



Reference Terms

CES-D – Center for Epidemiologic Studies Depression
HI – Hearing Impairment / **HL** – Hearing Loss
VL – Vision Loss
DSL – Dual Sensory Loss
OR – Odds Risk
RR – Relative Risk
MDD – Major Depressive Disorder
PHQ-9 – Patient Health Questionnaire for depression

INTRODUCTION AND PUBLIC HEALTH IMPORTANCE

Mental health is a key component in the health and well-being of older adults and refers to the “state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community” (World Health Organization, 2013).¹

Depression is a major contributor to healthcare costs associated with older populations, and is projected to be the leading cause of disease burden in older populations by the year 2020.² **The prevalence of depression in patients aged 65 and older may be as high as 40% in hospitalized and 30% in nursing home patients, and 8–15% in community settings.**³

The reported percentages of those with visual impairment or combined visual and hearing impairments who experience depression or its symptoms have ranged from 28% to 43%, while percentages for the general population are reported to be between 8% and 16%. This represents a major public health concern for these populations, as the experience of depression or symptoms of depression can negatively impact all areas of a person's life.⁴

Unipolar depressive disorders have been reported as the leading cause and adult-onset hearing impairment (**HI**) as the second leading cause of years of life lived

with disability among adults in high-income countries.⁵

Besides reduced ability to enjoy music and other sounds that we appreciate, hearing loss may produce social isolation, distorted communication, and, in some cases, stigmatization, all of which can affect mental health and quality of life.⁶

Persons with visual impairments or combined visual and hearing impairments are more likely to have lower income and education levels, poorer health, and be members of racial/ethnic minority groups. They are also more likely to have additional chronic conditions, diseases, or disabilities, including major depression.⁷

In old age, both depression and chronic diseases have high prevalence and depression and chronic diseases may induce the development of each other. Therefore, it is important to investigate the relationship between chronic diseases and risk for depression in old age.⁸

Public awareness of **DSL** is also not widespread and in turn, rehabilitation options have not been well-explored in many countries.¹

Unsurprisingly, a number of studies have consistently demonstrated a strong link between co-occurring vision and **HL, often referred to as dual sensory loss (DSL), and depressive symptoms.**⁹

KEY RESEARCH STATISTICS

After pooling these studies, there were 172 and 1114 subjects with poor and good hearing respectively, and **those with poor hearing had significantly higher risk for depression (RR: 1.92, 95% CI: 1.12–3.29)** (Fig. 3). The significant **OR** and **RR** showed that poor hearing was an important risk factor for depression in old age.⁸

Still, other authors examined the incidence of depressive symptoms in a large group of Japanese

patients aged 65 years and older. After 3 years, they noted a 19.6% rate of depression in the group with hearing handicaps versus 8.0% in normal controls. They thus concluded that hearing loss was predictive of future depression with an odds ratio of >2.0 .¹⁰

The estimates from sensory loss adjusted analysis indicated that participants identified with DSL (bD2.17, SED0.39, $p < 0.001$) and HL only (bD1.14, SED0.32, $p < 0.001$) had elevated levels of depressive



symptoms compared to those with no sensory loss. Participants with DSL had significantly higher levels of **CES-D** scores compared to those with HL (Mean Difference D 1.03, SED 0.34, p D 0.003).¹¹

The estimated prevalence of moderate to severe depression (**PHQ-9** score, ≥ 10) was 11.4% (95% CI, 10.1%–13.0%) for adults with any self-reported HI and 5.9% (5.3%–6.6%) for those without HI. Among those with HI, the prevalence of depression was 9.0% (95% CI, 7.5%–10.8%) for men and 14.7% (12.7%–16.9%) for women. **The estimated prevalence of depression was higher among adults with HI than in those without HI and higher among women than among men.**⁵

Depressive symptoms (assessed according to the MHI) were significantly higher in subjects with mild bilateral hearing loss (OR) 51.83, 95% confidence interval (CI) 51.18–2.83) after multi-variable adjustment, although subjects with moderate to severe hearing loss (10.2%) did not have a higher likelihood of depressive symptoms than those with normal hearing (OR 51.20, 95% CI 50.66–2.17).¹³

The strongest effects were estimated for depression and self-esteem among young men. In this group, a 50-dB hearing loss for low frequencies, which is a very serious impairment, on average produces a 0.5-SD increase in depression and 0.5-SD loss of self-esteem in addition to slight effects produced by medium and high-frequency hearing loss.⁶

Women with hearing loss were more likely to report depressive symptoms as assessed according to the MHI. Furthermore, women younger than 70 (n515, 40.5%) with any level of hearing loss were substantially more likely to have depressive symptoms than women younger than 70 without hearing loss (multi-variable adjusted OR 54.76, 95% CI 51.93–11.72).¹³

There was also an association between the degree of HL and depressive symptoms scores, with higher PTA thresholds predicting higher CES-D scores.¹¹

In relation to DSL, Capella-McDonnall (2005) estimated that out of a total sample of 6089 participants, 7.3% had DSL of whom 35% had depression.¹³

There is an increase in depression at the point of first report of DSL, and a substantially faster increase in depression from that point forward until approximately 5 years later, compared to males without sensory loss.⁷

Hearing aid use was associated with reduced odds of **MDD** (OR=0.35, 95% CI: 0.14–0.90) and any depressive symptoms (OR=0.33, 95% CI: 0.14, 0.77) in the fully adjusted model (Table 2).¹⁴

Subjects who reported using a hearing aid for a minimum of 1 hour per day had a significantly lower likelihood of having depressive symptoms (according to the CES-D-10) than non-frequent users (01 h/d; multi-variable adjusted OR50.32, 95% CI50.14–0.76).¹³

KEY RESEARCH RESULTS AND DISCUSSION

This study demonstrated that bilateral hearing loss is significantly associated with depressive symptoms. Several possible mechanisms might explain this relationship. Hearing loss in older adults may lead to greater dependence on caregivers, loneliness, and ultimately poorer quality of life and depression.¹³

In the present study based on a nationally

representative sample, **HI was significantly associated with an increased risk of depression in adults of all ages, but was most pronounced in those aged 18 to 69 years.**⁵

It appears counterintuitive that a rather mild functional hearing loss, which to a large extent may be restored by hearing aids, is more important to mental health



and well-being than losing hearing altogether, even if somewhat impaired in the first place.⁶

Most notably, participation levels in socially engaging and mentally stimulating activities fully explained the increased depressive symptoms experienced by adults with sensory loss.¹¹

Our meta-analysis showed that in old age, both poor hearing and vision were associated with depression and also were risk factors for depression.⁸

Regarding incident sensory loss, the present findings illustrated that **the first observed occurrence of HL and DSL coincided with a jump in the level of depressive symptoms.** In contrast, no increase in the level of depressive symptoms was observed at the first observed occurrence of **VL**.¹¹

The curvilinear growth pattern exhibited in depression following DSL is indicative of an adjustment process taking place. Experiencing DSL causes an initial

spike in depression, as expected with the onset of a disability, which is often a traumatic experience that causes increased stress for the individual.¹⁵

Young people with a less severe hearing loss than what is normal for old people may suffer from being different in terms of not being fully able to function as expected for people at their age. The effects are stronger among men than among women, perhaps because career expectations for men result in stronger feelings of being disabled at work among hearing-impaired men.⁶

Our **results demonstrate that hearing aid use is significantly associated with reduced odds of MDD and any depressive symptoms,** consistent with prior studies.¹⁴

In our hands, general health perception, social functionality and vitality, along with mental well-being and emotional perception, all improved with hearing aid use.¹⁰

PRACTICAL AND CLINICAL APPLICATIONS

Furthermore, by describing these relationships between psychological health and HI, we hope to engage the clinicians caring for our veterans in a more active role in screening for HI and depression, thereby improving HRQOL.¹⁷

Thus, older adults may be at increased risk of depression if they do not have sufficient resources available to cope with the restricted independence and communication difficulties caused by sensory declines.¹¹

Additionally, we found that self-reported HI was significantly associated with increased odds of depression in each of our 3 major racial/ethnic groups: Hispanics, non-Hispanic blacks, and non-Hispanic whites.⁵

In summary, VL and HL are highly prevalent among older adults and their co-occurrence may compound their respective impacts on health and functioning,

thereby exerting strong effects on the mental health and wellbeing of those affected. Visual cues can provide an important compensatory mechanism for hearing-impaired adults, and, conversely, auditory cues for adults with visual impairment.¹¹

The focus on adaptable variables is important because of their potential to be included in interventions and their potential ability to offer individuals some control in reducing their experience of depressive symptoms.⁷

The principal contribution of audiometric HL to increased depressive symptoms suggests that hearing assistive technologies and hearing rehabilitation programs may help to reduce the impacts of DSL. This evidence base can inform health policy which is needed to **encourage improved awareness and screening of sensory loss and co-morbidities among older adults.**

There is a need for health professionals and care practitioners to be sensitive to the combined effects of vision and HL on mental health and wellbeing.¹¹

The National Council on the Aging found that people with HI who did not use hearing aids more often stated that they had sadness, depression, worry, anxiety, paranoia, less social activity, emotional turmoil, and insecurity. In that study, both those with HI (56%) and their family members (66%) reported benefits from hearing aid use in terms of better relationships at home, more confidence, and better relationships with others.¹⁸

Technological advances in hearing aids and exemplary customer care might do more than improve

hearing capacity and favor the observed long-term compliance. The mood, social life, general health and overall mental profile of patients also stand to benefit. **Sufficient attention to the special needs of older patients should therefore lead to a wider use of hearing aids and to a better quality of life for elderly patients.**¹⁷

We should therefore be conscious in planning future social and health services and expect that many older persons will experience hearing loss that could predispose them to depressive symptoms. Early recognition of these symptoms could lead to interventions or rehabilitation that may be of practical assistance in retaining a higher quality of life.¹⁴

Disclaimer: Research excerpts provide helpful references for those interested in learning more about these important healthcare topics. They are intended to empower providers, patients and loved ones with additional input for personal consultation. For those seeking additional educational references, it is suggested they research specific topics of interest via publicly available resources such as pubmed.gov or Google Scholar. Please personally consult with expert health providers to make well-informed decisions.

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