Original Article

Knowledge of Bitewing Radiographs Among Faculty of Public Sector University Karachi, Pakistan

Isma Sajjad[1], Maham Muneeb Lone[1], Tazeen Zehra[3], Humera Akhlaq[2], Samira Adnan[1] and Muhammad Atif[2]

ABSTRACT

Objective: To evaluate Knowledge of Bitewing Radiographs among faculty of public Sector University Karachi, Pakistan.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Jinnah Sindh Medical University (JSMU) and Jinnah Postgraduate Medical Center (JPMC), Karachi during June 2021.

Materials and Methods: A questionnaire-based survey was conducted with permission of JSMU Ethical Committee. A questionnaire was disseminated in faculty of the institute. The questionnaire included consent form, demographic details and questions related to bitewing radiographs. Data was analyzed using SPSS version 21.

Results: Total 73 complete responses were received and analyzed**.** Nearly one-third were attending specialization (n=23, 31.5%). All of the participants heard about bitewing radiograph. 41(56.2%) did not prescribe bitewing radiograph in their practice. Majority responded that occlusion radiograph and bitewing radiograph are not the same thing (n=67, 91.8%). Most of the participants were using periapical radiograph n=70, 95.9%) and few reported that were using bitewing (n=2, 2.7%) and occlusal radiograph (n=1, 1.4%).

Conclusion: Although dental practitioner had awareness of bitewing radiograph but it is particularly underutilized among practitioners at our institute for diagnosing dental caries. Therefore, trainings sessions should be could conducted to improve the clinical practices to establish appropriate diagnosis of dental caries and providing the timely management to patients.

Key Words: Dental caries, dental practitioner, bitewing radiograph, periapical radiograph, public sector hospital, Karachi, Pakistan.

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INTRODUCTION

One of the most frequently occurring oral disease caused by bacteria is dental caries [1]. American Dental Association classified dental caries as normal, initial, moderate or extensive based on the lesion severity [2]. It is well recognized that prompt diagnosis is essential for initiating effective management plans to increase the success chance and lessening the healthcare costs. This concept is also applies to oral diseases including dental caries.

[1.] Department of Operative Dentistry / Oral Pathology[2], Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University, Karachi.

[3.] Department of Operative Dentistry, Liaquat College of Medicine and Dentistry, Karachi.

Correspondence: Dr. Isma Sajjad, Assistant Professor of Operative Dentistry, Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University, Karachi.
Contact No: 0333-7593872
Email: isma.sajjad@jsmu.edu.pk

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However, because of lacking in timely diagnosis, these lesions are mostly identified in late stages when restoring is the merely effective option [3].

The identification of proximal caries with proper and timely diagnosis is a challenging task for general dental practitioners in their routine practice [4, 5]. the diagnosis established with the correlation of clinical and imaging findings. In this context, radiography is the dentists' chief diagnostic support among various domains of dentistry which may establish diagnosis for intra and post-operative conditions for various dental procedures [6]. Disregarding the radiographs use shown the underestimation of dental caries, particularly in proximal and occlusal surfaces [7].

There are many modalities for detection of dental caries with each modality has its own limitations. The most frequently using technique for detecting caries is visual-tactile. Further non-invasive methods for early detection have been emerged and studied including Fibre-optic Transillumination (FOTI), DIAGNOdent (DD), Quantitative Light-induced Fluorescence (QLF) and Electrical Conductance (EC) [8]. Nevertheless, because of lacking in light dispersion, use in the clinical setting, and inadequate capacity of bacteriological

byproducts, none of these techniques in their existing way are smart enough for early identification of caries. The Finnish Current Care Guidelines to manage dental caries delineate radiographic imaging as reasonable in kids even if caries lesion penetrates into dentin as identified through visual clinical evaluation. Radiographic imaging is also permissible even if there is a basis to suspect that there may be raised dental caries risk and radiographic images have not been taken in years [9].

Bitewing radiography is an imaging technique through which premolar, molars and alveolar bones are distinctly bilaterally appear on the radiograph. Radiographic imaging is done by inserting a receptor inside and corresponding to the dental arch next to the anticipated part, typically through a particular holder which benefits placing of the X-ray tube[10]. Since carious lesions are repeatedly existing on the proximal planes, it is suggested to carry out not only a visual and medical assessment but likewise prescribe bitewing X-rays [11].

It is documented that in a perfect clinical setting (with sufficient light, and hygienic and dehydrated teeth), clinical inspections conducted without adjunctive radiography have been observed to miscalculate the definite illness severity [12]. It was observed in China that clinical evaluation alone without bitewing radiograph caused the underrating of caries lesion nearly by 50% [13]. Since dental carries impose other serious complaints such as toothache, dental abscesses, loss of function, poor diet, and tooth loss and it is underestimated when radiographic evaluations are not used. Therefore, it is very necessary to ascertain its knowledge among our local dental practitioners.

MATERIALS AND METHODS

This cross-sectional survey was performed at Sindh institute of Oral Health Sciences, Jinnah Sindh Medical University, Karachi during the month of June 2021 with acquiescence of hospital ethics committee. The survey included all of dental faculty and general dental practitioner working at the institute. Survey participants who were not giving consent to participate were excluded from the study. The written consent was gained from the participants which was the first component of the survey questionnaire.

A questionnaire distributed to all of the targeted population of the institutes. Reminders were sent to participants who did not respond and their responses was expected within a week and this way the link of the survey was closed when all of the participants responded within one week of the reminders. The first part of the questionnaire was consent form those who were filling were suggested to fill out the survey further. Second component included demographic such as dental specialization, years of practicing. Third part included questions related to their practice of prescribing bitewing radiographs and their perceptions regarding bitewing radiographs. In fourth part, their preference for using bitewing radiograph in different dental conditions was determined. The questionnaire is attached as supplementary material.

The collected data was imported to SPSS version 21 for statistical analysis. Categorical data was summarized as frequency and percentages whereas mean ± standard deviation was calculated to present continuous variables. Appropriate tables and graphical representation was used to present the data.

RESULTS

Total 73 complete responses were received and analyzed. Nearly one-third were attending specialization (n=23, 31.5%). 19(26%) had no specialization. Among 54(39.7%) participants who had specialization or attending specialization, most of them had specialist of operative dentistry (n=28, 51.9%) followed by maxillofacial surgery (n=7, 13%), ortho (n=6, 11.1%), basic science (n=6, 11.1%), prosthodontics? (n=4, 7.4%), periodontics (n=3, 5.6%). Majority had experience of less than 5 years (n=31, 42.5%) whereas some people also had experience of 5-9 years (n=26, 35.6%), 10-19 years (n=14, 19.2%) and ≥20 years (n=2, 2.7%).

Figure 1 shows the frequency of doctors who had practice of prescribing bitewing radiographs. Among 32 (43.8%) who reported that they prescribe it to their patients, 19(59.4%), 12(37.5%), and 1(3.1%) were prescribing several times a year, month and week respectively. In response of question, do they think that occlusion radiograph and bitewing radiograph are same thing, most of them said they did not think so (n=67, 91.8%). Most of the participants were using periapical radiograph n=70, 95.9%) and few reported that they were using bitewing (n=2, 2.7%) and occlusal radiograph (n=1, 1.4%).

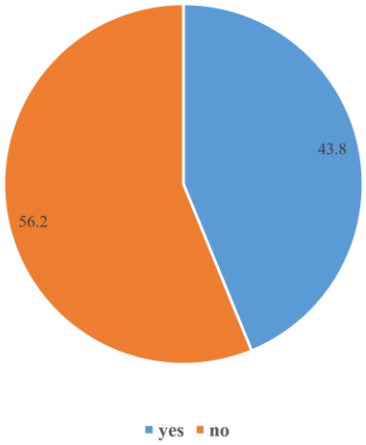

Figure No.1: Proportions of participants prescribing bitewing radiographs to patients in their practice

Survey respondents reported that they were using radiographs because of the following reasons; their

expertise in interpreting it (n=4, 5.5%), personal preferences (n=15, 20.5%), clarity in diagnosing (n=25, 34.2%), assistant training (n=1, 1.4%) and ease of availability (n=21, 28.8%). Table 1 shows their level of preference of using bitewing radiograph versus periapical radiograph for the different dental defects.

Table No.1: Dental practitioner preference of prescribing bitewing radiograph over periapical radiograph

Dental conditions	Least preferred	Slightly preferred	Neutral	Preferred	Most preferred
Vertical bone loss	28(38.4)	20(27.4)	9(12.3)	7(9.6)	9(12.3)
Horizontal bone loss	11(15.1)	17(23.3)	13(17.8)	14(19.2)	18(24.7)
Occlusal carries	18(24.7)	7(9.6)	6(8.2)	19(26)	23(31.5)
Proximal carries	1(1.4)	4(5.5)	7(9.6)	10(13.7)	51(69.9)
Overhang restoration	5(6.8)	3(4.1)	9(12.3)	14(19.2)	42(57.5)
Foreign body impaction	15(20.5)	6(8.2)	25(34.2)	8(11)	19(26)
Calculus	30(41.1)	11(15.1)	5(6.8)	11(15.1)	16(21.9)
Apical periodontitis	45(61.6)	11(15.1)	7(9.6)	3(4.1)	7(9.6)

DISCUSSION

Dental radiography is the primary part of understanding process of mass fatality events. It provides unbiased indication of the dentition formerly and subsequently death. Radiographs are a beneficial instrument for dental practitioners for a range of purposes including diagnosing caries for evaluating bone loss in periodontal disease. Radiographs may be tremendously beneficial throughout the dental management of a patient as the job of identifying caries is chief work of a dentist. Establishing a diagnosis of caries relies on a combination of detailed clinical investigation and the practice of different tests, the commonest of which is bitewing radiography.

It is not possible to underrate the radiographs utilization, particularly bitewings, for the identification of caries (specifically in kids). According to the Faculty of General Dental Practice (FGDP), bitewings are a crucial aids for clinical evaluation [14]. This kind of narrative emphasizes the radiographs significance for caries recognition and consequently the concern of subsequent reporting and disease evaluation.

In the present study, nearly half of the participants (43.2%) reported that they prescribe bitewing radiograph in their practice. However, another Pakistani survey conducted among dental practitioner reported that 96.4% of the practicing dentist had x-ray unit in their working institute/clinic [15]. It is quite alarming to conclude that there is underutilization of bitewing radiographs in our local settings. On the other hand, an international survey reported that 79.4% of the participated dentist were using digital radiological imaging[16]. A cross-sectional study performed in Norway to reveal the diagnostic value of the bitewing radiograph demonstrated that in 90% of the cases bitewings are consistently advised with a clinical checkup[17]. However, some studies have interrogated whether consuming radiographs for increasing the sensitivity of visual inspection have concurrently lessen its specificity and presented numerous cases of false positives, leading to an overestimation of caries and consequently overtreatment [18, 19].

Periapical method offers complementary evidences at a comparatively small price and radiation dosage. Each periapical X-ray displays all teeth in single portion of either the upper or lower jaw. Periapical X-rays discover any rare variations in the root and nearby bone structures. However, in spite of its extensive use, it is unable to portray the compound anatomic outline of teeth as image overlapping inherent to conventional 2-dimensional radiography [20]. On other hand, bitewing illustrates a tooth from its crown to the level of the backup bone. Bitewing radiography identify deterioration in between of teeth and alterations in bone thickness occurred because of gum problems. Bitewing X-rays may also aid in determining the appropriate fitting of a crown or further restorations. It may comprehend any wear or breakdown of dental fillings as well. It was reported observer performance was greatest with intraoral bitewing use for making diagnosis of interproximal caries [20, 21].

In our study, majority of respondents were using periapical (95.9%). Awareness level of dentist was investigated in a survey conducted in Tanzania which reported that the periapical X-ray was suggested for 65.5% patients, 28.9% were advised for orthopantomograms and 5.6% remaining was advised for both OPG and periapical X-rays[22]. However, a study was performed to compare accuracy of bitewing and periapical methods for early diagnosis of interproximal caries keeping consensus reference as gold standard and it was observed that bitewing showed a meaningfully higher sensitivity than periapicals for all stages of caries. Positive-predictive value and negative-predictive value of bitewing were also considerably higher than periapical and hence it was concluded that bitewings offer a substantial benefit over periapical for establishing early diagnosis of interproximal carious lesions [23].

In this survey, most of the faculty reported that they were using radiographs for clarity in diagnosis (34.2%), ease of availability (28.8%) and personal preferences (20.5%). A survey from Tanzania reported that dentists were using imaging X-rays because they felt it was a great aid for confirming the diagnosis (37.9%), diagnosis and management could be more accurate

(35.4%) and it was part of patients' management (16.1%). 22.7% also reported that dental x-rays could also play part in knowing the patients' age [22]. It was revealed in a cross-sectional survey conducted in Sweden that dentists were preferring digital radiographs due to following reasons; image processing (87%), improved image quality (66%), improved communication with patient (86%), improved diagnosis (74%), ease of work (91%) and lesser radiation dose is required (85%) [24].

The present study shows a single center experience of a public sector institute which may not generalized to all dental practitioners in Pakistan. Moreover, the study was descriptive in nature so possible factors associated with practice of prescribing the bitewing radiographs were not assessed. The studies also did not uncover the barriers which stop dental practitioner to prescribe the radiographs. To reveal the basic knowledge of bitewing and practices of prescribing it among Pakistani dentist, we prose a future nation-wide survey with larger sample size.

CONCLUSION

Although dental practitioner had awareness of bitewing radiograph but it is particularly underutilized among practitioners at our institute for diagnosing dental caries. Therefore, trainings sessions should be could conducted to improve the clinical practices to establish appropriate diagnosis of dental caries and providing the timely management to patients.

Author's Contribution:

Concept & Design of Study:	Isma Sajjad
Drafting:	Maham Muneeb Lone, Tazeen Zehra
Data Analysis:	Humera Akhlaq, Samira Adnan, Muhammad Atif
Revisiting Critically:	Isma Sajjad, Maham Muneeb Lone
Final Approval of version:	Isma Sajjad

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