

Stunting Prevention Through at Home Dental Care for Children: A Review

Muhamad Zakki¹, Anita Rosa Delima², Nugroho Ahmad Riyadi³

¹Department of Pediatric Dentistry, Faculty of Dentistry, Universitas YARSI, Jakarta, Indonesia

²Department of Conservative Dentistry, Faculty of Dentistry, Universitas YARSI, Jakarta, Indonesia

³Department of Orthodontic, Faculty of Dentistry, Universitas YARSI, Jakarta, Indonesia

*Corresponding Author: muhamad.zakki@yarsi.ac.id

ARTICLE INFO : Received, June 12, 2023; Revised, August 9, 2023; Accepted, September 18, 2023; Published, December 20, 2023
O.R.C.I.D. : Zakki M ([0009-0007-8945-6870](https://orcid.org/0009-0007-8945-6870)); Delima AR ([0000-0003-0698-4808](https://orcid.org/0000-0003-0698-4808)); Riyadi NA ([0009-0009-9106-7801](https://orcid.org/0009-0009-9106-7801))
DOI : [10.24815/jds.v8i2.36545](https://doi.org/10.24815/jds.v8i2.36545)

ABSTRACT

Background: Dental and oral health is a healthy condition of hard tissue and soft tissue, and stunting is a problem of malnutrition, which is quite high in Indonesia, namely 37.2% in 2013 and 30.8% in 2018.

Objective: This article aims to create a guide for parents of toddlers on how to maintain children's dental health at home, with the hope of contributing to reducing the prevalence of Early Childhood Caries and stunting in toddlers in Indonesia. **Methods:** The library sources for this article were obtained from several valid literature based on the author's expertise and compiled with theory or research from several journals published by Elsevier, Oxford University Press, Blackwell Munksgaard, Google Scholar, and Pubmed. **Results:** Nutritional problems are caused by several factors, both directly and indirectly, which are interrelated. Nutrition and oral health have a reciprocal relationship that influences each other. Proper nutrition is needed to maintain healthy teeth and mouth and healthy teeth and mouth to get adequate nutritional intake. **Conclusion:** Parents, especially mothers, play a key role in maintaining children's dental health and preventing stunting because toddlers cannot yet effectively clean their teeth.

Keywords: Stunting, Early Childhood Caries, Role of Parents, Cleaning teeth and mouth

A.B.S.T.R.A.K.

Latar Belakang: Kesehatan gigi dan mulut adalah kondisi sehat jaringan keras dan jaringan lunak serta Stunting merupakan masalah kekurangan gizi yang cukup tinggi di Indonesia yaitu 37,2% pada tahun 2013 dan 30,8% pada tahun 2018. **Objective:** Artikel ini bertujuan untuk membuat panduan bagi orang tua yang memiliki balita mengenai cara memelihara kesehatan gigi anak di rumah, dengan harapan bisa berkontribusi untuk menurunkan prevalensi *Early Childhood Caries* dan stunting pada balita di Indonesia. **Methods:** Sumber pustaka artikel ini diperoleh dari beberapa literatur yang valid berdasarkan keahlian penulis dan dikompilasi dengan teori atau penelitian dari beberapa jurnal yang diterbitkan oleh Elsevier, Oxford University Press, Blackwell Munksgaard, Google Scholar dan Pubmed. **Hasil:** Masalah gizi disebabkan oleh beberapa faktor baik secara langsung maupun tidak langsung yang saling berkaitan. Nutrisi dan kesehatan gigi mulut memiliki hubungan timbal balik yang saling mempengaruhi. Nutrisi yang tepat diperlukan untuk menjaga kesehatan gigi dan mulut dan kesehatan gigi dan mulut dibutuhkan untuk mendapatkan asupan nutrisi yang adekuat. **Kesimpulan:** Orang tua terutama ibu mempunyai peran kunci dalam memelihara kesehatan gigi anak dan mencegah terjadinya stunting, karena balita belum mempunyai kemampuan untuk membersihkan giginya sendiri secara efektif.

Kata kunci : Stunting, *Early Childhood Caries*, Peran Orang Tua, Pembersihan gigi dan mulut

1. Introduction

Human Resource Development (HR) in Indonesia still faces many challenges. One of the biggest challenges faced is nutritional problems, which greatly affect the quality of human resources in Indonesia. Stunting is a malnutrition problem whose incidence is still quite high in Indonesia. Children are declared to be included in the stunting group if the measurement of height to age (TB / U) is below minus two standard deviations of the height of children their age. The prevalence of stunting based on Basic Health Research (Riskesmas) data in toddlers (0-59 months) in Indonesia is still very high, namely 37.2% (18% very short and 19.2% short) in 2013 and 30.8% (11.5% very short and 19.3% short) in 2018. ^{1,2,3}

Several directly or indirectly interrelated factors cause nutritional problems in children. Factors that directly affect are infectious diseases and chronic malnutrition. In contrast, factors that affect indirectly are the distribution of health services, parenting, environmental sanitation, and food availability at the family level. ⁴

Nutrition and oral dental health have a reciprocal relationship that affects each other, proper nutrition is needed to maintain healthy teeth and mouth. Otherwise, dental and oral health are critical factors for adequate nutritional intake. Good tooth growth and development requires sufficient intake of calcium, fluorine, phosphorus, and vitamins C and D. Left dental caries can cause pain in children, causing eating problems, sleep disorders, and learning disorders. Iron deficiency anemia and malnutrition in children occur due to eating disorders over a long period.⁵

The prevalence of caries in Indonesian children is still quite high, namely 36.4% in the age group of 3-4 years and 54% in the age group of 5-9 years.³ Caries in deciduous teeth or *Early Childhood Caries* (ECC) is a chronic disease in children under six years of age with characteristics found in one or more caries, tooth loss (due to caries), or fillings in deciduous teeth.⁶ Impaired chewing function in children occurs because children experience toothache caused by caries events. In untreated children, children will have difficulty chewing food on the side of the affected tooth.⁴ The growth of babies suffering from ECC is slower than babies who have healthy teeth. The incidence of ECC in children causes them to become very thin; this condition occurs because of the child's inability to eat well due to pain in the child's teeth.⁷

Parents, especially mothers, have a key role in maintaining children's dental health. Parents should help clean their children's teeth until they reach school age because toddlers cannot yet clean their teeth effectively. Mothers act as initiators and facilitators in maintaining the health of toddler teeth. Parents' dental and oral health behavior determines the dental health status of toddlers. Therefore, parents should have sufficient knowledge about preventing dental and oral diseases.⁸ Based on the description above, the author is interested in writing a guide for parents who have toddlers on how to maintain children's dental health at home, hoping that it can contribute to reducing the prevalence of ECC and stunting in toddlers in Indonesia.

2. Material and Methods

The literature sources for this article were derived from various credible sources within the author's field of expertise. These were combined with theories and research extracted from journals such as Elsevier, Oxford University Press, Blackwell Munksgaard, Google Scholar, and Pubmed. Nineteen articles from these manuscripts were subsequently singled out and assessed for their relevance to the themes addressed in this paper. Following this identification process, a descriptive analysis was conducted, and the findings were elucidated following the scientific principles outlined in this manuscript.

3. Result and Discussion

3.1 Stunting

Stunting is a condition of failure to thrive in children under five that occurs due to chronic malnutrition conditions or repeated infections, especially in the first 1000 days of human life (HPK), namely from the fetal period to the child aged 24 months. Stunting causes reduced intelligence, disease loss, decreased productivity, stunted economic growth, and an increase in poor people.² The leading cause of stunting is the problem of nutritional intake. Stunting prevention can be done by meeting the nutritional needs of children from the womb to the age of 24 months. The government's commitment to accelerate nutrition improvement has been shown through the Presidential Regulation (Perpres) of the Republic of Indonesia number 42 of 2013, concerning the National Movement (Gernas) to accelerate nutrition improvement. This Presidential Regulation aims to enable Indonesian children to grow and develop optimally, have good physique and intelligence, be creative, innovative, and able to compete internationally. Three things that must be considered in stunting prevention are a healthy diet, good family parenting, and the availability of clean water and proper sanitation.²

3.2 Early Childhood Caries (ECC.)

Dental caries is an infectious disease that results in a progressive demineralization process in the hard tissues of the crown and root of the tooth. *Early Childhood Caries* (ECC) are caries in the first tooth experienced by children under six years old. A severe ECC condition is called *Severe Early Childhood Caries* (SECC). The characteristics of SECC, according to the *American Academy of Paediatric Dentistry* (AAPD), are: a) found caries marks on the smooth surface of the deciduous teeth of children under the age of 3 years, b) obtained an *index of decayed filled extracted surfaces* (def-s) of at least 4 in children aged 3 years, at least 5 in children aged 4 years, and at least 6 for children aged 5 years.^{6,9}

Early childhood caries in children can occur due to four factors that influence each other, namely host (teeth and saliva), microorganisms, substrate, and time. Plaque bacteria will ferment foods that contain sugar, and the results of fermentation will produce acids that cause a decrease in salivary pH below 5.5. The demineralization process on the surface of the teeth will occur if this decrease in salivary pH occurs continuously for a long time. Carious pathogenic bacteria consist of *Streptococcus mutans* and *Lactobacilli*. *Streptococcus mutans* is a bacterium that can produce acid (asiduric) and acts as an initiator of caries, while *Lactobacilli* are bacteria that can live in an acidic atmosphere (acidogenic) and have a role in the development of caries.^{10,11}

Streptococcus mutans found in infants' mouths come from the mother or a nearby adult (vertical transmission). This transmission event was proven by isolating *identical Streptococcus mutans* in mothers and offspring. In addition to vertical transmission, *Streptococcus mutans* can be transmitted by horizontal transmission. Research by Raadal et al. in 2001 succeeded in isolating *Streptococcus mutans* from infant schools (aged 12-30 months) and found many *identical Streptococcus mutans* genotypes among the infants. This indicates that there is horizontal transmission.¹²

3.3 Relationship between Stunting and Early Childhood Caries

Nutrition and dental health of children have a close relationship, especially in children in the growth and development phase. The child's diet largely determines the nutritional intake or nutrition of a child. Adequate nutrition greatly determines the quality of a child's growth and development and also plays a role in preventing stunting in toddlers. The health of children's teeth and mouth is one of the influential factors that ensures adequate nutritional intake can be fulfilled. The mouth is the main gateway to the digestive system of food in humans. In the mouth, the food consumed will be processed with the help of teeth, tongue, and saliva. Impaired dental and oral health will make children unable to eat optimally, cavities (caries) that are not treated will cause pain that is very disturbing for children it can make the child have no appetite, cannot chew food properly so that nutritional intake for children will not be fulfilled.^{4,5}

The link between ECC and malnutrition has been proven in previous studies. Malnutrition leads to hypofunction of the salivary glands, changes in salivary composition, and reduction of salivary ability, thereby increasing the occurrence of caries.¹³ Recent research has shown that children with ECC have higher proinflammatory cytokines.¹⁴ These cytokines will produce free radicals that increase the inflammatory response. This is associated with an increased risk of malnutrition and affects growth. Severe E.C.C. can be associated with iron deficiency anemia, also characterized by decreased salivary flow rate. In addition, a deficiency of vitamin D, vitamin A, calcium, and albumin can cause enamel hypoplasia/hypomineralization and loss of the protective effect of iron, vitamins, and zinc on teeth.¹⁵

3.4 Prevention of Early Childhood Caries

The incidence of caries in a child can be prevented. Parents, especially mothers, are the main initiators and facilitators to prevent ECC in their children, so parents must have the knowledge and a strong will to ensure their children have good dental and oral health conditions. The incidence of caries in children is often caused by the lack of knowledge of parents about the types of healthy food and proper dental and oral care for their children, so continuous education is needed from dentists to the public about the safe consumption of children's teeth and how to maintain children's hygiene at home so that children can keep healthy teeth and mouth.^{8,11}

3.5 Recommended diet/food for children

Food is divided into three groups based on its nature in triggering caries, namely karyogenic, anti-karyogenic, and karyostatic. This grouping of foods is needed as a guide to a healthy diet for children to prevent caries.⁵ The karyogenic group is foods that contain sugar so that microorganisms can ferment them, examples of these foods are biscuits, chocolate, candy, soda, and ice cream. Karyogenic foods have carbohydrate compounds and are easily soluble in saliva. Consumption of foods of this group will cause salivary pH to drop to critical pH (pH 5.5), which, if this condition lasts for a long time, will cause caries in the teeth.^{5,10} Anti-karyogenic foods are a good group of foods that can raise the pH of saliva and keep it at an alkaline level (pH 7). Milk and its derivative products, such as cheese, are examples of anti-karyogenic foods. Meanwhile, the karyostatic group is food that cannot be metabolized by microorganisms to produce acid, so consuming these foods does not cause a decrease in salivary pH. Examples of foods included in this group are vegetables and food sources containing animal protein.^{5,10} ECC prevention strategies in children emphasize efforts to reduce consumption and control the frequency of high sugar intake. The recommended dietary advice for children to prevent ECC is^{10,16,17}

1. Limit consumption of sweet and sticky foods such as chocolate and sweets;
2. Do not add sugar to milk and baby food;
3. Do not let the child fall asleep with a bottle filled with sweet liquid;
4. Get used to children starting to use glasses to drink from the age of 6 months;
5. Limit the number of meals and snacks, each a maximum of three times a day;
6. Increase the consumption of foods containing protein;
7. Multiply eating vegetables and fruits;
8. Do not blow food before giving it to a child to avoid transmitting *Streptococcus mutans* from parent to child;
9. Use xylitol as a sugar substitute. Xylitol has anti-bacterial effects and cannot be metabolized by bacteria in acid formation.

3.6 Oral hygiene

Brushing your teeth is the most effective way to keep your teeth and mouth clean. Toddlers are not yet able to maintain oral hygiene independently, so they need parents to help and accompany them when brushing their teeth. Parents help brush children's teeth at least until they are 6 years old, then start allowing them to brush their teeth independently while remaining supervised and accompanied. Parents, as initiators and facilitators of children in brushing their teeth, must understand how to brush them properly. The basic principle in brushing a child's teeth is that the entire child's oral cavity must be brushed well so that no plaque or dirt is left behind. It is done twice a day with toothpaste containing fluorine, and brushing teeth is done for two minutes.^{16,18,19}

Children are advised to use a toothbrush that has a small size, a stalk that is easy to grip, smooth brush bristles, and a narrowed brush head so that it effectively reaches the inside of the child's oral cavity. The toothbrush is kept upright, so it can dry out and not come into contact with other toothbrushes. The toothbrush should be changed at least once every three months or if the bristles bloomed.^{18,19} Children are advised to use toothpaste containing fluorine. The incidence of caries has been proven to be lowered by brushing teeth twice a day using toothpaste containing fluorine. Toothpaste given to children should not be excessive. For children under 3 years old, enough as big as rice seeds, while children over three years old should be given toothpaste the size of pea seeds (Figure 1).^{18,19}



Figure 1. Size of toothpaste for children. Top (for children over 3 years of age/about the size of a pea seed)
Down (for children under 3 years of age/rice-sized)¹⁸

Parents must understand how to clean their children's teeth well. Some several ways or techniques can be used by parents at home to clean their children's teeth optimally; brushing teeth should be a fun activity for children and parents. Ways or techniques to clean children's teeth at home are grouped based on the age of the child. There are three groups of ways or techniques based on age, namely: age 0 to 12 months, age 1 to 3 years, and age 3 to 6 years.¹⁸ The health of the child's teeth and mouth must be maintained from the moment the child is born. The mouth of a baby who has not grown teeth is simply cleaned by rubbing a wet cloth/gauze on the baby's oral cavity after each feeding, while for babies under the age of one year who have grown teeth, the teeth, and mouth must be cleaned with a wet cloth/gauze after every meal/feeding. The position of parents when cleaning the teeth of children aged 0-12 months is called *arm-cradled* (Figure 2). Parents carry children like a breastfeeding position, then hands in an accessible position to clean the child's mouth with a wet cloth/gauze.¹⁸

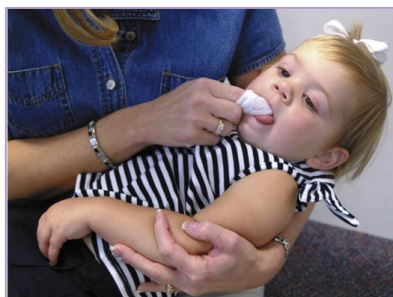


Figure 2. *Arm-cradled* parent position in helping clean children's teeth¹⁸

Children aged 1-3 years have their teeth cleaned using a special children's toothbrush and toothpaste containing fluorine, which is given as big as rice seeds on the surface of the brush bristles. Children are taught to spit without the need to rinse their mouths after brushing their teeth. Parents' position in cleaning the teeth of children aged 1-3 years is called the *lap-to-lap* position (Figure 3), where both parents sit facing each other, and the child's body is put to sleep in between. The child's hand and body movements are held back by the hands of the person on the child's feet while the other person brushes the teeth.¹⁸



Figure 3. Lap to lap parent position in helping to brush teeth anak¹⁸

Children aged 3-6 can begin being taught how to brush their teeth. Parents give examples of how to brush their teeth, and then the child is asked to follow the way that has been exemplified. The position of parents in brushing the teeth of children aged 3-6 years is sideways (Figure 4). The child's head rests on the parent's body, the child's chin is pulled down using one hand, while the hand is still free to brush the child's teeth. Children aged 3-6 years also began to be accustomed to using dental floss as an effort to perfect children's teeth and mouth cleaning activities.^{18,19}



Figure 4. The position of the parents is sideways to help brush teeth of children¹⁹

Parents, apart from being facilitators in brushing their children's teeth, are also required to maintain the cleanliness of their teeth and mouth. Parents should be an example for their children in terms of dental and oral health care, and parents should be able to consistently practice brushing their teeth twice a day with a toothpaste containing fluorine, limit foods containing sugar, and control their routine every 6 months to the dentist. This is necessary to cause positive behavior in children and to prevent the transmission of *Streptococcus mutans* bacteria from parents to their children.^{11,17}

4. Conclusion

Nutrition and oral-dental health have a reciprocal relationship that affects each other, and proper nutrition is needed to maintain healthy teeth and mouth. Otherwise, dental and oral health is a critical factor in getting adequate nutritional intake. Parents are initiators and facilitators in supporting children's oral dental health at home. A simple way that parents can do to prevent caries in their children is to practice healthy food consumption patterns and take good care of children's dental and oral hygiene from birth.

5. References

1. Ministry of Health (2013) *Results of Riskesdas 2013*. Jakarta: Secretariat of the Health Research and Development Agency, Ministry of Health of the Republic of Indonesia.
2. Ministry of Health of the Republic of Indonesia (2018) Preventing Stunting is Important. *Data and Information Center*, Ministry of Health of the Republic of Indonesia Jakarta: Secretariat of the Health Research and Development Agency, Ministry of Health RI1–27.
3. Ministry of Health (2018) *Riskesdas 2018 in numbers, Indonesia ii*. Jakarta: Secretariat of the Health Research and Development Agency, Ministry of Health of the Republic of Indonesia.
4. Asrianti, Bahar, B. and Zulkifli Abdullah, A. (2013) *Relationship of Early Childhood Caries (E.C.C.) and Food Intake and Nutrition Status of 3-5 Years Old Children*. Hasanuddin University.
5. Hendarto, A. (2015) Nutrition and Oral Health in Children. *Sari Paediatrics* 17 (1), 71–75.
6. AAPD (2021) Policy on early childhood caries (ECC): Classifications, consequences, and preventive strategies. *Pediatric Dentistry* 81–84.
7. Kawashita, Y., Kitamura, M. and Saito, T. (2011) Early childhood caries. *International Journal of Dentistry*

- 2011, 725320.
8. Yani, R.W.E., Setijanto, D., Pradopo, S. and Fridiana, D. (2014) Influence of Parenting History towards Dental Caries of Tooldler. *Dentika Dental Journal* 18 (2), 170–173.
 9. Octiara, E. (2020) *Prediction and Prevention of Early Childhood Caries (ECC) Based on Salivary Lysozyme, sIgA, S. mutans Colonies and Life Style Factors in Children (9-Month Longitudinal Study)*. University of North Sumatra.
 10. Agung, IGAA and Nurlitasari, D.F. (2017) Nutrition, Diet and Dental Health of Children. *Journal of Dentistry* 13 (1), 21–24.
 11. El Fithriyah, R. and Herryawan (2018) The Relationship of Mother Knowledge Level About Caries Prevention with Early Childhood Caries in Pre School Children. *Journal of Medicine and Health* 1 (2), 106–114.
 12. Raadal, M., Espelid, I. and Mejare, I. in K G & P S (editors), (2001) The caries lesion and its management in children and adolescents. *Pediatric Dentistry, a clinical approach* Blackwell Munksgaard. 189.
 13. Psoter, W.J., Reid, B.C. and Katz, R. V (2005) Malnutrition and dental caries: a review of the literature. *Caries research* 39 (6), 441–447.
 14. Ribeiro, C.C.C., Pachêco, C. de J.B., Costa, E.L., Ladeira, L.L.C., Costa, J.F., Rubenice Amaral da Silva and Carmo, CDS (2017) Cytokine Proinflammatory cytokines in early childhood caries : Salivary analysis in the mother/children pair. *Cytokine* (December), 0–2.
 15. Folayan, M.O., Arije, O., El Tantawi, M., Kolawole, K.A., Obiyan, M., Arowolo, O. and Oziegbe, E.O. (2019) Association between early childhood caries and malnutrition in a sub-urban population in Nigeria. *BMC Pediatrics* 19 (1), BioMed Central Ltd.433.
 16. Angela, A. (2005) Primary prevention in children with high caries risk. *Dental Journal* 38 (3), 130–134.
 17. NSW (2014) *Early Childhood Oral Health Guidelines for Child Health Professionals*, 3rd Edition. 3rd Edition. Sydney: Centre for Oral Health Strategy NSW.
 18. Hughes, C. V. and Dean, J.A. in MTH R, Welbury, M. Duggal (editors), (2016) Mechanical and Chemotherapeutic Home Oral Hygiene. *McDonald and Avery's Dentistry for the Child and Adolescent* 10th Edition. St.Louis, Missouri: Elsevier Inc. 120–137.
 19. Deery, C. and Toumba, K.J. in R Welbury, MS Duggal & Marie Therese Hosey (editors), (2012) Diagnosis and prevention of dental caries. *Pediatric Dentistry* 4th Edition. United Kingdom: Oxford University Press. 85–104.

Authors Contribution

Contribution	Zakki M	Delima AR	Riyadi NA
Concepts or ideas	√	√	√
Design	√		
Definition of intellectual content	√	√	√
Literature search	√	√	√
Experimental studies	√	√	√
Data acquisition	√	√	√
Data analysis	√		
Statistical analysis	√	√	√
Manuscript preparation	√		
Manuscript editing	√	√	√
Manuscript review	√	√	√



JDS (Journal of Syiah Kuala Dentistry Society) is an Open Access Journal licensed under a Creative Commons Attribution-ShareAlike 4.0 International License. This license authorizes the utilization, replication, modification, distribution, and reproduction of the article in any medium or format, provided that due credit is given to the original author (s) and the source, a link to the Creative Commons license is provided, and any alterations made to the article are duly indicated.

Citation Format: Zakki M, Delima AR, Riyadi NA: Stunting Prevention Through At-Home Dental Care For Children: A Review. *J Syiah Kuala Dent Soc.* 2023; 8(2): 143–148.

Publisher's Note: The authors of this article assert that all claims made herein are exclusively their own and may not necessarily reflect the views of their respective affiliated institutions or those of the publisher, editors, and reviewers. The publisher does not provide any guarantee or endorsement for any product subject to evaluation in this article or any claim made by its manufacturer.