

Incidence of Cerumen Impaction Among School-Age Children at the Durenan Primary Public Healthcare Working Area in 2025

Restu Kaharseno^{1*}, Garnis Nirwanasari², Ani Shofiani³

Romo Wijoyo Primary Care Clinic, Indonesia¹

Durenan Primary Public Healthcare, Indonesia^{2,3}

Email: belo0836@gmail.com^{1*}

Keywords:

Cerumen; earwax; cerumen impaction; cerumen prop.

Abstract

Hearing loss is a global health concern affecting more than 5% of the world's population, with cerumen impaction being one of the leading causes of conductive hearing loss, particularly among children. This study aimed to determine the incidence of cerumen impaction among school-age children in the Durenan Primary Public Healthcare working area in 2025. This was a descriptive qualitative study using secondary data obtained from hearing health screenings conducted in 22 elementary schools, 5 junior high schools, and 7 senior high schools within the healthcare center's service area. The screenings were performed using otoscopic and headlamp examinations. The results showed that 376 elementary school students (20.15%), 159 junior high school students (12.58%), and 215 high school students (7.53%) experienced cerumen impaction, indicating a higher prevalence among younger age groups. These findings were consistent with previous research in Indonesia, which reported cerumen impaction rates of 30.5% among school-age children, with higher incidence among elementary school students compared with older age groups. The findings highlight the need to strengthen public health education, particularly for parents and school communities, regarding appropriate ear hygiene practices and the risks associated with cotton bud use. Furthermore, routine school-based ear screenings are recommended as an early detection and prevention strategy.

INTRODUCTION

Hearing loss is a condition that occurs when sound transmission from the outer ear to the brain is impaired. This impairment may occur at any point along the auditory pathway, either before or after the cochlea, resulting in conductive or sensorineural hearing loss, respectively. When both areas are affected, the condition is categorized as mixed hearing loss (Basura et al., 2020; Hill-Feltham et al., 2021; Liberman, 2017; Sataloff & Roehm, 2024; Sloan-Heggen et al., 2016).

More than 5% of the global population, or approximately 430 million people, require rehabilitation services to address disabling hearing loss, including 34 million children. It is estimated that by 2050, more than 700 million people, or 1 in 10 individuals worldwide, will experience disabling hearing loss.

In children from developing countries, approximately 60% of hearing impairment cases are preventable through appropriate preventive measures. A comprehensive medical history is

essential for the early diagnosis of hearing loss in pediatric patients. This includes information regarding prenatal conditions, birth history, early childhood development, postnatal events, symptom onset, and family history of hearing loss. Children with hearing loss may present with signs such as reduced responsiveness to sound, behavioral difficulties, speech disorders, delayed language development, learning difficulties, and pronunciation problems. A family history of early-onset hearing loss is also an important factor in identifying children at risk (Alhazmi, 2023; Barreira-Nielsen et al., 2016; Fitzpatrick et al., 2017; Kataoka et al., 2020; Le Roux et al., 2015).

The causes of hearing loss vary according to the stage of life. Prenatal causes may include genetic and hereditary factors, as well as intrauterine infections such as rubella and cytomegalovirus infection. Perinatal causes include birth asphyxia, hyperbilirubinemia, low birth weight, and other medical complications during the neonatal period. Causes during childhood and adolescence include chronic ear infections, meningitis, and other infectious diseases. In adulthood and older age, hearing loss may be associated with chronic diseases, smoking, otosclerosis, age-related sensorineural hearing loss, and sudden sensorineural hearing loss (Lohi, 2021; Lohi et al., 2015; Tang et al., 2023; Tsai Do et al., 2024; Tsuzuki & Wasano, 2024). Other contributing factors throughout life include cerumen impaction, ear or head trauma, exposure to excessive noise, ototoxic medications, workplace exposure to ototoxic chemicals, nutritional deficiencies, viral infections, other ear disorders, and late-onset or progressive genetic hearing loss.

Cerumen is produced by sebaceous and ceruminous glands located in the skin of the external auditory canal. It functions to remove dirt, dust, and foreign particles entering the external auditory canal, lubricate the canal to prevent dryness and irritation, and provide antimicrobial and antifungal protection. These protective properties are associated with components such as saturated fatty acids, lysozyme, a low pH environment, and specific odor compounds that may repel insects. Under normal conditions, cerumen is naturally expelled through jaw movements during chewing and epithelial migration within the external auditory canal (Braut et al., 2021; Chalya et al., 2019; Chaudhary, 2025; Schwartz et al., 2017; Yamano et al., 2023). This self-cleaning mechanism, sometimes referred to as a “conveyor belt” process, facilitates the movement of cerumen, exfoliated epithelial cells, and debris toward the outer ear.

Cerumen can be classified into dry and wet types, with the variation primarily determined by genetic factors. Dry cerumen is more commonly found among Asian and Native American populations, whereas wet cerumen is more prevalent among African and European populations.

Cerumen impaction is one of the most common causes of conductive hearing loss. Symptoms associated with cerumen impaction may include tinnitus, ear irritation, otalgia, and vertigo. Cerumen impaction affects approximately 5% of adults, 10% of children, and one-third of older adults.

A rapid survey conducted by the Indonesian Association of Otolaryngology–Head and Neck Surgery (Perhimpunan Dokter Spesialis Telinga Hidung Tenggorok Bedah Kepala Leher [PERHATI-KL]) and the Department of Ophthalmology and Otolaryngology, Faculty of Medicine, Universitas Indonesia, in several schools across six Indonesian cities reported a relatively high prevalence of cerumen impaction among school-age children, ranging from

30% to 50%. Screening among first-grade elementary school students, junior high school students, and senior high school students identified cerumen impaction as one of the most frequently detected ear health problems.

Normally, cerumen is expelled spontaneously from the external auditory canal through natural jaw movements. However, this self-cleaning mechanism may fail in some individuals, resulting in cerumen accumulation and impaction. Excessive cerumen buildup is frequently underdiagnosed and undertreated. The use of cotton buds or other instruments for ear cleaning may push cerumen deeper into the ear canal, potentially obstructing the tympanic membrane and causing temporary hearing impairment.

One consequence of cerumen accumulation is reduced hearing ability. Previous studies have demonstrated an association between the degree of external auditory canal obstruction and changes in hearing function. Wet cerumen impaction has been associated with greater hearing changes compared with dry, hardened cerumen. Overall, cerumen impaction may result in conductive hearing loss.

Cerumen impaction is among the most common ear problems identified in school-age children. It may reduce hearing ability and interfere with communication and learning processes. Therefore, periodic ear examinations are recommended, particularly for children with a history of cerumen impaction, with follow-up examinations every 6–12 months when clinically indicated.

Increasing education regarding proper ear hygiene practices and cerumen management among high-risk populations may promote the use of safe and effective ear-care methods. Cerumen impaction requires appropriate education because the condition may recur periodically. Recurrent cerumen impaction and related complications often result from inappropriate ear-cleaning practices, including excessive use of cotton buds, keys, safety pins, or habitual ear manipulation after bathing. Counseling regarding the risks of cotton bud use is an important preventive measure, and educational interventions have been shown to improve public knowledge regarding ear health.

The urgency of this research lies in the need for epidemiological data regarding the incidence of cerumen impaction in the Durenan Primary Public Healthcare working area. Such data are essential for planning appropriate health interventions, particularly considering the prevalence of cerumen impaction in Indonesia and its potential impact on children's learning processes. Without adequate epidemiological information, prevention and management strategies may not be optimally implemented. This research also provides a foundation for developing educational programs targeting parents and school communities regarding safe ear-cleaning practices and the risks associated with inappropriate cerumen removal methods.

The novelty of this research lies in its focus on the Durenan Primary Public Healthcare working area, involving elementary, junior high, and senior high school students. This study provides comparative data on the incidence of cerumen impaction across different educational levels, offering a comprehensive overview of the condition in the region. Furthermore, the study utilized secondary data from the School Health Program (Usaha Kesehatan Sekolah [UKS]) conducted in 2025, ensuring the relevance and timeliness of the findings.

Based on the background described above, this study addressed the incidence of cerumen impaction among school-age children in the Durenan Primary Public Healthcare working area, Trenggalek Regency. The objective of this study was to provide information

regarding the incidence of cerumen impaction among school-age children as baseline data for hearing health programs. The findings are expected to serve as a source of information on children's hearing health in the Durenan Primary Public Healthcare working area, Trenggalek Regency, and increase public awareness regarding the importance of preventing cerumen impaction.

METHOD

This study employed a qualitative descriptive method using secondary data obtained from hearing health screenings conducted through the 2025 School Health Program (Usaha Kesehatan Sekolah [UKS]). The screenings were performed using otoscopic and headlamp examinations at schools under the supervision of the Durenan Community Health Center. The screening activities involved 22 elementary schools, 5 junior high schools, and 7 senior high schools.

The inclusion criteria comprised elementary, junior high, and senior high school students who attended school during the UKS screening activities, while students who were absent on the screening day were excluded.

RESULTS AND DISCUSSION

Based on secondary data obtained from health screening activities carried out at schools in the Durenan Community Health Center's supervised area in 2025, the following results were obtained:

Table 1. Number of Cases of Ear Wax Obstruction

NO.	School Level	Number of Students	Number of Cases of Ear Wax Blockage	Percentage (%)
1.	Elementary School	1866	376	20.15%
2.	Junior High School	1263	159	12.58%
3.	Senior High School	2854	215	7.53%

Based on table 1, the results obtained are that from 22 Elementary Schools (SD) with a total of 1866 children, there were 376 children (20.15%) who experienced earwax blockage, as many as 5 Junior High Schools (SMP) with a total of 1263 children there were 159 children (12.58%), and from 7 Senior High Schools (SMA) with a total of 2854 children there were 215 children (7.53%) who experienced earwax blockage.

Discussion

Incident impaction / obstruction earwax can occurs in various circles age . Although part big incident impaction earwax more Lots found in people with carry on age , but on child age schools in the target area Community Health Center Durian there are 7 – 20% of samples that experienced impaction earwax.

Incident impaction earwax can occurs in children age more schools young, because channel narrow and twisted ears. The presence of impaction earwax can result in disturbance hearing that can influence quality life someone . Besides the disturbance hearing, a complaint

that can occurs in sufferers impaction earwax is Sick head , ears ringing , until pain in the ear. If this happens the experienced by children with age school, can impact on achievement academic child school.

Based on research conducted by Hafidzoh et al (2017) related description knowledge parent there are 95% of parents consider dirt ear can bother health ears, there are 70.2% of parents No know If dirt ear own mechanism cleaning naturally, there are 80.9% of parents consider dirt ear must cleaned until No There is dirt in the ear canal. whereas For description behavior from parent there are 85.1% of parents who clean ear his son use *cotton buds*.

So that importance concern and knowledge parents and all circles public related prevention occurrence impaction earwax.

CONCLUSION

Cerumen impaction remains a significant ear health problem in Indonesia. This condition is not limited to older adults but is also frequently observed among school-age children. Younger children tend to have a higher incidence of cerumen impaction compared with other age groups. This may be associated with anatomical differences, as children's external auditory canals are generally narrower and have different orientations compared with those of adults, which may contribute to cerumen retention and reduced natural clearance.

In addition to anatomical factors, behavioral practices and public awareness also contribute to the occurrence of cerumen impaction. Limited knowledge regarding proper ear hygiene and the common practice of using cotton swabs for ear cleaning, despite recommendations against their use, may increase the risk of cerumen accumulation. Cotton swab use does not effectively remove cerumen and may instead push it deeper into the external auditory canal, potentially worsening obstruction and increasing the risk of injury to the ear canal and tympanic membrane.

Based on these findings, the incidence of cerumen impaction in Indonesia can be considered multifactorial, involving both nonmodifiable anatomical factors, particularly in children, and modifiable behavioral and educational factors. Therefore, more intensive health education efforts are needed for communities, especially parents and schools, regarding appropriate and safe ear hygiene practices. Such education is essential to reduce the incidence of cerumen impaction among school-age children, who may be more vulnerable due to anatomical characteristics, and to minimize inappropriate ear-cleaning practices in the community.

REFERENCES

- Alhazmi, W. (2023). Risk factors associated with hearing impairment in infants and children: a systematic review. *Cureus*, 15(6).
- Barreira-Nielsen, C., Fitzpatrick, E., Hashem, S., Whittingham, J., Barrowman, N., & Aglipay, M. (2016). Progressive hearing loss in early childhood. *Ear and Hearing*, 37(5), e311–e321.
- Basura, G. J., Adams, M. E., Monfared, A., Schwartz, S. R., Antonelli, P. J., Burkard, R., Bush, M. L., Bykowski, J., Colandrea, M., & Derebery, J. (2020). Clinical practice guideline: Ménière's disease. *Otolaryngology–Head and Neck Surgery*, 162, S1–S55.
- Braut, T., Velepich, M., Kujundžić, M., Marijić, B., Maržić, D., & Oštarijaš, E. (2021). *Emergencies in Otorhinolaryngology*.

- Chalya, P. L., Mabenda, S. B., BUNABE, G., Gilyoma, J. M., & Mahalu, W. (2019). Prevalence of cerumen impaction and associated factors among primary school children in Mwanza City, Tanzania. *Tanzania Journal of Health Research*, 21(1), 1–9.
- Chaudhary, A. K. (2025). Procedure of Clearing of External Ear Canal. In *Common Ear Diseases in Dogs: Diagnosis and Management* (pp. 62–76). Bentham Science Publishers.
- Fitzpatrick, E. M., Dos Santos, J. C., Grandpierre, V., & Whittingham, J. (2017). Exploring reasons for late identification of children with early-onset hearing loss. *International Journal of Pediatric Otorhinolaryngology*, 100, 160–167.
- Hill-Feltham, P. R., Johansson, M. L., Hodgetts, W. E., Ostevik, A. V, McKinnon, B. J., Monksfield, P., Sockalingam, R., Wright, T., & Tysome, J. R. (2021). Hearing outcome measures for conductive and mixed hearing loss treatment in adults: a scoping review. *International Journal of Audiology*, 60(4), 239–245.
- Kataoka, Y., Maeda, Y., Fukushima, K., Sugaya, A., Shigehara, A., Kariya, S., & Nishizaki, K. (2020). Prevalence and risk factors for delayed-onset hearing loss in early childhood: a population-based observational study in Okayama Prefecture, Japan. *International Journal of Pediatric Otorhinolaryngology*, 138, 110298.
- Le Roux, T., Swanepoel, D. W., Louw, A., Vinck, B., & Tshifularo, M. (2015). Profound childhood hearing loss in a South Africa cohort: Risk profile, diagnosis and age of intervention. *International Journal of Pediatric Otorhinolaryngology*, 79(1), 8–14.
- Liberman, M. C. (2017). Noise-induced and age-related hearing loss: new perspectives and potential therapies. *F1000Research*, 6, 927.
- Lohi, V. (2021). *Hearing impairment among ageing adults in Northern Finland: prevalence, incidence and risk factors*.
- Lohi, V., Hannula, S., Ohtonen, P., Sorri, M., & Mäki-Torkko, E. (2015). Hearing impairment among adults: the impact of cardiovascular diseases and cardiovascular risk factors. *International Journal of Audiology*, 54(4), 265–273.
- Sataloff, R. T., & Roehm, P. C. (2024). Mixed, central, and functional hearing loss. In *Occupational Hearing Loss, Fourth Edition* (pp. 298–311). CRC Press.
- 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. (2017). Clinical practice guideline (update): earwax (cerumen impaction). *Otolaryngology–Head and Neck Surgery*, 156(1_suppl), S1–S29.
- Sloan-Heggen, C. M., Bierer, A. O., Shearer, A. E., Kolbe, D. L., Nishimura, C. J., Frees, K. L., Ephraim, S. S., Shibata, S. B., Booth, K. T., & Campbell, C. A. (2016). Comprehensive genetic testing in the clinical evaluation of 1119 patients with hearing loss. *Human Genetics*, 135(4), 441–450.
- Tang, D., Tran, Y., Dawes, P., & Gopinath, B. (2023). A narrative review of lifestyle risk factors and the role of oxidative stress in age-related hearing loss. *Antioxidants*, 12(4), 878.
- Tsai Do, B. S., Bush, M. L., Weinreich, H. M., Schwartz, S. R., Anne, S., Adunka, O. F., Bender, K., Bold, K. M., Brenner, M. J., & Hashmi, A. Z. (2024). Clinical practice guideline: age-related hearing loss. *Otolaryngology–Head and Neck Surgery*, 170, S1–S54.
- Tsuzuki, N., & Wasano, K. (2024). Idiopathic sudden sensorineural hearing loss: A review focused on the contribution of vascular pathologies. *Auris Nasus Larynx*, 51(4), 747–754.
- Yamano, T., Nishi, K., Omori, F., & Kajii, T. (2023). Effects of food properties and aging on external auditory canal movements associated with mastication. *Cureus*, 15(11).