems in the Armed Forces and included the General Health Questionnaire (12 item version [GHQ-12]; Goldberg, 1972) and the Posttraumatic Stress Disorder Checklist (PCL-C; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The questionnaire also enquired about internal stigma (an individual's beliefs about seeking personal help for a mental health problem) and external stigma (an individual's beliefs about how other people who suffer from mental health problems should be treated) utilizing a measure based upon U.S. military research (Hoge et al., 2004). The questions used for constructing the self-stigma variable were "It would harm my career"; "My peers would not trust me when faced with stressful situations (i.e., operational duties)"; and "I would be seen as weak and I would be embarrassed asking for help." The questions for constructing the external stigma scale were "People who experience stress-related problems are weak"; "Most people have a mental health problem at some point in their lives"; "It is acceptable to suffer from stress-related problems in an operational environment"; and "There is enough support for stress-related problems in the Armed Forces."

### Procedure

Trauma Risk Management practitioners were also available to speak to about less than critical events as and when personnel

felt the need to do so since the practitioners are based within the unit and therefore available to talk to whenever an individual might desire to. The other six ships used current standard naval care for traumatic events, which would have included access to standard managerial and medical support but not the use of Trauma Risk Management. All vessels in the trial would have had access to non-doctor medics, who were part of the crew, who could refer those needing more help to physicians or mental health providers although these may well not be based in the vessel. Trauma Risk Management training, for the six ships that received it, took place between December 2005 and March 2006. Only trainees who were deemed by the instructors to be competent practitioners were entitled to join the vessel's Trauma Risk Management team.

Data from the Royal Navy's disciplinary database concerning the rates of minor disciplinary offenses upon the sampled ships were used as a proxy measure of occupational functioning (Beckerman & Fontana, 1989). The minor disciplinary offenses included being absent without leave, insubordinate behavior, disobeying a lawful command, disobeying ship's standing orders, conduct prejudicial to Naval discipline, poor conduct in relation to sentries/ watches/ duties, and failure to attend appointments. Data were obtained for the complete year before the trial began and for the complete year afterwards.

Informed consent was gained from all participants and ethical clearance for the study was obtained from the Ministry of Defence (Navy) Research Ethics Committee.

## Data Analysis

Summary statistics (means and standard deviations) were calculated for both psychological health (PCL and GHQ) scores and stigma measurements obtained pre- and postintervention phase for each ship in the study. Where appropriate, 95% confidence intervals (CIs) for the differences between pre- and postscore were calculated. For those individuals that had both a pre- and postscore for the PCL and GHQ, summary statistics and a 95% CI were calculated from the differences of pre- and postscores for the paired observations. Standard meta-analysis methodology was used to calculate standardized effect sizes for both the group of ships having the intervention and those not having the intervention; analyses were conducted taking clustering into account. For the data from individuals having both a pre- and postscore, random effects models (Everitt, 2002) were fitted to the postscore to determine the effect of the Trauma Risk Management program having adjusted for prescore, age, gender, and time in service.

The disciplinary data were analyzed using statistical software package STATA, version 8. Statistically significant differences between the proportions were identified using Pearson's  $\chi^2$  statistic; *p*-values of less than .05 were taken to indicate statistical significance.

## RESULTS

The baseline study group ( $n = 2,259$ ) included 1,559 individuals who completed the questionnaires (69% of the opportunistic sample) and the follow-up population ( $n = 1,980$ ) included 1,235 who completed the questionnaire (62% of the opportunistic sample). The demographic characteristics of both groups are described in Table 1. Sixty-two percent had deployed on at least one operational deployment in their career to date.

Table 2 shows the use of Trauma Risk Management, both for real and for exercise scenarios, and number of traumatic events during the study period. The table also shows the poor standard of reporting from the ships. Overall 62% (66/106) of the data capture forms were returned to the research team. There were 27 recorded traumatic incidents during the study period, 14 of which were in the intervention group. The traumatic events included fires, floods, and injuries of a significant nature; none included death.

There was no difference between the groups in terms of either the estimated standardized effect pre- and post-GHQ score (Trauma Risk Management ships = 0.53, 95% CI = 0.43–0.63; control ships = 0.52, 95% CI = 0.40–0.64) or PCL score (Trauma Risk Management ships = 0.11, 95% CI = 0.21–0.01; control ships = 0.06, 95% CI = 0.18–0.06).

There was also no difference between the groups in terms of either the estimated standardized effect pre- and post-internal stigma score (Trauma Risk Management ships = 0.08, 95% CI = –0.02–0.18; control ships = –0.10, 95% CI = –0.22–0.02) or external stigma score (Trauma Risk Management ships = 0.15, 95% CI = 0.05–0.25; control ships = 0.03, 95% CI = –0.09–0.15).

Only a minority (21.8–22.8%) of the population on each ship completed both pre- and postintervention questionnaires. The GHQ, PCL, and internal and external stigma summary statistics for those personnel are in Table 3. Only prescore was a significant predictor of postscore; there was no evidence of an intervention effect. These results suggest that overall there is no treatment effect for Trauma Risk Management and there is also no negative effect. Whether or not Trauma Risk Management was implemented on the ships made no difference to the crew's psychological health or the prevalence of internal or external stigma.

The sum of each ship's annual offenses, for the six minor disciplinary offenses detailed previously, for 2005 and 2006 was calculated. Although it was not possible to count only offenses that occurred after a ship had been trained (December 2005 to March 2006), the 2005 data represent offenses that, in the main, had been committed before the trial was properly underway and the 2006 data represent offenses that, in the main, were committed after the trial had commenced. Over the study period, the offense count for the Trauma Risk Management ships increased from 150 in 2005 to 152 in 2006 (1%,  $n = 2$ ) and the count for the non-Trauma Risk Management group increased by from 162 to 205 in the same period (21%,  $n = 43$ ). In 2005, there was no difference

**Table 1.** Baseline and Follow-Up Demographics for the Study Population

Variable	Baseline questionnaire group ( <i>n</i> = 1,559)		Follow-up questionnaire group ( <i>n</i> = 1,235)	
	<i>n</i>	%	<i>n</i>	%
Age (years)				
<20	272	17.6	184	14.9
21–25	476	30.8	398	32.2
26–30	264	17.1	230	18.6
31–35	211	13.7	208	16.8
≥36	321	20.8	208	16.8
Gender				
Male	1392	89.9	1085	87.9
Female	159	10.3	143	11.6
Marital status				
Married/cohabiting	706	45.3	603	49.3
Divorced/separated/widowed	102	6.7	72	5.9
Single	730	47.5	549	44.9
Rank				
Officer	187	12.1	135	11.1
Senior noncommissioned officer	338	21.8	295	24.2
Junior noncommissioned officer	1027	66.2	790	64.8

between the groups (3.1%, 95% CI = 0.5–5.8%), while in 2006 the offending rate on the non-Trauma Risk Management ships was significantly higher than on the Trauma Risk Management ships (difference 6.8%, 95% CI = 4.0–9.7%).

## DISCUSSION

This study aimed to investigate the use of Trauma Risk Management within military units through a cluster randomized controlled trial. The data suggest three major findings. First, Trauma Risk Management did not improve psychological health, but importantly, we did not find any evidence that the use of Trauma Risk Management led to any worsening of psychological health. Second, we found no evidence to suggest that the use of the Trauma

Risk Management system in military units improved personnel's attitudes towards mental health issues, in terms of either internal or external stigma. Last, there appeared to be a modest, but positive, effect of Trauma Risk Management upon the occupational functioning of the military units involved in the study as indicated by offending rates.

Although this was a randomized controlled trial there were a number of relevant limitations that should be considered when interpreting the data. During the study period the study vessels were only exposed to a modest number of traumatic incidents, none of which were serious. Although this is reassuring for the Royal Navy, the low rate of exposure would have led to a low rate of use of the Trauma Risk Management system and, consequentially, limited Trauma Risk Management's ability to influence mental health.

**Table 2.** Use of Trauma Risk Management (TRiM) and Recorded Traumatic Events in the Intervention Group

Ship study number	No. of monthly returns completed/No. of months that the ship was involved in the trial	No. of traumatic incidents	Number of times TRiM used in real incidents	Number of times TRiM used in exercise
1	11/19	4	2	2
4	13/15	1	1	3
5	5/22	0	0	4
7	13/17	3	3	10
10	12/17	3	3	2
12	12/16	3	3	2

**Table 3.** Effect of Trauma Risk Management Intervention on Outcomes

Outcome measure	Before and after treatment measurements		<i>B</i>	<i>SE B</i>
	<i>n</i>	%		
GHQ	280	22.8	-0.79	0.45
PCL	269	21.8	-2.23	1.97
Internal stigma	281	22.8	-0.02	0.46
External stigma	277	22.4	-0.12	0.28

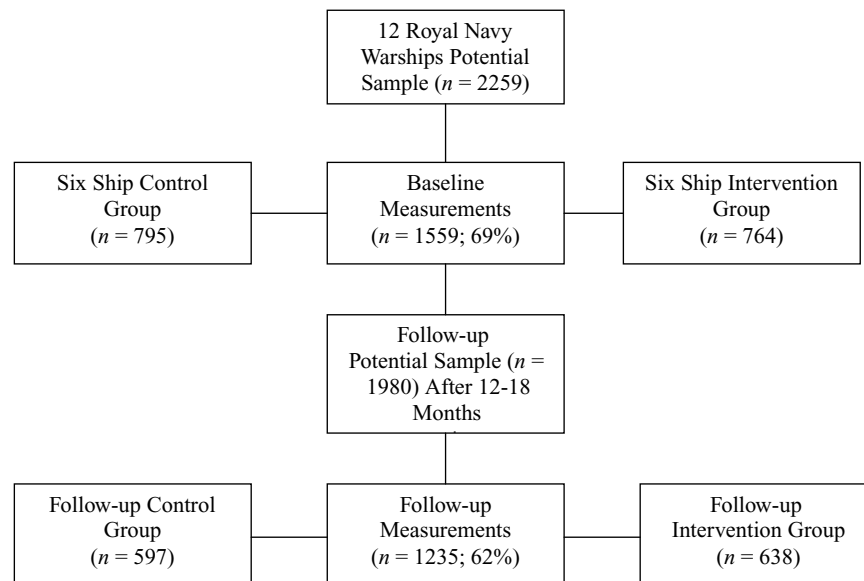
Note. All estimates adjusted for prescore, age, sex, and years of service. GHQ = General Health Questionnaire; PCL = Posttraumatic Stress Disorder Checklist.

Whether or not more use of Trauma Risk Management might have influenced mental health or stigma outcomes is unclear; however, overall the mean use of the Trauma Risk Management system was less than once every 2 months on the intervention vessels. Furthermore, the recording of the data about traumatic incidents and Trauma Risk Management use was not complete. In addition, due to the limited time scale of the trial, the postintervention measurements of occupational functioning were collected before the quantitative follow-up measurements. This meant that the period of occupational functioning measurement was less than for both stigma and psychological health. Although it would have been additionally ideal to compare the study vessels with the Fleet as a whole, this was not possible because other vessels were not at simi-

lar stages of deployment, meaning that the disciplinary challenges faced by their personnel would have been very different. For instance, foreign ports provide sailors with many more opportunities for getting into difficulty than home ones do.

A further important limitation was that during the study period only about one fifth of those who completed the initial survey also completed a follow up survey. Although we did not carry out a specific intention to treat analysis because this would not have produced different results, our use of standard meta-analysis methodology to calculate standardized effect sizes took account of the low numbers of matching pre and post interventions measures. The low numbers of personnel available at follow up was not, in the main, due to nonresponse but because the Royal Navy's drafting policies (that require personnel to move between units to progress with their career) had led to personnel moving away from the surveyed vessels. Thus, ship-wide education about Trauma Risk Management, that would have been part of the initial Trauma Risk Management training, may well have not permeated into the inherent "ship's culture" concerning the handling of stress-related issues on that vessel.

There are a number of reasons for the lack of a positive result from this trial. First, it may be that Trauma Risk Management does not work. The qualitative results of the study (Greenberg et al., 2009) suggest that Trauma Risk Management appears to be generally acceptable to military personnel. However, as was demonstrated with the trials that examined psychological debriefing, the acceptability of an intervention is a poor measure of its effectiveness (Van Emmerik et al., 2002). Unlike debriefing studies, however, our results do not provide any evidence to suggest that

**Figure 1.** Study flow diagram.

Trauma Risk Management is harmful although, as stated above, formal use of Trauma Risk Management after traumatic events was infrequent. However, the potential harmful effects of introducing a peer support system, such as Trauma Risk Management, would not only result from its use after critical incidents. Trauma Risk Management practitioners remain within units whether there is a critical incident to deal with or not. Because of their Trauma Risk Management training, personnel are encouraged to approach them to speak about stressful events of any origin offering the possibility that adverse outcomes from the use of Trauma Risk Management may have occurred even in the lower stress environments of the Royal Navy ships in the trial.

It may also be that attitudinal change takes more than 12 to 18 months to become apparent. A study of the attitudes towards women going to sea in the Royal Navy was conducted by Plymouth University over an 8-year period (Bryant, Sutton, & Bunyard, 2000). The research team surveyed a sample of male and female personnel on three separate occasions some 2, 4, and 8 years after the female personnel became eligible for sea service in 1991. The outcome found no real shift in attitudes in the first two surveys; however, by the 8-year point, attitudes had shifted leading the researchers to conclude that genuine attitude change may take many years. We suggest that although our data did not show any change in attitudes to stress and stigma, such cultural changes may take a considerable time to become evident.

Another important factor in the studied group of vessels was the relative lack of serious events that might formally require Trauma Risk Management or indeed "treatment as usual" within the control group. The infrequent exposure of personnel to traumatic incidents during the study period would have meant that the Trauma Risk Management system would have been used only rarely during the study and thus the potential to influence attitudes may well have been limited. Given that other research has found that a U.S. postdeployment psychological support program called Battlemind appeared to be mainly beneficial for those who had the highest level of operational experiences (Adler, Bliese, McGurk, Hoge, & Castro, 2009) and of no apparent benefit for those with lower levels of exposure, our study findings may simply reflect the relative paucity of traumatic incidents for the Royal Navy during the period of the trial. Furthermore, although personnel are in theory drafted to a ship for a period of 5 years, in practice we found a considerable turnover of personnel, which might also have diluted the effect of the intervention.

Although this study found no measurable psychological benefits of using Trauma Risk Management, a recent study by Gould, Greenberg, and Hetherington (2007) investigated the effect of Trauma Risk Management training with a military sample who received 2 days of Trauma Risk Management training to become practitioners and compared them to a non-Trauma Risk Management trained control group. Although the study was not randomized, the authors found that both immediately after the training course, and when followed up after a month, those who had re-

ceived Trauma Risk Management training reported less stigmatizing attitudes about mental health than the nontrained control group. Also, restricted reports from military psychiatrists who visit both Iraq and Afghanistan regularly, suggest that in that environment Trauma Risk Management is being used frequently, is well accepted by troops and commanders and in some cases, has led to early referral as intended (Personal Communication, Permanent Joint Headquarters, Stuart Collett, J4 MedOps, 2007).

In terms of occupational functioning we found that Trauma Risk Management trained vessels had a better outcome in terms of disciplinary offenses, used as a proxy measure of unit functioning and morale. Use of disciplinary offense data as a proxy is supported by other studies which have suggested that poor psychological health in military personnel is associated with an increase in offending behavior (Beckerman & Fontana, 1989). Given that this was a secondary outcome, however, and there was a lack of effect on the primary outcome, this needs replication.

This study suggests that although there is no evidence that Trauma Risk Management is either harmful or beneficial to psychological health or perception of stigma, there appears to be a modest beneficial effect of Trauma Risk Management upon occupational functioning. It is possible however that Trauma Risk Management could still have a positive direct impact on mental health if used in a more hostile environment with greater exposure to potentially traumatic events, as appears to be the case for the U.S. Battlemind training system. Future studies into the use of Trauma Risk Management may help to determine the longer term effects of its use in military, and other, personnel.

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