ORIGINAL ARTICLE
ISSN 2645-4351

https://doi.org/10.22037/jds.v43i3.46684

Knowledge and Attitudes of Dentists Regarding the Etiology and Management of Non-Carious Cervical Lesions in teeth

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Submitted: 01 November 2024
Revised: 29 December 2024
Accepted: 08 January 2025
Published: Summer 2025

How to cite:
Feili F, Seidkhani H, Mahdavi MM. Knowledge and Attitudes of Dentists Regarding the Etiology and Management of Non-Carious Cervical Lesions in teeth. J Dent Sch 2025;43(3):114-120.

Abstract:

Objective(s): This study aimed to assess the knowledge and attitudes of dentists regarding the etiology and management of non-carious cervical lesions (NCCLs) and to identify gaps in their understanding. **Methods:** A cross-sectional study was conducted involving 119 general dentists in Ilam, Iran. A validated questionnaire, consisting of 39 questions concerning the etiology and management of NCCLs, was distributed. Data were analyzed using descriptive and inferential statistical methods by Chi-square and T-test at $p<0.05$. **Results:** There was significant difference in knowledge and attitude based on age and experience. Dentists over 40 and those with over 10 years of experience displayed greater knowledge and attitude regarding the etiology and management of NCCLs ($P < 0.01$). However, no significant differences were observed between the two genders.

Conclusion: Findings highlight a critical need for continuing education among dentists, particularly for younger practitioners. Enhancing knowledge and attitudes towards NCCLs can improve clinical practices and patient outcomes. Targeted educational programs are recommended to address the identified gaps in understanding and management strategies for NCCLs.

Keywords: Dentists; Knowledge; Continuing Education; Clinical Management; Etiology

Introduction

Cervical lesions are defined as defects located at the cemento-enamel junction, often manifesting as shallow indentations or grooves on the tooth surface. These lesions are categorized into decayed and non-decayed types, with the latter being devoid of carious activity. Non-carious cervical lesions (NCCLs) have garnered increasing attention in dental practice due to their prevalence, which has been found to affect a significant portion of the population. Studies reveal that these lesions are not merely aesthetic concerns; they possess clinical significance that can influence the overall dental health and require timely intervention.[1, 2]

The etiology of NCCL is multifaceted, with several contributing factors including abrasion, erosion, and acid exposure. Abrasion typically arises from aggressive tooth brushing techniques or the use of hard-bristled toothbrushes, while erosion often correlates with dietary habits that expose teeth to acids from beverages such as soda and citrus juices.[3, 4] Additionally, lifestyle factors, including inadequate oral hygiene practices and certain medical conditions that may predispose individuals to increased acid exposure, play crucial roles in the development of these lesions.[5] Understanding these underlying causes is vital to define effective prevention strategies and management approaches in dental practice. Clinical implications surrounding the diagnosis and management of NCCLs are substantial. Improper or delayed identification of these lesions can lead to detrimental effects on dental health, including sensitivity, compromised integrity of dental structures, and potential discomfort for patients.[6] Furthermore, addressing these lesions can significantly enhance aesthetic outcomes and improve the overall quality of life for patients, reinforcing the importance of dentists' vigilance in recognizing and treating such conditions.[7]

Dentists play a pivotal role in the management of cervical lesions. Their knowledge regarding the etiology, diagnosis, and treatment options is essential for effective patient care. Research indicates that a dentist's attitudes toward NCCLs significantly influence clinical practice and treatment outcomes, underscoring the necessity of continuing education in this area.[8] An awareness of the latest research and techniques is paramount to ensuring optimal patient care and dental health.

A review of existing literature reveals a limited focus on the knowledge and attitudes of dentists regarding NCCLs, particularly in specific geographic areas such as Ilam City. Studies suggest significant gaps in this domain, indicating a pressing need for further exploration.[9] This research aimed to fill that gap by assessing the current understanding and

perspectives of dentists in Ilam City, highlighting the opportunities for targeted educational programs and improved clinical practices.

The aim of this study was to evaluate the level of knowledge among dentists regarding the etiology and management of NCCLs and to explore their attitudes towards these conditions. Findings from this research were expected to inform local dental practices, ultimately promoting improved patient care and outcomes.

Methods

Study Design

In this cross-sectional study, a census sampling method was employed, where all practicing general dentists in the area (Ilam, Iran) were targeted. Ethical approval was obtained from the Research Ethics Committees of Ilam University of Medical Sciences (ID: IR.MEDILAM.REC.1402.088).

Research Tool

A specifically designed researcher-made questionnaire served as the primary research tool. This questionnaire consisted of two main sections: one focusing on the knowledge related to the causes of NCCLs, and the other addressing the attitudes towards their treatment.

Questionnaire Development

The questionnaire comprised 39 questions related to NCCLs. To enhance the accuracy of responses and ensure that participants do not stray beyond their expertise, two response options were provided. Specifically, questions 1 to 22 assessed awareness and attitudes, questions 23 to 26 focused on treatment, questions 27 to 30 re-examined the awareness and attitudes, and questions 31 to 39 pertained to treatment. Correct answers were assigned a code of 1, while incorrect answers were coded as 0 (Table1).

Inclusion and exclusion criteria

The inclusion criteria for this cross-sectional study specified that participants had to be practicing general dentists in Ilam city, ensuring that the findings reflect the knowledge and attitudes of this specific group. Additionally, participants needed to agree to complete the specially designed questionnaire regarding NCCLs. Conversely, the exclusion criteria outlined that any questionnaires with unanswered questions would be discarded from the final analysis to maintain data integrity. Furthermore, non-practicing dentists and those who do not identify as general dentists, such as specialists, were excluded to focus the study solely on general dentists and their perspectives on NCCLs. These criteria collectively ensured a targeted and relevant assessment of the knowledge and attitudes regarding the etiology and management of NCCLs among general dentists in the specified geographic area.

Visual Assessment

In addition, four images of NCCL lesions were presented to the participants, illustrating cases that may or may not require interventional treatment. Participants were asked to indicate their decision regarding the necessity of interventional treatment for these cases. Any questionnaires with unanswered questions were excluded from the final analysis of the study.

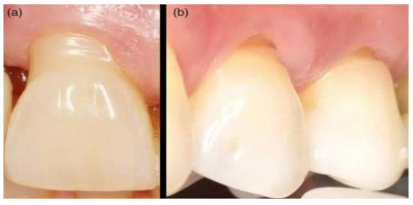
Validation of the Questionnaire

Face validity was assessed through expert evaluation by dental faculty members, who reviewed the items and suggested revisions to improve their clarity and relevance to the study objectives. To ensure the reliability of the questionnaire, a test-retest method was employed. Initially, the questionnaire was distributed to a pilot group of 20 dentists to gauge their understanding and feedback. After one week, the same group received a revised version of the questionnaire. The reliability of responses was analyzed using Cronbach's alpha, resulting in a value of 0.86, indicating excellent reliability.

Following the validation phase, the finalized questionnaire was distributed to the participating dentists in Ilam city. Data collected from the completed questionnaires were then analyzed quantitatively and qualitatively, focusing on the prevalence of knowledge gaps and divergent attitudes towards the management of NCCLs.

Data Analysis

Statistical analysis was carried out using SPSS version 23, with descriptive statistics summarizing demographic data and responses. Inferential statistics were applied to explore associations between variables related to knowledge and attitudes using the Chi-square and T-tests. Additionally, the Kruskal-Wallis test was employed to assess the differences between groups when the data did not meet the normality assumptions, allowing for a more robust analysis of non-parametric data. A significance level of $p<0.05$ was used for statistical interpretation.

Table 1- Questionnaire on Etiology and Management of Non-Decayed Cervical Lesions		
	Question	**Picture**
1	How does the hardness of toothbrush bristles affect the development of NCCL?	
2	What is the impact of brushing force on the occurrence of NCCL?	
3	How does the abrasiveness of toothpaste influence the formation of NCCL?	
4	Is there a higher incidence of NCCL on the mandibular side opposite the dominant hand?	
5	Do parafunctional habits contribute to the development of NCCL?	
6	What role does oral hygiene play in the formation or prevention of NCCL?	
7	How does the consumption of acidic foods and beverages affect NCCL?	
8	Is there a correlation between stomach acid reflux and the occurrence of NCCL?	
9	How does age relate to the development of NCCL?	
10	Can NCCL occur in younger individuals?	
11	Does the incidence of NCCL vary among different races and populations?	
12	Should restorative treatment be considered when tooth sensitivity accompanies NCCL?	
13	When lesion depth increases, should restorative treatment be initiated?	
14	Should NCCL be treated restoratively when there is a risk of dental frenum involvement?	
15	Is lesion size irrelevant in determining the treatment approach when aesthetic concerns are absent?	
16	Is occlusal correction not considering a treatment method for NCCL?	
17	Does NCCL occur on the lingual surface?	
18	Is there any relationship between gender and the incidence of bacteria associated with NCCL?	
19	Do molars and premolars exhibit equal rates of NCCL occurrence?	
20	What role does Streptococcus mutants play in the development of NCCL?	
21	Is Lactobacillus acidophilus significant in the pathogenesis of NCCL?	
22	Do filamentous bacteria contribute to the development of NCCL?	
23	In the absence of pain or discomfort, is restorative treatment necessary for the condition depicted?	
24	Should restorative treatment be considered for an allergic patient?	
25	Is restorative treatment advisable for a patient experiencing pain and sensitivity?	
26	Is cosmetic treatment required for a patient without pain or sensitivity?	
27	What is the primary cause of dental erosion?	
28	What is the primary cause of abfraction?	
29	What is the primary cause of attrition?	

30	What is the primary cause of abrasion?	
31	Is the use of cotton rolls sufficient for isolation during NCCL treatment?	
32	Is subgingival floss utilized in the treatment of NCCL?	
33	What materials are suitable for NCCL in aesthetic areas?	
34	What materials are appropriate for treating NCCL in non-aesthetic areas?	
35	Which composites are suitable for managing NCCL?	
36	What adhesives are best for the treatment of NCCL?	
37	Do medium and large NCC lesions require retentive features?	
38	Is the cervical border of NCCL defined by a specific structural characteristic?	
39	What impact do sensitive toothbrush bristles have on primary lesions of NCCL?	

Results

A total of 119 dentists participated in the study. The majority of respondents were males, contributed under the age of 40, with less than 10 years of professional experience (Table2).

Table 2- Demographic Characteristics of Study Participants Among Dentists

Variables		Number	Percent	Cumulative Percent
Age	<40	72	60.5	60.5
	>40	47	39.5	100.0
Gender	male	78	65.5	65.5
	Female	41	34.5	100.0
work experience	<10	63	52.9	52.9
	>10	56	47.1	100.0

The assessment of dentists' knowledge and attitudes regarding NCCLs revealed significant findings related to their age. Dentists over 40 years of age demonstrated a notably higher level of knowledge regarding the etiology of NCCLs compared to their younger counterparts, with statistical significance (P=0.005). Specifically, the knowledge of NCCLs' management was significantly more robust among dentists aged over 40 (P=0.001). When evaluating the attitudes regarding the etiology, dentists over the age of 40 had significantly higher attitude scores related to the causes of NCCLs compared to those under 40 (P= 0.007). Similar trends were observed in the context of management attitudes, where dentists over 40 had markedly higher attitude scores than younger dentists (P < 0.001) (Table3).

Table 3- Age-Related Knowledge and Attitudes Towards Non-Decayed Cervical Tooth Lesions

		Age	N	Mean	Std. Deviation	P- value
Etiology	Knowledge	<40	72	13.58	2.17	0.005
		>40	47	14.80	2.45	
	Attitude	<40	72	2.79	1.53	0.007
		>40	47	3.63	0.70	
Management	Knowledge	<40	72	5.91	2.14	0.001
		>40	47	7.59	1.62	
	Attitude	<40	72	3.44	1.01	< 0.001
		>40	47	4.29	.88	

When evaluating the effect of work experience, practitioners with more than 10 years of experience had superior knowledge and attitude levels regarding the etiology of NCCLs in comparison to those with lower experience levels, reflecting a significant difference (P < 0.001). Additionally, dentists with more than 10 years of experience demonstrated a significantly higher score regarding the management knowledge and attitude (P < 0.001). Overall, it was noted that both knowledge and attitude increased substantially with increasing levels of work experience, suggesting a positive correlation between practical exposure and knowledge/attitude retention (Table4).

Table 4- Experience-Related Knowledge and Attitudes Towards Non-Decayed Cervical Tooth Lesions						
		Experience	N	Mean	Std. Deviation	P-Value
Etiology	Knowledge	<10	63	13.31	2.13	< 0.001
		>10	56	14.91	2.32	
	Attitude	<10	63	2.68	1.57	< 0.001
		>10	56	3.62	.75	
Management	Knowledge	<10	63	5.80	2.14	< 0.001
		>10	56	7.44	1.72	
	Attitude	<10	63	3.31	.96	< 0.001
		>10	56	4.30	.89	

Analysis of gender revealed no significant difference in knowledge regarding the etiology or the management of NCCLs. Notably, there were also no significant differences in attitude scores regarding etiology and management between the two genders. These results underscored the importance of age and experience in shaping both the knowledge and attitudes of dentists towards the management of NCCLs, suggesting that targeted continuing education may enhance the understanding and approaches in clinical practice (Table5).

Table 5- Gender-Related Knowledge and Attitudes Towards Non-Decayed Cervical Tooth Lesions						
		Gender	N	Mean	Std. Deviation	P-value
Etiology	Knowledge	Male	78	14.02	2.41	0.792
		Female	41	14.14	2.26	
	Attitude	Male	78	3.26	1.22	0.788
		Female	41	2.90	1.51	
Management	Knowledge	Male	78	6.60	2.08	0.178
		Female	41	6.53	2.20	
	Attitude	Male	78	3.96	.91	0.218
		Female	41	3.43	1.20	

Discussion

Recent literature highlights a concerning gap in dentists' knowledge regarding NCCLs.[10, 11] The current study revealed that younger practitioners, particularly those under 40, exhibited lower understanding of NCCL etiology and management compared to their older counterparts. Specifically, dentists over 40 demonstrated superior knowledge and attitudes toward the etiology and management of NCCLs, with statistically significant differences noted. Assessment methodologies, primarily through surveys and structured interviews, indicated that dentists should possess a foundational understanding of the etiology of NCCLs, effective differential diagnoses, and a variety of management strategies.[12] These assessment methods reveal significant discrepancies in knowledge not just by age, but also by years of professional experience, emphasizing the need for continuous professional education.

Dentists' attitudes towards NCCLs vary significantly, reflecting the importance they attribute to these conditions in clinical practice. The finding of this study revealed that older practitioners tend to have more favorable attitudes toward exploring various treatment modalities, including restorative and preventive strategies. This suggests a deeper appreciation for the complex nature of NCCLs among more experienced dentists. Factors influencing these attitudes include personal experiences, continuance in education, and the impact of peer relationships. Dentists actively engaged in ongoing education are more likely to view NCCLs as critical, potentially altering their treatment approaches.[11, 13]

The identified knowledge gaps among dentists regarding NCCLs are concerning. Contributing factors include outdated training protocols, variability in dental school curricula, and limited exposure to specific NCCL cases during clinical rotations. These gaps lead to implications such as inaccurate diagnoses and suboptimal treatment strategies, ultimately affecting patient outcomes. [13, 14] Challenges in managing NCCLs can significantly hinder effective treatment. Time constraints within clinical practice can limit detailed evaluations and discussions about NCCLs with patients, while patient compliance often varies based on their understanding of the conditions. The availability of appropriate materials for treatment also

poses a challenge, as not all dental offices may have access to recent advancements.[15]

Similar findings have been reported in previous studies. For instance, Modena et al. observed that while most Brazilian dentists acknowledged the multifactorial etiology of NCCLs, only a minority employed auxiliary diagnostic methods, indicating a gap between theoretical knowledge and clinical application[16]. Likewise, Haripriya and Ajitha found that general practitioners in Chennai lacked awareness of proper isolation techniques critical for successful NCCL restoration, underscoring the need for enhanced clinical training[17]. These results align with the current study's observation that younger or less experienced dentists may not fully appreciate the complexity of NCCL management. In contrast, studies such as that by Ozdemir et al. demonstrated that dental specialists, due to advanced training, were more likely to adopt evidence-based preventive strategies, suggesting that specialty education plays a pivotal role in shaping clinical attitudes and practices[18]. Collectively, these comparisons reinforce the conclusion that targeted educational interventions are essential to bridge the knowledge-practice gap in NCCL management.

Ongoing education is critical for enhancing dentists' knowledge and attitudes toward NCCLs. Suggested topics for training programs should include recent advances in the etiology and management techniques for NCCLs, reinforcing the significance of these lesions. Professional organizations can play a pivotal role by organizing workshops and providing resources that promote awareness and skill enhancement.

Conclusion

This study underscored the significant influence of age and experience on dentists' knowledge and attitudes regarding NCCLs. The findings advocate for continuing education as a means to bridge existing gaps and promote effective management practices in dental settings. Future research should focus on developing targeted educational programs to ensure that all practitioners can address NCCLs effectively, facilitating improved patient outcomes in dental health.

Acknowledgement: We would like to thank the health staff of the practice settings, in Ilam province, which helped us in data collection.

Author Contributions: F.F.: designed the study, literature review, preparation, and editing of the manuscript; and H.S.: participated in the design of the study, data collection, preparation, and editing; and M.H.M.: participated in the study design, data collection, preparation, and editing of the manuscript; and All authors reviewed the preliminary and final analyses and the drafts. Finally, all authors read and approved the manuscript.

Funding: This study was supported by the Ilam University of Medical Sciences.

Ethical Approval Code: Ethical approval was obtained from the Research Ethics Committees of Ilam University of Medical Sciences. Approval ID: IR.MEDILAM.REC.1402.088.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data Availability Statement: The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Using AI: No artificial intelligence was employed in the preparation of this article. The content is derived from a final thesis report.

Conflict of Interest: The authors declare no conflict of interest.

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