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Do different methods of hearing aid information delivery influence knowledge acquisition?

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Abstract

The main purposes of this study were to examine whether or not there was a difference in knowledge acquisition as a function of training method (these included: face-to-face session, DVD, and pamphlet); to determine which information included in hearing aid orientation was commonly known prior to training and which showed the most learning after training; and to evaluate which training method is the most popular among participants.

A sample of 65 young college students with no prior hearing aid experience completed a pre- and post-multiple-choice test of hearing aid knowledge and gave their opinion of the hearing aid orientation immediately following training. Regardless of training method, on average, participants correctly answered 87.62% of questions immediately following training, thus improving their knowledge of hearing aids after their orientation session by 16.85%. The face-to-face training method resulted in significantly more improvement in pre- and post-test scores than either of the other training methods. Learning in all of the categorical aspects of hearing aid information (e.g. troubleshooting, manual controls and acoustical feedback), improved after training; however, the category "batteries" showed the most improvement. Overall, participants agreed that each method of orientation was beneficial, but the face-to-face condition received the most consistently beneficial ratings.

While hearing aid orientation, no matter how it was presented, resulted in increased knowledge to participants, face-to-face hearing aid orientation yielded the greatest amount of information learned. In addition, it was found that some aspects of hearing aids (e.g. trial period and cleaning and care) were commonly known; meaning

that less time should be spent teaching this material during the hearing aid orientation so that more time can be used to focus on information that is less known such as hearing aid physical properties and acoustical feedback. Participants decided that the most beneficial hearing aid orientation was the face-to-face condition, which is currently the most widely used teaching method.

1. Introduction

Audiologists across the country educate new hearing aid users through what is known as a hearing aid fitting, or orientation, session. Future hearing aid users have their hearing evaluated so that the audiologist is able to recommend the best type of amplification for each person's hearing loss. Patients then see the audiologist for a second time; this visit is the hearing aid orientation. Reese and Hnath-Chisolm suggest that this orientation should last at least 15-20 minutes (2005). "According to data from the MarkeTrak VII survey, dispensers spent on average a total of 45 min during the hearing aid trial period instructing individuals on how to use and care for their hearing aids" (Kochkin, 2005). The information covered during this time typically includes: the physical landmarks of a hearing aid, basics about the batteries that will be used, maintenance and cleaning, issues that may arise while the hearing aid is in use, listening strategies to help the patient communicate effectively, as well as what to expect and what not to expect from usage (Reese & Hnath-Chisolm, 2005). This session also includes a hands-on portion where the audiologist instructs the patient in hearing aid insertion and allows the patient to practice until they feel comfortable enough to insert the device on their own. This session is designed so as to inform the patient of everything they will need to know in order to use and care for their hearing aids. During this, the patient is able to communicate with the audiologist regarding their devices, in order to gain optimum benefit from their hearing aids.

Since effective hearing aid orientation is vital to the hearing impaired patient's ability to use their hearing aid, audiologists feel the time they spend in this activity is valuable and worthwhile. However, at least one study (Ward and Gowers, 1980) has

shown that patient self-instruction through reading materials can be just as, or even more, effective in teaching these important skills. Ward and Gowers used various forms of instruction, including: group and individual orientations with the audiologist and patient self-instruction through the use of a pamphlet. They found that self-instruction was the most successful since the patient was able to perform the tasks required at their own speed, without feeling rushed by having the audiologist present in the room.

The present study addresses how well individuals are able to learn the material generally included in hearing aid orientation by using several different methods of instruction. Rose & Gravel, 2010, suggest that people use three major learning modalities: visual, auditory and tactile. The current study will use each of these methods, alone or in combination, to determine which results in the most acquisition of knowledge. Specifically, we will present hearing aid orientation material using either face-to-face instruction (visual, auditory and tactile), information presented in pamphlet form (visual) or through a DVD movie presentation (visual and auditory). In order to determine how much learning has taken place, subjects will be tested on the hearing aid orientation material at least one week prior to training and then immediately after training. In 2005, Reese & Hnath-Chisolm evaluated how well information was retained by patients immediately following the hearing aid orientation and one month later; it was found that 74% of information was remembered immediately following the session while 78% was remembered one month later. Because subjective reaction to the training method may influence a patient's future use and satisfaction with the hearing aid, a subjective question regarding reaction to the training method will also be included at the end of the training session.

The results of this study should lead to a better understanding of whether audiologist face-to-face instruction to patients is a worthwhile method to teaching hearing aid users about their new devices or if providing informational reading or viewing materials to patients is just as successful in patient knowledge acquisition.

1.1. Statement of Purpose

The specific aims of the current proposal are:

- To determine if there is a difference in knowledge acquisition as a function of training method.

- To determine which of the items generally included in hearing aid orientation were commonly known prior to training and which ones showed the most learning after training.

- To determine which training method is the most popular among participants.

1.2. Hypotheses

1. Hearing aid orientation training results in increased knowledge about hearing aid use.

2. Face-to-face hearing aid orientation training results in more knowledge acquisition than self-instructional training.

1.3. Literature Review

1.3a. Hearing Aid Orientation - Overview

It is very important for individuals who own hearing aids to be able to properly use them; those who do not understand how to gain the maximum benefit from their amplification devices typically do not wear them. According to Desjardins & Doherty (2009), people who have hearing loss avoid contact with others, thus spend much of their time alone. This is because they feel isolated while in social situations since they miss important information in conversations.

Everything the hearing impaired person needs to know about their hearing aids is generally delivered to them in one hearing aid orientation session at the time of initial purchase (Desjardins & Doherty, 2009). All of this information is expected to be remembered by the patient so they can properly use their hearing aids once they leave the audiologist's office (Desjardins & Doherty, 2009). Those hearing aid users who are not as successful with manipulating and using their hearing aids will obtain less benefit from amplification and not use their devices as much as individuals with no difficulty (Humes, 2006).

Currently, the only way in which to assess a person's ability to use their hearing aids is through subjective measures. Desjardins & Doherty (2009) used the Abbreviated Profile of Hearing Aid Benefit (APHAB) in order to determine how well users were able to manipulate their hearing aids. In addition, the SADL, Satisfaction with Amplification in Daily Life, was used to determine patient benefit, positive and negative aspects of the hearing aids, and cost as well as a questionnaire regarding patient knowledge and hearing aid use. Desjardins & Doherty (2009) developed the Practical Hearing Aid Skills Test

(PHAST). “The 8 tasks on the PHAST cover the following skills: (a) hearing aid insertion, (b) hearing aid removal, (c) opening the battery door, (d) changing the hearing aid battery, (e) cleaning the aid, (f) manipulating the volume control, (g) telephone use, and (h) use of the directional microphone or noise program” (Desjardins & Doherty, 2009). This was administered to experienced hearing aid users. Every participant from this study was given a score for each task, depending upon how well it was completed. Each participant was given a total score of excellent (90-100%), good (80-89%), fair (65-79%) or poor (below 65%). Scores varied from 48%-100%, showing that some participants were able to use their hearing aids very efficiently, while others showed poor usage abilities. These results explain that younger individuals (age 46-64) performed better overall than older participants (age 76-89) (Desjardins & Doherty, 2009). This could be due to older individual’s inability to process and retain new information which might be related to a decline in working memory (Salthouse, 1990). The most difficult task to perform for the majority of participants was using the hearing aid on the phone; these individuals were unable to correctly position the hearing aid next to the phone to receive amplification. Another difficult task was cleaning the hearing aid; inability to do this will result in less gain given by the hearing aid (Desjardins & Doherty, 2009). There was no correlation seen between asking participants how well they were able to use their hearing aids and their actual performance. Ninety-six percent of individuals stated that they were able to use their devices well while only 48% of these participants obtained excellent or good scores on the PHAST. These results lead to the belief that there is disparity in a person’s perception of their ability to perform certain tasks and their actual ability to do so (Desjardins & Doherty, 2009).

A possible reason as to why some individuals are not able to use their hearing aids well is that the initial orientation method did not result in effective learning. In 1980, Ward and Gowers evaluated several types of hearing aid orientation teaching methods for hearing aid insertion. These authors felt that success with hearing aid insertion was predictive of other skills for effectively using the hearing aid. These investigators used the following training methods: training using visual material (one person at a time and pairs of individuals at one time), face-to-face instruction, and self-instruction through reading material. Each of these methods included the same guidelines of instruction about the devices and insertion into the subject's ear. In every training method, re-instruction on insertion was given if any subject had difficulty with this concept. Subject performance was evaluated as a function of training method, age and sex. In terms of age differences, this study found that older individuals took a longer amount of time to insert their hearing aids than did younger participants. In addition, women performed worse than men, but no significant difference was noted. The self-instructional method was found to be the most successful; meaning that the highest percentage of participants, 75%, were able to sufficiently insert the earmolds, while this required approximately 30% less instruction time. This is because these participants were able to review and attempt insertion on their own, without the presence of a medical professional, leaving them feeling more relaxed about the task at hand. The self-instructional method proved to be the most successful in decreasing clinician time as well as increasing patient understanding and achievement (Ward and Gowers, 1980). In addition to saving instruction time, the self-instruction method enabled the clinician to identify which patients could efficiently learn the skills required as well as those who needed more

assistance, so that more time and effort could be spent teaching those who needed more help. Drawbacks seen in the self-instruction method were that 3-4% of individuals were unable to perform to their best ability due to deteriorated eyesight, leading to an inability to adequately view the instructions; also, the illustrations of hearing aid insertion and physical landmarks were unclear to some participants. One technical problem associated with self-instruction is the lack of adequate space required for instruction; this can be overcome by allowing the patient to learn from the self-instruction materials at home a few days before displaying their learned skills to the clinician (Ward & Gowers, 1980).

1.3b. Hearing Aid Orientation - Benefit

Hearing aid orientation is very pertinent to a person's success in using their hearing aids. In 1979, Brooks evaluated the amount of benefit patients received from their hearing aids; one group of patients, the control group, received their hearing devices and were told to return to the clinic if any problems arose, which was the standard protocol at the time. The second group of patients, the experimental group, was given their hearing aids and was told about the benefits, problems that may occur, and how to avoid or alleviate those problems. The patients were then asked to assess their social handicap through the Weighted Index of Social Hearing handicap (WISH). This questionnaire contained 19 questions that resulted in a total score ranging from 0-100, where the lower the score, the less difficulty the patient had communicating in social situations. The handicap scores reported from the control group before receiving their hearing aids was 68, while that of the experimental group was 74; following the hearing aid orientation, the average handicap for the control and experimental groups were 54 and 42 respectively. These results show that a detailed hearing aid orientation will lead to less

social handicap. Subjects were also asked to handle and manipulate the hearing devices (changing the battery, turning the device on, and inserting the earmold) in the presence of the audiologist. The ability to perform such duties as well as verification from the internal clock of the hearing device proved whether or not the patient's stated amount of daily usage was correct. From this information, it was seen that the majority of patients overestimated the amount of time their hearing aids were worn in a day. It was found that patients who participate in a hearing aid orientation session use their hearing aids more and receive the most benefit from amplification (Brooks, 1979).

In order to determine which type of patient benefits the most from a hearing aid orientation, Kemker and Holmes used the Glasgow Hearing Aid Benefit Profile (GHABP); this measurement tool is a handicap scale devised to assess the amount of difficulty a hearing impaired individual has in social situations (2004). The individuals participating in this study were between the ages of 60 and 80 years old; they were split into three groups of 15 participants each, where one group, the control group, was not given a hearing aid orientation, while the remaining two groups were provided with an orientation session. The second group, the prefitting group, received a hearing aid orientation one week prior to receiving their hearing aids and the third group, the postfitting group, was given an orientation one week after receiving their hearing devices. Each of these hearing aid orientation sessions, regardless of whether or not they were administered before or after the patients received hearing aids, were accompanied by a written set of instructions as well. The GHABP assessed the following: patient perceived disability (both before and after receiving a hearing aid), the amount of time the hearing aids were worn by each patient, hearing aid benefit, and satisfaction with the hearing

devices. Individuals under the age of 66, in the postfitting group, were much more satisfied with their hearing aids than the group that received no orientation. A trend in the pre and postfitting groups of more satisfaction was seen in those with higher disability scores than the control group, showing that individuals who have more of a disability as seen on the GHABP are predicted to obtain the greatest benefit from hearing aid orientation. In addition, the prefitting group received greater improvement in difficult listening situations with their hearing aids than the other two groups, showing that prefitting orientation allows for more effective hearing aid usage. No differences were observed between the three groups in regards to the amount of time the hearing aids were worn or hearing aid benefit (Kemker and Holmes, 2004).

1.3c. Learning Modalities

Schools and other learning environments have adopted the concept of universal design for learning (UDL). This is a way of providing more learning options to increase knowledge acquisition for students, since different people learn better through certain modalities than others (Rose & Gravel, 2010). UDL attends to the three characteristics of teaching: the way information is provided, how the learner communicates their knowledge learned and the level students are engaged in learning. There are 9 teaching guidelines that comprise the UDL; 3 of these are relevant to the present study and will be discussed here. The first guideline is to provide options for perception, meaning that information must be presented in a way that is understandable to all students.

> "To reduce barriers to learning, therefore, it is important to ensure that key information is equally perceptible to all students by: (1) providing the same information through different sensory modalities (e.g., through vision, or hearing,

or touch); (2) providing information in a format that will allow for adjustability by the user (e.g., text that can be enlarged, sounds that can be amplified)" (Rose & Gravel, 2010).

For the majority of students, presentation of information in more than one modality (i.e. speech and text) will improve understanding of the material. The second guideline states that options for language and symbols should be available. This represents the idea that information can be understood in a different context depending on the learner; in other words, a statement or picture can have different meanings for some students than for others (Rose & Gravel, 2010). This shows that there can be disparities when information is only presented through one modality. The next guideline states that it is important to provide options for physical action in learning. It is important to allow students to physically interact with the material they are learning. The next guideline suggests providing options for recruiting interest; this acknowledges that when information is not paid attention to, cognition and understanding are not possible. Irrelevant information will be unprocessed in the brain, and will not be learned. It is important to keep the information that is taught applicable to the subject at hand. One way in which to improve attention is to allow the students the modality of how they learn (Rose & Gravel, 2010).

1.3d. Memory

In order for patients to effectively use their hearing aids on a daily basis, they must remember the audiologist's instructions and recommendations. The amount of information remembered from a visit with the doctor varies depending on the patient; Anderson et al., Ley, and Rice et al. found that immediate patient recall of medical

information ranged from 17.1% to 60%. Proper storage, in the brain, of information learned is a key component of memory; typically the geriatric population has more difficulty with this than younger individuals (Howe, 1988). This is because the abilities of working memory decline as an individual becomes older, resulting in less information storage (Salthouse, 1991).

McGuire (1996) studied the amount of information patients remember after leaving the doctor's office. This study used 27 participants which were split into an older group and a younger group; the older group ages ranged from 60-82 years while the younger group ranged from 18-44 years of age. Medical information was given to individuals through a videotape; this information was either organized or unorganized. Each participant was re-assessed on their knowledge from the videotape 1 week and 1 month after the presentation. The study showed that participants, no matter their age, remembered the most amount of information immediately following the videotape, than later. Older individuals remembered less information immediately than younger participants, yet both age groups remembered the same amount of information during the delayed assessments. According to Howe, 1988, this difference in memory recall is due to decreases in working memory as an individual ages, thus resulting in an inability to memorize a sufficient amount of information. As opposed to the Anderson et al. findings, which resulted in 40 to 60% of knowledge acquisition, this study found that 11.4% to 24.6% of information was remembered, which is much lower than the previous study. This is due to the videotape by McGuire revealing a lot more information to its viewers than previous studies. As found by Anderson et al., in 1979, less information presented will result in greater knowledge acquisition; the present study (McGuire, 1996) revealed

information in an 8-minute videotape while Anderson et al. presented information in a 4-minute videotape, resulting in higher acquisition. Immediately following the presentation of medical information, patients remember 25% of what was said; because of this, it is important for information to be repeated and explained directly before medical decisions must be made by the patient (McGuire, 1996).

In 2003, Kessels evaluated the reasons for patient difficulties with remembering medical information. The most noticeable decline in memory ability is due to aging. The storage of episodic information is difficult for these individuals. Regardless of age, the amount of information given can affect a person's ability to remember; the more information provided, the more information will be forgotten. This was evident in a study performed by Ley in 1979, where when 10 statements were presented to participants, 34% was remembered, as opposed to recall of 28% when 16 statements were presented.

Medical information can also be forgotten due to the patient's perception of how important it is. Information is seen as more important when specific instructions are given, rather than vague statements. For instance, a patient will remember "your batteries will last 4 to 5 days" better than they will remember "your batteries will need to be changed multiple times a month". In addition, simple statements will be remembered better than medical jargon. The mode of presentation can also affect the amount of information remembered. According to Blinder, et al., information that is written is remembered more than spoken information. One pitfall of this method is that the patient receiving the information must be literate and able to understand the information. The method of delivery that is most effective is the addition of visual stimuli that corresponds to the written information being presented. This was performed in HIV/AIDS patients,

where these pictographs yielded 80% of memory acquisition as compared to 14% from spoken information (Houts, et al., 2001).

Since new hearing aid users have little to no knowledge of hearing aids prior to wearing these devices, they may have a hard time remembering all of the new information they will learn from their orientation (Margolis, 2004). Reese and Hnath-Chisolm evaluated how well first-time hearing aid users were able to remember information about their devices (2005). In this study, 100 individuals were assessed, ranging from 56 to 88 years of age. Probed recall, or multiple choice questions were used as an assessment tool on the Hearing Aid Knowledge Inventory (HAKI). The HAKI contained 35 questions, all weighted equally, with topics that included: hearing aid landmarks, cleaning, storage, repair, batteries and expectations. Participants were evaluated on the knowledge learned from their hearing aid orientation immediately following instruction and 1 month later. It was found that the mean score following the HEARING AID ORIENTATION was 80% while the mean score 1 month later was 84%. This shows that a great deal of information was recognized immediately and increased slightly after personal experience with using the hearing aids. A correlation between hearing loss and information retained was seen, where the greater an individual's hearing loss, the worse they scored on the HAKI, signifying that the patient may not have heard all of the instructions given. It was also seen that age was not a factor in the results found; this indicates that recognition is less affected by age than probed or free recall questions (Reese and Hnath-Chisolm, 2005).

In 2006, Reese and Smith analyzed not only how well first time hearing aid patients remembered orientation information, but also the specific details that were

forgotten by many patients. The participants were 28 veterans, with a mean age of 65 years, who were all being fit for the first time with binaural hearing aids. Their knowledge of hearing aids, following the orientation, was assessed through a 25 question test, the Hearing Aid Probed Recall Inventory (HAPRI) that was read to the patient; this was administered immediately following the orientation as well as four weeks later. An average score of 79.1% was found immediately following the orientation while 76.6% was found four weeks later. Participants from this study, as well as from the previous Reese and Hnath-Chisolm study, had the most difficulty understanding the concept of acoustic feedback (Reese & Hnath-Chisolm, 2005). This phenomenon is not only new to patients, but the need to know when it is and is not appropriate is not easy to understand. Another finding from Reese and Smith is that a little over half of the participants knew how to use their program button effectively (2006). These findings signify the need for more instruction time given to acoustic feedback and the hearing aid's program button capabilities; this additional instruction could include more patient practice through hearing aid manipulation as well as visual displays of these hearing aid features.

The year following their initial research study, Ward and Gowers evaluated the long-term effects that hearing aid instruction had on knowledge acquisition (1981). The participants of this study were fitted with their hearing instruments in regards to their audiometric findings; in addition, the audiologist fitting these individuals made sure to address any listening needs the patients had during the fitting process. Subjects were divided into three groups, 2 experimental and 1 control group. One experimental group was handed a self-instruction manual while the other received the same information as the first group, yet was taught by one of the authors. The control group was not given any

instruction (Ward & Gowers, 1981). Data was collected at 3 and 6 months after fitting through the use of the Hearing Measurement Scale (HMS) score, where at 3 months, patients were urged to wear their hearing aids more often and were given listening strategies to aid in better communication abilities. This study found that there was a greater amount of improvement in HMS scores in the experimental group than the control group (Ward and Gowers, 1981).

1.3e. Test Question Format

Hearing aid orientation method, like other training methods, seeks to provide long term acquisition of knowledge and skills. Designing appropriate assessment of that knowledge and/or skill is critical. Reese & Hnath-Chisolm (2005) suggest that medical memory information can be assessed in three ways. These modalities of evaluating a person's memory of medical information are: recognition, probed recall, and free recall (Reese & Hnath-Chisolm, 2005). Recognition is equivalent to a multiple-choice test, where more than one option is available to choose as an answer. Probed recall is much like a fill-in the blank question, where the patient must know the information in order to correctly answer the question, however, there is additional information provided in which to help them in their decision. Free recall is equal to an open-ended essay question; this form of question is the most difficult for individuals to correctly answer since there are no supporting cues provided. Due to the high difficulty level of free recall questions, probed recall and recognition should be used when assessing memory for medical information; these forms of evaluation result in higher scores and greater memory ability than free recall (Reese & Hnath-Chisolm, 2005).

There are many different modalities of hearing aid orientation that can be presented to hearing aid users. It is important to inform patients of the uses, care, and expectations of their amplification devices so that they are able to gain the most benefit from their hearing aids. In 1980, Ward and Gowers found that patient hearing aid insertion through a self-instructional pamphlet yielded much more success than having a one-on-one, informational session with an audiologist. Presently, the vast majority of clinics that dispense hearing aids provide information about these devices to patients in a face-to-face manner. The purpose of our study is to determine which form of hearing aid orientation training is the most successful for knowledge acquisition since research has shown that the most successful orientation training type may not be the current clinical model.

2. Methods

2.1. Subjects

Subjects between the ages of 18 and 21 were recruited from an undergraduate introductory course in Audiology (CSD 310) at James Madison University. Following a brief explanation of the study and its purpose, seventy-nine students volunteered to participate in hearing aid orientation training. Students who completed the study were given 1 point of extra credit that was added to their final course grade. Exclusionary criteria for the study was that none of the subjects were currently wearing hearing aids nor had any previous personal experience with hearing aid usage; this was to ensure that the information participants knew about hearing aids was first learned during their particular hearing aid orientation. This information was made certain by asking each individual of their hearing aid knowledge and experience before their participation in the study. Of the original 79 students who agreed to participate and who had no previous hearing aid knowledge, 65 completed the entire training procedure, 10 missed their scheduled hearing aid orientation training appointment and 4 subjects completed training but did not complete the pre-test. Our original power analysis stated that a sample size of 63 would be necessary to provide 80% power (estimated effect size (d) of 0.40 with an alpha of .05). Equal numbers of subjects were originally randomly assigned to each of the three hearing aid orientation training methods, however because 14 students did not complete the training the final number of participants in each group was unequal. Twenty subjects obtained information through the face-to-face orientation, 24 participated in the DVD orientation, and 21 acquired information from the pamphlet. Training and assessment procedures are discussed below.

2.2. Materials

Each participant took a test in order to determine their knowledge of hearing aids prior to their hearing aid orientation. The pre-test was administered during one of the CSD 301 class meetings; all participants took the test at the same time. Following the pre-test, each participant was scheduled for a specific time, within the following 3 weeks, to meet with the researcher for hearing aid orientation training; participants did not know the method of orientation training to be used, this was announced at the meeting time. The 20 question pre-test (Appendix A) was adapted from the Hearing Aid Knowledge Inventory (HAKI) used by Reese and Hnath-Chisolm (2005).The original document contained 35 questions regarding hearing aid landmarks, battery usage, feedback concerns, cleaning, storage, trial periods and expectations. In order to standardize this test so that it adequately measured hearing aid orientation information presented in each training method, the test was reduced to 20 questions; the majority of these questions were identical to the original document. Seventeen questions were deleted from the original HAKI because the standardized DVD orientation method we used did not include information relevant to these questions. Three test questions were slightly modified to better address the updated material contained in the DVD and pamphlet. Two new questions were added to the test administered during the study, while 15 of the original HAKI questions remained the same. The same 20 question test (post-test) was administered to each participant again, following their hearing aid orientation session (Appendix B). The only modifications made to the post-test were that an additional qualitative question as well as a comment section were added at the end of the test in order to give each participant the opportunity to voice their opinion about whether or not

they felt their method of hearing aid orientation yielded appropriate and helpful information regarding the knowledge they learned.

Hearing aid orientation training was provided in three different learning modalities: a combination of visual, auditory and tactile (Group A), combined visual and auditory (Group B) and visual (Group C). The face-to-face orientation method (Group A) used two Oticon Hit open-fit hearing aids with directional microphones. Additional materials used included cleaning materials such as a brush, pick and cloth provided by Oticon. Size 312 batteries were also used in order to demonstrate insertion, removal and activation. A review of materials currently available and in use in the professional marketplace was performed in order to choose appropriate DVD and pamphlet instructional material. The DVD condition (Group B) utilized the "Hearing Aid Orientation DVD: How to Transition into Life with a Hearing Device", shown below in figure 2.1. This resource was developed by Dr. Jeremiah Smith through So Others May Hear, LLC. It can be purchased online at http://soothersmayhear.com and is currently in use at the Dayton, Ohio Veterans Administration.

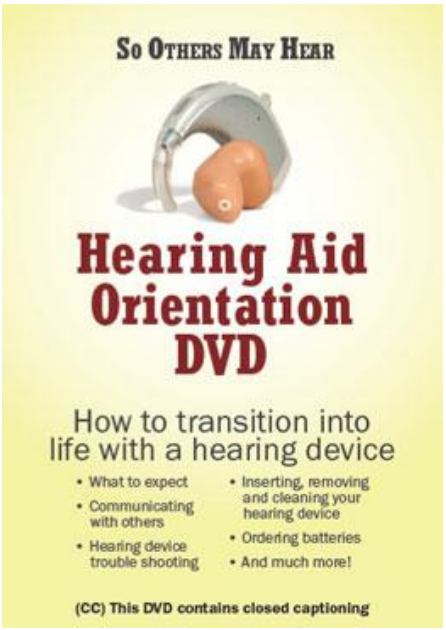

Figure 2.1. The cover of the hearing aid orientation DVD used in Group B.

The pamphlet orientation condition (Group C) utilized a pamphlet on hearing aid orientation, seen in figure 2.2, created by Brian Kreisman, Ph.D.: Kreisman, B. (1999). A Hearing Aid Orientation Pamphlet for Clinical Use with First-Time Hearing Aid Users. St. Louis: WUSM Program in Audiology and Communication Sciences. This pamphlet is similar to many on the marketplace, but was designed so as to eliminate hearing aid manufacturer bias.

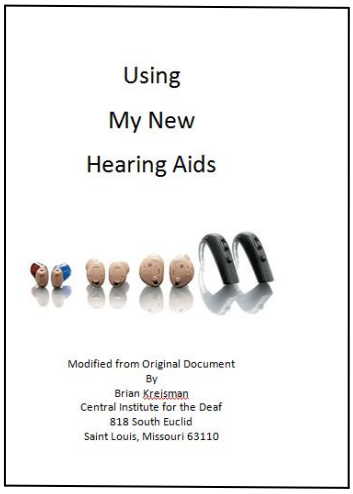

Figure 2.2. The cover of the hearing aid pamphlet used in Group C. The contents of the pamphlet are found in Appendix C.

This pamphlet was modified in order to include advances in hearing aid technology since 1999. Additional information was also added to the content of this pamphlet so as to standardize it, ensuring that all questions on both the pre and post-tests were included in the information offered in the pamphlet.

2.3. Procedure

Following the pre-test, Group A received individual face-to-face instruction. Literature suggests the audiologist spend at least 20 minutes on hearing aid orientation; because of this, the face-to-face instruction took place within a 20-30 minute session. Immediately following face to face instruction, members of Group A took the post-test. Group B viewed the hearing aid orientation DVD, and immediately following the video took the post-test.; Group C was given 20-30 minutes to read the hearing aid

orientation pamphlet and then immediately took the post-test. Specific procedures for each method of presentation of hearing aid orientation training are provided below.

Group A: Face-to-face hearing aid orientation: The individuals that were a part of Group A visited one-on-one with the researcher. Before participating in the orientation, they took a pre-test that included specific information about hearing aid care, maintenance, and usage. They then took part in the hearing aid fitting and orientation session with the researcher followed by the post-test.

Group B: *DVD hearing aid orientation:* This group received the content information about hearing aid use and orientation in the form of a DVD designed to instruct individuals about their hearing aids. This DVD was 45 minutes in length and covered the same information as both the face-to-face and pamphlet orientation sessions.

Group C: Pamphlet hearing aid orientation: This group received the content information about hearing aid use and orientation in the form of a custom designed pamphlet. Participants were given 20- 30 minutes to read the pamphlet prior to taking the post-test. This pamphlet covered the same information as the researcher's face-to-face session and as the DVD session.

3. Results

3.1 Pre- and Post-Test Score Improvement Analysis

Subject scores were recorded for the pre-test condition and then again following hearing aid orientation training. The following sections describe the difference in pre- and post-test scores regardless of training condition (All Conditions) as well as for each specific training method.

3.1a All Conditions

The objective of the tests taken by each participant was to determine whether or not there was a difference in scores between the pre- and post-tests. The difference in scores from these tests, whether positive, negative, or no change noted, confirmed the amount of information learned from each subject's specific hearing aid orientation training. A one-way ANOVA for pre-test scores by category showed no difference in knowledge before each hearing aid orientation: $F= (2,57)=0.09$, $p=0.91$. Regardless of specific training condition, pre- and post-test scores showed an increase in total percent correct , with a mean percentage correct of 70.77% SD ± 8.9) from the pre-test results and an 87.62% mean score (SD ± 9.8) from the post-test results (mean difference between pre and post =16.85%, SD ± 11.1). The largest individual difference noted from one subject was a 40% increase from the pre-test score to the post-test score while the smallest difference was a decline of 5%, meaning that a slightly higher score was achieved on the pre-test as compared to the post-test. Individual scores from each participant can be seen in Figure 3.1.

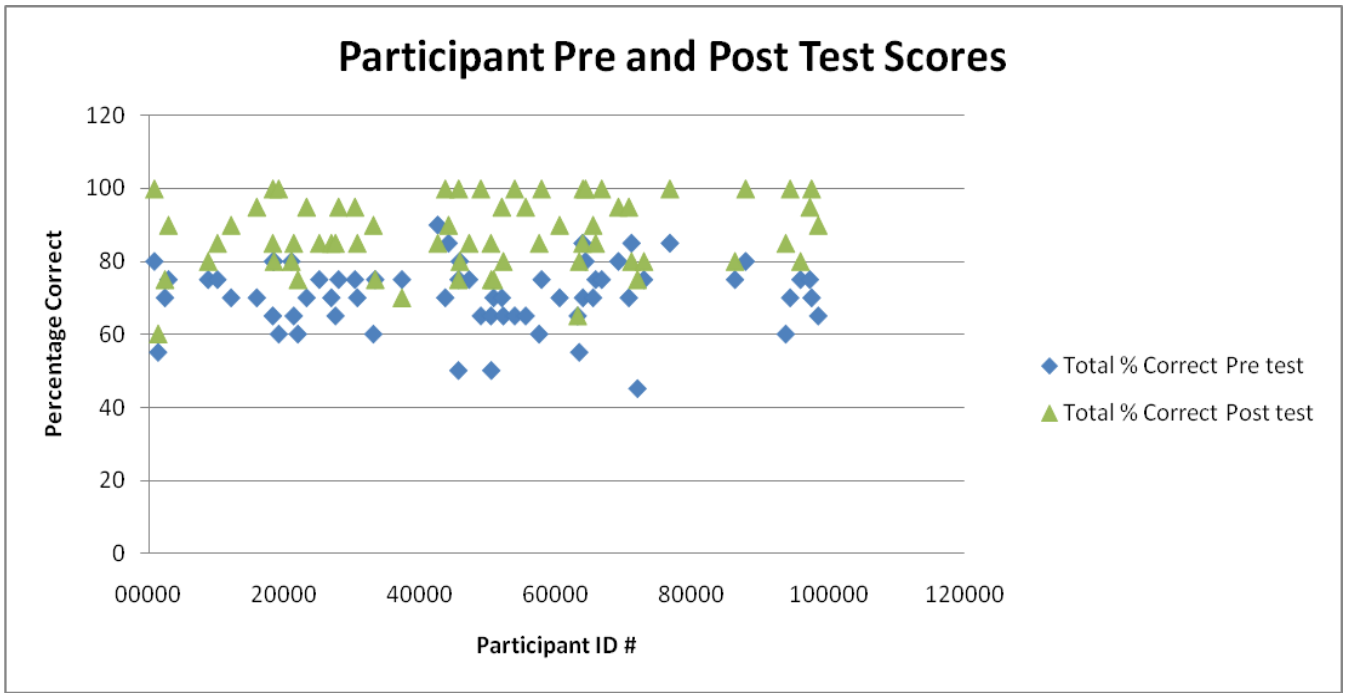

Figure 3.1. Comparison of all participants' total scores from the pre- and post-tests. This shows that the majority of post-test scores were better than those from the pre-test. The x-axis represents every subject's participation ID number; these ranged from 00749 to 98575.

A one-way ANOVA resulted in a significant main effect of training: $F=(2,62)=10.36$, $p<.05$ with a medium effect size (Cohen's $d=1.3$; effect=.54). Regardless of hearing aid orientation training method, participants generally had more correct responses on the post-test than on the pre-test.

Post-hoc one-way ANOVA multiple comparisons were made to determine whether there was any specific effect of hearing aid orientation training method. Subjects in the face-to-face condition scored significantly better than either of the other two self-instructional training conditions (average improvement =24.27, SD ± 6.8; $p<.05$). There was no significant difference between pamphlet and DVD method ($p=.294$). These results are shown in Figure 3.2 and Appendix D.

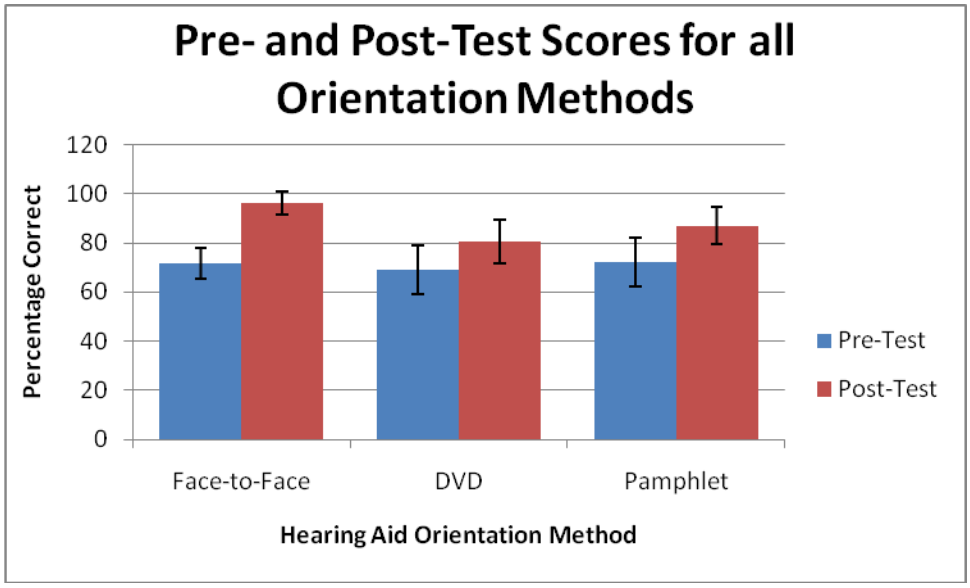

Figure 3.2 The improved mean score of individuals, categorized into each orientation method, is shown above. The mean increase from the pre- to the post-test for the DVD condition was 11.67, SD ± 10.4, the mean score improvement for the face-to-face condition was 24.27, SD ± 6.8, and the mean increase for the pamphlet condition was 14.76, SD ± 11.3. The individuals who participated in the face-to-face condition improved their test scores significantly more than those participating in the DVD and pamphlet conditions. Error bars = Standard Deviation.

3.1b Individual Condition Analysis

Face-to-Face: The difference in scores when assessing the subjects participating in the face-to-face condition by itself is higher than that noted in all conditions combined as well as the remaining two conditions assessed separately. The mean pre-test score from this condition was 71.5% while the mean post-test score was 96.25%. The mean difference, or improvement, between the pre- and post-test scores was 24.75%. This condition shows that each individual gained greater knowledge about hearing aids from their orientation than what they had before their orientation. The highest amount learned

from one individual was an increase in 40% from the pre- to the post-test while the smallest amount from another subject was an increase in 10%. Individual scores from each participant can be seen in Figure 3.3.

Pamphlet: The mean pre-test score from this condition was 72.14% while the mean post-test score was 82.95%. The mean difference, or improvement, between the pre- and post-test scores was 14.76%. The greatest score improvement seen individually was a 35% increase while the least amount of information learned from one subject was a decrease in 10%, meaning that a slightly higher score was achieved on the pre-test as compared to the post-test. Individual scores from each participant can be seen in Figure 3.3.

DVD: Individuals who learned information regarding hearing aids through viewing the DVD showed a smaller overall increase in scores from the pre-test to the post-test when compared to the previous two conditions. This group's average pre-test score was 68.96% while their post-test average score was 71.67%. The average difference, or improvement, between pre- and post-test scores was 11.67%. The greatest score improvement seen individually was a 30% increase while the least amount of information learned from one subject was a decrease in 5%, meaning that a slightly higher score was achieved on the pre-test as compared to the post-test. Individual scores from each participant can be seen in Figure 3.3.

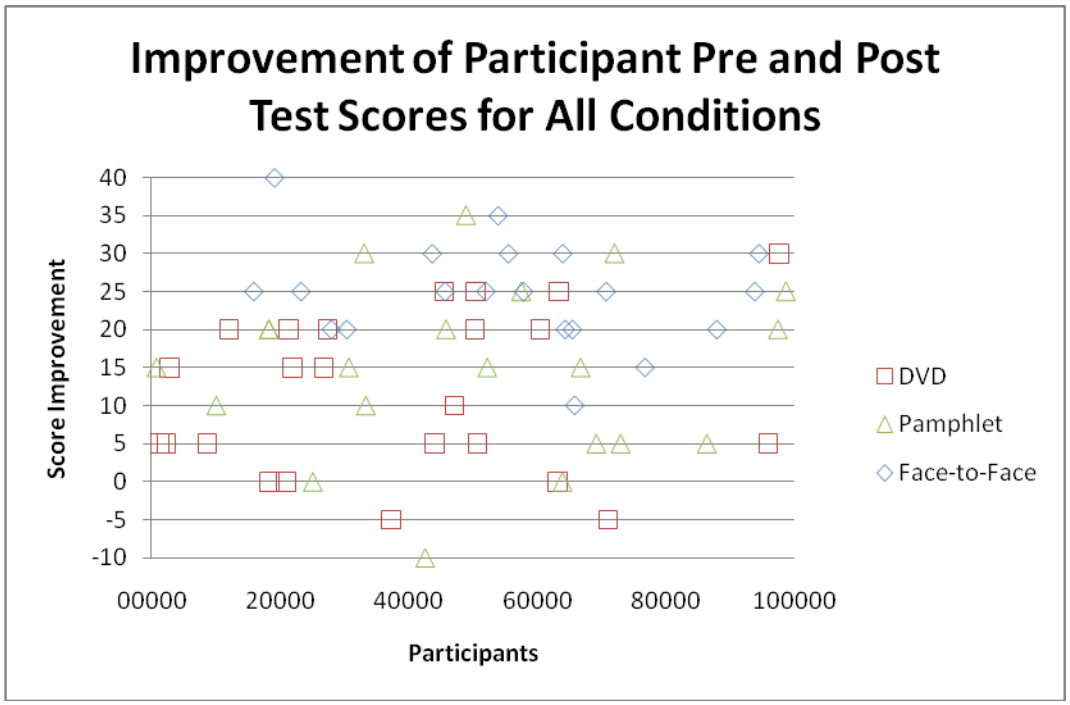

Figure 3.3. The above graph shows the improvements in each participant's knowledge learned after receiving their hearing aid orientation. This represents score improvements from the face-to-face, DVD and pamphlet methods.

3.2 Item Analysis

The pre-test and post-test contained the same twenty multiple-choice questions so as to keep an accurate and consistent record of the amount of information learned from each hearing aid orientation. No matter the delivery method of orientation, the same pre- and post-tests were administered to each participant. The questions included information regarding the following aspects of hearing aids: troubleshooting, trial period, physical properties, expectations, batteries, cleaning and care, acoustical feedback and manual controls. Test questions, arranged by aspects of hearing aid information, are shown in Table 3.1.

Table 3.1

Category	Question Number	Question	% of subjects that correctly answered this question in the Pre-test	% of subjects that correctly answered this question in the Post-test
Troubleshooting	1	If my hearing aid is not working, I need to: *Call the clinic for an appointment*	73.42	69.23
	2	If one of my hearing aids does not seem to be working, the first thing I do is: *Change the battery*	74.68	90.77
Trial Period	3	The best way to get used to my new hearing aids is to: *Wear them most of the day every day*	53.16	89.23
	4	During the period I am trying my new hearing aids, I should: *Pay close attention to what I do and don't like about the hearing aids*	91.14	98.46
	5	If your new hearing aids are painful to wear, you should: *Call your audiologist and take them out*	97.47	75.38
Hearing Aid Physical Properties	6	I can tell my right hearing aid from my left because: *The right aid is red OR has red printing on it*	88.61	100
	7	The microphones on my hearing aids: *Are located on the outside of the hearing aid*	45.57	83.08
	8	The serial number of my hearing aid is: *Written down in the information supplied by my audiologist or written on my* hearing aid	94.94	95.38
Expectations	9	I can expect my hearing aids to: *Help me hear better in many situations*	93.67	100
	10	Which of the following should I *not* expect as I adjust to hearing aid use? *The hearing aids may be painful at times*	67.09	67.69
	11	With my new hearing aids I cannot expect: *To hear speech better in noisy places*	60.76	92.31
Batteries	12	My hearing aid battery should last at least: *4-5 days and possibly longer*	2.53	84.62
	13	My hearing aid battery has a tab on the back that must be: *Removed before putting the battery in the hearing aid*	69.62	93.85

Table 3.1 cont'd.

Cleaning and Care	14	It is best to store my hearing aids overnight: *In a dry, safe place*	100	98.46
Category	**Question Number**	**Question**	**% of subjects that correctly answered this question in the Pre-test**	**% of subjects that correctly answered this question in the Post-test**
	15	I may use the following tool to clean my hearing aids: *A small, dry brush or cloth*	96.2	89.23
	16	The greatest cause of hearing aid problems is: *Earwax accumulation*	46.84	93.85
Acoustical Feedback	17	If feedback occurs when I laugh, talk, or chew: *My hearing aid may not fit well*	56.96	80
	18	If feedback occurs only when I hold my hand against the hearing aid: *Don't worry, this is normal*	64.56	67.69
	19	In order to avoid feedback: *Make sure your hearing aids fit securely in your ears*	77.22	90.77
Manual Controls	20	I can adjust the volume on my hearing aids manually. *Agree*	70.89	93.85
Average % of subjects that chose the correct answer			71.27	87.70

Table 3.1 This table shows each question asked on the pre- and post-tests. These questions were divided into the categories listed in the table and are accompanied by the % of subjects that correctly answered each question in the pre- and post-tests. The overall percentage values increased after administration of hearing aid orientation.

3.2a Pre and Post-test results (All Conditions)

As seen in Table 3.1, 71% of subjects seemed to already know some aspects of hearing aid information, as assessed by our pre-test. Specifically, questions regarding hearing aid troubleshooting, trial period, physical properties, expectations, cleaning and care, and manual controls were answered correctly by more than 70% of subjects on the pre-test (see table 3.1). The two aspects which were generally not known were batteries

(36.08% of subjects answered correctly on the pre-test) and acoustical feedback (66.25% answered correctly on the pre-test).

All subjects, 100%, chose the correct answer for question #14: "It is best to store my hearing aids overnight: *in a dry, safe place"* (Table 3.1). Since everyone correctly identified this answer, there was no way for them to improve their score overall on the post-test for this question. The post-test percentage correct for this question was almost identical to the pre-test in that 98.46% of individuals chose the correct answer. Another easy question was # 5: "If your new hearing aids are painful to wear, you should: *call your audiologist and take them out"*. This answer was correctly identified by 97.47% of participants in the pre-test while surprisingly only 75.38% correctly identified it in the post-test; this apparent decline in knowledge was driven by the post-test performance of subjects in the DVD training group. Of those individuals, only 51.85% correctly answered this in the post-test taken after watching the DVD, meaning that this method of orientation may have not covered the answer to this question as clearly as the other two orientation methods where the face-to-face and pamphlet conditions yielded a post-test score of 95% and 86.37% respectively.

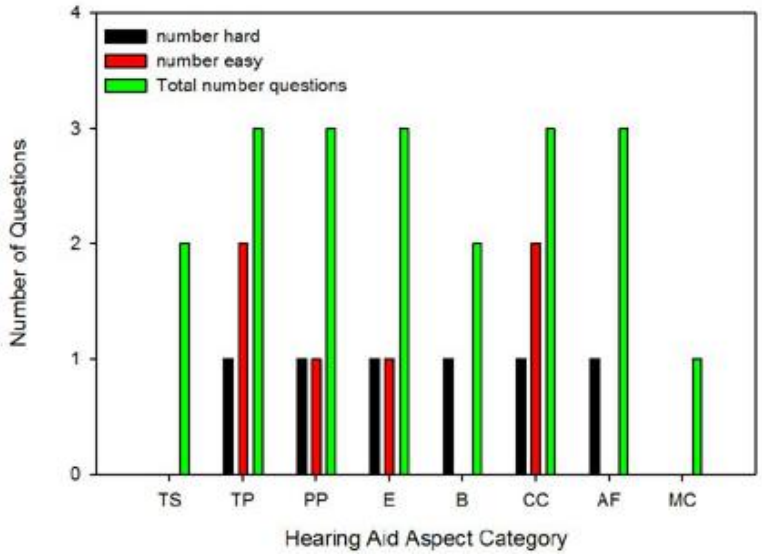

Figure 3.4. The above graph shows the amount of easy and hard questions that were in each category of the hearing aid orientation.

As seen in Figure 3.4, every question was categorized into a certain aspect of hearing aid characteristics. The following categories included 1 difficult question: trial period, physical properties, expectations, batteries, cleaning and care, and acoustical feedback, meaning that troubleshooting and manual controls were the only two categories that did not contain difficult questions. Easy questions, any resulting in 90% or greater scores from the pre-test, were seen in 4 of the 8 categories. Two easy questions were found in “Trial period” as well as “Cleaning and care” while 1 was present in “Hearing aid physical properties” and “Expectations”. The mean score for each category can be seen below in Figure 3.5. The batteries category contains a very low average as opposed to any of the other categories; this is because only 2.53% of participants correctly answered the question: “My hearing aid battery should last at least: *4-5 days and possibly longer*.”

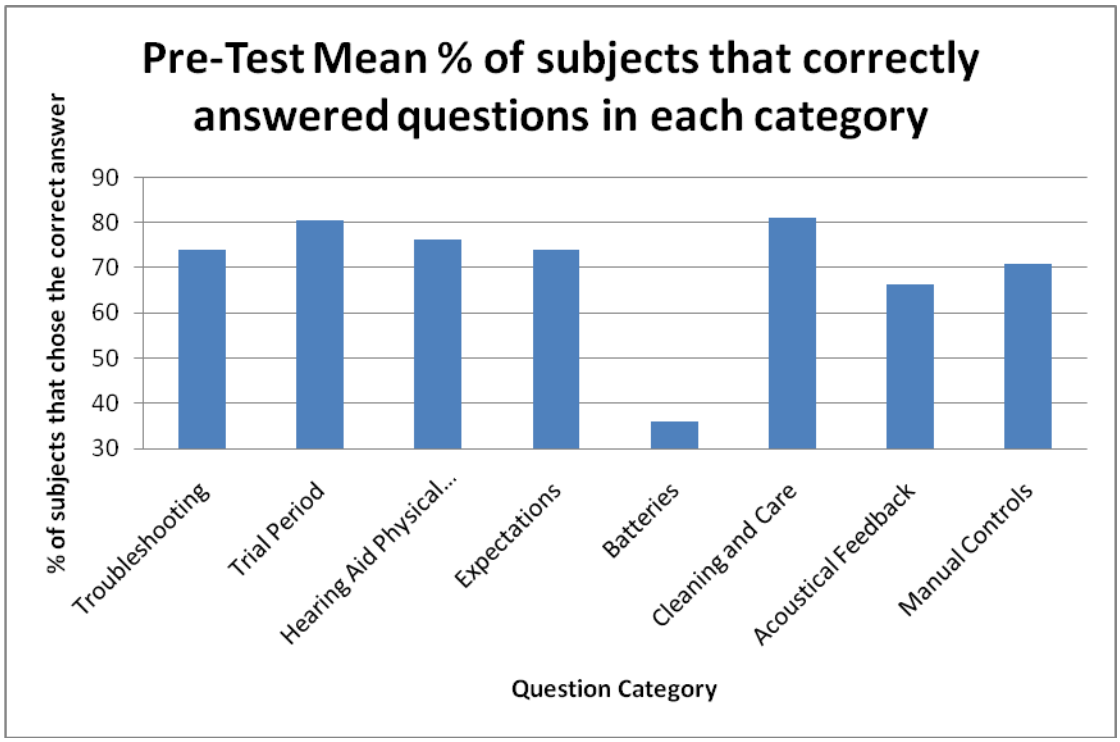

Figure 3.5. This figure represents the mean percentage of subjects, from the pre-test, who chose the correct answer for questions contained in each category of hearing aid aspects. All categories were relatively equal in difficulty, with the exception of "Batteries"; this category contained one question that was known to very few participants prior to their hearing aid orientation.

3.2b Training Method

There was very little difference seen in the pre-test scores when comparing training groups (See Figure 3.6). The questions that were difficult overall, were difficult equally for participants in each group. The largest difference noted was that question 17: "If feedback occurs when I laugh, talk, or chew*: my hearing aid may not fit well*", was more difficult for individuals in the DVD group, where they scored 41.67% while the remaining groups had scores of 70% and 71.43%. The same pattern is seen with questions that were very easy, where all participants scored 90% or greater on a particular

question. The only exception to the pattern of all participant groups performing equally on each question was question 4: "During the period I am trying my new hearing aids, I should*: pay close attention to what I do and don't like about the hearing aids*". This question was more difficult for the DVD group as compared to the individuals in the face-to-face and pamphlet groups, where the DVD group scored 79.17% while 95% and 100% scores were seen in the remaining two groups.

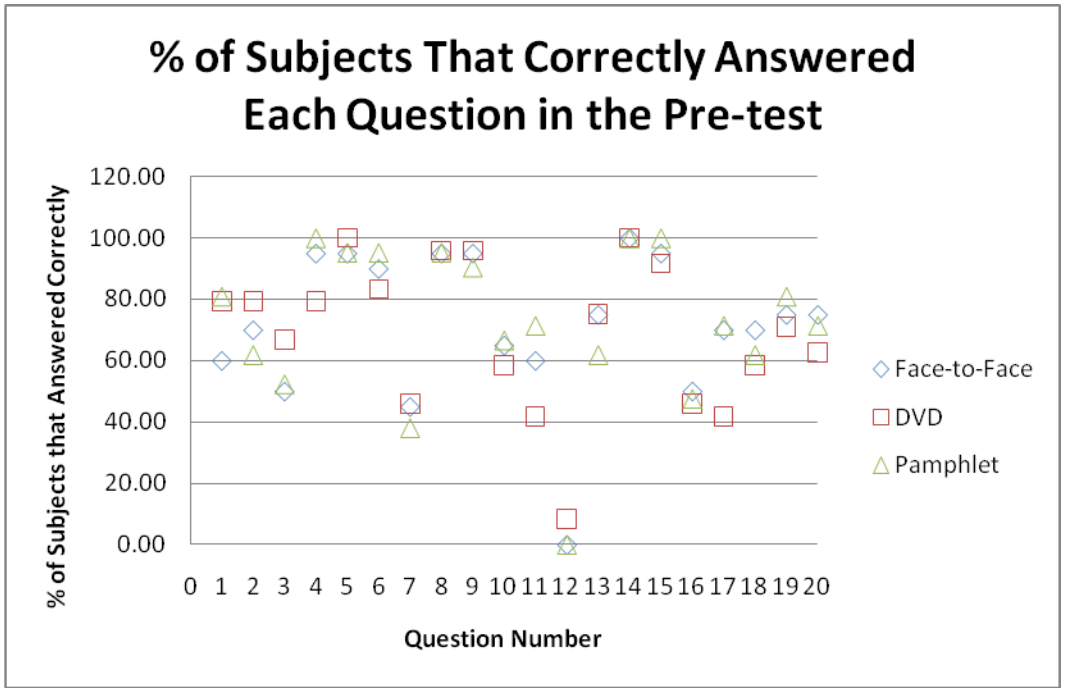

Figure 3.6 The average percentage of subjects that correctly answered each question on the pre-test from all three conditions is plotted above. Little to no differences were observed in pre-test scores between each condition.

3.2c Post-Test Improvement

Subjects improved their scores on all but four questions: 1, 5, 14 and 15 (see Table 3.1). One of these questions was from the troubleshooting category, one from the

trial period, and two from cleaning and care. In each of these cases more than 70% of subjects answered these items correctly on the pre-test and, except for question #1, more than 70% answered correctly on the post-test. In addition, questions 5, 14 and 15 were categorized as being very easy, where pre-test scores were above 90% correct. It is also noted that all of the difficult questions, questions where 61% or less of subjects answered correctly, had improved scores from the post-test.

3.2d Face-to-Face

Subjects improved their scores on all but one question, # 14: "It is best to store my hearing aids overnight: *in a dry, safe place*", see Table 3.2. This was a part of the "Cleaning and Care" category and was a very easy question, where 100% answered correctly on the pre-test and 95% answered correctly on the post-test. Participants showed an overall improvement in scores on the remaining 19 questions, following their hearing aid orientation sessions.

Question	% of subjects that correctly answered this question in the Pre-test Face-to-Face	% of subjects that correctly answered this question in the Post-test Face-to-Face
1	60	95
2	70	100
3	50	100
4	95	100
5	95	95
6	90	100
7	45	95
8	95	100
9	95	100
10	65	85
11	60	90
12	0	100
13	75	95
14	100	95
15	95	100
16	50	95
17	70	100
18	70	85
19	75	100
20	75	100

Table 3.2. The percent of subjects, from the face-to-face condition, who correctly answered each question in the pre- and post-test.

3.2e Pamphlet

Table 3.3 shows that subjects improved their scores on all but three questions: 5, 8 and 18. Question 5 was: "If your new hearing aids are painful to wear, you should: *call your audiologist and take them out*". Question 8 stated: "The serial number of my hearing aid is: *written down in the information supplied by my audiologist or written on my hearing aid*". Question 18 was: "If feedback occurs only when I hold my hand against the hearing aid: *don't worry, this is normal*". Two of these questions, 5 and 8 were considered to be very easy in the pre-test. Question 5 was a part of the "Trial Period" category, question 8 asked about "Hearing Aid Physical Properties", and question 18 was included in the "Acoustical Feedback" category. All difficult questions, where <70% of participants correctly answered on the pre-test showed improved scores on the post-tests, no matter the training method used.

Question	% of subjects that correctly answered this question in the Pre-test Pamphlet	% of subjects that correctly answered this question in the Post-test Pamphlet
1	80.95	81.82
2	61.90	90.91
3	52.38	81.82
4	100	100
5	95.24	83.37
6	95.24	100
7	38.10	68.19
8	95.24	90.91
9	90.48	100
10	66.67	77.28
11	71.43	95.46
12	0	86.37
13	61.90	86.37
14	100	100
15	100	100
16	47.62	95.46
17	71.43	72.73
18	61.90	54.55
19	80.95	90.91
20	71.43	90.91

Table 3.3. The percent of subjects, from the pamphlet condition, who correctly answered each question in the pre- and post-test.

3.2f DVD

Subjects improved their scores on all but four questions: 1, 5, 10 and 15, this is seen in Table 3.4. Question 1 was: "If my hearing aid is not working, I need to: *call the clinic for an appointment*". Question 5 stated: "If your new hearing aids are painful to wear, you should: *call your audiologist and take them out*". Question 10 asked: "Which of the following should I *not* expect as I adjust to hearing aid use? *The hearing aids may be painful at times*". Question 15 was: "I may use the following tool to clean my hearing aids: *a small, dry brush or cloth*". Two of those questions, # 5 and #15, were considered very easy in the pre-test. Question 1 was included in the "Troubleshooting" category, question 5 asked about the subject's "Trial Period", while questions 10 and 15 were included in the "Expectations" and "Cleaning and Care" categories respectively.

Question	% of subjects that correctly answered this question in the Pre-test DVD	% of subjects that correctly answered this question in the Post-test DVD
1	79.17	37.04
2	79.17	85.19
3	66.67	88.89
4	79.17	96.30
5	100	51.85
6	83.33	100
7	45.83	88.89
8	95.83	96.30
9	95.83	100
10	58.33	44.44
11	41.67	92.59
12	8.33	66.67
13	75	100
14	100	100
15	91.67	74.07
16	45.83	92.59
17	41.67	74.07
18	58.33	59.26
19	70.83	85.19
20	62.50	85.19

Table 3.4. The percent of subjects, from the DVD condition, who correctly answered each question in the pre- and post-test.

3.3 Qualitative Analysis

An additional test question was added to the post-test for each condition that was not present on the pre-test. This question stated: "*I feel like this is a beneficial method of learning about hearing aids".* The corresponding answers were as follows*: a) Strongly agree, b) agree, c) neutral, d) disagree and e) strongly disagree.* Each answer choice was associated with a number from 1-5 where 1 represented strongly agree and 5 corresponded to strongly disagree while agree, neutral, and disagree represented 2, 3, and 4 respectively. In addition, subjects were also given space on the post-test in order to add any comments they had about the particular method in which they participated. Figure 3.7 shows each participant's opinion of their specific orientation method.

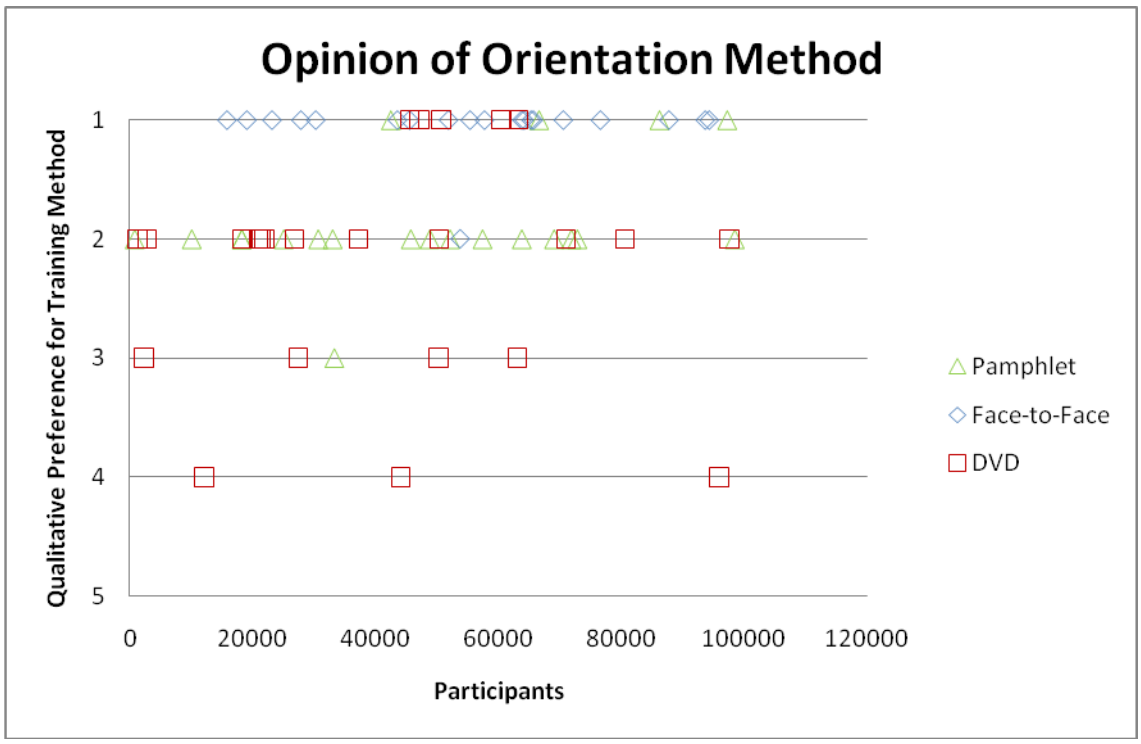

Figure 3.7. The opinion from each participant from all three conditions regarding whether or not they found their specific hearing aid orientation to be beneficial is plotted above. The number 1 represents "strongly agree" 2 refers to "agree", 3 is "neutral", 4 represents "disagree" and 5 refers to "strongly disagree" (lower numbers indicate stronger preference).

On average, subjects in all training methods agreed or strongly agreed that the training method was beneficial. The most beneficial method, however, was the face-to-face orientation, where 95% of subjects strongly agreed that this method was beneficial.

3.3a Training Method – Subjective Comments

Individuals that participated in the face-to-face condition scored this method with an average of 1.05, meaning that overall, it was well liked as an option for hearing aid orientation. Participant opinions included: "I feel this was very helpful. I enjoyed being

able to see and hold the hearing aid while learning. It really helped me better understand and comprehend.", "Great hands-on activity. Learned a lot. I liked the one-on-one information session because it allowed you to really understand the material.", and "I liked the individual session because I felt like I got all of my questions answered."

Subjects participating in the pamphlet orientation method ranked it with an average score of 1.86, meaning that overall, these individuals agreed it was a beneficial method of hearing aid orientation. Some subject opinions of the hearing aid pamphlet included: "While I think that this was an effective way to learn about hearing aids, it would have been helpful to have someone to answer questions that I might have.", "For me personally, I learn better visually so more pictures about hearing aids and what each component is would have been better." and "Pamphlet was easy to follow & very informative- nice reference guide." In the Pamphlet condition only one person was neutral with regard to benefit.

Participants in the DVD condition scored this method with an average of 2.22, meaning that overall, subjects agreed that this was a beneficial orientation method of learning about hearing aids. Some opinions included: "The man giving the presentation mumbled when discussing hearing aids. It was hard to understand him.","I thought the movie was a good source of information, but the man talking was very boring to listen to at times." and "Having someone physically show where something is on the hearing aid helps.". In the DVD condition, 4 subjects (16.6%) were neutral and 2 subjects (12.5%) actually disagreed that the method was beneficial.

4. Discussion

4.1. Pre- and Post-Test Analysis

The participants (n=65) sampled in this study showed an overall improvement in hearing aid knowledge after hearing aid orientation training. The average post-test score of 87.62% was slightly better than the average score reported by Reese & Hnath-Chisolm in 2005 (80%) using a similar multiple choice post-test questionnaire and face-to-face training.

As opposed to the Ward & Gowers study (1980), the participants in this study benefited/learned the most from the face-to-face condition rather than self-instruction. The present study found that participants scored an average of 96.25% correct on the post-test after receiving face-to-face instruction while those who learned on their own, through both the DVD and pamphlet conditions, scored an average of 71.67% and 82.95% correct respectively. It is noteworthy that all participants in the face-to-face group improved their test scores from the pre- to the post-test while not all individuals from the DVD and pamphlet conditions were able to accomplish this. Ward & Gowers found that the most beneficial method of learning was from self-instruction through an informational pamphlet; this yielded the highest amount of patient success with hearing aid insertion. We might infer from their finding that self-instruction may be the most effective instructional method when teaching individuals about hearing aid insertion; however, when teaching patients about the overall use and care of hearing aids, including insertion, our study indicates that the face-to-face method is the most beneficial. Further, it is important to note that while the self instructional methods using DVD or pamphlet training were not adequate enough to use on their own, they can be utilized as additional

material to aid in the face-to-face orientation. These materials could be distributed to hearing aid patients prior to their hearing aid fitting so that patients will have a general understanding of how to use and care for their hearing aids before their visit with the audiologist; these additional materials may save the audiologist and patient time during the hearing aid fitting session.

4.2. Item Analysis

4.2a. Pre-Test Questions

Even though all participants denied any prior knowledge of hearing aid use, approximately 71% of participants chose the correct answer on the pre-test for hearing aid orientation knowledge. Since the exclusion criteria for this study was that subjects did not have any knowledge about hearing aids, the possible reasons for this pre-test average are that subjects knew more than they thought they did, the answers to the questions were obvious to non-hearing aid users or guessing the correct answer occurred, since there were no controls for guessing. Of the 20 questions included in the pre-test, 6 were considered to be difficult, meaning that <61% of participants knew the correct answer prior to their hearing aid orientation and 6 additional questions were classified as very easy, in that >90% of individuals answered correctly. Overall, there was not one particular category or aspect of hearing aid orientation that contained more difficult or easy questions than the rest. Two of the three questions which were answered with more than 96% accuracy prior to training were in the Cleaning and Care category and one was in the Trial Period category. The most notable difficult question was in the "Batteries" category (# 12: "My hearing aid battery should last at least*: 4-5 days and possibly*

longer") where only 2.53% of all subjects chose the correct answer prior to training. This is probably because the lifespan of batteries that are used in household items is much longer than those used in hearing aids.

While we attempted to minimize poor multiple choice question design by using questions from previously published studies, it is possible that the easy questions, and their answer choices, could have been worded in such a way that the correct answer was the only logical choice or that the question was one that is common knowledge to non-hearing aid users. The difficult questions could have contained answer choices that were either unknown to the subjects or had multiple possible choices that non-hearing aid users found suitable.

4.2b. Post-Test Questions

Every difficult question from the pre-test, overall, showed improvement in the post-test, meaning that no question resulted in a score of 61% or less. Both the face-to-face and pamphlet conditions resulted in scores, on all questions, greater than 61%. The DVD condition resulted in 4 questions that were still difficult for individuals to answer. These questions were not specific to any particular category and included questions in the categories of Trial Period, Hearing Aid Physical Properties and Acoustical Feedback. In comparing the pre- to post-test score improvement of each condition, the face-to-face group improved their scores for every question (where improvement could be measured) while the other two groups showed improvement in all but three (pamphlet) or four (DVD) questions. Ninety percent of subjects in the face-to-face training group correctly answered 18 of the 20 questions on the post- test. Only eight questions were answered correctly by 90% of subject in the DVD group and only 10 questions were correctly

answered by 90% of subjects in the pamphlet group. Thus not only did the face-to-face orientation lead to higher overall improvement, but it also resulted in a higher degree of homogeneity of improvement among participants.

4.3. Qualitative Analysis

Each participant, regardless of orientation method received, was given the opportunity to answer the question, "*I feel like this is a beneficial method of learning about hearing aids."* as well as write any additional comments they had about their particular orientation method. Overall, each hearing aid orientation method was ranked as being beneficial to the learning process of its participants. The majority of subjects that participated in the face-to-face condition (95%) strongly agreed their session was beneficial (95%) while the majority of the pamphlet condition (76.2%) agreed their orientation session was beneficial. In contrast, only 50% of participants in the DVD condition agreed that their orientation session was beneficial. In addition, 12.5% of individuals disagreed that the DVD condition was beneficial; this is the only condition where participants gave a negative ranking.

A factor that can affect a person's ability to remember information is the actual presenter (Griew, 1970). In the opinion portion of the post-test, of the 7 participants who wrote comments about the DVD method of instruction, 4 of those individuals commented that the presenter either "mumbled", "was boring to listen to" or was "hard to understand". This is important to note since these individuals as a whole, scored lower than participants from the other two methods of instruction and there were no negative comments about the presenter of the face-to-face orientation method.

4.4. Limitations and Overall Clinical Implications

Since the face-to-face method is the current, and most widely used clinical hearing aid orientation, we predicted that it would be the best method in patient knowledge acquisition. Our results support this prediction. Thus, we suggest that this method continue to be the preferred method of hearing aid orientation, while different modes of orientation, including DVDs and pamphlets, be used only as supplemental information to aid in knowledge learned from the face-to-face orientation session.

Limitations of the current study include the age and motivation of the subject population. Since the majority of hearing aid users are over the age of 70 (Ward & Gowers, 1981), we recommend the use of older individuals for future studies. Results from an older population may differ greatly from those found from college students. Learning is different in young people when compared to the elderly population. Learning that includes more practice sessions and different teaching modalities may be needed in teaching the elderly new tasks (Robnett & Chop, 2010).

Ward and Gowers, 1980, suggested that the more motivated a person is to learn about hearing aids, the better their results; this implies that actual hearing aid users would be better subjects to use in the study. Thus, individuals who are taught about hearing devices that they are actually going to be wearing, may be more apt to pay attention and remember the information than people who will not be to be using hearing aids.

Due to the mostly negative feedback from participants regarding the presenter in the DVD, more media options should be researched in the future. A more enthusiastic and well-spoken presenter would be better understood and would better captivate the attention of the audience.

Hearing Aid Knowledge Inventory

1. If my hearing aid is not working, I need to:
    a. Call the clinic for an appointment
    b. Take it apart to see if I can fix it
    c. Take it to a commercial hearing aid dealer for repair
    d. Ask my primary care physician for an appointment to get a new hearing aid

2. If one of my hearing aids does not seem to be working, the first thing I do is:
    a. Change the battery
    b. Use a toothpick to clean it out
    c. Make an appointment with the clinic to repair the hearing aid
    d. Send the hearing aid to the manufacturer for repair

3. The best way to get used to my new hearing aids is to:
    a. Wear them only 1 or 2 hours each day
    b. Wear them most of the day every day
    c. Wear them only when I watch TV
    d. Wear them only in restaurants

4. During the period I am trying my new hearing aids, I should:
    a. Send them back to the manufacturer if I'm having problems
    b. Wait to use my hearing aid until I see the audiologist again
    c. Pay close attention to what I do and don't like about the hearing aids
    d. Expect to receive a yearly supply of batteries

5. If your new hearing aids are painful to wear, you should:
    a. Continue to wear them no matter how they feel
    b. Take them apart to figure out why they are not fitting correctly
    c. Call your audiologist and take them out
    d. Clean your hearing aids

6. I can tell my right hearing aid from my left because
    a. The right aid is blue OR has blue printing on it
    b. The left aid is red OR has red printing on it
    c. The right aid is red OR has red printing on it
    d. Don't know

7. The microphones on my hearing aids
    a. There are no microphones on my hearing aids
    b. Cannot be seen
    c. Are located on the outside of the hearing aid
    d. May be cleaned out with alcohol

8. The serial number of my hearing aid is
    a. Written down in the information supplied by my audiologist or written on my hearing aid
    b. A secret number appearing in your audiologist's computer files only
    c. Not of any significance
    d. The same as my Social Security number

9. I can expect my hearing aids to:
    a. Help me hear better in all situations
    b. Return my hearing function to normal
    c. Help me hear better in many situations
    d. Help me hear better on the telephone only

10. Which of the following should I *not* expect as I adjust to hearing aid use?
    a. My own voice may seem louder
    b. The hearing aids may be painful at times
    c. The hearing aids may take several months to get used to
    d. I may still have difficulty hearing in some situations

11. With my new hearing aids I cannot expect
    a. To hear better in quiet
    b. To hear environmental sounds better
    c. To hear speech better in noisy places
    d. To hear better on the telephone

12. My hearing aid battery should last at least:
    a. 4-5 days and possibly longer
    b. 2-3 months
    c. 1 year
    d. I have no idea

13. My hearing aid battery has a tab on the back that must be:
    a. Removed before putting the battery in the hearing aid
    b. Put back on at night to save energy
    c. In place when putting the battery in the hearing aid
    d. Saved to show my audiologist how many batteries I am using

14. It is best to store my hearing aids overnight
    a. In the bathroom
    b. In the refrigerator
    c. In a dry, safe place
    d. I should wear them at night also

15. I may use the following tool to clean my hearing aids:
    a. A small, dry brush or cloth
    b. A damp toothbrush
    c. A bobby pin
    d. A toothpick

16. The greatest cause of hearing aid problems is:
    a. Wearing them at night
    b. Using the wrong size battery
    c. Earwax accumulation
    d. Storing them in a dry box

17. If feedback occurs when I laugh, talk, or chew:
    a. It is normal and I will get used to it
    b. The battery needs to be replaced
    c. My hearing aid may not fit well
    d. My hearing aid is probably broken

18. If feedback occurs only when I hold my hand against the hearing aid:
    a. Call your audiologist
    b. Don’t worry, this is normal
    c. The hearing aid does not fit properly
    d. The battery needs to be replaced

19. In order to avoid feedback:
    a. Wear your hearing aids with the volume fully on
    b. Replace your battery often
    c. Store your hearing aids in a dry place when not in use
    d. Make sure your hearing aids fit securely in your ears

20. I can adjust the volume on my hearing aids manually.
    a. Agree
    b. Disagree
    c. Don’t know

Using My New Hearing Aids

Modified from Original Document
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Topics

Getting Started Using My Hearing Aids

It takes time to become accustomed to using your hearing aids. Remember to have realistic expectations about how much your hearing aids will help you. Here are some hints to help you become a successful hearing aid user.

1. Start wearing your hearing aids at home, where the noise level is low.

2. Practice using the volume control, if present, to find a comfortable listening level. As you become more comfortable using your hearing aids, you can slowly increase the volume.

3. Wear your hearing aids only for as long as you are comfortable. If you get tired, then take them out. Ideally, you should be able to wear your hearing aids all day long within the first month.

4. Get used to your hearing aids by practicing listening to just one other person. Talk about familiar things. You can also have them read something aloud while you follow along and ask questions about the material.

5. Remember that you may hear sounds that you have not heard for a long time. Some of these sounds may be undesirable. Over time, you should be able to ignore some of the sounds that you initially found disturbing.

6. Get used to listening to your voice. At first your voice may sound louder. Ask family members or friends to compare your voice volume with and without the hearing aids. Talking or reading aloud from a newspaper or book will help you monitor your voice while wearing your hearing aids.

7. Gradually increase the difficulty of situations in which you use your hearing aids. (Refer to “Listening Experiences” on page 14.)

8. Be patient. As you become more adjusted to listening with the hearing aids, you will learn to tune out some of the background noise and focus on listening to the speaker.

9. Consider taking a hearing aid orientation class to learn more about using your hearing aids.

Parts of My Hearing Aids

Every hearing aid has three basic parts: the microphone, the amplifier and the receiver. The microphone picks up the sounds around you and is located on the portion of the hearing aid that is behind the ear. The amplifier makes these sounds louder. Finally, the receiver sends the louder sounds into your ear. Your hearing aids may also have other controls. Listed below are parts on the outside of the hearing aids that you may control.

On/Off Switch

For all types of hearing aids, Behind-the-Ear (BTE), In-the-Ear (ITE), In-the-Canal (ITC), and Completely-in-the-Canal (CIC), the battery door serves as the on/off switch. Open the battery door completely to turn off the hearing aid

Volume Control

This control may be a wheel or a remote control that you can use to adjust the loudness of the hearing aid. Set the control at a comfortable level. If your hearing aid has an automatic volume control, you will not have a volume control wheel. If your hearing aid sounds too loud or too soft, contact your audiologist. The hearing aid may need to be adjusted.

Battery and Battery Door

Refer to “My Hearing Aids” (pages 18-19) to find out the correct size battery. Most battery doors are built to prevent you from putting the battery in incorrectly. Most battery compartments have a “+” sign to show where the positive side of the battery should be placed. The battery should be placed

into the hearing aid with the flat, “+”, side up with the ridge of the “-“ side down into the battery door.

Earmold

The earmold attaches to a behind-the-ear (BTE) hearing aid. It should feel comfortable once inserted. If it is not comfortable, contact your audiologist. Earmolds may have to be replaced due to shrinkage or age. The tubing for the earmold may need to be replaced if it becomes cracked or brittle. If feedback or a squealing sound occurs often during daily activities, the earmold may not fit properly in your ear. It is a normal occurrence if feedback is only heard when an object is very close to your ear.

Open-fit hearing aids will have what is known as a “dome” on the end of the tubing. This is a small, clear, flexible piece that fits easily in any ear canal.

Left vs. Right

In order to tell your left hearing aid from your right, you will need to look for certain color patterns. Your left hearing aid will have either blue writing on it or will be marked by a small blue ring or dot. Your right hearing aid will have either red writing on it or will be marked by a small red ring or dot. An easy way to remember the difference between the two is that both the words “red” and “right” start with the letter “R”.

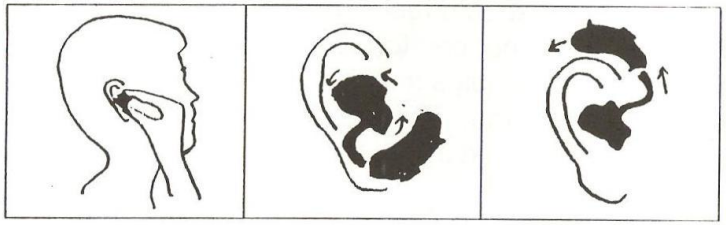
There are other controls that only your audiologist uses to “fine tune” your hearing aids. They are often located under a door on the hearing aid or built into the hearing aid casing. You should not attempt to adjust these controls yourself.

Hearing Aid Insertion and Removal

As you use your hearing aids, you will become more adept at inserting and removing them. If you have difficulty, try referring to the following steps.

BTE Insertion

1. Make sure the earmold is clean and free of wax.
2. Hold earmold upright with the nib pointed towards the ear canal. Using your thumb and index finger, hold the earmold securely.
3. Insert nib of earmold snug into ear canal. It may help at first to use your other hand to reach over and pull the ear back and down. This helps to straighten your ear canal.
4. Turn earmold back, push it in, then turn it forward to lock it into place
5. Press on the earmold to ensure fit. Lift hearing aid upward and place behind ear. Turn on and set volume at a comfortable level.



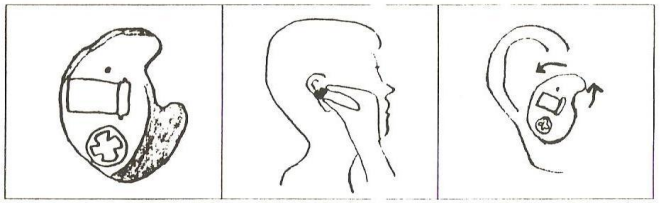
BTE Removal

1. Place fingernail behind top of earmold and gently pull up to break the seal.

2. Grab the earmold firmly and gently pull it out. You may need to slowly turn it as you pull it out so that it comes out of your ear canal easier.
3. Lift the earmold up and back to get the hearing aid off of your ear

ITE/ITC/CIC Insertion

1. Make sure the hearing aid is clean and free of wax.
2. Hold the hearing aid upright with the canal portion pointing toward your ear.
3. Insert canal portion of hearing aid snug into ear canal. It may help at first to use your other hand to reach over and pull the ear back and down. This helps to straighten your ear canal.
4. For ITE, turn hearing aid back, push in, and then turn it forward to lock it into place.
5. Press the hearing aid into your ear to ensure fit. Turn on and set volume at a comfortable level



ITE and ITC Removal

1. Place fingernail behind top of hearing aid and gently pull to break the seal.
2. Grab the hearing aid firmly and gently pull it out. You may need to slowly turn it as you pull it out so that it comes out of your ear canal easier.

CIC Removal

1. Grab the removal string and pull the hearing aid out.

Hearing Aid Maintenance

Do:

Every Day:

- Always carry spare batteries with you.

After removing your aid:

- Wipe off with a dry cloth.
- Check openings for wax.
    - The greatest cause of hearing aid problems is earwax in the hearing aid

Every Night:

- Store hearing aids in a dry cool place (preferably a dry-aid kit or in the hearing aid case).
- Turn aids off and open battery compartment.

Every Year:

- Have your hearing and hearing aids checked by an audiologist.

As Needed:

- Change battery.
- Replace hearing aids.

As Needed for BTE's Only:

- Wash earmold. (Remove from hearing aids. Use warm, soapy water. Dry completely.)
- Check for moisture in earmold.
- Put hearing aids and earmolds in a dry-aid kit.
- Have audiologist replace earmold tubing.
- Have earmolds replaced.

Do Not:

- Expose your hearing aids to excessive heat or cold.
- Wear your hearing aids while using a hair dryer.
- Apply hair spray when wearing your hearing aids.
- Get your hearing aids wet by wearing them in the bath, shower, or pool.
- Drop your hearing aids.
- Leave your hearing aids or hearing aid batteries where pets or small children can reach them.
- Open the casing of your hearing aids. (This will void the warranty.)

(10)

(11)

Hearing Aid Troubleshooting

Problem	What to Check
Aid does not work at all	✓ The battery is not weak or dead. ✓ The battery is the correct size and is in correctly ✓ The battery door is closed completely. ✓ Wax is not plugging the hearing aid or earmold. ✓ The tubing on BTE is not bent or cracked. Still doesn't work? Call your audiologist.
Aid is working but weak	✓ The volume control is turned up (if present). ✓ The battery is not weak. ✓ The earmold is inserted properly. ✓ Wax is not plugging the hearing aid or earmold Still weak? Call your audiologist.
Aid gives intermittent or scratchy signal	✓ The battery contacts are not corroded or dirty. ✓ The battery is the correct size and is not weak. ✓ No moisture is in the hearing aid. ✓ The on/off contacts are not dirty. Try turning the switch on and off a few times to get rid of any dust. Call your audiologist if it still sounds scratchy or intermittent.

Problem	What to Check
Aid makes whistling or squealing sound	✓ The hearing aid or earmold is properly seated in your ear. ✓ The volume setting is not full-on. ✓ The tubing on BTE is not cracked. ✓ Wax is not blocking the hearing aid openings. Still whistling or squealing? Call your audiologist.
Aid uses up batteries too quickly	✓ The hearing aid is turned off at night. (Open the battery door completely to be sure it is off.) ✓ Keep track of when you put the last battery in. Call your audiologist if it is still draining too quickly.
Aid produces distorted, unclear signal	✓ The battery is not weak. ✓ Wax is not plugging the opening. ✓ The volume setting is not full-on. ✓ The microphone is free from dust and dirt. Signal still distorted? Call your audiologist.
Moisture in tubing of BTE or excessive moisture with other hearing aids	✓ Use a dry-aid kit. ✓ Use an air blower for BTE tubing. If these don't work, call your audiologist.

Battery Questions and Answers

What kind of battery should I buy?
Your hearing aid is designed to use a Zinc Air battery. Many different manufacturers make zinc air batteries.

What size battery should I buy?
Hearing aid batteries come in different sizes. Each size has a different color package and tab that is associated with it. For example, the size 13 batteries have orange on the package. The number may change depending on the manufacturer (i.e., 13AZ or SA13), but the color on the package will be orange. Refer to "My Hearing Aids" (pages 18-19) for the specific battery size and tab color for your hearing aids.

How are zinc-air batteries activated?
Zinc-air batteries are activated by the air. The battery will begin draining as soon as the colored tab is removed.

Where can I purchase batteries?
Many clinics have battery clubs that will mail batteries as needed. Batteries can also be purchased at many local stores.

How long should the batteries last?
Your batteries will usually last between one to two weeks. The life of the battery depends on the battery size, the degree of your hearing loss, the volume setting of your hearing aids, and the number of hours you wear your hearing aids. It is always a good idea to open your battery door at night to reduce the chance of excess drain.

Safety Rules and Warnings for Batteries and Hearing Aids:
Hearing aids and their batteries can be dangerous if swallowed or improperly used. Make sure to store and to discard batteries in a place where children and small pets cannot find them. Batteries (and smaller hearing aids) have also been mistaken for medications. Don't store them in the same place as your medication. Do not place hearing aids or batteries in your mouth. Do not let others use your hearing aids-it could cause sudden and permanent hearing loss.

In case batteries are swallowed, contact your doctor immediately or call the Poison Control Center.

Listening Experiences

Start using your hearing aids in easy listening situations. Try more difficult listening experiences as you become more comfortable with your hearing aids. By the time your 30-day trial period is over, you should have tried using your hearing aids in as many different situations as possible and should know what you like and don't like about your hearing aids.

Some easy situations:
With one person in a quiet living room
In the kitchen with one person
In a quiet room listening to the television or radio

Some more difficult situations:
A conversation in a quiet room with 2, 3, or 4 people
Outside in a quiet place (get used to wind noise)
Along a street in a quiet neighborhood

Most difficult situations:
At a dinner table with several people
At a religious service
While driving
While shopping
At a noisy restaurant
At a party

It is important not to get frustrated. Even people with normal hearing have trouble in some of these situations!

Using the Telephone with My Hearing Aids

You should try moving the telephone receiver around the front or top of your ear to find the position that works best for you. Don't press the phone too tightly against your ear or the hearing aid may make a whistling sound called "feedback". Try to find the position that will let you hear the best without the hearing aid whistling. If the hearing aid whistles, try holding the phone a little further away from the hearing aid. You can also try using a telephone comfort pad, which may put enough distance between the telephone receiver and the hearing aid to prevent feedback.

Practicing "Active" Listening

- Pay attention to the people speaking. Watch their facial expressions and gestures, and listen.
- Don't pretend to understand what you don't hear.
- Ask people to repeat or speak more clearly (or more loudly or softly).
- Tell people that you have a hearing impairment and tell them what they can do to help you understand them better.
- Try to position yourself so the light comes from behind you. This will allow you to see the speaker's face more clearly.
- Try to limit the number of people you speak with at one time.
- Realize that understanding speech in noisy places such as restaurants or parties is difficult for everyone.
- Arrive early at group functions so that you can get your choice of seats. This will help you hear and see the speaker's face
- The ideal distance between you and your communication partner is 3-6 feet. Stay within this distance whenever possible.

Communication Strategies

- Always watch the speaker.
- Do not interrupt the speaker.
- When you don't understand, ask the speaker to repeat or rephrase.
- Tell the speaker what you did hear, so that the speaker knows what to fill in.
- Learn the topic being discussed. It makes it easier to follow the conversation.
- Listen for "key words" in sentences to help you follow ideas.
- Use clues from the situation to help get meanings.
- Try to guess what a person might say next.
- Use active listening- repeat what you heard so that the speaker knows you understood or can correct what you misunderstood.
- Stay informed of your friend's interests.
- Stay aware of current events.
- Don't dominate conversations- let others have their turn talking.
- Keep a sense of humor.

My Hearing Aids

Left Ear

Make: ~~Oticon~~ _____
Model: ~~Hit~~ _____
Serial #: _____

Style: [BTE] ITE ITC CIC

Battery Size (Tab Color):
_____10 or 230 (Yellow tab)
_____13 (Orange tab)
___✓___312 (Brown tab)
_____675 (Blue tab)

Trial Period ends: _____

Warranty expires:
Loss/Damage _____
Repair _____

My Audiologist:

_____

My Audiologist's Phone Number:

_____

Right Ear

Make: ~~Oticon~~ _____
Model: ~~Hit~~ _____
Serial #: _____

Style: [BTE] ITE ITC CIC

Battery Size (Tab Color):
_____10 or 230 (Yellow tab)
_____13 (Orange tab)
___✓___312 (Brown tab)
_____675 (Blue tab)

Trial Period ends: _____

Warranty expires:
Loss/Damage _____
Repair _____

I have received the pamphlet about using my hearing aids and have discussed the contents with my audiologist.

_____

Client's Signature Date

_____

Audiologist's signature

Note to Audiologist: You may wish to photocopy this page and place it in Client's file.

References and Resources

Here is an abbreviated list of references for you to get more information about hearing loss and hearing aids.

Chedoke-McMaster Hospitals Department of Communicative Disorders Audiology. (1996). Hearing aid orientation booklet. [On-line]. Available: http//www.cmh.on.ca/audio/habookle.html.

Pascoe, D.P. (1986). Hearing Aids. Austin: Pro-Ed.

Rezen, S.V. and Hausman C. (1993). Coping with hearing loss: A guide for adults and their families. Fort Lee: Barricade Books.

Smedley, T.C. and Schow, R.L. (1998). Problem-solving and extending the life of your hearing aids. In R. Carmen (Ed.), The consumer handbook on hearing loss and hearing aids: A bridge to healing. (pp. 130-158). Sedona: Auricle Ink.

Wayner, D.S. (1990). The hearing aid handbook: Clinician's guide to client orientation. Washington D.C.: Gallaudet University Press.

Waymer, D.S. and Abrahamson, J.E. (1996). Learning to hear again. Austin: Hear Again.

Self Help for Hard of Hearing People, Inc. (SHHH) is a group of hard-of-hearing people who support and educate one another through meetings and publications. You may consider getting involved in this organization. Information on SHHH can be obtained by phone at (301) 657-2248 or online at http://www.shhh.org.

Oneway

[DataSet1] C:\Users\Lindsey\Documents\Dissertation\SPSS\Data Sheet.sav

ANOVA

Difference between Pre and Post

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1982.953	2	991.477	10.365	.000
Within Groups	5930.893	62	95.660		
Total	7913.846	64			

Post Hoc Tests

Multiple Comparisons

Difference between Pre and Post
LSD

(I) Txcode	(J) Txcode	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	13.08333*	2.96121	.000	7.1639	19.0027
	3.00	9.98810*	3.05585	.002	3.8795	16.0966
2.00	1.00	-13.08333*	2.96121	.000	-19.0027	-7.1639
	3.00	-3.09524	2.92250	.294	-8.9372	2.7468
3.00	1.00	-9.98810*	3.05585	.002	-16.0966	-3.8795
	2.00	3.09524	2.92250	.294	-2.7468	8.9372

* The mean difference is significant at the 0.05 level.

Data Analysis

All Conditions

Subject	Total % Correct Pre test	Total % Correct Post test	Difference
00749	80	100	20
01304	55	60	5
02301	70	75	5
02824	75	90	15
15839	70	95	25
08671	75	80	5
10043	75	85	10
12053	70	90	20
18199	65	85	20
18224	80	100	20
18365	80	80	0
19074	60	100	40
20945	80	80	0
21283	65	85	20
21893	60	75	15
23177	70	95	25
25051	75	85	10
26825	70	85	15
27436	65	85	20
27888	75	95	20
30305	75	95	20
30657	70	85	15
33025	60	90	30
33287	75	75	0
37224	75	70	-5
43609	70	100	30
44098	85	90	5
45550	50	75	25
45594	75	100	25
45752	80	80	0
47128	75	85	10
48856	65	100	35
50338	65	85	20
50392	50	75	25
50738	70	75	5
51947	70	95	25
52166	65	80	15
42505	90	85	-5

53845	65	100	35
55463	65	95	30
57446	60	85	25
57808	75	100	25
60458	70	90	20
63130	65	65	0
63349	55	80	25
63848	85	85	0
63898	70	100	30
64281	80	100	20
65395	70	90	20
65772	75	85	10
66665	75	100	25
69120	80	95	15
70662	70	95	25
71056	85	80	-5
71933	45	75	30
72890	75	80	5
76709	85	100	15
86304	75	80	5
87880	80	100	20
93789	60	85	25
94437	70	100	30
95960	75	80	5
97346	75	95	20
97596	70	100	30
98575	65	90	25
	Mean % Correct	**Mean % Correct**	**Mean**
	70.76923077	87.61538462	16.84615385
	Standard Deviation	**Standard Deviation**	**Standard Deviation**
	8.936878004	9.846782958	11.09508727

Face-to-Face

Subject	% Correct pre-test		% Correct post test	Difference
15839	70	15839	95	25
19074	60	19074	100	40
23177	70	23177	95	25
27888	75	27888	95	20
30305	75	30305	95	20
43609	70	43609	100	30
45594	75	45594	100	25
51947	70	51947	95	25
53845	65	53845	100	35
55463	65	55463	95	30
57808	75	57808	100	25
63898	70	63898	100	30
64281	80	64281	100	20
65395	70	65395	90	20
65772	75	65772	85	10
70662	70	70662	95	25
76709	85	76709	100	15
87880	80	87880	100	20
93789	60	93789	85	25
94437	70	94437	100	30

Mean % Correct	**Mean % Correct**	**Mean**
71.5	96.25	24.75
Standard Deviation	**Standard Deviation**	**Standard Deviation**
6.303716531	4.832728335	6.7813599

DVD

Subject	% Correct pre test		% Correct post test	Difference
01304	55	01304	60	5
02301	70	02301	75	5
02824	75	02824	90	15
08671	75	08671	80	5
12053	70	12053	90	20
18365	80	18365	80	0
20945	80	20945	80	0
21283	65	21283	85	20
21893	60	21893	75	15
26825	70	26825	85	15
27436	65	27436	85	20
37224	75	37224	70	-5
44098	85	44098	90	5
45550	50	45550	75	25
47128	75	47128	85	10
50338	65	50338	85	20
50392	50	50392	75	25
50738	70	50738	75	5
60458	70	60458	90	20
63130	65	63130	65	0
63349	55	63349	80	25
71056	85	71056	80	-5
95960	75	95960	80	5
97596	70	97596	100	30

Mean % Correct	**Mean % Correct**	**Mean**
68.95833333	71.66667	11.66667

Standard Deviation	**Standard Deviation**	**Standard Deviation**
9.777877278	8.761638223	10.39091

Pamphlet

Subject	% Correct pre test	% Correct post test	Difference
00749	80	95	15
10043	75	85	10
18199	65	85	20
18224	80	100	20
25051	75	75	0
30657	70	85	15
33025	60	90	30
33287	75	85	10
42505	90	80	-10
45752	80	100	20
48856	65	100	35
52166	65	80	15
57446	60	85	25
63848	85	85	0
66665	75	90	15
69120	80	85	5
71933	45	75	30
72890	75	80	5
86304	75	80	5
97346	75	95	20
98575	65	90	25

Mean % Correct	**Mean % Correct**	**Mean**
72.14285714	82.95454545	14.761905
Standard Deviation	**Standard Deviation**	**Standard Deviation**
10.07117528	7.660970969	11.344182

Item Analysis

Question	% Correct Pre-test	%Correct Post-test	%Correct Pre-test Face-to-Face	%Correct Post-test Face-to-Face	% Correct Pre-test DVD	% Correct Post-test DVD	% Correct Pre-test Pamphlet	% Correct Post-test Pamphlet
1	73.42	69.23	60	95	79.17	37.04	80.95	81.82
2	74.68	90.77	70	100	79.17	85.19	61.9	90.91
3	53.16	89.23	50	100	66.67	88.89	52.38	81.82
4	91.14	98.46	95	100	79.17	96.3	100	100
5	97.47	75.38	95	95	100	51.85	95.24	86.365
6	88.61	100	90	100	83.33	100	95.24	100
7	45.57	83.08	45	95	45.83	88.89	38.1	68.185
8	94.94	95.38	95	100	95.83	96.3	95.24	90.91
9	93.67	100	95	100	95.83	100	90.48	100
10	67.09	67.69	65	85	58.33	44.44	66.67	77.275
11	60.76	92.31	60	90	41.67	92.59	71.43	95.455
12	2.53	84.62	0	100	8.33	66.67	0	86.365
13	69.62	93.85	75	95	75	100	61.9	86.365
14	100	98.46	100	95	100	100	100	100
15	96.2	89.23	95	100	91.67	74.07	100	100
16	46.84	93.85	50	95	45.83	92.59	47.62	95.455
17	56.96	80	70	100	41.67	74.07	71.43	72.73
18	64.56	67.69	70	85	58.33	59.26	61.9	54.545
19	77.22	90.77	75	100	70.83	85.19	80.95	90.91
20	70.89	93.85	75	100	62.5	85.19	71.43	90.91
	Mean % Correct	**Mean % Correct**	**Mean % Correct**	**Mean % Correct**	**Mean % Correct**	**Mean % Correct**	**Mean % Correct**	**Mean % Correct**
	71.2665	87.6925	71.5	96.5	68.958	80.9265	72.143	87.501
	Standard Deviation	**Standard Deviation**	**Standard Deviation**	**Standard Deviation**	**Standard Deviation**	**Standard Deviation**	**Standard Deviation**	**Standard Deviation**
	23.65721	10.60092	24.06679302	4.893604849	24.01135381	19.53507595	25.25819473	12.149335

Qualitative Analysis

Answer Key:

A=5
B=4
C=3
D=2
E=1

Face-to-Face

Subject	Answer
19074	1
23177	1
94437	1
65395	1
76709	1
30305	1
51947	1
55463	1
15839	1
53845	2
65772	1
63898	1
93789	1
70662	1
87880	1
27888	1
57808	1
45594	1
43609	1
64281	1
	Average
	1.05

Face-to-Face
Comments

Subject	Comment
30305	I feel this was very helpful. I enjoyed being able to see and hold the hearing aid while learning. It really helped me better understand and comprehend.
15839	Great hands-on activity. Learned a lot. I liked the one-on-one info. session because it allowed you to really understand the material.
76709	I think she did a great job. Just might not want to use the laptop in the heat example with old people. (they might not use computers).
23177	I liked the individual session because I felt like I got all of my questions answered
43609	Learning it as if it was my personal appointment made it easier to remember.
57808	The one-on-one interaction provides the best opportunity for questions and hands-on learning with the hearing aid.
27888	She did a very nice job explaining everything to me and making sure I understand. She also showed me how to put in a battery and the hearing aid, which was helpful.
93789	This was very informative:)!

Pamphlet

Subject	Answer
30657	2
97346	1
71933	2
52166	2
86304	1
63848	2
33025	2
57446	2
18224	2
48856	2
72890	2
18199	2
98575	2
25051	2
00749	2
42505	1
10043	2
69120	2
66665	1
33287	3
45752	2
	Average
	1.857143

Pamphlet Comments

Subject	Comment
45752	Don't remember some questions being mentioned in the pamphlet.
69120	Q12-> should 2-3 mos be 2-3 weeks like the packet says? Good job. :)
18224	While I think that this was an effective way to learn about hearing aids, it would have been helpful to have someone to answer questions that I might have. Good luck with your study! :)
48856	For me personally, I learn better visually so more pictures about hearing aids and what each component is would have been better.
57446	They have descriptions of "casing" and "nibs" maybe there could be a diagram of the names for the part of the hearing aid?
72890	Easy to understand booklet!
33025	I know better about hearing aids now than before.
71933	Thank you for this opportunity to participate! :)
97346	Pamphlet was easy to follow & very informative- nice reference guide.

DVD

Subject	Answer
47128	1
01304	2
12053	4
37224	2
27436	3
18365	2
20945	2
71056	2
21283	2
63349	1
50392	2
50738	1
80671	2
26825	2
02301	3
50338	3
63130	3
2824	2
44098	4
97596	2
45550	1
95960	4
21893	2
60458	1
Average	
2.208333	

DVD Comments

Subject	Comment
95960	The man giving the presentation mumbled when discussing hearing aids. It was hard to understand him.
44098	The man in this video was very hard to understand. I missed a lot of the information because he spoke too fast sometimes and did not annunciate enough. Awkward pauses were very distracting.
63130	I thought the movie was a good source of information, but the man talking was very boring to listen to at times.
50338	He mumbled and was sometimes hard to hear and understand. Also, he was monotone so it was difficult to always pay complete attention. However, the information was detailed and very beneficial!
97596	Having someone physically show where something is on the hearing aid helps.
71056	Very instructional, easy to understand, volume wasn't loud enough- missed some things.
18365	Some questions seemed to have all applicable or no applicable answers (#1, 10). The video was beneficial for learning, though.

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