

Headphone Hearing Technology for Elder Care: Eversound

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Sub Council Reviewers (SCR): LCB Senior Living, LLC, Internal Research Council

Type: Journal/Magazine Article, Submission

Abstract

With the first wave of the *Baby Boomers* entering the Senior Care industry, there is an undeniable need for more progressive and supplemental audio technology. To further investigate this LCB Senior Living, LLC and Eversound have collaborated on a 6-month *Investigative / Cross-sectional* study to explore the use of specially designed and personalized headphones. This study focused on how the system might improve resident engagement in a communal setting, improve hearing functionality and concentration, and in doing so decrease signs and symptoms of dementia.

OBJECTIVE: To investigate the use of specialized headphones and hearing loss in a communal senior living organization.

DESIGN: Observation, interview, and survey study comparing both users & non-users who have hearing loss.

SETTING: Two senior living organizations, one being a split non-dementia and dementia community and the other being a full dementia community.

PARTICIPANTS: 50(+) randomly-selected participants with and without hearing loss who are over the age of 65.

MEASUREMENTS: Standardized engagement tools such as facial observations, metric-based first and third part surveys.

RESULTS: Engagement, ability to understand, and ongoing socialization improved for those who used the specialized headphones.

CONCLUSION: With specialized hearing technologies, senior living organizations may be able to more effectively improve engagement as well as quality of life for those with an age-related and/or dementia-related hearing loss. The results of this study will validate the assumption that with better hearing capabilities a person's overall quality of life might improve.

Key words:

Elderly [senior] hearing impairment [hearing loss]; Technology and hearing

impairment [hearing loss]; Eldercare and hearing technology

INTRODUCTION:

According to the National Institute of Health (NIH) there is a strong statistical relationship between age and hearing loss to the extent that: 18 percent of American adults 45-64 years of age have hearing loss, 30 percent of adults 65-74 years of age have hearing loss, and 47 percent of adults 75 years, or older, have hearing loss (NIDCD). Research indicates that with a hearing impairment a person has an increased chance of becoming socially isolated (Weinstein and Ventry). Another consideration to take into account is the increasing number of Americans being diagnosed with a neuro-cognitive or neuro-degenerative disorders such as Alzheimer's Disease and related forms of dementia. Research also indicates that hearing loss may speed up age-related cognitive decline and those with hearing loss may exhibit more dementia-like symptoms (American Association of Retired Persons).

Currently, between 5.4 and 5.6 million Americans are living with Alzheimer's disease, which constitutes seventy-five percent of the dementia population (Alzheimer's Association, "Facts and Figures"). This number is expected to increase four-fold within the next few decades, and seems certain to turn this epidemic into a pandemic. It is also important to keep in mind that vascular dementia, the second most common type of dementia, as well as frontotemporal dementia is also increasing at an alarming rate. Each of these dementias changes a person's respective language abilities as they decline throughout the seven (7) stages of dementia. For example, a person in the early stages of Alzheimer's disease will drop 1 out of 4

words that are spoken to them while someone with mid-to-late stage Alzheimer's disease will drop 2 to 3 of every 4 words spoken to them.

The "Headphone Hearing Technology for Elder Care" research provides a clearer lens on the subject matter associated with hearing loss for the aging ear as well as any dementia-related hearing impairments.

METHODOLOGY:

The study consisted of an *Investigative / Cross-sectional* research trial of Eversound headphones, a wireless headphone system for seniors, intended to improve hearing and engagement in a community and expand possibilities for programming and entertainment. This was conducted over a duration of 60 days.

Group size ranged from 18 – 40 attendees. Only 25 subjects, who said they had hearing loss, were given headphones during meetings, social groups and movie viewings. Research took place at The Residence at Otter Creek of Middlebury, Vermont, which is a senior living community with independent, assisted and memory care residents, and The Arbors of Bedford, a community that specializes in serving residents with a memory loss diagnosis (such as: Alzheimer's disease or related form of dementia) in New Hampshire. Both communities are owned and operated by LCB Senior Living, LLC.

DISCUSSION:

The use of specialized headphones which allow for more personalized modifications of sound frequencies, volume, and an object of concentration, improve the engagement levels for residents living in a communal senior living community.

The project made use of Eversound Headphones within two LCB Senior Living, LLC communities. Data was collected by first and third party investigators such as the

elderly resident, caregiving/engagement associate, or Resident Engagement Director.

RESULTS:

Many measurable outcomes were generated from this study. The results showed consistently more engaged residents, as evidenced by higher percentage of resident participation (calling out answers, engaging in conversation, asking questions, and other vocalizations). Resident engagement increase by 28% overall. Outcomes also showed 17% fewer residents leaving the group or falling asleep during the group which is a common sign or symptom of lack of engagement due to a hearing impairment. Results at The Residence at Otter Creek generated a higher attendance rate to group programs, during which residents attested to being able to actually hear the program with the headphones. It became clear that some residents at Otter Creek were less apt to attend a program previously for fear or actuality of their inability to hear what was being presented. Group leaders' findings noted the change in their volume level to which they had to speak. Not only did this allow the leader to speak at a more conversational level, but it also provided more of a dignified environment for the residents with the elimination of a leader shouting to be heard.

Additionally, survey results and resident self-reporting revealed the assistance the headphones provided in eliminating background noise, made it much easier to focus on the group or activity. This provided a deep level of positive benefit for the residents with dementia, as too much stimuli can not only be distracting but anxiety provoking. Both communities found that the use of the headphones allowed for a more lively and active group. 100% of surveys reported Eversound Headphones had a positive effect on residents in the community,

and would recommend these headphones to other senior living communities.

DATA:

Results were gathered by observational reports and surveys from associates and staff and participation surveys completed by the residents

LIMITATIONS:

Limitations noted in the trial included: a limited amount of headphones for larger groups outside of the 25 subjects at one time; limited size of subject group; limited mixed-population (subjects with memory loss and without memory loss).

RECOMMENDATIONS:

The Internal Review Council (IRC) at LCB Senior Living, LLC would suggest the group that uses the Eversound Headphone should follow their suggested steps of engagement which were built in collaboration with Harvard Medical School and Brigham and Women's Hospital:

1. When using the headphone ensure that the group is in a single half circle (arc) row (or no more than two rows). This will increase engagement and make everyone a front row learner while providing a stimulating environment. This in return will help a person with hearing loss be more successful with perceptive language.
2. This use of headphones should be repeated in different locations throughout the community. Research shows that by changing someone's surroundings it can increase engagement. The first round of research has shown positive results, but it may be even more effective when used in different locations.
3. Provide something for the resident to hold or manipulate such as handouts,

clipboards, etc. Research shows that when someone holds something in their hands associated with the topic being discussed their brain will have a higher information intake (aka improving understanding and engagement).

MISCELLANEOUS:

It would be interesting to see how the headphones could aid in more fruitful visits with family members, as well as events a resident might attend out of the community.

REFERENCES:

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