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Abstract from the Literature

by
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Pflanz S, Sonnek S. Work stress in the military: Prevalence, Causes, and Relationship to Emotional Health. Mil Med 2002; 167(11): 877- 882.

OBJECTIVE
This study examined the prevalence and sources of occupational stress for military personnel and the relationship between work stress and emotional health in the military population.

METHODS
Four hundred and seventy-two active duty military personnel stationed at EE. Warren Air Force Base completed a 65-item survey that included items involving reported life events, perceptions about occupational stress and perceptions about the relationship between work stress and emotional health.

RESULTS
These military personnel were significantly more likely to report suffering from work stress than civilian workers ($p<0.001$). 26% reported suffering from significant work stress, 15% reported that work stress caused them significant emotional stress and 8% reported experiencing work stress that was severe enough to be damaging to emotional health. Generic work stressors were endorsed more frequently than military-specific stressors.

CONCLUSIONS
More than on e-quarter of this sample of military personnel reported suffering from significant work stress and a significant number of these individuals suffered serious emotional distress. These results support previous research suggesting that work stress may be a significant health hazard in the US military.

COMMENT
The latest ADF attitudinal survey was published in April 03. For the first time it asked about wellness. The figures for a negative impact on 'emotional health' were much lower than 25%, but of course, the same questions were not being asked. It was interesting that RAAF seemed to have the highest wellness level (self-reported). If that is reflected in the US, what does that say about emotional health in the Navy, Army and Marines? It would be interesting indeed to see a comparison between military and civilian emotional health in Australia. I suspect that we would not see a significant difference in the way this US study has.

Agazio], et al. Evaluation of a Virtual Reality Simulator in Sustainment Training. Mil Med 2002; 167(11): 893-897

Is there a better way to train and prepare our health care personnel to function in a chemical biological environment while continuing to provide for patient care in a variety of healthcare settings? The purpose of this pilot work was to compare the effectiveness and user satisfaction of the Cath-Sim Intravenous training system to the traditional IV arm model for teaching and achieving competence at IV insertion while in Mission-Oriented Protective Posture Level 4 for Army medical personnel. Grounded in Adult Psychomotor learning principles and in an established evaluation model, participants were tested on both the traditional IV arm and Cath-Sim models and then allowed to practice on each model at MOPP-4. One week later, participants were again tested on both models. Outcome measures included (1) a computer-generated score sheet measuring time to success and criterion success/non-success on the Cath-Sim (2) time and success rating for IV insertion on the IV arm model and

(3) satisfaction evaluations completed by the participants. There were conflicting evaluation scores for recommending one model over another. Participants felt there was some benefit to each model depending on user, setting and purpose.

COMMENT
Well, I think that the question is bigger than the one posed by the researchers. It is assessing in the military environment, and particularly skills maintenance issues when deployed, computer-based simulation tools. This study was inconclusive. It was suggested that the Nann could be used in field settings and Cath-Sim in fixed facilities, but this really seems to be missing the point - it should be the field situation that needs the most realistic training. There is considerable interest in simulation in the ADF, and this should be part of an 'e-health' capability in the future.

Pouliot Z, et al. Sleep disorders in a Military Population. Mil Med 2003; 168(1): 7-10.

INTRODUCTION
Sleep disorders are common in the civilian population but little is known about which sleep disorders are common in members of the military. This article com pares a group of military personnel referred to our sleep disorders clinic with a group of civilian controls also referred to our clinic.

METHODS
We analysed the data of 70 Canadian military personnel and 70 civilian controls matched for age and gender. All subjects had full polysomnography. We compared the reasons for the referral and final sleep diagnoses for both groups.

RESULTS
The mean age of each group was 40.8 +1- 7.0 (military) and 40.8 +1- 7.3 (civilians) and there were 61 men and 9 women in each group. Both groups were obese (BM I 30.2 +1- 5.3 v 32.5 +1- 6.9). Both groups were also pathologically sleepy during the day (Epworth Sleepiness Score 10.4 +1- 4.6 v 11.3 +1- 5.4). The majority of referrals in each group were to rule out a sleep breathing disorder (66% v 79%, not significant). Only military patients were referred to rule out a movement disorder (17.1% v 0%, 95%CI8.4%- 27.6%, $p<0.05$). Fewer military were referred because of excessive daytime sleepiness or insomnia (7.1% v 20.0%, $p< 0.05$). The most common diagnosis confirmed in both groups was a sleep breathing disorder (53% v 66%, p not significant).

CONCLUSIONS
The range and distribution of sleep disorders seen in the military population is similar to that in a civilian population. Both groups were overweight and sleepy and were found to have SBD and movement disorders.

These findings underscore the importance of diagnosing and treating sleep disorders in both groups. The neurocognitive impairment associated with SBD and movement disorders impact highly on the ability of these groups to safely perform their jobs.

COMMENT
This study looked at military and civilian patients referred to a sleep disorder clinic. It did not look at prevalence in the military compared to matched civilians. It did not address the issue of the significance of sleep disorders in the military -particularly fatigue, decision making, errors, and impact on colleagues, especially if having to share sleeping quarters. It is but a descriptive cross-sectional analysis and more needs to be done to define just what the burden of sleep disorders actually is.

Booth C, et al. The physiological and psychological effects of Combat Ration feeding during a 12-day training exercise in the tropics. *Mil Med* 2003; 168(1): 63-70

The health and psychological effects of combat ration pack (CRP) feeding during 12 days of military training in a tropical environment were investigated. Three groups of air defence guards received either: freshly prepared

foods (fresh group, 15 MJ, 3600 kcal, N=l3), full CRP (15 MJ, N=10) or half CRP (7.5MJ, N=10). Underconsumption by the full CRP group resulted in CRP groups experiencing similar weight loss, protein catabolism and immune suppression (both cell-mediated and humoral) whereas the fresh group maintained their weight and protein balance and cell-mediated immune status. CRP groups reported greater fatigue than the fresh group. All ADGs experienced poor sleep quality and declining folate and iron status. ADGs drank insufficient water to prevent dehydration. In the medium term, ADGs were able to adapt to restricted food consumption and poor sleep quality with no decrement in physical fitness or cognition.

COMMENT

Numerous issues come out of this study, including the under consumption of full CRPs: the first food to be dis-carded tends to be carbohydrates and how to ensure the available energy and micronutrient s are consumed. Second is the issue of how long is it safe for personnel to be consuming solely CRPs before fresh rations are required to avoid significant decrement in performance and potentially adverse health outcomes. Those questions are being considered by the Defence Nutrition Research Centre of DSTO, whose research this is.

Rice G, et al. Incidence of Decompression Sickness in Hypoxia Training with and without 30 min 02 Prebreathe. *Aviat Space Environ Med* 2003; 74(1): 56-61

BACKGROUND

All naval aviators, navigators and aircrewmen are required to participate in hypoxia familiarisation training. This training is performed in a hypobaric chamber and is considered high risk due to the potential for barotrauma and/or decompression sickness. Prior analysis of the DCS in US Navy hypobaric chambers revealed a significantly higher incidence amongst inside observers (10s) compared with students. In response to these reports, all 10s are required to denitrogenate using 100% Oxygen for 30 min prior to altitude exposure (prebreathing). Although the Army, Navy and Air Force pre-breathe for 30 min prior to most hypobaric exposures, there have been no reports validating the efficacy of this measure. This study examined the incidence of altitude DCS during training exposures to simulated altitudes of 25,000 ft and 35000 ft in 10s and students, some of whom pre-breathe and some whom did not.

METHODS

Exposures and DCS cases for a period of 9 yrs. were tabulated from training reports maintained at the Naval Operational Medicine Institute at Pensacola, FL. Chi-squared or Fisher's Exact test was used to compare the data sets and $p< 0.05$ was considered significant.

RESULTS

The overall DCS incidence for students and 10s for all chamber profiles was 0.25%. The incidence for 25,000 ft was 0.29% for students who did not pre-breathe and 0.15% for 10s who did ($p=0.10$). Within the student group there was a 0.44% DCS incidence for 25,000 ft with no pre-breathe and a 0.17% incidence for 35,000 ft with pre-breathe. ($p=0.004$).

CONCLUSION

A 30-min pre-breathe prior to altitude exposure appears to contribute to a reduction in the risk of DCS during hypobaric chamber training.

COMMENT

In the ADF, we have been requiring instructors and students to pre-breathe for 30 minutes for the last 10 years. Certainly, physiological principles suggest this must reduce the risk of Decompression Illness. This study has confirmed that principle. It is interesting that it is only a requirement for students: what is the acceptable risk profile for students? It seems a 1 in 200 exposure risk of DCI is acceptable, based on 0.44% incidence with no pre-breathing at 25,000 ft. If pre breathing can reduce this, then I see no justification for not pre breathing students as well as instructors.

Hall S, et al. Food for Thought: The use of Hazard and Critical Control Point Analysis to Assess Vulnerability of Food to Terrorist Attack in Deployment Locations. *Mil Med* 2002; 167(12): 1006-1011.

As part of a screening study, a literature review, personal interviews and fieldwork at several deployment locations, we examined the historical use of biological warfare agents and the vulnerability of food at military deployment locations to a bioterrorist attack. The results of our experience suggest the following: historically, food has occasionally been used as a weapon by individuals; a benchmark procedure already exists to evaluate and ensure the safety of foods procured and used by the US federal government, and food sources at the deployment locations examined are vulnerable to terrorist attack as determined by critical point analysis. Recommendations to potentially decrease the vulnerability of the US military food supply to intentional contamination are also provided.

COMMENT

There were really surprisingly few intentional contamination events identified in the US over fairly recent times. The opportunities and potential consequences should make food contamination a popular option for terrorists in the future.

Curry I. An Analysis of Routine Blood Testing of British Army Pilots. *Aviat Space Environ Med* 2003; 74(4): 332-336.

BACKGROUND AND OBJECTIVE

The purpose of the study was to ascertain what had been discovered in the 15 yr. that the British Army has been conducting a program of routine blood testing on its pilot population. These results were to be analysed with respect to the causes of medical retirement, change in flight status on medical grounds, accidents, incidents and sudden incapacitation in flight.

METHODS

Data were collected from the records of 408 aircrew and comprised 1213 records of test batteries. Each battery consisted of complete blood count, erythrocyte sedimentation rate, urea and electrolytes, liver function tests, fasting glucose, thyroid function tests and fasting lipids. Altogether 8491 tests were considered. They were analysed for degree of abnormality, subsequent action, resultant diagnosis and therapeutic interventions.

RESULTS

The positive predictive values for the tests ranged between 2% and 33%. The overall percentages of tests that resulted in diagnosis were between 0.08% and 3.5%, and therapeutic intervention between 0.08% and 3.4%.

CONCLUSIONS

No evidence to support the continuation of routine blood testing was found other than in the case of lipid estimation. Although this had the highest diagnostic yield, abnormal results were dealt with in an inconsistent manner. Further, the testing was shown to have no predictive value in any of the adverse pilot outcomes mentioned above. Recommendations to alter future practice have been made and accepted in full by the Aviation Medicine hierarchies of all three UK Services.

COMMENT

Much is made in this review of the low diagnostic yield and lack of any relationship of positive results to aviation outcomes, and the decision was made to ditch the annual screening in favour of ab initio screening and a cardiac screen at age 40. With most of this, I am in agreement; where I have difficulty is that the prevention of just one mishap would be sufficient to justify such a program over many years. The identification of an avoided mishap is practically impossible. There seems to have been almost no discussion about blood glucose. In the period of the review, 3 aircrews were diagnosed with diabetes. One of these was through the test battery. It is not discussed how the other two presented. I am at a loss to figure out how the resultant decision was to ditch the blood glucose examination.

Thomas T. et al. Health of US Navy Submarine Crew during Periods of Isolation. *Aviat Space Environ Med* 2003; 74(3): 260-265.

BACKGROUND
An essential element in planning for long-term space missions is the prediction of the medical support required. Medical data for analogous populations serving in isolated and/or contained environmentals are useful in predicting the health risks for astronauts.

METHODS
This study evaluated the rates of health events that occurred among a highly screened, healthy military population during periods of isolation using a centralised database of medical encounter records from US Navy submarines. The study population was composed of US Navy officers and enlisted men deployed on 240 submarine patrols between 1 Jan 1007 and 30 Sep 2000.

RESULTS
A total of 1389 officers and 11952 enlisted crew members served aboard participating submarines for 215086 and 1955521 person-days at sea, respectively, during the study period. Officers had 214 initial visits to medical staff with 79 revisits for the same condition during these patrols, while the enlisted men had 3345 initial visits and 1549 revisits. Among officers, the most common category of medical events was respiratory illnesses (primarily upper respiratory infections) followed by injury, musculoskeletal conditions, infectious diseases, symptoms and ill-defined conditions and skin problems. Among enlisted men, the most common category of medical events was injury, followed by respiratory illnesses, skin problems, symptoms and ill-defined conditions, digestive disorders, infectious conditions, sensory organ problems and musculoskeletal conditions.

CONCLUSION
Potential mission impacting medical events reported were rare; i.e. among a crew of seven officers, only one medical event would be expected to occur during a 6-month mission and result in less than a day of limited or no duty. Among a crew of seven enlisted men, about two medical events would be expected during a 6-month mission and result in about 1 day of limited or no duty per medical event.

COMMENT
Interesting the justification for the study - looking for predictions of space flight health problems, rather than that the submarine environment in and of itself justified the study. The population was also all-male, so immediately of limited value. The absence of psychological diagnoses may reflect a true absence, a reluctance to report, or a diagnostic bias. Anyway, if there are truly few episodes where medical events of any kind lead to problems during a 6-month submarine mission, that augers well for space exploration as well as for future submarine missions.