Development of a questionnaire to assess Knowledge, Attitudes and Behaviors towards hearing loss prevention using the constructs of the Health Belief Model

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Motivation

• People are generally resistant to changing health behavior (Rollnick et al, 1992)

• Health behavior models can be applied to understand attitudes and behaviors towards hearing conservation

• Health Belief Model (HBM) – Rosenstock, 1966
  • 6 factors: perceived susceptibility, severity, benefits, barriers, self-efficacy, and cues to action
  • Has been used in several hearing conservation related studies, however none have developed psychometrically-validated questionnaire to assess all 6 factors of the HBM
<table>
<thead>
<tr>
<th><strong>Individual’s own judgment of</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Perceived Susceptibility</strong></td>
<td>I believe noise can damage my hearing.</td>
</tr>
<tr>
<td><strong>Perceived Severity</strong></td>
<td>I believe hearing loss has negative consequences.</td>
</tr>
<tr>
<td><strong>Perceived benefits</strong></td>
<td>I believe preventing hearing loss would be beneficial to me.</td>
</tr>
<tr>
<td><strong>Perceived barriers</strong></td>
<td>I believe that there are negative factors associated with protecting my hearing.</td>
</tr>
<tr>
<td><strong>Self-efficacy</strong></td>
<td>I believe I can use/learn to use hearing protection to prevent NIHL.</td>
</tr>
<tr>
<td><strong>Cues to Action</strong></td>
<td>I have a friend who has hearing loss. I saw an ad for earplugs.</td>
</tr>
</tbody>
</table>
Health Belief Model

Perceived Susceptibility and Perceived Severity → Subject characteristics and Self-efficacy → Perceived Threat → Cues to Action → Perceived Benefits minus Perceived Barriers → Likelihood of health-promoting behavior
Goals

• How does one evaluate the effectiveness of a hearing conservation program?

• Develop a psychometrically validated questionnaire, known as the knowledge, attitudes, and behaviors questionnaire (KAB) to assess the constructs of the HBM related to hearing conservation.

• Develop a measure that is sensitive to change.

• Evaluate the relationship between scores on the KAB and reported hearing conservation behaviors.
We wanted the KAB to consist of 3 sections

• **Knowledge (K):** assess knowledge about the auditory system, NIHL, and hearing conservation

• **Attitudes (A):** assess attitudes towards hearing, hearing loss, and hearing conservation using HBM constructs

• **Behaviors (B):** assess behaviors associated with participation in noisy activities and use of hearing protection
KAB Development

Knowledge – 21 questions
Attitudes – 34 questions
Behaviors – 10 questions
Knowledge – 21 questions
Attitudes – 34 questions
Behaviors – 10 questions

5 Knowledge & 8 Attitude questions removed due to scores at ceiling or low variance

Data merged with original data set (total n = 225; age range 18-80; 117 males)

Additional data collected using modified version

Principal component analysis (PCA) and reliability analyses were used to extract psychometrically valid scales

Knowledge – 16 questions
Attitudes – 22 questions
Behaviors – 10 questions
Knowledge

Hearing an extremely loud sound just once can cause someone to lose some hearing.

a) I know this is True
b) I think this is True
c) I’m not sure
d) I think this is False
e) I know this is False

People with hearing loss caused by loud sounds can hear normally again if they wear a hearing aid.

a) I know this is True (+1)
b) I think this is True (+1)
c) I’m not sure

d) I think this is False (0)
e) I know this is False (0)
Attitudes

Six factors:
• Perceived susceptibility
• Perceived severity
• Perceived barriers
• Perceived benefits
• Perceived self-efficacy
• Cues to action

2-7 items per factor
Attitudes - Perceived susceptibility

The advantages of protecting my hearing are greater than the disadvantages.
   a) I strongly agree (+2)
   b) I agree (+1)
   c) I’m not sure (0)
   d) I disagree (-1)
   e) I strongly disagree (-2)

Perceived severity

Having a hearing loss will limit my social activities.
   a) I strongly agree (+2)
   b) I agree (+1)
   c) I’m not sure (0)
   d) I disagree (-1)
   e) I strongly disagree (-2)

Perceived benefits

I see value in spending money to protect my hearing.
   a) I strongly agree (+2)
   b) I agree (+1)
   c) I’m not sure (0)
   d) I disagree (-1)
   e) I strongly disagree (-2)
### Perceived barriers

Earplugs are uncomfortable.
- a) I strongly agree (-2)
- b) I agree (-1)
- c) I’m not sure (0)
- d) I disagree (+1)
- e) I strongly disagree (+2)

### Perceived self-efficacy

My lifestyle makes it difficult for me to protect my hearing.
- a) I strongly agree (-2)
- b) I agree (-1)
- c) I’m not sure (0)
- d) I disagree (+1)
- e) I strongly disagree (+2)

### Cues to action

I know where to go to buy hearing protection.
- a) I strongly agree (+2)
- b) I agree (+1)
- c) I’m not sure (0)
- d) I disagree (-1)
- e) I strongly disagree (-2)
Behaviors

How often do you use gas powered machinery or power tools (lawn mower, leaf blower, chainsaw, power drill, etc)?

a) Never
b) A few times a year
c) A few times a month
d) A few times a week
e) Almost every day

On average, how long do you use them each time?

a) 1-15 minutes
b) 16-30 minutes
c) 31 minutes-1 hour
d) 2 hours
e) More than 2 hours

When using gas powered machinery or power tools do you use hearing protection?

Yes → Why?
No → Why?
Sometimes → When I do → Why?
When I don’t → Why?

After using these tools, how often do you have ear pain or “ringing” sounds in your ears?

a) Always
b) Often
c) Sometimes
d) Rarely
e) Never
Results - Knowledge

Figure 1. Distribution of percent correct score on Knowledge scale

Mean = 62.4%
S.D. = 9.3
Results - Attitudes

Mean and SD of baseline scores on Attitudes scales

[Diagram showing mean and SD of baseline scores for Susceptibility Severity, Benefits, Barriers, Self-efficacy, and Cues to Action]
Results - Behaviors

Percentage of participants engaging in each activity at least occasionally

- Listen to music
- Attend concerts
- Use power tools
- Work in noise
- Play musical instruments
- Target shoot
- Ride motorcycles
- Hunt
- Attend car/motor races

Graph showing the percentage of participants engaging in various activities.
Use of hearing protection when working in noise

Comparisons by use of HPDs
F=7.57, p=0.001
Yes vs. No: p=0.001
Sometimes vs. No: p=0.011
Use of hearing protection when using gas-powered machinery/power tools

Comparisons by use of hearing protection
F=6.05, p=0.004
Yes vs. No: p=0.001
Sometimes vs. No: p=0.028
Use of hearing protection at musical events

Comparisons by use of HPDs
F=2.69, p=0.073
Percentage of hearing protection use per activity

- Attend concerts
- Use power tools
- Work in noise
- Play musical instruments/sing
- Target shoot
- Ride motorbikes/ATVs
- Hunt
- Attend car/motorbike/truck races

- Yes
- Sometimes
- No
Note: Participants selected all applicable reasons, thus totals can be greater than 100%
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Limitations & Future Directions

• Test-retest was not formally examined in this present study, but we hope to do so in the future.

• Would be good to explore “other” reasons for using or not using hearing protection.

• Needs to be validated with additional datasets.
Conclusions

• The KAB is a valid and reliable tool for assessing knowledge, attitudes, and behaviors towards hearing loss and hearing protection within the framework of the HBM

• A standardized outcome measure can help direct the content of future hearing education programs

• Use as an outcome measure and ability to be sensitive to change will be discussed at this afternoon's talk
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THANK YOU!