

# KAP SURVEY ON SALIVARY DIAGNOSTIC METHODS OF CARIES RISK ASSESSMENT

<sup>1</sup>Trisha Sasikumar, <sup>2</sup>Dr. Sankeerthana Kolli\*

<sup>1</sup>Undergraduate, Saveetha Dental College & Hospitals, Saveetha Institute of Medical & Technical Sciences, Saveetha University, Chennai-77

<sup>2</sup>\*Senior Lecturer, Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-77

## Abstract

**OBJECTIVE:** Caries risk assessment is a tooth to evaluate the risk factors that are responsible for the occurrence of dental caries. Saliva is readily available and has been recognized in the diagnostics and normal health surveillance.

**MATERIALS AND METHODS:** A convenient sample size of one hundred consecutive respondents participated in this study. A cross-sectional study was conducted using google forms and multiple-choice questions. The approval was obtained from the Institutional Ethics Committee. The questionnaire contained 12 questions based on the knowledge, awareness, attitude, and practice of dental interns and postgraduates towards salivary diagnostic methods for caries risk assessment.

**RESULTS:** Out of the total study population, 52% of the participants were aware of caries risk assessment and 64% thought caries risk assessment is needed. About 89% of the participants knew how saliva is used as a diagnostic tool.

**CONCLUSION:** More dental education programs have to be conducted to increase the awareness of salivary diagnostic aids for caries detection.

**Keywords:** Caries, Diagnosis tools, Innovative, Risk assessment, Saliva.

**DOI:** 10.47750/pnr.2022.13.S04.154

## INTRODUCTION:

Early diagnosis of diseases is crucial to prevent complications that could have a negative impact on a patient's quality of life. Despite the regular screenings and check-ups, many diseases go unnoticed till clinical signs and symptoms become apparent. ('Saliva', no date; Sridharan, 2019) To overcome these challenges, researchers are unraveling biomarkers (Glock, 1992), (Santolia *et al.*, 2016). Dental caries has a multifactorial etiology, the risk of dental caries can be evaluated by analyzing and integrating several causative factors. These include caries experience, plaque, bacterial activity and social and behavioral factors. Hence prompt diagnosis and management become imperative. The Caries Risk Assessment Tool is a research-based tool used to identify the risk factors that cause dental decay. They generally have data to accurately quantitate disease susceptibility and allow for preventive measures (Muthukrishnan, 2021), (Website, no date).

Saliva, a biofluid, is totally non-invasive and readily available and has been recognized to address the roadblock pertaining to the more expensive alternatives. (Karobari *et al.*, 2021) (Ezhilarasan, 2020) Salivary diagnostic tests have lately come into the limelight, considering their efficiency and cost-effectiveness, as it can allow chair-side diagnosis of various oral diseases including dental caries. (Jessica, Jessica and Auerkari, 2019; 'Saliva as a Diagnostic Tool in Orofacial Disorders', 2020; Kart and Yarat, 2020) (Bhavikatti *et al.*, 2021). Therefore, saliva can be seen in many cases as a reflection of the physiological function of the body and this makes it an excellent candidate for evaluating various biomarkers (Kushwaha *et al.*, 2021) ('Saliva', no date) (Romera *et al.*, 2018)

However, in dentistry, there still is a lack of screening tools to determine the risk of dental caries. (Maddu, 2019) Currently available screening models include a combination of various factors including diet, host, bacteria, fluoride exposure that interplay with a variety of social, cultural, and behavioral factors. (Deepa and Thirrunavukkarasu, 2010; Majid *et al.*, 2014; Syed, 2020) (PradeepKumar *et al.*, 2021) With the ability to detect caries in the early stages, prompt treatment can be provided. (Tsujimoto *et al.*, 2021) Our team has extensive knowledge and research experience that has translate into high quality publications (Dinesh *et al.*, 2013; Krishnan and Lakshmi, 2013; Muthukrishnan and

Warnakulasuriya, 2018; Sekar *et al.*, 2019; Gomathi *et al.*, 2020) (Sathivel *et al.*, 2008; Panda *et al.*, 2014; Govindaraju, Neelakantan and Gutmann, 2017; Johnson *et al.*, 2020; Saraswathi *et al.*, 2020). This led to our quest in assessing the knowledge, awareness and practice on the salivary diagnostic methods of risk assessment of caries.

## MATERIALS AND METHODS

A convenient sample size of one hundred consecutive respondents participated in this study. A cross-sectional study was conducted using google forms and multiple-choice questions. The approval was obtained from the Institutional Ethics Committee. The questionnaire contained 12 questions based on the knowledge, awareness, attitude, and practice of dental interns and postgraduates towards salivary diagnostic methods for caries risk assessment. The participants have explained the purpose of the study in detail. The questions were carefully studied and corresponding answers were marked by the participants. The data was collected and statistically analyzed.

Statistical analysis:

The data was converted to SPSS Version 20.0 categorical variables were expressed in terms of frequency, and bar graphs were displayed. Chi-square tests were used to determine the statistical significance of the correlations.

## RESULTS:

Figure 1 represents the percentage of participants aware that saliva can be used as a diagnostic tool. Out of the total study population, 86% of the participants were aware that saliva can be used as a diagnostic tool and 14% of the participants were not aware that saliva can be used as a diagnostic tool. Blue represents aware and green represents not aware.

Figure 2 represents the percentage of participants who were aware of the predominantly prevalent caries associated with microorganisms in the saliva. Out of the total study population, 49% thought that predominant caries associated with microorganisms in the saliva were *S.mutans* and *S. sobrinus*, 38% thought that predominant caries associated microorganisms in the saliva was *Lactobacillus* and 13% thought that predominant caries associated microorganism in the saliva were *S.mutans* and *S.aureus*. White represents *S.mutans* and *S.sobrinus*, red represents *Lactobacillus* and purple represents *S.mutans* and *S.aureus*.

Figure 3 represents the percentage of participants who thought normal salivary flow is crucial for protection against dental caries. Out of the total study population, 64% thought it was crucial while 36% did not think it was crucial. Blue represents no and green represents yes.

Bar graph 1: The figure represents the association between gender and awareness of caries risk assessment. The X-axis represents the gender and Y-axis represents the number of responses for the number of participants aware of caries risk assessment. Green represents the number of people who were not aware of caries risk assessment and blue represents the number of people who were aware of caries risk assessment.

Bar graph 2: The figure represents the association between gender and awareness of the salivary biomarkers used for caries risk assessment. The X-axis represents the gender and Y-axis represents the number of responses for the number of participants aware of the salivary biomarkers used for caries risk assessment. Orange represents the number of people who thought that the salivary biomarker was microbiota and pH and purple represents the number of people who thought the salivary biomarker was the amount of saliva.

## DISCUSSION:

Out of the total study population, 54% were men and 46% were women. When asked about their awareness of whether saliva can be used as a diagnostic tool, 86% of the participants were aware of the use of saliva as a diagnostic tool and 14% of the participants were not aware of the use of saliva as a diagnostic tool. (R *et al.*, 2020) When asked if saliva can be a host factor for dental caries, 81% of the participants said yes, saliva can be a host factor for dental caries while 19% said no, saliva cannot be a host factor for dental caries. (Deepa and Thirrunavukkarasu, 2010) When asked if they knew what caries risk assessment was, 60% of the participants knew what caries risk assessment was and 40% did not know what caries risk assessment was. (Chaturvedula *et al.*, 2021) When asked if they thought caries risk assessment was needed, 64 % of the participants thought it was needed and 34 % of the participants did not think it was needed. (Tenovuo, 1989; Maddu, 2019) When asked if they knew about the presence of caries-associated microorganisms, 72% knew the presence of caries-associated microorganisms while 28% did not know. (Tsuji moto *et al.*, 2021) When asked what are the predominantly prevalent caries-associated microorganisms in the saliva, 49%

of the participants answered *S. mutans* and *S. sobrinus*, 38% of the participants answered *Lactobacillus* and 13% answered *S. mutans* and *S. aureus*. (Maddu, 2019) When asked if they knew saliva can be used as a diagnostic tool, 85% of the participants said yes and 15% of the participants said no. (Priyadharsini, 2019) When asked if they think that a caries-free individual has higher or lower salivary pH, 64% of the participants thought a caries-free individual has higher salivary pH and 36% of the participants thought a caries-free individual has lower salivary pH. (Ushanthika *et al.*, 2021) When asked if they knew what were the salivary biomarkers for caries risk assessment, 75% of the participants said they knew and 25% of the participants said they did not know. (Priyadharsini *et al.*, 2018) When asked what are the salivary biomarkers for caries risk assessment, 86% of the participants said microbiota and pH while 14% of the participants said the amount of saliva. (Kanniah *et al.*, 2020) When asked if they think normal salivary flow is crucial for protection against caries, 64% of the participants said they think normal salivary flow is crucial for protection against caries and 36% of the participants said they think normal salivary flow is not crucial for protection against caries. (Priyadharsini *et al.*, 2018; Maheswari, Nivedhitha and Ramani, 2020)

## CONCLUSION:

Salivary diagnostic methods are effective and play an important role in caries risk assessment. From this study, we conclude that there is an overall good awareness among dental interns and postgraduates on salivary diagnostic methods for caries risk assessment.

### Author's contribution:

Trisha Sasikumar - Contributed to conception, design, data acquisition and interpretation, drafted and critically revised the manuscript.

Dr. Sankeerthana Kolli - Contributed to conception, design, and critically revised the manuscript.

All authors gave final approval and agreed to be accountable for all aspects of the work.

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

**Acknowledgment:** The authors would like to thank the management of Saveetha dental college, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai for giving a platform to carry out this project.

### Funding Support :

The present project is funded by  
Saveetha Dental College and Hospitals  
Saveetha Institute of Medical and Technical Sciences,  
Saveetha University and Jeevan Clinic

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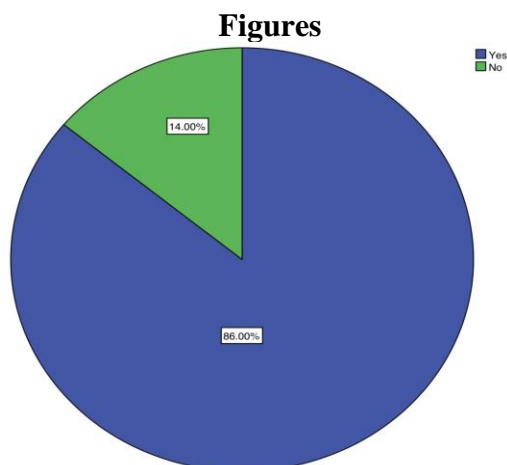


Figure 1

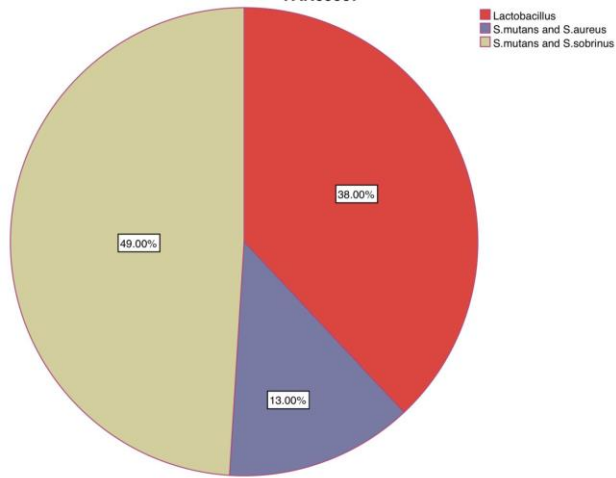


Figure 2

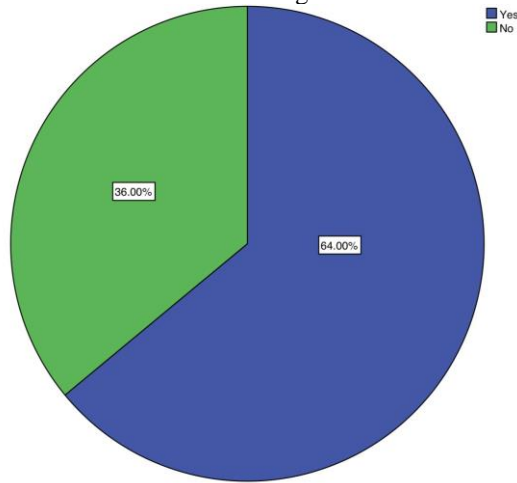
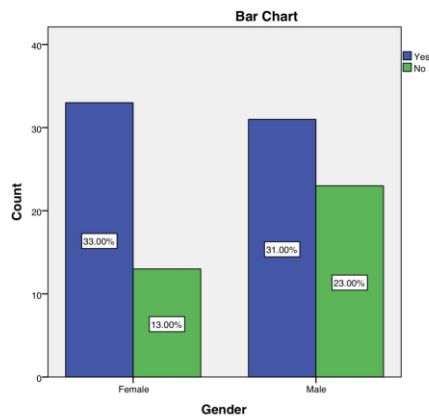
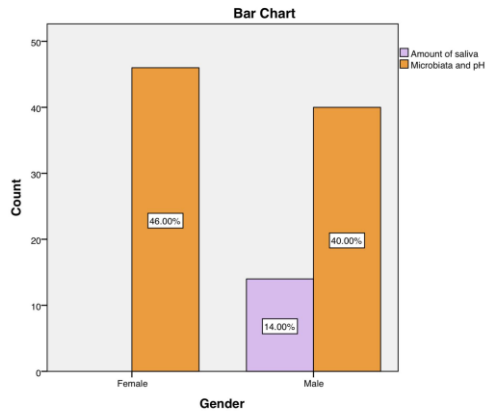


Figure 3



Bar graph 1



Bar graph 2