

Variations in Periodontal Diagnosis Among Clinicians: dental hygienists' experiences and perceived barriers

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Abstract

Purpose: Research indicates clinicians face barriers when attempting to utilize evidence-based protocols for periodontal disease and periodontal disease diagnosis often varies between dental providers. The purpose of this study was to identify and better understand dental hygienists' perceived barriers and experiences during the process of diagnosing periodontal disease in clinical practice.

Methods: This study used a qualitative design and a purposive sample of dental hygienists (n=20). Utilizing a virtual video-conferencing platform, participants logged into focus group sessions to discuss their experiences with diagnosing periodontal disease in clinical practice. Focus group sessions were recorded and transcribed. Thematic analysis involved the use of inductive coding to draw themes from the data.

Results: Dental hygienists reported being responsible for periodontal disease diagnosis, and that they utilized similar classification systems, and agreed with colleagues' periodontal disease diagnoses. However, participants reported the lack of a standardized periodontal classification system was confusing when communicating outside of their dental practice and described both intrinsic and extrinsic barriers to diagnosing disease. A common theme expressed by participants was that patients' lack of acceptance of their periodontal disease status and inability to fund treatment interfered with providing an evidence-based diagnosis and treatment plan. Newly licensed dental hygienists felt somewhat prepared to diagnose periodontal disease upon completion of their education but reported increased confidence in their skills and knowledge with years of practice and continuing education.

Conclusion: Study data indicates dental hygienists feel the lack of a standardized periodontal classification system causes confusion and inconsistencies when communicating with other oral health care providers outside of their clinical practice setting, and dental hygienists face barriers when diagnosing periodontal disease. These findings may be instrumental in assisting educators in preparing students for clinical practice.

Keywords: periodontal disease, periodontal diagnosis, dental hygienist, barriers

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Introduction

Data from the National Health and Nutrition Examination Survey (NHANES) indicates that more than 47% of adults over the age of 30 have either mild (8.7%), moderate (30.0%), or severe (8.5%) periodontal disease (PD) with increasing severity as the population ages.¹ Chronic periodontal disease is a major cause of tooth loss.² Research suggests PD can have serious effects on systemic health and links have been suggested between PD and both chronic and autoimmune diseases including cardiovascular diseases, diabetes, pre-term

births, respiratory diseases, and other systemic conditions due to related inflammatory mediators.^{3,4}

Evidence-based recommendations released by the American Dental Association (ADA) state periodontal disease should be treated at its earliest stages with scaling and root planing and in some cases supplemented with subgingival-antimicrobial dosed doxycycline.² By treating PD in its early stages, clinicians can reduce inflammation; however, without an accurate diagnosis, a treatment plan cannot be

established.⁵ Williams et al. states good clinical reasoning and decision making, play a key role in the treatment of PD, and inadequate diagnostic skills can interfere with the early detection of disease.⁵ Research indicates disagreement and variations in the diagnosis and treatment of periodontal disease among clinicians, students, and dental faculty.⁵⁻⁹ Some studies suggest the variation in periodontal disease diagnosis may be due to a lack of standardized diagnostic terminology, practice, and changing diagnostics.¹⁰⁻¹²

Clinical guidelines for periodontal diagnoses and classification of periodontal disease from the American Academy of Periodontology (AAP) include the recording and interpretation of probing depths and clinical attachment levels; radiographic surveys; the presence or absence of inflammation, bleeding and other clinical signs and symptoms; in addition to the medical, dental, and social history.^{13,14} While Birrenbach et al. found that even though physicians feel clinical guidelines are helpful to guide practice and improve patient outcomes, barriers may still prevent health care providers from utilizing them.¹⁵ A lack of awareness and familiarity with clinical guidelines along with insufficient time to utilize guidelines are among the most commonly cited barriers.¹⁵ Another study reported disagreement and lack of self-efficacy among healthcare practitioners in regards to utilizing and understanding recommended measures of assessment and their outcomes.¹⁶ Spallek et al. conducted a cross-sectional study of dentist attendees at an evidence-based practice (EBP) continuing education course and identified common barriers to implementing EBP included difficulty in changing current practice models, resistance and criticism from colleagues, and distrust in the evidence or research.¹⁷

Diagnosis and treatment of PD is based on the ability to utilize the evidence-based ADA and AAP clinical guidelines and the utilization of clinical decision-making skills.^{2,13,14} Shortcomings in PD diagnostic capabilities and clinical decision making skills may prevent early and accurate disease diagnosis, leading to delayed treatment and increased risk of oral and systemic complications.⁵ Diagnostic inconsistencies can lead to under or non-treatment of disease and overall inaccurate reporting of PD incidence and prevalence.^{12,18} Without proper assessment of PD and adherence to AAP standards for a timely diagnosis,^{13,14} patients may not receive evidence-based care,² placing them at increased risk for a multitude of oral health related chronic conditions including heart disease, diabetes, and stroke.^{3,4,5}

Research indicates a variation in PD diagnosis among dental providers,⁵⁻⁹ and dentists report a range of barriers in the utilization of evidence-based guidelines;¹⁷ however, there

is a gap in the literature on the clinical practice experiences and barriers of dental hygienists regarding PD diagnosis. The purpose of this study was to identify and better understand dental hygienists' perceived barriers and experiences during the process of diagnosing periodontal disease in clinical practice.

Methods

This study was granted exempt status by the MCPHS Institutional Review Board.

A qualitative phenomenological design was used with a purposive sample of dental hygienists to allow individuals to describe experiences in their own words or voice.¹⁹ Semi-structured, open-ended questions were developed based on the purpose of the study to gather participants' experiences and perceived barriers for diagnosing PD. Content validity of the interview questions was not indicated for this study. Qualitative focus groups utilizing semi-structured interview guides are useful for identifying group norms and allow for sharing of a variety of viewpoints within a population.¹⁹

Focus Group Setting

A virtual focus group setting (Zoom Video Conferencing[®]) was chosen for its convenience and accessibility.²⁰ Research has shown that virtual or video-conferencing is an effective tool for gathering data for qualitative research when face-to-face interviewing techniques are not possible.²¹ Video-conferencing provides a high degree of social presence (provides the sense the other participants are with one another in the 'room') which is important when conducting interviews.²¹ Furthermore, social presence also allows participants to visualize non-verbal cues that may be overlooked in written or audio surveys.²¹

Sample Selection

Purposive sampling and snowball sampling were used for sample selection. Purposive sampling is used when participants are chosen based on preselected criteria related to the topic under study.¹⁹ Snowballing involves those who meet the preselected criteria reaching out to others who also meet the criteria. An initial minimum sample size of 15 was identified, with a final sample size determined by reaching data saturation.²² Saturation refers to the point at which new data provides no new themes or codes on the subject under study.²² Purposive sampling and a small sample size are common with qualitative research design, and past studies indicate a small likelihood of newly emerging themes (or saturation) after 12 interviews with a purposive sample of participants.^{23, 24}

Inclusion criteria included the following: being a registered dental hygienist holding an Associate's degree or Bachelor's degree, current and valid licensure, and having practiced

clinical dental hygiene in a public health or private practice setting in the U.S. for a minimum of one day a week for at least one year. Dental hygienists holding graduate degrees, and those who were not currently practicing at least one day of clinical dental hygiene or had been practicing less than a year, were excluded from the study. The exclusion rationale included: individuals not practicing are less likely to remain current with evidence-based guidelines and may not be utilizing them, new graduates may not have enough experience to provide substantive response, and individuals holding a graduate degree may have had additional in-depth study of periodontal classification.

Survey Instrument

Interview questions were developed based on the existing literature; focus group questions were pilot tested by 5 dental hygienists with similar characteristics to the proposed sample with the exception that they had recently started a graduate program. The Zoom platform was used for the 1-hour pilot test. Proposed questions were asked and the investigator found two of the questions were unclear; these were subsequently revised. The revised questions served as the primary instrument for the focus group questions.

Recruitment

Invitations to participate were sent via email to researcher's colleagues and also to members of a dental hygiene forum on a social networking website; messages and flyers were delivered electronically each week throughout the duration of the 6-week study. A gift card drawing was offered as an incentive to participate. Interested participants were able to access the informed consent and demographic survey to determine study eligibility. The eligible participants received an email with an embedded link allowing access to the assigned Zoom focus group session.

Participants were able to log in with either their real or fictitious name and were also able to either opt in or out of the video feature. Focus group size was determined by participant availability; there were four focus groups with 3 to 7 participants per group, which was smaller than the typical focus group size of 8 to 10 participants.¹⁹ The smaller size was not considered a disadvantage as qualitative research aims to extract the participants' experiences in rich detail which is not feasible with larger populations.²³ Participants were informed they would be asked 6 open-ended questions (Table I) regarding the research topic during a 45 to 60-minute focus group session. The participants also received an email containing the various periodontal classification systems to use as a reference during the focus group sessions (Table II).

Table I. Focus Group Questions

Who in your clinical practice setting is responsible for diagnosing periodontal disease?

After reviewing the classification guidelines emailed to you, what classification system do you and your colleagues currently use for diagnosing periodontal disease?

Please explain how you feel about the lack of a standard periodontal classification system?

Is there often agreement or disagreement among clinicians in your clinical practice setting when diagnosing periodontal disease? Please explain your answer.

What barriers do you or your colleagues face when diagnosing periodontal disease in your clinical practice setting?

Do you feel your clinical education prepared you to diagnose periodontal disease?

Please explain your answer.

Focus group sessions were audio recorded and moderated by the principal investigator (PI) who also took field notes.

Audio recordings were transcribed verbatim by the PI and were also reviewed by a focus group participant to ensure accuracy. An inductive coding process, consisting of close reading of the transcript for a general sense of the information followed by summarizing the data into common word phrases to identify meaningful units of text related to each question, was used to draw themes from the data.²⁵ The research questions served as the context for organizing the themes identified, and direct quotes from the participants illustrated the dimensions of each theme.²⁵

Accuracy and credibility were established through peer debriefing and member checking by which impartial colleagues and participants reviewed the major findings and provided their feedback.²⁶ Recordings and notes of this study were shared with an impartial colleague to help minimize bias and identify discrepancies in the interpretation of the data. Contradictory findings are included in the discussion.²⁶ Reliability was assessed by reviewing the transcripts and data for errors and assuring the stability of the code definitions.²⁶

Results

Thirty dental hygienists completed the informed consent and demographic survey and 20 qualified for the study (n=20), yielding a 67% response rate for participation in the focus group sessions (Table III). Out of the 20 participants, 10 opted out of video and one used an alias.

Table II. Periodontal Case Types

1986 ADA/AAP Periodontal Case Types	1986 AAP Classification System
Healthy	Juvenile Periodontitis
Type I Gingivitis	Prepubertal periodontitis
Type II Mild Periodontal Disease	Localized Juvenile periodontitis
Type III Moderate Periodontal Disease	Generalized Juvenile periodontitis
Type IV Advanced Periodontal Disease	Adult Periodontitis
	Refractory Periodontitis
1989 AAP Classification System	1999 AAP Classification System
Early-Onset Periodontitis	Gingival Diseases
Prepubertal periodontitis	Plaque-induced
Juvenile periodontitis	Non plaque-induced
Adult Periodontitis	Chronic Periodontitis (slight, moderate, severe)
Necrotizing Periodontitis	Localized
Refractory Periodontitis	Generalized
Periodontitis Associated with Systemic Disease	Aggressive Periodontitis (slight, moderate, severe)
	Localized
	Generalized
	Periodontitis as a Manifestation of Systemic Diseases
	Necrotizing Periodontal Diseases
	Abscesses of the Periodontium
	Periodontitis Associated with Endodontic Lesions
	Developmental or Acquired Deformities and Conditions

Evaluation of the focus group sessions revealed the participants shared many of the same clinical experiences surrounding the periodontal diagnostic process and its relationship to the patient care process. Data saturation levels were reached by the third focus group session; no new themes were identified in the fourth session. Participants shared experiences in all 6 areas discussed during the virtual focus group sessions resulting in the following common themes: diagnosis responsibilities, usage of classification systems, opinions on the lack of a standardized periodontal classification system, agreement between clinicians, barriers to diagnosis, and educational preparation. Six themes were identified in the analysis of the data.

Responsibility for Diagnosing Periodontal Disease

Regarding responsibility for diagnosing PD, just over half of the participants responded it was the dental hygienist who was responsible for patients' disease diagnosis. Participants made the following statements regarding diagnosis responsibility: "In our office, it's the hygienist that decides and diagnoses the periodontal disease," and "I would say the hygienist is the one who does all of the chartings and gives the doctor a strong recommendation, but it is ultimately up to the doctor to decide what

Table III. Participants Demographics

Variable	(n=20) Frequency (%)
Location of Dental Practice	
Northeast	12 (60%)
Southeast	2 (10%)
Midwest	3 (15%)
Southwest	3 (15%)
Highest Degree Attained	
Associate's Degree	13 (65%)
Bachelor's Degree	7 (35%)
Years in Practice	
1-5	6 (30%)
6-10	3 (15%)
11-20	4 (20%)
21-30	4 (20%)
31-40	3 (15%)
Days/Week Working	
1-3	8 (40%)
4-7	12 (60%)
Dental Practice Specialty	
General	18 (90%)
Periodontal	1 (5%)
Group	1 (5%)

treatment is done." Less commonly, participants reported it was the dentists' responsibility, or the diagnosis responsibility depended on who saw the patient first. Conversely, two participants indicated their patients were not necessarily given a periodontal diagnosis but rather a treatment plan. For example, one participant stated, "...I don't think we actually classify anybody. We treatment plan based on individual needs, but we never document a classification..."

Usage of Periodontal Classification Systems

When asked about using a specific periodontal classification system, just over half of the participants stated they used the 1986 ADA/AAP Case Types. An equal number of participants reported using the 1999 AAP periodontal classification system or not using a classification system at all. One participant stated, "We don't specifically put

down any type of classification...” Another participant reported using a combination of the 1986 ADA/AAP Case Types and the 1986 AAP periodontal classification system.

Lack of a Standardized Classification System

Diagnostic inconsistencies and confusion were mentioned frequently among the participants when asked about the use of a standardized classification. Nearly half of the participants reported the lack of a standardized classification system made for inconsistencies between clinicians, about a third of participants said it caused confusion for them personally, and several stated it caused confusion when referring to a periodontist. One participant stated, “There’s a lot of discrepancies just with the hygienists at the same office,” while another stated, “It could be very confusing... if I were not in the same practice every day.” Regarding communication outside of the office, one participant stated, “I work in one practice and we all use the same terminology... but it could get confusing when communicating outside the office.” Another stated, “We refer to a bunch of different periodontists and each one of them has a different system.” Conversely, several participants stated they did not feel the lack of a standardized classification system caused inconsistencies between clinicians or practices, and two participants stated that they did not find it caused any confusion at all. “I’m lucky to work in just one office. So, we all in that office have a standard. It’s not an issue within our own practice.”

Agreement between Clinicians

In the area of diagnostic agreement, more than half of the hygienists stated they experienced agreement with their colleagues when diagnosing disease. One participant shared, “I don’t ever seem to find that there’s a conflict or a disagreement.” However, a little over a third of the participants expressed that they often experienced disagreement with their colleagues when diagnosing periodontal disease. Of experiencing disagreement, almost half stated the disagreement was between the hygienists and the doctor while the remainder stated that the disagreement was between the hygienists. One participant commented, “There’s agreement between the hygienists but depending on which doctor is in the office that day, there can be disagreement.” Another participant from the same practice stated, “Not everybody is doing the same thing. We are not all on the same page.” A third participant shared, “Everybody has their own idea on it and it does cause some conflict when you start a patient and, for whatever reason, they get scheduled with somebody else...”

Barriers to Diagnosing Periodontal Disease

Almost one half of the participants reported the financial constraints of patients and lack of insurance coverage affected the diagnostic process when discussing barriers experienced while diagnosing PD. Participants explained that despite their ability to deliver a PD diagnosis they knew the patient would not proceed with treatment because they could not afford it. Furthermore, some participants felt the PD diagnosis lost credibility if insurance denied payment for the treatment. Patients felt the disease was not serious if the insurance would not cover the procedure. One participant stated, “I think there is definitely a lack of education around it and the fact that it’s a disease that doesn’t hurt.” Another shared, “A lot of patients are very turned off by anything that their insurance doesn’t cover...They feel like if there’s something that isn’t 100% covered, it must not be important.” Four participants said their biggest barrier to diagnosing periodontal disease was due to the patient being in denial of their disease and not accepting the diagnosis. Other comments regarding barriers to PD diagnosis included: disagreement between hygienist and dentist on diagnosis and treatment recommendations, patients not trusting the hygienist, hygienists letting their personal feelings get in the way of their ability to give a patient a diagnosis, lack of time during the appointment to complete the assessments necessary to diagnose, and lack of legal authority to diagnose.

Educational Preparation

The final theme was in regards to dental hygiene education and whether hygienists felt prepared to diagnose periodontal disease upon graduation. Half of the participants reported that while they felt somewhat prepared by their dental hygiene education, they became more knowledgeable and confident with practice and continuing education. One participant stated, “I think that the school was very good at introducing periodontal disease. They focused a lot on it. But, I think the biggest part of my education came from experience” Almost a third of participants stated they felt prepared to diagnose upon graduation; a few dental hygienists stated they were not prepared at all; some felt they were prepared when they graduated, but time in practice has actually caused them to lose their knowledge because they are not diagnosing as they were in dental hygiene school. One participant stated, “I feel like I got all the tools and understanding [from hygiene school], but I feel like I don’t implement it enough in an actual daily clinical practice...I am not classifying like I did during school.”

Discussion

Based on the results of this study, the following themes emerged from the clinical practice experiences shared by the participants: diagnosis responsibilities, use of classification systems, opinions regarding the lack of a standardized periodontal classification system, agreement between clinicians, barriers to diagnosis, and educational preparation. The findings were consistent with previous research in regards to variations in periodontal diagnosis⁵⁻¹² and barriers to following evidence-based protocols.¹⁵⁻¹⁷

More than half of the participants in this study reported being responsible for the diagnosis of PD in their clinical practice setting. It is noteworthy that none of the participants resided in a state where diagnosis of PD is part of the scope of practice.²⁷ Participants also reported feeling confused by the lack of a standardized periodontal classification system, often adopting classification systems being used by colleagues employed in other dental practices. Participants reported less frequently that they noticed differences among the clinicians within their own clinical practice setting. These findings are consistent with previous research suggesting evolving periodontal nomenclature and a lack of a standardization make it challenging for providers to accurately diagnose disease.¹⁰⁻¹² Even though these classification disparities were noted by participants, more than half of the dental hygienists in this study reported feeling most familiar with one of the more dated periodontal classification systems and 20% reported not using any classification system at all.

Contrary to the results of previous research looking at variation in periodontal diagnosis among dentists, dental hygienists, and dental faculty, nearly three-quarters of participants in this study reported they were often in agreement with the clinicians in their clinical practice setting when diagnosing periodontal disease.⁵⁻⁹ However, when participants reported a lack of diagnostic agreement, occurrences of disagreement were equal between dental hygienists and between dental hygienists and dentists.

When discussing barriers to diagnosing PD, 40% of the participants stated financial limitations and lack of insurance coverage affected patients' ability to follow through with the diagnosis-based treatment recommendations. Participants also reported that patients often lost sight of the seriousness of the disease diagnosis when insurance declined coverage for periodontal treatment. Patients' dental knowledge was also thought to affect their level of acceptance of their PD status. Even though the majority of the participants reported diagnosing PD in clinical practice, responses to the question regarding diagnostic barriers may have been interpreted

differently than the PI intended. Many of the responses to this question were pertaining to barriers to disease treatment rather than to the diagnostic process. However, this could also indicate that dental hygienists may be allowing for factors such as insurance coverage to dictate the PD diagnosis rather than focusing on the disease process itself.

Other barriers mentioned included insufficient time to gather the data needed for a diagnosis, feeling the patient did not trust the dental hygienist's diagnosis and experiencing disagreement between the dentist and dental hygienist. Another area identified was the inability to set aside personal beliefs and preconceptions when assessing a patient's needs, such as: assuming the patient could not afford treatment, assuming a patient would not accept treatment plan because of advanced age, or assuming the patient would not follow through with treatment due to lack of insurance coverage. Previous research in medicine indicated that health care providers experienced both internal and external barriers, including lack of familiarity, resources, confidence, or not seeing value in guideline principles, impacting their ability to follow evidence-based care guidelines.^{15, 16, 28-30} Likewise, if a dental hygienist has difficulty utilizing evidence-based practices due to internal or external barriers, it could be difficult for them to assign a PD diagnosis.¹³

Data from the American Dental Hygienists' Association (ADHA), indicates there are only three states, (Colorado, Connecticut, and Oregon) which allow for a dental hygienist (without an advanced license) to make a dental hygiene diagnosis.^{27,31} Despite diagnosis not being part of the scope of practice in a majority of states, only one participant indicated this was a barrier to assigning a PD diagnosis. This finding is not surprising given the dental hygiene diagnosis requires critical analysis and interpretation of periodontal assessments in order to reach evidence-based conclusions regarding the patient's dental hygiene treatment needs and the dental hygiene care plan.³¹

Regarding the role of dental hygiene education, participants commonly reported feeling somewhat prepared to diagnose PD, but length of time in practice and along with continuing education strengthened their skills and confidence. Some participants stated that they felt completely prepared and confident following graduation from a dental hygiene program while others felt that while they were well prepared that they had lost some knowledge regarding PD classification due to lack of use in their clinical settings. Reports of less than adequate preparation are consistent with previous research conducted with dental students.³² While the students reported feeling they did not have enough faculty

available to assist them, being assigned too many non-clinical tasks, and experiencing high stress levels due to clinical requirements, the key finding to the topic of variation in periodontal diagnosis among clinicians was the inconsistent clinical feedback students received from their instructors.³²

Limitations of this study include the lack of representation for bachelor degree dental hygienists in the study sample, purposive sampling technique, and the participants' ability to articulate their clinical practice experiences in regards to barriers to diagnosing periodontal disease. Varying schedules and availability to join focus group sessions presented challenges so that the participants in each group had either the same degree level or an even representation of associate and bachelor degree participants. There was the potential of misinterpreting the participants' responses due to the personal values and experiences of the PI. However, to increase the credibility of the analysis, the PI utilized the process of member checking to validate the findings as recommended by Creswell.²⁶

Areas for future research include examining the perceived patient barriers to periodontal disease diagnosis reported by the participants in this study. More extensive research needs to be conducted on the evolving PD diagnostic terminology and its impact on the clinician's ability to accurately diagnose periodontal diseases particularly in light of the proposed 2017-18 change in PD classification guidelines.¹⁴

Conclusion

The purpose of this study was to explore dental hygienists' experiences and perceived barriers during the process of diagnosing PD. Study data indicates that dental hygienists feel the lack of a standardized periodontal classification system causes confusion and inconsistencies when communicating with other oral health care providers outside of their individual clinical practice settings. Dental hygienists also face barriers related to perceived patient difficulties in proceeding with treatment when diagnosing PD as well as discrepancies in the PD diagnosis with other dental hygienists and dentists. Identifying the challenges and barriers to making an accurate PD diagnosis may be instrumental in assisting dental hygiene educators in preparing students for clinical practice and ultimately improve the quality of patient care.

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