Hearing loss and travel: Assessing the hearing needs of travelers at airports

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Background

- 15 – 20% (over 785 million) of world population are disabled
  - Huge potential market for tourism industry

- Dissatisfactory provision of services may influence the uptake of traveling by persons with disabilities
  - Limited studies on needs of air travelers with hearing impairment
  - Crucial to understand the needs of these travelers in order to provide adequate services

Aims

- Measure the prevalence of self-reported hearing-related challenges faced by individuals as they travel through Singapore Changi Airport

- Measure the self-reported utilization and usefulness of existing assistive services, and identify their source of information for the services

- Measure the self-reported likelihood of using services from a pre-selected list of options

Methodology

- Development of questionnaire
  - Scenarios adapted from Caves, R., & Pickard, C. (2001), Chang, Y.-C., & Chen, C.-F. (2012), Castiglioni, R. (2013)
  - Services provided by airports around the world

- Questionnaire consisted of 4 sections
  - Demographic and hearing-related information
  - Hearing-related challenges when traveling through Singapore Changi Airport
  - Utilization and usefulness of existing assistive services
  - Likelihood of using services from a pre-selected list of options

Methodology

- Subject pool
  - Patients scheduled for appointments with audiologist or receiving audiometric evaluation at NUH
  - Students from the NUS Master of Science (Audiology) program
- Inclusion criteria
  - Aged 21 years old and above
  - Traveled through Changi Airport in the past year
  - Latest audiogram dated within the past year
  - Use hearing and speech as their primary modes of communication
- Exclusion criteria
  - Unable to complete questionnaire with/without assistance

Methodology

- Pure tone thresholds at 500, 1000, 2000 and 4000 Hz for each ear were recorded

- Descriptive statistical analysis
  - Participants stratified based on their degree of hearing impairment, and their use of amplification

Profile of study population (N = 201)

Variables	Categories	n (%)
Subject groups	Normal Hearing (NH)	119 (59.2)
	Hearing Loss − Unaided (HLU)	64 (31.8)
	Hearing Loss – Aided (HLA)	18 (9.0)
Degree of hearing loss	No impairment (≤ 25 dB HL)	119 (59.2)
	Slight impairment (26 – 40 dB HL)	35 (17.4)
	Moderate impairment (41 – 60 dB HL)	32 (15.9)
	Severe impairment (61 – 80 dB HL)	11 (5.5)
	Profound impairment (> 80 dB HL)	4 (2.0)
Amplification	Hearing aid(s)	16 (8.0)
	Cochlear implant(s)	1 (0.5)
	Hearing aid and cochlear implant	2 (1.0)
	Not specified	1 (0.5)

Results – Hearing-related challenges

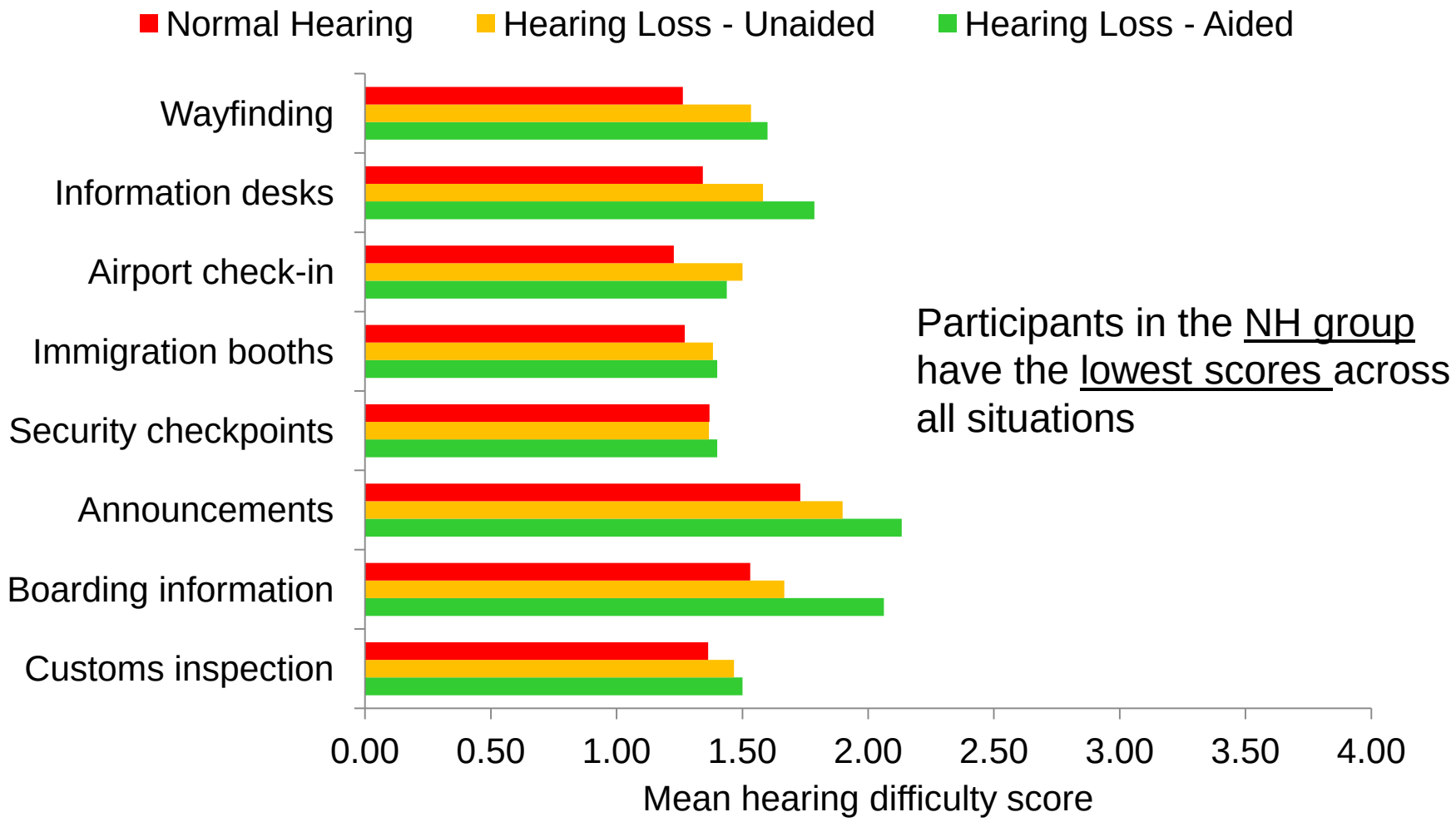
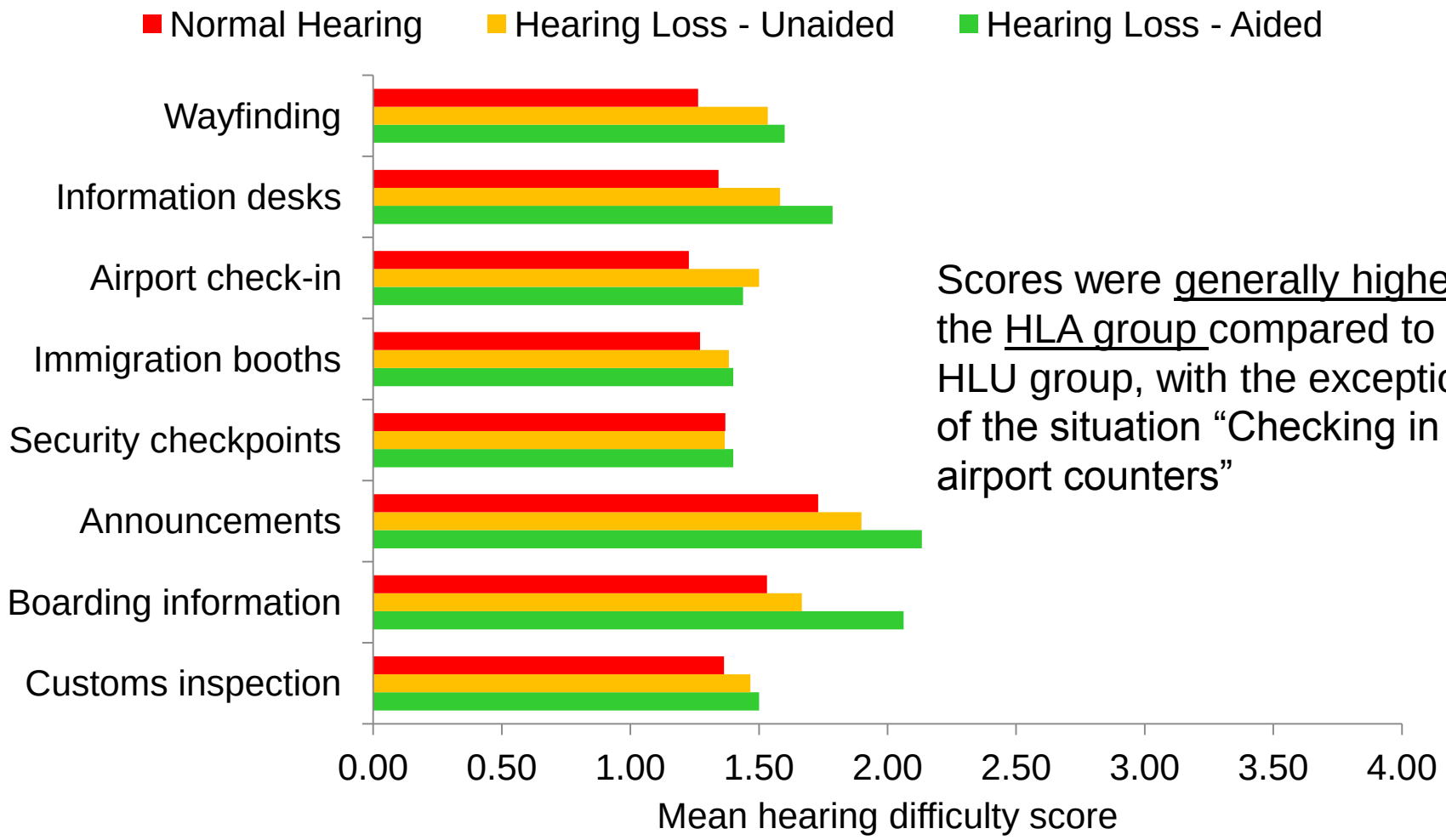


Figure 1. Mean hearing difficulty scores for eight different listening situations at Singapore Changi Airport

Results – Hearing-related challenges



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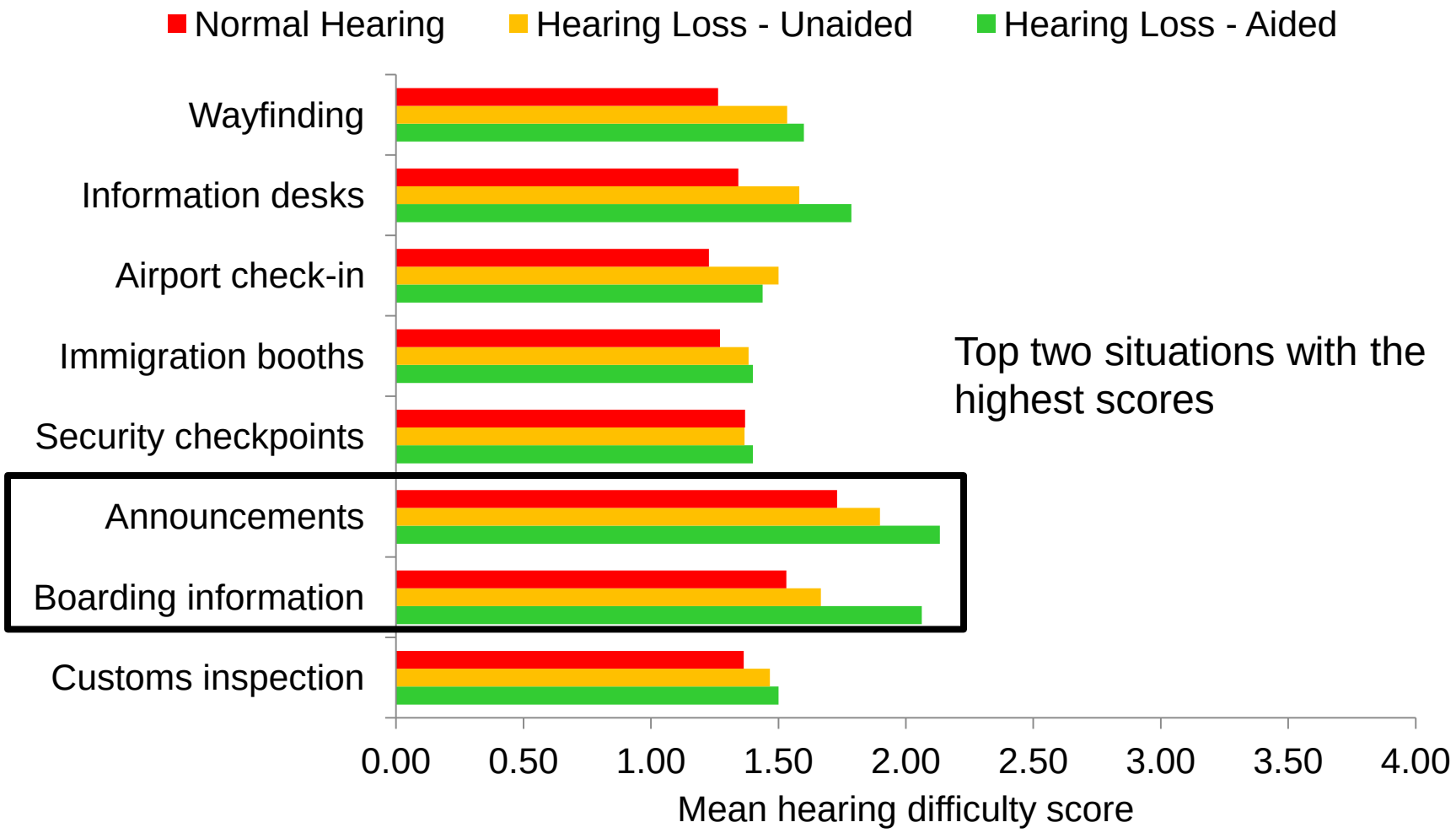

Figure 1. Mean hearing difficulty scores for eight different listening situations at Singapore Changi Airport

Results – Hearing-related challenges

- Mean hearing difficulty scores of the NH, HLU and HLA groups across the eight listening situations were between 1.23 and 2.13
  - Suggest good degree of accessibility in terms of hearing
  - Results may not be representative of the situation in other airports around the world

Results – Hearing-related challenges

- Participants in the NH group who indicated it was “Somewhat difficult” or “Very difficult” to hear in the eight listening situations
  - Unilateral hearing loss
  - Noise exposure in participants that resulted in the damage of their afferent nerve terminals and auditory nerve

Results – Hearing-related challenges

- Participants with greater degree of hearing loss, regardless of the use of amplification, face greater difficulties hearing in different situations at the airport compared to participants with lesser degree of hearing loss
  - Barriers, and hence needs, varied according to the degree of severity of the disability (Bi, Card, & Cole, 2007; Burnett & Baker, 2001)

Results – Hearing-related challenges

- A majority of participants in the HLA (Severe) subgroup reported it was “Very easy” or “Somewhat easy” to hear in these situations
  - Suggest people may be benefiting from the use of amplification

Results – Likelihood of using services

List of services	Would or might use/want	Would not use/want
Special assistance		X
Public phones with adjustable volume		X
Public phones with text function		X
General mobile phone applications	X	
Visual paging systems		X
Hearing loops		X
Asking for assistance using sign language		X
Personal amplifiers/handsets		X
Writing boards		X
Personalized mobile phone applications	X	
Self-service kiosks	X	
Separate queue for persons with disabilities	X	
Flashing lights that indicate boarding	X	

Results – Utilization and usefulness of existing assistive services

- A majority of participants had not previously used any of the assistive services listed in the questionnaire
  - Usage of mobile phone applications was greater compared to usage of other services

- Participants who used these services before found them at least “Somewhat useful”
  - Finding on the usefulness of these services cannot be generalized to a larger population due to the small sample size

Recommendations to Changi Airport

Implement	Do not implement unless already present at airports	Good to consider
Mobile phone applications	Public phones with adjustable volume	Extend existing special assistance service to persons with hearing impairment
Self-service kiosks	Public phones with text function	Staff who knows sign language
Separate queue for persons with disabilities	Personal amplifiers/handsets	
Flashing lights that indicate boarding (coupled with visual paging systems)	Writing boards	
Hearing loops		

Conclusion

- Participants did not experience much difficulty hearing in eight different listening situations at Singapore Changi Airport
- A majority of participants had not previously used existing assistive services in airports
- A majority of participants indicated they would want a separate queue for persons with disabilities and flashing lights that indicate boarding, and would use services such as mobile phone applications and self-service kiosks

Future Work

- Inclusion of more people with greater degree of hearing impairment and people wearing amplification
  - Limitations of study population prevent a more in-depth analysis of the hearing needs of air travelers, across a range of hearing levels

- A follow up study after the introduction of different assistive services
  - Determine whether the services introduced resulted in an improvement in the accessibility of air travelers at the airport

Future Work

- Conduct the same study at different airports around the world
  - Determine the relative accessibility of different airports around the world
- Perform the same study at Singapore Changi Airport
  - Travelers are actively engaged in these processes and will be in a better position to comment on the difficulties that they experience
  - Would need a sound booth if thresholds are wanted

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