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Original Article

Influence of visual impairment and hearing impairment on functional dependence status among people in Taiwan—An evaluation using the WHODAS 2.0 score

Ko-Fang Chang [a], Kwang-Hwa Chang [b,c,d], Wen-Chou Chi [e], Shih-Wei Huang [d,f], Chia-Feng Yen [g], Hua-Fang Liao [h], Tsan-Hon Liou [b,d,f], Pin-Zhir Chao [i], I.-Chan Lin [a,*]

[a] *Department of Ophthalmology, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan, ROC*
[b] *Graduate Institute of Injury Prevention and Control, College of Public Health, Taipei Medical University, Taipei, Taiwan, ROC*
[c] *Department of Physical Medicine and Rehabilitation, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan, ROC*
[d] *Department of Physical Medicine and Rehabilitation, School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan, ROC*
[e] *Department of Occupational Therapy, Chung Shan Medical University, Taichung, Taiwan*
[f] *Department of Physical Medicine and Rehabilitation, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan, ROC*
[g] *Department of Public Health, Tzu-Chi University, Hualien, Taiwan, ROC*
[h] *School and Graduate Institute of Physical Therapy, College of Medicine, National Taiwan University, Taipei, Taiwan, ROC*
[i] *Department of Otorhinolaryngology, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan, ROC*

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Abstract

Background: Visual impairment (VI) and hearing impairment (HI) are the two most common types of sensory disability encountered clinically. However, VI and HI result in different limitations in daily life. We assessed the level of functioning in patients with VI or HI based on the International Classification of Functioning, Disability, and Health.

Methods: This nationwide, cross-sectional study included 312 people with VI and 540 people with HI. Each participant's degree of functioning and disability was evaluated using the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0). The standardized WHODAS 2.0 scores ranged from 0 (least difficulty) to 100 (most difficulty).

Results: Patients with VI and those with HI had a mean (±standard error) 32-item WHODAS 2.0 score of 42.4 ± 2.9 and 27.1 ± 1.6, respectively. The degree of restriction was positively related to the level of VI. Specifically, the patients with VI and a WHODAS 2.0 score of 33.7−35.3 or higher were likely to experience barriers to accessing *mobility products*, *communication products*, and *education products*. Furthermore, patients with a score of 42.9 or higher might experience barriers to accessing *ingestion products* and *living products*.

Conclusion: WHODAS 2.0 scores are strongly correlated with the severity of VI. Mild VI should be targeted for treatment and referral as early as possible. Compared with the patients with HI, the patients with VI more frequently experience barriers to accessing environmental factors.

Keywords: Disability; Functioning; Hearing impairment; International Classification of Functioning (ICF); Visual impairment; WHODAS 2.0

1. Introduction

Partly because of the absence of visual feedback, people with visual impairment (VI) may be less active in their daily lives.[1] VI includes both low vision and blindness. According to the criteria established by the World Health Organization (WHO), low vision

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* Corresponding author. Dr. I.-Chan Lin, Department of Ophthalmology, Shuang Ho Hospital, 291, Zhongzheng Road, Zhonghe District, New Taipei City 235, Taiwan, ROC.
E-mail address: ichanlin@gmail.com (I.-C. Lin).

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and blindness are defined by a best-corrected visual acuity (BCVA) score worse than 20/60 to a lower limit of 20/400 and BCVA score worse than 20/400 in the eye with better vision, respectively. In Taiwan, the estimated prevalence of blindness and low vision among people older than 65 years is 0.59−0.82% and 2.94−4.06%, respectively.[2,3]

The presence of VI negatively affects a person's quality of life and is related to low physical and mental functioning.[4] VI is also associated with an increased risk of depression,[5] falls,[6] mortality[7] and poor quality of life.[8−11] Visual functioning entails receiving information from the environment,[12] and people with VI usually experience restrictions in daily activities.[13,14] Therefore, visually impaired people might have considerable requirements regarding the environment, which must be assessed.

The ICF categories of hearing functions evaluate hearing impairment in both ears using hearing handicap (HH) with percentage loss of hearing (PLH) worksheet, first suggested by American Academy of Otolaryngology (AAO) in 1979 and further modified by using pure-tone average of thresholds at frequencies 0.5, 1, 2, 4 KHz in calculating equations instead of using frequencies 0.5, 1, 2, 3 KHz as in 1979 version.[15] If that average was less than 25 dB hearing loss (HL) in both ears, HH was zero. For every dB above 25, HH was increased by 1.5%, reaching a maximum at 92 dB. If the two ears had unequal pure-tone averages, HH was calculated by a weighted average giving the better ear 5 times the weight of the worse ear. Mild disability in hearing function was defined as the HH from both ears between 50% and 70%. Moderate disability was defined as HH between 70% and 90%, Severe disability in hearing function was defined as that higher than 90%.[16] Hearing impairment (HI) also affects the quality of life on many dimensions. HI in older age was associated with significantly more depressive symptoms, lower self-efficacy and mastery, more feelings of loneliness, and a smaller social network than normally hearing peers.[17] Individuals with moderate to severe hearing loss were found more likely than individuals without hearing loss to have impaired activities of daily living (ADLs) and instrumental ADLs. Severity of hearing loss is also associated with reduced quality of life in older adults.[18]

The WHO Disability Assessment Schedule, Second Edition (WHODAS 2.0) was developed based on the International Classification of Functioning, Disability, and Health (ICF) and closely corresponds to the ICF component of *activities and participation*.[19] WHODAS 2.0 assesses a person's level of functioning in the following six domains: *understanding and communicating*, *mobility*, *self-care*, *getting along with people*, *life activities* (*household activities* and *work and school activities*), and *participation*. The psychometric properties of WHODAS 2.0 have been evaluated for numerous clinical conditions, including osteoarthritis,[20] stroke,[21] psychiatric conditions,[22] cancer,[23] hearing loss,[24] and visual disability.[25]

VI and hearing impairment (HI) are the two most common types of sensory disability encountered clinically, although they result in different limitations in daily life. In this nationwide study, we used the WHODAS 2.0 to assess the functioning and disability of patients with VI and to evaluate the difference in functioning between patients with VI and those with HI.

2. Methods

In this study, our data were obtained from the Taiwan Data Bank of Persons with Disability (TDPD). According to government statistics, the number of people eligible for disability support before 2010 was estimated to be 1,063,624 by using the Disability Eligibility Determination Scale, version 1980 (DES-1980). Between 2010 and 2012, the eligibility criteria for disability support were based on the medical model. An authorized physician was required to evaluate and report an applicant's impairments or problems in body functions and structures by using official DES-1980. In July 2012, the process of disability evaluation in Taiwan was again amended according to the *People with Disabilities Rights Protection Act*. In addition to evaluating applicants' impairments in bodily functions and structures, an assessment of their needs in daily life is currently required.[26] The content of the official DES was revised, and the updated version was issued as DES, version 2012 (DES-2012). The DES-2012 is based on the ICF framework and incorporates the Functioning Scale of the Eligibility Determination System of Disability. This functioning scale comprises an interviewer-administered version of WHODAS 2.0 in Chinese and evaluates the influence of environmental factors on a person's level of activities and participation.[26]

We conducted a nationwide pilot study in Taiwan between January 1, 2011 and June 30, 2012, in which the DES-2012 was used to assess 6244 people. Specifically, we used the DES-2012 data to construct the TDPD.[27] In the near future, all patients eligible for disability will be evaluated using DES-2012, thereby gradually leading to a larger TDPD. The present study was approved by the Joint Institutional Review Board of Taipei Medical University.

2.1. Participants

In the present study, patients with VI were recruited from the TDPD between August 1, 2011 and February 29, 2012. The TDPD provides information on the participants' sex, age, caregivers, work or school status, urbanization (based on their residential address), disability-related diseases or medical conditions, and major impairments in bodily functions and structures (coded as ICF categories). The TDPD also contains information on the patients' total and domain WHODAS 2.0 scores. The ICF Chapter b2 *sensory functions and pain* includes both *seeing functions* (ICF category b210) and *hearing functions* (ICF category b230). Both functions entail receiving information from the environment.[4] Therefore, patients with HI were recruited during the same period as those with VI. Patients younger than 18 years were excluded from this study.

2.2. Measurements

Using the Interviewer's Training Manual and Interview Guide of WHODAS 2.0, we trained five or more interviewers

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