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Questionnaire Study On Oral Pigmentation To Assess Knowledge And Awareness Among Dental Students

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ABSTRACT

Background: Oral pigmentation encompasses a range of physiological, pathological, and systemic conditions. Early recognition is essential for accurate diagnosis, timely referral, and management. Dental students, as future clinicians, must possess adequate knowledge and awareness of oral pigmentation.

Objectives: To evaluate the knowledge and awareness of oral pigmentation among dental students.

Methods: A descriptive cross-sectional study was conducted among 105 dental students at a private dental college in Chennai from June to August 2025. Participants were selected using convenience sampling. A structured 10-item questionnaire was administered via Google Forms. Data were analyzed using IBM SPSS Version 26. Descriptive statistics, cross-tabulations, and Pearson's chi-square tests were performed, with $p<0.05$ considered significant.

Results: Most participants correctly identified melanin as the primary pigment and recognized both physiological and pathological causes of pigmentation. Awareness varied for syndromes, tobacco-induced pigmentation, post-inflammatory lesions, and treatment modalities, with senior students demonstrating higher knowledge. Significant differences were noted across academic years for Peutz-Jeghers syndrome, tobacco-related pigmentation, lichen planus, amalgam tattoo, fungal causes, and depigmentation management.

Conclusion: While dental students demonstrated overall good knowledge, targeted education is recommended to address gaps and enhance clinical competence.

Keywords: Oral pigmentation, Dental students, Knowledge, Awareness, Oral mucosa **INTRODUCTION**

Oral pigmentation refers to the discoloration of the oral mucosa resulting from a variety of physiological, pathological, or systemic factors. While many pigmented lesions are benign and primarily of cosmetic concern, some may serve as early indicators of serious systemic conditions or malignancies, making their recognition clinically significant (Thomson, 2024). Pigmentation occurs due to the deposition of pigments in the tissues and can arise from increased melanin production, a higher number of melanocytes (melanocytosis), or the accumulation of exogenous materials introduced accidentally or iatrogenically (Abati *et al*., 2024). The spectrum of oral pigmented lesions is broad, ranging from benign entities such as freckles (ephelides), oral melanotic macules, and smoker's melanosis to potentially lifethreatening conditions like oral malignant melanoma or pigmentary manifestations of systemic disorders such as Addison's disease, Peutz–Jeghers syndrome, and other endocrinopathies (Gondak *et al*., 2012). These lesions may originate from endogenous factors, including genetic syndromes, endocrine abnormalities, nevi, or chronic inflammatory processes, or from exogenous causes such as drugs, heavy metals, amalgam tattoos, or tobacco use. The evaluation of oral pigmentation is particularly challenging due to this multifactorial etiology, subtle clinical presentations, and overlapping features among benign, reactive, and neoplastic lesions (Alawi, 2013). Accurate recognition and differential diagnosis are critical not only for patient management but also for timely referral to specialists and prevention of potential complications (Rosebush *et al*., 2019). Given this diversity, it is crucial for dental students, as future clinicians, to possess thorough knowledge and awareness of the types, causes, and clinical significance of oral pigmentation to ensure accurate diagnosis, timely referral, and appropriate management. This study is therefore designed to assess the knowledge and awareness of dental students regarding oral pigmentation.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted to assess the knowledge and awareness of oral pigmentation among dental students. The study was carried out over a period of three months, from June to August 2025, covering data collection, analysis, and report preparation. The target population included dental students from a private dental college in Chennai. Ethical approval was obtained from the Institutional Review Board, and the study was conducted under the guidance of the Department of Oral Medicine and Radiology. A total of 105 participants were selected using convenience sampling. Demographic details, including age, gender, and academic year, were recorded. A structured 10-item questionnaire was developed and distributed digitally via Google Forms through various social media platforms, predominantly WhatsApp. Informed consent was obtained from all participants, ensuring confidentiality and privacy, and participants were provided with a brief explanation of the questionnaire to facilitate accurate responses. The collected data were compiled and entered into Microsoft Excel, followed by statistical analysis using IBM SPSS Statistics for Windows, Version 26.0 (Armonk, NY: IBM Corp). Descriptive statistics, including frequencies and percentages, were calculated for all responses. Comparisons between study groups were performed using crosstabulations, and statistical significance was determined using Pearson's chi-square test. A pvalue of less than 0.05 was considered statistically significant.

RESULTS

A total of 105 dental students participated in the study, of which 30.5% were third-year students, 12.4% were in their final year, 31.4% were interns, and 25.7% were postgraduate students. Regarding the pigments contributing to normal oral mucosa color, most participants identified "Melanin" or "All of the above," with no statistically significant difference between groups (p=0.103). The majority correctly recognized the causes of oral pigmentation as both physiological and pathological factors, with 89.5% overall selecting this option, showing no significant difference among study groups (p=0.315). Attached gingiva was most commonly identified as the site of physiological pigmentation by 73.3% of participants, with no significant association across academic levels (p=0.423). Ibuprofen was correctly chosen as a drug not typically associated with oral pigmentation by 53.3% of students, without significant variation between groups (p=0.383). Peutz-Jeghers syndrome was identified as the syndrome linked to oral pigmentation by 52.4% of participants, with a significant difference in knowledge among groups (p=0.002), indicating higher awareness among Interns and PGs. The buccal mucosa was most frequently recognized as the site of tobacco-induced pigmentation (46.7%), showing a significant difference across groups (p=0.028). Lichen planus was identified as the condition associated with post-inflammatory pigmentation by 43.8%, with significant differences between academic levels (p=0.013). A large majority (87.6%) correctly identified amalgam tattoos as blue-gray spots, with significant variation among groups (p=0.003). Candidiasis was recognized as the fungal infection linked to oral pigmentation by 84.8% of participants, also showing significant differences across groups (p=0.039). Finally, for treatment of oral depigmentation, "Both Laser Therapy and Scalpel Surgical Technique" was the most common response

(74.3%), with a significant difference between groups (p=0.019), reflecting higher awareness among senior students and postgraduates compared to Third-Year students.

Q.NO	QUESTION	OPTION	RESPONSE (%)	P-VALUE	SIGNIFICANCE
1	Pigments contributing to normal oral mucosa color	All of the above	43.8	0.103	Not Significant
		Melanin	47.6		
		Not sure	3.8		
		Reduced Hb	4.8		
2	Causes of oral pigmentation	Both physiological & pathological	89.5	0.315	Not Significant
		Not sure	1.9		
		Pathological	4.8		
		Physiological	3.8		
3	Common site of physiological pigmentation	Attached gingiva	73.3	0.423	Not Significant
		Floor of mouth	15.2		
		Not sure	10.5		
		Uvula	1		
4	Drug not typically associated with oral pigmentation	Ibuprofen	53.3	0.383	Not Significant
		Chloroquine	10.5		
		Ketoconazole	19		
		Not sure	17.1		
5.	Syndrome associated with oral pigmentation	Peutz–Jeghers syndrome	52.4	0.002	Significant
		Cushing's syndrome	13.3		
		Sjögren's syndrome	16.2		

		Not sure	18.1		
6	Site of tobaccoinduced oral pigmentation	Buccal mucosa	46.7	0.028	Significant
		Attached gingiva	30.5		
		Hard palate	15.2		
		Not sure	7.6		
7	Postinflammatory pigmentation commonly seen in	Lichen planus	43.8	0.013	Significant
		Leukoplakia	19		
		Candidiasis	14.3		
		Not sure	22.9		
8	Appearance of amalgam tattoo	Blue-gray spot	87.6	0.003	Significant
		White patch	4.8		
		Not sure	5.7		
		Yellow ulcer	1.9		
9	Fungal infection linked to oral pigmentation	Candidiasis	84.8	0.039	Significant
		Malaria	1		
		Tuberculosis	8.6		
		Not sure	5.7		
10	Treatment modalities for depigmentation	Both Laser & Scalpel	74.3	0.019	Significant
		Laser therapy	12.4		
		Scalpel surgical technique	4.8		
		Not sure	8.6		

DISCUSSION

This study assessed the knowledge and awareness of oral pigmentation among 105 dental students at a private dental college in Chennai, revealing varying levels of understanding across different academic years and highlighting both strengths and areas for improvement in dental education. Most participants correctly the contributors to the normal color of oral mucosa, indicating a consistent baseline understanding across all levels of study. A substantial proportion of students also recognized both physiological and pathological factors as causes of oral pigmentation, demonstrating a comprehensive understanding necessary for accurate diagnosis and management. The attached gingiva was most frequently identified as the site of physiological pigmentation, aligning with clinical observations, while over half of the participants correctly identified Ibuprofen as a drug not typically associated with oral pigmentation, reflecting reasonable knowledge of pharmacological influences on the oral mucosa. Peutz-Jeghers syndrome was correctly recognized by more than half of the students, with higher awareness among interns and postgraduates, highlighting the importance of advanced education in recognizing systemic conditions with oral manifestations. The buccal mucosa was most frequently identified as the site of tobacco-induced pigmentation, consistent with clinical findings, although variation among academic years suggests a need for reinforced education on this topic (Sreeja *et al*., 2015). Lichen planus was correctly associated with postinflammatory pigmentation, with higher awareness among interns and postgraduates, while the majority of participants accurately described the appearance of an amalgam tattoo as a bluegray spot, supporting correct knowledge of iatrogenic lesions. Candidiasis was correctly linked to oral pigmentation by most participants, reflecting solid understanding of fungal contributions to mucosal changes. Regarding treatment of depigmentation, the majority recognized both laser therapy and scalpel surgical techniques, reflecting current clinical practices, with significant differences across academic years emphasizing the value of advanced training (Dadhich et al., 2023). When compared to existing literature, these findings align with a systematic review, which reported high knowledge of oral cancer risk factors among medical and dental students, suggesting a strong foundation in recognizing systemic oral manifestations (Escoto-Vasquez *et al*., 2025). Similarly, the current study supports findings on the need for comprehensive education in oral mucocutaneous diseases, particularly for conditions like lichen planus and candidiasis (Alharbi et al., 2022). The identification of the buccal mucosa as a common site of tobacco-induced pigmentation is consistent with observations, underscoring the importance of educating students on tobacco-related oral changes (Rotbeh *et al*., 2022). Finally, the recognition of amalgam tattoos as blue-gray spots aligns with established clinical descriptions, indicating that dental students are receiving accurate training in identifying iatrogenic oral conditions.

CONCLUSION

This study provides valuable insights into dental students' knowledge and awareness of oral pigmentation. While there is a solid understanding across various topics, the variation in responses among different academic years indicates areas where the curriculum can be enhanced. By addressing these gaps, dental

education can better prepare students to recognize and manage oral pigmentation, ultimately improving patient care.

References

1. Peter Thomson. (2024). Oral pigmented lesions: a pragmatic approach to diagnosis and management. *Faculty Dental Journal*, 15 (3). https://doi.org/10.1308/rcsfdj.2024.3
2. Silvio Abati, Giacomo Francesco Sandri, Leonardo Finotello, Elisabetta Polizzi. (2024). Differential Diagnosis of Pigmented Lesions in the Oral Mucosa: A Clinical Based Overview and Narrative Review. *Cancers (Basel)* ,16(13): 2487. DOI: 10.3390/cancers16132487
3. Rogério-Oliveira Gondak, Rogério da Silva-Jorge, Jacks Jorge, Márcio-Ajudarte Lopes, Pablo-Agustin Vargas. (2012). Oral pigmented lesions: Clinicopathologic features and review of the literature. *Medicina oral, patología oral y cirugía bucal*, 17(6): e919-24. DOI: 10.4317/medoral.17679
4. Faizan Alawi. (2013). Pigmented lesions of the oral cavity: an update. *Dental clinics of North America*, 57(4): 699-710. DOI: 10.1016/j.cden.2013.07.006
5. Molly S Rosebush, Ashleigh N Briody, Kitrina G Cordell. (2019). Black and Brown: Non-neoplastic Pigmentation of the Oral Mucosa. *Head and neck pathology*, 13(1): 47-55. DOI: 10.1007/s12105-018-0980-9
6. C Sreeja, K Ramakrishnan, D Vijayalakshmi, M Devi, I Aesha, B Vijayabanu. (2015). Oral pigmentation: A review. *Journal of pharmacy & bioallied sciences*, 7(Suppl 2): S403-8. DOI: 10.4103/0975-7406.163471
7. Harsh Dadhich, ManishaSardar Ahire, SaurabhRajesh Nagar, Nimma Vijayalaxmi. (2023). Perceptions and Awareness of Dental Students Toward Oral Tissues: A CrossSectional Study. *Journal of Primary Care Dentistry and Oral Health*, 4(1): 8. DOI:10.4103/jpcdoh.jpcdoh_21_22
8. Lilibeth-Stephania Escoto-Vasquez, Mario Alberto Alarcón-Sánchez, Ruth RodríguezMontaño, Julieta Sarai Becerra-Ruiz, Sarah Monserrat Lomelí-Martínez, Artak Heboyan. (2025). Knowledge and Awareness of Medical and Dental Students About Oral Cancer Risk Factors: A Systematic Review and Meta-Analysis. *Cancer Control*, 32. https://doi.org/10.1177/10732748251316603
9. Shahad Alharbi, Ali Aboalela. (2022). Knowledge and Awareness of Oral Mucosal Diseases Among Saudi Dentists. *The Open Dentistry Journal*, 16: e187421062206270. DOI: 10.2174/18742106-v16-e2206270
10. Ali Rotbeh, Mohsen Kazeminia, Mahsa Kalantari, Fatemeh Rajati. (2022). Global prevalence of oral pigmentation and its related factors: a systematic review and metaanalysis. *Journal of stomatology, oral and maxillofacial surgery*, 123(5): e411-e424. DOI: 10.1016/j.jormas.2022.01.009