A prospective study on the prevention of hearing loss through hearing conservation lessons and parental awareness: Assessment of elementary, middle and high school aged children

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Introduction

Children with high frequency hearing loss have more learning difficulties and behavior problems than children with normal hearing (Anderson, 1987). Children with minimal sensorineural hearing loss scored significantly lower on the Comprehensive Test of Basic Skills, and exhibited more behavioral problems and lower self-esteem (Beas, et al. 1998). Noise Induced Hearing Loss (NIHL) causes permanent damage to hearing, and is a recognized problem in the industrial world. NIHL does not only affect adults. Niskar et al. (2001) estimated 12.5% of children and adolescents aged 6–19 years (approximately 5.2 million) have suffered permanent damage to their hearing from excessive exposure to noise. Questionnaires administered to 479 fourth and fifth graders indicated that only 50% knew that hearing protective devices could protect them against noise, and 28% did not intend to adopt any protective behavior towards noise, the main reason being the lack of knowledge (Chen et al., 2008).

Research has demonstrated that parental involvement can have a significant positive impact on other child-related health issues, such as obesity (Andrews et al., 2010), smoking (Paek, 2008), and alcohol consumption (Austin & Chen, 2003). In this paper, we seek to determine if increasing the awareness of parents by providing information regarding the causes and prevention of NIHL to the parents/caregivers of students who receive hearing conservation education in the classroom has a positive effect on students’ knowledge retention and attitudes regarding hearing and hearing loss prevention. We hypothesize that disseminating supplemental materials for students to review at home with their parents will improve retention of hearing conservation information, as assessed by multiple choice test.

Methods

Participants:

Two hundred children (6 to 15 years-of-age, 102 boys, 98 girls) served as participants. Data was obtained from four groups of children: Group 1: First Grade, 5-6 years of age; Group 2: Fourth Grade, 9-10 years of age; Group 3: Seventh Grade, 12-13 years of age; Group 4: Ninth Grade, 14-15 years of age. An informational letter was sent to all parents explaining the study with an opt out waiver attached. If the parent did not want their child to participate, they could fill out the waiver and return it to the child’s teacher prior to data collection. An Oral Assent was also read to each group before the lecture was given. This study was approved by the Internal Review Board of Wayne State University.

Procedures:

A lecture on hearing conservation was presented to four groups: First Grade, Fourth Grade, Seventh Grade and Ninth Grade. Each lecture addressed the same material in an age appropriate manner. The lecture duration was approximately 30 minutes and covered basic anatomy of the ear, how noise exposure can cause permanent hearing loss, and how children can protect their ears. Immediately after the lecture a test was given to the children. Half of each grade received supplemental information, and a request was made that they review the provided information with their parents. The other half of the group received no supplements. A post test was given to all students three weeks later to see how much information the students retained and if parental involvement made a difference in the retention of knowledge.

Results

The data is displayed in the box and whisker graph below. Figure 1 shows four separate graphs, each one represents each grade. Each grade is separated into 3 tests. Test 1 represents the mean score directly after the lecture for all the children. Test 2A represents the mean score for the children who did not receive parental supplements, 3 weeks after the initial lecture. Test 2B represents the mean score for the children who did receive parental supplements, 3 weeks after the initial lecture. All Groups: There was no statistical difference between the scores of the children who received supplemental materials to take home and discuss with their parents, and those who did not receive the material. The test scores are summarized in Table 1.

The children were also asked to self report whether or not they discussed the information presented, independent of receiving supplemental materials. There was no statistical difference noted between the scores of those children who reported discussing the information further, and those who denied further discussion. There was statistical difference noted between males and females.

No difference was noted in the performance of males and females, with the exception of females in Group 4. This difference is unexplained.

Table 1: Mean scores for post lecture tests and related to determination of retention.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Post lecture test</th>
<th>3 weeks later: supplemental materials received</th>
<th>3 weeks later: No supplemental materials received</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>86.7%</td>
<td>92%</td>
<td>86.2%</td>
</tr>
<tr>
<td>4</td>
<td>90.8%</td>
<td>85.7%</td>
<td>86.5%</td>
</tr>
<tr>
<td>7</td>
<td>88.6%</td>
<td>89.5%</td>
<td>87.2%</td>
</tr>
<tr>
<td>9</td>
<td>80.4%</td>
<td>79.7%</td>
<td>79.0%</td>
</tr>
</tbody>
</table>

Discussion

The influence of parental involvement was not shown to be statistically significant on student retention of lecture materials in this study. Limitations of this study include allowing the children to deliver the supplemental materials to their homes. Incidence of parental discussions as reported by the parents was not recorded.

No overall performance was observed to get worse with age. Group 1 performed much better than Group 4 on the test directly after the presentation, as well as on the test 3 weeks later. This may have been due to the level of difficulty in the questions.

The acceptance of hearing protection was also influenced by age:
When asked if the children would try to protect their hearing in the future around loud sounds, 100% of Group 1, 82% of Group 2 and 44% of Group 4 answered affirmatively.
When asked if the children would wear hearing protection at a loud concert, 65% of Group 2, 60% of Group 3 and 50% of group 4 answered affirmatively.

Conclusions

• Regardless of age, participants retained information over the time period studied.
• The oldest group of children demonstrated a poorer performance overall.
• Parental supplemental material did not appear to not appear to have an affect of information retention

References


