A Systematic Review of The Impact of Hearing Aid Use on Depression in Adults

Kelly Allison, Hollis Elmore & Kelsey Roy

Division of Speech and Hearing Sciences, University of North Carolina at Chapel Hill

UNC SCHOOL OF MEDICINE

BACKGROUND

The National Institute on Deafness and Other Communication Disorders reports that on average 1 in 3 adults age 65-74 years old have hearing loss. This number grows to almost 50% of adults over 75 years old, making hearing loss a major problem for older adults. Previous research has shown that hearing loss impacts a person's quality of life. A study by Dalton et al showed that a reduction in quality of life is significantly associated with increasing severity of hearing loss. Research has also compared hearing aid users to non-hearing aid users to determine their odds of having a major depressive disorder (MDD). The results of a study conducted by Krabbe et al showed that hearing aid users had lower odds of having a MDD based on questionnaire results.

For this project, we conducted a systematic review to specifically look at in adults with hearing loss, how does hearing aid use influence depression, in order to determine if the results would have clinical significance for hearing aid recommendations and counseling patients.

METHODS

Databases Searched
Embase (n=55 articles)
PubMed (n=122 articles)
CINAHL(n=47 articles)

Search Strategy
"Depression" AND ("hearing loss" OR "HL" OR "hearing impairment") AND ("hearing aids" OR "amplification" OR "hearing technology")

Inclusion and Exclusion Criteria
Inclusion criteria:
Qualitative, quantitative, longitudinal, and peer reviewed studies
Exclusion criteria:
Expert opinion, non-systematic literature reviews

Time period
Until January 2017

Number of Articles
Articles remaining after duplicates removed: n=189
Title and Abstracts Screened: n=189
Full-Text Articles Reviewed: n=34
Full-Text Articles Appraised: n=8
Full-Text Articles Included: n=6

RESULTS

Table 1 Article information and quality appraisal

Article	Study Design	Sample Size	Age Range and Mean	Quality
Choi, Betz et al, 2016	Cohort Prospective	n = 63	> 50 years $\bar{x}$ = (71.0 Range: 62.9 - 78.5	Lesser quality
Acar et al, 2011	Cohort Prospective	n = 34	> 65 years olds $\bar{x}$ = (70.08 ∓ 4.8) Range: 65 - 82	Lesser quality
Boi, Racca L. et al, 2012	Longitudinal	n = 15	> 70 years $\bar{x}$ = (78.0 ∓ 4.4) Range: 70 - 85	Lesser quality
Metselaar et al, 2009	Randomized Control Trial	n = 254	$\bar{x}$ = (71.0 ∓ 13.5) Range: 29 - 95	Good quality
Mulrow et al, 1992	Longitudinal	n = 162	> 64 years $\bar{x}$ = (72.0 ∓ 6.0) Range: 70 - 85	Lesser quality
Manrique-Huarte et al, 2016	Cohort Retrospective	n = 62	> 65 years olds *Treatment group:* $\bar{x}$ = (79.0 ∓ 6.8) *Control group:* $\bar{x}$ = (76.0 ∓ 7.0)	Lesser quality

Table 2 Depression survey data extraction

Article	Degree of Hearing Loss	Depression Survey	Pre-Intervention Score	Post- Intervention Score	Follow-up Evaluation
Choi, Betz et al, 2016	Mild to severe	Geriatric Depression Scale **Score >5 indicates suspicion of depression*	$\bar{x}$ = 1.5	$\bar{x}$ = 1.1 (at 6 months) $\bar{x}$ = 1.3 (at 12 months)	6 months & 12 months
Acar et al, 2011	Moderate to severe	Geriatric Depression Scale **Score >7 indicates suspicion of depression*	$\bar{x}$ = 6.8 ∓ 3.9	$\bar{x}$ = 4.9 ∓ 3.4	3 months
Boi, Racca L. et al, 2012	Moderate to severe	Center for Epidemiological Studies- Depression Scale (CES-D) **Score ⩾16 indicates psychological distress*	$\bar{x}$ = 23.27 ∓ 2.12 (standard error of mean)	$\bar{x}$ = 12.27 ∓ 1.76 (at 1 months) $\bar{x}$ = 14.20 ∓ 2.21 (at 3 months) $\bar{x}$ = 11.33 ∓ 1.55 (at 6 months) (standard error of mean)	1, 3, & 6 months
Metselaar et al, 2009	Average PTA >35 in the better ear	Geriatric Depression Scale **Score >5 indicates suspicion of depression*	$\bar{x}$ = 2.05 ∓ 2.44	$\bar{x}$ = 1.57 (at 3 months) $\bar{x}$ = 2.32 (at 12 months)	3 months and 12 months after fitting
Mulrow et al, 1992	> mild hearing loss at 40 dB HL	Geriatric Depression Scale **Score >5 indicates suspicion of depression*	$\bar{x}$ = 3.5 ∓ 23.2	$\bar{x}$ = 2.8 ∓ 3.0 (at 4 months) $\bar{x}$ = 2.8 ∓ 3.0 (at 8 months) $\bar{x}$ = 2.7 ∓ 3.1 (at 12 months)	4, 8, & 12 months
Manrique-Huarte et al, 2016	Moderate to severe	Geriatric Depression Scale **Score >5 indicates suspicion of depression*		*Treatment group:* $\bar{x}$ = 2.0 *Control group:* $\bar{x}$ = 1.5	24 months

A quality appraisal was conducted on 6 articles including 2 longitudinal studies, 3 cohort studies, and 1 randomized control trial. All of the studies were deemed lesser quality, with the exception of the randomized control trial. A significant improvement in depressive symptoms was seen in two studies, an improvement was seen in one study, one showed an initial improvement but then no long term significant difference, and no significant difference was seen in two studies.

CONCLUSIONS

In this systematic review, we sought to evaluate the correlation between adults with depression and concomitant hearing loss and the use of hearing aids. The results of this review illustrate that this area of research needs to be continued and more data needs to be collected. There is limited research in this field and among the research that has been conducted, there is a shortage of high quality studies. There were many inconsistencies in the studies including, measures to assess depression, what score is considered to indicate depression, types of hearing aids provided, and results found in the studies. Some limitations of the studies assessed in this systematic review are that most participants had borderline depression before the studies began, high rates of attrition, no long term follow up and very weak conclusions. The studies were also limited in terms of their external validity due to the small number of subjects included in the research and the amount of heterogeneity in these studies. Another large problem was the recruiting method used in these studies.

While the data found during this systematic review was of lesser quality, there are strong implications for future research in this field, with a potential for clinical significance. Future research needs to have a much larger and more diverse sample group. In future research, the participants should have a more concrete implication of depression and should be followed long term.

KEY REFERENCES

For a full list of references email Kelly Allison at:
kelly_allison@med.unc.edu

ACKNOWLEDGEMENTS

The systematic review was completed as a project for SPHS 701 Introduction to Research Methods, under the guidance of Dr. Linda Watson and Dr. Jessica Steinbrenner. The authors have no financial or intellectual conflicts of interest.