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Diet Analysis and Counseling for Caries Prevention: A Case Report

Case Report

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Abstract

Dental caries is a diet-related disease that continues to be a problem for certain dental patients. Frequent consumption of fermentable carbohydrates that have low oral clearance rates increases the risk for caries. This report emphasises on the significance of diet counseling in prevention of dental caries.

A 21-year-old female patient reported to the clinic with a chief complaint of brownish discoloration on the posterior region. On eliciting detailed case history it was found that patient had adequate oral hygiene practices, however, the patient had a habit of snacking and not rinsing her teeth immediately afterward. Detailed dietary analysis revealed on patients habit of 'in-between' consumption of sugary foods. Hence the intervention was aimed at reduction of in-between consumption and replacement with alternate diet. Multiple oral health education sessions, positive reinforcement and allowing the patient to decide the alternate by explaining her food pyramid followed by convincing the patient to change her pattern of diet were the measures taken. All these measures resulted in changing the eating habit of the patient.

Hence it is important to understand the risk of patient to develop dental caries and to plan tailor made interventions for a caries preventive regimen

Keywords: Dental caries; Diet; Diet counseling; Diet chart; Sugars; Cariogram

Introduction

Many chronic health problems are associated with increased consumption of free sugars. The term free sugars refers to monosaccharides and disaccharides that are naturally present in honey, syrups, and fruit juices, as well as also added by manufacturers or consumers to food and beverage [1]. According to the WHO, free sugars should make up less than 5% of one's daily total energy intake, to reduce one's risk of obesity and dental decay. This recommendation is based on the recognition that dental caries has cumulative health effects, affecting both children and adults. Even a small reduction in the risk of dental caries in childhood is significant in later life since dental caries is the consequence of lifelong exposure to a dietary risk factor [2].

Despite dental caries is highly preventable disease, but increased intake of free sugars considers as major risk factors for chronic disease among population [3]. Age wise prevalence was 62% in patients above 18 years and 52% among 3-18 years of age in India [4]. Dental caries occur when bacteria metabolize sugar, which produces organic acids, leading to the demineralization of the hard tooth structure [5]. Dental caries is a multifactorial disease and one of its factors is behaviour related diet. With this background, it seems logical that dental practitioners should conduct risk assessment based on the primary findings. This will enable planning interventions specific to risk identification ranging from diet counselling to complex treatment.

Case Report

A 21-year-old female patient reported to the Comprehensive Oral Health Care Unit with a chief complaint of brownish discoloration on posterior region since 1 year with no history of pain and sensitivity and any other related signs. Patient had past dental history of restorations and oral prophylaxis which was done 1 year ago. The patient confirmed adequate oral hygiene practices. However, the 24 hour diet chart revealed that she ate sugary snacks during and after

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the college times and taking dinner without brushing or rinsing her teeth immediately afterward.

On Intra-oral examination, it was found that following teeth had been restored with glass ionomer cement: teeth numbers 47, 37, 17 and 26 in addition, teeth numbers 46, 48,and 36 had deep pit and fissures. Since we were looking at more sensitive index, ICDAS was used because it had continuum to caries pathway from sound tooth to distinct cavitation [6]. Considering patients caries status, we planned to conduct a risk assessment using cariogram including one week diet chart. Caries risk assessment was done and data was collected as suggested by Bratthall [7].

Cariogram assessment

Patient data was obtained for all the parameters enlisted in the cariogram and it revealed that patient had 44% actual chance to avoid new cavities and contribution of planned diet was 22% (Figure 1).

Diet chart analysis

Patient was asked to submit the diet chart for 7 days including time, frequency and consistency of food that she ate. The detailed analysis of the 7 days diet chart revealed the in-between sugar snacking and the frequency of consumption was 4-5 times per day and consistency of food was predominately retentive and the average sugar-score for a week was 37.14, hence intervention was to reduce in-between consumption.

Intervention plan

The cariogram output suggested that the diet with respect to its content of fermentable carbohydrates is a problem - a reduced intake of such products would be an advantage. Hence intervention was planned for diet counseling and for preventive regime. Rationale for diet counseling was the frequency of cariogenic diet, consistency, and in-between consumption.

First session

It included familiarizing patient with balance diet, food pyramid, and the beneficial effects of all the foods in the pyramid and importance of balanced diet. Patient was also informed about oral health including types of dentition, simple oral diseases and emphasizing dental caries. Patient was also explained about the role of cariogenic diet in causing dental caries, stages of dental caries and remineralization and demineralization using Stephen's curve [5]. However comprehension was maintained and technical terms were not used.

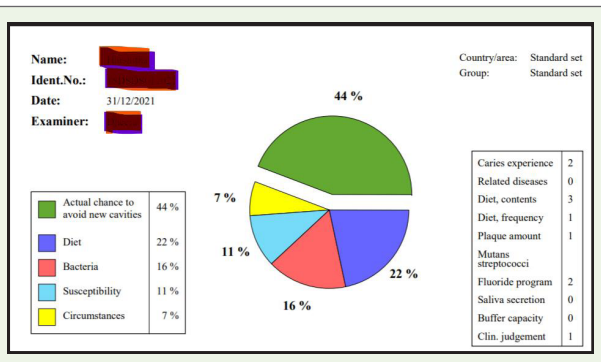

Figure 1: Pre-intervention cariogram.

Second session

It started with reinforcing first session contents and diet chart analysis of the patient. And patient herself was able to appreciate the frequency, consistency and in-between snacking behaviour being responsible for dental caries. The second session ended up with requesting the patient to submit alternate replacements for the snacks she was consuming.

Third session

The patient came up with alternate diet with suggestion of nuts and fruits. Basically patient was into the behaviour of consuming quick snacks to overcome the stress.

Considering the patient suggestion, it was reinforced the importance of planned diet and beneficial effects of these foods and the patient was motivated to adhere to this plan. Following which patient was asked to maintain diet chart for subsequent second and third week. Timely Whatsapp messages were sent to the patient reinforcing the beneficial effect and exactly at those timings were in the habit of consuming sugary snacks.

Similarly, second and third week diet chart was submitted by the patient. The analysis indicated that, there were not many changes in the diet chart in the second week whereas in the third week diet chart showed drastic improvement. Sugar score was calculated based on the form, frequency and consistency of sugar intake by classifying each sugarintake into liquid, solid and sticky or slowly dissolving using Nizel and Papas 24 hour diet method [5]. Table 1 shows pre and post intervention of diet chart and table 2 shows the average and composite score for sugar consumption for each week. The average sugar score calculated for fourth week was 5.7. Along with this patient was also instructed to rinse her mouth each time after consumption of food.

Fourth week risk assessment revealed that patient had 82% actual chance to avoid new cavities and contribution of diet was 1% (Figure 2).

Discussion

It was very clear that consistency, frequency and in-between snacking habit played a major role in causing dental caries [8]. This relationship between dietary habits and dental caries was proven by Vipeholm study [8]. Tailor made interventions, active patient participation in planning diet, motivation and reinforcement for patient compliance to treatment regimen contributes to effectiveness of interventions demonstrated as decreased total diet score and change in diet pattern [9]. Rather than considering the total score from the diet chart, detailed analysis of diet chart is more beneficial. It gave us better idea about the in-between meal consumption, frequency of snacking and quality of food which facilitated in patient education about diet and dental caries and also planning interventions. The change in diet pattern was evident after 4 weeks which was backed with 3 face to face sessions and frequent reinforcement messages. However, the sustainability of the changed behaviour is yet to be studied.

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Pre-intervention (1st week)				Post-intervention (4th week)		
Days	Time	Frequency	Quantity	Time	Frequency	Quantity
Day 1	7:15 AM	Coffee (sugar)	1 cup	07:15 am	Coffee	1 cup
	8:05 AM	Dosa with chutney	2	08:45 am	Dosa with chutney	2
	10:45 AM	Chocolate	1	11:45 am	Almonds and cashews	4 each
	12:50 PM	Dosa with chutney	2	01:20 pm	Rice with dal	1 bowl
	05:00 PM	Rice with curry	1 bowl of rice	05:15 pm	Dosa with dal	1
	09:00 PM	Rice with curry	1 bowl of rice	09:00 pm	Rice and dal	1 bowl
Day 2	07:10am	Coffee	1 cup	07:30 am	Coffee	1 cup
	08:00am	Pulao	1 bowl	08:45 am	Chapatti with vegetable sides	2
	10:30am	Chocolate	2	12:00 pm	Badam, cashews and dates	3 each
	01:00pm	Pulao with bhajji	1 bowl	12:15 pm	Apple	1
	04:15pm	Fruit bowl	1 bowl	01:45 pm	Rice with gobi curry	1 bowl
	05:00pm	Fried rice	1 bowl	05:15 pm	Noodles	1 bowl
	8.50pm	Rice and sambar		09:00 pm	Rice with curry	1 bowl
Day 3	07:00am	Coffee	1 cup	07:15 am	Badam	4
	08:00am	Puttu (contains sugar)	1	07:45 am	Coffee	1 cup
	12:45pm	Chocolate	1	09:00 am	Roti	2
	01:20pm	Puttu (with sugar)		11:30 am	Apple	1
	05.15pm	Bread jam	1	12:30 pm	Cashews, dates	3 each
	09:15pm	Rice with curry	1 bowl	01:20 pm	Rice and dal	1 bowl
				05:30 pm	Chapatti with vegetables	1 no
				08:45 pm	Rice and dal	1 bowl
				07:15 am	Badam	4
Day 4	07:00am	Coffee	1 cup	07:30 am	Badam	5
	08:00am	Puttu (with sugar)	1	08:00 am	Coffee	1 cup
	12:45pm	Chocolate	1	09:40 am	Chapatti with vegetable curry	2
	01:20pm	Puttu (with sugar)		12:00 pm	Apple	1
	05.15pm	Bread jam	1	01:15 pm	Rice with dal	1 bowl
	09:15pm	Rice with curry	1 bowl	05:00 pm	Masala puri	1
	07:00am	Coffee	1 cup	09:00 pm	Rice with dal	1 bowl
Day 5	08:10 AM	Coffee	1 cup	08:00 am	Badam and cashew	4 each
	09:00 AM	Mushroom biryani	1 bowl	08:15 am	Coffee	1 cup
	11:00 AM	Banana and chocolates	1	09:30 am	Idli vada and pongal	1 plate
	01:00PM	Rice and sambar	1 bowl	01:30 pm	Rice, sambar, vegetables sides, vada	1 bowl
	05:10PM	Coffee with biscuits	1	05:00 pm	Apple , nuts	1 each
	08:00PM	Masala puri	1	09:00 pm	Vegetable pulao	1 bowl
	09:00 PM	Rice and sambar	1 bowl			
Day 6	07:30 AM	Coffee	1cup	06:00 am	Coffee	1 cup
	09:15 AM	Ragi roti	2	08:00 am	Badam and cashews	3 each
	01:10 PM	Custard	1/2 cup	10:00 am	Idli, puri with sagu	1 each
	01:30 PM	Rice, sambar, vada, vegetable salad		12:45 pm	Nuts	1 no
	04:15 PM	Banana	1	01:45 pm	Rice, sambar	1 bowl
	06:00 PM	Biscuits	1 packet	03:30 pm	Nuts	3 no
	08:00 PM	Chips, Popcorn and Biscuits	1 each	05:30 pm	Vada with chutney	
	10:30 PM	Rice and sambar	1 bowl	09:00 pm	Rice, sambar	1 bowl
Day 7	07:00am	Pulao		07:30 am	Coffee	1 cup
	08:00am	Chocolate		09:30 am	Idli, vada, nuts	
	12:45pm	Pulao with bhajji		12:45 pm	Rice, dal, vegetable sides, vada	1 bowl
	01:20pm	Fruit bowl		03:00 pm	Apple	1 no
	05.30pm	Coffee		04:15 pm	Coffee	1 cup

Table 1: Pre-intervention and post-intervention diet chart.

Table 2: Scores for sugar consumption for each week.

Scores	1st week	2nd week	3rd week	4th week
Average	27.14	24.28	14.28	5.7
Composite	190	170	100	40

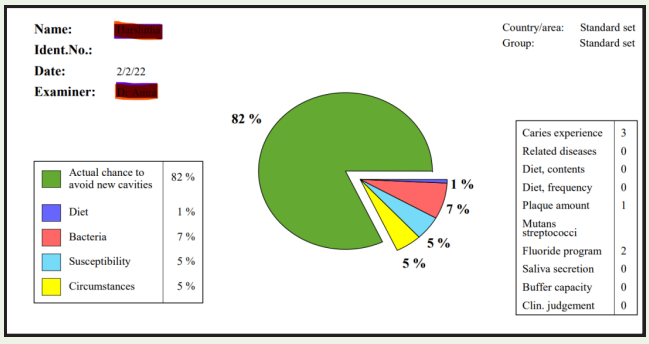

Figure 2: Post intervention cariogram.

Also, patient had the background of science therefore using the language such as balanced diet, food guide, and pyramid helped us to maintain the comprehension level. Understanding literacy level of patient is very important for patient compliance and successful dietary intervention. Hence this method appears to be promising in bringing about changes in individual level, however for future direction we would recommend to develop a diet chart which can be scored for type of food, frequency and time which can enhance sensitivity and contribute to evidence. This particular case report has shown promising results with diet counseling as an intervention, however more number of cases in the future is recommended.

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