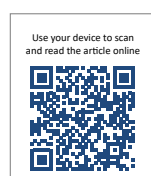




Short Article

Clinical Characteristics and Hearing Aid Uptake Rate of Patients Seen at the Community Hearing Clinic: A Model of Upstream Preventive Care and Earlier Intervention

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Citation: Chua KWD, Yuen HW. The Clinical Characteristics and Hearing Aid Uptake Rate of Patients Seen at the Community Hearing Clinic: A Model of Upstream Preventive Care and Earlier Intervention. *Aud Vestib Res.* 2024;33(1):79-84.

 <https://doi.org/10.18502/avr.v33i1.14277>

Highlights

- Community Audiologists can be empowered to triage patients with hearing problems
- Hearing aid uptake rates are similar to hospital. However, actual numbers are small
- Limiting hearing aid subsidy to community clinic may not be financially sustainable

Article info:

Received: 29 Jun 2023

Revised: 17 Jul 2023

Accepted: 27 Jul 2023

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ABSTRACT

Background and Aim: Presbycusis is one of the most common causes of hearing loss for seniors age above 60 years. Yet diagnostic hearing tests are not readily accessible to seniors in the community. Since 2018, the Ministry of Health in Singapore started a pilot program to screen them for their visual, oral, and hearing health in the community and improve accessibility to hearing healthcare. We describe the clinical characteristics of seniors presenting to Community Hearing Clinic (CHC) and compared hearing aid uptake rates with patients seen at a tertiary hospital.

Methods: Retrospective cross-sectional descriptive study on Singaporeans with hearing difficulties presenting to the community clinics.

Results: Attendance rates were generally positive at more than 80% and is comparable to the specialist outpatient clinic at the tertiary hospital. Hearing aid uptake rates were comparable between CHC and tertiary hospital at 61.9% and 66.9% respectively. Despite having better accessibility with direct access to the audiologists, and more financial subsidies, the eventual uptake rates of hearing aids are not clinically different at the CHC.

Conclusion: CHC may be a viable model of improving accessibility to hearing healthcare with audiologists providing the 1st level of triaging safely. However, the cost-effectiveness of this model remains to be seen. Further health service research studies are warranted to determine the cost-effectiveness of sandbox CHC. Right-siting and expanding the sandbox to include access to hearing aid subsidies in private clinics may further help with this move beyond hospital to the community in line with our public health vision.

Keywords: Community health services; audiology; hearing aids; financing; governmental



Introduction

Population statistics estimate that the number of elderly aged 65 and above will almost double from 2019 to 2030 [1] (600,000 to 900,000). Approximately 20% (120,000) of these seniors will have a Disabling Hearing Loss (DHL). The uptake rate for hearing aids and implants should correspond to the trend of a growing ageing population, however, the uptake rate remains low due to various barriers such as financial cost [2], long waiting times [3], stigma [4], family support [5], recognition of hearing loss [6] etc. There may also be a tendency for seniors to prioritize other health services over hearing, and most people may choose to remain silent and delay seeking treatment for hearing loss until it becomes unbearable or severe.

The number of Singaporeans with DHL is only expected to rapidly increase with the ageing population. With a disproportionate number of people seeking hearing loss treatment, it is a concern because delayed treatment can have the following impacts. Seniors may struggle to communicate with caregivers, family members or friends, and get excluded from conversations. This may lead to isolation, loneliness, frustration and even depression [7]. Working adults may also face loss of productivity or discrimination at workplaces, which may lead to unemployment. An overall reduction in physical and social activities due to hearing loss restrictions may lead to poorer overall quality of life [8]. Emerging evidence in studies have also demonstrated the correlation between the hearing loss and the onset of dementia [9]. Hence, there is a need to encourage early treatment for chronic hearing loss and promote upstream intervention. In line with this, the Ministry of Health started a program to screen seniors aged 60 and above in the community for oral, visual, and hearing. Residents are then referred to sandbox pilot satellite Community Hearing Clinic (CHC) for further diagnostic hearing assessment. Audiologists at the CHC triage the residents and provide timely intervention for hearing loss. When medical attention is warranted, residents are referred to partnered tertiary hospitals. This allowed seniors to directly access audiology services within a month from hearing loss diagnosis, as compared to three months or longer at the hospitals. The Senior Mobility Fund (SMF) is a government funding in Singapore for

hearing aids, which started in 2013 and provides up to \$2700 for seniors above 60 years of age, provided they meet financial means testing requirements. Hence, most seniors pay between \$270 to \$300 out of pocket for their purchase of a pair of hearing aids at the hospital. At the community however, there is a further subsidy of \$200 effectively reducing out of pocket payment for most seniors to a hundred dollars or less. We hypothesize that if cost and accessibility are significant barriers to hearing aid uptake as identified in the literature before, we should expect greater proportion of seniors acquiring hearing aids at the CHC.

The study aimed to describe the clinical characteristics of patients seen at the community hearing clinic and compare the hearing aid uptake rate with seniors seen at the hospital. We discuss the possibility of expanding the sandbox to provide greater access to hearing health subsidies in the community, as there is still a disproportionate number of seniors seeking treatment for non-acute hearing loss at the hospitals.

Methods

Retrospective cross-sectional descriptive study, comparing the hearing aid uptake rate between seniors seen at a tertiary hospital and the CHC. Services provided include pure-tone audiometry, hearing aid evaluation and eventual hearing aid fitting. The average number of seniors seen per year from 2018-2022 in the CHC were compared with those who presented at the hospital in 2017 before CHC was accessible. A convenience sample of 1222 residents were taken from 2020-2022 and reasons for onward medical referral were identified for 851 seniors who required referral. A further random sample of 140 patients who rejected hearing aid fitting were asked for their reasons and this was further analyzed.

Results

Hearing aid uptake rate

A total 2409 seniors were seen in the CHC between October 2018 to December 2022 for diagnostic pure tone audiometry resulting in an average of 482 seniors per year. Of the 482 seniors, an average of 71 seniors attended hearing aid evaluation with an audiologist in the community and a further 43 seniors were eventually

fitted with hearing aids. In comparison, 5618 seniors were seen at the tertiary hospital for pure tone audiometry and of the seniors seen, 872 attended the hearing aid evaluation session with 583 deciding to acquire hearing aids. Although the numbers are starkly different between the groups, hearing aid fittings were proportionate to the number of seniors seen for evaluation and for diagnostic pure tone audiometry. There was approximately twelve times more diagnostic hearing test and hearing aid evaluation performed at the hospital as compared to CHC. Consequently, we expected proportionately more hearing aids fitted at the hospital (10X). Hearing aid uptake rate was 61.9% at the CHC compared to 66.9% at the hospital (Table 1). Chi square test was not significant at referenced p value of 0.05, suggesting no significant difference between both groups in hearing aid uptake rate (Table 2).

Reasons for medical referral

Of the convenience sample of 1222 patients taken,

we present the reasons for onward medical referral of 851 residents (69.7%) to the outpatient Ear-Nose-Throat clinic at the tertiary hospital in Table 3. The top two most common reasons for referral are for asymmetrical sensorineural hearing loss (51%) and conductive/mixed hearing loss (16.8%). Asymmetrical SNHL as the top referral reason is consistent with the findings of a local single-center study [10] of Singaporeans in the Western region. Together these two diagnoses make up for almost 70% of cases referred for further medical investigation. The other reasons for referral can also be seen in the same table including a significant number of residents with ear wax occlusion (15%). 371 seniors were not referred to our tertiary hospital based on existing referral criteria identified previously [10]. Of the 371 seniors, 224 had >40 dB HL Pure Tone Average (PTA) in the Better Ear (BE) and were referred for Hearing Aid Evaluation (HAE). 184 seniors eventually attended HAE representing a 82.1% (1DP) attendance rate. The remaining 147 seniors had <40dB HL PTA in BE and were discharged for annual monitoring.

Table 1. Clinical characteristics of services provided in community hearing clinic versus hospital

	2022	2021	2020	2019–2018	Average (1DP)		Ratio of procedures performed (2017-18/2018-22)
					2018-2022	2017–2018 (Hospital)	
Pure tone audiometry	546	165	511	1187	482	5618	11.7
Hearing aid evaluation	80	41	63	170	71	872	12.3
Hearing aid fitting	53	30	31	100	43	583	10.0
Hearing aid take-up rate	66.3%	73.2%	49.2%	58.8%	61.9%	66.9%	

IDP; internally displaced persons

Table 2. Referral reasons from community hearing clinic to tertiary hospital for medical care

Referral reason (2020–2022) n=851	N
Asymmetrical hearing loss	434
Conductive/mixed hearing loss	143
Ear wax occlusion	128
Abnormal tympanogram	64
Chronic suppurative otitis media/otitis media	28
Tinnitus	21
Eustachian tube dysfunction	19
Otitis externa	9
Giddiness	5

Table 3. Chi-Square test of association in hearing aid uptake rate between Community Hearing Clinic and tertiary hospital

Chi-Square 2X2	Hearing aid fitting (yes)	Hearing aid fitting (no)	Total
Community hearing clinic	43	28	71
Tertiary Hospital	583	289	872
Total	626	317	943

Chi-Square value: 1.17 (2DP), p=0.28

Table 4. Common reasons for hearing aid rejection

Reasons for hearing aid rejection (n=140)	N
Feels that they do not need hearing aids	90
Denial of hearing loss	36
Cost	8
Stigma of hearing aids	2
Commitment issues	2
Unable to manage hearing aids independently due to poor dexterity, vision, or cognition	2

Reasons for hearing aid rejection

A closed-ended questionnaire was administered to 140 seniors who attended HAE but rejected hearing aid prescription. The majority of them (90/140; 64.3%) felt that they do not need hearing aids while a quarter of seniors (36/140; 25.7%) denied having any loss of hearing despite their audiogram results. 5.7% (8/140) felt that hearing aids were too costly despite an out-of-pocket cost of \$100 for a pair of hearing aids. The rest (2/140; 1.4%) either felt that there was a stigma with hearing aids, could not commit to use, care or maintenance or were unable to manage hearing aids due to poor dexterity, vision or cognition respectively (Table 4).

Discussion

Presbycusis is one of the most common reasons for hearing loss in seniors and is a non-acute, chronic condition. However, the current healthcare model was less convenient with no direct access to audiologist in the community prior to the government’s initiative in 2018. Seniors will have to see a primary care physician at one of the 20 polyclinics around the island and wait to see a specialist Ear-Nose-Throat (ENT) physician before finally consulting the audiologist. Such wait-times can range between two to four months.

With the introduction of sandbox CHC, seniors now have direct access to audiologists without having to see an ENT physician. Audiologists have also demonstrated previously that they can promote timely intervention with their expertise and have physician’s concurrence with otology related medical diagnoses [10]. However, despite direct access, convenience, and reduced cost of hearing aids due to additional subsidies in the community, hearing aid uptake rates are not significantly or clinically different from the tertiary hospital. The question that remains in health service research is whether disproportionately seeing seniors at the tertiary level and having a similar hearing aid uptake rate as CHC will be financially sustainable. A local study found that seniors who acquired hearing aids were motivated by low cost and affordability more than perceived need for hearing aid use. This suggests that the use of hearing aids may be underappreciated, especially in those with low self-perceived hearing handicap [11]. From a public health perspective, HA uptake rates may not matter as much as promoting behavioral change through improving knowledge and attitude. 72% of seniors reported that they would not have sought treatment for hearing loss if not for the mobile hearing clinic [10], suggesting some evidence of promoting hearing health awareness. However, such outcome measures are harder to quantify making it less feasible for policy makers to determine if the financial cost associated with CHC is well justified.

More qualitative and mixed method studies may help to elucidate changes in knowledge, attitude, and behavior in hearing health, with time from hearing loss diagnosis to intervention serving as one of the public health outcome measures for example.

Between 2020 and 2022, almost 70% of seniors seen at the CHC had onward referrals to specialist ENT physicians at the hospital. It would be interesting to see in future studies the number of unwarranted false positive referrals. Unpublished data from a local mobile hearing team serving residents in the west suggested good physician concurrence with most cases referred but did not report such a high proportion of residents referred compared to our study. Criteria for referral were similar and taken from the Ministry of Health [12] who first licensed community accessible diagnostic hearing test and hearing aid services with the mobile hearing clinic. This means that any differences in referral rate may be attributed to our CHC audiologist's clinical judgement and confidence at managing the patient. Hence, there may be a need to have experienced clinical audiologists in the CHC to ensure efficient and effective triaging, which includes minimizing unnecessary referrals.

To determine the efficacy and safety of Audiologists triaging seniors in the community for otologic conditions, multi-center concurrence in data looking not just at false positive but also false negative referrals are needed as it would be more concerning if there were missed medical referrals. However, data from an overseas study published more than a decade ago revealed that audiologists care plans in 1550 cases did not differ significantly from specialty physician colleagues, and only in 0.33% (5 cases) of hearing asymmetry was potentially missed [13]. Although not directly transferrable due to differences in academic and clinical audiology training, audiologists practicing at the top of their license should be competent enough directly provide hearing healthcare to patients.

Of interest, 90% of 140 seniors who rejected hearing aids either had low self-perceived hearing handicap or for reasons unknown felt that they do not need a hearing aid, despite evidence of hearing loss. The limitation of this survey is that lack of nuanced and richer data on the reasons why seniors feel they do not need hearing aids or recognize their hearing loss. This may be better explored in future studies with a qualitative design.

Conclusion

In line with our country's public health vision of promoting preventive medicine, collaborative care models need to emerge and one such example has been shown by the community audiologists who are capable of triaging and promoting timely intervention. Further prospective studies are needed to validate this model of care and determine if confining it to sandbox Community Hearing Clinic has longer term viability and financial sustainability. If competency framework for audiology practice is in place, there may be a need to engage more audiologists and hearing professionals alike to support the growing hearing health demands of our ageing population. This may involve the extension of subvention or subsidies for the provision of hearing healthcare like our Community Health Assistance Scheme enable general practitioner and dental clinics.

Ethical Considerations

Funding

No funding was provided for this study.

Authors' contributions

KWDC: Conceptualization of study, data acquisition, drafting of the manuscript, statistical analyses and study design; HWY: Supervision, conceptualization and revision of the manuscript.

Conflict of interest

The authors declare that they have no conflict of interest.

Acknowledgments

The authors would like to thank the Audiology Department and the Department of Otorhinolaryngology for their support in making community audiology efforts possible.

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