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## Oral Health Knowledge, Attitude and Practices of Parents/Caregivers

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### 1. Introduction

Parents usually are the primary decision makers on matters affecting their children's health and health care (Cafferata & Kasper, 1985; Hickson & Clayton, 2002). Moreover, in everyday life, parents function as role models for their children, and therefore, parents' own dental hygiene habits are very meaningful. Parental characteristics and beliefs may also be an important consideration in attempts made to improve children's oral health. Therefore, in attempts to achieve the best oral health outcomes for children, parents should be considered as key persons in ensuring the well-being of young children. This can improve the preventive dental care children receive at home and their use of professional dental services (Inglehart et al., 2002). In addition, appreciating their knowledge, attitude and practices about their children's oral health may help the dental community understand some of the reasons why children do not receive the dental care they need.

It is important to initiate basic good oral health habits in childhood so that the appropriate dental norms are established and then maintained into adult life. The family is the first institution that influences child behavior and development, especially mothers, who are the primary model for developing behavior (Blinkhorn, 1981). Therefore, childhood is an important period of life that needs to be monitored closely so that the child will grow up healthy. However, recent rapid social expansion in many societies creates a negative impact on child-rearing. Parents have to transfer their caring role to caregivers and may compromise the health status of young children including their oral health. This consequence is especially important for preschool children because they are totally dependent on adults.

The most important negative impact to child oral health is Early Childhood Caries (ECC) (Milnes, 1996; Tinanoff & O'Sullivan 1997; Tinanoff, 1998) which may compromise growth and development of affected children (Acs et al., 1992; Ayhan et al., 1996). Several factors could contribute to a high rate of ECC (Seow, 1998; Reisine & Douglass 1998), such as parent health beliefs and attitudes towards their own dental care which is a significant predictor of children's dental care utilization (Amen & Clarke, 2001). Sarnat *et al.* reported that the more positive the mother's attitude regarding her child, the fewer carious teeth were noted, the better the child's oral hygiene, and the more dental treatment the child received (Sarnat et al., 1984). Sasahara *et al.* showed that mothers' oral health behavior was associated with the prevalence and severity of dental caries in their children (Sasahara et al., 1998).

Okada et al. illustrated that parent oral health behavior could influence their children's gingival health and dental caries directly and/or indirectly through its effect on children's oral health behavior. (Okada et al., 2002).

Even though it has been widely studied, ECC remains a serious public health problem, especially in countries where there is no national program of oral health assessment and no legitimate primary oral health care. Many aspects related to ECC have been investigated including etiology, risk factors, consequences, oral health promotion and preventive measures. Attempts to solve ECC have also been studied intensively. However, there is still no effective program to overcome this problem. A lot of infants and young children around the world, not only in developing countries but also in developed countries (Pitts & Palmer, 1994; Widstrom & Hiiri, 1998), are still facing this severe health problem. There have been many studies focusing on mothers'/caregivers' knowledge, attitude and practices (Kamolmatyakul & Saiong, 2007; Okada et al., 2002; Sarnat et al., 1984; Sasahara et al., 1998). Many studies have shown that good levels of attitude and knowledge did not result in good practice (Benitez et al., 1994; Kamolmatyakul & Saiong, 2007; Tinanoff et al., 1999). Our study demonstrated that despite good levels of knowledge and attitude in oral health, caregivers seem to be unable to apply them to everyday practice (Kamolmatyakul & Saiong, 2007). Therefore, instead of focusing on providing knowledge to mothers/caregivers, more practical programs to let them "do it" in the course will probably result in less carious teeth in young children's mouths. There is no "magic bullet". However, this chapter intends to focus on the attempt to generate a universally effective, caries-prevention program which will help improve better oral health for all, starting from a very young age, as a good foundation for a happy smile, as shown in figure 1.



Fig. 1. Soft and hard tissues of a young child's mouth should be seen as the foundation for a lifetime free from preventable oral disease

## 2. Childhood oral health

Infant oral health care should be seen as the foundation on which a lifetime of preventive education and dental care can be built. In order to help assure optimal oral health in childhood, the American Academy of Pediatric Dentistry (AAPD) recommend that infant oral health care should begin ideally with prenatal oral health counseling for parents. Then

<p>AAPD's recommendations on Infant Oral Health Care. (Revised 1989, 1994, 2001, 2004, 2009)</p> <ol style="list-style-type: none"> <li>1. All primary health care professionals who serve mothers and infants provide parent/caregiver education on the etiology and prevention of ECC. Oral health counseling and referral for a comprehensive oral examination and treatment during pregnancy is especially important for the mother.</li> <li>2. The infectious and transmissible nature of bacteria that cause ECC and methods of oral health risk assessment, anticipatory guidance, and early intervention be included in the curriculum of all medical, nursing, and allied health professional programs.</li> <li>3. Every infant receives an oral health risk assessment from his/her primary health care provider or qualified health care professional by 6 months of age. This initial visit should consist of the following: <ul style="list-style-type: none"> <li>• assessing the patient's risk of developing oral disease using a caries risk assessment;</li> <li>• providing education on infant oral health; and</li> <li>• evaluating and optimizing fluoride exposure.</li> </ul> </li> <li>4. Parents or caregivers establish a dental home for infants by 12 months of age. The following should be accomplished at that visit: <ul style="list-style-type: none"> <li>• recording thorough medical (infant) and dental (mother or primary caregiver and infant) histories;</li> <li>• completing a thorough oral examination;</li> <li>• assessing the infant's risk of developing caries and determining an appropriate prevention plan and interval for periodic reevaluation based upon that assessment;</li> <li>• providing anticipatory guidance regarding dental and oral development, fluoride status, non-nutritive sucking habits, teething, injury prevention, oral hygiene instruction, and the effects of diet on the dentition;</li> <li>• planning for comprehensive care in accordance with accepted guidelines and periodicity schedules for pediatric oral health;</li> <li>• referring patients to the appropriate health professional if intervention is necessary.</li> </ul> </li> <li>5. Health care professionals and all other stakeholders in children's oral health should support the identification of a dental home for all infants at 12 months of age.</li> <li>6. Legislators, policy makers, and third party payers are educated about the benefits of early interventions in order to support efforts that improve access to oral health care for infants and children.</li> </ol>
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Table 1. The American Academy of Pediatric Dentistry recommendations on Infant Oral Health Care

an initial oral examination within six months of the eruption of the first primary tooth and no later than twelve months of age should be carried out. The other recommendation is

anticipatory guidance including preventive education and appropriate therapeutic intervention for the infant. These can enhance the opportunity for a lifetime of freedom from preventable oral disease (AAPD, 2011a).

The AAPD also recognizes that infant oral health is one of the foundations upon which preventive education and dental care must be built to enhance the opportunity for a lifetime free from preventable oral disease. The AAPD proposes recommendations for preventive strategies, oral health risk assessment, anticipatory guidance, and therapeutic interventions to be followed by dental, medical, nursing, and allied health professional programs. Table 1 shows AAPD's recommendations for Infant Oral Health Care that have been adopted since 1986 and periodically revised in 1989, 1994, 2001, 2004, and 2009 (AAPD, 2010a).

### 2.1 What is ECC and its etiology?

A current definition of ECC, adopted by the AAPD, is the presence of 1 or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of 6 (AAPD, 2011b). ECC has been termed the most prevalent pediatric infectious disease and the most common chronic disease of children in U.S.A. (US Dept of Health and Human Services, 2000). One of the major virulent caries-producing organisms is *Mutans streptococci* (MS). MS vertical transmission from mothers to infants is the primary source of dental caries (Berkowitz & Jones, 1985; Douglass et al., 2008). However, horizontal transmission between siblings of a similar age or children in a day care center has already been reported (Emanuelsson & Wang, 1998; Mattos-Graner et al., 2001; Mitchell et al., 2009; Van Loveren, 2000). MS can be detected in many locations in the oral cavity. The furrows of the tongue are an important ecological niche in preerupting infants (Berkowitz, 2006; Law et al., 2007; Tanner et al., 2002). Transmission of MS may occur from the time of birth. However, significant colonization occurs after dental eruption, as MS can



Fig. 2. Caries progression of Early Childhood Caries (ECC) starting from maxillary central incisors and extends gradually to the maxillary lateral incisors, maxillary first primary molars, maxillary canines, and then second primary molar. (Photo courtesy of Dr. Aunwaya Kaewpitak, Prince of Songkla University, Songkla, Thailand)

adhere to non-shedding tooth surfaces. After colonization, they produce acid from sugars which, over time, demineralizes tooth structure (Loesche, 1969). The process normally takes place at the smooth surfaces of upper teeth starting from the central incisors, extending gradually to the lateral incisors, the first primary molars, canines, and then the second primary molars (Edelstein et al., 2009). Figure 2 demonstrates an example of severe ECC in a young child who attended the dental hospital at Prince of Songkla University, Thailand.

## **2.2 Factors influencing and consequences of ECC?**

There are many factors influencing ECC including biological (feeding practices, diet, and MS level of primary caregivers) and social (sociopsychological, socioenvironmental, and socioeconomic status) factors (Edelstein et al., 2009). Starting from the 1990s, these multiple factors have been raised in an attempt to focus attention on, rather than ascribing sole causation to, inappropriate feeding practices (Reisine & Douglass, 1998). Oral health has a significant impact on overall health and well-being. The consequences of ECC, when left untreated, can become painful and cause many alterations including chewing patterns, eating and dietary nutrition, learning, speech and communication, playing, sleeping and, quality of life, in addition to potential growth restriction (Schroth, et al., 2009). Children with ECC have been reported to have a high risk of decay in both primary and permanent dentition. These could cause mal-alignment and crowding of permanent teeth that consequently result in a malocclusion. In addition, early tooth loss may result in speech difficulties as well as associated self-esteem issues due to altered appearance (Schroth et al., 2007b). Therefore, the importance of each influencing factor should be emphasized to all involved agencies and health team personnel.

### **2.2.1 Biological determinants of ECC**

#### **2.2.1.1 Salivary mutans streptococci levels and visible plaque.**

The association between the salivary MS level and ECC is well documented (Berkowitz, 2003). The relationship of MS levels between children and their mothers/caregivers has also been evaluated since the mid-1970s (Douglass et al., 2008). Therefore, managing adult reservoirs and interfering with transmission may reduce dental caries onset and experience. Parisotto et al. showed that the higher the levels of maternal salivary MS, the greater the risk of transmission of MS to their infant (Parisotto et al., 2010). Apart from MS salivary levels, the mother's oral hygiene, snack frequency, periodontal disease, and socioeconomic status are also associated with infant colonization (Wan et al., 2001). In addition, the plaque index of young children is a strong predictor of caries (Mattila et al., 1998).

#### **2.2.1.2 Breast- and bottle-feeding**

In 2011, the AAPD's recommendations for infant's oral health state that "frequent night time bottle feeding with milk and ad libitum breast-feeding are associated with, but not consistently implicated in, ECC". Not only milk, but bottle feeding with juice/soft drink and repeated use of a sippy cup also increase caries risk (AAPD, 2011b).

#### **2.2.1.3 Diet**

Improper diet and nutrition was also reported to be associated with caries in young children; for example, soda or other sugared beverage intakes, greater frequency of

carbohydrate intake, and greater frequency of eating occasions (Mariri et al., 2003). Another important aspect is the quality of fluid intake such as “high-juice group”, “high-carbohydrate soft drinks”, “high-water group”, and “high-milk group”. The milk group causes the least caries experience (Sohn et al., 2006). Additionally, normative diet behaviors are correlated with overall caries experience. These include not consuming the recommended five fruits and vegetables on a daily basis and not eating breakfast (Dye et al., 2004). Moreover, the importance of sugar consumption should also be emphasized. Although toothbrushing has been shown to be essential for prevention of caries, the most important element has to do with the frequency of sugar consumption (Ainamo, 1980). Recently, Kalsbeek and Verrips reported a positive relationship between sweets/snacks consumption and caries occurrence (Kalsbeek & Verrips, 1994).

### **2.2.2 Social determinants of ECC**

Many social determinants affect children’s general health as well as oral health. These include personal, cultural, communal and economic factors which influence dental health behaviors and nutritional habits. They are powerful determinants for when or whether families seek dental health care (Waldman, 1995). The maturity of the parents is another important aspect in the family issue; they may be ill-equipped to bring up their children. These habits would show up daily by allowing their children to watch TV for hours, by frequent feeding of unhealthy snacks, and also by using sweets to comfort the child during temper tantrums. All these features should be emphasized in children with caries (Mattila et al., 2000). Therefore, preventive dentistry that concentrates only on the oral health of the child is inadequate. Attention must be focused on the whole family, their dental health habits, and their lifestyles. These strategies need to be emphasized not only by dental staff, but also the involved agents and health team personnel.

### **2.3 Attempts to solve ECC**

ECC is the result of the interplay of substrate, oral bacteria, and the host, as well as the family, social, and economic conditions. Therefore, health-promotion policies that emphasize community empowerment and address the determinants of health are needed along with strategies that focus on disease prevention. Changes in the modern world results in high caries prevalence among young children, not only in developing countries but also in developed countries which used to have a low prevalence of ECC. Both are now facing the problems of ECC consequences (Mattila et al., 2000; AAP, 2011a). Therefore, effective programs to solve ECC problems will benefit all children around the world. Based on ECC influencing factors, the American Academy of Pediatrics (AAP) recommended (AAP, 2011) that ECC prevention should start during the prenatal period, progress through the perinatal period, and then continue with the mother and infant within the context of preschool programs. Since a vertical transmission of cariogenic bacteria usually occurs from mother to child, the approach to create good oral health in children involves first including pregnant women in oral health screening, dental treatment, and oral health hygiene instruction. In addition, their nutrition should be bolstered along with the use of fluoride toothpaste. These strategies can assist in the prevention of ECC. Second, these prenatal visits would also provide an opportunity to build awareness about the importance of oral health for mothers in relation to their infants. Examples of important lessons for mothers include appropriate oral health care during the perinatal period of pregnancy, as it would prevent preterm and

low-birth weight babies. Additionally, women with poor oral health have the chance to infect their babies with cariogenic bacteria and thus increase their children's risk of caries at an early age. Moreover, change of frequent consumption of sugar-containing drinks and sugary snacks should be promoted. These lessons would alter practices through education for pregnant women, mothers/caregivers and school children. Finally, the selection of foods available in the communities should be enabled.

#### **2.4 Mothers'/caregivers' attitude, knowledge and practice**

In order to implement effective programs to solve ECC problems, the investigation of knowledge, attitude and practice is essential. Many researchers have tried to assess the relationship between attitude, knowledge and practice on oral health (Ab-Murat & Watt, 2006; Al-Omiri et al., 2006; Smyth et al., 2007). Firstly, they indicated that strong knowledge of oral health exhibits better oral care practice (Smyth et al., 2007). Secondly, people with a more positive attitude towards oral health are predisposed by better knowledge in how to take care of their teeth (Al-Omiri et al., 2006). Thirdly, some researchers showed that appropriate oral health education can help to cultivate healthy oral health practice (Ab-Murat & Watt, 2006). Finally, the change to healthy attitude and practice can be created by providing adequate information, motivation and practice of the procedure with the subjects (Smyth et al., 2007). However, such knowledge that mothers/caregivers know about the concept of the first dental visit before the child's first birthday does not necessarily translate into practices that are likely to prevent ECC (Schroth et al.; 2005; Schroth et al.; 2007a). These data from westernized countries are similar to our study in Thailand. Most parents attending the Prince of Songkla University dental hospital in Thailand had a good level of knowledge and a positive attitude about their children's oral health. However, some of them still could not follow some of the recommendations for preventive pediatric dental care. Therefore, knowledge may not result in appropriate behavior. This discrepancy between dental knowledge and parents oral health care practices indicates a need for oral health education. However, influencing the oral health behavior of parents is difficult. Therefore, we suggested that it may be more practical to offer comprehensive oral health educational programs for children at school (Kamolmatyakul & Saiong, 2007). Based on influencing factors, these programs should involve not only the educational aspect but also aspects of attitude and most importantly, how the practical behaviors can be developed. Therefore, implementation of these programs should involve not only pediatric dentists, allied health professionals, nursery staff, and teachers in kindergarten, but also health policy personnel. However, the most important persons are mothers/caregivers.

#### **2.5 Programs for mothers/caregivers**

Infants and toddlers are most susceptible to ECC. Therefore, proper oral care for this age group should be implemented for all persons involved. The first group should be the mothers/caregivers. Since these young children's oral health is totally dependent on their caregivers, a program for these adults is very important. The program should start from the prenatal period. All pregnant women should be scheduled to receive counseling and oral health care during pregnancy. They should also be registered in a dental home program to make sure that their infants undergo oral health assessment by the first birthday. Importantly, the program will help them follow each step of the program without any problem.

### **2.5.1 Programs related to mothers/caregivers' oral health**

Community-based activities should be used to emphasize the importance of oral health for the pregnant woman and her infant(s). In terms of knowledge, they should be educated about the importance of oral health, the transmissible nature of bacteria, and the etiology and prevention of ECC. For example, plaque deposits on tooth surface, improper consumption of snacks, and frequent consumption between meals of sugar-containing snacks or drinks (e.g., juice, milk, formula, soda) are strong caries predictors that increase caries risk. The influences of cariogenicity of certain foods, snacks and beverages and the frequency of consumption of these substances that are related to caries should also be emphasized. Moreover, parents need to be educated regarding other powerful social determinants for children. The most powerful aspects are the issues of being well-equipped to bring up their children. These involve, firstly, avoiding saliva-sharing behaviors (e.g., sharing cups, spoons and other utensils, or cleaning a dropped pacifier or toy with their mouth). Secondly, frequent night time ad libitum breast-feeding, as well as bottle feeding with milk and sugar-containing beverages should be included in educational programs. Finally, repeated use of a sippy or no-spill cup, and frequent consumption between meals of sugar-containing snacks or drinks (e.g., soda, juice, milk, formula) that increase the risk of caries should also be emphasized and discouraged.

The above knowledge should not only be taught in a lecture manner, but also able to be implemented with the possibility of suitable practical methods for them to really apply it. In order to achieve the practical behavior, a good attitude should be implemented, such as good general health depends on good habits (eating, sleeping and routine exercise) and thus dental health also depends on good habits (proper tooth brushing, regular dental visits and a good diet). Parents' self-confidence in bringing up their children in a consistent and logical manner should also be emphasized. Therefore, the programs could build up the parents' attitude that they can be models for their children through a good lifestyle.

In terms of appropriate practical behaviors, the implemented programs should involve oral health services in order to create an impact on the MS reservoir suppresses in mother's/caregiver's mouths, inhibit the MS transmission and decrease the child's caries rate. Oral health services should be provided to pregnant women to get their oral examined and cleaned and to have any needed periodontal and dental work performed before their infant is born. This service would include an oral examination, professional prophylaxis, fluoride treatment, early intervention such as removal of active caries with subsequent restoration, and the use of xylitol chewing gum (AAPD, 2010b).

### **2.5.2 Programs related to children's oral health**

After implementation of knowledge and attitude to mothers/caregivers, the next step is the practical programs to promote appropriate child rearing behaviors instead of improper ones, such as allowing the child to watch TV for hours, frequent feeding of sugar and sweets, and using sweets to comfort during temper tantrums. The most important factor of all that needs to be included is an infant oral health care program because it is one of the foundations upon which promotional education and oral health care must be built to enhance the chance of a lifetime free from preventable oral disease. The program of promotional activity includes promoting teeth cleaning, which is an example that has to be modified according to the age of the child. At first, oral hygiene is the parent's responsibility, then the parent and child must work together, and gradually, the child

assumes the responsibility. This depends on the child's anatomic/physiological development, improving skills, different motivational forces, changing lifestyles and anatomic and physiological changes associated with growing up. The program should facilitate mothers/caregivers to clean their infant's mouth with a clean cloth after each feeding or at least once a day before bed time. Then as soon as the first tooth erupts, they should be cleaned with a soft toothbrush. This will help reduce bacterial colonization. The protocol of activities which should be demonstrated and supervised to mothers/caregivers includes age-appropriate tooth brushing with age-appropriate amount of fluoridated toothpaste twice daily using a soft toothbrush of age-appropriate size, rinsing 0.05% sodium fluoride mouth rinse once a day, and flossing with dental floss to help dislodge food and reduce bacterial plaque levels. Flossing should be initiated around three years of age when adjacent posterior tooth surfaces cannot be cleansed with a toothbrush. The amount of fluoride toothpaste to be used has to be emphasized to mothers/caregivers. According to AAPD guidelines, a 'smear' of fluoridated toothpaste should be used in a child under the age of 2 and a 'pea-size' amount should be used in all children aged 2 to 5 (AAPD 2011b).

## **2.6 Programs for dentists and allied health professionals**

General dentists can provide oral health service to pregnant women/mothers during prenatal, perinatal and postnatal periods, while pediatric dentists can provide oral health services to children starting from infancy through adolescence. Since oral health services for pregnant women/mothers are already discussed above, this section will only deal with children oral health services. Pediatric dentists are the first professionals directly involved in oral health care service for children. They have an opportunity to see children much earlier and thus capture the parents' interest in appropriate oral health milestones and the consequences of improper habits and behaviors. Implementation of an anticipatory guidance to oral health promotional education is an organized way for all oral health providers to enjoy the attention of parents and be more successful in good oral health care for children.

Early access to oral health providers to establish a dental home should be organized no later than when the child reaches 12 months of age. This will ensure that the full range of oral health-promotion and interceptive disease-prevention services will be provided. Oral hygiene measures should be implemented no later than the time of the first primary tooth eruption. However, mothers/caregivers should be taught to clean infants' mouths after each feeding or at least once a day before bed time, as soon as possible, even before tooth eruption. Professionally-applied topical fluoride, such as fluoride varnish and fluoride gel, should be considered for children at risk for caries. Systemically-administered fluoride should be considered for all children with moderate/high caries risk who drink fluoride deficient water (<0.6 ppm), after assessing all other dietary sources of fluoride exposure (AAPD, 2011a).

The AAPD encourages physicians, nurses and other health care professionals to educate pregnant women about perinatal and infant oral health (AAPD, 2011a). Since physicians, nurses, and other health care professionals are far more likely to see new mothers and infants than are dentists, it is important that they be aware of the ECC infectious etiology and associated risk factors, make suitable decisions regarding timely and effective intervention, and assist the establishment of the dental home or merge oral health assessment/intervention as part of a regular holistic child health care clinic program.

Physicians, nurses, physician extenders and child health associates all can intervene at an appropriate point with any child. A similar program in dentistry delivers a well-defined source of information that can be organized by all members of the office team. Regardless, multidisciplinary approaches are needed to promote good oral health in preschool children. These require collaboration among dentists, especially pediatric dentists, allied health professionals, child-care centers personnel, and health policy personnel such as decision-makers, policy-makers, and researchers involved with young children.

### **2.7 Programs for child-care centers personnel**

Child-care center personnel comprise of nursery staff and center-based program staff such as staff in day-care centers, pre-kindergartens, nursery schools and teachers in kindergarten. Increasing health promotion in out-of-home child-care settings could improve the oral health of preschool age children. The AAPD encourages child-care centers' staff, early education providers, and parents to implement promotional practices that can decrease the risk of developing ECC in children (AAPD, 2011c). The program could be prepared step by step. First, the health staff, preferably a pediatric dentist, should monitor program practices regarding oral health. Then the individualized recommendations for each program should be carried out at least once a year. Second, the concept of the dental home should be promoted by educating their personnel as well as mothers/caregivers on the importance of oral health and providing assistance with implementation of a dental home no later than 12 months of the child's age. Third, keep oral health records, merging with the child's health report, starting at age 12 months. It should address the child's oral health needs as well as any special instructions given to mothers/caregivers. Fourth, sponsor on-site age appropriate oral health promotion programs for children that will encourage good oral hygiene and dietary practices, injury prevention, and the importance of regular scheduled dental visits. Fifth, provide in-service training programs for the personnel regarding proper nutrition choices, links between diet and tooth decay, oral hygiene concepts, and children's oral health issues including appropriate initial response to traumatic injuries along with complication and dental consequences. Personnel with an understanding of these concepts in their minds are a great benefit in caring for children. Sixth, encourage mothers/caregivers to be active partners in the children's health care process and grant an individualized education plan, one that is responsive to cultural values and beliefs, to meet every family's needs. Written material should be provided and, at a minimum, tackle oral health promotion and disease prevention and the timing of oral health visits. Seventh, integrate oral health activities as part of the daily health care of each child such as oral hygiene practices at least once daily after a meal. Eighth, supply well-balanced diets of low caries-risk, and optimally-fluoridated drinking water accessible for consumption throughout the day. Finally, in terms of general/dental health habits, not permitting infants and toddlers to have bottles/sippy cups in the crib or to carry them while walking, and minimizing saliva-sharing activities (e.g., sharing utensils, orally cleansing a pacifier) help decrease an infant's or toddler's acquisition of cariogenic microbes (AAPD, 2011c).

### **2.8 Programs for health policy personnel/government**

It is important that the oral health needs of infants and young children be addressed as early as possible and as a part of good child-care since dental disease is preventable. Therefore,

the health policy personnel/government should incorporate programs to make sure legislators, policy makers, and third party payers are well-informed regarding the importance of early interventions of ECC. They can then facilitate to support the continuing programs for good oral health in children. The first requirement would be providing knowledge for pregnant women (the most important aspect is education regarding the infectious and transmissible nature of bacteria that causes ECC) to have a good attitude where they can really take care of their own oral health. Moreover, proper oral health services for mothers/caregivers should also be prepared (oral examination, fluoride treatment, professional prophylaxis, early intervention such as removal of active caries with subsequent restoration of remaining tooth structure). Next, health care professionals and all other stakeholders in children's oral health should support the implementation of a dental home for all infants by 12 months of age. The dental home concept refers to a continuing relationship between health personnel and child, where the child's access to holistic and coordinated oral health care and prevention is the main focus and tailored to the needs of the child. The details of a dental home include, firstly, thorough medical (infant) and dental (parent and infant) histories, a thorough oral examination, performance of an age-appropriate tooth brushing demonstration and prophylaxis. Secondly, fluoride varnish delivered as part of a regular child health clinic program. These procedures can be provided by trained health auxiliaries, community health workers, family physicians, or pediatricians. Alternative health or child care professionals and dental auxiliaries (or trained lay child care workers such as early childhood development workers) should be recruited to ensure access to fluoride-varnish programs. Thirdly, sealant placement on deep grooves and fissures on primary teeth should be delivered by pediatric dentists. Finally, investigating the infant's risk of developing caries and determining a prevention plan and interval for periodic reevaluation should also be scheduled.

In the communities where it is difficult to recruit and retain an adequate number of dentists, health policy personnel should arrange for other oral health and primary health care providers to deliver oral health services and promote an early dental visit within the first year of life. Recent studies, noting that a majority of pediatricians and general dentists were not advising patients to see a dentist by 1 year of age, point to the need for increased infant oral health care education in the medical and dental communities (AAPD, 2011a). It is important to develop oral health information programs to pediatricians. Information on oral health should be included in medical curricula and residency (Balaban et al.; 2011). Therefore, oral health training should be incorporated into pediatric and family medicine residency programs.

For older children, health policy personnel should set a program that facilitates students to take responsibility for their own oral health. This will diminish dependency on oral health personnel. Among teenagers, schools would serve as the best platform for oral health care instruction. The oral health programs should be intensified to promote oral healthcare as a lifelong practice. After incorporation of oral health promotion activities into the school's curriculum, more attempts in the form of educational materials (tooth brushing techniques, healthy food etc.) and general health promotion activities related to oral health need to be carried out. Another important school health policy that needs implementation is healthy eating behavior that bans unhealthy foods and drinks in the school premises. Healthy foods must be made available in the school canteens, while the canteens should be prohibited from selling unhealthy food and drinks such as soda and those with high sugar

levels. Although parents play an important role in influencing their children's eating behavior, a more effective method would be empowering the children to make healthy food choices. At this age, these students are more likely to buy food on their own as compared to primary school children (Cheah et al., 2010).

### 3. Conclusion

Dental caries is a disease that generally is preventable. Early risk assessment allows for identification of parent-infant groups who are at risk for ECC and would benefit from early preventive intervention. The ultimate goal of early assessment is the timely delivery of educational information to populations at high risk for developing caries in order to prevent the need for later surgical intervention. The most important population is mothers/caregivers. The implementation of systems to promote good oral health for all should be the responsibility of health policy personnel/the government. Combined approaches must be implemented. Strategies should begin with community engagement and always include primary care providers and other community health workers. Arrangement programs should involve not only dentists, but also allied health professionals and child-care center personnel. Moreover, these programs should not only be arranged for preventive dentistry which concentrates only on the oral health of the child, but attention must also be focused on the whole family, its dental health habits and lifestyles. A combination of approaches is required to organize these programs. These include recommendations for preventive oral health and clinical care for young infants and pregnant women by primary health care providers, community-based health-promotion initiatives, oral health workforce and access issues, and advocacy for community water fluoridation and fluoride-varnish program access. Further community based research on the epidemiology, prevention, management, and microbiology of ECC would also be beneficial.

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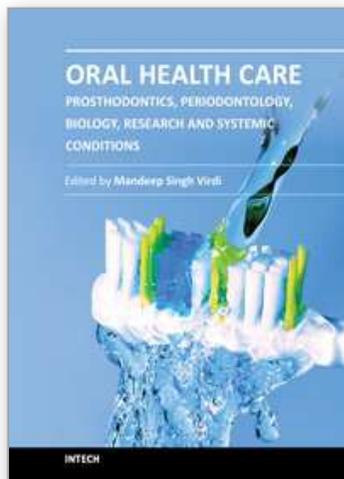
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Geriatric dentistry, or gerodontics, is the branch of dental care dealing with older adults involving the diagnosis, prevention, and treatment of problems associated with normal aging and age-related diseases as part of an interdisciplinary team with other healthcare professionals. Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation, and maintenance of the oral function, comfort, appearance, and health of patients with clinical conditions associated with missing or deficient teeth and/or oral and maxillofacial tissues using biocompatible materials. Periodontology, or Periodontics, is the specialty of oral healthcare that concerns supporting structures of teeth, diseases, and conditions that affect them. The supporting tissues are known as the periodontium, which includes the gingiva (gums), alveolar bone, cementum, and the periodontal ligament. Oral biology deals with the microbiota and their interaction within the oral region. Research in oral health and systemic conditions concerns the effect of various systemic conditions on the oral cavity and conversely helps to diagnose various systemic conditions.

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