

### ESTABLISHING THE PREVALENCE AND SEVERITY OF TINNITUS AMONG SINGAPOREAN ELDERLY POPULATION

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## Content



### Tinnitus Facts



### Tinnitus Facts

Prevalence

1 in 6 people worldwide suffers from tinnitus

### **Severity**

1 in 10 people perceived their tinnitus as severe



Background

Aims and Hypothesis

Methodology

Results

Discussion

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**Future Work** 

### Severe Tinnitus Affects an Individual's Ability to Lead a Normal Life



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### Research Gap



## Specific Aims

Aims and

**Hypothesis** 

Background



1. Determine the prevalence and severity of tinnitus in the elderly population in Singapore, aged 50 years and above

Results

2. Identify factors associated with the increased prevalence of tinnitus

Limitation

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**Future Work** 

Discussion

3. Identify factors associated with severe tinnitus

Methodology

## Hypotheses



### Increased Prevalence of Tinnitus

- Age
- Gender
- Ethnicity
- Hearing impairment
- HHIE-S score
- Exposure to loud noise

### **Increased Tinnitus Severity**

- Age
- Gender
- Ethnicity
- Hearing impairment
- HHIE-S score
- Emotional distress
- Sleep disorder

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## Methodology

### Outline

### **Phase 1 (Prevalence of Tinnitus)**

- Door-to-door interview
- 53-Item questionnaire administered
- Non-compulsory hearing screening

### Phase 2 (Severity of Tinnitus)

- Door-to-door interview
- 39-Item questionnaire administered

- Study Population
- Singapore Citizens and Permanent Residents
- 50 98 years old
- Ghim Moh Sub-Planning Zone estate
- Phase 1: 579 participants, Phase 2: 88 participants



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## Key Results



### **Tinnitus Prevalence**



# Factors Associated with Tinnitus

- 1. Ethnicity
- 2. HHIE-S score

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Table 1: Percent prevalence of any tinnitus with corresponding OR and 95% CI

Factors	Prevalence of Tinnitus (%)	Bivariate OR (95% CI)	P-value	Multi-adjusted OR (95% CI)	P-value
Ethnicity			0.024+		
Chinese	111/477 (23.3)	1.00		1.00	
Malay	7/46 (15.2)	0.59 (0.26 – 1.36)	0.217	0.60 (0.26 – 1.41)	0.239
Indian	4/50 (8.0)	0.29 (0.10 – 0.81)	0.019*	<b>0.30</b> (0.11 – 0.88)	0.028*
HHIE-S			0.001+		
No handicap	95/509 (18.7)	1.00		1.00	
Mild to moderate handicap	16/46 (34.8)	2.29 (1.20 – 4.37)	0.012*	<b>2.32</b> (1.20 – 4.50)	0.013*
Significant handicap	11/24 (45.8)	3.63 (1.58 – 8.36)	0.002*	<b>3.81</b> (1.62 – 8.97)	0.002*
<sup>+</sup> On chi-square test. *Significance at P < 0.05.					

Background	Hypothesis	Methodology	Results	Discussion	Limitation	Conclusion	<b>Future Work</b>

## **Tinnitus Severity**



# Factors Associated with Severe Tinnitus

- Ethnicity
   HHIE-S score
- 3. Emotional distress

Aims and

Factors	Prevalence of Severe Tinnitus (%)	P-value <sup>+</sup>
Ethnicity		
Chinese	1/82 (1.2)	
Malay	0/5 (0.0)	
Indian	1/1 (100.0)	<0.001*
HHIE-S		
No handicap	0/70 (0.0)	
Mild to moderate handicap	1/12 (8.3)	
Significant handicap	1/6 (16.7)	0.010*
Emotional Distress		
Yes	2/10 (20.0)	
No	0/78 (0.0)	0.004*

Table 2: Percent prevalence of severe tinnitus with corresponding P-value

+ On chi-square test.

\*Significance at P < 0.05.

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## Medical Help Sought by Participants

1. 35.2% sought professional help

**Hypothesis** 

Backgr

- 2. Majority (48.4%) sought help from an otolaryngologist
- 3. Only 1 participant was advised to use sound therapy

Table 3: Professional help sought by participants reporting tinnitus, by gender

	Men (%)	Women (%)	Subjects (%)
Persons seeking help	12/37 (32.4)	19/51 (37.3)	31/88 (35.2)
Professionals contacted			
General practitioner (GP)	4/12 (33.4)	2/19 (10.5)	6/31 (19.3)
Otolaryngologist	5/12 (41.7)	10/19 (52.6)	15/31 (48.4)
TCM practitioner (TCM)	1/12 (8.3)	2/19 (10.5)	3/31 (9.7)
Polyclinic and TCM	1/12 (8.3)	2/19 (10.5)	3/31 (9.7)
Otolaryngologist and TCM	0/12 (0.0)	3/19 (15.8)	3/31 (9.7)
GP and ENT	1/12 (8.3)	0/19 (0.0)	1/31 (3.2)
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## Medical Help Sought by Participants

- 1. 35.2% sought professional help
- 2. Majority (48.4%) sought help from an otolaryngologist
- 3. Only 1 participant was advised to use sound therapy

Table 4: Tinnitus management options received by participants reporting tinnitus, by gender

Management Options	Men (%)	Women (%)	Subjects (%)
None	9/12 (75.0)	12/19 (63.2)	21/31 (67.7)
Massage – Press tragus	1/12 (8.3)	0/19 (0.0)	1/31 (3.2)
TCM medication	2/12 (16.7)	2/19 (10.5)	4/31 (12.9)
Sound therapy	0/12 (0.0)	1/19 (5.3)	1/31 (3.2)
Acupuncture	0/12 (0.0)	2/19 (10.5)	2/31 (6.5)
Acupuncture and TCM medication	0/12 (0.0)	2/19 (10.5)	2/31 (6.5)

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## Discussion



### **Prevalence and Severity** of Tinnitus

## Aim 1: Determine the prevalence and severity of tinnitus in the elderly population in Singapore

 Table 5: Comparison of prevalence and severity of tinnitus with literatures

Methodology

	Current Study	Literatures
Prevalence of Tinnitus	21.1%	4.6% - 30.3% <sup>a</sup>
Severity of Tinnitus	2.2%	0.4% - 34.0% <sup>b</sup>

<sup>a</sup> Jalessi et al., 2013; Sindhusake et al., 2003

<sup>b</sup> Fujii et al., 2011; Michikawa et al., 2010; Oiticica & Bittar, 2015; Pinto et al., 2010; Shargorodsky et al., 2010; Sindhusake et al., 2003

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# Factors Associated with Tinnitus

Aim 2: Identify factors associated with increased prevalence of tinnitus

**Increased Prevalence of Tinnitus** 

- Ethnicity
- HHIE-S score
- Age
- Gender
- Hearing impairment
- Exposure to loud noise

## Aim 3: Identify factors associated with severe tinnitus

### **Increased Tinnitus Severity**

- Ethnicity
- HHIE-S score
- Emotional distress
- Age
- Gender
- Hearing impairment
- Sleep disorder

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## **Reasons for No Correlation**

### Aim 2: Identify factors associated with increased prevalence of tinnitus

**Increased Prevalence of Tinnitus** 

- Ethnicity
- HHIE-S score
- Age
- Gender
- Hearing impairment
- Exposure to loud noise

1. Insufficient sample size

2. Older adults may learn to accept tinnitus as part of an aging process  $\rightarrow$  result in under-reporting of tinnitus

3. Incomplete audiometric results obtained from all recruited participants

4. Variability in amount of noise exposure in different countries due to different occupations and non-occupational noise activities

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## **Reasons for No Correlation**

## Aim 3: Identify factors associated with severe tinnitus

**Increased Tinnitus Severity** 

- Ethnicity
- HHIE-S score
- Emotional distress
- Age
- Gender
- Hearing impairment

Aims and

**Hypothesis** 

• Sleep disorder

1. Insufficient sample size (n=2)

2. Incomplete audiometric results obtained from all recruited participants

3. All 88 participants reported no significant sleep distress despite having tinnitus



Conclusion

**Future Work** 

## Medical Help Sought

- 48.4% of the participants who sought help for their tinnitus consulted an otolaryngologist
- None tried hearing aids as a management option for tinnitus

Results

- Only one participant used the radio as a form of sound therapy

This might reflect:

Background

Aims and

**Hypothesis** 

1. General belief that there is no cure or treatment for tinnitus.

Methodology

2. Lack of awareness that these patients may be referred to an audiologist for counselling and sound therapy options, including hearing aids.

Discussion

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3. Attitudes of patients towards hearing aids and other devices acquisition.

### Limitations



### 1. Inability to generalise the research findings to the whole of Singapore

- Small sample size (N=579)
- Other epidemiological studies conducted worldwide had study population ranging from 1,337 to 172,621 participants

2. Information bias of tinnitus might have occurred since the presence of tinnitus was determined based on participant's recollection

Participants who reported presence of emotional distress might be more likely to recall tinnitus as compared to participants without emotional distress

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### Conclusion



- Ethnic group and HHIE-S score were found to be associated with increased prevalence of tinnitus.
- Ethnic group, HHIE-S score and emotional distress were found to be associated with severe tinnitus.
- Awareness should be raised among physicians that patients with tinnitus may be referred to an audiologist for counselling and sound therapy options, including hearing aids, which can potentially provide relief for tinnitus patients.

Aims and

**Hypothesis** 

### Future Work

 Large-scale epidemiological studies could be considered in other mature estates in Singapore

 Jurong West, Clementi, Queenstown, Bukit Merah, Toa Payoh, Ang Mo Kio, Bedok and Tampines (Statistics, 2010)

### Further studies may include a wider age group

Include young adults aged 21 years old and above

### Questionnaire may be modified to document more information

Average household income, history of coronary heart disease and occupation

Aims and

**Hypothesis** 

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