Correlations between Outcome Scores

“Firefighter Hearing Health”

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Acknowledgements

- Participants from fire departments in CA, IL, & IN
- Omaha System Partnership for Knowledge Discovery and Health Care Quality
Introduction

• Noise-induced Hearing Loss (NIHL):
  One of most prevalent occupational injuries among firefighters in the U.S.

• Need in measurement of outcomes of hearing loss prevention programs

• “Omaha System Problem Rating Scale for Outcomes”:
  Standardized language represent health outcomes relative to hearing problem
Modeling Relationships

• It is difficult to understand relationships between educational interventions, behavior changes, and health outcomes.

• Omaha System Knowledge, Behavior and Status framework enables investigation of associations between hearing health outcomes
Purpose

• “Correlations” between standardized hearing health variables
  - KBS variables by definitions of Omaha System rating
Method

- Secondary analysis from

Internet-based survey

Hearing assessment

Knowledge

Behavior

Status

(*) S.I.R.E.N. (Safety Instruction to Reduce Exposure to Noise and Hearing Loss)
Participants

- **346 firefighters from CA, IL, and IN**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>45</td>
</tr>
<tr>
<td>Years of work in fire service</td>
<td>17</td>
</tr>
<tr>
<td><strong>Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Ethnicity (Caucasian or White)</td>
<td>81</td>
</tr>
<tr>
<td>Gender (Male)</td>
<td>94</td>
</tr>
<tr>
<td>Loud noise exposure at job site (daily/weekly)</td>
<td>84</td>
</tr>
<tr>
<td>Standardized Outcomes</td>
<td>Omaha System Rating</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>Ability of the client to remember &amp; interpret information</td>
</tr>
<tr>
<td></td>
<td>1=no knowledge</td>
</tr>
<tr>
<td></td>
<td>5=superior knowledge</td>
</tr>
<tr>
<td><strong>Behavior</strong></td>
<td>Observable responses, actions, or activities of the client fitting the occasion or purpose</td>
</tr>
<tr>
<td></td>
<td>1=not appropriate behavior</td>
</tr>
<tr>
<td></td>
<td>5=consistently appropriate behavior</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Condition of the client in relation to objective and subjective defining characteristics</td>
</tr>
<tr>
<td></td>
<td>1= extreme signs/symptoms</td>
</tr>
<tr>
<td></td>
<td>5=no signs/symptoms</td>
</tr>
</tbody>
</table>
Data Analysis

- SPSS 18.0
- Descriptive statistics
- Nonparametric analysis
  - “KBS” variables are categorical variables with skewed distributions
  - Spearman’s rho correlations
**Correlations between “KBS”**

The level of statistical significance: $p<.05$

<table>
<thead>
<tr>
<th>Scale</th>
<th>Knowledge</th>
<th>Behavior</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Behavior</td>
<td>0.13</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Status</td>
<td>-0.07</td>
<td>0.12</td>
<td>1</td>
</tr>
</tbody>
</table>

$\rightarrow$ Significant correlation: knowledge-Behavior & Behavior-Status
**Conclusion**

- Firefighters having higher-level knowledge on NIHL used HPDs more frequently.
- Firefighters frequently used HPDs showed better hearing status.

**Future studies**
- Comparison between the baseline and the current hearing assessments of firefighters
- Compare between the “KBS” scores to other populations of interest for the hearing problem

(*) NIHL: Noise-induced hearing loss, HPD: hearing protection device
Implications

• Standardizing health data will create opportunities
  • further analysis of the way in which knowledge-behavior-status changes occur.
  • enable data exchange across occupational health and other care settings.
• Data exchange will support population-based hearing health assessments and outcomes.
Thank you! & Questions!

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