Knowledge and Practice Assessment among Dental Practitioners in Southern Region About Diagnosis and Treatment of Dental Caries – A Cross-Sectional Study

Waleed Asiri[1], Siraj DAA Khan[2], Abdulmajeed Saeed Alshahrani[1], Mahmoud Tallab[1], Saeed Awod Bin Hassan[3], Ghanem Mohammed Alqahtani[4], Saqer Alqarni[5], Salim A. Algarni[1], Abeer Alshehri[6]

[1]Department of Restorative Dentistry, Faculty of Dentistry, Najran University, Najran, Saudi Arabia

[2]Department of Preventive Dental Sciences, Faculty of Dentistry, Najran University, Najran, Saudi Arabia

[3]Department of Restorative Dental Sciences, College of Dentistry, King Khalid University Abha, Saudi Arabia

[4]Armed Forces Hospital Southern Region, AFHSR, Saudi Arabia

[5]Restorative Consultant, Khamis Mushite Dental Centre, Ministry of Health, Saudi Arabia

[6]General Dental Practitioner, Abha, Saudi Arabia

Corresponding Author-Siraj DAA Khan, Faculty of Dentistry, Najran University, KSA,

ABSTRACT:

Aim and Background: Dental caries and periodontal diseases represent critical public health concerns in contemporary times. The proficiency and approach of dental practitioners in diagnosing and treating dental caries can greatly influence the efficacy of management or treatment outcomes. Thus, this study aimed to evaluate the knowledge and practice level of dental practitioners in Southern, Saudi Arabia, on the adoption of diagnostic and treatment methodologies for managing dental caries.

Methodology: a descriptive questionnaire-based cross-sectional study involved 398 dental practitioners affiliated with the Department of Restorative Dentistry across four distinct universities. The questionnaire focused on assessing participants' knowledge and practices concerning dental caries. Subsequently, the collected data underwent statistical analysis employing appropriate software.

Results: The findings revealed that while clinical experience did not notably impact the knowledge and practices of the participants, the educational level of the practitioners exhibited a significant correlation with both their knowledge and practices (P=004 and 0.001 respectively).

Conclusion: In conclusion, enhancing knowledge could be achieved by integrating systematic protocols for caries detection and management into the dental curriculum. Moreover, future emphasis should be placed on the didactic teaching of ICDAS and ICCMS to further augment proficiency in this domain.

INTRODUCTION

Caries stands as one of the most common oral conditions, characterized by damage to dental hard tissues due to acid-producing bacteria influenced by various factors. It arises from an imbalance among elements like saliva flow, fluoride contact, dietary habits, and oral microbial presence, culminating in harm to dental hard tissues.[1] This issue poses a substantial challenge in early childhood, carrying repercussions throughout one's life.[2] If untreated, caries progresses, yet early intervention can potentially reverse its effects.[3]

The oral cavity ailment represents a significant public health issue due to its widespread occurrence and significant implications for overall health.[4] Among oral diseases, dental caries reigns as the most commonly encountered.[5] Globally, dental caries affects 60-90% of children, surpassing the prevalence of childhood asthma.[2] Developed countries have witnessed a decline in caries rates, but their prevalence remains alarmingly high in developing countries, reaching unacceptable levels. [6] Saudi Arabia, for instance, exhibits a notably elevated prevalence, such as in 2019, recording a 71.35% prevalence among 15-year-old children according to national statistics.[7]

In children, multiple factors contribute to poor oral health, spanning socioeconomic status, gender, age, lifestyle choices, location, and social disadvantages.[6] Detecting dental caries initiates with identifying structural changes within the tooth.[8] Various elements influence the diagnosis of caries, with clinical expertise standing out as pivotal.[9] Precision in diagnosing caries is crucial, especially regarding lesion activity, impacting treatment selection for patients.[10] Properly detecting and diagnosing caries before any surgical intervention presents a critical and challenging task for clinicians.[1] Early identification of caries holds significant importance, aiding in determining a patient's susceptibility and forming integral components of treatment plans, design, prevention strategies, and caries risk evaluations.[11]

A scarcity of dentists is evident in African, Latin American, and Asian nations, leading to an exceptionally low dentist-to-population ratio of 1:150,000 in contrast to the ratio of 1:2,000 in developed nations.[4] At the Jenadriyah festival in Saudi Arabia, 59% of attending students were introduced to dentistry and oral health through family connections.[12] Surprisingly, 24% of intermediate and high school children in Jeddah, Saudi Arabia, had never visited a dentist, often due to experiencing dental pain.[13] In the Rijal region of Aseer province, Saudi Arabia, schoolchildren exhibited poor oral health practices.[14] The prevention of oral diseases hinges significantly on a widely accepted health education approach that involves imparting knowledge and skills essential for enhancing quality of life.

In a recently published study from Saudi Arabia, researchers identified substantial disparities between general dental practitioners and pediatric dentists across all three surveyed domains: knowledge, attitude, and practice.[15] However, despite limited existing studies in Saudi Arabia, none have delved into the knowledge and practices surrounding the diagnosis and treatment of dental caries within the Southern region. Hence, the objective of this study is to assess the knowledge and attitudes of general dental practitioners in Southern, Saudi Arabia, concerning the adoption of diagnosis and treatment strategies for managing dental caries.

METHODOLOGY

Study design and sample size

In the Southern region of Saudi Arabia, a descriptive cross-sectional study was undertaken involving dental practitioners. A total of 398 participants, including undergraduates attending clinics, dental interns, and postgraduates employed in the Department of restorative dentistry, were involved in this research. Prior to commencing the questionnaire, all participants received information regarding the study's objectives and provided their consent to participate.

Criteria for Inclusion and Exclusion:

Participants eligible for inclusion in this study comprise undergraduate students actively involved in clinics, dental interns, and postgraduates employed within the Department of Restorative Dentistry in the Southern region. However, individuals residing outside of the Southern and dental students not engaged in clinical practice will be excluded from participation in this study.

Data collection Technique and tools

The data collection involved the creation of a self-administered online questionnaire, formulated through a comprehensive review of the literature and divided into three sections:

i.   The initial section focused on gathering demographic information, including gender, years of clinical experience, and educational qualifications.

ii. The subsequent section was designed to assess practitioners' knowledge about diagnosis, early detection of caries lesions, and caries risk assessment.

iii. The final section explored the practices and attitudes of practitioners concerning the management of dental caries.

Data Analysis

All the collected data collecting was entered, tabulated, and analyzed using "Microsoft Office Excel" (2016). Descriptive data was presented in the form of frequency and percentages and for correlation, the chi-square test was used with SPSS.

RESULTS

a total of 398 dental practitioners participated in this study. Among them 213 were female and 185 were female. Regarding the qualification of participants, 218 were dental students, 62 were dental interns, 90 participants were graduates and 20 were postgraduates while the 8 students had Ph.D. 89 participants from Najran University, 187 participants from King Khalid University, 117 participants from Jazan University, and 5 participants from Albaha University. 145 participants had a clinical experience of less than 3 years 76 participants had a clinical experience of 3-5 years and 23 participants had clinical experience of more than 5 years. (Table:1).

The relationship between knowledge concerning clinical experience and qualification is presented in Table 2. A significant relationship was found between the knowledge of participants and their qualification level (P= 0.004). However clinical experience showed a non-significant correlation. The practice assessment of participants about diagnosis and treatment of dental caries is presented in Table 3. The qualification of participants had a significant effect on the practice level (P=0.001) while the clinical experience showed no significant effect.

Table. 1: Demographic Details of participants

Characteristics	n	Percentage
Gender (n=398)		
Male	185	46.5
Female	213	53.5
Qualification (n=398)		
Dental student	218	54.8
Dental intern	62	15.6
Graduate	90	22.6
Postgraduate	20	5.0
PhD/Board	8	2.0
University (n=398)		
Najran University	89	22.4
King Khalid University	187	47.0
Jazan University	117	29.4
AlBaha University	5	1.3
Clinical experience (n=398)		
Undergraduate students	154	38.7
Less than 3 years	145	36.4
3-5 years	76	19.1
More than 5 years	23	5.8

Table: 2. Knowledge of participants about dental caries concerning clinical experience and educational level

		Mean	F	Sig.
	Between groups	0.016	0.005	0.983

Clinical Experience	Within groups	0.289		
Education Level	Between groups	1.110	3.798	0.004
	Within groups	0.279		

Table: 3. Practice of participants about dental caries concerning clinical experience and educational level

		Mean	**F**	**Sig.**
Clinical Experience	Between groups	0.369	1.363	0.254
	Within groups	0.271		
Education Level	Between groups	1.193	4.550	0.001
	Within groups	0.262		

DISCUSSION

This study reports different perspectives of dental students, dental interns, graduate and postgraduates from four universities about the diagnosis and treatment criteria regarding dental caries management. They share their ideas based on their personal experiences, what they've learned in school, and their work experiences. It suggests there might be the existence of many schools of thought that imply different approaches.

Dental caries is a continuous cycle that includes both remineralization and demineralization over time.[16] While various methods classify this condition, the International Caries Detection and Assessment System (ICDAS) has developed as a more comprehensive and suitable approach for modern minimally invasive treatments. Current guidelines suggest its use in clinical practice. [17,18] Recognizing the importance, there has been a longstanding acknowledgment of the necessity for dental students to have thorough and systematic training in this aspect of dentistry.[19]

In the study of Anahita et al., students in the seventh semester showed better results in the assessment of caries stages, patient risk, and caries management options. These students had typically more clinical experience than the participants in Center 1 who attended the sixth semester and had not worked with patients yet.[22] In the current study the clinical experience didn't exhibit a significant effect on knowledge and practice of participants, however, the education level of participants showed a significant relationship both with knowledge and practice of participants (P=004 and 0.001 respectively).

Edalia and Kassim's study found a notable relationship between the duration of practice and knowledge of advanced methods for diagnosing cavities (p=0.048).[20] Similarly, another study highlighted a significant relationship between a practitioner's specialty and their knowledge and actions regarding evidence-based cavity management (p=0.002).[21] Contrarily, the current study didn't show a significant impact of clinical experience on the knowledge and practices of the participants. However, it did reveal a significant association between the participants' education level and both their knowledge and practices (P=0.004 and 0.001 respectively). Similar results were found in the study of Anahita et al. which indicated that seventh-semester students demonstrated better comprehension in evaluating cavity stages, patient risks, and treatment options, likely due to their increased clinical exposure compared to sixth-semester participants at Center 1, who hadn't yet engaged with patients.

Conclusion

Based on the findings from this study using a questionnaire, it appears that dental practitioners have a limited level of knowledge linked to their clinical experience. To enhance this knowledge, it might be beneficial to incorporate structured methods for detecting and handling cavities within the clinical dental curriculum. Dental schools already integrating ICDAS might consider including ICCMS in their learning objectives as well as in clinical practice. Moreover, it's

crucial to prioritize improved teaching methods for both ICDAS and ICCMS in the future.

REFERENCES

1. Selwitz RH, Ismail AI, Pitts NB. "Dental caries," 2e Lancet, 2007; 369(9555): 51-59.

2. Kassebaum NJ, Bernabe E, Dahiya M, Bhandari B, Murray CJL, Marcenes W. Global burden of untreated caries: a systematic review and Metaregression. J Dent Res. 2015; 94(5): 650-8.

3. Lewis C, Grossman D, Domoto P, Deyo R. The role of the pediatrician in the oral health of children: a national survey. Pediatrics. 2000; 106 (6): 84.

4. Petersen PE. "The world oral health report 2003: continuous improvement of oral health in the 21st century-the approach of the WHO global oral health program," Community Dentistry and Oral Epidemiology. 2003; 31(1): 3-24.

5. Heng C. "Tooth decay is the most prevalent disease," Federal Practitioner: for the Health Care Professionals of the VA, DoD, and PHS, 2016; 33(10): 31-33.

6. Watt RG, Sheiham A. Integrating the common risk factor approach into a social determinants framework. Community Dent Oral Epidemiol. 2012; 40(4): 289-96.

7. Al-Rafee MA, AlShammery AR, AlRumikan AS, Pani SC. A comparison of dental caries in urban and rural children of the Riyadh region of Saudi Arabia. Front Public Health. 2019; 7: 195.

8. Schulte AG, Pitts NB, Huysmans MCDNJM, Splieth C, Buchalla W. European core curriculum in cariology for undergraduate dental students. Caries Research. 2011; 45(4): 336-345.

9. Tranaeus S, Shi XQ, Angmar-Mansson B. Caries risk assessment: methods available to clinicians for caries detection. Community Dentistry and Oral Epidemiology. 2005; 33(4): 265-273.

10. Nyvad B, Fejerskov O. Assessing the stage of caries lesion activity on the basis of clinical and microbiological examination. Community Dentistry and Oral Epidemiology. 1997; 25(1): 69-75.

11. Anusavice K. Clinical decision-making for coronal caries management in the permanent dentition. Journal of Dental Education. 2001; 65(10): 1143-1146.

12. Al Subait AA, Alousaimi M, Geeverghese A, Ali A, El Metwally A. Oral health knowledge, attitude and behavior among students of age 10-18years old attending Jenadriyah festival Riyadh; a cross-sectional study. Saudi J. Dent. Res. 2016; 7: 45-50.

13. Farsi J, Farghaly M, Farsi N. Oral health knowledge, attitude and behaviour among Saudi school students in Jeddah city. J. Dent. 2004; 32: 47-53.

14. Togoo RA, Yaseen S, Zakirulla M, Nasim VS, Al Zamzami M. Oral hygiene knowledge and practices among school children in a rural area of southern Saudi Arabia. Int. J. Contemp. Dent. 2012; 3: 57-62.

15. World Dental Federation. The Challenge of Oral Disease – A call for global action. In: The Oral Health Atlas. 2nd ed. Geneva: FDI World Dental Federation; 2015.

16. Machiulskiene V, Campus G, Carvalho JC, Dige I, Ekstrand KR, Jablonski- Momeni A, Maltz M, Manton DJ, Martignon S, Martinez-Mier EA, et al. Terminology of Dental Caries and Dental Caries Management: Consensus Report of a Workshop Organized by ORCA and Cariology Research Group of IADR. Caries Res. 2020; 54(1): 7-14.

17. Caries Risk Assessment and Management. [https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/caries-risk assessment- and-management].

18. International Caries Detection and Assessment System (ICDAS II)–Manual criteria [https://www.iccms-web.com].

19. Schulte AG, Pitts NB, Huysmans MC, Splieth C, Buchalla W. European Core Curriculum in Cariology for undergraduate dental students. Eur J Dent Educ. 2011; 15: 9-17.

20. Edalia LG and Kassim BA. Knowledge and practice of new advances in occlusal caries

diagnosis and early caries management among dentists in Nairobi. East African Medical Journal. 2016; 93.

21. Dina M. Elkady and Ahmad G. A. Khater. Knowledge and attitudes toward evidence-based cariology and restorative dentistry among Egyptian dental practitioners: a cross-sectional survey. BMC Oral Health. 2023; 23: 622.

22. Anahita JM, Heike KS, Alexa T, Pia W, Monika HG, Rainer H, Felix K. Knowledge of undergraduate dental students regarding management of caries lesions. BDJ Open. 2022; 8:9.