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The relationship between knowledge about earwax cleaning with the grade of impacted cerumen in medical students

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ABSTRACT

The practice of using cotton buds for ear cleaning is common in the community. However, the use of cotton buds will cause various ear health problems. This study is needed to determine whether there is a relationship between knowledge about ear cleaning using cotton buds and the grade of cerumen impaction. Quantitative research using an observational analytic design with a cross-sectional approach. Sampling was carried out by simple random sampling using 37 respondents. The instrument used was a questionnaire and cerumen grade using otoscopy examination. The data were analyzed using chi square. Respondents who have a good level of knowledge (97.3%) have a sufficient level of knowledge (2.7%). The grade of cerumen in the right ear was grade 1 (13.5%), grade 2 (73.0%), grade 3, (10.8%), and grade 4 (2.7%). The left ear has the same as the right ear. There is no relationship between knowledge about the cleaning ears habits and the grade of cerumen with a p-value (0.381 > 0.05). Most respondents have a good level of knowledge. The knowledge about earwax cleaning not related with cerumen impaction grade.

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INTRODUCTION

The cleaning of the ear canal very important, cleanliness and ear health need to be maintained as well as possible so that the function of the ears are perfect (Poulton et al., 2015). Hearing loss and diseases of the outer, middle, and inner ear can be caused by a lack of attention to maintaining ear hygiene. The accumulationof ear wax in the external ear canal interferes with sound conduction, which results in decreased hearing acuity, irritation and discomfort(Rodríguez et al., 2022). The results epidemiology study showed that 30.5 % of the Indonesian children population had wax plugs, in many Public Health Center the epidemiology was significantly increased(Najwati et al.,

2019). From these data, it can be concluded that cerumen impacted is still a problem for Indonesian society.

Cotton bud is a simple device as the top choice (83.4%) used in ear cleaning because they are neat, cheap, and available in various shops such as mini markets, pharmacies, and supermarkets (Adegbiji & Aremu, 2018). However, the use of cotton buds that are too frequent will cause various kinds of problems, and potentially dangerous from minor to severe injuries. There were widely documented complication, which include ear canal trauma, traumatic tympanic membrane, impacted cerumen, infection, laceration, and retention of the cotton bud (Aisyah et al., 2014; Taheri et al., 2017).

Under normal circumstances, cerumen will not accumulate in the ear canal because the ear has its mechanism to remove the wax. The chewing and swallowing movements support the mechanism of its expenditure carried out by the jaws and the influence of the direction of skin growth (Rodríguez et al., 2022). This mechanism makes cerumen in the ear canal in a balanced amount(Poulton et al., 2015). The low public knowledge about the natural mechanisms for removing cerumen means that many people still clean their ears using cotton buds (Amutta et al., 2013).

Medical students are expected to have better knowledge of hygiene, including the mechanism of cerumen removal and the risks of cotton bud use. However, many individuals still practice self-ear cleaning, with cotton buds as the most common tool, and misconceptions persist even among healthcare workers who consider it beneficial. This reflects a gap between knowledge and actual behavior, as well as limited awareness of safe ear hygiene. Moreover, addressing cerumen impaction in medical students is important, as they represent future healthcare providers who will influence patient education and clinical practice. If improper practices persist at this level, it may contribute to the continuation of unsafe ear care behaviors in the wider community. Therefore, this study aims to examine the relationship between knowledge of earwax cleaning and the grade of cerumen impaction among medical students at Universitas Muhammadiyah Yogyakarta, to determine whether knowledge is associated with appropriate ear cleaning practices.

RESEARCH METHOD

This research is observational analytic with a cross-sectional research design. This research was conducted on July 16-23, 2021, at the Muhammadiyah University of Yogyakarta. Sampling was taken using the simple random sampling method with 37 students as respondents included in the inclusion criteria. The inclusion criteria were medical students from the class of 2018 who were actively enrolled, had completed the sensory block (which includes ear health education), were willing to participate until the end of the study, and had ear disorders but were not currently undergoing treatment. The selection of this specific participants was based on their prior exposure to sensory block learning, ensuring that participants had received formal education related to ear health. The relatively small sample size (n = 37) may reduce the statistical power of the analysis, limiting the ability to detect significant associations between variables. Therefore, the results should be interpreted with caution. The dependent variable in this study was cerumen level, and the independent variable was knowledge about earwax cleaning habits.

Data was collected using a questionnaire distributed using a Google form, and an ear examination was carried out using an otoscope to see the cerumen level. Classification of cerumen based on what was mentioned by Manchaiah et al., 2015, it can be said that a person has grade 1 cerumen if, during an otoscopic examination of the ear, the tympanic membrane is seen in its entirety and there is no cerumen covering it. In grade 2 cerumen, when the tympanic membrane is seen two-thirds of the way, you can find ear wax, both wet and dry, with a non-occlusive type. Whereas in grade 3 cerumen, the tympanic membrane appears tiny or even not visible with the occluding type of ear cerumen, and in grade 4 cerumen, the tympanic membrane is wholly closed with ear wax covering the ear canal.

The data that has been obtained is then analyzed using Chi-Square to analyze whether there is a relationship between the level of knowledge and the state of cerumen level. A significant limit value of p <0.05 with a 95% confidence interval.

RESULTS AND DISCUSSIONS

Characteristics and Behavior of the Respondents

The distribution of the characteristics and behavior of the respondents can be seen in Table 1. The total number of respondents in this study was 37 people, dominated by the age of 21 years, with a total of 19 people (51.5%). This research was also dominated by female respondents, 30 people (81.1%). The ear-cleaning tool that was most chosen by respondents in this study was cotton buds, with a total of 25 people (67.6%), with the most frequent ear-cleaning frequency being once a week, with a total of ten people (11.30%).

Table 1. Distribution of respondent characteristics and behavior

Variable	Frequency	Percentage (%)
Age (year)		
20	8	21.6
21	19	51.5
22	8	21.6
23	2	5.4
Gender		
Female	30	81.1
Male	7	18.9
Ear cleaner		
Cotton bud	25	67.6
Stainless	4	10.8
Brooch	1	2.7
Cloth/wet wipes for cleaning	6	16.2
the outer ear		
Others	1	2.7
Frequency of ear-cleaning		
Every day	1	1.3
Once a week	11	11.30
Twice a week	4	4.11
Thrice a week	5	5.13
Once a month	7	7.19
Twice a month	3	3.8
Thrice a month	6	6.16

In this study showed that 27% of respondents have cerumen impacted grade 2. Its in line the excess earwax is a common otolaryngological problem, requests for the removal of cerumen impaction are common reason for presentation in primary care or otorhinolaryngology clinics. Treatment regimens are cerumenolytics agents (sodium bicarbonate, olive oil, almond oil, water/saline), irrigation and manual removal (Radford, 2020). For manual removal, satisfaction rates of microsuctioning in technical aspect, were generally higher in general practice setting than in hospital setting (Hasson et al., 2019). When possible, patients undergoing microsuction clearance of cerumen impaction should be instructed to use a cerumenolytics agents prior to their procedure, and under direct microscopic vision to be a safe, efficacious and well-tolerated (Prowse & Mulla, 2014).

Based on the description of the characteristics of the respondents following those contained in Table 1, the majority of respondents in this study were 21 years old. Nineteen people (51.5%) were dominated by female respondents 30 (81.1%). Diffrerence with previous research conducted by Mabenda (2019), the higher prevalence in male, and the highest population in tenager (68.4%) (Mabenda et al., 2019).

The description of the respondents' behavior, which is also shown in Table 1, the ear cleaner that was most often chosen to be used as a cotton bud for 25 people (67.6%). In line with previous research it was found that most respondents 92.8%, used cotton buds as cleaning ear device (Gabriel et al., 2015). The highest frequency of ear cleaning performed by our respondents in this study was once a week, in 11 respondents (11.30%).

Knowledge Level

In Table 2. Regarding the respondents' level of knowledge, it was found that respondents with a good level of knowledge dominated, namely 36 people (97.3%). In contrast, for a sufficient level of knowledge, there was one person (2.7%) and no respondents with poor knowledge.

Tabel 2. Knowledge level

Knowledge Level	Frequency	Percentage (%)
Good	36	97.3
Sufficient	1	2.7

Description of Knowledge Respondents in this study was divided into three categories: good, sufficient, and poor. Respondents who fall into the good level of knowledge category are respondents who can answer questions correctly as much as ≥ 76%, then 56% -75% is sufficient, while less than ≤ 55%. Table 2 shows that in this study, as many as 36 respondents (97.3%) had good knowledge. In line with Faturrahman (2023) said that the level of knowledge of student at the Faculty of medicine Islamic university of North Sumatera class off 2019 about the using of cotton bud was relatively good (Faturrahman & Susanto, 2023).

These findings align with other studies showing that self-ear cleaning, especially with cotton buds, remains common despite good knowledge. Even among medical students, knowledge does not always translate into proper behavior. Study at KIST Medical Students found that 66.8% of students believed that wax is normal substance in ear canal, and they believed that the used of cotton bud could caused of ear injury (Khadka et al., 2023). Contrary with study at majmaah University, Saudi Arabia that only 44.6% of medical students had good knowledge (Abbas Aldawsari et al., 2018). The factors influencing knowledge are education, information or media, social culture, economy, environment, experience, and age. The majority parents also cleaned the child's ear canal every one week (Najwati et al., 2017). Even among medical students, knowledge does not always translate into proper behavior. In non-health populations, this issue is likely more pronounced due to lower awareness. Therefore, ear health education for medical students should emphasize not only knowledge but also behavioral change, as they play an important role in educating the community.

Cerumen Grade in Right and Left Ear

The results regarding the condition of the cerumen grades of the respondents can be seen in Table 3. This study showed that the distribution of cerumen grades was the same between the right and left ears, with the highest grade of cerumen is grade 2, namely 27 people (73%).

Tabel 3. Cerumen grade in right and left ear

Cerumen Grade	Right ear		Left ear	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Grade 1	5	13.5	5	13.5
Grade 2	27	73.0	27	73.0
Grade 3	4	10.8	4	10.8
Grade 4	1	2.7	1	2.7

The description of the respondents' grade of cerumen is in Table 3. The results were the same regarding the distribution of grades of cerumen on the right and left ears. The highest frequency was found in cerumen grade 2, namely 27 respondents (73.0%). Even though there is

cerumen in the ear canal, the cerumen that is present is still within normal limits when viewed in the classification grade 1, because the cerumen that is present does not only cover 1/3 of the tympanic membrane and is of a non-occlusive type (Schwartz et al., 2017).

Relationship Between Knowledge Level with Cerumen Grade in Right and Left Ear

Tabel 4. Relationship between knowledge level with cerumen grade in right and left ear

Knowledge Level	Cerumen Grade Right Ear				P	Cerumen Grade Left Ear				P
	1	2	3	4		1	2	3	4	
Good	5	26	4	1	0.944	5	26	4	1	0.944
Sufficient	0	1	0	0		0	1	0	0	

Based on the data presented in Table 4, the chi-square analysis yielded a p-value of 0.944 ($p>0.05$), with consistent findings observed in both the right and left ears. This indicates that there is no statistically significant association between respondents' level of knowledge and the grade of cerumen. Similarly, the analysis shown in Table 5 produced a p-value of 0.974 ($p>0.05$), suggesting that no significant relationship exists between knowledge level and the type of ear-cleaning method selected by respondents. Overall, the findings of this study demonstrate that knowledge level does not significantly influence the condition of cerumen grade among participants. This result implies that other factors, such as habits or environmental influences, may play a more prominent role.

Habit persistence is a strong predictor of continued self-ear cleaning with cotton buds, even among individuals who are aware of the associated risks. Across diverse populations, self-ear cleaning remains prevalent despite moderate to high levels of knowledge, largely due to entrenched habits and prevailing social norms. Studies conducted in Saudi Arabia demonstrates high rates of cotton bud use, even when participants acknowledge potential harm, highlighting the dominance of habit-driven behavior over knowledge-based decision-making (Alhusayni et al., 2025; Zaker & Id, 2024). Access to professional cerumen management and otoscopy influences how people manage ear wax. Limited access to ear care and lavage services can drive reliance on at-home methods, sustaining unsafe practices and cerumen outcomes despite knowledge (Bedaque et al., 2023; Tavor et al., 2022; Tolan et al., 2024). Conversely, when professional services are accessible, the likelihood of appropriate cerumen management increases, though this outcome is mediated by health-seeking behavior and cultural factors (Bedaque et al., 2023; Tavor et al., 2022).

Relatioship between Knowledge with Ear Cleaner Equipment Used

Tabel 5. Relationship between knowledge with ear cleaner equipment used

Knowledge Level	Ear Cleaner					P
	Cotton Bud	Stainless	Pin	Tissu	Others	
Good	24	4	1	6	1	0.974
Sufficient	1	0	0	0	0	

Table 5 presents the distribution of respondents based on their level of knowledge and the type of ear cleaner used. Among those with a good level of knowledge, the majority reported using cotton buds (24 respondents), followed by tissue (6 respondents), stainless ear cleaners (4 respondents), and a small number using pin and other tools (1 respondent each). Meanwhile, respondents with a sufficient level of knowledge showed minimal variation, with only 1 respondent using cotton buds and none reporting the use of other types of ear cleaners.

Individuals may acknowledge the risks associated with cotton bud use yet continue the practice due to habitual behavior, perceived effectiveness, and a lack of accessible or acceptable alternatives. A study by Weissman et al (2025) reported a high prevalence of cotton bud use despite awareness of potential harm, indicating that behavior is not solely determined by

knowledge. Similarly, a study by Alshehri et al (2024) in Saudi Arabia demonstrated that although participants had substantial awareness of the risks, the continued use of cotton buds was driven by cultural norms, and routine practices. These findings suggest that habits and cultural influences play a dominant role in shaping ear-cleaning behavior, often overriding evidence-based knowledge.

Statistical analysis using the chi-square test revealed a p-value of 0.974 ($p>0.05$), indicating that there is no significant relationship between the level of knowledge and the choice of ear-cleaning tools. In contrast to research, the risk of cerumen accumulation included canal hair, repeated using cotton bud to clean ear canal, using hearing aids or ear plug user, bony growths such as osteoma, and abnormally shaped ear canal (Money et al., 2018; Muhammad et al., 2021; Roland et al., 2008).

Education strategies that accompany safety devices and professional care are crucial, interventions that improve knowledge and equip patients with safer practices tend to reduce unsafe cleaning behaviors (Kamm et al., 2025). The effectiveness of educational media (e.g., PHBS-related programs) in shifting health behaviors supports the broader principle that safety-oriented tools must be paired with behavioral education and enabling environments to reduce risky practices (Maulidian & Linggardini, 2022).

CONCLUSION

In this study, most respondents demonstrated a good level of knowledge. However, there was no significant relationship between knowledge of earwax cleaning and the grade of cerumen impaction, nor between knowledge and the type of ear-cleaning equipment used among medical students at Universitas Muhammadiyah Yogyakarta. These findings suggest that knowledge alone is insufficient to influence behavior. Therefore, more effective interventions should go beyond knowledge improvement, including behavior-based education, habit modification strategies, and practical training on safe ear care. In addition, integrating ear health counseling into clinical skills training, improving access to professional ear care services, and utilizing media or campaigns to reshape social norms around ear cleaning may help promote safer practices.

For future research, studies should focus on examining the role of behavioral factors and habitual practices in ear health, using larger and more diverse populations, as well as longitudinal or interventional designs to better assess causality. Further research could also explore psychological, cultural, and environmental determinants of self-ear cleaning behavior to develop more targeted and effective interventions.

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References

Abbas Aldawsari, S., Aldawsari, A. A., Aljthalin, A. A., Aldossari, F. M., Alhammad, M. A., Saud, M., Shatri, A., Aljthalin, R. A., Aljthalin, R. A., Alsaadoon, S. A., Alotaibi, S. H., Eldin Atta, B., & Mohamed, E. Y. (2018). Knowledge, Attitudes and Practices of Self-Ear Cleaning Among Medical Students, Majmaah University, Saudi Arabia. *Original Research Article*, *155*(4). https://doi.org/10.21276/ijmrp.2018.4.4.037

Adegbiji, W. A., & Aremu, S. K. (2018). Cotton bud: usage, presentation, complications, and management among otorhinolaryngology patients. *MedLife Open Access (ENT - Otolaryngology)*, *1*(March), 1–5.

Aisyah, D. N., Andang, B., Adiwibawa, P., & Sulaiman, A. M. (2014). *Perancangan Iklan Layanan Masyarakat Mengenai Dampak Negatif Kesalahan Penggunaan Cotton Bud Bagi Kesehatan Telinga*.

Alhusayni, M. A., Othman, A., Sait, S., Aljohani, G. S., Alqarni, N. A., Alzahrani, A. A., Albogami, A. R.,

Alamri, A., Taha, A. A., & Abuduruk, S. H. (2025). Awareness among parents about cotton earbud use in children in the Western Region, Saudi Arabia: A cross-sectional study. *Cureus*. https://doi.org/10.7759/cureus.91891

Alshehri, A. M., Saad, M., Jallal, A., Mahzara, N. K. M., Alruwaili, G. Q. A., Ali, S., Asiri, A., Alharbi, M. G., Alzahrani, A. M. S., Alsenani, L. A., & Alkurdi, A. A. (2024). Knowledge, Attitudes, and Practices of Self-ear cleaning among the General Population in KSA. *WORLD FAMILY MEDICINE/MIDDLE EAST JOURNAL OF FAMILY MEDICINE*, *22*(1), 44–53. https://doi.org/10.5742/MEWFM.2024.95257006

Amutta, S. B., Yunusa, M. A., Iseh, K. R., Obembe, A., Egili, E., Aliyu, D., & Abdullahi, M. (2013). Sociodemographic Characteristics and Prevalence of Self Ear Cleaning in Sokoto Metropolis. *International Journal of Otolaryngology and Head & Neck Surgery*, *02*(06), 276–279. https://doi.org/10.4236/ijohns.2013.26057

Bedaque, H. de P., Ferreira, L. M. de B. M., Clemente, M. J. F., Morais, G. M., & Cavalcante, L. E. Q. (2023). Prevalence of wax stopper in children in Rio Grande do Norte. *Journal of Surgical and Clinical Research*, *14*(1), 1–11. https://doi.org/10.20398/jscr.v14i1.31688

Faturrahman, I., & Susanto, B. (2023). *Gambaran Pengetahuan Penggunaan Cotton bud dengan Kesehatan Telinga pada Mahasiswa FK UISU Tahun 2022*. *VI*(Ii), 138–142.

Gabriel, O. T., Mohammed, U. A., & Paul, E. A. (2015). Knowledge, Attitude and Awareness of Hazards Associated with Use of Cotton Bud in a Nigerian Community. *International Journal of Otolaryngology and Head & Neck Surgery*, *04*(03), 248–253. https://doi.org/10.4236/ijohns.2015.43042

Hasson, R., McDermott, E., Hanley, K., Carroll, C., & Collins, C. (2019). Assessing patient satisfaction with a microsuction service in general practice: A comparative study. *BJGP Open*, *3*(2), 4–9. https://doi.org/10.3399/bjgpopen19X101649

Kamm, W. E., Tolan, M. M., Kennedy, C. L., Choi, J. S., & Adams, M. E. (2025). *Efficacy of Over- - Counter Cerumen Removal Devices : A Randomized Trial*. 1–7. https://doi.org/10.1002/lio2.70313

Khadka, S., Shakya, A., & Rimal, S. (2023). *Knowledge Attitude and Practice of self-ear Cleaning Among Medical Students at KIST Medical College Teaching Hospital Knowledge Attitude and Practice of self-ear Cleaning Among Medical Students at KIST Medical College Teaching Hospital*. *January*, 1–5.

Mabenda, S. B., Bunabe, G., Gilyoma, J. M., Chalya, P. L., & Mahalu, W. (2019). *Prevalence of cerumen impaction and associated factors among primary school children in Mwanza City , Tanzania*. *21*(1), 1–9.

Maulidian, K., & Linggardini, K. (2022). *The Effect of Health Education with PHBS Media on the Knowledge Level of Santri Pondok Zam-Zam Islamic Boarding*. *2*. https://doi.org/10.30595/pshms.v2i.242

Money, P., Naftali, Z., & Marliyawati, D. (2018). Hubungan Antara Penggunaan Cotton Bud Dengan Serumen Obsturan. *Diponegoro Medical Journal (Jurnal Kedokteran Diponegoro)*, *7*(2), 892–905.

Muhammad, S., Shabbir, A., Aslam, S., Afzal, M., Riaz, N., Abbas, A., Afridi, J. A., Fahad, M., & Khan, W. (2021). *Self Cleaning Ears*. *71*, 476–478.

Najwati, H., Dian Saraswati, L., Peminatan Epidemiologi dan Penyakit Tropik, M., Kesehatan Masyarakat, F., Diponegoro, U., Bagian Epidemiologi dan Penyakit Tropik, D., & Sakit Kariadi Semarang, R. (2017). Gambaran Pengetahuan Orang Tua dan Perilaku Membersihkan Liang Telinga Anak Dengan Kejadian Impaksi Serumen Pada Anak Sekolah Dasar di Wilayah Pesisir. *Jurnal Kesehatan Masyarakat* , *5*, 2356–3346.

Najwati, H., Saraswati, L. D., & Muyassaroh. (2019). Factors associated with cerumen impaction in the coastal elementary schools (Case study in 1st grade of five elementary schools, Bandarharjo health center's work area, in North Semarang). *Indian Journal of Public Health Research and Development*, *10*(3), 893–898. https://doi.org/10.5958/0976-5506.2019.00615.6

Poulton, S., Yau, S., Anderson, D., & Bennett, D. (2015). Ear wax management. *Australian Family Physician*, *44*(10), 731–734.

Prowse, S. J., & Mulla, O. (2014). Aural microsuction for wax impaction: Survey of efficacy and patient perception. *Journal of Laryngology and Otology*, *128*(7), 621–625. https://doi.org/10.1017/S0022215114000796

Radford, J. C. (2020). Treatment of Impacted Ear Wax: A Case for Increased Community-Based Microsuction. *BJGP Open*, *4*(2), 1–4. https://doi.org/10.3399/BJGPOPEN20X101064

Rodríguez, R., Curado, M., Pastor, R., & Toribio, J. (2022). Mechanism Cleaning of the Ear Canal. *Inventions*, *7*(1), 1–10. https://doi.org/10.3390/inventions7010020

Roland, P. S., Smith, T. L., Schwartz, S. R., Rosenfeld, R. M., Ballachanda, B., Earll, J. M., Fayad, J., Harlor, A. D., Hirsch, B. E., Jones, S. S., Krouse, H. J., Magit, A., Nelson, C., Stutz, D. R., & Wetmore, S. (2008). Clinical practice guideline: Cerumen impaction. *Otolaryngology - Head and Neck Surgery*, *139*(3 SUPPL.2).

https://doi.org/10.1016/j.otohns.2008.06.026

Schwartz, S. R., Magit, A. E., Rosenfeld, R. M., Ballachanda, B. B., Hackell, J. M., Krouse, H. J., Lawlor, C. M., Lin, K., Parham, K., Stutz, D. R., Walsh, S., Woodson, E. A., Yanagisawa, K., & Cunningham, E. R. (2017). Clinical Practice Guideline (Update). *Otolaryngology - Head and Neck Surgery (United States)*, *156*(1_suppl), S1–S29. https://doi.org/10.1177/0194599816671491

Taheri, A., Mehmandari, S. N., Shahidi, M., Mehdizadeh, H., Mirlohi, S. M. J., Aref, N. M. N., Avanaki, M. A., & Khosravi, M. H. (2017). Popularity and Harm of Aural Foreign Bodies: A Descriptive Study of Patients in Baqiyatallah University Hospital, Tehran, Iran. *International Tinnitus Journal*, *21*(2), 98–103. https://doi.org/10.5935/0946-5448.20170019

Tavor, O., Schnapp, Z., Soffer, G. P., DeRowe, A., & Rimon, A. (2022). The outcome of cerumen removal in the pediatric emergency department. *Pediatric Emergency Care*, *38*(7), e1369–e1371. https://doi.org/10.1097/PEC.0000000000002756

Tolan, M. M., Choi, J. S., Tibesar, M., & Adams, M. E. (2024). Cerumen impaction: Prevalence and associated factors in the United States population. *Laryngoscope Investigative Otolaryngology*, *9*(2). https://doi.org/10.1002/lio2.1228

Weissman, B., Chowdhury, S., Mattin, M. D., Viola, F., & Flanagan, O. L. (2025). *Ear-Rational Behavior : A Survey Study of Q-tip (Cotton Swab) Habits and Health Perceptions*. *17*(9). https://doi.org/10.7759/cureus.92402

Zaker, A., & Id, M. A. (2024). *Ear care : Knowledge , behavior , and attitudes among healthcare practitioners in Najran City , Saudi Arabia*. 1–15. https://doi.org/10.1371/journal.pone.0303761