WG 4 (Physiological Health)

From Training Grounds to the Frontlines: Insights and Challenges - Lessons from the Swords of Iron War

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Background:
The IDF operates in extreme heat, where exertional heat injuries (EHI) are a persistent risk. Training enforces strict safety guidelines to prevent EHI, yet injury rates remain high. Paradoxically, during the "Swords of Iron" war—despite the absence of such guidelines in combat—EHI cases were unexpectedly low, even in Israel's hot summer.
Purpose:
This study examines the contrast between EHI incidence in training versus combat, exploring risk factors, mitigation strategies, and operational conditions.
Methods:
Data on heat injuries from both training and combat scenarios were analyzed, supplemented by a survey of medical officers and commanders. A retrospective review examined exertional heat injury (EHI) cases from the war, while qualitative insights explored exertion levels, hydration, and cooling measures in combat settings.
Results:
Contrary to concerns, only seven EHI cases occurred during combat, compared to 35 in training. Surveys showed 70% of soldiers rated combat exertion as moderate, attributing lower EHI rates to adaptive pacing, mission-driven exertion, and natural cooling opportunities. Despite the absence of formal prevention protocols, commanders pragmatically integrated hydration and cooling strategies.
Conclusion:
The paradox between training and combat suggests adaptive exertion, passive cooling, and mission pacing help reduce EHI risk. Unlike training's rigid protocols, combat conditions fostered a flexible yet effective approach. Logistical support—hydration, cooling, and environmental adaptations—proved essential, highlighting the need for adaptive, mission-driven heat mitigation strategies in military planning.

WG 4 (Physiological Health)

Advancing IDF Exertional Heat Injury Registries: Insights, Biomarkers, and Applications

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Background:
Exertional heat illness (EHI) is a major concern for military personnel operating in hot environments. In the Israeli Defense Forces (IDF), all service members with EHI undergo evaluation at the Institute of Military Physiology before return-to-duty (RTD) decisions. The IMP database records demographics, clinical presentation, risk factors, lab results, and RTD outcomes. From 2014 to 2021, RTD decisions were based on heat tolerance testing, whereas from 2022 onward, they have been physician-based.
Methods & Data Overview:
As of 2024, our database includes 686 evaluations: 474 from 2014–2021 and 212 from 2022–2024. This registry enables the identification of potential risk factors, risk markers, and biomarkers for heat intolerance (HI).
Findings:
We identified the lactate dehydrogenase to creatine phosphokinase (LDH/CPK) ratio as a potential risk marker for HI, with a higher ratio significantly associated with increased odds of HI (OR=3.35, 95% CI 1.74–7.95). Additionally, our analysis revealed an ethnicity-dependent association between creatine phosphokinase (CPK) levels and HI among the IDF Jewish population. Higher CPK levels were linked to increased odds of HI in Ashkenazi Jewish soldiers (OR=1.18, 95% CI 1.04–1.40) but were associated with decreased odds in non-Ashkenazi individuals (OR=0.33, 95% CI 0.04–0.82). Beyond biomarkers, we explored how the IDF Heat Illness Registry aids return-to-duty decisions after exertional heat stroke, optimizing safety and readiness. We also examined how registry data improves heat intolerance prediction, enabling early risk identification and prevention.
Conclusion & Future Directions:
The IDF Heat Illness Registry is a vital tool for identifying novel risk markers and improving our understanding of HI in military personnel. While CPK and LDH/CPK show promise as biomarkers, validation in larger cohorts is needed. Expanding research and collaborating with international military institutions, such as in the U.S., could refine these findings and enhance heat illness prevention strategies.