

The Awareness of Oral Health Professionals regarding Medication-Related Osteonecrosis of the Jaws- a Descriptive Study

Alden Schnyder Jason D¹, N.K. Aditya^{2*}, Uthra K S³, Divya Parimi⁴

¹MDS(Oral and Maxillofacial Surgery) Resident, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, TamilNadu, India

²MDS(Oral and Maxillofacial Surgery), MFDSRCS(Eng.), FIBCSOMS, FIBOMS, Assistant Professor, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

³MDS (Oral & Maxillofacial Surgery), MMCDSR, Maharshi Markandeswar University, Mullana- Ambala, Haryana, India

⁴MDS(Oral & Maxillofacial Surgery), Department of Oral & Maxillofacial Surgery, College of Dental Sciences, Davangere, Karnataka

*Corresponding Author

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ABSTRACT

Objectives: This study aimed to evaluate and assess the knowledge of dental students and residents(postgraduate) about Medication-related Osteonecrosis of the jaw (MRONJ) to aid in future training and accommodate teaching programs that emphasize the topic's importance in dentistry.

Materials and Methods: A self-administered questionnaire was sent to general dentists, residents and specialist dentists. It was divided into two sections: the first section was about general information such as participant designation, the participant's specialization, and the years of experience. The second section included questions about bisphosphonates (BPs) and their use and implications in dental practice. Descriptive statistics were derived, and the results were recorded.

Result: 140 participants completed the questionnaire. 78.6% of respondents were aware of MRONJ, with a majority (35.7%) claiming to have some knowledge about the condition. Only 15% of the respondents had heard about the MRONJ guidelines issued by the AAOMS. Only 48 subjects (34.3%) could answer the six case-based scenario questions. 37.1% were confident in treating a patient with MRONJ symptoms, most of whom were post-graduate residents (48.8%).

Conclusion: Although a convincing number of general dentists had answered case-based scenario questions correctly, and the majority of respondents with experience of less than three years had most correct answers, it was significant to note that most respondents were neither aware of AAOMS guidelines nor had confidence in treating or formulating a treatment plan for patients with MRONJ. The continued efforts toward planned teaching and learning programs will help the Oral health professionals be confident in examining and treating patients with MRONJ.

Keywords: MRONJ, AAOMS, BRONJ, Oral Health

INTRODUCTION

Bisphosphonates (BPs), both intravenous (IV) and Oral, are a class of drugs used in the treatment and prevention of various bone diseases, such as osteoporosis, multiple myeloma, osteogenesis imperfecta, osteitis deformans, and bone metastases, by suppressing osteoclast-mediated bone resorption through apoptosis of osteoclasts. However, there has been a severe adverse effect of jaw necrosis associated with administering BPs.^[1] Since Marx first established a connection between the use of bisphosphonates for malignant bone diseases and the occurrence of bone necrosis in the oral cavity in 2003, numerous studies have been published concerning the disease that soon became known as 'bisphosphonate-related Osteonecrosis of the jaws. Until now, the pathogenesis is still not fully understood. The treatment of BRONJ remains problematic, with an uncertain outcome.^[2, 3] Proposed hypotheses explaining the pathophysiology includes altered bone remodeling or oversuppression of bone resorption, angiogenesis inhibition, vitamin D deficiency, soft tissue BP toxicity,

constant microtrauma, suppression of immunity, and inflammation or infection.^[4] Although the outcome is uncertain, all specialists must prevent this complication by planning procedures before, during or after BPs treatment.

The American Association of Oral and Maxillofacial Surgeons (AAOMS) defined BRONJ in their 2009 position paper as “necrotic bone exposure in the maxillofacial region lasting for more than eight weeks in patients with previous or current administration of BP and with no history of radiation therapy”. In the 2014 edition and 2022 update, the term was modified into medication-related Osteonecrosis of the jaw (MRONJ) to emphasize the role of medication causing Osteonecrosis of the jaws, including antiresorptive and antiangiogenic therapies.^[5,6] Although the main indication for the use of bisphosphonates is osteoporosis—in more than 90% of all prescriptions—most cases of MRONJ are reported in association with malignant diseases such as prostate or breast cancer and multiple myeloma. The incidence of MRONJ associated with oral BP’s ranges from 0.001 to 0.1% and that associated with IV BP’s ranges from 1 to 12%. Longer duration of exposure results in an increased risk of developing MRONJ.^[6]

Various risk factors like extractions, implant placement along with pre-existing periodontal disease, use of corticosteroids along with anti-resorptive agents, co-morbid conditions of the patient, and adverse habits, especially abuse of tobacco products can trigger oral bisphosphonate-related Osteonecrosis of the jaws and hence is critical for oral health care professionals to be aware of the same.^[6,7]

Aims and objectives

This study aimed to investigate Oral health professionals’ awareness of MRONJ and their knowledge about the current guidelines for treating patients receiving Bisphosphonates to aid in future training and accommodate teaching programmes that emphasise the topic's relevance in dentistry.

MATERIALS AND METHODS

A cross-sectional descriptive study design was used. The subjects selected for the study were general dentists, post graduate residents and specialists working in all hospital departments.

A self-administered questionnaire was given to willing participants working in all dental specialties. The survey instrument was designed based on the review of pertinent literature and modifications of the questionnaires from studies by Maha A. Al-Mohaya et al., Al Hussain, Ahmed et al. and Rosella D et al.^[7, 8-10]

The questionnaire consisted of a total of 19 questions. Personal information was not included. Questions regarding BP treatment, the main reason for the administration of bisphosphonates, and the doctors' level of awareness and confidence were included. The dentists’ understanding of MRONJ was evaluated using the AAOMS guidelines, consisting of questions regarding the definition, staging, treatment, and prevention of the disease, and the discontinuation of medication. The terminology ‘BRONJ’ was used rather than MRONJ or ARONJ (Antiresorptive related osteonecrosis of the jaws) since the questionnaire aimed to evaluate dentists' awareness about bisphosphonate use and its relation to dental treatment. Since antiresorptive agents include not only BP and monoclonal antibodies, but also calcitonin, oestrogens, and selective oestrogen receptor modulators, BRONJ rather than ARONJ was considered a more appropriate term for this questionnaire.

Descriptive statistics were performed for the general characteristics of samples, experience with MRONJ patients, and the doctors' sources of MRONJ information. For evaluating the degree of understanding, 1 point was given for each correct answer to the questions regarding the definition, staging, treatment, prevention, and drug discharge. No points were given when the subject answered incorrectly or by answering 'I do not know'. Higher points correspond to a higher level of understanding. The group differences in level of understanding were evaluated according to job characteristics, BP indication, administration route, and experience of MRONJ patients. Knowledge-based questions on BPs were case scenario based, along with questions on administration and drug based.

Statistical analyses were performed using SPSS 20.0 (SPSS Inc., Chicago, IL, USA). Frequency and percentage analysis, chi-square test, independent sample T-test, and one-way analysis of variance were performed.

RESULTS

The anonymous questionnaire was administered to 176 study subjects, of which 140 complete responses were received. Incomplete responses were excluded.

The questionnaire is divided into two main sections:

1) General demographics:

The demographic characteristics of the respondents are listed in **Table 1**.

The study population consisted of Postgraduate Residents (57.1%), General Dentists (22.1%), and Specialists in their field (20.7%) (Table 2)

Most of the respondents had work experience of 1-2 years (47.1%), followed by 0-1 years (32.1%), and the least number of respondents had experience of 4-5 years (0.7%).

The distribution of the study participants across specialties is given in **table 2**.

Table 1: Distribution of Study Subjects according to the Specialty (N=140)

Specialty	No.	Percent
Oral medicine and radiology	8	5.7
OMFS	28	20.0
Prosthodontics	12	8.6
Periodontology	15	10.7
Public health dentistry	7	5.0
Pedodontics	13	9.3
Oral Pathology	7	5.0
Orthodontics	7	5.0
Endodontics	14	10.0
General Dentist	29	20.7

Table 2: Distribution of Study Subjects according to the Position (N = 140)

Position	No.	Percent
Resident	80	57.1
Specialist	29	20.7
General Dentist	31	22.1

2) Knowledge-based questions on Bisphosphonates

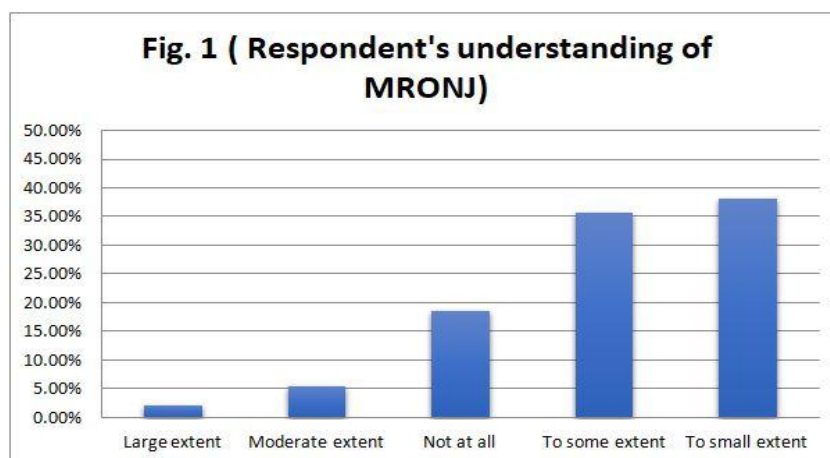
85%(119) of the respondents correctly identified osteoporosis as the chief indication for which bisphosphonates are prescribed to patients, while 12.9%(18) perceived that cancer was the chief indication, and 2.1%(3) felt that there are other leading causes for prescription of BPs. The respondents indicated that the most common form of prescription and route of administration of BPs is Oral (72.1%), followed by Intravenous (24.3%), and 3.6% marked 'other' routes as most used. Only 78.6% were aware of MRONJ, whereas 21.4% had yet to hear about the condition.

A larger proportion of the participants responded that they acquired knowledge about the disease through multiple sources (29.3%), followed by academic textbooks (24.3%), Specialised journals (10%), and Lectures and seminars (9.3%), the internet (3.6%) and others like colleagues and professors (2.1%).

The survey asked the respondents to rate their understanding of MRONJ on a scale ranging from 'A large extent,' 'A moderate extent,' 'to some extent,' 'to a small extent,' and 'not at all.' Only about 2.1% of the surveyed dentists claimed to be knowledgeable about the condition to a large extent. In comparison, a majority (35.7%) claimed to have some knowledge about the condition, and 18.6% claimed to have no knowledge about BRONJ.

(Fig.1)

39.3% of the participants claimed to ask about BP's medication history while examining a patient, while 60.7% did not.



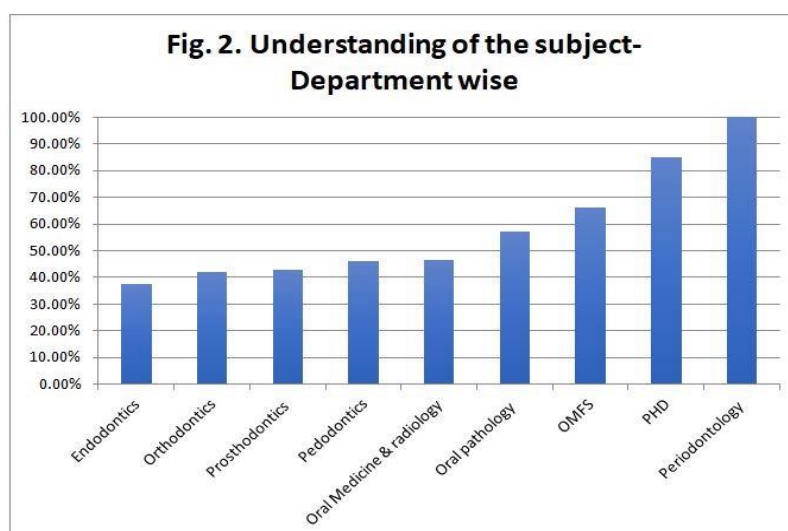
Only ten respondents claimed to have had an experience of treating patients with MRONJ (7.1%), and all ten of these dentists had seen only such patient each.

Only 15% of the respondents had heard about the MRONJ guidelines issued by the AAOMS for treating patients taking bisphosphonate antiresorptive. Only 48 subjects (34.3%) could answer all six case-based scenario questions.

68.6% of respondents could identify a Bisphosphonate drug (Alendronate) among a group of other drugs with similar indications and uses and 37.1% responded that they were confident in treating a patient with symptoms of MRONJ.

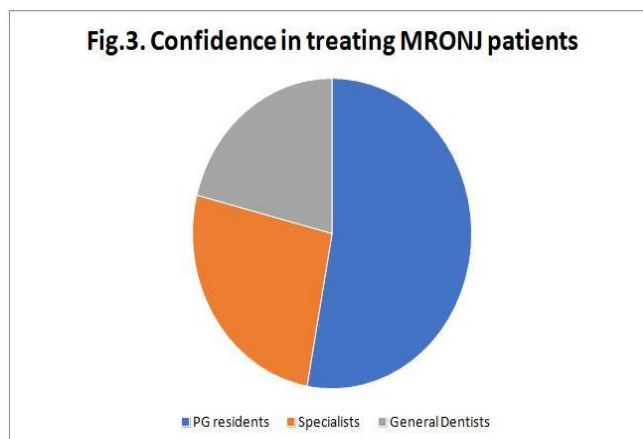
The responses were also correlated department-wise and based on the respondents' designations. 86.2% of Specialists, 81.3% of Postgraduate residents, and 64.5% of General dentists were aware of MRONJ, and the specialty with the highest affirmative response rate was Oral Medicine and Radiology (100%).

With regard to understanding MRONJ, 41.1% of specialists rated themselves as having an understanding to some extent, followed by 38.8% of Postgraduate residents and 35.5% of general dentists. 3.8% of Residents rated themselves as having an understanding of the subject 'to a large extent'. The specialty with 'a large extent of understanding of BRONJ was respondents from Periodontology (100%), PHD (85%), Dept. of OMFS (66%), 'understanding to moderate extent' was recorded with specialists of the Dept. Of Oral pathology (57.1%), Dept. of Pedodontics (46.2%), Prosthodontics (42.9%), and 'understanding to some extent' of the subject were noted with specialists of the Oral Medicine and Radiology (46.7%), and respondents of the Dept. Of Orthodontics (42.0%), the Dept. of Endodontics marked 'no understanding at all' of MRONJ (37.5%). (Fig.2)



The largest group of respondents who had heard MRONJ guidelines by AAOMS were specialists (24.1%), followed by general dentists (12.9%) and postgraduate residents (12.5%). The respondents with the most affirmative response were specialists in Periodontology (42.9%), Oral medicine (37.5%), OMFS (17.9%), Pedodontics (15.4%), and Oral pathology (14.3%), whereas doctors in community dentistry, Prosthodontics and Endodontics were not aware of the MRONJ guidelines (100% each)

The study showed that Postgraduate residents (48.8%) claimed to be the most confident in treating a patient with MRONJ symptoms, followed by Specialists (24.1%) and General dentists (19.4%) (Fig.3)



On comparing work experience after obtaining a dental license and the correct answers, The group with experience of 2-3 years (47.4%) had the most correct answers from the knowledge-based questions on MRONJ (from Q.13- Q.19). The same comparison was made with the designation of the respondent; the respondent group with most correct answers were General Dentists (45.2%), followed by Postgraduate residents (35%) and Specialists (24.1%).

DISCUSSION

Since the first reports of MRONJ in 2003 by Marx, there have been various clinical and experimental studies, yet much of the treatment and prognosis of the disease remains unknown^[1, 2].

It has become accepted that BPs are involved in the occurrence of MRONJ. Although the exact mechanism behind MRONJ remains unclear, proposed hypotheses that attempt to explain the unique localization of MRONJ exclusively to the jaws include altered bone remodeling or over-suppression of bone resorption, angiogenesis inhibition, constant microtrauma, suppression of innate or acquired immunity, vitamin D deficiency, soft tissue BP toxicity, and inflammation or infection^[6]. Disrupted bone renewal is considered a significant reason for MRONJ, and genetic pleomorphisms have recently been suggested as a new risk factor.^[9,11] As mentioned in the earlier part of this study, the term BRONJ is used for MRONJ since this questionnaire aims to evaluate dentists' knowledge and awareness about bisphosphonate use and its relation to dental treatment.

Considering the refractory progress of MRONJ, it is widely accepted that the best treatment is prevention.^[1] Owing to the increase in the incidence of diseases like malignancy and osteoporosis, which are relatively more common causes of anti-resorptive medication, there is a broad group of patients that often have dental health problems and are thus in need of a variety of oral care, including surgical procedures. Therefore, it is critical for dentists treating patients taking bisphosphonates to have sufficient knowledge about the side effects of the drugs. Thus, the objective of this study was to not only alert dentists about the nature of MRONJ and prompt them to react appropriately through medication history taking but also to aid in future training and accommodate teaching programs that emphasize the topic's importance in dentistry.

Most respondents (78.6%) claimed to have heard of MRONJ, but their confidence in treating a patient with the same was low (37.1%). Despite having claimed to have heard of the condition from textbooks, journals, and other sources, none of the surveyed dentists claimed to have an understanding of the disease to a large extent. Most respondents rated themselves as having a mediocre to low understanding of the condition. This provides an insight into the need for a comprehensive approach toward the patient rather than a work-specific approach.

In accordance with the study by Alhussain A. et al^[7], it was observed that most subjects with awareness of BRONJ were Specialists and Postgraduate residents, and in terms of years of experience after obtaining a dental license, the less experienced groups 2-3 years and 1-2 year groups seemed to have a higher understanding of the subject and the correct answers in the BPs knowledge and case-based scenarios. Since the number of patients taking bisphosphonates has increased, recent dental and specialty graduates are more likely to understand the lesion and its management. Many MRONJ cases can be prevented by maintaining oral hygiene and timely dental intervention. A study published by Rosella et al.^[10] on dental students' knowledge of MRONJ shows comparable results with our study about confidence in treating a patient with MRONJ, especially with invasive procedures. They found that only 37.1% of respondents, most of whom were residents (48.8%), were confident and comfortable in treating a patient taking bisphosphonates in a clinical setting.

The finding that only 68.6% of the participants in this study could identify a BP drug among a group of drugs used for similar indications and that most of them were specialists (75.9%) also demonstrates the low awareness and deficient knowledge about MRONJ among dentists similar to a study from a Brazilian group of dentists^[14]

It is important to educate those in general practice about MRONJ and its management since they are usually the first point of contact for patients with dental complaints and since invasive dental procedures like dental extractions and implant placement are the primary triggers for MRONJ.

It is interesting to note that based on the studies by a phase III trial conducted by Saad et al^[16], individual studies by Nicolatou-Galitis et al^[17] and Fatih Sentürk et al^[20], point out the importance of including consultations from dental professionals, especially in oncologic centers, to seek professional advice on oral health and its implications to reduce the risk of MRONJ.

There is an urgent need to improve the confidence of dentists and specialists because of the ever-growing numbers of diseases like malignancies and osteoporosis, the treatment of which may be based on antiresorptives.

In a country like India, ranking 3rd in the global incidence of cancer, it may also be necessary to study the awareness of Oncologists, Endocrinologists, Orthopaedic, and Physicians in the dental implications in patients taking Bisphosphonates or other antiresorptive that may cause Osteonecrosis of the jaw, since they are the primary prescribers of these drugs.

CONCLUSION

Based on the review of pertinent literature that depict the knowledge of the professionals on MRONJ^[7-17] and the results of our study, it is vital to emphasize the need to improve awareness not only among dentists in tertiary healthcare centers but also among young dental graduates and general dental practitioners. MRONJ is a complication that can be prevented or treated with the right decisions at the right time.^[18] It is up to oral health professionals to avert this painful and distressing complication by updating their knowledge and also delivering appropriate patient care. Those dentists with fewer years of experience answered more questions correctly, indicating a need for senior dental professionals to update their knowledge. Equally significant to note was that most respondents needed to be made aware of AAOMS guidelines and were confident to treat or formulate a treatment plan for patients with MRONJ.

The continued efforts toward planned teaching and learning programs will enhance the proficiency of dentists managing MRONJ. Including case-based learning and clinical application of the subject will reinforce a healthy and well-organized dental education system.

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Author disclosures and Conflicts of interest: None

Ethical clearance: Not applicable (No intervention on study subjects)

The participant consents: Taken

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