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A CROSS-SECTIONAL STUDY OF CUTANEOUS LESIONS OF THE EXTERNAL EAR IN PATIENTS ATTENDING A TERTIARY CARE HOSPITAL

Dr Meetha Lal Meena[1], Dr Ramesh Chandra Raidas[2], Dr Anshul Yadav[3*], Dr Jatin Prajapati[4], Dr Yogita Kumar[5]

[1] Assistant Professor, Department of Otorhinolaryngology, Government Medical College, Chittorgarh, Rajasthan, India
[2] Assistant Professor, Department of Dermatology, Venereology and Leprosy, Government Medical College, Chittorgarh, Rajasthan, India
[3*]Senior Resident, Department of Pharmacology, World College of Medical Sciences and Research, Jhajjar, Haryana, India
[4] Senior Resident, Department of Community Medicine, World College of Medical Sciences and Research, Jhajjar, Haryana, India, ORC ID: https://orcid.org/0009-0004-7298-4499
[5] MBBS Intern, Pt BD Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana, India

***Corresponding Author:** Dr Anshul Yadav
*Department of Pharmacology, World College of Medical Sciences and Research, Jhajjar, Haryana, India. PIN- 124103 ORC ID: https://orcid.org/0009-0004-7132-5168 Email: yadavanshul359@gmail.com

ABSTRACT

Background: The external ear is exposed to continuous environmental, physical, and infectious risk factors, making it susceptible to a wide variety of dermatological and otological conditions. Despite this clinical relevance, limited epidemiological data exist from Indian tertiary care settings on the spectrum of external ear cutaneous lesions.

Objectives: To assess the clinical profile, frequency, and patterns of cutaneous lesions affecting the external ear among patients attending dermatology and otorhinolaryngology outpatient clinics of a tertiary care hospital.

Methods: A hospital-based cross-sectional study was conducted from May 2025 to August 2025 at a tertiary care teaching hospital in Rajasthan. A total of 126 patients presenting with visible or symptomatic external ear lesions were enrolled through consecutive sampling. Detailed clinical history, demographic profile, and relevant examination findings were recorded using a structured proforma. Investigations including dermoscopy, microbiology, and histopathology were performed where necessary. Data were analyzed using SPSS version 26.0. Descriptive statistics were applied, and associations between categorical variables were assessed using the chi-square test. A p-value <0.05 was considered statistically significant.

Results: Of the 126 participants, males constituted 58.7% and the mean age was 38.6 $\pm$17.4 years. Inflammatory lesions were the most prevalent category (35.7%), followed by infectious lesions (29.4%). Benign neoplastic/cystic lesions, traumatic/degenerative lesions, premalignant lesions, and malignant tumors accounted for 15.1%, 9.5%, 5.6%, and 4.7% respectively. Otomycosis and

seborrheic dermatitis were the leading infectious and inflammatory conditions. Squamous cell carcinoma was the most common malignancy. Significant associations were observed between age >40 years and neoplastic lesions (p=0.012), UV exposure and malignant/premalignant lesions (p=0.008), and piercing with keloids/granulomas (p<0.001).
Conclusion: External ear lesions exhibit wide clinical variability, with a meaningful proportion demonstrating malignant or premalignant potential. Early diagnosis, preventive awareness, and interdisciplinary collaboration are essential for optimal patient outcomes.

Keywords: External ear dermatoses; Otomycosis; Squamous cell carcinoma; Seborrheic dermatitis; Cutaneous lesions; Epidemiology; Otorhinolaryngology.

INTRODUCTION

The external ear, comprising the auricle and external auditory canal, is a distinct anatomical region characterized by thin skin closely adherent to cartilage and periosteum, along with specialized ceruminous glands. Owing to this structural uniqueness, coupled with continuous environmental exposure, the external ear is predisposed to a broad range of dermatological and otological disorders. Chronic exposure to ultraviolet (UV) radiation, trauma, infection, pollutants, allergens, and irritants contributed to the manifestation of various lesions, many of which appeared subtle in early stages and were easily overlooked during routine ENT examinations.[1] The limited subcutaneous tissue and relatively poor vascularity in certain areas further complicated clinical presentation and disease progression.[1]

Cutaneous lesions of the external ear have been recognized to span congenital abnormalities, inflammatory dermatoses, infections, degenerative changes, benign tumors, premalignant conditions, and malignant neoplasms.[2] Inflammatory dermatoses such as seborrheic dermatitis, psoriasis, contact dermatitis, and eczema were commonly observed and frequently presented with erythema, scaling, pruritus, and fissuring. Infectious conditions, including perichondritis, furunculosis, otomycosis, and herpes zoster oticus, contributed significantly to morbidity, with fungal infections showing particular prevalence in warm and humid climatic zones.[1–3] Degenerative and trauma-associated lesions, such as keloids from ear piercing and chondrodermatitis nodularis helicis, were also frequently reported, particularly among individuals with cultural piercing practices or prolonged pressure on the pinna.[2,3]

Malignant and premalignant lesions formed an important clinical subset due to the high oncogenic potential associated with UV exposure. Non-melanoma skin cancer (NMSC), particularly basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), is known globally as one of the most common malignancies, with a rising incidence over recent decades.[4] The pinna has been identified as a high-risk subsite for aggressive squamous cell carcinoma owing to its chronic exposure to sunlight and thin dermal covering over cartilage.[4,5] Earlier literature reported that although BCC remains the most common skin malignancy overall, SCC demonstrated a greater tendency to occur on the external ear, especially among elderly males with prolonged occupational sun exposure.[5] Subsequent research reinforced this observation and highlighted delayed presentation as a major contributor to local invasion, perineural spread, deformity, and nodal metastasis.[6,7] Public awareness remained low, and minor persistent lesions on the external ear were frequently ignored or self-managed until progression occurred.[7]

Previous studies suggested that a considerable proportion of external ear lesions were benign or inflammatory rather than malignant.[8] However, clinical differentiation between benign, infectious, premalignant, and malignant conditions often remained challenging due to overlapping visual characteristics and patient-driven late presentation. Findings from Turkish and European studies demonstrated a diverse histopathological spectrum of external ear lesions, emphasizing that even small lesions required systematic clinical evaluation.[8]

Literature from India on cutaneous lesions of the external ear has remained comparatively scarce but has gradually expanded in recent years. A study from eastern India documented a wide variation in external ear pathology, including eczema, keloids, otomycosis, cystic lesions, and skin cancers, and noted frequent misdiagnosis by non-dermatology clinicians.[9] These observations suggested a need for integrated diagnostic perspectives between dermatology and otorhinolaryngology (ENT), particularly in tertiary care settings. Another Indian review highlighted that external ear disorders represented a meaningful proportion of ENT morbidity, influenced by climatic factors, hygiene practices, topical self-medication, and delayed health-seeking patterns.[10] Similarly, otomycosis was reported as a particularly common infection in humid tropical climates, presenting with itching, discomfort, or discharge, often associated with cotton bud use and oil instillation practices.[11]

Given the intersection of dermatology and otolaryngology in external ear pathology, accurate diagnosis requires familiarity with both cutaneous and otologic disease patterns. Misdiagnosis or delayed recognition can lead to avoidable complications, including persistent infection, structural deformity, chronic symptoms, recurrent lesions, and advanced skin cancer requiring extensive surgical management.[2,6,12] Recent dermatological literature has emphasized the importance of recognizing external ear dermatoses as a distinct clinical subset and recommended multidisciplinary evaluation to optimize outcomes.[12]

Despite the clinical relevance and increasing burden of such conditions, the available epidemiological evidence from tertiary care settings in India remained limited. Previous studies were either population-specific or focused on isolated subgroups such as older adults, infectious etiologies, or malignancies.[3,9,10] Variations in regional climate, cultural practices (such as piercing and jewellery use), levels of UV exposure, occupation, hygiene practices, and dietary and socioeconomic factors likely influenced prevalence patterns, making it essential to generate localized data that could strengthen clinical awareness, diagnostic accuracy, and preventive strategies.
Against this background, the present study was undertaken to evaluate the spectrum, frequency, and clinical profile of cutaneous lesions affecting the external ear among patients attending dermatology and ENT outpatient clinics of a tertiary care teaching hospital. The findings aimed to contribute to existing literature, enhance understanding of disease distribution in the regional population, and support improved multidisciplinary clinical evaluation, early detection, and patient-centered management of external ear lesions.

MATERIALS AND METHODS

Study Design and Setting: This study was designed as a hospital-based cross-sectional observational study. It was conducted in the Dermatology and Otorhinolaryngology outpatient departments of a tertiary care teaching hospital in Rajasthan. The study period extended over four months, from May 2025 to August 2025.

Study Population: The study population consisted of patients presenting with any dermatological lesion involving the external ear, including the auricle and external auditory canal, during the study period. Patients of all age groups and both sexes were eligible for inclusion.

Inclusion Criteria

- Patients presenting with visible or symptomatic cutaneous lesions involving the external ear.
- Patients willing to provide informed consent (and assent where applicable).

Exclusion Criteria

- Patients who declined participation.
- Patients with post-surgical postoperative lesions where original diagnosis could not be ascertained.
- Patients with incomplete clinical records or unclear diagnostic categorization.

Sample Size Calculation: The sample size was calculated using the prevalence reported in the seed article by Chowdhury et al. (2021), where the proportion of cutaneous lesions involving the external ear among dermatology and ENT OPD attendees was 9%.[9]
The formula for calculating the sample size for a proportion was applied:

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{d^2}$$

Where:

- Z = 1.96 (standard normal variate for 95% CI),
- p = Expected prevalence = 0.09,
- d = Allowable error = 5% (0.05).

$n = \frac{(1.96)^2 \cdot 0.09 \cdot (1-0.09)}{(0.05)^2} = 125.88$
The minimum required sample size was 126 patients, and the final enrolled sample reached this requirement during the study period.

Sampling Technique: A consecutive sampling method was used. All eligible patients presenting during the study period who fulfilled the inclusion criteria were enrolled until the required sample size was achieved.

Data Collection Procedure: After obtaining informed consent, a structured proforma was used to record:
- Sociodemographic profile: age, sex, occupation.
- Relevant medical and exposure history including trauma, cosmetic procedures (e.g., piercing), UV exposure, allergies, and self-medication.
- Clinical examination findings of the external ear lesion, including morphology, distribution, duration, and associated symptoms.

Based on clinical evaluation, provisional diagnoses were made. Where necessary, dermoscopy, microbiological investigations, and/or histopathological examination were performed to reach a definitive diagnosis.

Diagnostic Categorization: Lesions were grouped into the following categories:
1. Inflammatory dermatoses
2. Infectious conditions
3. Benign neoplasms / cystic lesions
4. Premalignant lesions
5. Malignant neoplasms
6. Traumatic and degenerative conditions

Final diagnoses were based on clinical correlation with investigative findings.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS (version 26.0). Descriptive statistics including frequency, percentages, mean, and standard deviation (SD) were used to summarize variables. Categorical variables were analyzed using the chi-square test. A p-value < 0.05 was considered statistically significant.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee prior to study initiation. Participation was voluntary, confidentiality was maintained, and identifiable patient information was not recorded or disclosed.

RESULTS

A total of 126 patients with cutaneous lesions of the external ear were included in the study. The mean age of participants was 38.6 ±17.4 years (range: 6–82 years). The majority belonged to the 21–40 years age group (38.9%), followed by 41–60 years (28.6%). Males constituted 58.7% (n= 74) and females 41.3% (n = 52), with a male-to-female ratio of 1.4 : 1. Table 1 shows demographic distribution and diagnostic categories among participants.

Table 1. Demographic Distribution and Diagnostic Categories Among Participants (N = 126)

Variable	Category	Frequency	Percentage (%)
Age Group (years)	≤10	6	4.8
	11–20	14	11.1
	21–40	49	38.9
	41–60	36	28.6
	>60	21	16.6
Gender	Male	74	58.7
	Female	52	41.3
Diagnostic Category	Inflammatory	45	35.7
	Infectious	37	29.4
	Benign neoplastic/cystic	19	15.1
	Traumatic/degenerative	12	9.5
	Premalignant	7	5.6
	Malignant	6	4.7

A significant association was observed between age above 40 years and presence of premalignant or malignant lesions ($\chi^2 = 9.87$, $p = 0.012$), indicating a rise in neoplastic pathology with advancing age. Within inflammatory conditions, seborrheic dermatitis was the most common diagnosis, while otomycosis accounted for more than half of infectious cases. Among benign lesions, epidermoid cysts and keloids were predominant. Squamous cell carcinoma formed the majority of malignant lesions. Table 2 shows most frequent diagnosis by category.

Table 2. Most Frequent Diagnoses by Category

Category	Leading Diagnosis	% of Category	Second Most Common	% of Category
Inflammatory	Seborrheic dermatitis	31.1	Chronic eczema	28.9

Table 2. Most Frequent Diagnoses by Category				
Infectious	Otomycosis	51.3	Perichondritis	21.6
Benign	Epidermoid cyst	42.1	Keloid	31.5
Traumatic/Degenerative	Chondrodermatitis nodularis helicis	50.0	Piercing granuloma	33.3
Premalignant	Actinic keratosis	71.4	Bowen's disease	28.6
Malignant	Squamous cell carcinoma	66.7	Basal cell carcinoma	33.3

Most lesions were unilateral (83.3%), with the right ear more frequently involved (54.2%). Bilateral involvement was mainly associated with inflammatory dermatoses such as seborrheic dermatitis and psoriasis. The mean duration of symptoms was 11.2 ±8.6 months. Neoplastic and premalignant lesions demonstrated a significantly longer disease duration compared to inflammatory or infectious lesions ($p < 0.001$, one-way ANOVA).

Table 3. Laterality and Mean Duration Across Categories			
Variable	**Category**	**Frequency (%)**	**Mean Duration (months)**
Side	Right	54.2	—
	Left	29.1	—
	Bilateral	16.7	—
Average Duration	Inflammatory	—	9.4 ± 5.3
	Infectious	—	7.2 ± 3.6
	Neoplastic (benign + malignant)	—	15.7 ± 9.2
	Premalignant	—	19.8 ± 7.5

Ultraviolet exposure was significantly associated with premalignant and malignant lesions, while ear piercing showed a strong correlation with keloids and granulomas. Self-cleaning practices and topical oil application were commonly reported among patients with otomycosis and otitis externa.

Table 4. Risk Factors Showing Statistical Association With Lesion Type		
Risk Factor	**Associated Lesion Type**	**Statistical Significance**
Prolonged UV exposure	Premalignant/Malignant	$p = 0.008$
Ear piercing	Keloids/Granulomas	$p < 0.001$

Table 4. Risk Factors Showing Statistical Association With Lesion Type		
Moisture/topical oils	Otomycosis	p = 0.032
Self-cleaning with hard objects	Bacterial otitis externa	p = 0.044

DISCUSSION

The present cross-sectional study assessed the spectrum of cutaneous lesions affecting the external ear among patients attending dermatology and otorhinolaryngology outpatient departments of a tertiary care hospital in Rajasthan over a four-month period. A total of 126 patients were evaluated, with a predominance of inflammatory and infectious dermatoses, followed by benign, traumatic, premalignant, and malignant lesions. The findings are comparable with previously published studies and contribute region-specific evidence to the limited Indian literature on external ear cutaneous pathology.

The demographic distribution in this study demonstrated a male predominance (58.7%), which aligns with earlier reports suggesting increased outdoor exposure, occupational sun exposure, and higher likelihood of ear piercings or trauma in males.[1,2] Similar gender patterns were reported by Sand et al. and Chowdhury et al., emphasizing that males are more frequently affected by both benign and malignant lesions of the ear.[2,9] The age distribution showed a peak in the 21–40-year age group, corresponding to heightened exposure to occupational and environmental risk factors, followed by older age groups where degenerative, premalignant, and malignant lesions were more common. The statistically significant association between age ≥40 years and neoplastic lesions observed in this study is consistent with findings from Ahmad et al. and Beecher et al., who identified increasing age as a major determinant of malignant transformation, particularly squamous cell carcinoma of the pinna.[5,6] Inflammatory conditions were the most common diagnostic category in the present study, accounting for 35.7% of cases. Similar findings were reported in earlier Indian and international studies, where seborrheic dermatitis, chronic eczema, and psoriasis constituted the major proportion of external ear dermatoses.[1,3,9] The predominance of seborrheic dermatitis may be attributed to the presence of sebaceous glands in the external auditory canal and retroauricular region, making these areas prone to chronic inflammation and scaling. Bilateral involvement noted among inflammatory dermatoses in this study further supports systemic or multifocal dermatological etiologies rather than localized triggers.

Infectious dermatoses formed the second largest disease category (29.4%), with otomycosis being the leading diagnosis. This is in agreement with findings from studies by Yabo et al. and Saini et al., where fungal otitis externa was common in warm, humid climates and frequently associated with self-cleaning habits and topical oil instillation.[10,11] The significant association between otomycosis and modifiable factors such as moisture, foreign body insertion, and topical oils observed in this study has meaningful public health implications, particularly in regions with similar climatic patterns.

Benign neoplastic and cystic lesions, including epidermoid cysts and keloids, accounted for 15.1% of cases. The higher prevalence of keloids in younger individuals, especially females with ear piercings, aligns with the cultural practices in India and reported literature from Koyuncuer and Chowdhury et al.[8,9] The strong statistical association between ear piercing and keloid formation further highlights the need for awareness regarding sterile piercing techniques and early clinical intervention.

Premalignant and malignant lesions collectively represented approximately 10.3% of cases in the current study. Squamous cell carcinoma was the most common malignancy identified, consistent with previously reported patterns by Ahmad et al., Beecher et al., and Sand et al.[2,5,6] High ultraviolet (UV) exposure and delayed healthcare-seeking behavior likely contribute to this pattern. The significant association between UV exposure history and both premalignant and malignant lesions underscores the need for prevention strategies, including sun protection counseling and early

detection programs. Actinic keratosis was the predominant premalignant lesion observed and is widely acknowledged as a precursor lesion to cSCC, as documented by global dermatologic oncology guidelines.[4,7] The laterality pattern in this study showed a higher frequency of right-sided involvement. Although laterality trends are rarely emphasized in literature, some authors suggest that sun exposure predominance on the driver-side window may play a role, particularly in regions where right-hand driving is common.[6,7] However, the statistical relevance of this observation remains uncertain and warrants further investigation.

The mean duration of symptoms was significantly longer in neoplastic and premalignant lesions compared with inflammatory and infectious lesions, which reflects delayed recognition, misdiagnosis, or underestimation of early skin cancer symptoms. Similar delays were documented in prior studies, where patients often presented only after ulceration, bleeding, or deformity occurred.[6,7] Overall, the patterns observed in the present study are largely consistent with published literature, reinforcing the importance of integrated dermatology–ENT evaluation when assessing external ear lesions. The findings suggest that while benign and inflammatory conditions form the majority, a significant fraction of lesions have malignant or premalignant potential, particularly in older individuals with chronic UV exposure. This emphasizes the importance of thorough clinical examination, risk factor assessment, and appropriate diagnostic work-up, including dermoscopy, microbiology, and histopathology when indicated.

CONCLUSION

The present hospital-based cross-sectional study demonstrated that cutaneous lesions of the external ear are diverse in presentation, with inflammatory and infectious dermatoses being the most common, followed by benign, traumatic, premalignant, and malignant lesions. The findings highlight that while most cases are non-neoplastic, a notable proportion—particularly among older individuals with chronic ultraviolet exposure—harbor premalignant or malignant potential. The significant associations observed between modifiable factors such as ear piercing, self-cleaning habits, topical oil use, and otomycosis emphasize the need for public health awareness to prevent avoidable morbidity. The delayed presentation observed among patients with neoplastic lesions further underscores the importance of early detection, appropriate referral, and multidisciplinary collaboration between dermatology and otorhinolaryngology specialists. Overall, the study contributes valuable regional epidemiological data and reinforces the need for preventive strategies, patient education, and improved clinical vigilance in the evaluation of external ear dermatoses.

Declarations

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