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Awareness, Clinical Exposure, and Referral Patterns Regarding Oral Medicine and Radiology Among Medical Practitioners in Nashik District, India: A Cross-Sectional Survey

Running Title: Awareness and Referral Patterns for Oral Medicine and Radiology

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ABSTRACT:

Background: Oral Medicine and Radiology (OMR) occupies a diagnostic interface between medicine and dentistry, yet awareness and utilisation of the specialty among medical practitioners in India remain poorly characterised, particularly outside major metropolitan centres.

Aim: To assess awareness, clinical exposure, and referral patterns related to Oral Medicine and Radiology among medical practitioners in Nashik district.

Materials and Methods: A cross-sectional survey was conducted among 255 registered medical practitioners (MBBS or higher, BAMS, and BHMS) practising in urban and semi-urban Nashik district, using a structured, pre-validated, self-administered questionnaire adapted from a previously published instrument 1. The questionnaire captured demographic data, frequency of oral conditions encountered, referral practices, and awareness of OMR as a specialty. Ethical clearance was obtained (reference 544/SMBT/04/SS/UG/IEC/22/69), and data were collected via Google Forms over six months and analysed using frequency distributions.

Results: Modern-medicine practitioners (MBBS or higher) comprised 62.3% of respondents, followed by BAMS (34.1%) and BHMS (3.5%) practitioners; 84.3% were private practitioners. Clinical exposure to oral-systemic manifestations, temporomandibular joint (TMJ)/facial pain, oral mucosal lesions, and salivary gland disorders was reported as occasional or frequent by 73.2%, 75.6%, 73.7%, and 64.7% of respondents, respectively. Despite this exposure, referral to OMR specialists remained low across all four conditions (3.9%, 7.45%, 5.49%, and 5.49%, respectively), with practitioners defaulting predominantly to general dentists or general physicians. Although 76.86% of respondents reported awareness of Oral Medicine as a distinct specialty, this did not translate into proportionate referral behaviour. A high proportion of responses

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recorded as referrals to "oncologist" for benign TMJ and salivary conditions (28.6–33.3%) is most likely attributable to questionnaire layout or response-option ambiguity rather than true clinical practice, and should be interpreted with caution.

Conclusion: A substantial knowledge–practice gap exists between stated awareness of Oral Medicine and Radiology and its actual utilisation in referral pathways among medical practitioners in Nashik district. Structured interprofessional education and curricular integration are needed to translate awareness into appropriate specialist referral.

INTRODUCTION

A multidisciplinary approach to comprehensive patient care is increasingly regarded as the standard of modern healthcare. The resulting proliferation of specialisation and super-specialisation has extended to dentistry as much as to medicine, yet awareness of dental specialities among the public and the medical fraternity in India remains low.

Dental and medical practitioners together form an integral part of a comprehensive healthcare team; however, meaningful collaboration between the two professions in India remains questionable in practice. Earlier surveys have reported a lack of knowledge about dental specialities among general medical practitioners, contributing to delays in referral and treatment [1,2].

Among the dental specialities, Oral Medicine and Radiology (OMR) is concerned with the diagnosis and non-surgical management of diseases affecting the oral and maxillofacial region, and also plays a central role in the interpretation of dental radiographs and the radiographic diagnosis of oral disease, including potentially malignant disorders and oral cancer. Internationally, oral medicine has been described as the dental speciality situated at the interface of medicine and dentistry, concerned with diagnosing and managing dental and non-dental pathology of the oral and maxillofacial region; it was formally recognised as a speciality relatively recently, through the American Board of Dental Specialities in the United States. Oral and maxillofacial radiology is similarly recognised by the American Dental Association as the discipline of radiology concerned with the production and interpretation of diagnostic images of the region [3].

In India, OMR was introduced into the Bachelor of Dental Surgery curriculum approximately five decades ago; Government Dental College, Bangalore, was the first institution to teach the subject and, in 1970, the first to introduce a two-year Master of Dental Surgery programme in the discipline. The Indian Academy of Oral Medicine, founded in 1985, was subsequently renamed the Indian Academy of Oral Medicine and Radiology and now has over 2,500 life members [3]. Despite this institutional growth, awareness of OMR expertise among medical practitioners remains limited, and referrals of oral mucosal lesions are directed predominantly to general dental practitioners rather than to OMR specialists [3].

This pattern is not unique to any one region. Comparable surveys have reported limited awareness of oral medicine as a distinct speciality, and correspondingly low rates of specialist referral, among medical practitioners in and around Chennai [4], in relation to the availability of oral medicine specialists more broadly [5], in discussions of the challenges facing OMR practice in private settings [6], among practitioners assessed for general dental awareness and attitudes [7,8], among health professionals with respect to oral and maxillofacial surgery [9,10], and in earlier work from the United Kingdom describing the role of the oral medicine clinic as an underused link between medicine and dentistry [11]. Collectively, this literature points to a persistent gap between the existence of the speciality and its integration into everyday referral behaviour, but few studies have examined this gap in relation to specific clinical presentations (oral-systemic manifestations, temporomandibular disorders, mucosal lesions, and salivary gland disease) within a single defined population, and no published data on this subject were identified from Nashik district.

The present study was therefore undertaken to assess awareness, clinical exposure, and referral patterns related to Oral Medicine and Radiology among medical practitioners in Nashik district.

AIM

To assess awareness of Oral Medicine and Radiology among medical practitioners in Nashik district.

Objectives

- To assess awareness of Oral Medicine and Radiology among medical practitioners.
- To assess knowledge of medical practitioners about the clinical scope of OMR.

- To evaluate the frequency and types of oral conditions encountered by them.
- To analyse referral patterns for oral health issues.
- To assess knowledge and application of radiographic safety protocols.
- To identify barriers to inter-specialty communication.
- To recommend interventions for improving interdisciplinary referral and awareness.

MATERIALS AND METHODS

Study design and setting: A cross-sectional survey was conducted among registered medical practitioners in urban and semi-urban areas of Nashik district with an optimal flow of outpatients and inpatients.

Ethical considerations: Ethical clearance was obtained from the institutional ethics committee (reference number 544/SMBT/04/SS/UG/IEC/22/69, dated 05/10/2022). Written informed consent was obtained from all participants after the purpose of the study was explained; participant identity was not disclosed and confidentiality was maintained throughout.

Data collection tool: A structured, self-administered questionnaire comprising closed- and open-ended items was adapted, with minor modifications, from a previously validated instrument used in a similar survey [1]. The questionnaire was organised into four sections: (i) demographic information, (ii) frequency and types of oral conditions encountered, (iii) referral practices, and (iv) awareness and knowledge of OMR. Content validity was reviewed by experienced subject experts, and a pilot study was conducted on a random mixed sample of respondents (n = 20); the instrument was refined based on the feedback obtained before wider distribution.

Sampling and procedure: The survey was administered electronically via Google Forms. The link, together with five closed-ended questions (each followed by an open-ended item), was distributed in English to a sample of 250 practitioners by email, WhatsApp, personal approach in their respective departments, telephone call, or text message. A final sample of 255 participants was obtained using stratified random/purposive sampling. Inclusion criteria were: registered medical practitioners holding an MBBS degree (with or without higher specialisation such as MD/MS/MCh), a BAMS degree, or a BHMS degree, including interns, currently practising in Nashik district. The study was conducted over a period of six months.

Data analysis: Responses were tabulated using Google Forms and Microsoft Excel, and results were summarised as frequencies and percentages.

RESULTS

A total of 255 healthcare practitioners completed the survey.

Demographic characteristics

Modern-medicine practitioners (MBBS or higher) constituted the majority of respondents (62.3%, n = 159), followed by Ayurvedic (BAMS) practitioners (34.1%, n = 87) and Homeopathic (BHMS) practitioners (3.5%, n = 9). Most respondents were private practitioners (84.3%, n = 215), while 8.6% (n = 22) worked exclusively in academia and 7.05% (n = 18) combined both roles (Table 1).

Table 1. Demographic characteristics of respondents (N = 255)

Characteristic	Category	n	%
Qualification	MBBS (or higher)	159	62.3
	BAMS	87	34.1
	BHMS	9	3.5
Occupation	Private practitioner	215	84.3

Characteristic	Category	n	%
	Academician	22	8.6
	Both	18	7.05

Clinical exposure to oral conditions

Oral manifestations of systemic disease were encountered occasionally or frequently by 73.2% of respondents; TMJ disorders/facial pain by 75.6%; oral mucosal lesions by 73.67%; and salivary gland disorders by 64.69% (Table 2).

Table 2. Frequency of clinical exposure to selected oral conditions (N = 255)

Clinical presentation	Rarely n (%)	Occasionally n (%)	Frequently n (%)	Nil n (%)
Oral manifestations of systemic disease*	66 (25.8)	90 (35.2)	97 (38.0)	2 (0.7)
TMJ disorders / facial pain	58 (22.7)	102 (40.0)	91 (35.6)	4 (1.56)
Oral mucosal lesions†	67 (26.2)	96 (37.6)	92 (36.07)	0 (0)
Salivary gland disorders	88 (34.5)	100 (39.2)	65 (25.49)	2 (0.7)

**Respiratory, CNS, cardiovascular, endocrine, haematological, and systemic-medication-related manifestations. †Red and white lesions, ulcers, swellings, potentially malignant lesions, radiation mucositis, xerostomia, burning mouth, taste alteration, and diseases of the tongue.*

Referral patterns

Referral destinations for each clinical presentation are summarised in Table 3. Across all four conditions, referral to OMR specialists remained low (3.9–7.45%), with practitioners defaulting predominantly to general dentists (25.8–41.96%) or, for musculoskeletal and glandular presentations, to orthopaedic surgeons/"oncologists" (28.6–33.3%; see Discussion regarding the likely artefactual nature of this latter finding).

Table 3. Referral destination by clinical presentation (N = 255, % of total respondents)

Referral destination	Oral-systemic manifestations	TMJ / facial pain	Oral mucosal lesions	Salivary gland disorders
Dentist (BDS)	41.96%	33.3%	25.8%	26.6%
Physician (MBBS/MD)	20.3%	14.1%	14.1%	14.9%
General surgeon	1.96%	1.17%	2.7%	3.5%
OMR specialist	3.9%	7.45%	5.49%	5.49%
Oral surgeon	0.78%	2.7%	8.2%	9.8%
ENT surgeon	0.78%	5.49%	2.7%	0%

Referral destination	Oral-systemic manifestations	TMJ / facial pain	Oral mucosal lesions	Salivary gland disorders
Orthopaedic surgeon / "oncologist"*	0.39%	3.1%	0.39%	0%
Invalid / blank	0%	28.6%	32.9%	33.3%

**Response option combined "MS orthopaedic" and "oncologist" in the original instrument; see Discussion. Column totals may not equal 100% due to rounding and the response-coding issue noted above.*

Awareness of Oral Medicine as a specialty

When asked directly, 76.86% (n = 196) of practitioners reported having heard of Oral Medicine as a distinct specialty, while 23.13% (n = 59) had not. This high level of stated awareness contrasted sharply with the consistently low referral rates (3.9–7.45%) to OMR specialists observed across all four clinical categories above, indicating a marked knowledge–practice gap.

DISCUSSION

This study aimed to evaluate awareness, clinical exposure, and referral patterns relating to oral manifestations of systemic disease and other oral pathology among medical and AYUSH practitioners in Nashik district. The principal finding is a marked dissociation between stated awareness of Oral Medicine and Radiology as a specialty (76.86%) and its actual integration into referral practice, with referral rates to OMR specialists remaining between 3.9% and 7.45% across all surveyed conditions.

The knowledge–practice gap

This contrast between nominal awareness and referral behaviour is consistent with the pattern first described by Bokkasam et al. [1] and Subramanian and Pradeep [4], and later echoed in Kanpur, where practitioners demonstrated reasonable knowledge and attitudes toward dentistry without a corresponding shift in referral practice [12]. A comparable disconnect has also been reported outside India: dentistry-related knowledge among Nigerian doctors, medical students, and nurses was similarly inconsistent [13], and an earlier Nigerian survey found that only 5.6% of medical doctors had good knowledge of dental specialities, with 79.6% rated fair and 14.8% poor [14] — a distribution that mirrors the fragmented, generalist-biased referral pattern recorded in the present cohort. Together, these findings suggest that superficial recognition of a speciality's name or existence, likely acquired through undergraduate exposure or professional directories, does not by itself translate into its use as an integral part of the interdisciplinary care pathway.

Fragmented referral pathways across clinical presentations

Oral pathology was a frequent feature of primary care in this cohort, with over 73% of respondents encountering oral-systemic manifestations and mucosal lesions occasionally or frequently. Despite this exposure, management strategies were highly fragmented. Temporomandibular disorders and facial pain, encountered by 75.6% of respondents, were referred mainly to general dentists (33.3%) and physicians (14.1%), with specialist pathways such as oral surgery (7.45%– combined oral surgeon referrals) or OMR (7.45%) used far less often — despite growing recognition that temporomandibular disorders often require coordinated, specialist-level management [15]. This pattern is consistent with international audits showing that referrals to specialist oral medicine units are frequently non-specific or inaccurately directed, a deficiency attributed largely to limited undergraduate exposure to the specialty [16].

A similar pattern was observed for oral mucosal lesions and salivary gland disorders, where clinical exposure remained high (73.67% and 64.69%, respectively) but a substantial proportion of responses were recorded as blank or invalid. This high non-response rate is itself informative: it suggests genuine clinical uncertainty among general practitioners as to which specialist holds definitive responsibility for these presentations, rather than a considered preference for one referral pathway over another.

Methodological considerations: the apparent "oncology" referral anomaly

A notable feature of the raw data is the high proportion of respondents (28.6–33.3%) who appeared to refer routine, benign presentations — mechanical TMJ pain and non-specific salivary gland complaints — to an "oncologist." Clinically, this figure

is implausible: it is not consistent with ordinary referral behaviour that one-third of practitioners would route everyday jaw-joint discomfort or minor salivary complaints to oncology services. The most likely explanation is a structural artefact of the questionnaire itself — for example, adjacent placement of the "MS orthopaedic" and "oncologist" response options on the form, or ambiguity in how these options were labelled — leading to unintended selection by respondents, rather than a true reflection of clinical practice. This figure has therefore been reported descriptively (Table 3) but should not be interpreted as evidence of an actual referral pathway, and highlights the importance of pilot-testing and cognitive debriefing of response options in future survey instruments in this field.

Broader context and implications

These findings sit within a wider body of work describing limited engagement of family and primary-care physicians with oral health [17,18], including persistent gaps in knowledge, attitude, and practice regarding the systemic implications of oral disease [19]. Bridging this divide has repeatedly been proposed to require structural integration of dental and medical curricula and continuing education, rather than parallel, non-interacting tracks of training [20]. The diagnostic role of OMR is also expanding — through advanced imaging modalities such as cone-beam computed tomography [21] and the evolving role of the dental radiologist as a diagnostic and interventional imaging specialist [22] — which further widens the clinical consequences of under-referral, particularly for the early detection of potentially malignant and malignant oral lesions [23]. More broadly, commentaries on the professional identity and future positioning of oral medicine and radiology within India's healthcare system [24,25] and its historically underrecognised standing relative to allied specialities [26,27] support the central argument of the present study: passive awareness of a speciality's existence is not sufficient, and active, structured interprofessional education is required to translate that awareness into appropriate clinical referral.

Strengths and limitations

This study benefits from a reasonably large sample (n = 255) spanning both allopathic and AYUSH practitioners, offering a broader view of the primary-care landscape than surveys restricted to MBBS practitioners alone, and represents, to our knowledge, the first such assessment conducted in Nashik district. Several limitations should nonetheless be considered when interpreting these findings. First, the cross-sectional, single-district design limits generalisability to other regions of India. Second, all data were self-reported via a closed-ended questionnaire, which is subject to recall and social-desirability bias, particularly for frequency estimates such as "rarely," "occasionally," and "frequently." Third, sampling was stratified/purposive rather than fully randomised, which may limit representativeness of the practitioner population. Fourth, a substantial proportion of responses for oral mucosal lesion and salivary gland referral items were blank or invalid, limiting the interpretability of referral estimates for these conditions. Fifth, as discussed above, the response options relating to oncology referral appear to have introduced a measurable artefact into the data, and this item should be revalidated before the instrument is reused. Finally, results were analysed as overall frequencies without stratification by qualification (MBBS versus BAMS versus BHMS) or occupation type, and the open-ended responses collected alongside each closed-ended item were not analysed in the present report; sub-group and qualitative analyses represent useful directions for future work.

CONCLUSION

This study demonstrates a clear knowledge–practice gap among medical and AYUSH practitioners in Nashik district with respect to Oral Medicine and Radiology. While over three-quarters of practitioners reported awareness of the specialty, actual referral to OMR specialists rarely exceeded 7.5% across major oral-systemic and oral-mucosal presentations, with practitioners defaulting instead to general dentists or broader medical specialities. This disconnect, together with the high proportion of missing or anomalous responses observed for some items, points both to genuine clinical uncertainty about appropriate referral pathways and to the need for more carefully validated survey instruments in this area of research. Translating awareness into appropriate clinical action will likely require structured integration of oral-systemic health content into medical and AYUSH undergraduate curricula, together with joint continuing medical education initiatives that formalise cross-referral pathways between primary medicine and Oral Medicine and Radiology.

Conflicts of Interest

"The authors declare no conflicts of interest."

Source of Funding

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Ethical Approval

This study was approved by the institutional ethics committee (reference number 544/SMBT/04/SS/UG/IEC/22/69, dated 05/10/2022). Informed consent was obtained from all participants.

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