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Etiology Risk Factors, Preventive Measures and Management of Early Childhood Caries: A Review

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Abstract

The human body is habitat for more than trillions of microbes, and the oral cavity makes it as one of the largest source of microbial colonisation. There are around 650 to 1100 microbial species that colonize the oral cavity. The occurrence and development of oral cavity diseases like dental caries, various types of periodontitis, and oral carcinomas are very closely linked to oral microorganisms

Key Words: ECC; Dental Caries; Streptococcus Mutans; Fluoride; Nursing Bottle Caries

Introduction

The human body is habitat for more than trillions of microbes, and the oral cavity makes it as one of the largest source of microbial colonisation. There are around 650 to 1100 microbial species that colonize the oral cavity. The occurrence and development of oral cavity diseases like dental caries, various types of periodontitis, and oral carcinomas are very closely linked to oral microorganisms [1–4]

Dental disease is unquestionably a public health issue and is among the most common diseases globally, in particular, dental caries which is a biofilm related disease [5].

It has been reported that 55 to 92% of school going children and nearly every adult worldwide are suffering from some kind of oral health problem and most common among them are dental caries [6]. Therefore, the prevention and early treatment of caries plays crucial role in public health. Federation Dentaire Internationale (FDI) presented the minimal intervention dentistry definition on managing dental caries in 2002, emphasizing that the existing preventive measure is to uphold a healthy tooth structure [7]. With the latest recommendation for early diagnosis and monitoring of caries, rather than waiting until a caries is established, the prevention of caries was shifted from the surgical intervention to a preventive model, and the proportion of patients receiving preventive oral health checkup has been drastically amplified in recent times [8]

Dental caries results from the interaction of specific bacteria with constituents of the diet within a biofilm termed 'dental plaque' (Bowen, 2002). Sucrose is considered as the most cariogenic diet associated carbohydrate, as it is fermentable, and it also serves as a substrate for the synthesis of extracellular and intracellularpolysaccharides in dental plaque (Newbrun, 1967; Bowen,2002). [9]

Early childhood caries (ECC) is one of the most prevalent biofilm-dependent infectious diseases in childhood worldwide. ECC can result in rapid and extensive carious lesions and destruction of primary teeth causing painful pulpal and complicated systemic infections (Casamassimo et al., 2009).

Even after removal or restoration of carious teeth, children remain at high risk for future recurrences, despite pharmacologic interventions, such as topical fluoride/antimicrobial applications, or recommendations to alter caries-promoting feeding behaviors (O'Sullivan & Tinanoff, 1996; Li & Tanner, 2015). Hence, ECC

places enormous health and economic burdens most often on those least able to bear them. [10]

Aetiology of tooth decay is well investigated, and thus it is logically preventable. Caries management for preschool children may differ from that for adults, as an atraumatic approach for children can slow the progression of caries so that the arrested decayed tooth exfoliates before causing oral pain. However, a very low proportion of paediatric dentists to child populations exists, especially in developing countries. It is impossible to handle such situations with the limited number of dentists in this specialty alone. The approach for tackling the heavy burdens of tooth decay must be effective, low cost and technically insensitive. In addition, the approach must be simple to use, as more general dentists may therefore adopt it, and it may be implemented in kindergartens for children in need, thus increasing access to dental care. [11]

Preventing caries preserves a sound tooth structure, prevents the demineralization of enamel, and promotes natural healing processes [12].

Risk Factors:

Early Childhood Caries is considered as a multifactorial disease. Food and beverages with high sugar content can lead to a dysbiosis of the oral microbiota which results in caries. As early childhood caries is also known as "baby bottle caries," feeding habits are considered as main risk factor for development of ECC. [13]. It has been observed that the upper central and lateral incisors and molars are affected at first, followed by the molars of the lower jaw and ultimately the lower jaw central and lateral incisors [14]. Children which sleeps with bottles filled with sugary milk containing several cariogenic agents are at high risk for developing ECC. As a result of taking milk or beverages during night time, without clearance of sugars, the oral microbiota will produce lactic acid quickly causing demineralization of the enamel [15,16]. In present scenario, not only baby bottles, but also numerous other sweetened beverages consumed throughout the daily routine will increase the risk for developing caries. ECC is a condition which affects both low socio economic status families and high socio economic status families [9, 10]. The important risk factors that increase the risk to develop ECC are irregular toothbrushing (mechanical plaque removal) and/or toothbrushing without supervision by any caregivers [14]. Therefore, supervised thorough tooth brushing twice a day should be applied [16,17]. (Fig. 1)

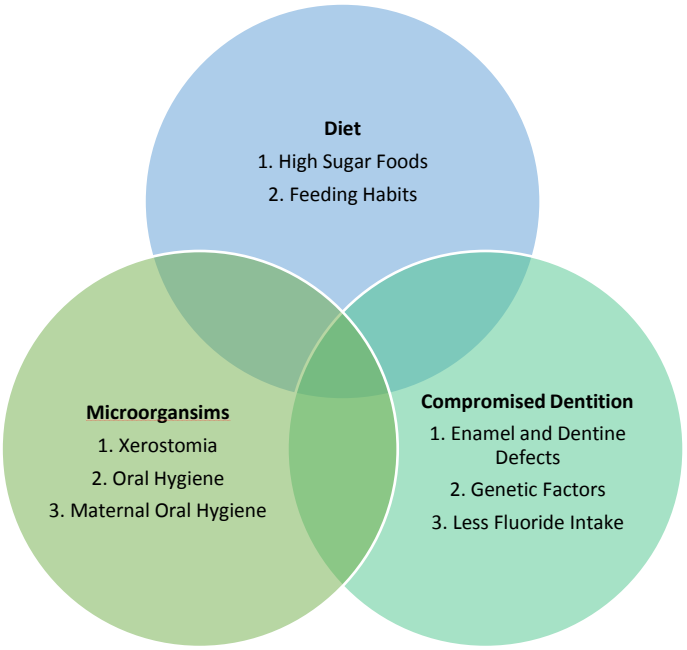

Fig.1: Interplay Between Various Factors for Early Childhood Caries

Preventive Measures

Early childhood caries (ECC) is a health problem with biological, social and behavioural elements. Interventional treatment does not resolve this problem.The only feasible way is prevention of this complex disease. European Academy of Pediatric Dentistry (2008) has recommended general strategies for ECC prevention: Oral health assessments with counselling at regularly scheduled visits during the initial years of life are an important strategy to prevent ECC

- Children's teeth should be brushed daily with a smear of fluoride toothpaste as soon as they erupt
- Professional applications of fluoride varnish are recommended at least twice yearly in groups or individuals at risk.
- Parents of infants and toddlers should be encouraged to reduce behaviours that promote the early transmission of mutans streptococci.

Primary prevention

- It should begin during prenatal period and it consists of pregnant woman's needs' fulfilment.
- Good quality of diet for the newborn during the enamel maturation phase;
- Fluoridation of newly-erupted teeth;
- Antimicrobial therapy with chlorhexidine.

Secondary prevention

Mothers' education on recognizing the first signs of early childhood caries using "lift-the-lip" technique. The aim of this technique is early detection of the so-called "white spot".

- breast-feeding of the baby;

- the use of cup or glass and replace the bottle as early as possible;
- restrict the use of sweetened beverages like juices or soda;
- the use of natural, a little sweetened, juice or tea, or just water;
- reduce the liquid in the bottle, gradually by night,
- reduce candies as much as possible;
- no sweet dishes between meals;
- regular tooth brushing, at least twice in a day, mandatory before going to bed.
- Regular follow-up consultations with the dental professional.
- Professional education activity targeting general health care professionals (family physicians, gynaecologist, paediatric professionals etc):
- early diagnosis of disease,
- fluoride supplementation as desirable and as per guidelines,

Conclusion

Oral health is vital to general health and should not be considered as secluded entity. Oral diseases have negative impact on an individual's physical and psychological well-being and can affect their quality of life. The most common oral disease is dental caries. Caries advancement or reversal is determined by the balance between defensive and pathological factors happening in the oral cavity. The most important strategy in the treatment of the carious lesion is prevention. Understanding the equilibrium between pathological factors and defensive factors can play crucial role in successful prevention of caries. Diagnosis of the etiology, prevalence, clinical presentation, manifestations and complications, caries in general and ECC more specifically are considered as grave issue, which represent not only health problem, but also pose a social and economic challenge.Significance of an early childhood caries, particularly in underdeveloped countries, can be very vast, ranging from tooth exfoliation to systemic health disorders

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