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Hearing Impairment in Adults with Pervasive Developmental Disorders

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Abstract

It has been reported that hearing impairment in adults with developmental disabilities is a significant clinical concern. Although the literature primarily reports the incidence of hearing impairment in children with Pervasive Developmental Disorders (PDD) as opposed to adults with PDD, these reports indicate that rates of loss for this group are greater than in the general population. In this study, adults with PDD were age, gender, and IQ matched to adults with Developmental Disabilities but without PDD (NPDD). The rate of hearing loss in the NPDD group (53.3%) was significantly greater than the rate of loss in the PDD group (21.7%; p=0.001). Significant combined predictors of loss for the PDD group were presence of a psychiatric diagnosis, and suspected loss (p=0.002). These findings have implications for service provision to this specific sub-group of adults with developmental disabilities.

Introduction and Literature Review

It has been documented that hearing impairment is commonly seen in people with developmental disability (DD) (Lowe & Temple, 2002; Mazzoni, Ackley & Nash, 1994; van Schrojenstein Lantman-de Valk et al., 1994) and particularly in aging adults with Down syndrome. Lowe and Temple (2002) at Surrey Place Centre in Toronto, reported the rate of hearing loss in their sample of adults with DD as 66%. They also determined that the most prevalent underlying condition responsible for hearing problems in this population was sensorineural impairment (45%). They postulated that audiological assessments could well serve the population of adults with DD as hearing impairments are likely contributing to the socio-emotional problems common to these individuals. Lowe and Temple cautioned,

however, that the rates of impairment found in their study may not be generalizable to specific sub-groupings of the developmentally delayed such as adults with autism.

Pervasive Developmental Disorders (PDD) is a grouping of developmental disorders with childhood onset that are characterized by social impairment, communication difficulties, and an unusual or restricted repertoire of interests and behaviours (DSM-IV)(American Psychiatric Association, 1994). Currently, this category includes the specific diagnoses of Autistic Disorder, Asperger's Disorder, Childhood Disintegrative Disorder, Rett's Disorder, and Pervasive Developmental Disorder (not otherwise specified). Numerous studies have suggested that an increased prevalence of hearing impairment exists within the autistic population (Klin, 1993; Konstantareas & Homatidis, 1987; Rosenhall, Nordin, Sandstrom, Ahlsen & Gillberg, 1999; Skoff, Mirsky & Turner, 1986; Smith, Miller, Stewart, Walter & McConnell, 1988; Taylor, Rosenblatt & Linschoten, 1982). It has also commonly been noted that, for such people, hearing loss may contribute to social and communicative difficulties and, accordingly, there is a need for early recognition of hearing loss and aural habilitation for these children and adolescents (e.g., Rosenhall et al.).

To date there has not been any known documentation of the frequency or effect of hearing loss in a large sample comprised solely of adults diagnosed with PDD. We set out to determine if there is a need for more regular audiological screening of adults with PDD. Specifically, our aims were to:

1. Determine the incidence of hearing loss in a population of adults diagnosed with PDD.
2. Compare the incidence and severity of hearing loss in developmentally delayed adults with PDD to the incidence and severity of hearing loss in developmentally delayed adults without PDD.
3. Determine if the PDD subjects with hearing loss differ from the PDD subjects without hearing loss in terms of:
    (a) demographic characteristics (i.e., age and gender);
    (b) clinical characteristics (i.e., IQ, specific PDD diagnosis, psychiatric diagnosis, and presenting problems), and
    (c) psychosocial characteristics (i.e., employment, housing, and financial source).

Method

All participants in the study were adults diagnosed with a developmental disability who have received services at Surrey Place Centre in Toronto. A sample of adults diagnosed with (PDD, (n=60) was matched with a sample of adults diagnosed with non-PDD developmental delay (NPDD) (n=45). The two samples were determined to be similar based on age range, gender, and IQ range using chi-square analysis. The adults in the PDD group had a mean age of 36.33 (*SD*=7.57). 80% were males and 20% females. The distribution of IQ was: 71-90 (25%), 50-70 (36.7%), 36-50 (26.7%), and <36 (11.7%). The adults in the NPDD group had a mean age of 38.96 (*SD*=10.92). 69% were males and 31% females. Here distribution of IQ was: 71-90 (15.6%), 50-70 (35.6%), 36-50 (28.9%), and <36 (20%).

Clinical records at Surrey Place Centre were reviewed to obtain demographic, clinical, and psychosocial information for all participants. Clients who had not had an audiological assessment within the last five years were reassessed for middle ear function (tympanometry) and hearing loss (conventional pure tone/speech reception or sound field audiometry) by the Surrey Place Centre audiologist. Hearing loss was defined as a loss of 25 dB or greater, at any frequency, in at least one ear (Davis & Silverman, 1970; Goodman, 1965). Hearing loss was further described as: mild (25-40 dB), moderate (44-70 dB), severe (71-90 dB), or profound (>90 dB). The database generated was analyzed by chi-squared analysis and binary logistic regression. Unless specified, p values were derived by ?² analysis.

Results

The rate of hearing loss in the NPDD group (53.3%) was significantly greater than the rate of loss in the PDD group (21.7%) (p=0.001). In addition, the NPDD sample demonstrated a greater degree of severity of hearing loss (47% no loss, 31 % mild loss, 22% moderate-severe loss) than the PDD sample (79% no loss, 18% mild loss, 3% moderate-severe loss).

The PDD sample was analyzed to determine predictors of hearing loss based on the demographic, clinical, and psychosocial data for each client. In terms of demographics, no significant differences were found for the rate of hearing loss across age groups (26-35 years, 36-45 years, and 46-55 years). Although not statistically significant, there was a trend suggesting an increased rate of hearing loss in females (41.7%) versus males (16.7%). Examining the four targeted clinical characteristics, it was shown that hearing loss occurred at an indifferent frequency across all IQ groupings.

There were no significant findings of hearing loss based on specific PDD diagnosis or presenting problems. Clients presenting with depression/anxiety/obsessive compulsive traits were shown to have a higher rate of hearing loss (43.8 %) than the clients without these psychiatric symptoms (13.6%; p=0.01). In terms of psychosocial functioning, it was shown that the rate of hearing loss did not differ with respect to the clients' employment type (competitive, sheltered workshops, or unemployed) or financial source. Although not statistically significant, there was a trend that suggested clients not living with a parent or relative (i.e., in a shelter, group home, or alone) had a higher rate of hearing loss (33.3%) than those in a family environment (11.4%).

Clients and/or caregivers were asked to indicate if they suspected hearing problems immediately before the audiological assessment. It was shown that hearing loss was found in 80% of the cases in which hearing problems were suspected ($p<0.01$). More surprisingly, hearing loss was revealed in 21.4% of situations in which hearing problems were not suspected ($p<0.01$). The best predictors of hearing loss (hearing problems suspected, $p<0.01$; presence of psychiatric symptoms, $p=0.01$) were combined using a binary logistic regression procedure. These variables together were again determined to predict hearing loss ($p=0.002$), accounting for 29% of the variance (loss versus no loss) in the PDD group.

Discussion

These results suggest that although hearing loss in adults with PDD may be a significant clinical need in this group, the lower rate, severity, and unique predictors of hearing loss markedly distinguish them from adults with other developmental delays. Unlike other studies of hearing loss in the DD population, hearing loss in our PDD sample does not appear to differ based on age or IQ level. Psychosocial predictors showed that although employment does not predict loss, those living away from the parental home tend to have a greater frequency of loss. It is our clinical experience that the aural hygiene of those living independent of their family is much worse, and sensory loss due to impacted earwax is common. The finding of the co-occurrence of psychiatric symptoms and hearing loss is consistent with other studies that hearing loss may be increased in psychiatric populations (Carvill, 2001).

The interaction of hearing loss, PDD symptomatology, and mental health symptoms requires closer scrutiny. It is concerning that although hearing loss in the PDD group was suspected by caregivers or the individuals

themselves, 20% of the cases where impairments are found in assessment, were not expected. These findings underscore the need for specialist audiological assessment in the population of adults with PDD.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (DSM-IV) (4th ed.). Washington, DC: Author.

Carvill, S. (2001). Sensory impairments, intellectual disability and psychiatry. *Journal of Intellectual Disability Research, 45*, 467-483.

Davis, H., & Silverman, S. R. (1970). *Hearing and deafness.* New York: Holt, Rinehart & Winston.

Goodman, A. (1965). Reference zero levels for pure tone audiometer. *ASHA, 7*, 262-263.

Klin, A. (1993). Auditory brainstem responses in autism: Brainstem dysfunction or peripheral hearing loss? *Journal of Autism Developmental Disorders, 23*(1), 15-35.

Konstantareas, M. M., & Homatidis, S. (1987). Ear infections in autistic and normal children. *Journal of Autism Developmental Disorders, 17*(4), 585-594.

Lowe, C., & Temple, V. (2002). Identifying Hearing Loss in Adults with Developmental Disabilities. *Journal of Speech-Language Pathology and Audiology, 26*(1), 20-26.

Mazzonni, D. S., Ackley, R. S., & Nash, D. J. (1994). Abnormal pinna type and hearing loss in Down's syndrome. *Journal of Intellectual Disability Research, 33*, 549-560.

Rosenhall, U., Nordin, V., Sandstrom, M., Ahlsen, G., & Gillberg, C. (1999). Autism and hearing loss. *Journal of Autism Developmental Disorders, 29*(5), 349-357.

Skoff, B. F., Mirsky, A. F., & Turner, D. (1980). Prolonged brainstem transmission time in autism. *Psychiatry Research, 2*(2), 157-166.

Smith, D. E., Miller, S. D., Stewart, M., Walter, T. L., & McConnell, J. V. (1988). Conductive hearing loss in autistic, learning-disabled, and normal children. *Journal of Autism Developmental Disorders, 18*(1), 53-65.

Taylor, M. J., Rosenblatt, B., & Linschoten, L. (1982). Auditory brainstem response abnormalities in autistic children. *Canadian Journal of Neurological Science, 9*(4), 429-433.

van Schrojenstein Lantman-de Valk, H. M. J., Haveman, M. J., Maaskant M. A., Kessels A. G. H., Urlings, H. F. J., & Sturmans, F. (1994) The need for assessment of sensory functioning in ageing people with mental handicap. *Journal of Intellectual Disability Research, 38*, 289-98.

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