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Assessment of Awareness and Knowledge of Medication Related Osteonecrosis of Jaw among Dental Students at a Tertiary Hospital in Eastern Nepal

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ABSTRACT

Introduction

The medication related osteonecrosis of jaw (MRONJ) is caused by bisphosphonates, antiresoptive or antiangiogenic drugs. It is the basic requirement for dental students to know the drugs that causing MRONJ and its management. The study was conducted to assess awareness and knowledge of MRONJ among dental students and to compare the mean knowledge score.

Methods

A cross-sectional study was conducted among dental students at College of Dental Surgery, B. P. Koirala institute of Health Sciences. A semi-structured questionnaires consisting of sociodemographic data and questions regarding awareness and knowledge of MRONJ. Descriptive statistics like mean, standard deviation, percentage and frequency were calculated. Students "t" test was used for statistical association between the variables at P-value of 0.05 using SPSS.

Results

Out of 191, 63 (32.98%) students were aware that drugs other than bisphosphonates can also cause osteonecrosis of jaw while only 16.23% students were able to name such drugs. Majority of the students (91.62%) failed to give proper definition of the MRONJ. More than half of the students did not know that invasive dental treatments cannot be given to patients who are currently on oral or intravenous bisphosphonates. Majority (77.5%) of the students didn't know the treatment guideline for MRONJ. Mean knowledge score of the students was 9.068±3.092. There was statistically significant association between the score and age, marital status and academic stream of the students (P-value <0.05).

Conclusions

The study showed that students had average knowledge and awareness on MRONJ. The knowledge score was statistically associated with age, marital status and educational level. It suggests preeminent steps should be taken to educate future dental students about MRONJ at undergraduate and post graduate level of dentistry.

Key words: Awareness; Dental students; Knowledge; Medication-related osteonecrosis of the jaw.

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INTRODUCTION

The American Association of Oral and Maxillofacial Surgeons has defined Medication-related osteonecrosis of jaw (MRONJ) as those presenting with a history of antiresorptive or antiangiogenic drug treatment, the presence of bone exposure or intra- or extraoral fistulization for over eight weeks without remission and no history of radiotherapy or diseases metastasizing to the maxilla.[1] It is a severe adverse drug reaction to antiresorptive and antiangiogenic drugs.[2,3] The risk of MRONJ among patients exposed to antiresorptive or antiangiogenic medications ranges from 0.1-6.7%.[4] The risk factors for MRONJ are tooth extractions, odontogenic inflammatory diseases, trauma by ill-fitted prosthetic dentures, mandibular and palatal tori, corticosteroids, smoking, absorbed dose of the antiresorptive medication and duration of exposure to the drug.[5,6] The etiology of MRONJ is not completely understood and many hypotheses have been proposed that includes remodeling suppression, osteoclast depression, angiogenesis disruption, and infection. A decrease in angiogenesis is a known contributor to the pathogenesis of osteonecrosis.[7] The management of MRONJ is problematic and patients do not respond well to the established protocols used for the treatment of MRONJ. Prevention is the key element in dealing with MRONJ.[8]

Dental care providers are more likely to encounter patients who are taking or have taken bisphosphonates and antiangiogenic drugs for osteoporosis, bony metastatic tumors, multiple myeloma, breast cancer and prostate cancer. A working knowledge and awareness of these medications are important for all dental practitioners. Education of dentists, pharmacists, general practitioners and patients about MRONJ is required.[9] It is crucial to recognize the clinical signs and symptoms of MRONJ, including its radiographic appearance. As MRONJ does not respond well to treatment, it is important to prevent and diagnose the disease early.

Awareness of MRONJ may be a key factor to implement preventative strategies in patients taking or exposed to bisphosphonates or antiangiogenic drugs. Various studies have indicated that awareness and knowledge regarding MRONJ seems to be lacking among dental students and practitioners.[9-12] Studies on the awareness and knowledge of MRONJ among dental students are very scarce. The detailed knowledge and awareness on occurrence of MRONJ is imperative. Therefore, this study was conducted to assess awareness and knowledge of MRONJ among dental students and to compare the mean knowledge score among undergraduate (UG) and postgraduate (PG) dental students.

METHODS

A cross-sectional study was conducted among UG and PG dental students between March-August, 2019 at College of Dental Surgery, B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. Sampling Method was population census. A semi-structured proforma was prepared based on the available literature review and used to collect the relevant data on sociodemographic profile, knowledge and on awareness of MRONJ.[13,14] Age, sex, academic stream were independent variables and mean knowledge score was dependent variable. There were 13 items on awareness (table 2) and 10 items on knowledge related to MRONJ. Score 1 was given for questions answered 'yes' and zero for 'no' or 'do not know' in knowledge section. The knowledge score ranged from 0-18. The knowledge was categorized as good (score 9-18) and poor (score <9). For validation and reliability, the questionnaire was pilot tested among 10% sample to clarity of the questions and advices from subject experts were also

taken and those samples were not included in the study. Cronbach's alpha was 0.79 indicating an acceptable level of reliability.

The principal investigator collected the data by visiting to the lecture theaters and individual dental departments. The objectives of the study were explained to the participants and written consent were taken. The proforma was then distributed anonymously and collected immediately within 15 minutes thereby removing false positive answers by discussing with peers or accessing alternative information sources. No personal information were collected to maintain the confidentiality of the participants. Ethical clearance was taken from Institutional Review Committee, BPKIHS (IRC/1474/2018).

The data were rechecked, coded and then entered in Microsoft Excel 2010. Descriptive variables mean, standard deviation (SD), percentage and frequency were calculated. Mean knowledge score was correlated with baseline variables using Student's "t" test at P-value of 0.05. All statistical analysis was conducted using SPSS version 11.5.

RESULTS

Out of 230 students, 191 participated in the study giving a response rate of (83%). Most of them (129, 67.54%) were female, unmarried (176, 92.15%) and aged 20-25 years (152, 79.58%). One hundred and fifty six students (81.68%) were undergraduate (UG) dental students and most of them were in 3rd year. Mean age of the students was 24.05±2.63years (**Table 1**).

Table 1. Sociodemographic characteristics of the participants. (n=191)

Variables		Frequency	Percentage
Gender	Male	62	32.46
	Female	129	67.54
Marital status	Married	15	7.85
	Single	176	92.15
Age group (years)	20-25	152	79.58
	26-30	35	18.32
	>30	4	2.09
Academic stream	(i) Undergraduate	156	81.68
	3rd year	56	35.9
	4th year	38	24.36
	5th year	33	21.12
	Intern	29	18.59
	(ii) Postgraduate	35	18.32
	1st year	16	45.71
	2nd year	10	28.57
	3rd year	9	25.71

Table 2 shows the awareness of MRONJ among the students. Most of the students (133, 69.63%) were aware of MRONJ; however only 63(33%) students were aware of the fact that drugs other than bisphosphonates can also cause osteonecrosis of the jaw. More than three forth students (149, 78.0%) were aware that asking the drug history of bisphosphonates and for antiangiogenic drugs is important before performing invasive dental treatment. More than four fifth students (158, 82.7%) were aware that patient should be checked and managed for the preexisting dental problems before starting bisphosphonates. More than half of the students did not know that invasive dental treatments cannot be given to patients who are currently on oral or intravenous bisphosphonates or who have taken bisphosphonates for more than 4 years. Majority of students (188, 98.4%) did not faced medication related osteonecrosis of jaw in their dental practice. Almost three fifth students (114, 59.7%) had got education on MRONJ and half of them got this education during Bachelor of Dental Surgery (BDS) course. Almost all students (97.9%) wanted more education on MRONJ and most of them preferred books

(71.7%) and workshop (64.4%) (**Table 2**).

Table 2. Awareness regarding medication related osteonecrosis of jaw. (n=191)

S.N.	Variables	Responses	Frequency	Percentage
1	Are you aware of medication related osteonecrosis of jaw?	Yes	133	69.6
		No	58	30.4
2	Are you aware that drugs other than bisphosphonates can cause osteonecrosis of jaw?	Yes	63	33.0
		No	128	67.0
3	Do you think that asking the drug history of bisphosphonates and antiangiogenic drugs is important before performing invasive treatment?	Yes	149	78.0
		No	7	3.7
		Do not know	35	18.3
4	Do you think that patient should be checked and managed the preexisting dental problems before starting bisphosphonates?	Yes	158	82.7
		No	2	1.0
		Do not know	31	16.3
5	Can invasive dental treatments be given to patients who are currently on oral bisphosphonates?	Yes	16	8.4
		No	71	37.1
		Do not know	104	54.5
6	Can invasive dental treatments be given to patients who are currently on intravenous bisphosphonates?	Yes	11	5.8
		No	83	43.5
		Do not know	97	50.7
7	Can invasive dental treatments be given to patients who have taken bisphosphonates for more than 4 years?	Yes	35	18.3
		No	55	28.8
		Do not know	101	52.9
8	Have you ever faced medication related osteonecrosis of jaw in your dental practice?	Yes	3	1.6
		No	188	98.4
9	Have you received any education on medication related osteonecrosis of jaw?	Yes	114	59.7
		No	77	40.3
10	You got the education on MRONJ through:	Taught during BDS course	113	59.2
		Seminar	54	28.3
		Continuing Dental Education	7	3.7
		Education within workplace	6	3.1
11	Are you aware of the guidelines for medication related osteonecrosis of jaw treatment?	Yes	43	22.5
		No	148	77.5
12	Would you like to learn more about medication related osteonecrosis of jaw?	Yes	187	97.9
		No	4	2.1
13	What would be your preference for continuing to learn about medication related osteonecrosis of jaw?	Books	137	71.7
		Workshop	123	64.4
		Journals	109	57.1
		seminar	43	22.5
		Structured Interactive Session	9	4.7
		internet	5	2.6
		Case Based Learning	2	1
		Continued Dental Education	1	0.5

The knowledge score ranged from 2 to 16. Only 112 students (58.6%) scored more than 50% of total knowledge score (**Figure 1**).

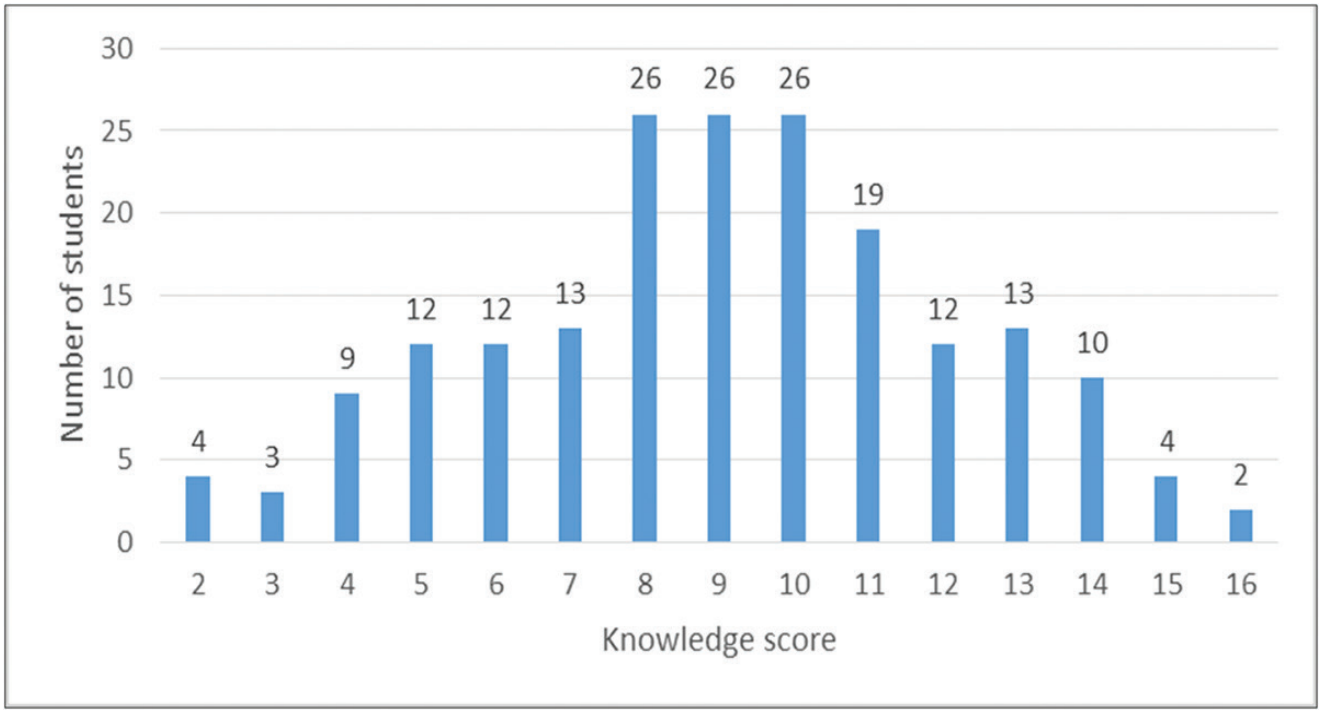

Figure 1. Knowledge score of the students (n=191)

Mean knowledge score of all students was 9.068±3.092. Out of 191, 112 (58.6%) students scored 50% and above while 79 (41.4%) students scored less than 50% of maximum score. The mean knowledge score of students having age more than 25 years (mean=11.74, SD=2.79) was statistically higher than the students having age up to 25 years (mean=8.41, SD=2.820) (t (189) = 6.334, P=000, d=1.14). Similarly, the mean knowledge score of postgraduate students (mean=11.77, SD=2.723) was statistically higher than the undergraduate students (mean=8.46,

Table 4. Knowledge score of the students. (n=191)

S. N.	Variables		Mean score ± Standard Deviation Upper limit	95% Confidence Interval of mean score		P-value	Cohen's d
				Lower limit			
1.	Gender	Male	9.37 ± 3.305	8.53	10.21	0.346	--
		Female	8.92 ± 2.986	8.40	9.44		
2	Age group in years	Up to 25	8.41 ± 2.820	7.96	8.87	0.000*	1.14
		> 25	11.62 ± 2.797	10.71	12.52		
3.	Marital status	Married	11.87 ± 2.924	10.25	13.49	0.000*	1.02
		Single	8.83 ± 2.994	8.38	9.27		
4.	Academic stream	Undergraduate	8.46 ± 2.841	8.01	8.91	0.000*	1.89
		Postgraduate	11.77 ± 2.723	10.84	12.71		

*Statistically significant at P-value less than 0.05 (Students t test)

SD=2.841) (t (189) = 6.276, P=000, d=1.89) (**Table 4**).

DISCUSSION

The increase in cases of MRONJ has indicated an imminent need for dentist to have a broad and consolidate knowledge about prevention, early detection and special management. Our study was performed with the aim to assess the knowledge and awareness of dentist about MRONJ. Most of the students were female and similar finding is also reported by Rosella et al.[15] Mean age of the students was 24.05 years and in contrast to this finding a lower mean age was reported by Rosella et al.[15] This was due to inclusion of PG students in our study. More than two third students (69.6%) were aware of medication related osteonecrosis of jaw. This is inconsistent with Park et al who reported that only 56.5 % of Korean dentists were aware of MRONJ.[12] Efforts to increase the awareness of MRONJ among dental students and practitioner is necessary emphasizing the importance of prevention of the disease. Approximately two third of the students were unaware that drugs other than bisphosphonates can also cause osteonecrosis of jaw. This is inconsistent with another study that identified that lesser number (55%) of the participants were unaware of any other drugs aside from bisphosphonates that could lead to the development of osteonecrosis of jaw.[10] This might be due to their study population that included dental practitioner who had more years of experiences. It remains important for dental surgeon to be aware of anti-angiogenic and antiresorptive drugs implicated in MRONJ as the number of these agents being prescribed is increasing and hence they are more likely to come across patients taking them.

Majority of the students failed to give proper definition of the MRONJ. In contrast to this majority of the participants gave a correct definition of osteonecrosis of the jaw stating 'dead bone' or 'death of bone' in a study conducted by Tanna et al.[10] Awareness of the definition of osteonecrosis and identification of 'at risk' patients is important for dental surgeon. More than three forth students were aware that asking the drug history of bisphosphonates and antiangiogenic drugs is important before performing invasive dental treatment. In contrast to this finding, only one third of Korean dentists used to ask antiresorptive drugs in patient medical history prior to surgery.[16] More than four fifth students were aware that patient should be checked and managed for the preexisting dental problems before starting bisphosphonates. Before starting administration of anti-resorptive for the treatment of osteoporosis, physicians need to explain to patients the benefits of anti-resorptive for bone metastases and osteoporosis, risks of anti-resorptive for MRONJ. It is wise to request patients to visit a dentist to control oral health to prevent the occurrence of MRONJ. All dental treatments should be completed two weeks before starting anti-resorptive treatment.[17] Patients should also be advised to maintain good levels of oral hygiene and to undergo regular dental check-ups (e.g. every 6 months) during treatment.[18]

More than half of the students did not know that invasive dental treatments cannot be given to patients who are currently on oral or intravenous bisphosphonates or who have taken bisphosphonates for more than 4 years. Similar findings is also reported by Yoo et al.[16] These findings describes the state of urgency in educating dentists about MRONJ. Majority of students had got education on MRONJ and half of them got this education during BDS course. Bisphosphonate is taught during BDS course as per the curriculum of the BPKIHS. There should be a separate module on MRONJ in phase 2 of BDS to make the students more aware on it. Almost all students wanted more education on MRONJ and most of them preferred books and

workshop. This is in consistent with the finding of Rosella et al.[15] The study suggests that there is a need for further education and regular update on MRONJ for dental students. The knowledge on MRONJ is found to be good only in three-fifth of the students. Out of 5 students, two had poor knowledge regarding MRONJ. The students aged more, married and PG scored more compared to the aged less, unmarried and UG students. The PG students have more experience as compared to the UG and hence they have high score. There is need of further education to young dental graduates through educational campaigns, seminar, workshop and lecture in collaboration with local dental association, state and national bodies to increase their knowledge about MRONJ.

Our study have some limitations. The study was limited to the UG and PG dental students at one college and hence any generalization to the students of other colleges may be inappropriate. The study was based on a self-reported questionnaire inducing an inconsistency between students' self-reported and actual awareness and knowledge.

CONCLUSIONS

The study showed that the knowledge and awareness on MRONJ among the students was not upto the standard level. It highlighted the importance of further education to increase the awareness and knowledge of MRONJ among the students. It also suggests that preeminent steps should be taken to educate future dentists about MRONJ at undergraduate and post graduate dental students.

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