



Health concerns in UK Armed Forces personnel

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DECLARATIONS

Competing interests

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Introduction

As a result of the nature of their employment members of the UK Armed Forces may, on occasion, be exposed to physical danger. Although the nature of the occupational hazards they encounter may be predictable, such as enemy action or adverse climatic conditions, they are frequently far more uncertain. Most military professionals acknowledge that they may face danger as part of the job – that is the nature of the military contract. However it is probable that personnel view such danger as resulting from enemy action rather than being caused by their own side. Again the latter is inherent in the military contract – the former is not. In this paper we explore the occupational health concerns connected to the anthrax vaccination and depleted uranium ammunitions used by the UK Armed Forces and their coalition partners, both of which have been the cause of considerable controversy.

Anthrax vaccination

1991 Gulf War

During the 1991 Gulf War, many service personnel received a combination of vaccinations, including anthrax, in order to prevent them from being injured by a variety of biological weaponry. Anthrax vaccination, in particular, has been implicated as a risk factor for ill-health in veterans of that conflict. Shortly after the end of the war, media reports began to emerge citing a link between receipt of vaccinations and the subsequent development of 'Gulf War syndrome'. Formal research investigating the health of Gulf War veterans found modest associations between receipt of the anthrax vaccination and reporting more physical symptoms.^{1,2}

Although these associations have not been replicated in subsequent cohorts that were not limited to Gulf war veterans,^{3–6} the results, and the media coverage, caused a considerable amount of anxiety at the time.

2003 Iraq War

Although the UK military policy has always been to offer vaccinations only on a voluntary basis, prior to the 2003 Iraq War, the military decided to emphasize the voluntary nature of the anthrax vaccination offered to troops. This was done by implementing a programme of information to help individuals to make informed choices. There were several reasons for these changes. First, even if the science remained uncertain, in the public mind the anthrax vaccination was linked with the unexplained ill-health termed 'Gulf War syndrome' witnessed in veterans of the conflict. Second, vaccination safety in general was now an even greater cause of public anxiety following the MMR crisis, which contributed to, and was symptomatic of, a general scepticism toward vaccinations, and a reduction in public confidence.⁷ Last, at the same time, with decreasing prevalence of infectious diseases in the UK, we have witnessed general social changes about vaccination towards a focus on the risk attached to a vaccination rather than its benefits.

The change in policy, from administering the anthrax vaccination in a way that may have implied that it was compulsory, although this was not indeed the case, to one which emphasized the voluntary basis of the vaccination, reflected similar changes that have occurred in non-military public health. For instance, the medical profession is under increasing obligation to provide informed

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choice to patients when offering medical interventions.⁸ Although the aim of the 'new' process was motivated by a desire to increase confidence in the anthrax vaccination, in a previous paper we identified that the voluntary policy may have instead increased concerns and failed to address the negative health associations that were perceived to exist. In fact, many personnel actually endorsed problems with the administration of the voluntary immunization programme as reasons for why they chose not to receive the anthrax vaccination.^{9,10}

Personnel criticized the information provided to them. Personnel reported that the information did not adequately address their health concerns, they reported that the information claimed the vaccine was 100% safe, fully effective in providing protection against weapons-grade anthrax, and placed a heavy emphasis on why soldiers should accept the vaccine rather than providing a more balanced and impartial view. It is clear that many soldiers wanted the information provided to have addressed the myths surrounding the anthrax vaccination, for example, possible links to infertility and birth abnormalities.⁹ By not addressing the specific concerns held by personnel, the information provided appears to have further damaged trust, the opposite of its intended purpose.

It is important to note that the anthrax vaccination per se has not resulted in adverse long-term health outcomes, however, associations were observed between making an uninformed choice to receive the anthrax vaccination and adverse health.¹¹ Therefore it seems that making uninformed choices may have increased anxiety, symptom amplification and sensitivity, which may have caused the increase in reported adverse health, a relationship that has been demonstrated previously.^{12,13}

US postal workers

Military personnel are not alone in having been offered the anthrax vaccination as protection against biological attack. US postal workers, following the 2001 anthrax attacks were offered the vaccination. Similar concerns were voiced by the postal workers offered the vaccination. In particular, lack of trust was reported to be a highly relevant reason for choosing not to accept the vaccination, with individuals citing the controversy over the military's use of the vaccination.

The parallels between the postal workers and the UK military personnel continue. Both groups were asked to sign consent forms to receive the vaccination and both groups reported that this only further damaged their confidence in the vaccination programme.¹⁴

Discussion

So while the Armed Forces, like other employers, has a duty of care to its members, including protecting them against infectious diseases while on deployment, the research into the delivery of anthrax vaccination shows that making anthrax a 'special case' may in turn have increased occupational health worries. Thus in a situation where employers realized that trust was in short supply and thus attempted to increase confidence through a shift in policy the opposite effect was achieved. We argue that while informed consent may be desirable on ethical, or legal grounds, but it may not inevitably lead to the expected positive consequences. When providing information to allay health concerns it is imperative that the content of this information should not only address the scientific data concerned about safety, efficacy and side-effects, but also go some way to address other concerns individuals may have.

Depleted Uranium**Background**

The anthrax vaccination is not the only uncertain, and coalition produced, threat faced by members of the Armed Forces. Depleted Uranium (DU) weapons, used by coalition and not enemy forces during recent conflicts, have also been implicated as having negative effects on health. The debate surrounding DU weapons highlights another occupational contradiction between battlefield risks which are reduced by the use of DU rounds, and potential for unintended health effects. DU rounds are kinetic energy penetrators, utilizing the high density of DU rather than explosive to penetrate armour, which makes them highly effective in battle. Metallic DU is weakly radioactive and therefore contact with unbroken skin is an extremely low risk to health. However, when a DU round strikes an armoured target, it undergoes spontaneous partial combustion resulting in a fine aerosol of largely insoluble uranium

oxides. Presence of this aerosol elevates the risk of potentially chemotoxic or radiotoxic exposure via inhalation or ingestion, and fears have been expressed for potential widespread exposure among military personnel.

Use in modern warfare

Deployed in vast quantities in the 1991 Gulf War DU weapons have frequently been implicated in the unexplained symptomatic ill-health of veterans colloquially referred to as 'Gulf War syndrome'.¹⁵⁻¹⁷ Following NATO deployments to the former Yugoslavia during the 1990s, concerns for the health effects of DU increased and in 2000-2001 there were media reports of a cancer epidemic within some of Europe's peace-keeping forces with attention focused on a small number of deaths from leukaemia.^{18,19}

However, in spite of the media reports of the effects of military DU munitions subsequent environmental studies of combat afflicted Balkan regions indicated DU contamination at a level below that which is considered to pose a risk to population health.²⁰ Similarly, cancer studies have shown cancer incidence in deployed peacekeepers to be analogous to non-deployed groups.^{21,22} As yet, similar detailed studies of Iraq have not been undertaken following the 1991 or 2003 conflicts where DU munitions were used, making a credible scientific study of DU-related health effects among the health of the Iraqi population highly problematic.²³

In contrast, we know more about the likely determinants and distribution of DU exposures among military personnel. Such exposure may occur in military units that use DU munitions, such as armoured brigades, or those tasked with 'cleaning up tanks' that have been attacked with DU. Peak exposures would be expected in personnel who were in a vehicle or building when it was struck by a DU round, or entered it immediately afterwards.²⁴ Recent data from UK personnel deployed during the 2003 invasion of Iraq suggest incidents of meaningful exposure are likely to be very limited.²⁵

Discussion

So should we be surprised that DU has aroused such concern? We do know that personnel have

reported experiencing DU exposure. However, disentangling the specific influences which lead to a belief of exposure is difficult; recall bias is an important consideration for researchers. Furthermore, the reporting of military hazards following conflicts is not static and appears to be strongly associated with current self-rated perception of health. The number of personnel that report exposure to DU has been shown to increase over time and the impact of media coverage cannot be completely removed.²⁶ We also know that a large number of UK Armed Forces personnel have expressed a desire for DU screening.²⁷

Exposures to DU and receipt of vaccinations have been cited as among the determinants of Gulf War illness. However there is now a large body of evidence to suggest that, whatever the cause of the ill-health experienced by Gulf War veterans, neither DU nor vaccinations are likely to have caused them. Both, though are examples of 'own side' hazards which military personnel would not have expected to be exposed to during operational duties or otherwise. Although the battlefield contains numerous uncertain risks, we argue that those which are perceived as being due to the negligence of one's 'own side' are most likely to cause psychological ill-health.²⁸ Such a view is based upon the principles of risk communication, where not all risks are perceived equally, and risk may be perceived greater where personal control is less.²⁹ Put another way: soldiers expect to be shot at, they don't expect to be poisoned by their own side.

Superficial concerns about DU may also reflect popular misconceptions about radiation and the extent of risk radiation poses to the general population. Employers who want to effectively communicate risks to their staff need to address popular concern, even if these concerns are considered to be ill-conceived. A dismissive approach to societal unease can increase distrust in the motives of regulators.³⁰

In response to concern for DU exposure among serving and ex-serving soldiers, including those who deployed in the 1991 Gulf War or in operations in the former Yugoslavia from August 1994, the UK Ministry of Defence (MoD) launched a DU testing programme that was heavily advertised and, for most participants, free.³¹ The programme ran from September 2004 until January 2006, undertaking testing of 464 persons. The programme

ceased when uptake fell off. Although it is difficult to compare the numbers who were screened with those who might have been at real risk of exposure, Greenberg *et al.* showed that psychological health concerns were a much stronger indicator of a desire for screening than an actual likelihood of exposure.²⁷ Indeed many of those who reported having inhaled DU dust, which would suggest they were at high risk of exposure, did not want screening at all. Although the screening programme may well have been a form of psychological management, rather than a formal method of detecting those at risk of exposure, that personnel stopped using it perhaps at least suggests it was successful. This suggests that early interventions may be effective if they address fears even if the fear is related to a risk that is very unlikely.

Conclusion

Although occupational exposure to danger is an inherent part of many occupations, employers may well fail to address personnel's concerns if they focus only on the scientifically plausible risks associated with exposure. We suggest that greater effort should be invested in establishing the origins and influence of individuals' exposure concerns and that these should be rigorously addressed. Health concerns are a subject that is often inaccurately reported within the media. Both health professionals and employers should remain cognisant that while personal reports of exposure to toxic hazards may be permeated by self-perceptions of ill-health, which may appear to be of limited interest to work colleagues and the wider public, more peripheral influences, such as media publicity, can easily make such perceptions become the foundation of a serious problem nonetheless.

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