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THEME: HEARING AIDS: IMPACT OF HEARING REHABILITATION ON QUALITY OF LIFE

Treatment for Diabetic Patients Presenting to a Community Hearing Aid Bank

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Abstract and Background

Thirty-seven million people in the United States have diabetes resulting in macrovascular (brain, heart, and extremities) and microvascular (ear, eye, kidney, and neuropathy) complications. Minorities, those of lower socioeconomic status, and lower levels of education have a higher prevalence of hearing loss due to diabetes (Chen et al, 2023). In 2021, the American Diabetes Association acknowledged that hearing loss and vestibular disorders are frequently comorbidities of diabetes (Elangovan & Spankovich, 2019; Spankovich & Yerraguntla, 2016). On May 22, 2022, the Centers for Disease Control stated those diagnosed with diabetes receive a baseline audiologic evaluation with yearly follow-up exams.

Socially vulnerable geographic areas may have higher prevalence rates of diabetes. Social vulnerability (SV) involves the demographic and socioeconomic factors (poverty, lack of access to transportation, and crowded housing) that may make communities negatively impacted by public health emergencies and disasters. About 390,400 adults and 9.2% of the general population in Oklahoma have diabetes. It would be important to know if the social vulnerability of Oklahoma counties predicted diabetes prevalence rates. If so, public health outreach programs about diabetes and hearing loss may be needed in areas with high SV.

It may be that patients presenting to the United Way Hearing Aid Bank (UWHAB) for those with low incomes in Oklahoma City, Oklahoma may have higher rates of diabetes than the general population. The UWHAB is a specialty clinic managed by students at the University of Oklahoma Health Sciences Center. If so, the UWHAB could partner with Unity Clinic, a student led and faculty supervised clinic, that increases access, reduces barriers, and addresses disparities to healthcare. Interprofessional teams of audiology, speech-language pathology, nursing, physical therapy, and social work students and professionals may effectively serve the unique needs of these patients with hearing loss and diabetes.

Objectives

The Centers for Disease Control and Prevention and the Agency for Toxic Substances and Disease Registry has a Social Vulnerability Index (CDC/ATSDR SVI) which is a placed-based index, database, and mapping application for identifying communities experiencing social vulnerability. The specific aims of this study were to : (1) determine if CDC/ATSDR SVIs predicts diabetes prevalence rates for counties in the state of Oklahoma, (2) determine if prevalence of this chronic condition in a low-income community hearing aid bank exceeds that for the general population, and (3) describe an intervention program for patients with diabetes presenting to UWHAB at the University of Oklahoma Health Sciences Center campus.

Methods

Aim 1 involved CDC/ATSDR SVIs and diabetes prevalence rates aggregated by county in Oklahoma from the US Centers for Disease Control and Prevention. Descriptive statistics for CDC/ATSDR SVIs and diabetes prevalence were computed across all 77 Oklahoma counties. Studentized residuals were examined for deviations from linear model assumptions. All statistical tests were performed assuming a 5% chance of type one error, using SAS 9.4. Aim 2 was a cross-sectional survey and retrospective chart review of +300 UWHAB patients to determine the prevalence of diabetes in a community hearing aid bank. Aim 3 was accomplished through an interprofessional team collaboration between the UWHAB and Unity Clinic.

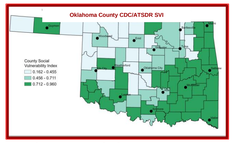
Results

For Aim 1, Oklahoma county CDC/ATSDR SVIs was associated with percent county population with diabetes (p=0.0049) (See Table 1). For each 0.5 increase in CDC/ATSDR SVI, there is a 1% increase in the county population with diabetes.

Table 1. Descriptive statistics for OK county social vulnerability and diabetes prevalence.

Variable		Mean	Std Dev	Median	Minimum	Maximum
Percent County Population with Diabetes	77	9.22	1.41	9.00	6.00	12.40
County Social Vulnerability Score	77	0.65	0.23	0.71	0.16	0.96
	77					

A



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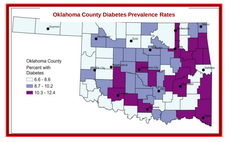

Figure 1. (A) OK County CDC/ATSDR SVIs and **(B)** Percent Diagnosed with Diabetes

For Aim 2, the cross-sectional survey from the retrospective chart review yielded a **37%** prevalence rate for diabetes in our community hearing aid bank (Odds ratio = 5.94; 95%CI 2.68, 13.16; Z=4.38; p=0.000006).

The odds of prevalent diabetes in the United Way Hearing Aid Bank is **5.9 times** the odds of prevalent diabetes in the State of Oklahoma. Spankovich and Yerraguntla (2016) suggested dividing patients into primary (hearing conservation prior to onset), secondary (slow progression) groups to prevent hearing loss. Figure 2 shows an interprofessional pathway of care that may be used by students in the UWHAB and Unity Clinic to serve patients with hearing loss and diabetes.

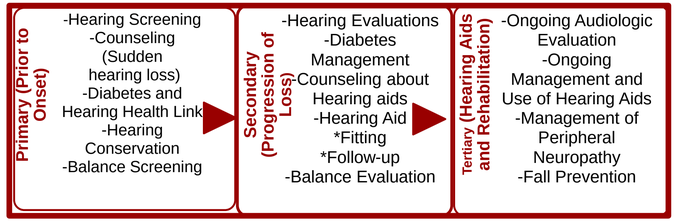

Figure 2. Interprofessional Pathway of Care for Patients with Hearing Loss and Diabetes

Discussion and Conclusions

The odds of prevalent diabetes in our community hearing aid bank is **5.9 times** what is found in the State of Oklahoma requiring identifying those afflicted for tracking and specialized interprofessional service provision in the UWHAB in partnership with Unity Clinic. Healthcare providers and students in training met to develop an interprofessional pathway of care for patients with hearing loss and diabetes. Students and faculty from audiology, speech-language pathology, nursing, physical therapy, and social work on the University of Oklahoma Health Sciences campus will partner to provide comprehensive care for the unique needs of with patients with hearing loss and diabetes.

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