ORIGINAL ARTICLE

A Survey on Knowledge and Practices in Erosive Tooth Wear Among Dental Practitioners in Kuantan, Pahang: A Preliminary Study

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ABSTRACT

Introduction: Erosive tooth wear (ETW) is an emerging dental condition worldwide. However, most dental practitioners overlooked the early stages of the condition due to vague clinical appearance of tooth surface loss. Therefore, this study was aimed to determine the knowledge of ETW and treatment given amongst dental professionals in private clinics in Kuantan, Pahang. **Method:** Several private dental clinics in Kuantan, Pahang, involved in this cross-sectional study. Dental practitioners were volunteering to participate in this research. A validated self-administered questionnaire was distributed, and a descriptive analysis was conducted. **Results:** The overall response rate was 75%. Results revealed that most participants obtained a structured education on ETW (79.2%). Through continuous dental education, about half of the participants learnt further. All participants agreed that carbonated drink caused ETW, and most reported that gastroesophageal reflux diseases and pickles had related to the ETW. The majority of participants favoured case note (79%) with regards to ETW records. Nevertheless, 40.9% and 36.4% are recorded at the tooth surface and individual level, respectively. Surprisingly, 79% of them did not know about special scores when assessing ETW. Most participants prefer to give instruction on oral hygiene and diet counselling as preventive measures, but the use of fluoride was not given priority. 77% have not ever referred the case to a dental specialist and preferred to treat the patient on their own. **Conclusion:** ETW knowledge among recruited PDPs is adequate; however, no specific indices were used for ETW scoring and insufficient treatment strategies..

Keywords: Diagnosis, Erosive tooth wear, Indices, Treatment, Private dental practitioners

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INTRODUCTION

Erosive tooth wear (ETW) is known for its multifactorial condition. Tooth wear is a general term used to describe a loss of dental hard tissue not due to bacteria or trauma. They also indicated that it might be categories depends on the physical and chemical impacts (5). Dental erosion is a partial demineralisation by extrinsic or intrinsic acid of enamel or dentine, while ETW is an accelerated loss of dental hard tissue through the combined effects of erosion and mechanical wear on the surface of the tooth (7). Most experts think the prevalence and severity of ETW has increased significantly (8, 13).

Unfortunately, the public's knowledge of ETW is still minimal, and most dental practitioners have missed the very early stages of ETW. There was insufficient understanding of dental erosion among students and faculty members of Brazilian Dental School (6), while only half of Sanaa dental practitioners seem to have sufficient knowledge of early dental erosion, causative factors and preventive measures (2). Early detection and prevention of ETW are very crucial because it is a slowly progressive condition and compromising the healthy dentition in later life, although in the mild stage. Unfortunately, most dental practitioners overlooked the very initial phases of tooth surface loss due to its nature and symptomless condition (6).

Many indices are available to record ETW, such as Eccles Index and Basic Erosive Wear Examination (BEWE). However, there is no specific tool and standardisation in recording ETW conditions among general dental practitioners (1). A survey among Norwegian dentists reported that they had good knowledge of ETW, but the documentation of ETW was not standardised (12). Hence, it is difficult to come up with a diagnosis and

adequate preventive measures.

Up to our knowledge, there has been no study conducted among dental practitioners in Malaysia to determine knowledge of diagnosis and treatment strategies of ETW. Hence, this study aims to determine the awareness among private dental practitioners in Kuantan, Pahang, about diagnosis and treatment strategies of ETW.

MATERIALS AND METHODS

Cross-sectional research was undertaken in private dental clinics of Kuantan, Pahang. Private dental practitioners (PDP) except for dental specialists were identified using convenience sampling. Participants of this study include PDP and general dental practitioners (GDP) who performed locum at the private clinics in Kuantan.

The questionnaire was developed in English by referring to the study done by Mulic et al. (2012). It consists of three (3) sections with a total of 25 questions. In the first section, the participants were asked about socio-demographic information, including year and place of graduation, the current workplace and sector of work. The second section of the questionnaire covered participant's knowledge of ETW, including its clinical features, etiological factors, source of information about ETW, a trend of ETW, and also ways of recording and indices used by participants to assess ETW. Finally, preventive measures and materials used by participants to treat ETW were recorded in the third section of the questionnaire.

This questionnaire has gone through a validation process, which is face validity and content validity. A pilot test was conducted at the outpatient dental clinic, International Islamic University Malaysia (IIUM), among six (6) dental officers. The survey was distributed accordingly and was collected on the same day. The items in the questionnaire were revised according to the feedback received from the pilot test. The modified and validated questionnaires were distributed among 32 private dental practitioners in Kuantan. A reminder has been given twice a week to the participants through phone calls within three weeks. Unfortunately, only 24 participants had returned the completed questionnaire. Analysed data using version 19.0 of the Statistical Package for Social Sciences (SPSS). The data was cleaned by running frequency distribution before data analysis. The descriptive statistics were performed to evaluate the response rates for each part of the questionnaires relating to ETW's knowledge of diagnosis and treatment strategies.

Ethical approval was obtained from the IIUM Research Ethics Committee (IREC) (IIUM/305/14/11/2/IREC566) before the actual survey. It also obtained permission from selected private dental clinics to conduct the study. Written consent was obtained from all participants, and all information was kept strictly confidential.

RESULTS

Overall, 24 out of 32 private dental practitioners had returned the completed questionnaire providing a response rate of 75%. Most of them had graduated from the local university range about four (4) to twenty-seven (27) years back. The majority of the participants (54.2%) work in the private sector only, 12.5% involved in the private and university sector. Meanwhile, 33.3% of them work in the private and government sector. Table I stated that about 79.2% of the participants received information regarding ETW from dental school, 54.2% of them also acquired from a scientific journal, and 50% learned from their studies.

Table I: Participant's source of information about erosive tooth wear (ETW)

Source of information about ETW	Number of participants (%)
Syllabus in dental school	19 (79.2)
Journal/scientific article	13 (54.2)
Own studies	12 (50.0)
Continuous dental education	10 (41.7)
Media	3 (12.5)

Table II depicts the opinion on the causative factors of ETW among participants. All participants suggested the carbonated drink as one of the causative factors of ETW. In contrast, 87.5% and 75.0% of the participants suggested gastroesophageal reflux disease (GERD), and fruit juice also can cause erosive tooth wear.

Table II: Participant's opinions on the causative factors of erosive tooth wear

Causative factors of ETW	Number of participants (%)
Carbonated drinks	24 (100.0)
Gastroesophageal reflux disease	21 (87.5)
Fruit juice	12 (75.0)
Pickles	16 (66.7)
Anorexia	14 (58.3)
Fruits	12 (50.0)
Wine	11 (45.8)
Sport drinks	9 (37.5)
Competitive swimming	7 (29.2)
Xerostomia	4 (16.7)
Other	4 (16.7)
Dehydration	2 (8.3)
Plain water	1 (4.2)

The majority of participants (91.7%) have seen patients with ETW. However, 33.3% of participants claimed that they only encountered one or two patients with ETW monthly. About half of the participants, 45.7% and 41.7%, have found ETW among adult and elderly patients, respectively. 66.7% of the participants reported that they commonly found ETW cases among male patients. Besides, 62.5% of the participants reported that they had encountered patients with a moderate stage of ETW, while 20.8% and 8.3% met patients in mild and severe stages, respectively. The participant's opinions

on trends in erosive tooth wear prevalence, as in Fig. 1 showed that 41.7% of them knew that the ETW trend has been increasing, while another 41.7% were not sure about it. Less than 9% of the participants reported that the pattern had been decreasing and did not change.

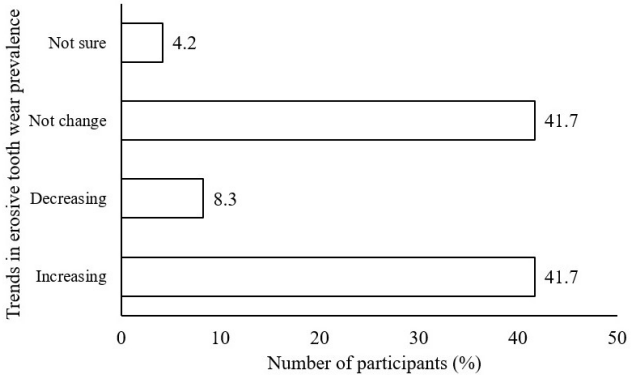

Figure 1: Participant's opinion on trends in erosive tooths wear prevalnce

Table III shows the participant's knowledge of the clinical features of ETW. All of the participants stated that enamel loss on the palatal surface of the maxillary tooth as one of the clinical features of ETW. The other clinical features reported are surface of restoration is higher than the level of a tooth (79.2%), cupping on the molar cusp (62.5%), dull enamel surfaces (58.3%). Only 29.2% of participants suggested wear of incisal edge of the anterior mandibular tooth and wore of the incisal edge of the anterior maxillary tooth (20.8%) as the clinical features of ETW.

Table III: Participant's knowledge of the erosive tooth wear clinical features

Clinical features of ETW	Number of participants (%)
Loss of enamel on palatal of the maxillary tooth	24 (100.0)
The surface of restoration is higher than the level of tooth	19 (79.2)
Cupping cusp tips of molar	15 (62.5)
Dull enamel surfaces	14 (58.3)
Wear of incisal edges mandibular anterior tooth only	7 (29.2)
Wear of incisal edges of the anterior maxillary tooth only	5 (20.8)

The second aim of this study is to evaluate the assessment tools and indices used by the participants to diagnose ETW. Figure 2 showed the style of recording ETW cases by the participants. The majority of participants (40.6%) recorded data at the tooth surface level (example; mesiobuccal, distal etc.), while 36.4% of them recorded at the individual level (for example, the patient presented with or without ETW).

Regarding the criteria considered in the ETW assessment, 91.7% of the participants depends on the clinical signs of ETW without using any index. At the same time,

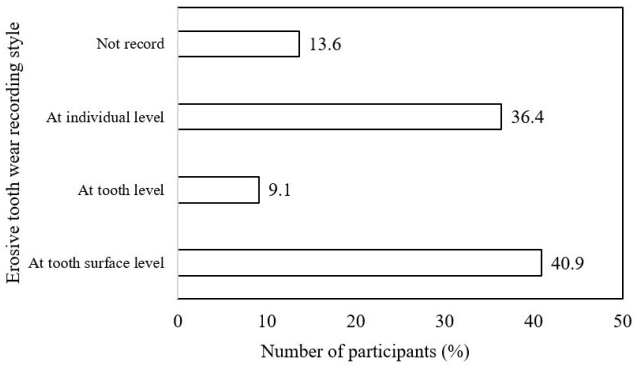

Figure 2: Erosive tooth wear recording style by the participants

75% asked the dietary habit of the patient. Only 4% of them depended on clinical signs of ETW with a specific index (Table IV). Most of the participants (79%) did not know the specific scoring of ETW. Only a minority of participants (8%) knew indices of ETW. Regarding the index of ETW, the participants recognised Erosion Index and Basic Erosive Wear Examination (BEWE).

Table IV: Criteria considered by participants in assessing erosive tooth wear condition

Criteria considered in assessing ETW condition	Number of participants (%)
I depend on the clinical signs of ETW without using any index	22 (91.7%)
I will ask the dietary habit of patient	18 (75.0%)
I will ask the patient's medical illness if any	16 (66.7%)
I will ask the patient's occupation	5 (20.8%)
I depend on the clinical signs of ETW with a special index	1 (4.2%)

When they were facing with ETW cases, majority of the participants (91.7%) claimed that they feel competent in recognising clinical signs and aetiology of ETW, while 87% of them feel competent to treat patients and discuss treatment strategies of ETW with patients. However, most of the participants (79%) choose case notes as a method to document ETW cases. 41.7% of them never used a clinical photograph, 78.3% never taking an impression for the study model, and 20.8% never used case notes for the record.

Table V depicts the preventive measures offered by participants for patients with ETW. The standard preventive measures provided by the participants were giving oral hygiene instruction, diet advice and recommend patients to use sensitive toothpaste and. Only a few of them carried out the salivary status assessment and defaulted any treatment for ETW patients.

More than half of the participants feel competent to treat the mild and moderate stage of ETW. Furthermore, 77% never refer their ETW cases to dental specialists or physicians, and 63.6 % of them treat ETW cases by themselves.

Table V: Preventive measures taken for a patient with erosive tooth wear

Preventive measures taken for ETW patient	Number of participants (%)
Oral hygiene instruction	16 (80%)
Sensitive toothpaste	16 (80%)
Diet counselling	14 (70%)
Composite restoration	9 (45%)
Bonding agents	6 (30%)
Occlusal guard	6 (30%)
Tooth mousse	5 (25%)
Fluoride varnish	5 (25%)
None	2 (10%)
Salivary status assessment	1 (5%)
Fluoride mouthwash	1 (5%)

DISCUSSION

In this study, most of the participants acquired knowledge on ETW during the undergraduate study in dental school and have basic knowledge about it. However, more than half of the participants gained information about erosive tooth wear from the syllabus taught during undergraduate years in dental school and self-reading of scientific journal articles. According to Al-Ashtal et al. (2015), the inadequate coverage of the syllabus during undergraduate about dental erosion might contribute to this finding (2). Although most of them have adequate knowledge about ETW, but most of them did not aware of the increasing trend of ETW. The practitioners also missed to detect the early sign of ETW. It could be due to a lack of ETW cases seen by them since many of them have only encountered one or two patients in a month and lack of clinical exposure during undergraduate years. It is supported by the study conducted in Brazil (6).

The participants revealed to have good knowledge on ETW causative factors, similar to the finding of the previous study (2, 12). It can be seen that most of the participants knew that acidic drinks, food intake, as well as a systemic disease like gastroesophageal reflux disease (GERD) could cause ETW. Although most of them assess ETW by asking a patient's dietary intake and medical illness.

Majority of the participants used the dental restoration is higher than the level of the tooth surface as a clinical features in diagnose ETW cases, indicating that the participants have good knowledge about this which is in accordance to the study by Al-Ashtal et al. (2015) and Mulic et al. (2012) (2, 12). Ganss and Lussi (2006) and Lussi et al. (2006) had proposed that the appearance on the facial and oral site of a smooth, silky-glazed appearance is typical of early erosion (4, 10). They also stated that, in advanced stages, dental erosion clinically appeared as rounding of cusps grooves and incisal edges, restorations rising above the level of adjacent tooth surfaces, and flattening of the surface of enamel concavities. Then, occlusal morphology disappeared in the severe stage (4, 10).

This study showed that most of the participants only encountered a patient with a moderate stage of ETW. Almost half of them also found that adult and the elderly group was typical to have ETW. It might be due to overlooking the early clinical sign of ETW by the clinician, or the patients with the mild stage of ETW did not feel any disturbing symptom. The finding of this study was nearly similar to the survey by Al-Ashtal et al. (2015), which concluded that in its early stages, many respondents in Sanaa ignored the diagnosis and preventive measures of dental erosion (2).

Clinical signs of ETW are the essential criteria to consider for the assessment of ETW (14). Furthermore, they also suggested that the clinician must determine other risk factors further to assess ETW, which indicates the importance of clinical and non-clinical signs (14). In this study, most participants (91.7%) depend on the clinical signs of ETW without using any index, and 75% of them will ask the dietary habit of the patient to assess ETW. It is a useful finding because the assessment of ETW should include both clinical and risk factors to provide effective prevention for the ETW. Furthermore, this concurred with the previous Yemeni study, in which the majority of dentists and dental students were practice asking on a dietary habit of the patient to aid in the diagnosis and treatment strategies of ETW (2).

Ganss et al. (2011) highlighted the importance of grading index to record the presence, severity and progression of ETW (5). However, most of the participants (79%) in this study did not seem aware of the specific scoring of ETW, and a minority of participants (8%) knows indices of ETW. This finding is consistent with a study by Hermont et al. (2011), in which most faculty members and students did not know the availability of a specific index to record ETW (6). Al-Ashtal et al. (2015) suggested that this is due to a lack of knowledge regarding the indices of dental erosion (2). Moreover, this might be due to the nature of ETW since the disease was not recognised previously compared to dental caries or periodontal diseases.

The participants recognized the Erosion Index and Basic Erosive Wear Examination (BEWE) with regard to the ETW indices. BEWE was proposed to provide a simple scoring system that includes diagnostic criteria for previous indices and allows for reassessment and integration in comparison with previous studies (3). Furthermore, Lopez-Frias et al. (2012) revealed that many indices had been developed all over the world, which varies considerably to classification, scale and grading. Hence, it is expected to have a variation in data documentation due to the availability of various types of literature (9).

Data documentation is vital as part of medico-legal in dentistry. In this study, the majority of participants (79%) choose case notes as a method to record ETW cases. Almost half (40.9%) of dental practitioners in this study prefer to record ETW at tooth surface level (e.g., mesiobuccal, buccal or lingual) while another 36.4% prefer to record individually (e.g., the patient presented with or without ETW). The difference of preference might due to no "gold standard" implemented when the participants studied during undergraduates and also different degrees of erosion such as mild cases of ETW, which influenced the operator's choice to record ETW in different patients. Mulic et al. (2012), in their study, also reported that there was no standardisation in recording ETW cases among Norwegian dentists (12).

In the present study, most of the participants feel competent to recognise clinical signs of ETW. It indicates that they have adequate knowledge about the clinical features of ETW. The finding also indicated that they feel competent to treat a patient with ETW and discussing its aetiology. Generally, dental professionals are expected to gain knowledge about ETW in their undergraduate studies. These findings are consistent with Mulic et al. (2012) about the competency of Norwegian dentists to record and diagnose ETW and also to be able to treat the patient by themselves (12).

Surprisingly, the majority of dental practitioners never referred their ETW cases to dental specialists or physicians and preferred to treat patients with ETW by themselves. Mulic et al. (2012) in their study also found a similar result among Norwegian dentist (12). It may indicate that the practitioners have sufficient knowledge and feel competent in their skills. It may also due to their self-sufficient experiences in dealing with ETW's patients.

In terms of preventive measures, most of the participants prefer behavioural attitudes modification to treat ETW by highlighting oral hygiene instruction and diet counseling to the patient. This finding is similar to a study by Mulic et al. (2012) (12). Therefore, it indicates that the participants have good knowledge of the etiological factor of ETW in which they can come out with an excellent preventive treatment plan for specific patients. Hermont et al. (2011) in their research also suggest that professionals need to spare more time on providing education for behavioural modification in patients besides providing other treatment strategies (6). According to the previous study by Mulic et al. (2012) and Hermont et al. (2011), the majority of dentists recommended fluoride as their primary treatment strategies for ETW (6, 12). Conversely, the finding of this study and also another study by Al-Ashtal et al. (2015), revealed that only a minority of them advised fluoride usage to treat ETW (2). Hence, further encouragement on the usage of fluoride needed because the previous study conducted by Magalhaes et al. (2011) has evidence that fluoride generally will strengthen the teeth against erosion and frequent applications will provide effective prevention on ETW (11).

CONCLUSION

Generally, most participants in this study have adequate knowledge about the causative factor of ETW; however, they have limited exposure and input on specific indices for ETW. Recording ETW from the early stage should be highlighted during data documentation so that the treatment of ETW can be carried out based on patient needs. Most participants prefer to treat ETW cases by themselves and focus more on behavioural modification, such as oral hygiene instruction and diet counseling. The usage of fluoride as the preventive measures also was not widely prioritised by the participants. As the prevalence and incidence of ETW have increased from time to time, dental practitioners need to equipped with good knowledge of preventive measures and early diagnosis of ETW. Nevertheless, specific scoring for ETW should be implemented and standardised among all dental practitioners for better diagnosis and treatment given.

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REFERENCES

1. Alix Y, Bennett TA, Christopher D, Peter H, June N, Ulrich S, Lussi A & Carolina G. Current erosion indices - flawed or valid? Clini Oral Investig. 2008;12(1):59-63.
2. Al-Ashtal A, Johansson A, Omar R, & Johansson AK. Awareness and knowledge of dental erosion among Yemeni dental professionals and students. BMC Oral Health. 2015;15:119.
3. Bartlett D, Ganss C & Lussi A. Basic Erosive Wear Examination (BEWE): a new scoring system for scientific and clinical needs. Clin Oral Investig. 2008;12 Suppl 1(Suppl 1):S65-S68. doi:10.1007/s00784-007-0181-5.
4. Ganss C & Lussi A. Diagnosis of erosive tooth wear. Monogr oral Sci. 2006;20:32–43.
5. Ganss C, Young A & Lussi A. Tooth wear and erosion: methodological issues in epidemiological and public health research and the future research agenda. Community Dent Health. 2011;28(3):191-195.
6. Hermont AP, Oliveira PAD, & Auad SM. Tooth erosion awareness in a Brazilian Dental School. J Dent Educ. 2011;75(12):1620-1626.
7. Huysmans MC, Chew HP, & Ellwood RP. Clinical studies of dental erosion and erosive wear. Caries

Res. 2011;45(1):60-68.
8. Jaeggi T & Lussi A. Prevalence, incidence and distribution of erosion. Monogr oral Sci. 2006;20:44-65.
9. Lypez-Frнas FJ, Castellanos-Cosano L, Martнn-Gonzбlez J, Llamas-Carreras JM, & Segura-Egea JJ. Clinical measurement of tooth wear: Tooth wear indices. Journal of Clinical and Experimental Dentistry. 2012;4(1):48–53.
10. Lussi A, Hellwig E, Zero D, & Jaeggi T. Erosive tooth wear: diagnosis, risk factors, and prevention. Am J Dent. 2006;19(6):319–325.
11. Magalhaes AC, Wiegand A, Rios D, Buzalaf MAR & Lussi AFluoride in dental erosion. Monographs in oral science. 2011;22:158-170.
12. Mulic A, Vidnes-Kopperud S, Skaare AB, Tveit AB, Young A. Opinions on Dental Erosive Lesions, Knowledge of Diagnosis, and Treatment Strategies among Norwegian Dentists: A Questionnaire Survey. Int J Dent. 2012;716396. doi:10.1155/2012/716396
13. Ab Halim N, Esa R & Chew HP. General and erosive tooth wear of 16-year-old adolescents in Kuantan, Malaysia: prevalence and association with dental caries. BMC Oral Health. 2018;18,11. https://doi.org/10.1186/s12903-017-0451-9.
14. Wang X & Lussi A. Assessment and management of dental erosion. Dent Clin North Am 2010;54(3): 565-578.