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Sensory Disability



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Hearing Loss and/or Deafness

Hearing Decrease in hearing sensitivity of any level.
Deafness Profound or total loss of hearing in both the ears.

Synonyms

[Sensory impairment](#)

Definition

Sensory disability usually refers to the impairment of the senses such as sight, hearing, taste, touch, smell, and/or spatial awareness. It mainly covers conditions of visual impairment, blindness, hearing loss, and deafness. According to the World Health Organization (WHO), these impairments are defined as follows:

Visual Impairment and/or Blindness

Visual impairment	Decrease or severe reduction in vision that cannot be corrected with standard glasses or contact lenses and reduces an individual's ability to function at specific or all tasks.
Blindness	Profound inability to distinguish light from dark or the total inability to see.

Overview

Hearing loss is common among the elderly population (See ► “Disability”; ► “Disability Types”; ► “Impairment”). People over 60 years old experience a hearing decline of about 1 dB annually (Walling and Dickson 2012). The common clinical tests for mild and moderate hearing loss use whispered voice, finger rub, and watch tick, and the threshold is often set at less than 25, 30, or 40 dB at 500–4000 Hz. Based on the global estimation by WHO (2014), about one third of adults over age 65 had disabling hearing loss. The prevalence of hearing loss in the United States stands between 20% and 40% in adults aged 50 years or older (Chou et al. 2011). About two thirds of Americans aged 70 or older have hearing loss, out of whom about one fifth use hearing aids (Lin et al. 2013). It is also estimated that one fourth of older Americans over 70 years of age has hearing impairment, with men having higher prevalence than women (Dillon et al. 2010). According to the 2010 US census, the prevalence of hearing disability (“Is this person deaf or does he/she have serious difficulty hearing?”) was 8.9% for the age group of 65–74 and 22.7% for the age group of 75 and older (Erickson et al. 2012).

Visual impairment (See ► “Disability”; ► “Disability Types”; ► “Impairment”) may be tested with the aid of an eye chart, such as the Snellen chart. According to the *International Classification of Diseases 11*, vision impairment can be classified as distance and near presenting vision impairment. For the former, mild is $<6/12$, moderate is $<6/18$, severe is $<6/60$, and blindness is $<3/60$ and for the latter, $< N6$ or $M.08$ with existing correction.

Based on the Global Vision Database, a recent review (Bourne et al. 2017: 892) on the global prevalence of vision impairment reports: “31 million (86%) of 36 million blind people, 172.3 million (80%) of 216.6 million people with moderate and severe vision impairment, 140.3 (74%) of 188.5 million people with mild vision impairment, and 666.7 (61%) of 1094.7 million people with functional presbyopia were within this age category (aged 50 years and older).” In the United States, the prevalence of visual disability measured by asking if the respondent is blind or has serious difficulty seeing even when wearing glasses was 4.2% for the age group of 65–74 and 10.2% for the age group of 75 and over (Erickson et al. 2012). Seland et al. (2011) recently estimated the prevalence of visual impairment in European older adults aged 65 years or older: across the six European countries that were examined, the prevalence of low vision ranged from 0.58% to 3.31%, and blindness prevalence ranged from 0.27% to 2.15%. Older adults in developing societies have a higher prevalence of visual impairment. Based on a nine-province survey in rural China, Zhao et al. (2010) reported that the prevalence of presenting visual impairment ranged from 6.9% to 15.8% and blindness from 1.3% to 5.4%. Gu et al. (2013) reported that prevalence rate of visual impairment among the Chinese older adults increased from about 6–10% for individuals aged 65–69 to more than 50–60% for individuals at ages 100 or older. A recent study on Gujarat, India, reported that the prevalence of presenting visual impairment was as high as 13.5%, and bilateral blindness constituted 3.1% with best correction (Murthy et al. 2010).

Key Research Findings

The risk factors of age-related hearing loss include family history, hormones, male sex, medical conditions, medications, illicit drug use, vitamin intake, alcohol use, tobacco use, noise, and industrial chemicals (Walling and Dickson 2012). Kiely et al. (2012) recently examined an 11-year trajectory for changes in pure-tone hearing thresholds, finding that hypertension and cognitive impairment independently predict hearing loss and risk factors for prevalence such as smoking, diabetes, and stroke are not predictive of incident hearing loss.

Hearing loss and impairment can have important biological outcomes. For example, Peelle and colleagues (2011) reported that hearing loss may cause downregulation of neural activity supporting speech comprehension (See ► “Speech Capability”) and the loss of gray matter volume in the primary auditory cortex. Lin et al. (2014) also noted that hearing impairment could accelerate brain atrophy. Accordingly, hearing loss and impairment are associated with various health and socioeconomic outcomes in the later years. Hearing impairment is associated with accelerated cognitive decline and incident cognitive impairment among older adults (Lin et al. 2013). It is also correlated with the decline of physical function among older adults (Bess et al. 1989). Based on the Blue Mountains Hearing Study, Chia et al. (2007) reported that older adults with self-reported hearing loss had significantly poorer health-related quality of life. Using the same survey, Karpa et al. (2010) assessed the significant association between hearing loss and mortality, which is mediated through disability in walking, cognitive impairment, and self-rated health. Moreover, hearing loss can lead to difficulties in communication and thus create barriers in social interaction and thereby result in social isolation. This has been observed in Australia, the Netherlands, and the United States (Mick et al. 2014). Genther et al. (2013) also find that hearing loss leads to hospitalization among Americans over 70 years old.

According to the WHO (2018), the leading causes of vision impairment include uncorrected

refractive errors, cataract, age-related macular degeneration, glaucoma, diabetic retinopathy, corneal opacity, and trachoma. Before 2006, uncorrected refractive errors were not recognized by the WHO in estimating the global prevalence of visual impairment; however when this risk factor is counted in as the leading cause of visual impairment, the global estimates increase from 161 million to 314 million (Resnikoff et al. 2008).

In comparison with hearing loss, Wallhagen et al. (2001) contend that vision impairment has affected a wider range of functional status among older adults. Visual impairment can lead to falls and hip fracture in older adults (Abdelhafiz and Austin 2003). According to the review of Legood et al. (2002), poor-sighted individuals are 1.7 times more likely to have a fall, 1.9 times more likely to have multiple falls, and 1.3 to 1.9 times more likely to have a hip fracture. In a prospective cohort study based on four metropolitan areas of the United States, Lin et al. (2004) reported that vision impairment predicts cognitive and functional decline in older women.

Depression is another major outcome of visual impairment. Based on a large sample of British older adults over 70 years old, Evan and colleagues (2007) find a strong association between visual impairment with depression, which is attenuated by activities of daily living. Brown and Barrett (2011) further reveal four mediating mechanisms for such negative association: (1) activity limitations; (2) socioeconomic resources; (3) social resources; and (4) psychological resources, measured by self-efficacy. Among these, self-efficacy was found to have the strongest effect. Hodge and Eccles (2013) argued that loneliness and social isolation may not be necessary for the visual impaired individuals, but “loneliness and social isolation interact with other factors as part of a reinforcing process, resulting in a decline in psychosocial and physical wellbeing” (2013: 6). Visual impairment is also associated with mortality in old age. Based on the national data of China, Gu et al. (2013) reported that visual impairment strongly predicted mortality of the older adults, though the impact of mild visual impairment seemed not significant for the young olds, namely, those who aged 65–79.

The concurrence of hearing loss and vision impairment is also common in old age. Dual sensory impairment (See ► “Disability”; ► “Disability Types”; ► “Impairment”) could be defined as the coexistence of both vision and hearing impairment as a result of the aging process (Heine and Browning 2002: 764). According to Swenor et al. (2013), the prevalence of dual sensory loss reached 11.3% in Americans over 80 years. The dual sensory loss brings more negative health impact than vision impairment or hearing loss alone (Crews and Campbell 2014; Cimarolli and Jopp 2014). Walh and colleagues (2013) compared major health indicators across those of severely visually impaired, of severely hearing-impaired, of dual sensory-impaired, and of no sensory-unimpaired older adults and concluded that the largest difference is between those who are dual sensory-impaired and those without sensory impairment. Similarly, Gopinath et al. (2013) reported that concurrent visual impairment and hearing loss were more associated with increased mortality risks.

Examples of Interventions

One of the core treatments for hearing impairment (See ► “Preventive Care”) is the technological use and provision of hearing aids, which comprise cochlear implants, electric acoustic stimulation, and active middle ear implants, among others (Dawes et al. 2015; Sprinzl and Riechelmann 2010). Such hearing-assistive technologies have also been paired up with other visual, auditory, or tactile modalities (Sprinzl and Riechelmann 2010; Walling and Dickson 2012). There are aural rehabilitation programs proposed to complement hearing aid provision (Hickson and Scarinci 2007).

Studies that evaluate technology intervention pertaining to hearing aid have shown positive results (Dawes et al. 2015). In Contrera et al.’s (2016) work, for instance, it was noted among patients who were 50 years and above that improvement in mental health quality of life was seen, post-intervention with hearing aids and cochlear implants. By comparing before and after hearing aid fitting periods, Joanovic and

colleagues (2018) found in their study on outpatients aged 60 years and above that improvement among women in the domains of abilities, social participation, and senses of intimacy were more significant than those of men.

As one of the most common causes of blindness worldwide, and as the number one cause of irreversible vision loss, glaucoma has afflicted approximately 66.8 million people worldwide (Conlon et al. 2017). Glaucoma treatments – comprising both medical and surgical treatments – may include topical medications (of different classes), laser therapies, and surgical therapies (See ► “Preventive Care”). Over the past 10 years, there has been an overall increase in the availability of glaucoma medications and the use of laser trabeculoplasty, accompanied by a decrease in invasive incisional surgery (Conlon et al. 2017). Microinvasive glaucoma surgery has been recently introduced which takes a midway point between conservative medical treatments and surgery of the more invasive, incisional types (Conlon et al. 2017). Azuara-Blanco et al. (2016) assessed the effectiveness of early lens extraction as first-line treatment for patients 50 years or older who are facing primary angle-closure glaucoma. They found that the overall health status and glaucoma-specific disability, visual impairment, and disability saw improvement. Other positive outcomes included the reduced requirement for medications and surgery.

Future Directions of Research

Hearing loss is often ignored by older adults as a normal aspect of aging and thus makes it undertreated. Social stigma and cost have also surfaced as barriers in acknowledging and managing hearing loss (Fischer et al. 2011; Walling and Dickson 2012). It is therefore imperative to further study the reasons and consequences of untreated hearing loss in older adults and the effective preventive and rehabilitate interventions (Lin et al. 2013). In this area, researchers have started to analyze how societal factors affect the management of hearing loss (e.g., Fischer et al. 2011; Mick et al. 2014). In Mick et al.’s (2014)

work, for example, the authors found a strong link between hearing loss and social isolation among women in the 60–69-year-old band. More pertinently, the authors point out that access to adequate treatment and services might also be impeded if hearing-impaired individuals are lacking in various forms of social support including community programs and assistance from their networks of family members and friends. Further research is paramount in confirming the extent to which social support relates to hearing loss and how this translates across different demographics.

Future research on visual impairment needs to consider a number of directions. They comprise investigating the extent to which newer micro-invasive glaucoma surgery procedures – which bridge the gap between conservative medical management and more invasive glaucoma surgery – play in glaucoma treatment (Conlon et al. 2017); assessing the relationship between canaloplasty (a nonpenetrating surgical method) and quality of life of glaucoma patients (Klink et al. 2015); or developing other intervention strategies to improve visual function in order to reduce the occurrence of falls and hip fractures among older people (Abdelhafiz and Austin 2003) (See ► “Preventive Care”).

So far, insufficient attention has been paid to how dual sensory impairment may be managed through recommended clinical practice or rehabilitation of individuals. In Heine and Browning’s (2002) work, they suggest not only further reviews of intervention programs and reference to clinical case studies but also raise possibilities of multidisciplinary assessment and intervention, with a longer-term goal of improving quality of life and overall well-being for older adults coping with sensory disability. Saunders and Echt (2007) propose a series of audiological rehabilitation considerations to include paying closer attention to cognitive factors, patient-provider communication, training providers in both recognizing dual sensory impairment, and how to carry out treatment protocols. Further approaches comprise employing assistive listening devices in the home and using tactile information drawn from

doorbells, alarm clocks, and smoke alarms, to name a few vibrating devices.

In this vein, it is important to consult studies on aging and sensory behavior that deal with qualitative research and analyses. They include incorporating the researcher's body and embodied narratives as an important component of health research on geriatric oncology (Ellingson 2006) and other medical domains (Stelter 2010), analyzing the relationship between sensations and symptoms in the field of medical anthropology (Andersen et al. 2017), as well as assessing the digital health practices of the elderly in managing chronic illness alongside other health practices, senses, and emotions (Urban 2017), among various other qualitative research trends.

Summary

Sensory disability mainly refers to visual impairment and hearing loss, the prevalence of which are both high in older adults. Age-related hearing loss and visual impairment are related to a wide range of factors including genetics, disease, nutrition, health behaviors, the environment, etc. They are also associated with various biological, health, and socioeconomic outcomes in the later years of life. For example, hearing loss is strongly associated with cognitive decline; and visual impairment could lead to hip fractures in older adults. Visual impairment and hearing loss both lead to difficulties in social interaction and thus increase the risk of depression in old age. The concurrence of hearing loss and vision impairment is also common in old age. Various interventions have been developed, but more research is needed in this important area.

Cross-References

- ▶ [Disability](#)
- ▶ [Disability Types](#)
- ▶ [Impairment](#)
- ▶ [Preventive Care](#)
- ▶ [Speech Capability](#)

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