Hearing Loss and Mortality: To What Extent Does Injury and Fall Mediate This Relationship?

Dongjuan Xu, PhD RN; Alexander L. Francis, PhD; Melissa D. Newell, Au. D
Purdue University

BACKGROUND

Using a recent and nationally representative sample of the U.S. adults aged 18 years and older, this study examines:
1) the association between self-reported hearing problems and later mortality,
2) the associations between self-reported hearing problems and the risk of injury, and whether the associations differ by characteristics of injury (i.e., due to a fall or another cause, and whether the injury was minor or serious), and
3) the mediating role of injury in the association between self-reported hearing problems and mortality.

METHODS

This study uses public-use data from the National Health Interview Survey (NHIS) and the National Death Index (NDI).

- To estimate associations between hearing problems and mortality, we used the linked 1997–2014 NHIS-NDI data files (N= 521,146).
- To estimate associations between hearing problems and injury incidence, we used data from the 2004 to 2017 NHIS surveys (N= 412,661).
- To investigate the role of injury in the association between hearing problems and mortality, we used the linked 2004–2014 NHIS-NDI data files (N= 310,787).

RESULTS

- There was a clear difference in mortality risk by the severity of hearing problems. More than 27% who reported having a lot of trouble hearing or who were deaf died within the study period, 12% who reported a little or moderate trouble hearing died, and 5% who reported having excellent or good hearing died.
- In the fully adjusted model, participants who reported hearing problems continued to have significantly higher risks of death compared with the excellent/good hearing group (hazard ratio = 1.20 for a little or moderate trouble hearing and hazard ratio = 1.50 for a lot of trouble hearing or deaf).
- Participants who reported a lot of trouble hearing/deaf also had a higher risk of death than those who reported a little/moderate trouble hearing (hazard ratio = 1.25).
- For those who reported having a lot of trouble hearing or who were deaf, 4.3% were injured, 2.2% had a fall, 2.1% sustained a non-fall injury, 2.6% had a serious injury and 1.7% had a minor injury.
- Participants who reported having hearing problems had significantly higher risks of injury, including both fall and non-fall injury, compared with the excellent/good hearing group. Moreover, participants who reported having hearing problems were more likely to have a serious injury.
- Fall and serious injury mediated the associations between hearing problems and mortality, with mediation effects ranging from 12% to 39%.

DISCUSSION

Previous researchers have proposed that the relationship between hearing loss and increased risk of injury and fall may arise through three potentially overlapping mechanisms.

- First, hearing problems are often comorbid with vestibular dysfunction and balance difficulties.
- Second, individuals with sensory dysfunction, including hearing loss, may experience reduced auditory and spatial awareness of their immediate surroundings, making them more likely to experience accidental injury.
- Finally, hearing loss may increase cognitive load, reducing the cognitive capacity remaining for balance, perhaps especially during walking and other cognitively demanding activities such as driving.

CONCLUSIONS

- In summary, we found that increased severity of hearing problems was associated with increased mortality risk, and survival time was significantly shorter.
- Participants who reported having hearing problems also had significantly higher risks of injury, including both fall and non-fall injury, compared with those reporting excellent or good hearing, and were also more likely to suffer serious injury.
- Finally, injury, specifically fall-related injury and serious injury, mediated the association between hearing problems and mortality.