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Yoghurt: A Potential Recipe for the Management of Dental Caries among Children and Adults in Developing Countries

Nri-Ezedi Chisom Adaobi[1]* and ULASI Thomas Obiajulu[2]

*[1]*Lecturer, Department of Paediatrics, Faculty of Medicine, Nnamdi Azikiwe University Awka, Anambra, Nigeria*

[2]*Assocaite Professor, Department of Paediatrics, Faculty of Medicine, Nnamdi Azikiwe University Awka, Anambra, Nigeria*

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***Corresponding author:** Morittu S, Dental Hygienist, Private Practice, Silanus, Sardinia, Italy

Abstract

Dental caries is the most common non-communicable disease known to man. Yoghurt, a micro-nutrient rich dairy product, possesses several properties that protect against- and decelerate the advancement of new carious lesions. A 28-year-old female medical doctor with a chronic history of dental caries, failed restorative therapies and tooth extractions of nine years duration. Onset of new carious lesions were particularly observed to be aggravated during and soon after pregnancy. In her fourth pregnancy, following the start of the regular intake of fresh yoghurt twice weekly, no new lesions have occurred in four successive years. Regular intake of yoghurt may offer some benefits against dental caries.

Keywords: Probiotics; Oral health; Cariogenic organisms; Oral diseases; Cariostatic; Yogurt

Introduction

Dental caries is the leading non-communicable disease that affects over two billion persons worldwide [1,2]. In low and middle-income countries, a disproportionately higher disease burden is observed in both adult and children [1,3]. Unlike other non-communicable diseases, dental caries is primarily overlooked with devastating physical and social consequences [1]. Factors contributing to the incidence of this disease, particularly in resource-constrained regions, include inadequate intake of food rich in micronutrients, lack of fluoridated water, poor dental hygiene, a dearth of skilled dental specialists, and a high cost of dental care, amongst others [1]. Yoghurt is a fermented milk-based dairy product rich in protein, potassium, calcium, phosphorus, magnesium, vitamin D and probiotics [4]. This micronutrient-rich meal possesses multi-pronged benefits against dental caries. Yoghurt contains the prerequisite micro-nutrients required for optimal teeth development, it protects against the onset of any cariogenic activity and delays the progression of existing dental caries [5-7]. Furthermore, yoghurt enriched in probiotics, notably streptococcus thermophilus and lactobacillus bulgaricus, stimulates a local immunomodulatory effect that guards against the proliferation of cariogenic organisms within the oral cavity [8]. Since yoghurt is readily available and affordable, regular intake can protect against the incidence of dental caries, potentially reversing the grim statisitcial trend reported in developing countries. There is need for more robust studies to further elucidate the oral benefits of yoghurt among our populace.

Case Report

A 28-year-old female medical doctor presented at the dental clinic of Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra with an acute history of tooth ache of several hours and a 5-year history of recurrent carious lesions, dental restorations and teeth extractions. Patient occasionally brushed twice a day, does not smoke, rarely indulged in sugary snacks or drinks and had delivered her last child six months prior to presentation. Clinical examination of the oral cavity revealed a failed temporary dressing at the left lower second molar which was very tender alongside a new carious lesion at the right lower third molar. Extraction of the left lower second molar tooth was conducted with restorative therapy with composite-renin fillings done for the right lower third molar. Eight months later, the restored tooth in the prior visit failed with onset of fresh dental caries observed at the left lower first molar tooth. Composite filling of the new carious lesion and failed restored tooth were conducted.

Three weeks later, following another complaint of tooth ache, a new carious lesion was observed at the upper left first premolar tooth for which a composite filling was done, and antibiotics given. Patient was counselled to brush at least twice every day. A year later, she presented with hypersensitive of a previously restored tooth at the left lower first molar. On examination, a failed composite restoration was observed which was redone. Eighteen months later, patient presented with complaints of a new cavity at one of the right upper teeth.

An inspection of the dental area showed new dental caries at the upper right first and second premolars in addition to the lower left third molar. The lower left third molar was extracted. Due to scarcity of composite-resin material, patient opted for amalgam fillings to restore the premolars. Seven months later, a defective rest was observed at the lower left first molar with new lesions at the right lower first molar and premolar. Restoration of the previously filled tooth and new dental caries were conducted with patient adviced to floss regularly. Seven weeks later, a defective filling of the right lower first premolar was observed with new dental caries at the right lower second premolar. Both were restored with amalgam fillings. During this visit, patient observed that new onset of dental caries appeared to be aggravated during pregnancy. At the time, patient was pregnant with her 4th child at the gestational age of 6 months. Suspecting micronutrient deficiency to be the primary cause of the recurrent dental caries, which is seemingly refractive to preventive and active management, she started and maintained a dietary intake of about 500mls of freshly made yoghurt two times a week. We observed that unlike the aftermath of her two previous pregnancies, no new dental lesions further occurred following birth. Attributing this phenomenon to the intake of yoghurt, patient continued with the weekly dietary regimen with no new dental lesions or failed restorations occurring in the next four successive years.

Discussion

Micronutrient deficiency is often downplayed as a predisposing factor of dental caries particularly in developing countries. Hypomineralization of the tooth secondary to micronutrient deficiencies can accelerate the underlying pathologic mechanism of dental caries [9]. In addition, pregnancy, characterized by its high nutritive demand, is increasingly being recognized as a risk factor for dental caries [10]. This supports the observation in our index case, in which the patient's lesions appeared to worsen during and after pregnancy. Micronutrients essential to optimal dental development include calcium, phosphorus and fluoride. Several high-quality studies have illustrated the oral benefits of yoghurt which is well recognized as a micronutrient-rich dairy product [5-8,11]. In addition, yoghurt contains casein phosphopeptides which promote remineralization of the tooth.5 Compared to other dairy products such as milk, cheese and butter, yoghurt provided the better cariostatic activity [6,7]. In a comparative study conducted among 68 students, yoghurt intake significantly enhanced the calcium and phosphorus concentrations of all teeth including those with existing plaques. A similar effect was not obtained when milk was given to the control subjects [7]. Unlike milk and other dairy products, calcium and phosphorus exist in soluble forms in yoghurt thus enhancing its overall bioavailability [7]. This benefit also appears to be dose dependent as higher yoghurt consumption is significantly linked with a lower incidence of dental caries [6]. The dramatic decline of new dental caries and failed restorations in the index case following the consistent intake of freshly made yoghurt rich in probiots strongly supports the findings from the aforementioned clinical trials.

It appears that not all yoghurts are the same vis-à-vis its cariostatic benefits. Yoghurts enriched with probiotics appear to offer better protection against dental caries through its immune-modulatory properties that decreases the activity of cariogenic organisms [8,11]. In a double-blind randomized placebo-controlled trial conducted among 66 adult students with early-onset caries, the group assigned to three weeks of daily intake of probiotic yoghurt demonstrated a significant reduction in cariogenic organisms compared to the control group given regular yoghurt.8 Notwithstanding these reports, several studies have demonstrated conflicting findings indicative that regular yoghurt, a cheaper commercialized variant with little or no probiotic properties, may offer a better protection against the proliferation of these cariogenic organisms compared to the probiotic-rich yoghurt [12,13]. This is intriguing as it suggests that all yoghurts, irrespective of their probiotic content, may in fact offer some value against the development of dental caries. In addition, since regular yoghurts are generally cheaper with a longer shelf-life compared to the probiotic-rich variants, it invariably means that this product can easily be incorporated as a regular food diet.

The oral benefits of yoghurt against dental caries are essential particularly in developing regions plagued with a high disease burden. Yoghurt is relatively cheap, safe, readily available, palatable and acceptable to almost all individuals from different societal and cultural divides. Interestingly, notwithstanding the lack of fluoridated water and generally poor oral hygiene obtainable in these climes, yoghurt still offers some degree of protection against dental caries in both adults and children [13]. In cooperating yoghurt in the diet of an average child from resource-poor regions can also promote optimal growth and development as well as protect against the onset and progression of acute watery diarrhoea [14]. Pregnancy is increasingly being recognized as a risk factor for dental caries [10]. Dental caries is considered to be the second most common oral disease during pregnancy [10]. The risk of developing dental caries increases with each successive pregnancy, especially during the third trimester and postpartum periods [10]. This was keenly observed by our patient who experienced the same outcome. Factors associated with the increased risk of dental caries during pregnancy are complex which primarily consists of pregnancy-induced intraoral changes enhancing a reduction in salivary calcium concentrations and pH value, both of which enhances cariogenic activity [15]. Although there are no known published reports on the benefits of yoghurt

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in preventing dental caries during pregnancy, the author believes that yoghurt, a safe dairy product, can decelerate the onset of dental caries in pregnant women at risk as witnessed in our index patient.

Conclusion

In conclusion, growing reports continue to demonstrate the cariostatic properties of yoghurt in both adults and children. This author recommends the universal daily intake of yoghurt, particularly among children and pregnant women from resource-poor nations. Furthermore, local studies are needed to affirm these cariostatic benefits within these populations.

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