EurAsian Journal of Oral and Maxillofacial Surgery
Official publication of AÇBİD (Association of Oral and Maxillofacial Surgery Society)

RESEARCH ARTICLE

The Knowledge and Awareness Level of The Turkish Dentists on Bisphosphonate-Related Osteonecrosis of The Jaws: A Survey Study

Türk Diş Hekimlerinin Bifosfonata Bağlı Çenelerin Osteonekrozu Hakkında Bilgi ve Farkındalık Düzeyi: Anket Çalışması

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ABSTRACT

Objective: This study aimed to evaluate the knowledge and awareness levels of general dentists (GDs) and specialist dentists (SDs) in Turkey regarding bisphosphonate-related osteonecrosis of the jaws (BRONJ).

Materials and Methods: A web-based survey was conducted from December 2014 to June 2015 among members of the Turkish Dental Association. The survey consisted of two sections: demographic information and questions about knowledge and awareness of BRONJ, such as awareness of its clinical importance, stages, treatment experience, and disorders where BPs can be used.

Results: A total of 945 responses were received, of which 897 (94.9%) were complete and included in the study. Of the respondents, 72.2% were GDs, and 27.8% were SDs. Only 38.1% of SDs and 30% of GDs reported good knowledge of BRONJ. A significant number of SDs (74.6%) asked about BP usage during medical history taking compared to 59.8% of GDs ($p<0.001$). Furthermore, 86% of GDs had never diagnosed a BRONJ case themselves.

Conclusion: While Turkish dentists are generally aware of BRONJ, there is a need for improved knowledge and diagnostic skills, especially among GDs. Enhanced education and training, including post-graduation courses and seminars, are recommended to improve understanding and management of BRONJ among dental professionals in Turkey.

Keyword: Bisphosphonate-Related Osteonecrosis of The Jaws; Dentist; Survey; Knowledge

ÖZ

Amaç: Bu çalışmanın amacı, Türkiye'deki genel diş hekimleri (GD) ve uzman diş hekimlerinin (SD) bisfosfonat ile ilişkili çene osteonekrozu (BRONJ) hakkındaki bilgi ve farkındalık düzeylerini değerlendirmektir. BRONJ, ilk olarak 2003 yılında tanımlanmış olup, osteoporoz ve metastatik malignitelerde kemik rezorpsiyonunu önlemek için kullanılan bisfosfonatlar (BP'ler) nedeniyle ortaya çıkmaktadır.

Gereç ve Yöntemler: Aralık 2014 - Haziran 2015 tarihleri arasında Türk Diş Hekimleri Birliği üyeleri arasında web tabanlı bir anket yapılmıştır. Anket iki bölümden oluşmuştur: demografik bilgiler ve BRONJ hakkında bilgi ve farkındalıkla ilgili sorular, klinik önemi, evreleri, tedavi deneyimi ve BP'lerin kullanılabileceği hastalıklar gibi konuları içermektedir.

Bulgular: Toplam 945 yanıt alınmış ve bu yanıtların 897'si (%94,9) eksiksiz olup çalışmaya dahil edilmiştir. Katılımcıların %72,2'si GD, %27,8'i ise SD idi. SD'lerin sadece %38,1'i ve GD'lerin %30'u BRONJ hakkında iyi bilgiye sahip olduklarını bildirmiştir. SD'lerin önemli bir kısmı (%74,6), GD'lere kıyasla (%59,8) tıbbi öykü alırken BP kullanımını sormaktadır ($p<0,001$). Ayrıca, GD'lerin %86'sı kendi başlarına hiç BRONJ vakası teşhis etmemiştir, bu da klinik deneyim ve bilgi eksikliğine işaret etmektedir. Çalışma, son mezunların, diş hekimliği müfredatındaki değişiklikler nedeniyle daha iyi farkındalığa sahip olduğunu ortaya koymuştur.

Sonuç: Türkiye'deki diş hekimleri genel olarak BRONJ konusunda farkındalığa sahip olsa da, özellikle GD'ler arasında bilgi ve tanı becerilerinin geliştirilmesi gerekmektedir. Türkiye'deki diş hekimlerinin BRONJ'u daha iyi anlamaları ve yönetmeleri için mezuniyet sonrası kurslar ve seminerler gibi eğitimlerin artırılması önerilmektedir.

Anahtar Kelimeler: Bifosfonata bağlı çenelerin osteonekrozu; diş hekimi; anket; bilgi

Submission Date: September 9, 2024
Acceptance Date: September 11, 2024
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INTRODUCTION

Bisphosphonate related osteonecrosis of the jaws (BRONJ) was first presented by Marx at 20031 and several papers[1-3] were published which demonstrate the relationship between bisphosphonates (BPs) and necrosis of the jaws (ONJ). However, the possible mechanism is still unclear how BPs are responsible on BRONJ.[4]

BPs have been using on patients with osteoporosis and metastatic malignancies to eliminate bone resorption.[3] Within years, usage of the BPs have been increasing due to increasing numbers of the cancer or metabolic bone disease patients. American Association of Oral and Maxillofacial Surgeons (AAOMS) presented a guideline in 2009 and classified patients due to risk of ONJ and categorized ONJ into stages (Stage 0, 1, 2, 3) and defined treatment strategies for each stage.[5]

Also, recent cases of ONJ, beside BPs, such as; denasumab (an antiresorptive drug), bevacizumad and sunitinib (antiangiogenic drugs) were reported.[6] After realization of that ONJ can occur due to other medications beside BPs, AAOMS published an updated guideline in 2014 and renamed BRONJ to medication-related osteonecrosis of the jaws (MRONJ).[7]

Studies have revealed that a significant number of dentists lack the necessary knowledge to perform invasive procedures (such as tooth extraction) on patients undergoing bisphosphonate therapy.[8-9]

In cases that MRONJ diagnosis is delayed, or the right treatment cannot done properly, the clinical situation can worsen from asymptomatic bone exposure to the resection of the affected bone. Hence, delayed treatment can cause to increase morbidity and cost.

Beside the researches that focused on the mechanism or treatment of MRONJ, several survey studies were published which evaluate the knowledge and awareness level of dentists.[2,4,10]

The aim of this survey-based study was to evaluate knowledge and awareness level of dentists on BRONJ in Turkey.

MATERIALS AND METHODS

This study was consisting of a web-based survey from Dec 2014 to June 2015, which participants involved the survey voluntarily. A link of the survey was sent via e-mail to the general (GD) and specialist dentists (SD) who are the members of the Turkish Dental Association. A total of 945 surveys were filled and 897 (94, 9%) were evaluated. Incomplete surveys (n: 48, 5, 1%) were excluded from the study.

SURVEY CONTENT

First part of the survey was consisted of demographic questions about year of graduation, type of clinic and field of specialty (if exist).

Second part of the survey was consisted of the questions about knowledge and awareness on BRONJ, such as; awareness of the clinical importance of BRONJ, awareness of the clinic stages of the BRONJ, experience on the treatment of a patient with BRONJ, clinical diagnosis of BRONJ and the disorders that BPs can be used in.

Statistical Analysis

Statistical analyses were carried out using IBM SPSS Statistics for Windows, Version 22.0 (Armonk, NY, USA: IBM Corp) statistical software package. Normal distribution was evaluated with the Shapiro-Wilk test. Parametric results were analyzed using ANOVA, and non-parametric results were obtained using the Kruskal-Wallis test. Tukey HSD was used to determine the statistical differences among groups. $p \leftarrow 0,05$ was considered statistically significant.

RESULTS

648 (72, 2%) of the participants were GDs and 249 (27, 8%) were SDs. had specialty on one of the fields of dentistry.

Result of the SDs'

Most of the SDs graduated (n: 89, 35. 7%) after 2009, while 69 (27, 7%) had been continuing to PhD education. Table 1 shows the numbers and the fields of the SDs.

38, 1% of the SDs selected 5 (very good) as their knowledge level about the clinical importance of the BRONJ, while 20 (8%) selected 1 (no idea). SDs concluded that they had been mainly

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Table 1. Distrubition of the participants in terms of specialty or Ph.D

		n	%
Do you have a specialty or Ph.D?	Yes	249	27,9
	No	645	72,1
If yes, please state the department	Oral and Maxillofacial Surgery	69	27,7
	Periodontology	36	14,5
	Prosthodontics	54	21,7
	Orthodontics	21	8,4
	Prosthetic dental treatment	14	5,6
	Pedodontics	25	10,0
	Oral and maxillofacial radiology	7	2,8
	Endodontics	18	7,2
	Implantology	5	2,0

obtained information about BRONJ in the PhD education (37, 7%) and from journal articles (25, 7%). Comparison of the difference between graduation year and knowledge level showed statistically significant difference. Recently graduated (2009 and after) SDs had higher knowledge level (Knowledge level 1, 3 and 4) when compared with former graduates. (p←0,001). The increase in the knowledge level of physicians according to the year they graduated is shown in Table 2.

181 (72, 6%) of the SDs are asking BP usage in history taking, while 68 (27, 4%) did not. Also, 186 (74, 6%) of the SDs faced with BP taking patient, while 63 (25, 4%) did not.

106 (42, 5%) of the SDs were diagnosed the BRONJ by themselves, however 143 (57, 5%) did not. 77 (72, 6%) of the 106 participants that diagnosed BRONJ are Oral and Maxillofacial Surgeons and Periodontologists. Statistical analysis showed that the SDs with surgical notion are more prone to BRONJ diagnosis. Also, statistical analysis showed significant difference between SDs and GDs that SDs had a higher rate on diagnosis of the BRONJ. (p←0,001)

Only 73 (29, 3%) of the SDs were correctly selected the right indication (prostate cancer, breast cancer, multiple myeloma and osteoporosis) that BP can be used. 64 (25, 7%) were only selected osteoporosis as the indication for BP. However, 6 (2, 4%) of the SDs selected "none of them", and half of the SDs (n: 121, 48, 6%) were unaware of the clinical stages of the BRONJ.

Result of the GDs

254 (39, 2%) of the GDs indicated that they mainly obtained information about BRONJ from the post-graduation courses or seminars, and 241 (37, 2%) in the dentistry education.

181 (30%) of the GDs had knowledge about the clinical stages of BRONJ, while 70% of them had not.

One-third of the GDs (33, 1%) concluded that they had moderate knowledge about the clinical importance of the BRONJ, while 86 (13, 5%) had no idea.

387 (59, 8%) of the GDs concluded that they had been asking BP usage in medical history, while 261 (40, 2%) did not. Comparison between SDs and GDs showed statistically significant difference favor to SDs. (p←0,001)

More than half of the GDs (53, 6%) had faced with BP taking patient, however, 557 (86%) of the GDs concluded that they didn't diagnosed a BRONJ patient by themselves. Statistical analysis showed significant difference that SDs have high diagnosis rate when compared with GDs. (p←0,001)

Table 2. Comparison of the knowledge level with graduation year

		Graduation Year			p
		2002 and before N (%)	2008 -2003	2009 and later	
		N (%)	N (%)	N (%)	
Could you please rate your knowledge of the clinical significance of BRONJ on a scale of 1 to 5?	I don't know	60(14,1)a	36(19,4)a	10(3,6)b	≤0,001
	Partially	56(13,1)a	26(14)a	24(8,5)a	
	Middle	121(28,3)ab	45(24,2)b	101(35,9)a	
	Good	94(22)a	36(19,4)a	90(32)b	
	Very good	96(22,5)a	43(23,1)a	56(19,9)a	

Kruskall-Wallis

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88 (13, 5%) of the GDs were correctly selected the right indication (prostate cancer, breast cancer, multiple myeloma and osteoporosis) that BPs can be used. 229 (35, 3%) of the GDs were only indicated osteoporosis for BP use. However, 20 (4%) of the GDs selected "none of them". Comparison of two groups showed statistically significant difference that SDs had a higher rate on the right indication. (p≤0,001)

DISCUSSION

It was accepted that, BPs are the main cause of MRONJ. Marx published the first case describing the relation between osteonecrosis of jaws (ONJ) and IV BP usage.[1] ONJ is a challenging clinical situation as an adverse effect of BPs with morbidity. However, the possible mechanism is un-clear.3 It is thought that, as the possible mechanism of the BPs, is inhibiting the osteoclastic activity by inhibiting the osteoclast precursor cells. Also, BPs have impacts on angiogenesis, microenvironment and signal transition between osteoclast and osteoblasts.[4]

Awareness and also knowledge on the BRONJ began to increase in years with the help of the ONJ cases being reported. In present study, number of the participants with "no knowledge" decreased statistically in recent graduates (after 2009) when compared to graduates between 2003 and 2008 (p≤0,001). Also number of the participants with "moderate" and "good" knowledge level increased statistically in recent graduates when compared to graduates between 2003 and 2008 (p≤0,001). Increase of the knowledge level can be linked to place taking of BPs in the dentistry curriculum of Turkey after 2008.

BPs are indicated in bone disorders or skeletal complications which occurs due to metastatic malignancies or osteoporosis.[1] Metastatic and bone malignancies, especially prostate CA, breast cancer and multiple myeloma and metabolic bone disorders, such as osteoporosis are main indications of BPs and are commonly used for supportive therapy of the suffered patients. In present study, 29, 3% of SDs and only 13,5% of GDs selected the right indication for BP usage. Usually, patients, especially older patients, had difficulties to remember the name of the drugs that they use routinely but, they know disorders that they have been using the medications for. Therefore, practitioner must be aware of disorders that BPs can be used and thus, practitioner can prevent possible complications related with BPs.

Dougall et al. reported that medical history taking is an important stage that should not be skipped out to reduce the possibility of complications especially for medically compromised patients.[11] Results of present study showed that a total of 568 (63,3%) dentists are asking BP usage in history taking.

Osta et al.'s survey study revealed that the majority of participants were unaware of the clinical stages of BRONJ.[12] Similarly, in our survey study, 30% (n: 181) of general dentists (GDs) were knowledgeable about the clinical stages of BRONJ, while 70% lacked this knowledge. Additionally, 86% (n: 557) of GDs had never diagnosed BRONJ themselves. The failure to detect BRONJ in its asymptomatic early stages can lead to disease progression to more severe stages that are more difficult to treat.

Yoo et al. published the results of survey about awareness on BRONJ and reported that the awareness of the severity of BRONJ was highest among the oral and maxillofacial surgeons.[10] Similar to Yoo et al.[10] and due to results of present study, 57 of 137 (41, 6%) specialized dentists that selected "good" and "very good" are oral and maxillofacial surgeons or residents.

In a society where the prevalence of osteoporosis is increasing and more patients are taking bisphosphonates and related medications, it will be critically important for dentists and doctors to improve their current knowledge and confidence. To bridge the communication gap in the future, there is a need to enhance the knowledge of physicians and dentists about MRONJ. This will ultimately improve patient care.[13]

Results of present study showed that most participants composed of GDs of this survey commonly obtain information about BRONJ from post-graduation courses and seminars. In addition, GDs have information about clinical stages and importance of BRONJ but not sufficient. It is recommended that, it can be useful to organize local post-graduation courses and seminars that contain topics about BRONJ and disorders that BPs can be used to increase the number of the educated dentists.

In present study, last source of the knowledge of GDs was journal articles. It is hypothesized that this may be related to the predominance of English, as a significant portion of the literature is in English, making it challenging for dentists

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whose first language is not English to access scientific knowledge. Also, it is recommended to dental associations of the countries to translate the up-to-date guidelines, such as AAOMS' BRONJ Guideline, to national languages and let the members be aware of the actual developments on BRONJ.

Various reports have been published in Türkiye, and the number of BP prescriptions is increasing in parallel with the aging population. As suggested in the literature[14-17], we also believe that conducting similar studies targeting general practitioners and specialist doctors who prescribe these medications is important to assess their knowledge in this area and ensure that they adequately warn their patients about the risks concerning the oral cavity.

CONCLUSION

The results of this study showed that dentists in Türkiye are aware of BRONJ, but their level of knowledge is not sufficient for accurate diagnosis and treatment, similar to what is reported in the literature. The literature clearly shows a lack of knowledge about BRONJ among healthcare professionals, including both physicians and dentists. Further studies on BRONJ awareness are needed. Also, update on recent dentistry curriculum and motivating the dentists to attend courses or seminars are recommended.

REFERENCES

1. Marx RE. Pamidronate (Aredia) and zoledronate (Zometa) induced avascular necrosis of the jaws: A growing epidemic. J Oral Maxillofac Surg. 2003;61(9):1115.
2. López-Jornet P, Camacho-Alonso F, Molina-Miñano F, Gomez-Garcia F. Bisphosphonate-associated osteonecrosis of the jaw. Knowledge and attitudes of dentists and dental students: A preliminary study. J Eval Clin Pract. 2010 Oct;16(5):878-82.
3. Reid IR. Osteonecrosis of the jaw: who gets it, and why? Bone. 2009 Jan;44(1):4-10.
4. Alhussain A, Peel S, Dempster L, Clokie C, Azarpazhooh A. Knowledge, practices, and opinions of Ontario dentists when treating patients receiving bisphosphonates. J Oral Maxillofac Surg. 2015 Jun;73(6):1095-105.
5. Ruggiero SL, Dodson TB, Assael LA, Landesberg R, Marx RE, Mehrotra B. American Association of Oral and Maxillofacial Surgeons Position Paper on Bisphosphonate-Related Osteonecrosis of the Jaw – 2009 Update. Aust Endod J. 2009 Dec;35(3):119-130.
6. Sivolella S, Lumachi F, Stellini E, Favero L, Stellini E, Veltroni A, et al. Denosumab and antiangiogenetic drug-related osteonecrosis of the jaw: An uncommon but potentially severe disease. Anticancer Res. 2013 May;33(5):1793-7.
7. Ruggiero SL, Dodson TB, Fantasia J, Goodday R, Aghaloo T, Mehrotra B, et al. American Association of Oral and Maxillofacial Surgeons Position Paper on Medication-Related Osteonecrosis of the Jaw—2014 Update. J Oral Maxillofac Surg. 2014 Oct;72(10):1938-1956.
8. Vinitzky-Brener I, Ibáñez-Mancera NG, Aguilar-Rojas AM, Álvarez-Jardón AP. Knowledge of bisphosphonate-related osteonecrosis of the jaws among Mexican dentists. Med Oral Patol Oral Cir Bucal. 2017;22(1).
9. Alhussain A, Peel S, Dempster L, Clokie C, Azarpazhooh A. Knowledge, practices, and opinions of Ontario dentists when treating patients receiving bisphosphonates. J Oral Maxillofac Surg. 2015;73:1095-1105.
10. Yoo JY, Park YD, Kwon YD, Kim DY, Ohe JY. Survey of Korean dentists on the awareness on bisphosphonate-related osteonecrosis of the jaws. J Investig Clin Dent. 2010;1(2):90-95.
11. Dougall A, Fiske J. Access to special care dentistry, part 5. Safety. Br Dent J. 2008 Aug;205(4):177-90.
12. El Osta L, El Osta B, Lakiss S, Hennequin M, El Osta N. Bisphosphonate-related osteonecrosis of the jaw: awareness and level of knowledge of Lebanese physicians. Support Care Cancer. 2015 Nov;23(10):2825-31.
13. Kazmi S, Siddiqui H, Khan F, Sarwar H, Latif M, Raza S, et al. Knowledge, attitudes and practices of physicians and dentists on medication-related osteonecrosis of the jaw: a cross-sectional survey. Br Dent J. 2023;234(3):151-6.
14. Vinitzky-Brener I, Ibáñez-Mancera NG, Aguilar-Rojas AM, Álvarez-Jardón AP. Knowledge of bisphosphonate-related osteonecrosis of the jaws among Mexican dentists. Med Oral Patol Oral Cir Bucal. 2017 Jan;22(1).
15. Al-Mohaya MA, Al-Khashan HI, Mishriky AM, Al-Otaibi LM. Physicians' awareness of bisphosphonates-related osteonecrosis of the jaw. Saudi Med J. 2011;32:830-835.
16. Tanna N, Steel C, Stagnell S, Bailey E. Awareness of medication-related osteonecrosis of the jaws (MRONJ) amongst general dental practitioners. Br Dent J. 2017;222:121–5.
17. Kim J, Jeong S, Kim S, Kim Y. Perceptions of medical doctors on bisphosphonate-related osteonecrosis of the jaw. BMC Oral Health. 2016;16:77.