



IETARY TRACKING APPS: A Smart, AI-Assisted Approach to Preventive Dentistry

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Abstract

Dietary habits play a critical role in the development of dental caries in children, particularly the frequent consumption of sugary and cariogenic foods [1-3]. Traditional dietary assessment methods such as manual diet diaries are often time-consuming, inaccurate, and poorly complied with. Advances in artificial intelligence (AI) and digital health have enabled the use of dietary tracking apps as effective tools for monitoring eating patterns, identifying cariogenic foods, and supporting preventive oral health care[5]. Dietary tracking apps facilitate early detection of high-risk dietary behaviors, provide personalized dietary guidance, and encourage positive behavior modification through motivational feedback. Evidence from published studies demonstrates that such digital dietary tracking methods significantly improve parental awareness, reduce sugar intake, and promote preventive oral health behaviors in children.

Keywords: Dietary habits, Preventive dentistry, Artificial intelligence, Cariogenic diet.

INTRODUCTION

Dental caries is one of the most prevalent chronic diseases affecting children and is closely associated with dietary practices, particularly frequent intake of sugars and refined carbohydrates.[1] Repeated exposure to fermentable carbohydrates leads to prolonged acid production and enamel demineralization, increasing the risk of caries development [2-3]. Although parents recognize the importance of monitoring their children's diet, maintaining conventional written diet diaries is often impractical due to time constraints, forgetfulness, and poor compliance[4]. Recent advances in artificial intelligence and digital health have led to the development of dietary tracking apps that enable structured and continuous monitoring of children's eating habits. These digital tools can analyze dietary patterns, identify cariogenic foods, and provide real-time, personalized feedback.[5] Evidence from clinical studies evaluating digital diet-tracking systems has shown significant improvements in parental awareness, dietary regulation, and oral health behaviors, supporting their role in preventive pediatric dentistry [6-7].

Dietary sugar consumption remains a major public health concern worldwide, with strong evidence linking both the amount and frequency of sugar intake to the initiation and progression of dental caries [1-3]. Frequent snacking, prolonged oral sugar exposure, and poor dietary habits established early in life significantly increase caries risk in children [2]. International guidelines emphasize reduction of free sugars as a key preventive strategy. However, effective monitoring of dietary habits in children continues to pose challenges in clinical practice.

Conventional dietary assessment methods such as 24-hour recalls and written diet diaries are prone to recall bias, underreporting, and poor long-term compliance, particularly in pediatric populations. Advances in artificial intelligence and digital health technologies have introduced dietary tracking apps capable of real-time data capture, pattern recognition, and automated dietary analysis [5]. These tools offer an opportunity to enhance dietary counseling by providing objective, structured, and continuous dietary information relevant to caries risk assessment.

AIM

To highlight the role of dietary tracking apps in supporting preventive dentistry through AI-assisted monitoring of dietary habits in children.

OBJECTIVES

1. To identify cariogenic dietary patterns using dietary tracking apps.
2. To monitor the frequency and timing of sugar intake relevant to caries risk.
3. To promote healthier snacking habits through personalized dietary guidance.
4. To encourage behavior modification using motivational feedback strategies.
5. To support dentists with data-driven insights for effective dietary counseling.

METHODOLOGY

Dietary tracking apps function as digital tools that assist in preventive dietary assessment and counseling [5]. Parents or caregivers record children's daily meals and snacks, which are analyzed using AI-based systems to identify cariogenic foods and high-risk dietary patterns. Based on this analysis, personalized dietary guidance and motivational feedback are provided to encourage healthier food choices. The collected dietary information can be utilized by dental professionals for targeted preventive counseling. This methodology is supported by evidence from studies assessing the compliance and validity of digital diet-tracking systems in pediatric populations. [6-7].

RESULT & DISCUSSION

Dietary tracking apps overcome the limitations of traditional diet diaries by providing structured, user-friendly, and continuous dietary monitoring. Clinical studies have demonstrated improved compliance, increased awareness of sugar intake, and positive changes in dietary behavior among children and parents using digital tracking tools. [1-3,7]. The interactive nature of these platforms enhances engagement and supports sustained behavior modification. By enabling early identification of cariogenic dietary behaviors, dietary tracking apps promote a shift from treatment-oriented dentistry to prevention-focused care. Integration of AI-assisted dietary analysis into pediatric dentistry allows for timely intervention and strengthens preventive strategies against dental caries.

Evidence suggests that digital dietary monitoring improves user engagement, compliance, and accuracy compared to traditional methods. Studies have demonstrated that technology-assisted diet tracking enhances awareness of sugar intake and supports positive dietary modifications. Artificial intelligence-assisted analysis further strengthens preventive care by identifying hidden dietary risk patterns and enabling personalized feedback.

From a preventive dentistry perspective, dietary tracking apps complement existing caries risk assessment models by incorporating behavioral and dietary determinants of oral health. Their integration into pediatric dental practice supports early intervention, reinforces oral health education, and promotes a preventive approach aligned with modern minimally invasive dentistry. [6-7].

Clinical Significance

- Facilitates early detection of cariogenic dietary habits.
- Improves awareness regarding sugar consumption.
- Supports evidence-based dietary counseling.
- Encourages long-term preventive oral health behaviors.
- Contributes to reduction in dental caries among children.

CONCLUSION

Dietary tracking apps represent a valuable AI-assisted approach in preventive pediatric dentistry. By enabling early

identification of high-risk dietary patterns, providing personalized guidance, and supporting data-driven counseling, these digital tools promote healthier eating habits and preventive oral health behaviors. Integration of dietary tracking apps into routine dental care has the potential to significantly strengthen caries prevention and improve oral health outcomes in children.

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