Occupational Noise Induced Hearing Loss (NIHL): Resounding Effects throughout the Department of Defense (DoD)

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Overview

• Introduction
  • Background
  • Scope of problem
• Purpose
• Literature Review
• Methods
• Results

• Discussion
  • Implications for public health?
  • Strengths?
  • Weaknesses?

• Conclusion
Introduction

- Noise-induced hearing loss (NIHL) is one of the top occupational health hazards
- Affects 1.3 billion people worldwide
- Over $1 billion paid out in 2009 for NIHL compensation cases in the US
- NIHL is the top occupational health expense and is only increasing every year

Photo credit: http://www.gulfcoasthearingaids.com/2015/10/31/age-related-hearing-loss/
• Department of Defense (DoD) consists of the Army, Navy, Marine Corps, Air Force
  • Over 3 million personnel
  • Operates under a $419.3 billion budget
  • DoD personnel include both civilians and active duty
• DoD personnel are at increased risk due to unique job duties
  • Industrial jobs
  • Aircraft carrier jobs
  • Use of firearms
  • Combat situations
Combat noise harms soldier’s hearing

Ear plugs are recommended for volumes 85 decibels or above. Without them, instant ear damage occurs at about 140 decibels.

Approx. maximum volume
In decibels

Vacuum 60-85

Violin 84-103

Chinook helicopter 100

Ticking watch 20

Headphones 100-110

Tank 114

Grenade 160

SOURCE: American Tinnitus Association

Photo credit:
http://www.nbcnews.com/id/23523729/ns/health-health_care/t/hearing-loss-silent-epidemic-us-troops/#.V51FC45zIwI
Introduction (continued)

- Effects of NIHL include:
  - Permanent disease and disability
  - Negative effects on mental and physical health
  - Decreased ability to perform activities of daily living, quality of life
  - Decreased ability to perform job duties sometimes resulting in job loss
  - Increased costs (disability claims, medical treatment, decreased productivity, etc.)
  - Ultimately negatively impacts national security

Photo Credit: http://unseeking59.rssing.com/chan-39442190/all_p4.html
Purpose

• Despite such significant impacts, NIHL is completely preventable
• DoD Instruction 6055.12 provides minimum hearing conservation program (HCP) requirements
• No local HCP exists for commands at Naval Air Station North Island (NASNI)
• Development of a local policy is needed to improve NIHL prevention
• Hearing protective device (HPD) efficacy is dependent on:
  • Personnel compliance
  • Proper fit dependent on technique
  • Proper fit dependent on individual ear anatomy

• No provision in the current HCP objectively measures efficacy of HPD’s

Photo credit: http://www.globalsafetyco.com/images/ppe_ear.jpg
Purpose (continued)

• Annual hearing conservation education is required per current HCP policy
  • No individualized education or training is offered
  • No assessment of education efficacy, such as student assessments, is required
  • Topics are specified but there is no further guidance or involvement of education professionals

Photo credit: http://mccollumhearingcenter.com/wp-content/uploads/2013/02/images.jpg
Purpose (continued)

- Education is key due to several barriers to HPD compliance:
  - Work culture
  - Stigma
  - Self-perception
  - Comfort and fit issues
  - Bulkiness of additional required personal protective equipment (PPE)
- No formal periodic program evaluation process

Literature Review

• Lack of high quality evidence regarding hearing loss prevention programs especially long term studies
• High risk of bias due to confounding factors (age, prior hearing loss)
• Difficult to pinpoint success of specific interventions in studies involving multimodal HCP’s
Literature Review (continued)

• Lack of high quality evidence may be due to strict noise regulations preventing in-field experimentation

• Available peer-reviewed literature supports:
  • Individualized fit testing to include personal attenuation ratings (PAR’s)
  • Individualized education and training
  • Use of the Health Belief Model in education planning
  • Use of the biopsychosocial approach to program planning

Methods

• Multi-method observational inquiry
  • Literature reviews
  • Field observation including worksite tours
  • Interviews with subject matters experts

• Collaboration with various departments across multiple bases in San Diego, CA
  • Audiologists
  • Industrial Hygienists
  • Occupational Medicine Professionals
  • Policy Developers
  • Safety Officers
  • Worksite Supervisors
Results

• Recommendations to be used in the development of a local HCP were derived based on:
  • Peer-reviewed literature reviews and research
  • Multi-departmental collaboration via site visits and interviews
  • Thematic analysis of subject matter expert interviews

Photo credit: http://www.expertmediacoach.com/images/interior/microphones.jpg
Results (continued)

• The following recommendations to be used in the development of a local HCP are proposed:
  • Clearly define roles of each department
  • Establish leadership role (local audiology department)
  • Increase communication across all departments

Photo credit:
Results (continued)

• (recommendations continued)
  • Establish specific data reporting requirements (periodicity, audiometric trends by workplaces and professions)
  • Develop an individualized fit testing program that includes 1:1 education and training, attenuation testing
  • Revise educational curriculum incorporating HBM and biopsychosocial approaches

Photo credit: http://returnlogistix.com/Content/images/reporting.png
Results (continued)

• (recommendations continued)
  • Establish tools to evaluate the efficacy of HCP educational interventions
  • Develop a periodic process improvement program
    • Continuous quality improvement models
    • Multi-departmental program evaluation
    • Formal audit process

Photo credit:
https://uclafirstyearexperience.wordpress.com/2015/10/
Discussion

• Limitations encountered:
  • Lack of data to be analyzed to evaluate efficacy within the current HCP
  • Lack of data available affected study design
  • Lack of high quality evidence in peer-reviewed literature databases
  • Fragmentation of chain of command in current HCP
  • Field experience and site visits sometimes difficult due to various occupational hazards and security clearance issues

Photo Credit:
https://anmolkarnik.wordpress.com/2012/09/18/seal-team-six/
Discussion (continued)

• What lies ahead?
  • Address ototoxic chemicals and vibration hazards contributing to NIHL
  • In-field instead of clinical PAR measurements to more accurately assess HPD efficacy
  • Workplace leadership training to address workplace culture and safety climate to improve overall workplace safety

Photo credit: http://unseeking59.rssing.com/chan-39442190/all_p4.html
Conclusion

• Although engineering controls should continue to be the first line in NIHL prevention, improving administrative controls like developing a local HCP is also crucial in NIHL prevention

• A need exists to develop a local HCP to improve NIHL prevention by incorporating various evidence-based strategies

• Proposed recommendations set the foundation to develop a local HCP to ultimately achieve more effective NIHL prevention

• Expansive impacts on NIHL prevention are possible with a successful local HCP serving as a model for DoD-wide HCP policy and even private enterprises
References


References (continued)


References (continued)


