

Washington State Physicians' Perceptions of Oral Medicine

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Abstract

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Background and Aims

Oral Medicine (OM) is the dental specialty devoted to the diagnosis and non-surgical treatment of complex oral and maxillofacial conditions. Oral medicine provides care for oral conditions typically not adequately addressed by their dentist, otolaryngologist or oral surgeon, as evidenced by frequent referrals to OM from these specialties. Physician education and training around oral and maxillofacial conditions is limited, potentially leading to missed diagnoses and fragmented care for patients with these conditions. To improve interdisciplinary collaboration, referral pathways, and medical education of oral conditions, it is important to understand physicians' awareness of OM. Therefore, this study aimed to assess levels of awareness and knowledge as well as referral practices and barriers, among medical physicians in Washington State with regard to the OM specialty.

Methods

This cross-sectional electronic survey study was conducted using REDCap©. The survey was distributed to 23,336 licensed physicians in the state of Washington. Twenty-two questions captured five domains including demographics, awareness of and knowledge about OM, referral patterns and barriers. Quantitative data analysis was conducted using descriptive statistics. Open-ended responses were summarized.

Results

Five hundred eligible physicians completed the survey. Two hundred and sixty-eight (53.6%) participants reported prior awareness of OM. Nearly half of the participants (n=239, 47.8%) had >20 years of clinical experience, with family medicine (n=219, 43.8%) and internal medicine (n=164, 32.8%) comprising the specialties with the greatest number of participants. Nearly all (n=251, 93.7% and n=244, 91.0%) participants who were aware of OM correctly identified oral complications of cancer therapies and oral premalignant conditions, respectively, far fewer participants aware of OM (n=175, 65.3%) correctly identified medication related osteonecrosis as part of the OM scope of practice. Just more than half (n=166, 62.0%) of aware participants reported referring to OM providers. One hundred and thirty-five(50.4%) of these physicians made fewer than five referrals annually. Perceived barriers to collaboration included lack of awareness of OM (n=157, 58.5%), limited availability of OM providers (n=143, 53.3%), insurance issues (n=115, 42.0%), referral networks or systems (n=116, 43.2%), and perceived overlap with ENT and Dermatology (n=109, 40.6%).

Conclusion

This study highlights critical gaps in medical physicians' awareness and knowledge of OM, which may reduce access to adequate care for patients with oral conditions. Targeted educational initiatives, integration of OM content into medical curricula, and clearer referral pathways with increased availability of OM providers are possible methods to enhance physician knowledge of OM referrals and ultimately improve patient care. These findings support national efforts to increase medical-dental collaboration and emphasize the oral-systemic health connection, promoting a less segmented healthcare model.

TABLE OF CONTENTS

INTRODUCTION	8
MATERIALS AND METHODS.....	11
Participant Selection and Recruitment.....	12
Inclusion criteria	12
Exclusion Criteria	12
Survey	12
Demographics	13
Awareness of Oral Medicine as a Dental Specialty.....	13
Knowledge of Oral Medicine.....	14
Referral Patterns/Behaviors and Barriers to Referral.....	15
Statistical Analysis.....	17
RESULTS	18
Characteristics of Study Participants	18
Awareness and Knowledge about Oral Medicine.....	18
Referral Patterns/Behaviors	19
Barriers to Referral to OM Providers.....	20
DISCUSSION.....	21
CONCLUSION.....	25
ACKNOWLEDGEMENT	27
REFERENCES	28
TABLES	34
Table 1	34
Table 2	36
Table 3	37
Table 4	38
Table 5	39
Table 6	40
Table 7	41
Table 8	42
Table 9	43
Table 10	44
Table 11	45
Table 12	46

Table 13	47
Table 14	48
Table 15	49
Table 16	50
Table 17	51
Table 18	52
FIGURES.....	53
Figure 1	53
Figure 2	54
Figure 3	55
Figure 4	56

INTRODUCTION

Oral Medicine (OM) “is the specialty of dentistry responsible for the oral health care of medically complex patients and for the diagnosis and management of medically related diseases, disorders and conditions affecting the oral and maxillofacial region” (American Dental Association, 2020). Oral medicine has had long-standing training programs and board-certified diplomates for many years; however, only recently has it gained specialty recognition by the American Dental Association in 2020 (American Board of Oral Medicine, 2025). The interdisciplinary training that OM providers receive enables them to bridge dentistry and medicine, making them also known as "physicians of the mouth" (The American Academy of Oral Medicine, 2025).

In the United States (US), post-graduate training programs in OM are held to education standards set by the Commission on Dental Accreditation (CODA). The standards stipulate that specialists receive formal training in foundational biomedical sciences, including anatomy, physiology, microbiology, immunology, biochemistry, neuroscience, and pathology. This training enables them to assess patients with complex medical conditions that affect various organ systems and the craniofacial region. Further, the curriculum includes topics such as pathogenesis and epidemiology of orofacial diseases, molecular biology and genetics, internal medicine and pathology relevant to managing orofacial diseases, principles in pharmacology that relate to drug mechanisms and interactions, nutritional principles that relate to oral health, research methodologies including biostatistics and scientific writing, and behavioral sciences that emphasize communication with patients and behavioral therapy (Commission of Dental Accreditation, 2025).

Oral Medicine providers manage a broad range of conditions including mucosal, salivary, systemic diseases or therapies with oral manifestations, oral chemosensory changes and orofacial pain disorders (Sollecito et al., 2013). Two-thirds of referrals to an OM hospital-based practice were reported to come from physicians with a majority from primary care, dermatology, otolaryngology, and oral oncology (Villa et al). A previous study at the University of Washington School of Dentistry found that 40% of patients were referred by a medical provider to a dental school-based OM service (Hatem, 2021). The most common reason for referral is orofacial pain, among which temporomandibular disorders (TMD) are the most common (Hatem, 2021; Sun et al., 2020). This reflects the epidemiology of the condition as there is an approximate 34% incidence of temporomandibular disorders (TMDs) (Zieliński et al., 2024). While the prevalence of TMD signs and symptoms varies dramatically across studies (5% to 88%) depending on the population and criteria examined, temporomandibular pain specifically affects approximately 10% of adults over age 18 (Mishra, 2019 (LeResche, 1997). The next most common referral is for oral disorders, and approximately 5% of individuals are estimated to have an oral mucosal disorder (Yoon et al., 2024; Miller & Peterson, 2018). This is also reflected in the prevalences of common oral disorders, among which oral lichen planus is one of the most common chronic conditions managed in OM practice. The prevalence of oral lichen planus is estimated to be between 0.5 to 2% of adults (Glick et al., 2021). Furthermore, the role of OM in the care of cancer patients cannot be underestimated, where 30–50% of allogeneic hematopoietic cell transplantation recipients, with over 90% of chronic graft-versus-host disease (cGVHD) cases appear within the first 12 months post-transplant, 94% of head and neck cancer patients will develop radiation-induced mucositis, and 80% dry mouth or other post-treatment oral complications (Dean & Sroussi, 2022 (Li et al., 2024 (Pinna et al., 2015). In light of these

findings, referral and specialized care by OM providers is essential for patients that often present to their medical provider with a myriad of oral conditions.

Historically, dentistry and medicine have been separated, resulting in fragmented healthcare that separates oral health from systemic health. There is a division in education, insurance, and clinical practice that contributes to a culture that views oral health as outside the scope of medicine. Although there is an entrenched divide between oral and systemic health, studies indicate the majority of physicians recognize the connection. One study found that 92.8% of physicians acknowledged the link between oral health and systemic health problems (Al-Habib et al., 2022). Despite this, more than half of the physicians reported little or no oral health training during their medical school education (Laniado et al., 2021). In addition, fragmentation in health care delivery leads to missed opportunities for referrals and thus early disease detection and comprehensive patient management (Stange, 2009).

Oral Medicine board certified diplomates are not distributed equally across the US (Yoon et al., 2024). As a newly recognized dental specialty, it is likely that many physicians across the US, and in Washington State remain unaware of the existence of OM. In the absence of this understanding, interdisciplinary collaboration is hindered, leading to common delays in diagnosing and management for patients. The diagnostic journey can be lengthy, often involving multiple healthcare providers before they are seen in OM. A study conducted in the U.S. found that 95% of patients referred to an OM clinic had previously seen at least one other practitioner, with 36% seeing two to nine. As noted by Villa et al. (2015), diagnostic delays often stem from provider unfamiliarity and fragmented referral pathways, highlighting the need for broader interdisciplinary training.

The objective in this study was to evaluate medical physicians in Washington State regarding their awareness, knowledge, and perceptions of collaboration with OM, as well as referral practice and barriers. Two hypotheses guided this investigation;

1. A majority of physicians practicing in relevant specialty areas are unaware of OM as a specialty.
2. Systemic barriers, such as inadequate interdisciplinary education and unclear referral pathways, would be indicated as limiting the effectiveness of referrals to OM providers.

MATERIALS AND METHODS

Study Design

This study employed a cross-sectional survey to evaluate the awareness and knowledge of the OM specialty among licensed medical physicians in Washington State. The survey was hosted on the Research Electronic Data Capture (REDCap[©]) platform. REDCap[©] at The Institute of Translational Health Sciences (ITHS) is supported by the National Center for Advancing Translational Sciences of the National Institutes of Health under Award Number UL1TR002319. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Washington, School of Dentistry.^{1,2} REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies, providing 1) an intuitive interface for validated data capture; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for data integration and interoperability with external sources (Harris et al., 2019). The Institutional Review Board at the

University of Washington's Human Subjects Division deemed the survey exempt (IRB ID STUDY 00020982).

The survey landing page included details about the study and the survey process. All invitations and reminders were sent via email, and data collection was self-administered electronically. Once respondents consented to participation, the survey was presented. No incentives were provided to the participants.

Participant Selection and Recruitment

We obtained a list of 52,212 registered medical practitioners from the Washington State Department of Health's database. We identified 23,336 practitioners with active licenses, excluding those with revoked, expired, or canceled licenses.

Inclusion criteria

- 1) Adults , ≥ 18 years old;
- 2) Active Physician license in Washington State;
- 3) Recognizing the overlap between OM and certain medical specialties, we identified internal medicine, dermatology, oncology, hematology, rheumatology, family medicine, and neurology as most relevant specialties for inclusion.

Exclusion Criteria

- 1) Missing data within the demographics;
- 2) Specialties listed not falling under the inclusion criteria.

Survey

The survey addressed five main domains: demographics, awareness of OM, knowledge of OM, referral behaviors, and referral barriers. The survey included modified questions and was developed using previous related studies' question sets. (Almazrooa & Binmadi, 2021),

(Alrashdan et al., 2019), (Aljishi et al., 2024). The knowledge domain survey questions were reviewed by four experts in OM at the University of Washington for completeness, relevance, and comprehensibility, and were subsequently refined. The survey underwent pilot testing with a purposive sample of four medical practitioners to ensure comprehension and completeness before distribution. The survey consisted of a total of 22 close-ended questions, including 8 questions with an “other (please specify)” option. Some questions had checkbox options (multiple responses were allowed) and some had radio buttons (selecting only one option was allowed)

Demographics

Three demographic questions included age (<29 years, 30-39 years, 40-49 years, 50-59 years, 60+years), gender (woman, man, other), and racial/ethnic background (Asian, Black or African American, Hispanic or Latino, Middle Eastern or North African, Native American or Alaska Native, Native Hawaiian or Other Pacific Islander, White or Caucasian, Other, Prefer not to answer). Participants were able to select multiple racial/ethnic background choices.

Participants were then asked to select their primary specialty from the list of the inclusion criteria (more than one option could be selected), followed by the number of years of clinical practice.

Awareness of Oral Medicine as a Dental Specialty

To address the primary research question, one survey item asked if the participant was aware of the OM specialty (yes/no). The response to this question determined the subsequent survey questions to be presented to the participant using branching logic, with respondents that stated they were aware (A) and those that were unaware (U) answering some separate and common questions (B). For those who were not aware of OM, the following description was provided [Oral Medicine is a specialty of dentistry that bridges the gap between medicine and

dentistry by diagnosing, managing, and treating complex oral and maxillofacial conditions non-surgically. In addition to diagnosing and treating diseases of the oral mucosa, salivary glands, and orofacial pain disorders, Oral Medicine specialists are also trained in managing systemic diseases that manifest in the mouth. Orofacial pain syndromes, temporomandibular disorders (TMD), oral cancer, precancerous lesions, autoimmune disorders, infections, and complications of cancer therapies are all included in this specialty. A major role of Oral Medicine is to provide comprehensive care to patients with both local and systemic diseases manifesting themselves in the mouth. In addition to improving patient outcomes, relieving symptoms, and detecting systemic diseases, Oral Medicine specialists practice interdisciplinary collaboration and evidence-based management strategies.] The description was followed by one question pertaining to the educational training pathways for OM providers (Where did you learn about the Oral Medicine specialty? Check all that you think apply) with these options as checkbox selection (Graduated from dental school, Graduated from medical school, Spent part of their training in internal medicine, GI clinic and other medical specialty, Went through internal medicine residency, Went through oral and maxillofacial pathology residency, Went through Oral Medicine residency, None of the above). The same question followed for those who endorsed being aware of OM.

Knowledge of Oral Medicine

For participants who endorsed being aware of OM, an additional three knowledge questions were asked regarding the OM specialty's role in patient care. The first question asked respondents to identify the conditions diagnosed by OM providers, from a list including Aphthous Ulcers, Asthma, Burning Mouth Syndrome, Dental/oral complications of cancer therapies (e.g., mucositis), Glaucoma, Hypertension, Irritable Bowel Syndrome,

Medication-related osteonecrosis, Mucocutaneous Bulous Disorders, Oral lichen planus/lichenoid, Oral premalignant conditions (e.g., leukoplakia), Orofacial (Trigeminal) Neuropathic Pain, Oromandibular Dystonia, Sjögren's Syndrome and Temporomandibular Disorders (TMD/TMJ). Responses to this question were via checkbox selection from a predefined list, with eleven choices deemed being correct. Scoring on this question was true/false with each option being scored and reported as a percentage.

The second knowledge question asked respondents to identify the procedures performed by OM providers, from a list including Allergy Patch Testing of Dental Materials, Arthrocentesis, Bone and gum grafting, Cognitive Behavioral Therapy, Dentures, Intralesional steroid injections, Invisalign, Minor salivary gland biopsies, Occlusal appliances for obstructive sleep apnea and/or TMD/bruxism, Pharmacological management of chronic orofacial pain, Placement of dental implants, Root canal treatments, Soft tissue biopsies, Swab for fungal or viral infection and Therapeutic Injections (Trigger Points and/or Neurotoxin). Here again, responses to this question were via checkbox selection from a predefined list, with eight choices deemed to be correct. Scoring on this question was true/false with each option being scored and reported as a percentage. Lastly, a question about respondents' knowledge of training background for OM providers was asked (Graduated from dental school, Graduated from medical school, Spent part of their training in internal medicine, GI clinic and other medical specialty, Went through internal medicine residency, Went through oral and maxillofacial pathology residency, Went through Oral Medicine residency, None of the above).

Referral Patterns/Behaviors and Barriers to Referral

Using branching logic, the following questions were asked of respondents who responded “aware” (A) or “unaware” (U) of the specialty of OM prior to the questionnaire, or to both groups (B):

- 1) How would you rate the adequacy of any training on the topic of Oral Medicine in preparing you to potentially coordinate care with an Oral Medicine provider? With radio buttons: Very inadequate, Inadequate, Adequate, More than adequate, Excellent (B)
- 2) What interferes with gaining further knowledge or training in Oral Medicine? (Check all that you think apply) With checkbox options: Lack of time, Lack of resources, Limited awareness of the specialty, Limited availability of CME courses, Not relevant to my specialty, Other (please specify) (B)
- 3) How valuable is collaborating with Oral Medicine specialists to your clinical practice? With radio options: Not important, Slightly important, Moderately important, Very important, Extremely important. (A)
- 4) In your clinical practice, approximately how many patients with Oral Medicine concerns did you encounter in the past 12 months? With radio options: None, Fewer than 5, From 6–10, From 11–20, More than 20. (A)
- 5) Have you ever referred patients to an Oral Medicine specialist? With radio options of yes and no. (A)
- 6) Approximately, how many Oral Medicine referrals did you request in the past 12 months? With radio options: Fewer than 5 referrals, From 6–10 referrals, From 11–20 referrals, More than 20 referrals. (A)

- 7) If you refer patients with Oral Lesions to colleagues other than Oral Medicine, who do you refer them to? With checkbox options: Dermatology, ENT, General Dentist, Oral Surgeon, Other (with open box text specification). (B)
- 8) Approximately, how many referrals for Oral Lesions did you request in the past 12 months? With radio options: None, Fewer than 5 referrals, From 6–10 referrals, From 11–20 referrals, More than 20 referrals. (B)
- 9) If you refer patients with Orofacial Pain to colleagues other than Oral Medicine, who do you refer them to? With checkbox options: General Dentist, Neurologist, Sleep Specialist, Other (with open box text specification). (B)
- 10) Approximately, how many referrals for Orofacial Pain did you request in the past 12 months? With radio options: None, Fewer than 5 referrals, From 6–10 referrals, From 11–20 referrals, More than 20 referrals. (B)

Statistical Analysis

Descriptive statistics were used to summarize demographic characteristics, awareness levels, and referral patterns in Microsoft® Excel® for Microsoft 365 MSO (Version 2504 Build 16.0.18730.20186) 64-bit. Categorical variables were summarized using counts and percentages in REDCap©. A true/false scale was used to describe scores of knowledge questions in percentages. Each option out of 15 predefined list of conditions and procedures for both knowledge questions had a score if correctly identified. A total of the score was converted into percentage to be reported. A 5-point Likert scale (Radio options used were: Very inadequate, Inadequate, Adequate, More than adequate, Excellent) was established for measuring the perceived adequacy of prior training on OM.

RESULTS

Characteristics of Study Participants

Among the 23,336 physicians invited to participate, 853 initiated the survey. Five hundred gave consent to participate, completed the questions querying demographic information, and were eligible for inclusion based on the medical specialty they indicated. One hundred fifty-one respondents were excluded because the medical specialties reported were inconsistent with the study's inclusion criteria. Two hundred sixty-three of the included participants (52.6%) were women. Three hundred seventy-six participants (75.2%) reported their racial or ethnic background as white. One hundred sixty participants (32.0%) reported being greater than 60 years of age. The most common primary medical specialty was family medicine, with 269 responses (53.8%). Of the 500 participants, 8 indicated multiple specialties, with 6 participants indicating 2 separate specialties and 2 participants indicating 3 separate specialties (all meeting inclusion criteria). There were 239 participants (47.8%) who reported more than 20 years of clinical experience. Demographic characteristics for the full study sample are described in Table 1.

Awareness and Knowledge about Oral Medicine

Out of the 500 participants, a majority (n=268, 53.6%) reported prior awareness of the OM specialty before receiving the survey (Table 2). Amongst those that were familiar with OM, the most common places they learned about the dental specialty were in medical school (n=84, 31.3%), and in residency (n=67, 25.0%) (not mutually exclusive) (Table 6). Regarding knowledge of OM, a majority of the aware participants (n=251, 93.7%) correctly identified dental/oral complications of cancer therapies (e.g., mucositis) as a condition managed by OM providers. Similarly, 233 (86.9%) of the participants who were aware of OM correctly identified

minor salivary gland biopsies as a treatment/procedure completed by OM providers. However, 15 (5.6%) incorrectly identified irritable bowel syndrome and hypertension as conditions diagnosed/managed, and 58 (21.6%) incorrectly identified bone and gum grafting as a treatment/procedure completed by OM providers. One hundred twenty-one (24.2%) participants correctly identified the OM training pathway as graduating from dental school and completing an OM residency. Of the 121 participants who correctly identified the training pathway, 71 (58.7%) were aware of OM prior to the questionnaire and 50 (41.3%) were unaware of OM prior to the questionnaire. See Tables 3-6 for summaries of participants' knowledge about the OM dental specialty.

Referral Patterns/Behaviors

Of the 268 participants who indicated prior knowledge of the OM specialty, a majority (n=166, 62.0%) reported having previously referred patients to OM providers within the past 12 months. The incidence of patients with OM concerns seen by the participants within the past 12 months was 34.7% with fewer than 5 encounters, and 18.7% with more than 20 encounters. Despite such prevalent encounters, 135 participants (50.4%) made fewer than 5 referrals to an OM provider within the past 12 months. Five of the participants reported managing the lesions and pain themselves in their clinics.

The most common pattern of referral for patients with oral lesions was referral to ENT (n=357, 71.4%); the second most common was referral to OS (n=248, 49.6%) (not mutually exclusive). Patients with oral lesions were also referred to general dentists (n=240, 48.0%) and dermatologists (n=67, 13.4%). Half of the participants (n=250, 50%) reported making fewer than 5 referrals for oral lesions, and (n=186, 37.2%) reported no referrals; (n=8, 1.6%) made more than 20 referrals.

For patients with orofacial pain, the predominant referral pathway was to general dentists (n=277, 55.4%) and neurologists (n=234, 46.8%), whereas referrals to sleep specialists were notably lower (n=17, 3.4%). Nearly half (n=247, 49.4%) of participants reported making no referrals for patients with orofacial pain in the past year, while 198 (39.6%) of participants made fewer than five referrals.

Regarding the perceived value of collaboration with OM providers, 10 of the participants (3.8%) deemed such collaboration as not important, 79 (29.5%) as slightly more important, 87 (32.2%) as moderately important, 70 (26.2%) as very important, and 20 (7.6%) as extremely important. See Figure 3.

Barriers to Referral to OM Providers

Among the participants who were aware of OM, the main barriers to referral were lack of awareness about OM providers (n=157, 58.5%), limited availability of OM providers (n=143, 53.3%), referral networks or systems (n=116, 43.2%), and insurance coverage issues (n=115, 42.9%) and See Figure 4.

The following strategies were endorsed by participants as likely to improve the referral process to OM providers: enhanced referral networks and systems (n=141, 52.6%), increased availability of OM providers (n=140, 52.2%), and improved insurance coverage (n=97, 36.1%). Additionally, 23 (8.5%) of the participants provided open-ended responses identifying other potential strategies. These participants indicated that the referral process to OM providers could be improved by improving the electronic medical record (EMR) integration and enhancing direct referral options within systems such as Epic.

DISCUSSION

This study aimed to assess medical physicians in Washington State regarding their awareness, knowledge, and perceptions of collaboration with OM, as well as referral practices and barriers. The findings provide critical insights into the integration of OM within broader healthcare systems, highlighting existing gaps, barriers, and opportunities for interdisciplinary collaboration. Efforts to improve the integration of medicine and dentistry have been slow to develop since 2000 (NIH, 2021). This study indicates that significant barriers between medicine and dentistry persist, requiring targeted interventions to enhance interdisciplinary collaboration.

This study confirmed both hypotheses. First, most physicians practicing in relevant specialty areas lack awareness of OM as a distinct specialty. Second, systemic barriers such as inadequate interdisciplinary education and unclear referral pathways significantly impede effective referrals to OM providers.

Among WA State physicians in this study who were aware of OM, their exposure was primarily limited to medical school and residency with misconceptions about OM's scope. The study highlights a gap in awareness and understanding of OM among physicians, despite its overlap with the relevant medical specialties. Additionally, the majority of participants felt inadequately trained for interdisciplinary collaboration, hence incorporating OM in medical curricula could help with addressing this factor.

Knowledge of conditions as relevant to OM were relatively strong, but treatment-related knowledge was weaker with frequent misidentification of surgical procedures as OM treatments.

Although the highest awareness rate of the specialty of OM was found among internal medicine and family physicians, referrals to OM providers were still uncommon. Specifically, 37.2% of physicians did not refer patients with oral lesions and 49.4% did not refer those with

orofacial pain. While the questionnaire did not specify acute versus chronic conditions, these low referral rates suggest persistent specialty consultation barriers.

This gap has serious clinical implications, as oral lesions (persistent ulcers, leukoplakia, erythroplakia, mucosal desquamation) may indicate malignancies, autoimmune diseases, hematological disorders, or infections, while orofacial pain can signal temporomandibular disorders (TMD), neuropathic syndromes, occult malignancies, or systemic conditions including cardiac ischemia. Non-referral risks delayed diagnosis, missed biopsy opportunities, inadequate risk stratification, and suboptimal pain management. The impact is substantial: untreated oral disease ranks among the 10 leading global causes of disability-adjusted life years (Peres et al., 2019).

Multiple systemic barriers impede OM referrals. Insurance limitations compound access barriers, with 42.9% of physicians citing inadequate coverage, particularly Medicaid acceptance, as referral obstacles. Fragmented referral pathways and limited standardized protocols further delay care, potentially worsening outcomes.

Open-ended responses revealed additional barriers across multiple domains. Technical infrastructure challenges included the need for shared EMRs and improved referral tools, particularly within platforms like EPIC, which the FDI World Dental Federation has advocated should include oral health indicators (FDI, 2025). Educational gaps centered on insufficient OM training in medical curricula, especially regarding TMD and facial pain management. Geographic and practice-related barriers included limited specialist access in rural areas and concerns about OM providers requiring long-term patient management.

As NIDCR Deputy Director Jennifer Webster-Cyriaque noted, "both dentists and physicians can benefit from a better understanding of oral manifestations of systemic diseases,

enabling earlier diagnosis and better management" (McMains, 2024; National Institute of Dental and Craniofacial Research, 2021). Enhanced collaboration between medical and dental professionals through continuing education, structured communication pathways, and policy reform is essential to improve patient outcomes.

This was the first comprehensive study assessing OM awareness and referral behaviors among physicians in Washington State. This study identified a systemic disconnect between clinical needs and referral practices for oral-systemic conditions and provides actionable insights for interprofessional education, policy advocacy, and care integration.

The study has several notable strengths. The sample size of 500 participants provided data across multiple related medical specialties, allowing for comprehensive assessment of both awareness, knowledge, and referral practices. The study sample's demographic alignment with Washington State's physician population supports the generalizability of these findings within the state. Washington physicians average 52 years of age, with women comprising 41% of the overall workforce and 52% of primary care practitioners (Washington State's Physician Workforce in 2021 – UW CHWS). This study's participants were predominantly women with a majority over age 50, largely reflecting these state demographics.

The study, however, had a number of limitations. It is important to note that, given the approach to participant recruitment, it is not possible to calculate a response rate, as it is not possible to know the total number of physicians practicing within eligible specialty areas using the contact information provided for sending study invitations. Recall and social desirability biases may be present in self-reported data, representing a second potential limitation. Third, there are limits to the depth of information that was gathered via a time-efficient survey designed for busy clinicians.

While findings are generalizable within Washington State, certain factors may limit broader generalizability. Washington hosts one of only six OM training programs in the United States, potentially elevating local specialty awareness compared to other regions. Additionally, the findings may not extend beyond Washington State without further research examining national and international trends. More comprehensive comparative studies would be necessary to identify best practices for OM integration across diverse healthcare systems worldwide. As such, to gain a more comprehensive understanding of physician attitudes and barriers in the future, qualitative methodologies, such as focus groups and in-depth interviews, should be utilized in future work.

Integration of OM in medical health care and education systems can help improve patient care. To achieve this, systemic reforms are necessary, including the expansion of training opportunities and workforce development, as well as the establishment of hospital-based OM clinics to increase exposure. An economic analysis of the impact of untreated oral conditions on the health care system could contribute to the development of more effective policies and insurance plans. An assessment of the impact of OM interventions on physician awareness and referral patterns, as well as patient outcomes in interdisciplinary settings, will be crucial to validating its role as an integral part of systemic health management.

In many cases, OM experts are contributing the lead role in these advances nationally and internationally. In addition, American Board of Dental Specialty recognition of OM as a specialty in 2015 has positioned OM professionals to substantively enhance the delivery of oral health care to medically complex patients as well. (Miller & Peterson, 2018)

CONCLUSION

The specialty of OM is not well known by medical physicians, which hinders interdisciplinary collaboration and patient care. Aside from identifying awareness and familiarity gaps, this study also supports the hypothesis that systemic barriers limit the effectiveness of referrals to OM providers. These barriers include inadequate interdisciplinary education and unclear referral pathways. To address these structural challenges, one solution that the authors suggest is to incorporate OM education into medical curricula and continuing education programs in order to eliminate specialty-specific disparities. Integrating OM into comprehensive patient care could be enhanced by establishing clearer referral pathways for physicians and promoting the role of OM through professional societies and foundational oral health education beginning with medical schools. Although most physicians were not familiar with OM, they acknowledged OM's relevance to patient care, indicating the need for targeted initiatives to fill this knowledge gap. As a result, it is imperative to address these challenges in order to foster a unified healthcare model that aligns with public health priorities and strengthens the connection between oral and systemic health. According to the authors, there are a few points that should be considered in future research and recommendations.

- Evaluation of OM awareness in diverse healthcare environments should be conducted nationwide.
- Identify the effects of educational interventions on the referral behavior of OMs.
- Analyze the impact of EMR integration and insurance reforms on patient outcomes.
- Increase the visibility of OM through collaboration with medical societies, CME programs, and public health initiatives.

For the long-term goal, it would be beneficial to integrate OM into the broader healthcare model to enhance interdisciplinary collaboration and improve systemic health outcomes. Addressing infrastructure, policy, and training gaps will position OM to better support the diagnosis and management of complex oral-systemic conditions.

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TABLES

Table 1

Demographics of Survey Respondents

Sample Characteristics	Number of responses (N=500) n	Percentage of responses (%)	
Age			
< 29 yo	13	2.6	
30 to < 40 yo	102	20.4	
40 to < 50 yo	113	22.6	
50 to < 60 yo	112	22.4	
>60 yo	160	32.0	
Ethnicity			
Asian	77	Not Applicable- (Multiple Selections for Responses Allowed)	
Black or African American	6		
Hispanic or Latino	22		
Middle Eastern or North African	12		
Native American or Alaska Native	6		
Native Hawaiian or Other Pacific Islander	1		
White or Caucasian	376		
Other	9		
Prefer not to answer	24		
Multiple Racial Ethnic Backgrounds Selected	27		
Gender			
Woman	263		52.6
Man	234	46.8	
Other	3	0.6	
Primary Medical Specialty			
Dermatology	18	Not Applicable- (Multiple Selections for Responses Allowed)	
Family Medicine	219		
Hematology	15		
Internal Medicine	164		
Neurology	29		

Oncology	27	
Otolaryngology	29	
Rheumatology	11	
Other	37	
Multiple Primary Medical Specialties Selected	8	

Years in Clinical Practice		
Less Than 5 Years	84	16.8
From 6-10 Years	58	11.6
From 11-15 Years	67	13.4
From 16-20 Years	52	10.4
More Than 20 Years	239	47.8

Table 2

Number of Participants Who Responded They Were Aware of the Oral Medicine Specialty Before the Questionnaire

Responded Yes N= 500 (%)	Responded No N= 500 (%)
268 (53.6%)	232 (46.4%)

Table 3*Knowledge Domain: Perceptions of the Scope and Training of Oral Medicine Providers*

A. Conditions Oral Medicine Providers Can Diagnose and Manage

Condition	Correct Responses (N= 268) (Multiple Selections for Responses Allowed) n	Incorrect Responses (N= 268) (Multiple Selections for Responses Allowed) n
Aphthous Ulcers	215	53
Asthma	256	12
Burning Mouth Syndrome	212	56
Dental/Oral Complications of Cancer Therapies (e.g., Mucositis)	251	17
Glaucoma	267	1
Hypertension	253	15
Irritable Bowel Syndrome	253	15
Medication-Related Osteonecrosis	175	93
Mucocutaneous Bullous Disorders	197	71
Oral Lichen Planus/Lichenoid	231	37
Oral Premalignant Conditions (e.g., Leukoplakia)	244	24
Orofacial (Trigeminal) Neuropathic Pain	182	86
Oromandibular Dystonia	213	55
Sjögren's Syndrome	196	72
Temporomandibular Disorders (TMD/TMJ)	227	41

Table 4*Knowledge Domain: Perceptions of the Scope and Training of Oral Medicine Specialists***B. Procedures Oral Medicine Providers Can Perform**

Procedures	Correct Responses (N= 268) (Multiple Selections for Responses Allowed)	Incorrect Responses (N= 268) (Multiple Selections for Responses Allowed)
	n	n
Allergy Patch Testing of Dental Materials	128	140
Arthrocentesis	199	69
Bone and Gum Grafting	58	210
Cognitive Behavioral Therapy	239	29
Dentures	127	141
Intralesional Steroid Injections	208	60
Invisalign	172	96
Minor Salivary Gland Biopsies	233	35
Occlusal Appliances for Sleep Apnea and/or TMD/Bruxism	212	56
Pharmacological Management of Chronic Orofacial Pain	202	66
Placement of Dental Implants	91	177
Root Canal Treatments	119	149
Soft Tissue Biopsies	227	41
Swab for Fungal or Viral Infection	204	64
Therapeutic Injections (Trigger Points and/or Neurotoxin)	188	80

Table 5

Knowledge Domain: Perceptions of the Scope and Training of Oral Medicine Providers

C. Perceived Training Background of Oral Medicine Providers (Aware & Unaware)

Training Background	Responded Yes (N= 500) (Multiple Selections for Responses Allowed) n
Graduated from Dental School	437
Graduated from Medical School	171
Spent Part of Training in Internal Medicine, GI, or other Medical Specialties	194
Completed Internal Medicine Residency	25
Completed Oral and Maxillofacial Pathology Residency	143
Completed Oral Medicine Residency	389
None of the Above	0

Table 6*Awareness of the Topic of Oral Medicine*

Where Did You Learn of Oral Medicine	Number of Responses (N= 268) (Multiple Selections for Responses Allowed) n
Medical School	84
Residency	67
Fellowship	25
Continuing Medical Education	39
Other	107

Table 7

Adequacy of Training on the Topic of Oral Medicine to Coordinate Care With an Oral Medicine Provider (Among Both Participants Aware and Unaware of Oral Medicine)

How Would You Rate the Adequacy of Any Training on the Topic of Oral Medicine in Preparing You to Potentially Coordinate Care With an Oral Medicine Provider?	Number of Responses N= 500 (%)
Very inadequate	133 (26.6)
Inadequate	223 (44.6)
Adequate	109 (21.8)
More than adequate	18 (3.6)
Excellent	10 (2)
Missing	7 (1.4)

Table 8

Interference With Gaining Further Knowledge or Training in Oral Medicine (Among both Participants Aware and Unaware of Oral Medicine)

What Interferes With Gaining Further Knowledge or Training in Oral Medicine?	Number of Responses (N= 500) (Multiple Selections for Responses Allowed) n
Lack of time	159
Lack of resources	130
Limited awareness of the specialty	359
Limited availability of CME courses	106
Not relevant to my specialty	34
Other (Specified)	44

Table 9

Perceived Value Collaboration With Oral Medicine Providers to Your Clinical Practice (Among Participants Aware of Oral Medicine)

How Valuable is Collaborating With Oral Medicine Providers to Your Clinical Practice?	Number of Responses N= 268 (%)
Not Important	10 (3.8)
Slightly Important	79 (29.4)
Moderately Important	87 (32.4)
Very Important	70 (26.2)
Extremely Important	20 (7.5)
Missing	2 (0.7)

Table 10

Patients With Oral Medicine Concerns Encounter in the Last Twelve Months (Among Participants Aware of Oral Medicine)

How Many Patients With Oral Medicine Concerns Did You Encounter in the Last Twelve Months?	Number of Responses N= 268 (%)
None	22 (8.2)
Fewer than 5	93 (34.7)
6-10	65 (24.3)
11-20	36 (13.4)
>20	50 (18.7)
Missing	2 (0.7)

Table 11*Oral Medicine Referrals (Among Participants Aware of Oral Medicine)*

Have You Ever Referred Patients to Oral Medicine?	Number of Responses N= 268 (%)
Yes	166 (62.0)
No	100 (37.3)
Missing	2 (0.7)

Table 12

Oral Medicine Referrals Requested in the Past Twelve Months (Among Participants Aware of Oral Medicine)

How Many Oral Medicine Referrals Did You Request in the Past Twelve Months?	Number of Responses N= 268 (%)
Fewer than 5	135 (50.4)
From 6-10	14 (5.2)
From 11-20	11 (4.1)
>20 referrals	6 (2.2)
Missing	102 (38.1)

Table 13

Referral for Oral Lesions Other Than Oral Medicine Provider (Among Both Participants Aware and Unaware of Oral Medicine)

Whom Do You Refer Oral Lesions to Other Than Oral Medicine Providers?	Number of Responses (N= 500) (Multiple Selections for Responses Allowed) n
Dermatologist	67
ENT	357
General Dentist	240
Oral Surgeon	248
Other (Specified)	26

Table 14

Oral Lesions Referrals Requested in the Past Twelve Months (Among Both Participants Aware and Unaware of Oral Medicine)

How Many Oral Lesions Referrals Did You Request in the Past Twelve Months.	Number of Responses N= 500 (%)
None	186 (33.2)
Fewer than 5	250 (50)
From 6-10	41 (8.2)
From 11-20	7 (1.4)
>20 referrals	8 (1.6)
Missing	8 (1.6)

Table 15

Referral for Orofacial Pain Other Than Oral Medicine Provider (Among Both Participants Aware and Unaware of Oral Medicine)

Whom Do You Refer Orofacial Pain to Other Than Oral Medicine Providers?	Number of Responses (N= 500) (Multiple Selections for Responses Allowed) n
General Dentist	277
Neurologist	234
Sleep Specialist	17
Other (Specified)	103

Table 16

How Many Orofacial Pain Referrals Requested in the Past Twelve Months (Among Both Participants Aware and Unaware of Oral Medicine)

How Many Orofacial Pain Referrals Did You Request in The Past Twelve Months.	Number of Responses N= 500 (%)
None	247 (49.4)
Fewer than 5	198 (39.6)
From 6-10	31 (6.2)
From 11-20	6 (1.2)
>20 referrals	4 (0.8)
Missing	14 (2.8)

Table 17*Barriers to referrals to Oral Medicine Providers*

Barriers	Number of Responses (N= 268) (Multiple Selections for Responses Allowed) n
Differences in Treatment Approaches	14
Geographic Distance to Oral Medicine Providers	80
Insurance Coverage Issues	115
Lack of Awareness about Oral Medicine Providers	157
Lack of Referral Networks Or Systems	116
Limited Availability of Oral Medicine Providers	143
Patient Resistance Or Reluctance	7
Perceived Overlap With Other Specialties (e.g., ENT, dermatology)	109
Previous Negative Experiences With Referrals	15
Time Constraints in Practice	12
Uncertainty About Which Conditions Require Referral	102

Table 18*Improvements to Referral Process*

Improvements to Referral Process Options	Number of Responses (N= 268) (Multiple Selections for Responses Allowed) n
Better Insurance Coverage	97
Enhanced Referral Networks and Systems	141
Improved Patient Education and Support	72
Increased Availability of Oral Medicine Providers	140
More Education on Referral Guidelines	171
Other (please specify)	23

FIGURES

Figure 1

Flowchart of questionnaire questions

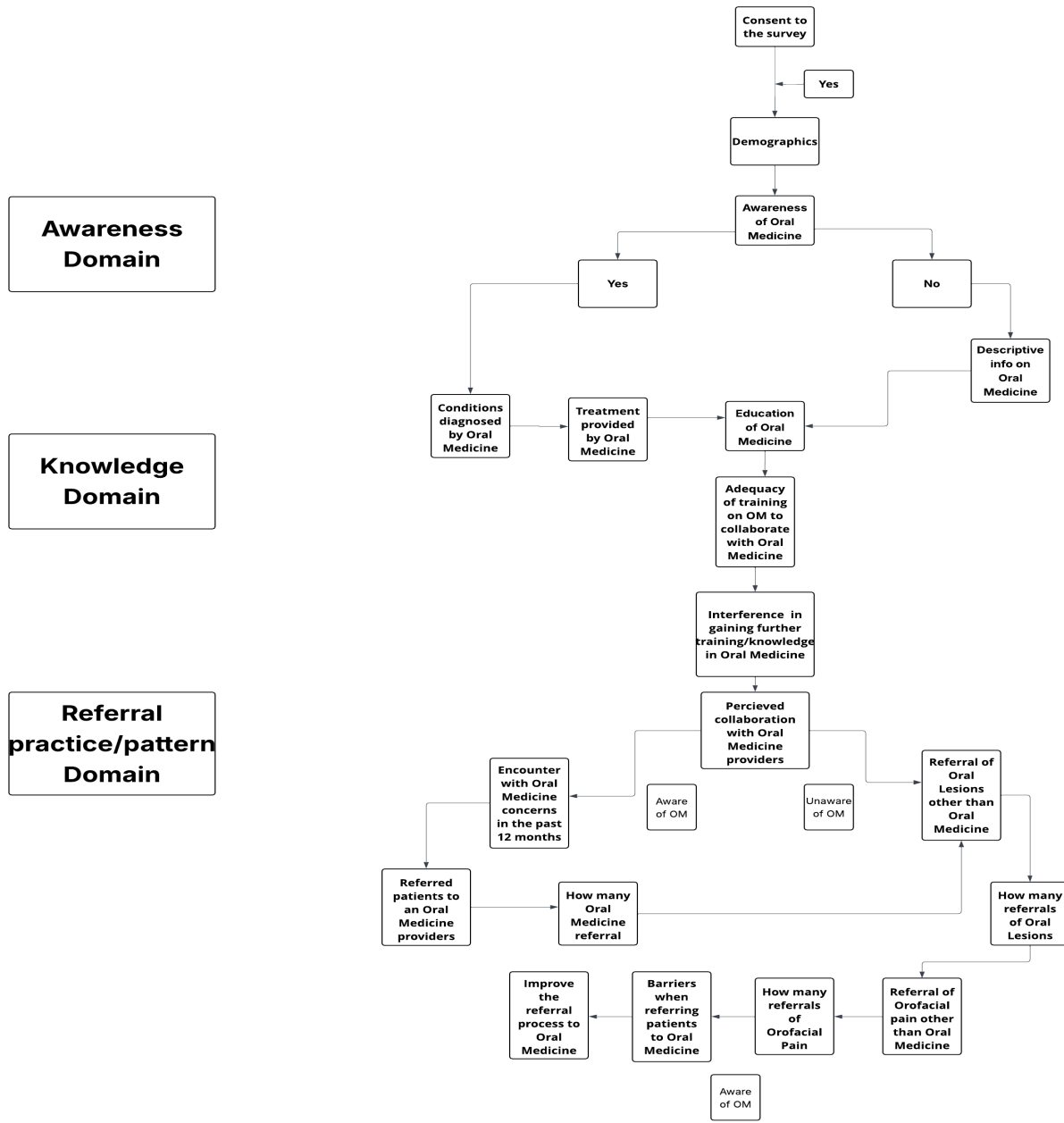


Figure 2

Adequacy of Training to Coordinate with Oral Medicine

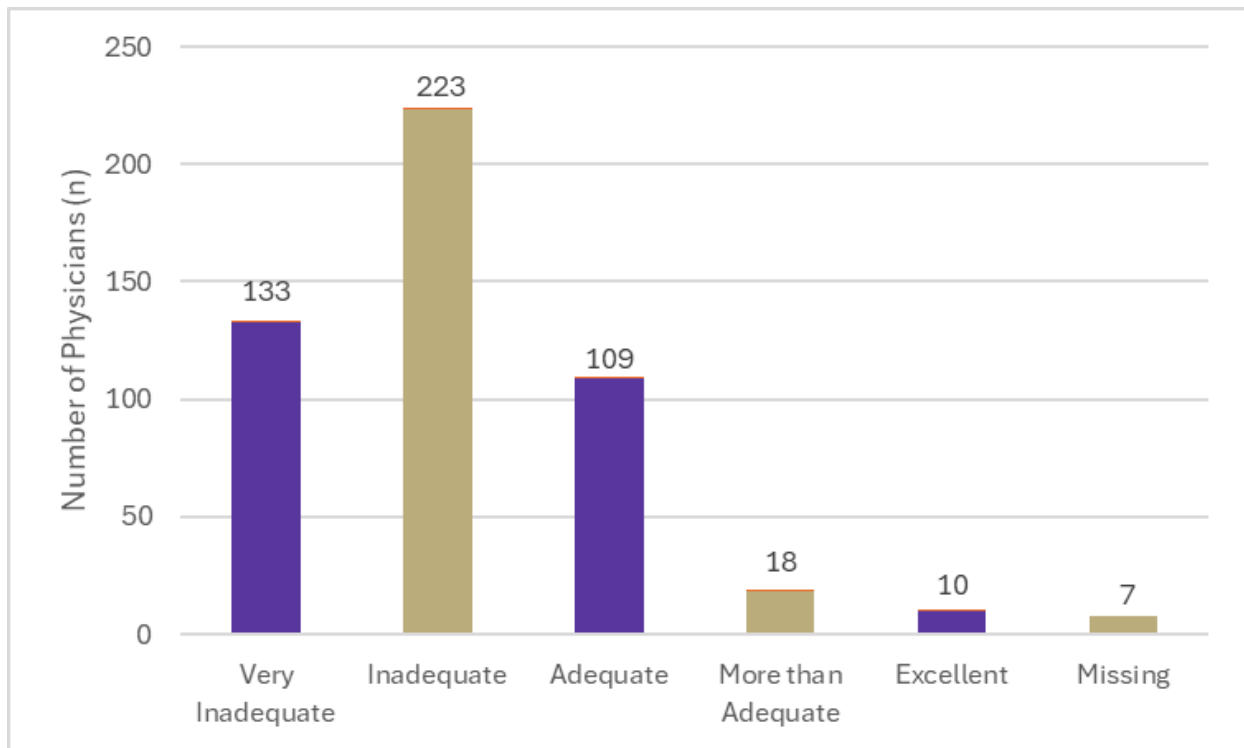


Figure 3

Perceived Value of Collaboration with Oral Medicine Specialty (Among participants aware of Oral Medicine)

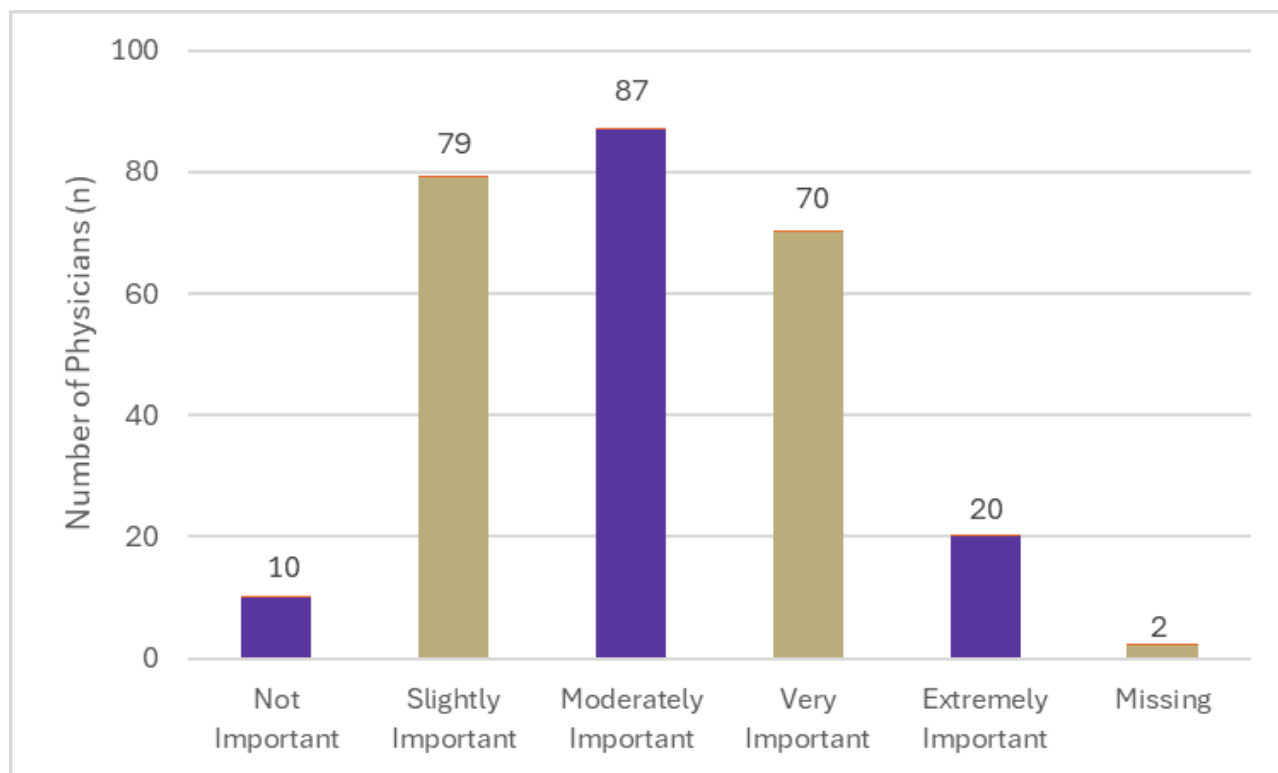


Figure 4*Barriers to Referral to Oral Medicine providers*