



Knowledge and Performance of Dentists and Senior Dental Students Regarding the Treatment of Patients Taking Bisphosphonates in Bandar Abbas City, Iran

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ABSTRACT

Introduction: Bisphosphonates (BP) have recently been used in the treatment of bone diseases. The BP-related osteonecrosis of the jaw (BRONJ) is a severe complication of long-term usage of BP and can lead to serious consequences. This study aimed to evaluate the level of awareness and performance of dentists and senior dental students in Bandar Abbas, Iran, regarding the treatment of patients who take BP.

Method: In this cross-sectional study, a questionnaire, based on the standard guidelines, was handed out to dentists and senior dental students in Bandar Abbas city. Variables, such as gender, age, level of awareness, and performance when treating the aforementioned patients were taken into account. The collected data were analyzed using Kolmogorov-Smirnov, Levene, chi-squared, and independent t-test.

Result: The performance index was 11.8 ± 2.82 in dentists and 14.29 ± 5.8 in senior dental students which indicates a significant difference between them in terms of performance when treating BRONJ in patients taking BP. However, no significant difference was observed in terms of their knowledge.

Conclusion: The level of performance and knowledge in most dentists and dental students was intermediate and policies should be made to raise their abilities.

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Introduction

Bisphosphonates (BP) are antiresorptive drugs used to treat bone metastases, multiple myeloma, osteoporosis, and other bone diseases (1, 2). Despite the beneficial effects of BP, many patients sought medical service due to necrotic jawbones with unknown etiology in the early 2000s. Marx was the first person to suggest a link between osteonecrosis and the

use of BP in 2003 (3).

Since then, many studies have been performed to investigate the association between BP and BP-dependent maxillary osteonecrosis of the jaw (BRONJ). It should be noted that osteonecrosis is the death of a bone due to a defect in the blood supply (4). The term BRONJ defines an exposed bone that lasts longer than 2

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months in patients consuming BP (5).

The exact mechanism of BRONJ is still unclear (6); however, some risk factors, such as dentoalveolar surgery, periodontal disease, denture use, duration of therapy, type of BP, and route of administration have been identified (7). The prevalence of BRONJ in people taking oral BP is 0.1-0.001% while it can vary to 1-12% in patients taking intravenous BP (8,9). Nowadays, the term medication-related osteonecrosis of the jaw (MRONJ) is used instead of BRONJ (10). The MRONJ has a critical effect on the quality of life of patients. They might suffer from pain, esthetic outcomes, and in some cases infections (11,12).

The prevalence of MRONJ has increased over the past two decades since more patients are taking BP (2) which has resulted in problems for dentists, oncologists, gynecologists, urologists, and general surgeons (13). To prevent MRONJ from happening, a dentoalveolar focus screening should be done before prescribing any antiresorptive agent (14). Therefore, some interventions, such as tooth extraction, cystectomy, and root tip resection, should not be performed (15).

The American Association of Oral and Maxillofacial Surgeons issued a guideline in 2015, categorizing patients at risk in stages of 0 to 3 and suggesting special treatment methods for each stage (16). Despite the guideline, reports show that some dentists refuse to visit patients receiving BPs. It is suggested that a lack of awareness about these cases might play an important role in their refusal (17). The present study aimed to examine the knowledge and performance of dentists and senior dental students in Bandar Abbas, Iran, when regarding the treatment of patients taking BP.

Materials and Method

Study design

This analytical cross-sectional study was conducted in Bandar Abbas, Iran, and the subjects were selected using the census method. The researchers committed to keeping the name and information of the participants confidential. Based on the principles of the Helsinki Declaration, people who did not sign the consent form were excluded from the study.

The authors followed the instructions of the Strengthening The Reporting of Observational Studies in Epidemiology (STROBE) and the respondents were charged with no fee for participation in this research. A questionnaire written by Heidari et al (18), based on the guidelines of oral and maxillofacial surgeons of America, was handed out among dentists and

senior dental students in Bandar Abbas city.

The questionnaires included seven items about their theoretical knowledge and 24 items about their performance in the treatment of patients consuming BP.

Study variables and data collection

Data of subjects who met the inclusion criteria were collected. Variables, such as gender, age, and level of awareness about the patients taking BP and their rate of performance when treating the aforementioned patients were all considered based on their responses to the questionnaire. The level of awareness and performance of the dentists were categorized as high, intermediate, and low.

Statistical analysis

The information collected by the questionnaire was entered into SPSS software (version 20, SPSS Inc., Chicago, IL, USA). Demographic characteristics of the samples and descriptive analysis of the data were examined using tests of mean, standard deviation, median, and frequency percentage.

Before using the analytical statistical tests, the status of the variables was examined in terms of having a normal distribution with the Kolmogorov-Smirnov test and equality of variances with the Levene test. Moreover, the Chi-square test (or Fisher's exact test) was used to compare the qualitative variables.

Independent t-test was used to compare the rate of knowledge and performance between the two groups. Moreover, the analysis of variance or its non-parametric equivalent was used to compare more than two groups together. Furthermore, the factors affecting the knowledge and practice of maxillofacial surgeons were evaluated with the help of regression models. The results of the multivariate logistic regression test were interpreted with the odds ratio.

Results

In total, this study was performed on 128 participants; 92 (71.9%), 13 (10.1%), and 23 (18%) of whom were general dentists, specialist dentists, and senior dental students, respectively. The group consisted of 71 (55.5%) males and 57 (44.5%) females.

Furthermore, 87 (68%) members declared that they had not visited any patients with MRONJ symptoms and only 5 (3.9%) dentists stated that they had enough information about these patients. Further demographic characteristics are demonstrated in Table 1.

Table 1: Demographic data of participants.

Demographic factors		N (%)
Dentists		105 (82%)
Senior dental students		23 (18%)
Gender	Male	71 (55.5%)
	Female	57 (44.5%)
Age	24>	30 (23.4%)
	25-34	59 (46.1%)
	35-44	31 (24.2%)
	45-54	8 (6.3%)
Information level about BRONJ	Enough	5 (3.9%)
	Require additional info	31 (24.2%)
	Uncertain about the level of info	61 (47.7%)
	Not enough	31 (24.2%)
History of retraining classes	Yes	98 (77.6%)
	No	30 (23.4%)
Number of cases (per month)	0	87 (68%)
	1	30 (23.4%)
	More than 1	11 (8.6%)
Method of gaining awareness about MRONJ	Articles	38 (29.7%)
	One day courses	82 (64.1%)
	Visual courses	41 (32%)
	Annual conferences	52 (40.6%)
	videos	30 (23.4%)

BRONJ: bisphosphonate-related osteonecrosis of the jaw

MRONJ: medication-related osteonecrosis of the jaw

The mean levels of performance were 14.29 ± 5.8 and 11.8 ± 2.82 in senior dental students and dentists, respectively. It indicates that the level of performance was significantly higher in dental students, compared to dentists ($P < 0.001$). Only 1% of dentists and 17.4% of dental students had high levels of performance when treating patients suffering from BRONJ (Table 2).

As described in Table 3, demographic characteristics, such as the dentists' age, gender, or participation in the retraining were not significantly related to their performance level. Characteristics, such as the dentists' age, gender, or participation in the

retraining were not significantly related to their performance level.

The mean awareness levels of dentists and dental students were 7.67 ± 2.62 and 8.49 ± 2.17 , respectively, and no significant difference was found between them when facing patients who take BP ($P = 0.202$). A high level of awareness was observed in 19% of dentists and 21.7% of dental students. There was a significant correlation between the age and level of performance in dentists. However, no significant relationship was observed between the level of awareness and other demographic characteristics (Table 3).

Table 2. Level of performance and awareness of dentists and dental students when treating bisphosphonate-related osteonecrosis of the jaw in patients taking bisphosphonates

		Dentists N (%)	Students N (%)
Level of performance	Low	37 (35.2%)	7 (30.4%)
	Intermediate	67 (63.8%)	12 (52.2%)
	High	1 (1%)	4 (17.4%)
Level of awareness	Low	18 (17.1%)	2 (8.7%)
	Intermediate	67 (63.8%)	16 (69.6%)
	High	20 (19%)	5 (21.7%)

Table 3. Evaluation of the relationship of demographic factors with the level of awareness and performance

Demographic factors		Awareness rate	Awareness results	Performance rate	Performance results
Gender	Male	7.68±2.74	P=0.362	12.06±3.68	P=0.529
	Female	8.17±2.3		12.5±3.6	
Age	Less than 34	7.6±2.49	P=0.05	12.3±3.75	P=0.612
	More than 34	8.58±2.6		11.56±1.1	
Participation in retraining classes	Yes	7.72±2.64	P=0.128	11.77±2.84	P=0.089
	No	8.47±2.19		13.83±5.26	

Discussion

This cross-sectional study was designed to evaluate the level of knowledge and performance of dentists and senior dental students in Bandar Abbas when treating patients who consume BPs. In fact, the main goal of this investigation was to determine the level of coordination of dentists with the existing guidelines in terms of knowledge and practice.

The results suggested that senior dental students performed better, compared to dentists; however, no significant difference was observed in terms of their knowledge. In a previous study, Kim et al. found that 91.1% of their participants did not have proper knowledge about cases with MRONJ (19). The American Society for Bone and Mineral Research emphasizes that all patients should be aware of the benefits and consequences of taking BP and be encouraged to maintain good oral hygiene and regular dental examinations. Moreover, the American Association of Oral and Maxillofacial Surgeons has provided clear instructions regarding the various stages of BRONJ so that dentists can decide the best treatment option for their patients (20).

In this study, dentists considered taking specialized courses as effective in learning more about MRONJ. They also believed that participation in one-day training courses is the main source of updating their knowledge, in contrast to Alhussein et al. who considered reading articles as the main factor in this regard (21).

Participants in the present study mentioned the following cases as the indication for BP use: osteoporosis (93.7%), osteoarthritis (33.5%), bone metastasis (21.8%), and multiple myeloma (42.9%). These results indicated that their information should be updated and increased in this area. In the study performed by Delima, 43% of general dentists were unaware of the existence of such classification of drugs, and only 15% of respondents were familiar with the brand name Alendrenate (Fusomex), the most well-known drug in this category (6).

Although a long time has passed since the publication of the first BRONJ report, studies have shown that the knowledge of general dentists and senior dental students is still intermediate in this field (22). Mah et al. examined the knowledge of physicians and found a similar result as only 9% of participants of their study had sufficient information (23).

In line with the results of the study conducted by Alhussein et al., most participants of the present research answered the questions about patients receiving oral BP correctly, especially in cases with the usage of fewer than 3 years. However, the number of people who provided incorrect answers to the questions related to intravenous BP (regardless of time) was higher; which shows their lack of awareness about the effects of continuing or stopping intravenous BP (21).

Al-Mohaya et al. conducted a study to evaluate the knowledge of physicians about osteonecrosis of the jaw. They found that only less than 1.3% of their participants had awareness about the osteonecrosis of the jaw while more than half of them had patients who used BP (24). Therefore, it seems that most dentists are not aware of such specific guidelines.

On the other hand, Subramaniam et al. evaluated the knowledge and performance of dentists regarding the management of patients using bone anti-resorptive drugs. They found a higher knowledge and performance in males, compared to female dentists, and dental specialists with more than 2 years of experience, compared to others. In the aforementioned study, it was concluded that dental practitioners were properly aware of persuasions and management of these patients (25).

Teślak et al. found that oral and maxillofacial surgeons had a significantly higher level of knowledge about MRONJ, compared to dentists and dental students (26). However, Miranda-Silva et al. recognized huge gaps of knowledge about MRONJ in dental surgeons.

Nevertheless, specialists and people with more experience play an important role in the treatment of patients using anti-resorptive and anti-angiogenic drugs (27). In addition, Kasapoğlu et al. suggested that specialist trainees and specialists had more knowledge about radiological and oral management of patients taking BPs, compared to general dentists (28).

Decision-making is undoubtedly one of the most difficult aspects of treatment. The selection of a particular treatment is much more complex than expected and is related to the Heuristic principles that justify how awareness, knowledge, and practice are associated (29). Failure in the management of MRONJ can lead to more complicated treatments and cause troubles for both patient and physician (30).

It is recommended that Dental Associations publish more guidelines in this field. These guidelines, as well as the training courses, congresses, and retraining sessions, can improve knowledge and thus the quality of treatment.

Conclusion

In this study, the level of performance in most dentists and senior dental students was intermediate. However, there was a statistically significant difference between dentists and senior dental students in terms of performance.

Accordingly, dental students had a better condition when treating patients taking BP. It should be noted that more programs and long-term plans should be scheduled to increase the ability of dentists and dental students when treating patients with specific conditions.

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Conflict of interest

There is no any kind of conflict of interest in this article.

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