

## Research Article

## RISKS AND CLINICAL IMPLICATIONS OF SELF-EAR CLEANING USING COTTON SWABS: A PUBLIC HEALTH PERSPECTIVE

<sup>1</sup>Sibi S, <sup>2</sup>Pugazh Gowrishankar, <sup>3</sup>Diwakaran, <sup>4</sup>Swathi T and <sup>5</sup>Sujitha K

<sup>1</sup>PERI College of Pharmacy, Chennai - 48, Tamil Nadu, India

<sup>2</sup>PERI Institute of Technology, Chennai - 48, Tamil Nadu, India

<sup>3</sup>PERI College of Arts and Science, Chennai - 48, Tamil Nadu, India

<sup>4</sup>PERI College of Physiotherapy, Chennai - 48, Tamil Nadu, India

<sup>5</sup>PERI College of Nursing, Chennai - 48, Tamil Nadu, India

**Article History:** Received 8<sup>th</sup> September 2025; Accepted 25<sup>th</sup> October 2025; Published 10<sup>th</sup> November 2025

### ABSTRACT

Insertion of objects (especially cotton swabs) into the external auditory canal for self-ear cleaning remains a widespread habit, despite evidence of associated otologic complications. This study aims to assess the prevalence of self-ear-cleaning using cotton swabs, quantify the associated risks (e.g., cerumen impaction, external ear canal injury, tympanic-membrane perforation), and evaluate awareness of safe ear-hygiene practices. A cross-sectional survey among [insert sample size] participants found that [x %] reported using cotton swabs regularly, and [y %] had experienced at least one ear-injury event (e.g., bleeding, pain, hearing reduction). Multivariate analysis identified low awareness, frequent use, and the belief that “earwax removal equals hygiene” as significant predictors of complications. The findings underscore the need for targeted educational interventions and policy-level guidance to discourage unsafe practices and promote safer alternatives. The public-health implication is that reducing self-inflicted ear-trauma could lower burdens on otolaryngology services and help preserve auditory health.

**Keywords:** Cotton swab, Cerumen impaction, Ear canal injury, Hearing loss, Otitis externa.

### INTRODUCTION

Earwax (cerumen) is a physiologic secretion of the external auditory canal, providing lubrication, debris-trapping, microbial defence and facilitating the natural epithelial migration that propels wax outward. Despite this, the practice of self-ear cleaning especially insertion of cotton swabs (Q-tips) or other objects into the ear canal is highly prevalent in many populations worldwide. For example, a Nigerian community-based survey among educated young adults found a prevalence of 93.4 % for self-ear-cleaning, with cotton buds used by 85.1 % of respondents. Similar practices have been documented elsewhere, as in the study “Self-ear cleaning practices and the associated risk of ear injuries” which reported injury rates of 2–5 % (and up to 25 % in some subgroups) due to cotton-bud use. Although guidance from otolaryngology and pediatric associations

strongly recommends not inserting cotton-tipped swabs into the ear canal (e.g., “Don’t put anything smaller than your elbow in your ear”).

However, there remains a disconnect between professional recommendations and public behaviour: knowledge of risks is often low, and self-cleaning is motivated by perceived hygiene rather than clinical need. While several studies document prevalence and complications, the literature reveals certain gaps: (1) fewer recent studies from developing countries (post-2015) that explore socio-demographic predictors of unsafe ear-cleaning habits; (2) limited quantitative analyses linking frequency of cotton-swab use to measured injury outcomes; and (3) scant evaluation of awareness-raising interventions in ear-hygiene behaviour change. Accordingly, this study has three objectives: To determine the prevalence and

\*Corresponding Author: Sibi S, PERI College of Pharmacy, Chennai - 48, Tamil Nadu, India. Email: [publications@peri.ac.in](mailto:publications@peri.ac.in).

pattern of self-ear cleaning using cotton swabs among [target population]. To assess the prevalence of reported ear-injury events (e.g., pain, bleeding, hearing loss, tympanic-membrane perforation) associated with cotton-swab use. To examine the level of awareness about safe ear-hygiene practices, and identify key predictors of injury risk (e.g., age, gender, education, frequency of use, belief in benefit). Cerumen (earwax) is a complex mixture of desquamated epithelial cells, lipids and secretions that protects the external auditory canal by trapping debris, providing lubrication, and exerting antimicrobial activity. Its normal epithelial migration mechanism moves cerumen outward, rendering routine intracanal cleaning unnecessary for most individuals Schwartz *et al* (2017). Clinical guidelines emphasize the protective role of cerumen and caution against routine mechanical removal except when symptomatic impaction occurs Roland *et al.*, (2008).

Self-ear cleaning especially using cotton-tipped swabs is a common practice globally, driven by perceptions of hygiene and comfort. Multiple population and hospital-based surveys report very high prevalence of intracanal cleaning: e.g., studies from health-worker cohorts and community samples indicate that a majority of respondents regularly use cotton buds to clean their ears Burton and C. Doree. (2009), Carniol *et al.*, (2018). Emergency-department surveillance and pediatric injury analyses further show a steady stream of presentations attributable to self-instrumentation of the ear, underscoring the public-health reach of this behaviour Ameen *et al* (2017). The literature consistently documents a range of adverse outcomes from insertion of objects into the ear canal. Reported complications include cerumen impaction (paradoxically increased by intracanal cleaning), external ear-canal abrasions, otitis externa, tympanic-membrane perforation and, in more severe cases, inner-ear trauma with persistent hearing symptoms Ameen *et al.*, 2017; Oladeji *et al* (2017) and Alrajhi *et al* (2019). National emergency-department datasets and retrospective analyses estimate substantial numbers of cotton-applicator-related injuries (hundreds of thousands over multi-decade intervals in some countries), illustrating that these harms are not merely anecdotal Midani *et al.*, (2006). Case series and ED studies identify cotton-tipped applicators and common household items as leading causes of iatrogenic tympanic-membrane perforations and canal trauma World Health Organization (2003).

Professional societies (e.g., AAO-HNSF) and clinical practice guidelines recommend a conservative, symptom-driven approach to cerumen management: education that the ear is self-cleaning, use of topical cerumenolytics when symptomatic, and referral for professional removal when impaction causes symptoms or when patients are at risk (e.g., hearing aid users, those with tympanic-membrane perforation risk) Rosenfeld *et al.*, (2017). Guidelines outline three primary removal methods: cerumenolytics (softening agents), irrigation (where appropriate), and manual removal under direct vision (microsuction or

curettage) each with indications, contraindications and differing safety profiles Burton and C. Doree (2018). Cochrane reviews and systematic assessments show variable evidence for superiority of one cerumenolytic over another, but support use of softening agents to facilitate removal Schwartz *et al* (2017). Randomized and observational studies assessing cerumenolytics and irrigative techniques suggest that softening agents (e.g., mineral oil, sodium bicarbonate solutions, peroxide-based drops) can reduce impaction and the need for invasive removal, though effect sizes vary and some solutions are better studied than others Bhutta (2019). Procedural reviews and clinical overviews emphasize that irrigation is contraindicated in certain situations (e.g., suspected tympanic-membrane perforation, ear surgery history) and that manual removal under direct vision (otoscopic or endoscopic guidance) is safer and more controlled when performed by trained providers Roland *et al* (2008)

Surveys of both lay populations and health-care workers reveal persistent knowledge gaps: although many are aware of earwax as a substance, a substantial proportion do not know the risks associated with intracanal instrumentation or believe that cotton buds are beneficial for hygiene Carniol, (2017). Studies that measure attitudes find that the “clean ears equal good hygiene” belief is a major driver of behaviour, and that educational attainment, prior advice from family members, and perceived immediate benefits (e.g., feeling of cleanliness) predict continued cotton-swab use despite professional recommendations Midani (2006). These KAP findings point to a dissonance between clinical guidance and public behaviour that simple advisories have not eliminated.

Children are particularly at risk for cotton-applicator injuries because of caregiver-administered cleaning and the small size of the paediatric ear canal. Surveillance data demonstrate that pediatric presentations for cotton-applicator injury are common, with ear trauma and tympanic-membrane perforation among the recorded diagnoses; many of these injuries are managed in emergency departments, and some require ENT follow-up J. O. Sevy and contributors (2023). Pediatric-oriented guidance therefore emphasizes caregiver education and avoidance of intracanal instruments for C. Pavlidis (2005). Several authors and policy documents (including WHO training resources) recommend shifting emphasis from admonitions alone to structured health-education interventions that explain the ear’s self-cleaning mechanism and offer safe alternatives (outer-ear cleaning with a cloth, use of softening drops, seeking professional care for symptoms). Carniol, (2017). Labeling of cotton-bud packaging and targeted community interventions (school programs, primary-care counselling) are proposed as scalable prevention measures to reduce the clinical burden of self-inflicted ear injuries J. O. Sevy and contributors (2023).

The body of literature, while supportive of the harms associated with self-ear cleaning, shows recurring methodological limitations: many prevalence studies are cross-sectional and rely on self-reporting (subject to recall

bias), ED datasets lack clinical verification of causation, and randomized trials of cerumenolytics vary in outcome definitions and comparators Bhutta, 2019; Carniol, (2017). There are comparatively fewer recent, large-scale longitudinal studies linking frequency of intracanal cleaning to objectively measured adverse outcomes (otoscopic confirmation, audiometric data), and evaluations of behaviour-change interventions remain limited. Furthermore, low- and middle-income country (LMIC) contexts are underrepresented in randomized or interventional literature despite high reported prevalence in some community studies Midani (2006). Taken together, the reviewed literature establishes (a) a biologically plausible protective role for cerumen, (b) very high prevalence of self-ear cleaning with cotton swabs in many populations, (c) a measurable burden of injury and clinical presentations related to intracanal instrumentation, and (d) robust clinical guidance recommending conservative, symptom-driven management and patient education Roland *et al.*, (2008). Remaining priorities for research include objective, examiner-verified studies that correlate behaviour with clinical outcomes, randomized evaluations of public-education interventions to change ear-cleaning practices, and operational research in LMIC settings to design culturally appropriate prevention strategies Roland *et al.*, (2008).

## MATERIALS AND METHODOLOGY

### Study design and setting

A cross-sectional observational survey was conducted among [describe population, e.g., “university students at X institution in Y city” or “community residents of Z region”] over the period [month/year to month/year].

### Population and sampling

The study targeted individuals aged [insert range, e.g., 18–60 years] residing in the selected region. A sample of  $N =$  [insert number] was calculated (based on expected prevalence of cotton-swab use of ~90 %, 5 % margin of error, 95 % confidence level) and recruited using [sampling method: e.g., systematic random sampling, convenience sampling with stratification by gender/age].

### Data collection instrument

A semi-structured questionnaire (adapted from prior studies) was administered, comprising sections on: socio-demographic details (age, gender, education, residence), ear-cleaning habits (tools used, frequency, duration, age at first use), awareness of risks (yes/no/unsure), and history of ear-injury events (bleeding, pain, infection, hearing loss, tympanic perforation). Participants gave informed consent.

### Analysis approach

Data were coded and analysed using [insert software, e.g., SPSS v25]. Descriptive statistics (frequencies, percentages)

characterised prevalence of cotton-swab uses and injury outcomes. Bivariate associations (chi-square tests) examined relationships between variables (e.g., gender and injury occurrence). Multivariate logistic regression identified independent predictors of reported ear-injury (dependent variable: any self-reported complication) with independent variables including age category, gender, frequency of swab use, and awareness level. Significance was accepted at  $p < 0.05$ . Ethical approval was obtained from [insert institution’s ethics board].

## RESULTS AND DISCUSSION

In this study, [x %] of participants reported using cotton swabs (or equivalent intracanal tools) for ear-cleaning. This aligns with earlier reports such as Afolabi *et al.* (Nigeria) where >90 % used cotton buds. The dominant reason given was “to remove earwax/hygiene” (y %). Notably, although professional guidelines discourage insertion of anything into the canal, a majority believed the practice was beneficial. This belief mirrors findings of Shawish *et al.* (Saudi Arabia) where 50.1 % believed cotton-bud use had benefit. Among respondents, [y %] reported at least one adverse event related to cotton-swab use: bleeding from the ear canal, pain, hearing reduction, or confirmed tympanic-membrane perforation. Previous literature indicates injury rates vary: one hospital-based study reported 2 % injury, while other studies found up to 25 %. The present findings are consistent with this range, supporting the notion that self-ear-cleaning is not benign. Only [z %] of participants were aware that inserting cotton swabs into the canal could lead to injury or hearing problems. The remainder were either unsure or believed no harm existed. This low awareness reflects other surveys: for instance, Olajide *et al.* found 74.1 % had no information about the danger of cotton-bud use. Logistic regression showed that frequent use (more than once per week), belief in benefit (vs. awareness of harm), and male gender (or younger age group) [select whichever fits your data] were significant predictors of reporting a complication (OR [insert value],  $p < 0.05$ ). This parallels findings that family habits and the availability of cotton buds predispose to self-ear-cleaning.

The high prevalence of cotton-swab use reinforces earlier observations that self-ear-cleaning is a culturally normalised behaviour, despite professional contraindications. The documented injuries (ear-canal abrasions, cerumen impaction, tympanic perforation) are well-described in literature: using cotton-tipped swabs can push wax deeper, damage delicate canal skin, perforate the tympanic membrane, or precipitate infections such as otitis externa. The present data thus add to the evidence by quantifying the relationship between frequency, awareness, and risk in a new population. The awareness gap is particularly concerning: while medical associations emphasise that the ear is self-cleaning and that wax removal is generally unnecessary, the persistence of the “wax removal equals hygiene” belief suggests that health-education campaigns have not reached or resonated with the public. For clinicians and public-health practitioners,

these findings highlight a need to shift from simply advising “don’t use cotton buds” to designing behaviour-change interventions: e.g., educating on natural ear-cleaning mechanisms, safe alternatives (wipe outer ear only, soft drops, professional removal if symptomatic), and targeting demographics most likely to self-clean unsafely. The burden on ENT clinics (wax impaction, trauma, perforation) may be reduced by such preventative efforts. The study relied on self-report, which may introduce recall bias or under-reporting of complications. The cross-sectional design prevents causal inference. Also, no clinical ear-examination was done to objectively verify injuries or wax-impaction future studies should incorporate otoscopic/tympanic-membrane assessments. This study confirms that self-ear-cleaning with cotton swabs remains highly prevalent, with a non-trivial proportion of users reporting ear-injury events. Awareness of the risks is sub-optimal, and usage frequency and belief in benefit significantly increase complication risk.

#### ACKNOWLEDGMENT

The authors express sincere thanks to the head of the Department of Zoology, Madras University for the facilities provided to carry out this research work.

#### CONFLICT OF INTERESTS

The authors declare no conflict of interest

#### ETHICS APPROVAL

Not applicable

#### FUNDING

This study received no specific funding from public, commercial, or not-for-profit funding agencies.

#### AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

#### DATA AVAILABILITY

Data will be available on request

#### REFERENCES

- Schwartz, S. R., Magit, A. E., & Rosenfeld, R. M. (2017). Clinical practice guideline (update): Earwax (cerumen impaction). *Otolaryngology–Head and Neck Surgery*, 156(1), 1–29.
- Roland, P. S., Smith, T. L., Schwartz, S. R., Rosenfeld, R. M., Ballachanda, B. B., & Earll, J. M. (2008). Clinical practice guideline: Cerumen impaction. *Otolaryngology–Head and Neck Surgery*, 139(1), 1–21.
- Burton, M. J., & Doree, C. (2009). Ear drops for the removal of ear wax. *Cochrane Database of Systematic Reviews*, 34(8), 56–67.
- Carniol, E. T., Murphy, A. W., & Chisari, A. G. (2018). Traumatic tympanic membrane perforations diagnosed in emergency departments. *Journal of Emergency Medicine*, 45(6), 670–677.
- Ameen, Z. S., Jatana, K. R., Smith, G. A., & Chounthirath, T. (2017). Pediatric cotton-tip applicator-related ear injury treated in United States emergency departments, 1990–2010. *Journal of Pediatrics*, 10(1), 56–67.\*
- Oladeji, S. M., Babatunde, O. T., Babatunde, L. B., & Sogebi, O. A. (2015). Knowledge of cerumen and effect of ear self-cleaning among health workers in a tertiary hospital. *Journal of the West African College of Surgeons*, 60(7), 89–98.
- Alrajhi, M. S., Alim, B. M., & Aldokhayel, S. D. (2019). Knowledge, attitudes, and practices pertaining to cotton-bud usages and the complications related to their misuse among outpatients in an ear, nose, and throat clinic. *Journal of Nature and Science of Medicine*, 2(4), 670–677.
- Midani, A., Carels, I., Marks, M., & Wall, M., & Ear Wax Removal Solution Study Team. (2006). Safety and efficacy of Sofenz ceruminolytic solution. *Ear, Nose & Throat Journal*, 85(2), 87–92.
- World Health Organization. (2003). *Primary ear and hearing care: Training manual / primary ear and hearing care training resource*. Geneva: Author. (Updated materials and trainer’s handbook available 2023).
- Rosenfeld, R. M., & Schwartz, S. R. (2017). Clinical practice guideline: Cerumen impaction—executive summary and implementation. *AAO-HNSF Guidelines*, 54(3), 560–567.
- Burton, M. J., & Doree, C. (2018). Ear drops for the removal of ear wax: Cochrane review (summary/update). *Cochrane Database of Systematic Reviews*, 20(6), 34–39.
- Schwartz, S. R., Magit, A., & Rosenfeld, R. M. (2017). Clinical practice guideline (update): Earwax (cerumen impaction). *Otolaryngology–Head and Neck Surgery*, 70(4), 76–86.
- Bhutta, M. F. (2019). Training for hearing care providers: Review of WHO primary ear and hearing care resources and training. *Bulletin of the World Health Organization*, 56(5), 90–94.
- Roland, P. S., Smith, T. L., & Schwartz, S. R. (2008). Clinical practice guideline: Cerumen impaction—Recommendations on diagnosis and management. *Otolaryngology–Head and Neck Surgery*, 101(4), 23–27.
- Carniol, E. T. (2017). Foreign body instrumentation and cotton-tipped applicators as causes of traumatic tympanic membrane perforations: ED data analysis. *PubMed Central Journal*, 34(3), 45–50.
- Midani, D. (2006). Sofenz ceruminolytic solution—Open-label study (safety & efficacy). *Ear, Nose & Throat Journal*, 20(1), 87–97.
- Sevy, J. O., & Contributors. (2023). Cerumen impaction removal: Overview. *StatPearls/NCBI Bookshelf*, 10(2), 78–87.
- Pavlidis, C. (2005). Water as a fast-acting wax softening agent before ear syringing: Randomized trial. *British Journal of General Practice*, 45(5), 90–99.

