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A Study on Prevalence of Self-ear Cleaning Habit: The Risk of Injury and Associated Symptoms Among Undergraduate Medical Students

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Abstract

Cerumen (earwax) is a substance that provides a protective mechanism to the ear against infection and is also a defense mechanism that acts against substances such as water as well as organisms like insects. There is widespread belief that this earwax is unhygienic, and many people practice the habits of self-ear cleaning in the misguided belief that it maintains ear hygiene. This cross-sectional study aims to determine the prevalence of self-ear cleaning habit among undergraduate medical students in Manipal University College Malaysia, as well as the associated risks and related symptoms. An online questionnaire was distributed, and 144 responses were collected in total. Statistical analysis was done using Epi Info version 7.2.4.0. The findings of the data revealed that 80.7% of students practiced self-ear cleaning. However, there was differing levels of knowledge on the dangers of self-ear cleaning with 84.42% of those who practiced self-ear cleaning having good knowledge on the dangers of self-ear cleaning and just 15.58% of the students who did not practice self-ear cleaning having good knowledge about the dangers of self-ear cleaning. With the result obtained, there is a high percentage (94.3%) in the level of awareness on danger associated with self-ear cleaning. Nevertheless, students still perceive self-ear cleaning as beneficial (47.14%). This study shows that there was a significant positive association between student's beneficial perception with respect to self-ear cleaning practices (95% CI for OR 1.7-52.8; P-value: 0.003). Besides that, there was positive but insignificant association between knowledge and practice (95% CI for OR 0.73-3.94; P-value: 0.220). Furthermore, sociodemographic factors and self-ear cleaning practices were found to be statistically insignificant. There was no significance between sociodemographic factors and knowledge. In summary, our study revealed that majority of the students practice self-ear cleaning. Despite those who perceive it as harmful/not beneficial, the number of students from this group still practicing self-ear cleaning irrespective of their awareness shows the fact that personal hygiene is one of the main factors to practicing self-ear cleaning along with knowledge and perception towards self-ear cleaning. Hence, we recommend raising awareness on discouraging self-ear cleaning practice due to many harmful risks which may lead to ear damage.

Keywords

Knowledge, Practice, Perception, Awareness, Self-ear Cleaning, Undergraduate Students

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1. Introduction

The ear is essential for sound perception and body equilibrium. [1] The ear wax is made up of ceruminous and sebaceous gland secretions, as well as desquamated epithelium from the tympanic membrane and skin lining the external auditory canal. [2, 11] Glycopeptides, lipids, hyaluronic acid, sialic acid, lysosomal enzymes and

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immunoglobulins make up ear wax. [3] Cerumen preserves the external auditory canal's skin as well as assisting in cleaning and lubricating. Apart from that, it offers some protection against bacteria, fungi, insects, and water. While a sufficient quantity of cerumen is required to avoid ear infections, too much can produce impaction which can cause pain, hearing loss, and even dizziness. [1, 12]

When an instrument is placed into the external ear canal (EAC) with the goal of eliminating deposits, it is known as self-ear cleaning. This is a common technique that has the potential to damage the integrity of the ear as a natural, self-cleaning mechanism. [8, 9] These have been believed to be highly frequent in Malaysia, England, and the United States, among other countries. [7, 10] The common motivations for an individual to practice self-ear cleaning are to remove the ear wax, that is considered to be unhygienic and dirty, ear itchiness and ear irritation. [5] According to anecdotal evidence among the general public, the ear needs to be cleaned frequently to remove excess cerumen in order to maintain a good standard of ear hygiene. However, in developing countries, the morbidity and mortality associated with ear disease and injuries remains a significant but underappreciated public health problem. [4, 5, 9]

Cotton buds also known as q-tips are the most utilised object for self-ear cleaning by the majority of the population. [7] Cotton buds have become a commonly used commodity that is easily accessible in local markets and is a common household item. Cotton buds constitutes of a short wood/rolled paper/plastic rod with both ends coated with cotton pads capable of absorbing water quickly. [4, 5, 13] In a survey of 239 people in Southeast England, 68 percent acknowledged using cotton buds in their ears, whereas 90 percent and 93.4 percent of people in Nigeria's Kaduna and Osun states used cotton buds for self-ear cleaning respectively. Another tool for ear cleaning is the curette or ear pick. It is a popular and favoured equipment for removing ear wax in East Asia, where the dry form of ear wax is easily removed using the tool. [6, 7] Nevertheless, some use feathers, biro pen cover, match sticks, finger, towel and hairpin. [3] Regardless of the objects used to clean ears, they will hinder the ear's natural cleaning mechanism and counteracts by forcing cerumen farther back into the EAC, causing wax impaction. [3, 5]

Insertions of various objects into the ear are widespread in both adults and children, whether done by the children themselves or by their parents. Professional (non- medical) ear cleaners may also perform it on the streets of cities in nations like China, Japan, and Korea. Many individuals visit their family doctors and otorhinolaryngologists with otological complaints and the desire to scratch their EAC with any available instrument. [6, 8]

There are several complications that can arise from the practice of self-ear cleaning such as injury due to trauma in the external auditory canal, deafness, infection of the external ear, perforation of the ear drum as well as weakening of the external auditory canal's defence mechanisms against infections of bacterial and viral etiology. [5, 7]

This research study was carried out with the goal of identifying the prevalence of self- ear cleaning habits among MBBS students as they have better exposure provided with ENT postings during their clinical years compared to non-medical students.

Furthermore, we also looked to identify the perception and knowledge on self-ear cleaning among the target population as well as the self-ear cleaning practices and the associated risk of injury and related symptoms regarding self-ear cleaning.

2. Methodology

2.1. Study Design, Setting, Time and Population

An analytical cross sectional study approach was conducted in a private medical college, Manipal University College Malaysia (MUCM) which is formerly known as Melaka Manipal Medical College (MMMC) among undergraduate medical students. This study was carried out from the month of June 2021 to July 2021. Our university college consists of 2 campuses, based in Muar, Johor and Bukit Baru, Melaka which offers 3 courses namely MBBS, BDS and FIS. Among the courses offered, students from MBBS semester 1-5, 8-10, BDS and FIS are situated in Melaka campus while MBBS students of semester 6, 7 are located in Muar campus. In our study, we only included students from all 10 semesters of the MBBS program which is from batch 39-48 comprising of 1300 students. This study aims to determine the knowledge, practice and prevalence of self-ear cleaning habit and the associated risk of injury and related symptoms.

2.2. Sample Size

According to previous research conducted in patients attending a family medicine clinic in a teaching hospital in Sokoto metropolis, they found that 160 (80%) respondents practice self-ear cleaning. [2] The sample size for this research was calculated using a Microsoft Excel sample size calculator [14] with our population size (N) of an approximate total of medical students in MUCM, which is 1300. The study estimate is 80% and precision error is expected to be 7%. After calculation, the result was a minimum sample size of 119 taking non respond percentage

of 10% into consideration. N final was calculated using the formula below:

$$n\ final = \frac{n\ calculated}{1 - non\ response\ \%} = \frac{119}{1 - 0.1}$$

133 was considered the final sample size.

2.3. Sampling Method

In this study the sampling method that was utilised was purposive sampling which is a non-probability sampling method. The sample for our study was identified according to the objectives of the study as well as the population characteristics. Our target population for this study were students from the MBBS programme in Manipal University College Malaysia (MUCM) who are in the pre-clinical phase i.e., semester 1-5 either in Melaka campus or Manipal campus, as well as students who are in the clinical phase i.e., semester 6-10 in Muar campus or Melaka campus. These students were selected to participate in our study.

The inclusion criteria for the study were medical students from MUCM who are of age to provide consent and provided informed consent voluntarily to take part in the study and had to completely fill up the questionnaire for their responses to be taken into consideration for the study. In contrast, the exclusion criteria for the study are those that did not provide informed consent or were below the age of 18 and unable to provide consent on their own, and as participation in the study was voluntary, respondents that did not provide informed consent were excluded as well. Those respondents that did not completely fill out the questionnaire or provided responses that were not relevant to the study were also excluded from the study.

2.4. Data Collection

Questionnaire was designed in English language and was distributed online by forwarding it as Google forms to students among undergraduate MBBS students in MUCM. Participant's consent was obtained before they proceeded to answer the questionnaire. Independent variables of this study were age, gender, race, nationality, education, parent's occupation, economic status, and student's perceptions towards self-ear cleaning. Dependent variables were self-ear cleaning (yes/no), reasons for self-ear cleaning, frequency of self-ear cleaning, object(s) used to clean ear and part of the ear clean.

Questionnaire consists of 4 parts and students were asked to respond to close-ended and multiple-choice questions. The first part contained participant's sociodemographic details including participant's age (years), gender (Male/Female), race (Malay/Chinese/Indian/Others), nationality (Malaysian student/International student), academic year (pre-clinical from semester 1-5/clinical from semester 6-10) with specification for completion of ENT posting , parent's occupation (Medical officer/Other health professional/Non-medical field) and monthly household income (<RM4849/RM4850-RM10959/>RM10960).

The second part of our questionnaire comprised of a total of 7 questions regarding perception and knowledge on self-ear cleaning (Questions 1-4 to evaluate on knowledge and question 5-7 to evaluate on perception). The third part comprised of a total of 8 questions regarding self-ear cleaning practices. The fourth part comprised of a total of 6 questions regarding associated risk of injury and related symptoms regarding self-ear cleaning. The questionnaire was taken from several previous studies. [1-8, 12]

2.5. Data Processing & Data Analysis

Data collected was entered into Microsoft Excel. Data was then analysed using Epi Info version 7.2. In the study, quantitative data such as age of participants was analysed in order to derive the mean with standard deviation and range. Whereas frequency and percentage is calculated based on the qualitative data such as gender, race, nationality, education, parent's occupation, economic status and student's perceptions towards self-ear cleaning. The level of significance was set at 0.05 ($p < 0.05$). The statistical tests used to find out the association between the independent variables and dependent variables were shown in Table 1 below.

Table 1. Statistical test for assessing the relationship between sociodemographic and practice of self-ear cleaning.

Independent variable	Dependent variable	Statistical test
Age <22 ≥ 22	Self-ear cleaning practice (yes/no)	Chi square
Gender (M/F)	Self-ear cleaning practice (yes/no)	Chi square
Race (M/C/I/others)	Self-ear cleaning practice (yes/no)	Chi square
Nationality (M/I)	Self-ear cleaning practice (yes/no)	Chi square
Education pre-clinical clinical with ENT posting clinical without ENT posting	Self-ear cleaning practice (yes/no)	Chi square
Parent's occupation (medical/ non-medical)	Self-ear cleaning practice (yes/no)	Chi square
Economic status ≤ RM 4849 RM 4850 - RM 10959 ≥ RM 10960	Self-ear cleaning practice (yes/no)	Chi square

Independent variable	Dependent variable	Statistical test
Perceptions - beneficial - not beneficial/ harmful - not sure	Self-ear cleaning practice (yes/no)	Chi square
Knowledge (good/ poor)	Self-ear cleaning practice (yes/no)	Chi square

Table 2. Statistical test for assessing the relationship between sociodemographic and knowledge of self-ear cleaning.

Independent variable	Dependent variable	Statistical test
Age <22 ≥ 22	Knowledge (good/ poor)	Chi square
Nationality (M/I)	Knowledge (good/ poor)	Chi square
Education Pre-clinical Clinical with ENT posting Clinical without ENT posting	Knowledge (good/ poor)	Chi square
Parent's occupation (medical/ non-medical)	Knowledge (good/ poor)	Chi square
Economic status ≤ RM 4849 RM 4850 - RM 10959 ≥ RM 10960	Knowledge (good/ poor)	Chi square

2.6. Ethical Consideration

The research was conducted ethically by obtaining the approval from the Research Ethics Committee, Faculty of Medicine of Melaka Manipal Medical College, Malaysia. Participants of the study were obtained by voluntary participation, and they are able to withdraw at any time without any reason and an informed consent form were distributed to participants. We made sure that the participants' information was kept confidential and used only for the purpose of a particular research. Furthermore, their anonymity and privacy were maintained.

3. Results

Table 3. Sociodemographic variable (n=140).

Independent variable		Frequency (n)	Percentage (%)
Age	<22	40	28.57
	≥ 22	100	71.43
	Mean (SD)	22.13(1.41)	
	Min-Max	18-26	
Gender	Male	49	35.00
	Female	91	65.00
Race	Malay	17	12.14
	Chinese	42	30.00
	Indian	60	42.86
	Others	21	15.00
Nationality	Malaysian	121	86.43
	International	19	13.57
Education	Pre-clinical	43	30.71
	Clinical with ENT posting	34	24.29
	Clinical without ENT posting	63	45.00
Parent's occupation	Medical field (Doctor)	16	11.43
	Other health professional	7	5.00
	Non- medical field	117	83.57
Economic status	≤ RM 4849	25	17.86
	RM 4850 – RM 10959	65	46.43
	≥ RM 10960	50	35.71

A total of 144 questionnaires consisting of 27 questions were distributed to undergraduate MBBS students of MUCM and a total of 140 responses were selected after removing the duplicated data. Among the respondents, 100 are older or equal to 22 years old which gives rise to a mean of 22 years of age in our sample size. Out of 140 respondents, 65% are females whereas remaining 35% are male respondents.

Since MUCM is a private college, we have students from other countries as well, so a total of 121 (36.43%) students are Malaysian and the remaining 19 (13.57%) are

international students. In our study, the highest ethnicity recorded was Indian which is 42.86% followed by Chinese 30% making Malay (12.14%) the lowest among them. A large number of participants are in their clinical posting, among which 24.29% have gone through ENT posting and 45% have yet to complete their ENT posting. The remaining 30.71% are currently in their pre-clinical year. Since parent's occupation plays an important role in affecting their children's self-ear cleaning habit, therefore it is important for us to collect the related data. The parent's occupation is divided into 3 categories being doctors (11.43%), other health professionals (5%) and non-medical field (83.57%). Mostly our participants (46.43%) come from a household group of M40 with a monthly household income of RM4840 - RM10959.

Table 4. Frequency and percentage of students' knowledge (n=140).

Question		Frequency	Percentage (%)
What do you think ear wax is?	dirty substance	9	6.43
	normal product present in ear canala	128	91.43
	not sure	3	2.14
What do you think is the role of ear wax in the ear?	waste	10	7.14
	modifies hearing	0	0.00
	protection[a]	130	92.86
What do you think of the presence of ear wax in the ear?	dirty and needs to be removed dirty but can be	28	20.00
	left alone	30	21.43
	normala	82	58.57

acorrect answer

Table 4 depicts the student's knowledge on self-ear cleaning. For the question 'what do you think ear wax is?', the highest correct response was 91.43% and lowest response was 2.14% for not sure as an answer. The second question on knowledge was 'What do you think is the role of ear wax in the ear?', out of the 3 options given, highest response was on protection (92.86%) and the remaining 7.14% chose waste as their answer. The last question asked was 'What do you think of the presence of ear wax in the ear?', 58.57% of respondents believe that the presence of ear wax in the ear are considered to be normal, 21.43% thinks that it's dirty but can left alone and 20% thinks that it's dirty and needs to be removed.

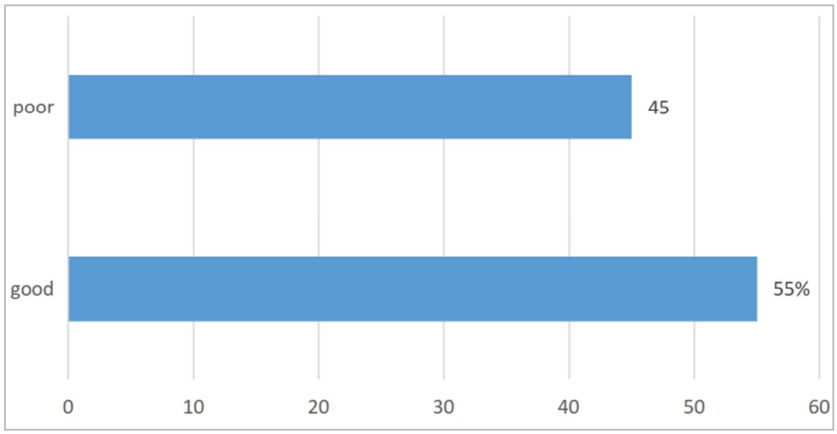

Figure 1. Knowledge on self-ear cleaning.

Table 5. Frequency and percentage on students' perception of self-ear cleaning (n=140).

Variables	Frequency (%)
What do you think is the possible effect of ear wax in the ear?	
Can cause deafness	31 (22.14)
Can cause ear itchiness	42 (30)
Can cause ear pain	3 (2.14)
Can cause ear infection	33 (23.57)
Makes one feel dirty	31 (22.14)
How do you perceive self-ear cleaning?	66 (47.14)
Beneficial	52 (37.14)
Not beneficial / harmful Not sure	22 (15.71)
How do you perceive the benefits of self-ear cleaning?	
Makes ear clean	39 (39.39)
Mops ear discharge	10 (10.10)
Cleans ear wax	22 (22.22)
Improves hearing	27 (27.27)
Others (Harmful)	1 (1.01)
How do you know when to clean your ears?	
Itches	21 (15)
Irritation	17 (12.14)
When ears are blocked	35 (25)
After shower/bath	29 (20.71)
When convenient to do so	38 (27.14)

Table 5 is displaying perception of self-ear cleaning among undergraduate MBBS students in MUCM. First question asked

was "What do you think is the possible effect of ear wax in the ear?" with 5 options; majority responded to 'can cause ear itchiness' with 42 responses (30%), followed by 33 (23.57%) responses to 'can cause ear infection', 31 responses (22.14%) for 'can cause ear deafness' and 'makes one feel dirty' and only 3 (2.14%) responded to 'can cause ear pain'. The second question was "How do you perceive self-cleaning?" with 3 options; majority of 66 responses (47.17%) thinks self-ear cleaning is 'beneficial', followed by 52 responses (37.14%) as 'not beneficial/harmful' and 22 responses (15.71%) 'not sure' about it. The third question was "How do you perceive the benefits of self-ear cleaning?" with 5 options; majority of 39 (39.39%) responded to 'makes ear clean', followed by 27 (27.27%) responses for 'improves hearing', 22 (22.22%) for 'cleans ear wax', 10 responses (10.10%) for 'mops ear discharge' and 1 response (1.01%) as 'harmful'. Last question under perception was "How do you know when to clean your ears?" with 5 options; majority about 38 responses (27.14%) responded to 'when convenient to do so', followed by 35 responses (25%) for 'when ears are blocked', 29 responses (20.71%) for 'after shower/bath', 21 responses (15%) for 'itches' and only 17 responses (12.14%) for 'irritation'.

Table 6. Frequency and percentage on students' practice of self-ear cleaning (n=140).

Variable	Frequency	Percentage (%)
Yes	113	80.7
No	27	19.3

Table 6 illustrates the percentage of students from our study sample who practice the habit of self-ear cleaning. A majority (80.7%) of the respondents stated that they do practice the habit of self-ear cleaning.

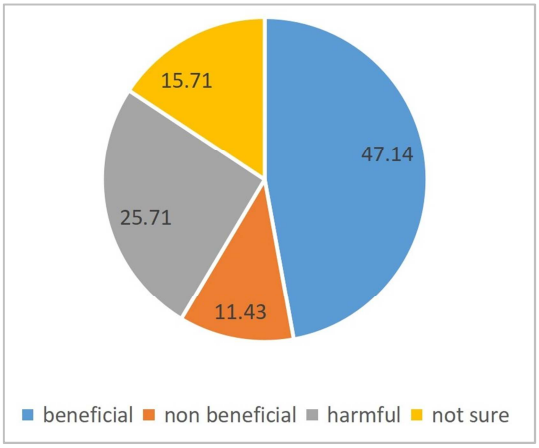

Figure 1. Perception on self-ear cleaning.

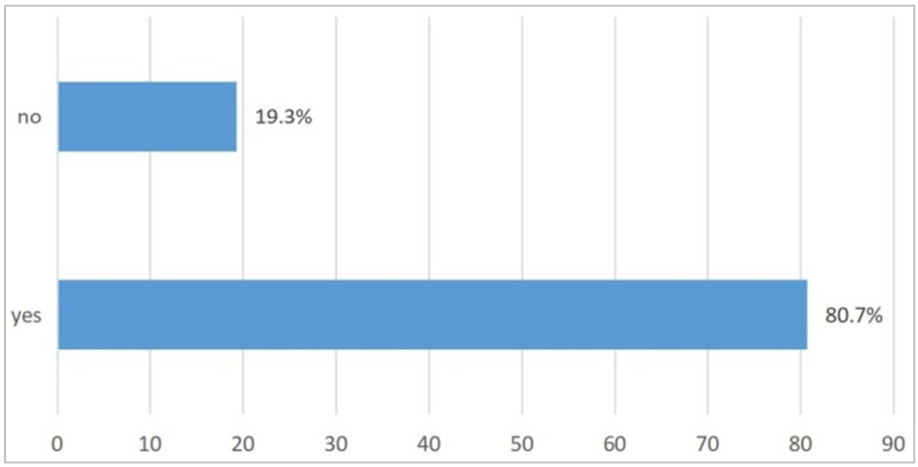

Figure 2. Prevalence of self-ear cleaning practices.

Table 7. Frequency and percentage on students' motivation and habits to self-ear cleaning (n=140).

Question		Frequency	Percentage
Why do you practice self-ear cleaning?	Hygiene	94	77.7
	Itchiness	58	47.9
	Ear wax removal	61	50.4
	Ear discharge	17	14.0
	Removal of dirt	62	51.2
	Removal of water in the ear after bath	54	44.6
	Prevention of infection	35	28.9
	Blockage	52	43.0
	Hearing impairment	21	17.4
	Irritation	24	19.8
	Others	2	1.6
Why do you not practice self-ear cleaning?	Wax impaction	7	24.1
	Trauma	17	58.6

Question		Frequency	Percentage
What do you use to clean your ears?	Foreign body	3	10.3
	Others	2	6.8
	Cotton bud	87	71.9
	Fingers	37	30.6
	Curette	19	15.7
	Towel	24	19.8
	Matchstick	1	0.8
	Hairpin	8	6.6
	Feathers	2	1.7
	Paper roll	10	8.3
	Visit the doctor	10	8.3
	Others	5	4.1
How frequently do you clean your ears?	Once a day	19	15.8
	More than once a day	5	4.2
	Once a week	41	34.2
	More than once a week	22	18.3
	Once a month	27	22.5
	More than once a month	6	5
Which part of the ear do you clean?	Outer part of the ear only	28	23.3
	Inner part of the ear only	8	6.7
	Both inner and outer part of the ear	84	70
Does any of your family members influence your self- ear cleaning habit?	Yes	55	45.1
	No	67	54.9
If family member influences self-ear cleaning habit, please state who	Parents	54	94.7
	Siblings	3	5.3

Table 7 further illustrates the motivations of the study subjects for practicing or not practicing self-ear cleaning habits. The most common reason for practicing self-ear cleaning was for hygiene purposes with 94 respondents choosing that response. The most common reason for not practicing self-ear cleaning was due to trauma which was chosen by 17 respondents. 87 participants used cotton buds to clean their ear which was the most common object used for elf-ear cleaning. 70% of respondents cleaned both inner and outer part of the ear.

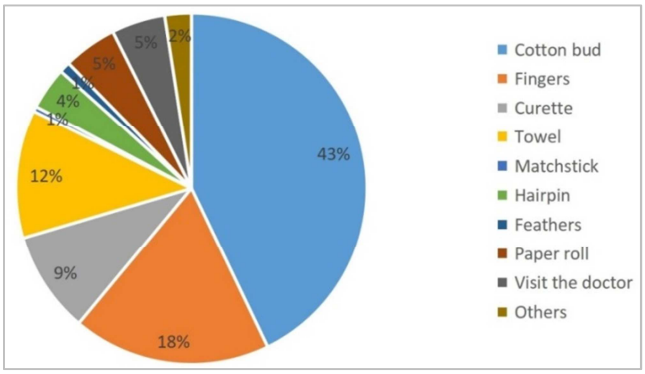

Figure 4. Object used.

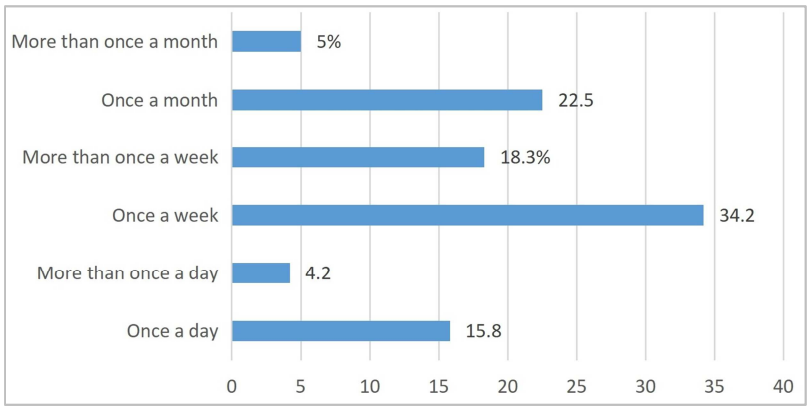

Figure 3. Frequency of self-ear cleaning.

Table 8. Frequency and percentage of associated risk of injury and related symptoms (n=140).

QUESTION		FREQUEN CY	PERCENTA GE (%)
Are you aware that self-ear cleaning can lead to ear damage?	Yes	132	94.3
	No	4	2.86
	Not sure	4	2.86
Have you received any education on the dangers associated with cotton bud usage?	Yes	116	82.9
	No	24	17.1
What is the information source you used on the dangers of cotton bud usage?	Health talk	91	70.5
	Media (TV/Radio)	50	38.8
	Publication/Journal	35	27.1
	Friends/Neighbors	21	16.3
	Others	23	18.4
Have you experienced any ear related symptoms?	Earache	54	37.5
	Ear discharge	14	9.70
	Itchiness	74	51.4
	Feeling of fullness	20	13.9
	Tinnitus	17	11.8
	Vertigo	5	3.50
	Hearing difficulties	22	15.3
	Other	13	9.10
Have you experienced any ear related complications?	Yes, with self-ear cleaning	16	11.4
	Yes, without self-ear cleaning	27	19.3
	No	97	69.3
Have you ever experienced any of the complications listed below with or without self-ear cleaning?	Otitis externa	4	5.9
	Object lodged in external auditory canal	5	7.4
	Trauma to the ear	3	4.4
	Perforation of tympanic membrane	2	2.9
	Otitis media	10	14.7
	Pain	44	64.7
	Bleeding	8	11.8
	Others	11	16.3

Table 8 depicts the various associated risk of injury and related symptoms with respect to the habit of practicing self-ear cleaning. A large percentage (94.3%) of the respondents were aware that the practice of self-ear cleaning led to damage of the ear. The second question in this part of the questionnaire was about whether the participants had received any education of the dangers on the usage of cotton buds with 82.9% responding positively to this question. Question 3 further inquired about the source of information on the dangers of cotton bud usage with participants requested to choose all options that applied to them. Most of the respondents (29.60%) stated that they received their information through a health talk while the next most common source of information was health talk and media. 30.71% of the respondents stated that the ear symptoms they experienced was itchiness which was the most common response for question no. 4. For question no.5, 69.3% of respondents had not experienced any ear related complications while 11.4% of respondents had experienced ear related complications with practice of self-ear cleaning. In the final question for this part, the most common complication experienced was pain with 26 responses.

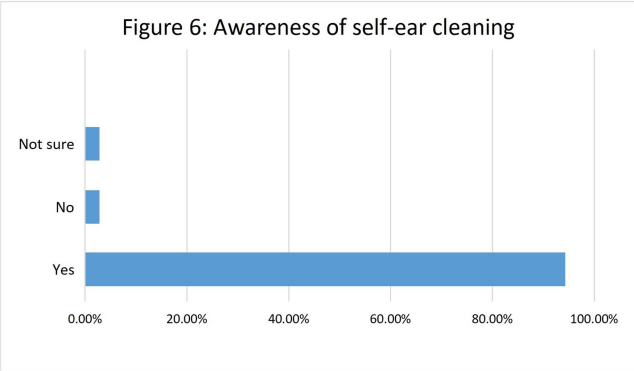

Figure 4. Awareness of self-ear cleaning.

Table 9. Association between demographic, knowledge, perception and practice on self-ear cleaning.

Independent variables	Self-ear cleaning practice		Odds ratio (95% CI)	Chi- square	P-value
	Yes	No			
Age					
<22	35 (87.5)	5 (12.5)	Reference		
≥22	78 (78)	22 (22)	0.51 (0.26-1.43)	1.657	0.198
Gender					
Male	37 (75.51)	12 (24.49)	0.61 (0.18-1.45)	1.312	0.252
Female	76 (83.52)	15 (16.48)	Reference		
Race					

Independent variables	Self-ear cleaning practice		Odds ratio (95% CI)	Chi- square	P-value
	Yes	No			
Indian	52 (86.67)	8 (13.33)	1.39 (0.33-5.95)	0.201	0.654
Chinese	32 (76.19)	10 (23.81)	0.69 (0.16-2.88)	0.605	0.605
Malay	14 (82.35)	3 (17.65)	Reference		
Others	6 (28.57)	15 (71.43)	0.43 (0.08-2.22)	1.046	0.307
Nationality					
Malaysian student	100(82.64)	21 (17.36)	2.20 (0.75-6.44)	2.134	0.144
International student	13 (68.42)	6 (31.58)	Reference		
Parent's occupation					
Medical field	18 (78.26)	5 (21.74)	0.83 (0.28-2.5)	0.106	0.744
Non-medical field	95 (81.2)	22 (18.8)	Reference		
Academic year					
Clinical with ENT posting	29 (85.29)	5 (14.71)	0.94 (0.26-3.39)	0.009	0.925
Clinical without ENT posting	47 (74.6)	16 (25.4)	0.48 (0.17-1.34)	2.035	0.154
Preclinical	37 (86.05)	6 (13.98)	Reference		
Economic status					
< RM4849	22 (88)	3 (12)	Reference		
RM 4850 – RM10959	48 (73.85)	17 (26.15)	0.39 (0.1-1.45)	2.093	0.148
> RM 10960	43 (86)	7 (14)	0.84 (0.2-3.56)	0.058	0.810
Knowledge					
Good	65 (84.42)	12 (15.58)	1.69 (0.73-3.94)	1.506	0.220
Poor	48 (76.19)	15 (23.81)	Reference		
Perception towards self-ear cleaning					
Beneficial	64 (96.97)	2 (3.93)	9.41 (1.7-52.8)	8.743	0.003
Not beneficial / harmful	32 (61.54)	20 (38.44)	0.47 (0.15-1.48)	1.710	0.191
Not sure	17 (77.27)	5 (38.44)	Reference		

PERCEPTION AND PRACTICES (n=140)
*CHI-SQUARE TEST WAS USED

Table 9 shows the association between demographic, knowledge, perception and practice on self-ear cleaning. There is positive association between perception and practice where students who perceived self-ear cleaning as beneficial are 9.41 times more likely to practice self-ear cleaning as compared to students who are not sure about it and there is significant association between them because P value is 0.003 which is <0.05 and 95% confidence level for odds ratio is ranged from 1.7 to 52.8 in which null value "1" is not included. Besides that, there is positive association between knowledge and practice where students with good knowledge is 1.69 times more likely to practice self-ear cleaning as compared to those with poor knowledge and there is no significant association between them because P value is 0.220 which is >0.05 and 95% confidence level for odds ratio is ranged from 0.73 to 3.94 in which null value "1" is included. Furthermore, positive association was found between nationality and race towards self-ear cleaning practice where Malaysian student is 2.2 times more likely to practice self-ear cleaning as compared to International student and Indian race is 1.39 times more likely to practice self-ear cleaning as compared to Malay race with no significant associations between them and practice as P value is 0.144 which is >0.05 and 95% confidence level for odds ratio is ranged from 0.75 to 6.44 in which null value "1" is included for nationality and P value is 0.654 which is >0.05 and 95% confidence level for odds ratio is ranged from 0.33 to 5.95 in which null value "1" is included for race. Other independent variables under demographics such as age (≥22), gender (Male), race (Chinese and Others), parent's occupation (Medical field), academic year and economic status found to have negative association and less likely to practice self-ear cleaning with no significant associations.

Table 10. Association between demographic and knowledge (n=140).

Independent variable		Knowledge		Odds ratio (95% CI)	Chi- square	P-value
		Good (%)	Poor (%)			
Age	<22	22(55.00)	18(45.00)	1.00(0.48-2.09)	0.000	0.999
	≥ 22	55(55.00)	45(45.00)			
Nationality	Malaysian	64(52.89)	57(47.11)	Reference		
	International	13(68.42)	6(31.58)	1.93(0.69-5.41)	1.600	0.206
Education	Pre-clinical	20(46.51)	23(53.49)	Reference		
	Clinical with ENT posting	21(61.76)	13(38.24)	1.86(0.74-4.64)	1.775	0.183
	Clinical without ENT posting	26(41.27)	37(58.73)	0.81(0.37-1.77)	0.286	0.593
Parent's occupation	Medical field	15(65.22)	8(34.78)	1.66(0.66-4.22)	1.161	0.281
	Non-medical field	62(52.99)	55(47.01)	Reference		

Independent variable		Knowledge		Odds ratio (95% CI)	Chi- square	P-value
		Good (%)	Poor (%)			
Economic status	≤ RM 4849	10(40.00)	15(60.00)	Reference		
	RM 4850- RM 10959	40(61.54)	25(38.46)	2.40(0.93-6.16)	3.392	0.066
	≥ RM 10960	27(54.00)	23(4.00)	1.76(0.66-4.67)	1.307	0.253

*CHI-SQUARE TEST WAS USED

Table 10 shows the association between sociodemographic profile of students and their knowledge on self-ear cleaning practices. By using chi square as the statistical test, we found out that there is no statistically significant association between sociodemographic profile and knowledge. Positive association are seen between international students, parents in the medical field and household group of M40 and T20 with knowledge of self-ear cleaning practices. The international students are 1.93 times more likely to have knowledge compared to Malaysian students (95% CI for OR 0.69-5.41; P-value: 0.206). Students with parents in medical field are 1.66 times more likely to have knowledge on self-ear cleaning compared to those parents in non-medical field (95% CI for OR 0.66-4.22; P-value: 0.281). Students who come from a household group of M40 with a monthly household income of RM4840-RM10959 (95% CI for OR 0.93-6.16; P-value: 0.066) and T20 (95% CI for OR 0.66-4.67; P-value: 0.253) with a monthly household income of ≥RM 10960 are 2.4 and 1.76 times more likely to have knowledge on self-ear cleaning compared to a B40 household respectively. Students who completed ENT posting are 1.86 times more likely to have knowledge compared to pre-clinical students (95% CI for OR 0.74-4.64; P-value: 0.183). However, there is negative association between clinical students without ENT posting and knowledge on self-ear cleaning. Clinical students who have not completed ENT posting are less likely to have knowledge compared to pre-clinical (95% CI for OR 0.37-1.77; P-value: 0.593). Last but not least, there is no association between age of the students and knowledge. Students less than 22 years old have equal knowledge to students 22 years old and older (95% CI for OR 0.48-2.09; P- value: 0.999).

4. Discussion

This cross-sectional study was done among undergraduate medical students of MUCM to determine the prevalence of self-ear cleaning habits among MBBS students. Furthermore, this study also aimed to identify the perception and knowledge on self-ear cleaning among the target population as well as the self-ear cleaning practices and the associated risk of injury and related symptoms regarding self-ear cleaning.

According to our study, we found out that 80.7% of the undergraduate students at this private university practice self-ear cleaning and a percentage of 11.4 experienced complications by doing so. Interestingly, a prospective study carried out at the Tundun-Wada community and National Ear Care Centre, Kaduna reviewed more or less similar results with 88.4% of the respondents practice self-ear cleaning. [15] A similar cross-sectional analytical study conducted among adolescents living in northern Saudi Arabia showed a higher percentage in the prevalence of self-ear cleaning practice which is 93.1%. [16] It has been found that the most common reason for self-ear cleaning was hygienic purposes being the highest (77%), followed by removal of dirt (51.2%) and ear wax removal (50.4%), other reasons such as itchiness, removal of water after bath and blockage showed a percentage of 47.9%, 44.6%, and 43% respectively. According to research in Sokoto Metropolis, the most common reason for self-ear cleaning was the removal of dirt followed by itchiness and ear wax. [2]

In contrast, a study done by Lee *et al.* earwax was noted to be the most common reason to clean the ears. Other reasons include water in the ear, itchy ears, and dirty sensation. [13] Other findings in a previous study conducted in a tertiary care centre in Bhutan stated that itchiness is the highest percentage for the reason of self-ear cleaning. [20] There are many objects used to clean the ears, in our study we found out that cotton bud (71.9%) and fingers (30.6%) are the most frequent object used among our respondents. Similarly, a survey done by KwaZulu-Natal University [9], Jos University Teaching Hospital [17], and Hobson and Lavy in London [18] stated that cotton bud is the most common object used in cleaning the ears. In contrast, sticks (43.3%), fingers (33.8%), and cotton bud (26.3%) are the most commonly used objects in a study profile of self-ear cleaning in the Nigerian rural community. [19]

From this study, results showed that 72.5% of our participants practice self-ear cleaning at least once a week. In comparison to research in KwaZulu-Natal University, the frequency of cleaning the ears at least once a week accounts for 83% [9], while another research done in King Abdulaziz University Hospital shows that most of the participants in this study cleaned their ears with cotton buds on a weekly or monthly basis. [5]

In our study, we assessed the knowledge, awareness, and perception of undergraduate medical students towards self-ear cleaning. According to our study, we highlighted that 55% of the subjects have a good level of knowledge

regarding self-ear cleaning whereas 45% have poor knowledge. This result showed a significant difference from another study conducted in Riyadh, Saudi Arabia in which they obtained 85% of good knowledge and 15% of poor knowledge. [24] In regard to awareness of whether self-ear cleaning could damage the ears, a large number of participants (94.2%) agreed that this practice will lead to ear damage. This result is supported by *Olajide et al* and *Ogah et al*. Both previous studies also found out that most of their respondents are aware of the health hazard associated with self-ear cleaning. [21, 22] Concerning student's perception towards self-ear cleaning, we come to know that 47.14% find it beneficial. However, 37.14% perceive it otherwise while the remaining are not sure. Researchers have found that the majority of respondents felt that self-ear cleaning is useful in several previous studies. [9, 23] With the result obtained, we can conclude that although there is a high percentage in the level of awareness, students still perceive self-ear cleaning as beneficial and it was done to make the ear clean, improve hearing and clean ear wax. However, based on a previous study by *Afolabi et al*, this habit should be discouraged as it is found to be a 'slow otologic poison with an attendant long-term effect.' [15]

This study also measured the association between sociodemographic factors, knowledge and perception with the practice of self-ear cleaning. According to the findings of our study, there was no statistically significant association between sociodemographic factors like age, gender, race, nationality, parent's occupation being medical or non-medical field, academic year being pre-clinical and clinical with or without ENT posting and economic status of the family with self-ear cleaning practices. Previous study done among adolescents in northern Saudi Arabia strongly supported this relationship. [16] Contrary, results found by *Aldawsari et al*, in which there was a significant association between gender, academic year and self-ear cleaning practices. [12] Similarly, we also found out that there is no statistically significant association between students' knowledge with their self-ear cleaning practices. However, in the current study we found out there is statistically significant association between student who perceive self-ear cleaning as beneficial with their ear cleaning practices. Those who perceive self-ear cleaning as beneficial were more likely to practice self-ear cleaning compared to those who are not sure and those who perceive it as non-beneficial or harmful. Unfortunately, there is no study done to assess the association between knowledge and perception with practice of self-ear cleaning.

Besides that, we also determined the association between sociodemographic factors such as age, nationality, parents' occupation being medical or non-medical field, academic year being pre-clinical and clinical with or without ENT posting and economic status of the family with students' knowledge on self-ear cleaning practices. By using chi square as the statistical test, we found out that there is no statistically significant association between sociodemographic factors and knowledge. Compared to the study carried out by *Aldawsari et al*, the researchers observed a statistically significant result between academic year and their knowledge on self-ear cleaning practice. [12] The findings of our study also illustrate that a majority of students have good knowledge of self-ear cleaning. A small majority of Malaysian students (52.89%) had good knowledge, but the proportion of international students was higher at 68.42%. However, the association between nationality and knowledge was statistically insignificant and may be attributed to the relatively smaller sample size of international students which was just 19 students in contrast to Malaysian students which was 121. According to a study conducted by *Ghauth et al.* [6] there is a public perception that ear wax is a dirty substance and requires periodic cleaning of the ear. Ear was in Bahasa Melayu, which is the Malay language, is known as 'tahi telinga' which has a negative connotation and is thought of as something unclean and that requires cleaning. This may be a reason why a large portion of Malaysian students (47.11%) have the incorrect belief that ear wax is a dirty substance and have poor knowledge with respect to self-ear cleaning.

We had some limitations for this study that could be addressed in future studies. A major limitation was that it is a self-reported behaviour of current and previous self- ear cleaning practices which can be easily influenced by social desirability and recall bias. The study was completed in a short duration of 5 weeks which is not sufficient to conduct a thorough research. Our study only includes undergraduate medical students in one private college (MUCM); hence we recommend future researchers to include all students doing their higher studies in different colleges to assess the knowledge and perception of self-ear cleaning. The present study adopted a cross- sectional design at one point of time due to time constriction and deadlines for completion. Therefore, the exposure and outcome are simultaneously assessed, there is generally no evidence of a temporal relationship between exposure and outcome. Without longitudinal data, it is not possible to establish a true cause and effect relationship. We recommend future studies to adopt a longitudinal study design to establish a true cause and effect relationship. Furthermore, we had difficulty in obtaining responses from all medical students of MUCM since our questionnaire was distributed online via google forms which lead to a relatively small sample size. We recommend future researchers to conduct and distribute their questionnaire physically to obtain more responses to improve

accuracy of the results.

5. Conclusion

In conclusion, our present study revealed that majority (80.7%) of MUCM undergraduate medical students practice self-ear cleaning. Despite the 37.14% of students who believed that practicing self-ear cleaning is harmful/not beneficial the number of students from this group still practicing self-ear cleaning irrespective of their awareness illustrates the fact that personal hygiene is one of the main factors to practice self-ear cleaning along with knowledge and perception towards self-ear cleaning. Hence, we recommend raising of awareness on discouraging self-ear cleaning practice due to many harmful risks which may lead to ear damage. We also recommend more similar studies should be done to get a better understanding of association between knowledge, perception, and practice of self-ear cleaning.

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Appendix

A cross sectional study on prevalence of self-ear cleaning habit and the associated risk of injury and related symptoms among undergraduate medical students in MUCM

You are being invited to take part in a research project which aims to determine the prevalence of self-ear cleaning habit and the associated risk of injury and related symptoms among undergraduate medical students in MUCM. It will ask for basic information without breaking anonymity. It will also ask you about your perception and knowledge on self-ear cleaning, self-ear cleaning practices and associated risk of injury and related symptoms. This survey will take about 5-10 minutes. This survey form includes demographic information followed by 3 sets of questionnaires. There are no right or wrong answers. Participation in this study is voluntary and you have the right to deny and/or withdraw from the study at any time, without giving any reason, and this will not bring any negative impact to you. Any information you provide is anonymous. Results of the study will be reported as a total picture and not individually. If you have any enquiry, you may contact any of the investigators shown below. We would like to thank you for your time and participation.

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Consent

I have read the above information. I am 18 years of age or older. I consent to participate in the study as titled above of my own free will. I further understand that I have the freedom to choose not to participate in the study. No reward or inducement has

been offered to me to participate as a volunteer in the study.

Name Date

Part 1: Sociodemographic details

1. Age

2. Gender:
   a) Male
   b) Female

3. Race:
   a) Malay
   b) Chinese
   c) Indian
   d) Other (please state)

4. Nationality:
   a) Malaysian student
   b) International student

5. Academic year:
   a) Pre-clinical (Semester 1-5)
   b) Clinical (Semester 6-10)

6. If you are in clinical semester, have you done your ENT posting?
   a) Yes
   b) No

7. Parent's occupation:
   a) Medical field: Doctor
   b) Other health professional
   c) Non-medical field

8. Monthly household income:
   a) RM 4849
   b) RM 4850 - RM 10959
   c) RM 10960

Part 2: perception and knowledge on self-ear cleaning

1. What do you think ear wax is?
   a) dirty substance
   b) normal product present in ear canal
   c) not sure

2. What do you think is the role of ear wax in the ear?
   a) waste
   b) modifies hearing
   c) protection

3. What do you think of the presence of ear wax in the ear?
   a) dirty and needs to be removed
   b) dirty but can be left alone
   c) normal

4. What do you think is the possible effect of ear wax in the ear? (Select whichever options are applicable)
   a) can cause deafness
   b) can cause ear itchiness
   c) can cause ear pain
   d) can cause ear infection
   e) makes one feel dirty

5. How do you perceive self-ear cleaning?
   a) beneficial (if beneficial proceed to question 6)
   b) not beneficial
   c) harmful
   d) not sure

6. How do you perceive the benefits of self-ear cleaning?
   a) makes ear clean
   b) mops ear discharge
   c) cleans ear wax
   d) improves hearing
   e) others

7. How do you know when to clean your ears?
   a) itches
   b) irritation
   c) when ears are blocked
   d) after shower/ bath
   e) when convenient to do so

Part 3: self-ear cleaning practices

1. Do you practice self-ear cleaning?
   a) yes (if yes proceed to question 2)
   b) no (if no proceed to question 3)

2. Why do you practice self-ear cleaning? (Select whichever options are applicable)
   a) hygiene
   b) ear wax removal
   c) itchiness
   d) removal of dirt
   e) prevention of infection
   f) removal of water in the ear after bath
   g) blockage
   h) ear discharge
   i) hearing impairment
   j) irritation
   k) others

3. Why do you not practice self-ear cleaning? (Select whichever options are applicable)
   a) wax impaction
   b) trauma
   c) Infection
   d) foreign body
   e) others

4. What do you use to clean your ears? (Select whichever options are applicable)
   a) cotton bud

b) fingers
c) curette
d) towel
e) matchstick
f) hairpin
g) feathers
h) paper roll
i) visit the doctor
j) other

5. How frequently do you clean your ears?
   a) once a day
   b) more than once a day
   c) once a week
   d) more than once a week
   e) once a month
   f) more than once a month

6. Which part of the ear do you clean?
   a) outer part of the ear only
   b) inner part of the ear only
   c) both inner and outer parts of the ear

7. Does any of your family members influence your self-ear cleaning habit?
   a) yes
   b) no

*If yes:
   a) Siblings
   b) Parents
   c) Relatives

Part 4: associated risk of injury and related symptoms regarding self ear cleaning

1. Are you aware that self-ear cleaning can lead to ear damage?
   a) yes
   b) no
   c) not sure

2. Have you received any education on the dangers associated with cotton bud usage?
   a) yes (if yes proceed to question 3)
   b) no

3. What is the information source you used on the dangers of cotton bud usage? (Select whichever options are applicable)
   a) health talk
   b) friends/ neighbors
   c) media (TV, radio)
   d) publication/ journal
   e) others

4. Have you experienced any ear related symptoms? (Select whichever options are applicable)

   a) earache
   b) itchiness
   c) ear discharge
   d) feeling of fullness
   e) tinnitus

f) vertigo
g) hearing difficulty
h) others

5. Have you experienced any ear related complications?
   a) yes with self ear cleaning
   b) yes without self ear cleaning
   c) no

6. Have you ever experienced any of the complications listed below with or without self-ear cleaning? (Select whichever options are applicable)
   a) otitis externa
   b) object lodged in external auditory canal
   c) trauma to the ear
   d) perforation of tympanic membrane
   e) otitis media
   f) pain
   g) bleeding
   h) others

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