**“Healthy Choice, Healthy Teeth!”**

Nutritional effects on caries in children:

What causes caries and what prevention methods can be used.

Semah Altam

Kehinde Bello

Olga Bondaresco

Jose Torija Gutierrez

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**Table of Contents**

Introduction……………………………………….. 2-3

Assessment………………………………………… 3-4

Planning……………………………………………. 4-6

Implementation……………………………………. 6-8

Evaluation…………………………………………. 8-9

Conclusion………………………………………… 9-10

Reference……………………………………….. 11

**Introduction**

Dental caries are the most common disease in children, the main cause of tooth loss. A dietary decision is a major contributory factor in dental caries, leading to the development of enamel defects and excessive exposure to fluoride during tooth development. (E.g. enamel hypoplasia, fluorosis). Caries left untreated can lead to pain, infection, tooth loss, hospitalization, and substantial risk of caries in the permanent teeth, which contributes to increased dental treatment costs, school absences, and decreased quality of life.

 According to Paula Moynihan, and Poul Erik Petersen at WHO Collaborating Centre for Nutrition and Oral Health, School of Dental Sciences, nutrition affects the teeth during development and malnutrition may exacerbate periodontal and oral infectious diseases. However, the most significant effect of nutrition on teeth is the local action of diet in the mouth. Dental caries and enamel erosion is associated with dietary acids, a major source of which is soft drinks. The lack of a healthy diet, absence of adequate fluoride exposure, and regular consumption of other sugary beverages and foods, even with 100% fruit juice can lead to early child caries (ECC). Examples of foods related to caries are sweet snacks, chips, confectionaries (e.g., candies, chocolate), and cakes. One study found confectionary intake to be associated with early child caries among children with poor oral hygiene (defined as brushing less than twice per day), which highlights the importance of both diet and hygiene in promoting optimal oral health.

Other factors associated with increasing caries are social-economic status; children from low-income households do not have insurance for a regular dental visit. It is highly recommended that parents visit the dentist with their child as soon as the first tooth erupts. However, due to financial burden, most low-income families ignore this essential care. This service project aims to bring awareness to children in need of dietary interventions. Our goal is to educate and improve the knowledge of parents and caregivers in making healthy dietary choices, maintain healthy dietary behaviors, reduce dental disease rates, and unnecessary dental treatment costs.

**Assessment**

 The target population being reached is elementary school children. The majority of children spend most of their day at school engaging in different activities. In between these activities they consume much of their daily calories at school. Children at this age tend to desire more unhealthy diets such as sugary foods, drinks, and carbohydrates not knowing how these choices affect their oral health. The amount and frequency of sugar intake put them at a greater risk for dental caries. Caries (cavity or tooth decay) is one of the most common chronic conditions of childhood. If left untreated caries can cause pain and infections that may lead to problems with eating, speaking, playing, and learning. Poor oral health can have a serious negative effect on children’s quality of life. Children with poor oral health are often absent from school; as a result, have poor performance and receive poor grades.

Using a verbal questionnaire assessment, we asked the children various questions like, what kind of food they eat and like. Their answers were relatively sugar foods. Such as chocolate cakes and chips. Only a few like fruits and vegetables. Then asked how many of you know what caries is and how often they brush. Many of them didn’t know the answer to caries and only a few answered they brush twice a day. About 1 in 5 (20%) children aged 5–11 years have at least one untreated decayed tooth. The percentage of children with untreated tooth decay is twice as high for children from low-income families (25%) compared with children from higher-income households (12%). It is recommended that parents supervise the tooth brushing of children around this age until they master it; visit the dentist for regular checkups. Oftentimes, parents do not make this a priority until a child complains of pain. Some parents believed that decayed primary teeth will fall out and the replacement of permanent teeth will fix the decay. However, cavitated primary teeth could lead to damage to permanent teeth.

 The great news is caries are preventable. However, optimal oral health can only be achieved through making healthy decisions, eating healthy diets such as fruits, vegetables, whole grains, and regular dental visits. As dental health care professionals, we have the responsibility to educate these students on the importance of choosing a healthy diet to maintain healthy teeth. Teaching the right tooth brushing technique in Tell-Show-Do participation will lead to retention.

**Planning**

One of the goals of this service learning project is to educate children on how their diet quality impacts their dental wellbeing. Secondly, the project will aim at desensitizing children on their fears about their first dental visit. For this reason, the project needs to be clear and understandable considering the age range of the children within the target population. The first step would involve teaching the children how taking sugar-sweetened drinks and foods places them at risk of developing dental caries. The second step would include enlightening the children on how beneficial crunchy foods can be in strengthening their teeth and minimizing the risk of developing some common teeth-related complications like caries. We will then engage the children in an activity that will help them distinguish the foods they consider healthy and those that are unhealthy. While conducting the service learning project, we will bear in mind that children tend to be easily distracted, especially when an activity is tedious. For the project to eliminate this barrier, we will incorporate crafts and brightly colored art to keep them engaged and motivated to answer questions.

Observantly, dental caries is a major oral health concern globally, especially given its ability to negatively influence a child's overall health. For this reason, the program would be an appropriate intervention method to prevent the development of dental caries among children, regardless of the social status of their family. The program would help them identify the nutrient-filled diets they need to consume and the harmful sugary foods they need to avoid. To start the activity, we will ask a few random questions about the children’s brushing routine. The questions may be based on the items they use to brush their teeth, how often they visit the dentist for a checkup, and the duration for which they brush their teeth, among others. The introductory step in the planning stage will help understand what the children's typical dental care routine looks like and offer insights on some of the things they can do or exclude from their practice to ensure better oral health.

We believe the program would be an appropriate area of focus since research shows a high association between dental caries and social-economic factors. The association may be attributed to the fact that families' eating habits vary depending on the amount of income and social class. Besides influencing their oral healthcare routine, the program would also educate the children on the importance of making regular visits to the dentist. Having regular visits to the dentist guarantees healthy gums and teeth. It also ensures that any oral health concerns like dental caries in children are diagnosed in good time and adequately treated before they spread to affect the child's general health.

At the end of the program, we expect that at least 90% of the children will be in a position to demonstrate the appropriate way to brush their tongue and teeth. The second measurable goal is that there will be a 70% improvement in the number of children that can correctly label out the healthy and unhealthy foods. Lastly, at the end of the program, we expect that at least three-quarters of the total number of students included will be in a position to state at least four negative impacts of dental caries. Every student will be given a chance to answer the three questions to determine how much they grasped from the presentation and measure the achievements in all the three sub-categories of measurable objectives.

**Implementation**

 We started by introducing ourselves and handing a box of crayons with two questionnaires to each student, one they had to answer before the presentation and the other one at the end. The first one was about their current food choices and about their oral hygiene along with a drawing of an animated smile with teeth that they could color, but we asked them not to color it until the end of the presentation. While doing that we set up a cup with soda and another one with just water, two small brushes and a typodont, we also had two plates, one label with the sign "SUGARY" with crush candy in it and the other plate with the label "VEGETABLES" with just a piece of broccoli and a carrot. We wanted to give them a fun activity so we asked the class for two volunteers to help us demonstrate what happens to our teeth depending on our food choices. We ask one of them to brush the right side of the teeth of the typodont with the soda and the other kid to brush the left side with water. After the soda and water was dried, we asked them to feel the teeth, as soon as they touched the side they brushed with soda they started making funny faces because it was very sticky. We then asked for two other volunteers, one of them had to try to stick candy on the surface of the teeth and one using pieces of broccoli and carrots. While laughing they soon realized that the candy was easily sticking to the teeth and not the vegetables. We then asked them to use the toothbrush and tried to remove the candy and soda from the typodont using the same method they use at home. They were seen to have trouble removing all since they were using a scrubbing method without a proper sequence. So we then showed them how to properly brush using a circular motion on the facial/linguals and back and forth motion on the occlusals, we did it by implementing the Tell, Show, Do” technique so they could easily learn it.

 After the activities we then told them that most unhealthy foods tend to stay longer periods of time on our teeth, like the soda and candy they just used and that this could cause caries to our teeth. We also showed them an animated short video explaining the process of caries and also taught them that healthy food such as broccoli and carrots not only makes us healthier, but can also help us clean our teeth while we eat them. According to Dr. Cor Van Loveren, a diet that is beneficial to both general and dental health is one that is low in sugar, saturated fat and salts, high in fresh fruits, vegetables, nuts and seeds along with plenty of fluids preferably water and milk.

 To help them retain the information we just provided them we asked them to arrange healthy and unhealthy food choices next to either a healthy tooth and one that had caries on it. Most of the kids who participated did great. After the end of the presentation, we asked them to answer the second questionnaire which was based on what food options and oral home care they would implement now that they have learned about the impact of their food choices. We then asked them to color both drawings where they have to color a healthy tooth and one with caries. At the end, they were able to see the difference between the two drawings. Based on their answers, on the first questionnaire only about %20 of the class chose healthy oral hygiene and diet, but on the second questionnaire about 90% of the class changed to healthier oral home care and nutritional choices.

**Evaluation**

Based on the articles, caries develop through children's diets. Consumption of sugar is the leading factor for early childhood caries which include, cake, candy, chips, and drinks with high sugar levels, are all contributing factors. This is problematic when oral homecare routines are either inconsistent, ineffective, or neglected. When food is left in the mouth around the tooth surfaces bacteria plays its part and produces acid that eats away the enamel.

Routine dental visits are highly important because if caries are present they are detected sooner. Regular dental visits are important because children develop a healthy habit of visiting the dentist or dental professional at least twice a year. Also, children are educated about their teeth and how to care for them, different products that are available and suitable for each individual.

Having dental professionals come into school and educate elementary school students about oral hygiene will not only enlighten them but give them a decent understanding of what will happen when they do not take care of their teeth. This will also teach them about prevention and how routine dental visits are key to optimum oral health. Dental professionals are experts and know how to reach out to people of all ages, having them as guest speakers can increase engagement and children's implementation of oral hygiene.

 Our observation through the experiment was that students did not have a decent understanding how sugar consumption can cause decay and how important daily dental visits are. Through the questionnaire experiment students answered better after the lesson on health dietary choices and daily dental visits. This was further demonstrated through the activity we conducted through illustration of a decayed tooth vs a health tooth. Students used crayons and colored in two samples of what they understood decay on a tooth looked like and a healthy tooth.

**Conclusion**

As dental care professionals, we have the sole responsibility to create a comprehensive approach in handling caries amongst this population who are very prone to caries risk. One can not have overall health without healthy teeth. Therefore, this service-learning project to elementary children allowed us to bring awareness to these children on how what they eat affects not just their teeth but overall health. The negative effect of caries on children requires deep explanations to parents that can help them to pay more attention to the characteristics of dental health. The proposed program can be essential for people of different social-economic statuses due to the presence of adequate information about the principles of appropriate cleaning of teeth and tongues by children. These principles are simple and do not require specific skills from the listeners of the program. The program helps children to determine healthy and unhealthy food products that will form their attitude to the proper lifestyle, needed for the development of their organisms without any general problems. The educational program also demonstrates the importance of routine dental visits and the examination of teeth on a regular basis for children. In this context, children learn more about their health and can use the received knowledge for oral hygiene during their adulthood.

Engaging them in the craft activities made the program a success. We were able to get their attention in participating and demonstrating these activities which was a good tool for their retention and to follow through with a new healthy habit. Caries was shown as one of the main reasons for the loss of teeth. From this point of view, the investigation of the nutritional diet, presented in the program, included essential facts that helped children to motivate themselves better, avoid the choice of sweet products, and control the daily diet more regularly. The program showed that visits of dental specialists to schools as one of the best initiatives that can organize systematic examinations of the oral health of students.

**References**

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