



## Background

Few studies have investigated Asian-Americans' access to hearing healthcare. The odds reporting of undergoing an audiologic evaluation was significantly lower for Asian Americans than for White, African American, or Hispanic Latino groups. Most research has focused on Korean Americans' barriers to accessing hearing healthcare. Choi et al (2016) identified several themes in Korean American's perceived obstacles to hearing healthcare including price, language, lack of collaborative communications, perceptions about hearing aids, and lack of knowledge. In addition, Choi et al (2017) found that using more non-English than English, being foreign-born, being less educated, being married, and not having insurance were associated with Asian Americans' lower likelihood of having a hearing test compared to White and Black Americans (Choi et al, 2018). It is important to note that, according to the US Census Bureau designation, Asian Americans represent 19 ethnic groups (Chinese, Asian Indian, Vietnamese, Korean, Japanese, Pakistani, Hmong, Cambodian, Thai, Taiwanese, Laotian, Bangladeshi, Burmese, Indonesian, Sri Lankan, Bhutanese, Mongolian, Malaysian, and Okinawan) speaking 23 different languages.

Social determinants of hearing healthcare are: (1) education access and quality, (2) social and community context, (3) economic stability, (4) neighborhood and built environment, and (5) healthcare access and quality (Schuh & Bush, 2022). One major obstacle for all Americans with hearing loss is the cost of hearing aids. In 2020, the average cost of a hearing aid was \$2500. Previous studies found that Asian Americans perceived cost of hearing aids as an obstacle. It would be important to explore the affordability of hearing aids for Asian Americans and if results would vary with age, living arrangement, education, geographic region, and sex. It is hypothesized that hearing aids are not affordable for some Asian Americans.

## Objectives

The specific aims were:

- determine the affordability of hearing aids for Asian Americans
- identify differences in affordability by age (<64 y vs. ≥ 65 y), living arrangement (alone vs. with children vs. with other adults vs. with children and other adults), education (<high school (HS) vs. HS/GED vs. >high school), geographic region (midwest vs. northeast vs. south vs. west), and sex (male vs. female).

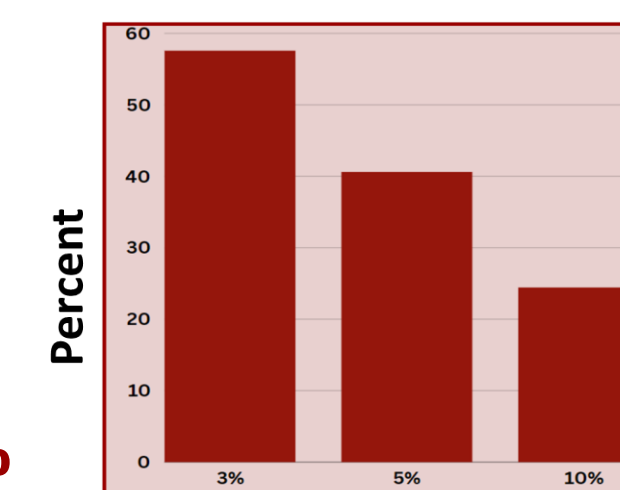
## Methods

Data from the 2020 US Census Bureau American Community Survey was used to determine the Proportion of Asian Americans for whom an expenditure of one (\$2500) hearing aid would be unaffordable. The catastrophic approach determined the proportion of the population for which the price of a hearing aid would exceed 3% of annual income. The impoverishment approach was used to determine what proportion would fall below the United States Federal Poverty Level (US-FPL) for the year after the purchase price of a hearing aid was deducted from annual income.

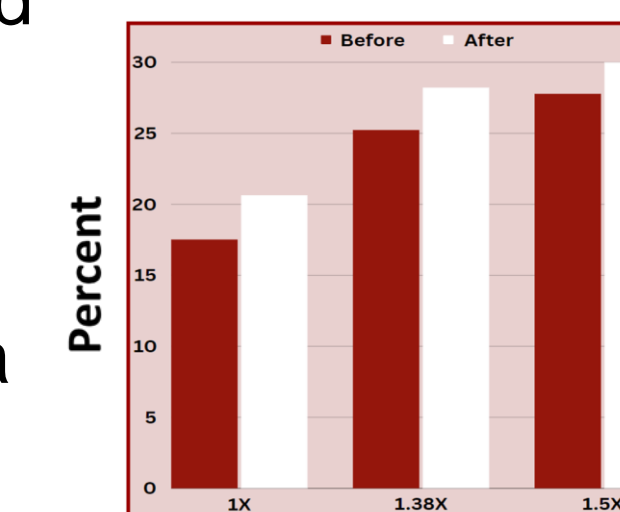
## Results and Discussion

The unweighted sample of Asian Americans with functional hearing loss was N=4618 and the total weighted sample was N=425,315. The catastrophic approach found that this purchase would exceed 3% of the annual incomes of **57.58%** (95%CI, 57.43, 57.73) of Asian Americans' households. Similarly, the impoverishment approach determined that purchase of a hearing aid would result in **20.64%** (95%CI, 20.52, 20.76) people falling below the US-FPL for the year.

Multivariate logistic regression determined that Asian Americans living alone or earning less than a high school degree had the greatest affordability issues than their peers with other living arrangements and/or with higher levels of educational achievement.



**Figure 1.** Percent of Asian-Americans for which purchase is >3%, 5%, and 10% of annual income



**Figure 2.** Percent 1, 1.38, or 1.5X below US FPL before (red) and after (white) purchase

**Table 1.** Variable grouping, overall percent and those with self-reported functional hearing loss, and affordability of hearing aids according to the catastrophic and impoverishment approaches at a hearing aid price of \$2500

Variable	Overall Sample (%)	Same w/FH L (%)	% of Sample Unaffordable (Purchase > 3% Annual Income)	Catastrophic		Impoverishment	
				Multivariate Odds Ratio (95%CI)	% of Sample Unaffordable (Falling below US-FPL after purchase)	Multivariate Odds Ratio (95%CI)	
<b>Age</b>							
≤ 64 y	83.92	33.69	54.13	REF	22.61	REF	
≥ 65 y	16.08	66.31	59.33	<b>1.08 (1.06, 1.09)</b>	20.28	<b>0.74 (0.73, 0.76)</b>	
<b>Living Arrangement</b>							
Alone	14.85	18.42	91.95	REF	49.12	REF	
With kids	3.03	6.09	68.73	<b>0.18 (0.17, 0.19)</b>	16.13	<b>0.17 (0.16, 0.17)</b>	
With adults	39.52	36.75	61.16	<b>0.14 (0.13, 0.14)</b>	18.57	<b>0.23 (0.22, 0.23)</b>	
With both	42.57	38.74	36.08	<b>0.04 (0.04, 0.05)</b>	9.77	<b>0.09 (0.09, 0.10)</b>	
<b>Education</b>							
<HS	11.03	27.17	65.34	REF	30.16	REF	
HS/GED	15.07	19.62	61.80	<b>0.77 (0.76, 0.79)</b>	20.38	<b>0.52 (0.51, 0.53)</b>	
>HS	73.72	53.21	63.10	<b>0.46 (0.45, 0.46)</b>	15.87	<b>0.35 (0.34, 0.35)</b>	
<b>Geographic</b>							
Midwest	11.82	9.85	66.40	REF	26.98	REF	
Northeast	19.51	16.21	58.87	<b>0.87 (0.85, 0.90)</b>	24.70	<b>1.17 (1.14, 1.21)</b>	
South	24.21	20.66	57.04	<b>0.84 (0.82, 0.87)</b>	19.94	<b>0.92 (0.90, 0.95)</b>	
West	44.46	53.28	55.77	<b>0.73 (0.71, 0.74)</b>	18.50	<b>0.80 (0.78, 0.82)</b>	
<b>Sex</b>							
Male	53.38	49.44	58.99	REF	22.07	REF	
Female	46.62	50.56	56.92	<b>0.90 (0.89, 0.91)</b>	19.24	<b>0.94 (0.93, 0.96)</b>	
<b>Income</b>	\$68,000 (median); IQR: \$25,980; \$132,400						

Significance level for multivariate logistic regression = 0.05. Results presented in red indicate p < 0.001.

## Conclusion

Purchase of a single hearing aid was unaffordable for a significant proportion of Asian Americans. Logistic regression determined that affordability varied significantly as a function of age, living arrangement, education, geographic region, and sex. Asian Americans may need specific informational counseling about costs of hearing aids and access to groups who may provide funding for those pursuing amplification which may be accomplished in culturally adapted community-based interventions. Future research should explore the affordability of hearing aids for specific subgroups of Asian Americans.

## References

Choi JS, Kari E, Friedman RA, Fisher LM. Prevalence of Hearing Loss and Hearing Care Use Among Asian Americans: A Nationally Representative Sample. *Otol Neurotol*. 2018 Feb;39(2):158-167. doi: 10.1097/MAO.0000000000001668. PMID: 29315179.

Choi JS, Shim KS, Kim K, Nieman CL, Mamo SK, Lin FR, Han HR. Understanding Hearing Loss and Barriers to Hearing healthcare Among Korean American Older Adults: A Focus Group Study. *J Appl Gerontol*. 2018 Nov;37(11):1344-1367. doi: 10.1177/0733464816663554. Epub 2016 Aug 22. PMID: 27550062.

Choi JS, Shim KS, Shin NE, Nieman CL, Mamo SK, Han HR, Lin FR. Cultural Adaptation of a Community-Based Hearing Health Intervention for Korean American Older Adults with Hearing Loss. *J Cross Cult Gerontol*. 2019 Sep;34(3):223-243. doi: 10.1007/s10823-019-09376-6. PMID: 31264090; PMCID: PMC6814539.

Schuh MR, Bush ML. Evaluating Equity Through the Social Determinants of Hearing Health. *Ear Hear*. 2022 Jul-Aug 01;43(Suppl 1):15S-22S. doi: 10.1097/AUD.0000000000001188. Epub 2020 Jun 13. PMID: 35724251; PMCID: PMC9219021.