Effectiveness of Dangerous Decibels® in Primary School Children in Singapore

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01

Introduction

BACKGROUND

Global increasing trend among adolescents to expose themselves to loud recreational noise

(Tung & Chao, 2013; Gopal et al., 2019; Rhee et al., 2019; WHO, 2020)

Limited Information on the sources of high intensity sounds exposed to by Singaporean adolescents

No NIHL* & tinnitus prevention programme being delivered to adolescents in Singapore

*NIHL: Noise-Induced Hearing Loss

BACKGROUND

- Dangerous Decibels® is an international public health collaboration devised to alleviate the incidence and prevalence of NIHL and tinnitus by changing knowledge, attitudes and intended behaviours of school-aged children

- It is an interactive programme that includes online simulations, hands-on activities and modified sound level meters to engage audience

- Effectiveness of the programme has been established in countries such as the United States, Brazil, New Zealand, China (Griest et al., 2007; Martin et al., 2013; Knobel et al., 2014; Welch et al., 2016; Deng, 2019)

Importance of the Study

Noise-Induced Hearing Loss (NIHL) & related tinnitus are irreversible but preventable

Important to educate people, especially adolescents, on knowledge of NIHL, sound exposure & hearing protective strategies

Better understand the sources of high intensity sound exposure faced by adolescents for targeted intervention

Auditory care is part of MOE's health & science curriculum. Encourage future implementation of the programme on a self-sustained basis.

Objectives

1. To evaluate the **effectiveness** of the Dangerous Decibels® hearing loss and tinnitus prevention programme

a. In changing knowledge, attitudes and intended behaviours;

b. Regarding sound exposure and;

c. Use of appropriate hearing protective strategies among adolescents in Singapore

Objectives

2. To obtain **preliminary information** on existing knowledge, attitudes and intended behaviours

a. Among adolescents aged 10-14 years old in Singapore;

b. Regarding sound exposure and the;

c. Use of appropriate hearing protective strategies

Objectives

3. To obtain information on the **sources of high intensity sounds** Singaporean youth are exposed to.

02

Methods

Methods

5 Classes

15-35 students/class

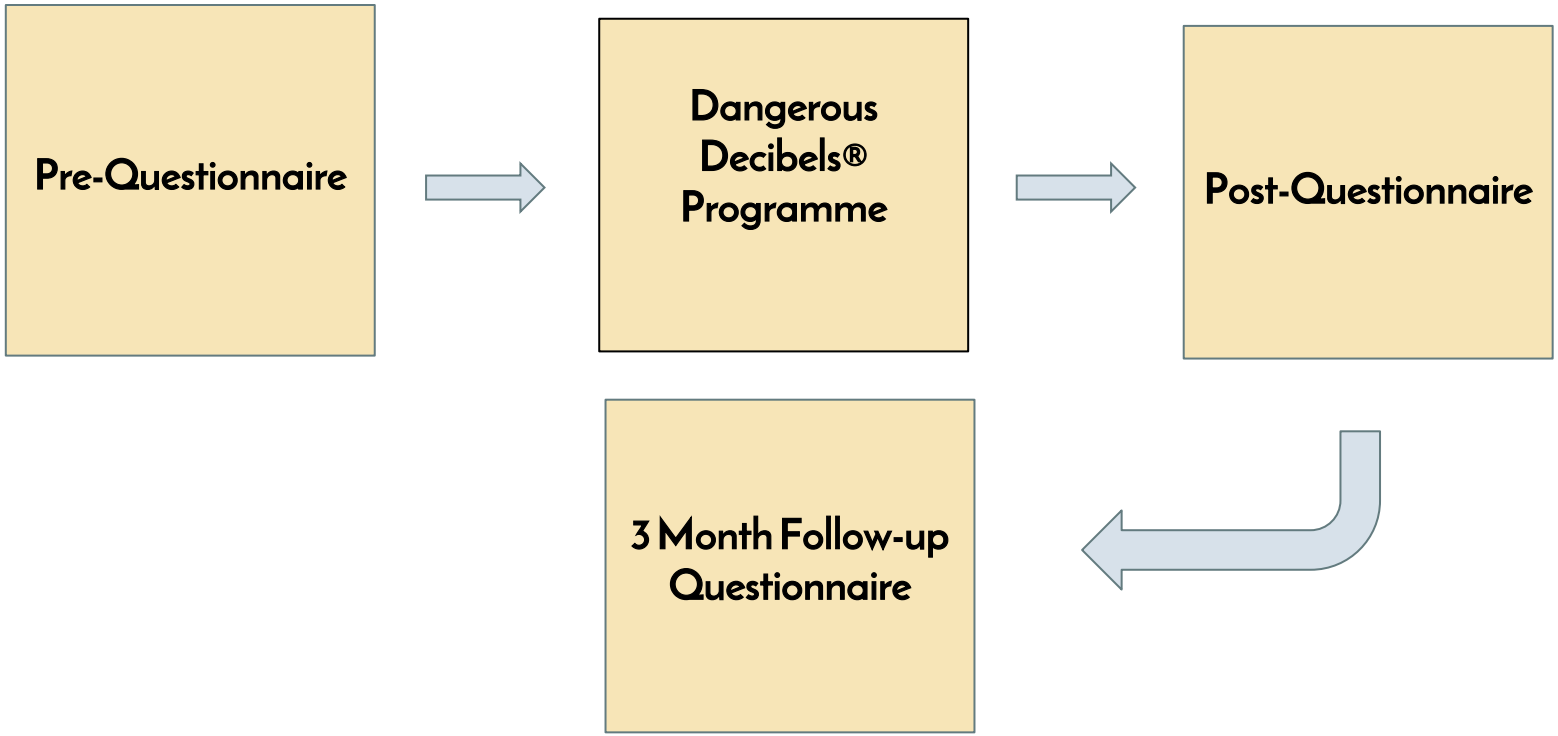
136 Students

*10 students were excluded from Data Analysis

Primary 5

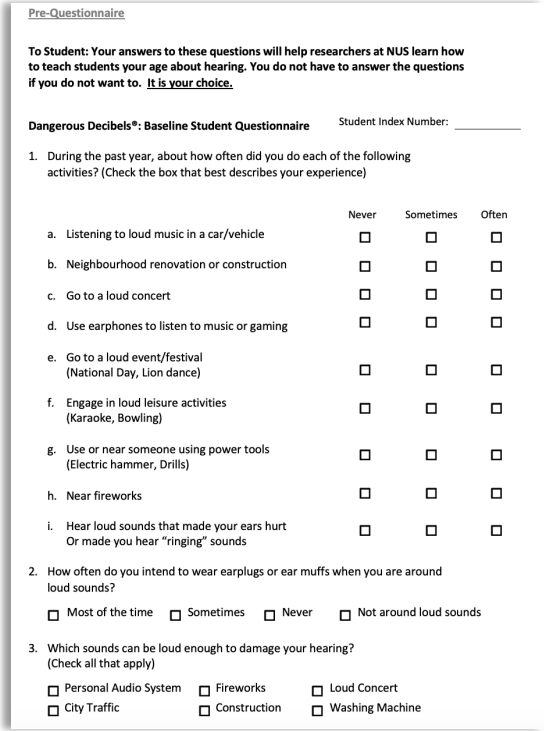
Aged 10-14

Flow of Session



03

Results



Pre-Questionnaire

To Student: Your answers to these questions will help researchers at NUS learn how to teach students your age about hearing. You do not have to answer the questions if you do not want to. It is your choice.

Dangerous Decibels®: Baseline Student Questionnaire Student Index Number: _____

1. During the past year, about how often did you do each of the following activities? (Check the box that best describes your experience)

	Never	Sometimes	Often
a. Listening to loud music in a car/vehicle	☐	☐	☐
b. Neighbourhood renovation or construction	☐	☐	☐
c. Go to a loud concert	☐	☐	☐
d. Use earphones to listen to music or gaming	☐	☐	☐
e. Go to a loud event/festival (National Day, Lion dance)	☐	☐	☐
f. Engage in loud leisure activities (Karaoke, Bowling)	☐	☐	☐
g. Use or near someone using power tools (Electric hammer, Drills)	☐	☐	☐
h. Near fireworks	☐	☐	☐
i. Hear loud sounds that made your ears hurt Or made you hear "ringing" sounds	☐	☐	☐

2. How often do you intend to wear earplugs or ear muffs when you are around loud sounds?

☐ Most of the time ☐ Sometimes ☐ Never ☐ Not around loud sounds

3. Which sounds can be loud enough to damage your hearing? (Check all that apply)

☐ Personal Audio System ☐ Fireworks ☐ Loud Concert
☐ City Traffic ☐ Construction ☐ Washing Machine

Results

1. Determine if there was a significant improvement in knowledge, attitudes and intended behaviours regarding noise exposure and the use of appropriate hearing protective strategies

2. Only common questions across the 3 questionnaires were analysed

3. Questions where >85% of correct responses were obtained at the pre-intervention were not analysed

Total: 21 Questions

16 Questions Analysed

Results

SHORT-TERM EFFECTIVENESS

1. Pre-intervention vs. Post-intervention

2. Significant improvement
(a) McNemar Test: p-value < 0.05
(b) Percentage of correct responses: Increase

3. Significant Decline
(a) McNemar Test: p-value < 0.05
(b) Percentage of correct responses: Decrease

SUSTAINED EFFECTIVENESS

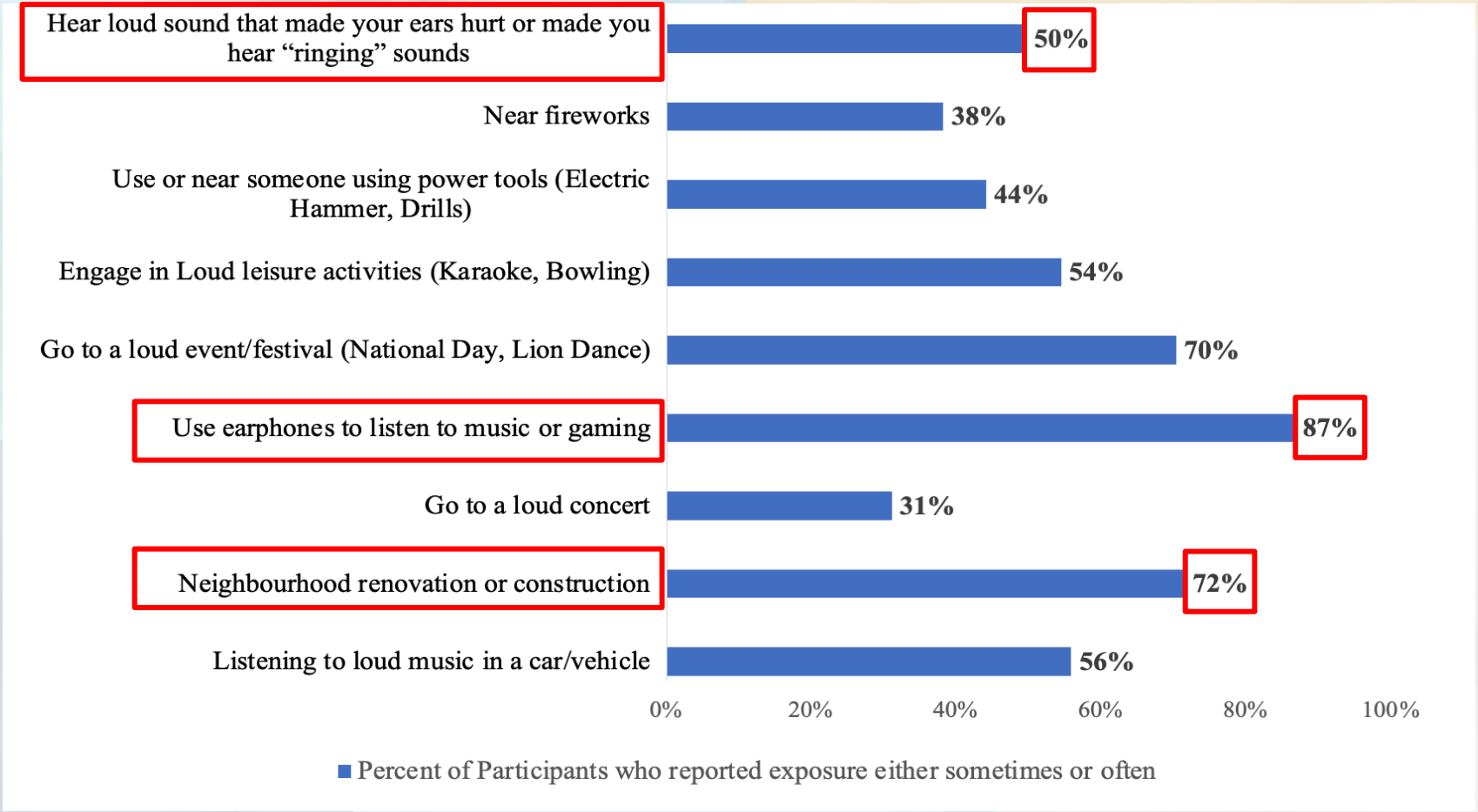
1. Pre-intervention vs. 3 month follow-up evaluation

2. Significant improvement
(a) McNemar Test: p-value < 0.05
(b) Percentage of correct responses: Increase

3. Significant Decline
(a) McNemar Test: p-value < 0.05
(b) Percentage of correct responses: Decrease

During the past year, about how often did you do each of the following activities?

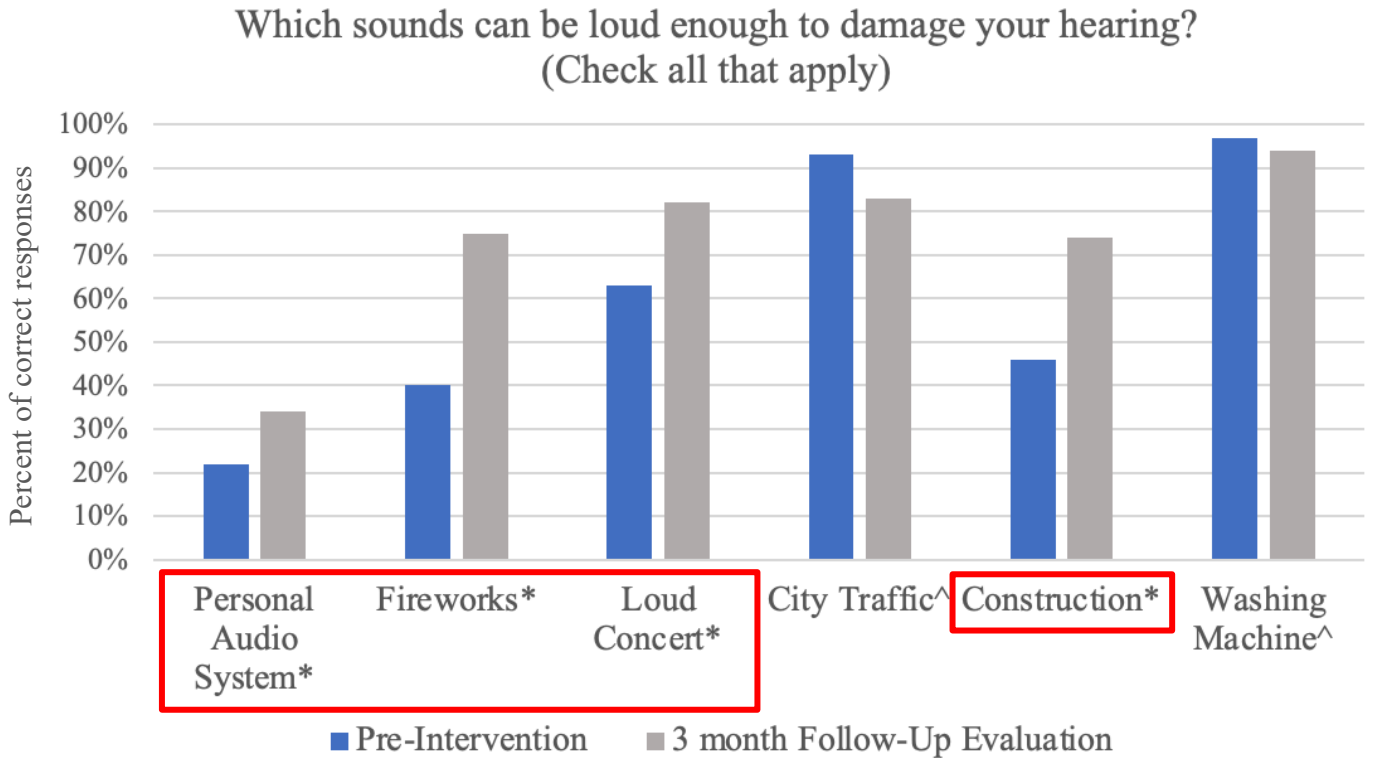
- [ ] Never
- [ ] Sometimes
- [ ] Often


Hear loud sound that made your ears hurt or made you hear “ringing” sounds
50%
Near fireworks
38%
Use or near someone using power tools (Electric Hammer, Drills)
44%
Engage in Loud leisure activities (Karaoke, Bowling)
54%
Go to a loud event/festival (National Day, Lion Dance)
70%
Use earphones to listen to music or gaming
87%
Go to a loud concert
31%
Neighbourhood renovation or construction
72%
Listening to loud music in a car/vehicle
56%
0%
20%
40%
60%
80%
100%
Percent of Participants who reported exposure either sometimes or often

Which sounds can be loud enough to damage your hearing? (Check all that apply)

- [x] Personal Audio system
- [x] Fireworks
- [x] Loud Concert
- [x] City Traffic*
- [x] Construction
- [ ] Washing Machine*

* Not statistically analysed due to ceiling effect (>85%)



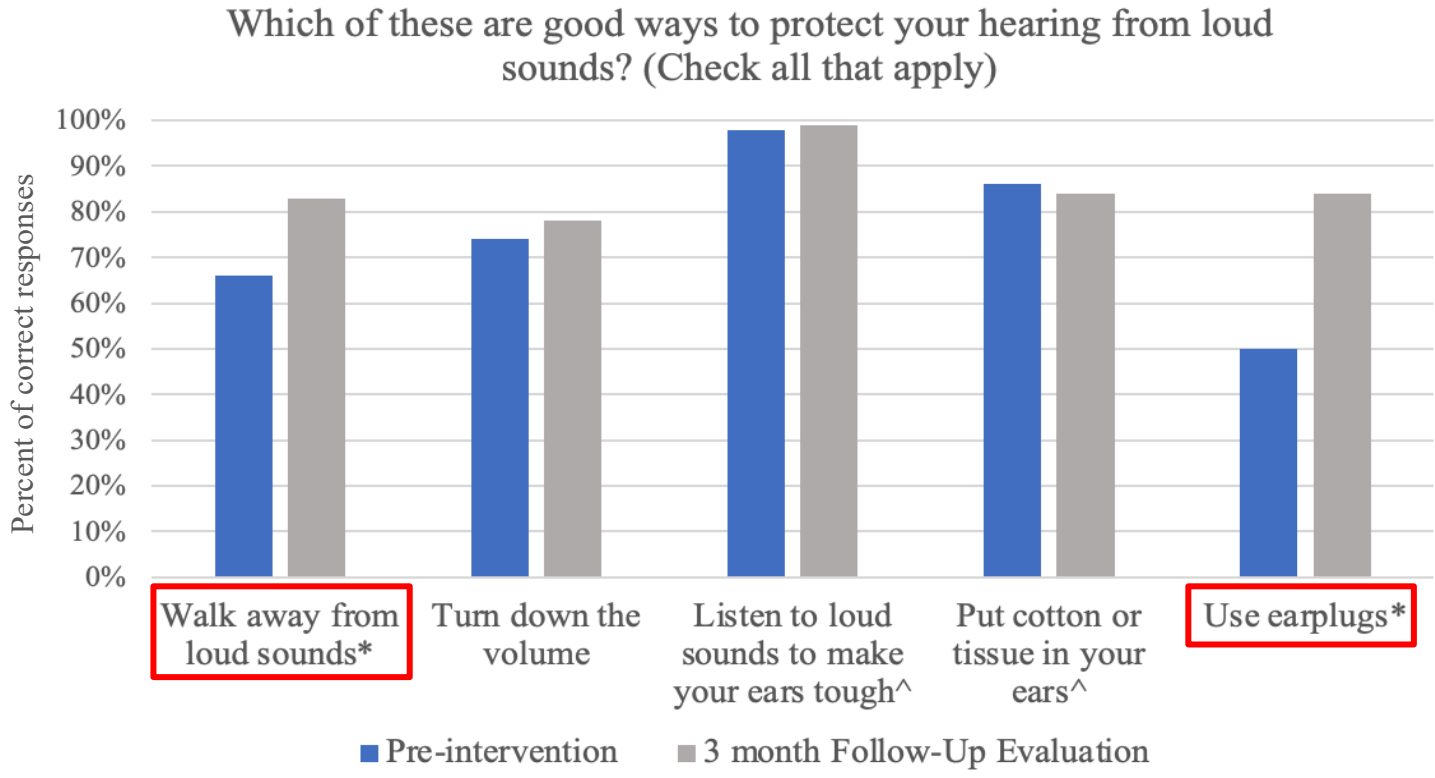
* Statistically significant results by McNemar Test, p-value < 0.05

^ Not statistically analysed due to ceiling effect

Which of these are good ways to protect your hearing from loud sounds? (Check all that apply)

- [x] Walk away from loud sounds
- [x] Turn down the volume
- [ ] Listen to loud sounds to make your ears tough*
- [ ] Put cotton or tissue in your ears*
- [x] Use earplugs

* Not statistically analysed due to ceiling effect (>85%)



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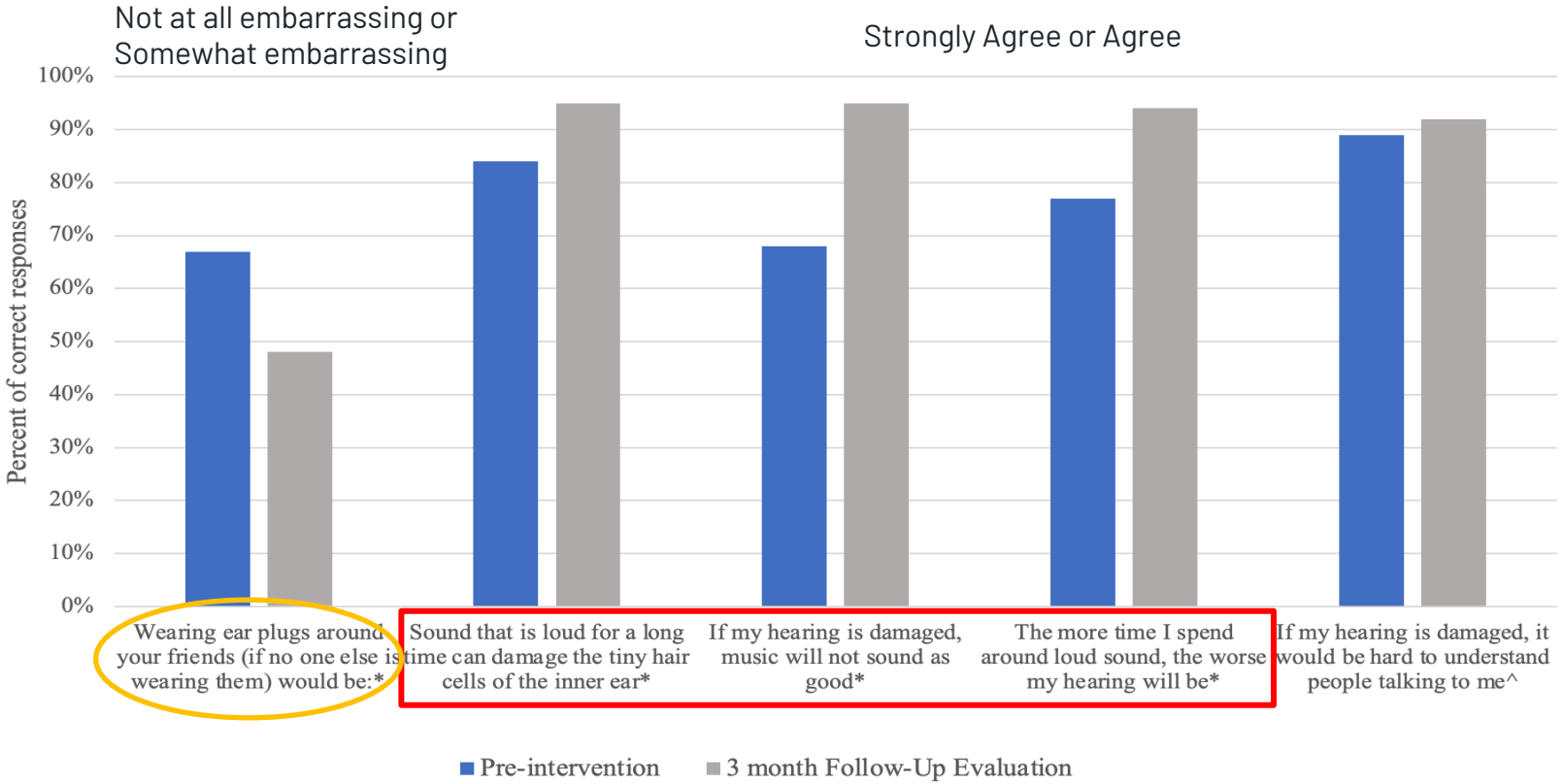
^ Not statistically analysed due to ceiling effect

Questions related to Attitudes

- [x] Strongly Agree
- [x] Agree
- [ ] Disagree
- [ ] Strongly Disagree

OR

- [ ] Very embarrassing
- [ ] Quite embarrassing
- [x] Somewhat embarrassing
- [x] Not at all embarrassing



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^ Not statistically analysed due to ceiling effect

Questions related to Intended Behaviours

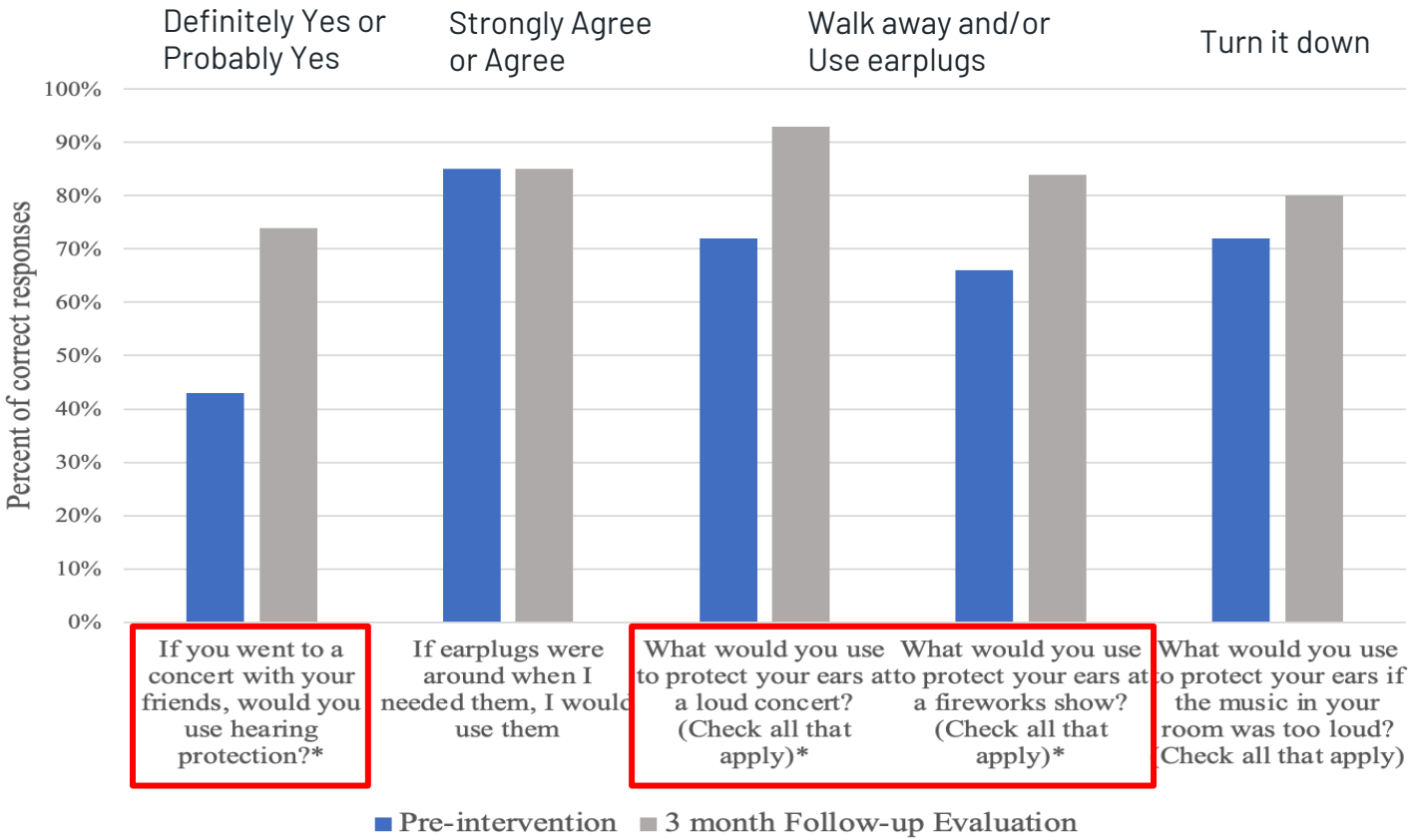
- [x] Definitely Yes
- [x] Probably Yes
- [ ] Probably No
- [ ] Definitely No

OR

- [x] Strongly Agree
- [x] Agree
- [ ] Disagree
- [ ] Strongly Disagree

OR

- [ ] Turn it down
- [ ] Walk away
- [ ] Use ear plugs
- [ ] Do nothing



* Statistically significant results by McNemar Test, p-value < 0.05

04

Discussion

Discussion

Majority of questions showed a significant improvement in knowledge, attitudes and intended behaviours regarding sound exposure and the use of appropriate hearing protective strategies at the 3 month follow-up evaluation than at pre-intervention

(Griest et al., 2007; Martin et al., 2013; Knobel et al., 2014; Welch et al., 2016; Deng, 2019)

Limitations

Time Constraints

Study Design Limitation

Questionnaire Design Limitation

Ambiguity of Question

Discussion

What would you do to protect your ears if the music in your own room was too loud? (Check all that apply)

- [x] Turn it down
- [ ] Walk away
- [x] Use ear plugs
- [ ] Do nothing

Limitations

Time Constraints

Study Design Limitation

Questionnaire Design Limitation

Ambiguity of Question

Reliability of Questionnaire

Sample Size

Is the Dangerous Decibels® Programme effective?

YES!

Significant improvement in responses observed at the 3 month follow-up evaluation than at pre-intervention for 13/16 questions!

Conclusion

Adolescents in Singapore are exposed to high sound levels

The Dangerous Decibels® programme is effective in improving knowledge, attitudes and intended behaviours regarding dangerous sound exposure and the use of appropriate hearing protective strategies

Encourage future implementation of the programme as part of the Ministry of Education's health and science curriculum on a self-sustained basis

THANKS!

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ANY QUESTIONS?

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