Eye in the sky: Understanding the mental health of unmanned aerial vehicle operators.

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Abstract

Background: Recent conflicts in the Middle East have seen rapid developments in the use of unmanned aerial vehicles (UAV). The Australian Government plans to acquire a number of UAVs to perform a range of operations.

Purpose: To determine whether UAV operators are exposed to greater or special risks to their mental health than other combatants.

Method: A non-systematic, narrative literature search was undertaken into the mental health of UAV operators.

Results: The adverse effect of occupational stressors, such as long working hours, on well-being and mental health outcomes emerged strongly. Prevalence rates of clinically significant symptoms of PTSD (Post Traumatic Stress Disorder) for UAV operators were found to be low, ranging between 2 - 5%.

Conclusion: These outcomes were consistent with occupational stressors found in the military context and previous findings on other military personnel with low combat exposure. This review is a first step towards establishing an evidence base to inform the management of mental health problems in UAV operators.

Keywords: unmanned aerial vehicle, drone, pilot, mental health, moral injury

Background

Unmanned aerial vehicles (UAV) are remotely controlled aircraft operated by a pilot and a sensor/weapons operator located in small, air-conditioned containers at a ground control station that may be thousands of miles away from the focus of military operations. UAVs are equipped with optical sensors that provide high-resolution images of the battlefield for intelligence, surveillance and reconnaissance (ISR) operations, which may also include coordinating attacks by local air or ground forces or the launching of strikes directly from the UAV, when armed.

The recent conflicts in the Middle East have seen rapid developments in the use of UAVs.[1] In particular, the United States' use of UAVs for ISR, as well as combat and counter-terrorism operations,[2] has greatly expanded, so much so that the US Air Force (USAF) is currently training more UAV pilots than pilots for fighter and bomber aircraft combined.[3]

The Australian Defence Force (ADF) deployed the HERON Remotely Piloted Aircraft System to Afghanistan from 2010 to 2014 to provide an unarmed ISR capability to the International Security Assistance Force. Over 400 members of all three services participated in these operations.[4] In early 2015, it was reported that Royal Australian Air Force (RAAF) personnel were already training in the United States to operate armed UAV systems[5] while the 2016 Defence White Paper announced the Australian Government's plans to acquire a number of UAVs to perform a range of ISR operations.[6]

Personal accounts of the experience of UAV operators have highlighted the emotional impact of combat operations and related ethical dilemmas,[7] while concerns have also been raised in the US about high attrition rates among UAV pilots and the risks of developing PTSD as a consequence of their duties.[8] Against this background, we ask are UAV operators exposed to higher or special risks to their mental health than other military personnel? We report the results of a literature reviewto in an attempt to answer this question.

Method

We conducted a non-systematic, narrative literature search using PubMed and Google Scholar employing the following search terms: unmanned aerial vehicle, drone, pilot, aircrew, mental health, depression, posttraumatic stress disorder, moral injury, intelligence, surveillance, reconnaissance and remotely piloted aircraft (RPA).

Results

The USAF School of Aerospace Medicine conducted a number of studies into the mental health of US UAV operators. Their first study[9] administered the Malasch Burnout Inventory-General Survey (which assesses emotional exhaustion, cynicism and professional efficacy) anonymously to groups of armed UAV operators, unarmed ISR UAV operators and non-combatant airmen. They found the unarmed ISR UAV group had higher overall rates of occupational stress (e.g. long work hours, shift work, long commuting times, delays to career progression, limited base resources etc.), as well as higher rates of high emotional exhaustion and cynicism.

A subsequent study by the same group[10] compared the results of anonymous, standardised self-report screening questionnaires measuring rates of clinical distress (Outcome Questionnaire - 45.2 (OQ-45.2)) and posttraumatic stress disorder (PTSD Check List - Military Version (PCL-M)) among armed UAV operators and non-combatant airmen. They found rates of clinical distress and PTSD were higher among UAV operators (20% and 5% respectively) compared to non-combatant airmen (11% and 2%). While these rates of PTSD were low compared to other US studies, which will be discussed later, the elevated levels of clinical distress in UAV operators seems to have raised the concerns of a command anxious to sustain a critical capability. As a result, the USAF embedded operational clinical psychologists with high-level security clearances within active duty drone units to improve access to mental health care and to try to reduce the effects of potentially traumatic events.[11]

Further work by the School of Aerospace Medicine[12] continued to find the most problematic stressors were operational (e.g. low unit manning, rotating shift work, extra duties/administrative tasks and long hours) with 11% reporting high levels of psychological distress and less than 2% with results consistent with a diagnosis of PTSD. Another self-report study from the same group found just 4.3% of armed drone operators reported clinically significant symptoms of PTSD[11] with personnel working longer hours in postings of longer duration more likely to meet criteria for PTSD.

Ortega (2013)[3], described the distinct challenges that emerged when pilots are removed from the physical battle space when operating UAVs. He argued that traditionally, military operations have been expeditionary in nature with personnel deploying overseas. This is known to have the ability to foster the development of organisational identity and unit cohesion, which has been shown to protect against combat stress. In contrast, Ortega described how US drone pilots, were exposed to 'unique stressors' related to not being overseas on deployment, instead being 'deployed in place' then driving home to the family an hour after finishing a combat sortie over the Middle East, working long hours on rotating shifts.

Further, Otto and Webber '2103'[13] retrospectively studied the mental health outcomes of USAF drone pilots and manned aircraft pilots from 2003 to 2011 via their electronic health records. They found 8.2% of drone pilots and 6% of manned aircraft pilots had recorded mental health outcomes, which consisted of diagnosed mental disorders and mental health problems, such as 'partner relationship problems' or 'family circumstance problems,' which required counselling only. Adjustment disorder and depressive disorder were the two most common diagnoses in both groups. Incidence rates for PTSD were 0.9 per 1000 persons for drone pilots (n=3, 95% CI 0.3-2.7) compared to 0.7 (n=20, 95% CI 0.4-1.0) for manned aircraft pilots. After adjustment, it was it was found that both groups had statistically equivalent rates of mental health outcomes despite self-reports of high levels of stress and fatigue reported among drone pilots. Also, the incidence of any mental health outcomes was lower in the two pilot groups compared to other USAF members from various employment groups.

Finally, Prince et al (2015)[14] assessed USAF ISR operators, who were exposed to real-time, high definition imagery working in direct support of combat operations; duties that are similar to UAV operators. Using an anonymous, web-based survey that included a comparison group of non-intelligence based personnel posted to the same units; they found higher rates of psychological distress among the intelligence operators and similar, low rates of PTSD symptoms in both groups (2.5% intelligence operators and 2% non-intelligence personnel).

Moral injury

Moral injury is a new and evolving concept that has been defined as a 'psychological state'[15] that may result from experiences that involved 'perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations'.[16] Features of this proposed condition include: feelings of guilt, betrayal, being changed by exposure to death,[17] relationship or spiritual difficulties and social alienation.[18]

While we considered that some of the duties of UAV operators had the potential to be 'morally injurious' e.g., incidents involving violence or property damage to civilians and disproportionate violence,[19] our search failed to locate any relevant articles. Nevertheless, a recent review of moral injury etc[15] concluded it was difficult to separate the features of PTSD and depression from the suggested effects of potentially morally injurious experiences, emphasiszing that the construct of moral injury remains to be validated.

Conclusions

The available literature on the mental health of UAV operators and related personnel consists only of US military studies. These anonymous surveys consistently found high levels of occupational stressors (e.g., long work hours, shift work, low unit manning) and rates of symptoms of PTSD (2-5%) that were either below or at the lower end of the range of reported PTSD symptoms found in other US military personnel returning from combat operations. One review of electronic health records of US UAV operators and manned aircraft pilots found no difference in the incidence of mental health outcomes, despite high levels of self-reported stress and fatigue in the UAV pilots. Both groups had similar, low incidence rates of PTSD.

Prevalence rates of clinically significant symptoms of PTSD between 2-5% in UAV drone operators are low when compared to twelve-month prevalence of PTSD in US civilian adults (3.5%),[20] Australian civilian adults (6.4%)[21] and members of the Australian Defence Force (ADF) (8.3%).[22] However, it is important to note that rates of PTSD in persons exposed to combat vary considerably. A meta-analysis of prevalence studies[23] found rates of combat-related PTSD in Iraq war veterans from the US ranged from 4-17% and from 3-6% in UK personnel, with a range of methodological issues suggested to explain the variation. Subsequent work comparing US and UK personnel who had deployed to Iraq, stratified respondents into high and low levels of combat exposure and found that differences in self-reported combat exposures explained most of the differences in reported prevalence of PTSD.[24] Despite the consistent findings of high levels of workplace/operational stressors among UAV operators, the risk of development of PTSD seems to be equivalent to other military personnel with low combat exposure.[24]

It is worth noting that the figure of 4.3% prevalence of clinically significant symptoms of PTSD using the PCL-M reported by Chappelle et al 2014[11] included those personnel scoring moderate (37-49) and extreme (50-85) levels, where a score of 50 is the recognised cut-off for a diagnosis of PTSD.[25] Evidence is building that sub-threshold PTSD (i.e., where persons have some symptoms of PTSD, but not a sufficient number or level of disability to meet full diagnostic criteria) is associated with delayed-onset PTSD (i.e., longer than six months after the traumatic event)[26, 27] and that delayed-onset PTSD may be more common in military populations.[28] Therefore, we believe including those with sub-threshold scores was appropriate.

With respect to the difference between prevalence rates of PTSD from anonymous surveys and the incidence rates of PTSD in the electronic health records of both UAV and manned aircraft pilots, military personnel have been found to be two to four times more likely to report symptoms of a mental disorder in anonymous surveys compared with identifiable health screens.[29] Aircrew are a highly screened and trained sample, who are known anecdotally to be particularly reluctant to present with mental health problems for fear of being grounded.[13] Furthermore, rates of help-seeking behaviour in those who screen positive for mental disorders are particularly low for US military personnel[30, 31] compared to US civilian,[32] Australian civilian[33] and Australian military populations.[22] Typical barriers to seeking mental health care reported by military personnel include: being seen as weak; concern about the risk of adverse effects on career; and believing that their leadership discouraged the use of mental health services.[22, 34, 35]

Notwithstanding the lack of research on UAV operators and the risk of moral injury, there was much debate in the literature on the morality, ethics and legality of using UAVs in combat and targeted killing. While full coverage of these issues is beyond the scope of this article, much of the debate centred on whether the vast asymmetry of drone warfare violates the laws of a just war[36-38] and whether they make war and killing 'risk-free,'[39] even to the extent that this may erode the martial virtue of courage.[40] Counter-arguments suggested there is a duty to employ technologies, such as UAVs, to protect one's own personnel when they are engaged in a just war.[41]

Finally, there is emerging evidence of the importance of differentiating between the operational demands of different types of military units.[42] Developing insights into the unique characteristics and profiling the occupational demands of UAV operations will be important to establishing practical and effective mental health prevention and support programs in the longer term. The authors recommend that UAV operators should undertake appropriately targeted psycho-education that is tailored to the unique psychological risks of the 'deployed in garrison' effect. They should be monitored long term for the likely impact of occupational stressors as well as measurement of the potential cumulative effect of their combat role. This could include the addition of a mid-tour screening activity that is tailored to address the psychological risk profile of the role. Lastly, they should be afforded the opportunity to participate in a tailored and standardised decompression and reintegration phase from the 'deployed in garrison' operational environment. While these measures would take significant advocacy and resources to establish, this review is a step towards establishing an evidence base to inform the potential recruitment, selection, training and support plans to meet the emerging mental health needs of UAV operators in the ADF.

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