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RESEARCH ARTICLE

REVIEW ON INFANT ORAL HEALTH

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Abstract

The medical literature provides some insight into the benefits of an anticipatory guidance program. Parents are extremely satisfied with the interaction fostered by this approach. Additionally, they enjoy the functional approach to education that deals with specific events in their own family. It may be this communication about a vital interest that makes the process so successful. Pediatric dentists have seen a dramatic increase in their market share of children's dental care, and some of this can be attributed to their tendency to see children much earlier and thus capture parents' interest in important dental milestones and the future effects of habits and behaviors. Applying anticipatory guidance to dental preventive education is a organized way for all dental providers to enjoy the attention of parents and be more successful in preventive dentistry. Early dental intervention using an individualized approach such as anticipatory guidance may be the next frontier in dental caries reduction.

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Introduction:-

An ounce of prevention is worth a pound of cure. It has been said that the mouth is the gateway to overall health and well being, thus maintaining the oral health of infant's teeth (primary tooth) is to facilitate proper growth and development in children. The Centers for Disease Control and Prevention reports that caries is the most prevalent infectious disease in our nation's children and more than 40% of children have caries by the time they reach kindergarten. Early childhood caries (ECC) and the more severe form of ECC can be particularly virulent forms of caries, beginning soon after tooth eruption, developing on smooth surfaces, progressing rapidly, and having a lasting detrimental impact on the dentition. Dental caries and premature loss of primary teeth can lead to severe consequences in the permanent dentition¹.

The perinatal period is the period beginning with the completion of the 20th to 28th week of gestation and ending one to four weeks after birth while infant period extends to the child's first birthday. Infancy being a critical time to establish habits, both good and bad has the potential to affect an individual's future oral health as well as overall health and well-being throughout in its adolescence.

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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. And its purpose is to keep the lips and mucosa soft, clean, intact and moist and maintain the health of primary dentition as they are equally important for eating, speaking, and growth of the jaws².

Oral health providers play an important role in perinatal and infant oral health care, particularly regarding the establishment of a dental home, educating new parents, and the timing of a child's first dental visit and should be knowledgeable with respect to common oral conditions, anticipatory guidance, and early dental caries preventive care including oral cleaning, dietary recommendations, and optimal fluoride exposure. Historically oral health has been neglected or taken for granted, especially with children and the primary dentition. Prevention in dentistry was uncommon before the 1960s, except in a few dental practices. Tooth brushing may or may not have been practiced at home. Age-appropriate brushes were not available until the 1960. Fluoridated dentifrices made their appearance about the same time. The first national voice of concern was from a small group of practitioners, fed up with the lack of support by organized dentistry³. They banded together and formed the American Society for Preventive Dentistry in the 1960 and sponsored the first "preventive convention" that reported on innovative and revolutionary departures from the mainly reparative practice method used in dentistry at that time. Indian Society of Pediatric and Preventive Dentistry (ISPPD) also strives to achieve this goal with the motto 'every child has the fundamental right to his/her total oral health'. It also states that dental-caries risk assessment, based on a child's age, biological factors, protective factors, and clinical findings, should be a routine component of periodic examinations by oral health and medical providers. Traditionally, AAP had recommended seeing the dentist by the age of 36 months. However, more recently the AAP has changed and expanded its oral health guidelines; and the recent policy aims to establish a dental home for children by 1 year of age through the use of oral health risk assessment at 6 months of age⁴.

Goals of infant oral health program to identify, intercept and modify the potentially harmful parenting practices that may adversely affect the infant's oral health, Parent education right from the prenatal period highlighting the importance of their role in the prevention of dental disease for their child, Parent/ caregiver orientation to perceive dental services as an integral part of infant's overall health program and Periodic evaluation of the orofacial development and oral health by the clinician.

Since children less than 3 years are not seen routinely by the dentist, they are at risk of developing dental disease. Pediatricians who see a child from birth as part of well baby visit program are in the best position to identify early dental problems and to educate the parents about the early oral preventive healthcare. They also can provide screening services for early detection of dental disease⁵, provide advice about the need to seek dental care and refer those children in need to pediatric dentist. A key element of comprehensive care for children thus involves the coordination of services between medical and dental providers so that they can provide appropriate services at the appropriate ages.

Discussion:-

The American Academy of Pediatric Dentistry (AAPD) 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 disease⁶. The Centers for Disease Control and Prevention reports that caries is the most prevalent infectious disease in our nation's children. More than 40% of children have caries by the time they reach kindergarten. In contrast to declining prevalence of dental caries among children in older age groups, the prevalence of caries in poor US children under the age of 5 is increasing. Early childhood caries (ECC) and the more severe form of ECC (S-ECC) can be particularly virulent forms of caries, beginning soon after tooth eruption, developing on smooth surfaces, progressing rapidly, and having a lasting detrimental impact on the dentition. This disease affects the

general population but is 32 times more likely to occur in infants who are of low socioeconomic status, who consume a diet high in sugar, and whose mothers have a low education level.⁷ Caries in primary teeth can affect children's growth, result in significant pain and potentially life-threatening infection, and diminish overall quality of life.

Recommendations for parental oral health

Oral health education:

All primary healthcare professionals who serve parents and infants should provide education on the etiology and prevention of ECC.

Educating the parent on avoiding saliva-sharing behaviors (eg, sharing spoons and other utensils, sharing cups, cleaning a dropped pacifier or toy with their mouth) can help prevent early colonization of MS in infants.

Comprehensive oral examination:

Referral for a comprehensive oral examination and treatment during pregnancy is especially important for the mother.

Professional oral healthcare:

Routine professional dental care for the parent can help optimize oral health. Removal of active caries, with subsequent restoration of remaining tooth structure, in the parent suppresses the MS reservoir and minimizes the transfer of MS to the infant, thereby decreasing the infant's risk of developing ECC.

Oral hygiene:

Brushing with fluoridated toothpaste and flossing by the parent are important to help dislodge food and reduce bacterial plaque levels.

Diet:

Dietary education for the parents includes the cariogenicity of certain foods and beverages, role of frequency of consumption of these substances, and the demineralization/remineralization process.

Fluoride:

Using a fluoridated toothpaste and rinsing with an alcohol-free, over-the-counter mouth rinse containing 0.05% sodium fluoride once a day or 0.02% sodium fluoride rinse twice a day have been suggested to help reduce plaque levels and promote enamel remineralization.

Xylitol chewing gum:

Evidence suggests that the use of xylitol chewing gum (at least times a day by the mother) has a significant impact on mother-child transmission of MS and decreasing the child's caries rate.

- 1) Recommendations for the infant's oral health

Oral health risk assessment:

Every infant should receive an oral health risk assessment from his/her primary healthcare provider or qualified healthcare professional by 6 months of age. This initial assessment should evaluate the patient's risk of developing oral diseases of soft and hard tissues, including caries-risk assessment, provide education on infant oral health, and evaluate and optimize fluoride exposure.

Establishment of dental home:

Parents should establish a dental home for infants by 12 months of age. The initial visit should include thorough medical (infant) and dental (parent and infant) histories, a thorough oral examination, performance of an age-appropriate tooth brushing demonstration, and prophylaxis and fluoride varnish treatment if indicated. In addition, assessing the infant's risk of developing caries and determining a prevention plan and interval for periodic reevaluation should be done. Infants should be referred to the appropriate health professional if specialized intervention is necessary. 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 are also important components of the initial visit.

Teething:

Teething can lead to intermittent localized discomfort in the area of erupting primary teeth, irritability, and excessive salivation; however, many children have no apparent difficulties. Treatment of symptoms includes oral analgesics and chilled rings for the child to "gum". Use of topical anesthetics, including over-the-counter teething gels, to relieve discomfort are discouraged due to potential toxicity of these products in infants.



Fig. 1:- Teething.

2) Pediatric dietary guidelines

Guidelines for both dietary habits and food choices are designed to provide adequate energy and nutrient intake to support expected physical growth and emotional, psychological, and cognitive development. Energy and nutrients are the required substances; foods and beverages are merely the vehicles that deliver these substances. Foods chosen for consumption and the manner of consumption, however, impact both energy and nutrient intakes.⁸ The consistency and texture of food and the nutrient requirements change with growth and development of the child.

Fluoride:

Optimal exposure to fluoride is important to all dentate infants and children. Decisions concerning the administration of fluoride are based on the unique needs of each patient. The use of fluoride for the prevention and control of caries is documented to be both safe and effective. When determining the risk-benefit of fluoride, the key issue is mild fluorosis versus preventing devastating dental disease. In children considered at moderate or high caries risk under the age of 2, a smear of fluoridated toothpaste should be used. In all children ages 2 to 5, a pea-size amount should be used. Professionally-applied topical fluoride, such as fluoride varnish, should be considered for children at risk for caries. Systemically-administered fluoride should be considered for all children at caries risk who drink fluoride deficient water (<0.6 ppm) after determining all other dietary sources of fluoride exposure. Careful monitoring of fluoride is indicated in the use of fluoride-containing products. Fluorosis has been associated with cumulative fluoride intake during enamel development.

Injury prevention:

Practitioners should provide age-appropriate injury prevention counseling for orofacial trauma. Initially, discussions would include play objects, pacifiers, car seats, and electric cords.

Non-nutritive habits:

Non-nutritive oral habits (eg, digit or pacifier sucking, bruxism, abnormal tongue thrust) may apply forces to teeth and dentoalveolar structures. It is important to discuss the need for early weaning and the need to wean infants from these habits before malocclusion or skeletal dysplasias occur.

Oral Hygiene

Oral hygiene goals and issue

The removal of plaque and debris from teeth and surrounding tissues is an essential hygienic activity that must be performed daily. Plaque provides the foundation for bacteria to multiply and metabolize food to produce acids that initiate the caries process.⁶³ Daily interruption of plaque and flushing away of its products has to be included in a preventive program for optimal outcomes. Repeated studies point to plaque in infancy as a predictor of dental caries later in the preschool years. Tooth cleaning can be best accomplished with an age-appropriate brush for use by the parent.⁹

Although brushing is usually associated with the presence of teeth, the cleaning process can be included with the infant's daily bath, prior to the eruption of teeth. Including tooth brushing/ mouth cleaning with other bathing activities may assist in the development of a lifelong habit.

For the pre-three child, the parent/ caretaker assumes major responsibility for daily hygiene. As with bathing, brushing hair and clipping fingernails, tooth cleaning cannot be performed by pre-three children. It is difficult for the pre-three child to conceptualize the steps of oral hygiene operation, the three dimensional nature of the oral cavity and tooth surfaces or accomplish the act safely with the stage of developed motor coordination.

Position Of Child For Tooth Brushing

- (a) **On a Bed or Sofa:** Place the child on a bed or sofa lying down, with his head in your lap. Support his head and shoulders with your arm. If the child is uncooperative, a second person can gently hold his hands and feet
- (b) **In a Beanbag Chair :** If it is hard for the child to sit up straight, sitting in a beanbag chair may allow her to relax without fear of falling. Use the same position as described above for brushing on a bed or sofa
- (c) **Lying on the Floor:** Place the child on the floor lying down, with her head on a pillow. Kneel behind the child's head, using your arm to help hold her still, if necessary
- (d) **In a Wheelchair:** Stand behind the wheelchair. Use your arm to brace the child's head against the wheelchair or against your body. You can use a pillow to make the child more comfortable. Sit behind the wheelchair and tilt it back into your lap. Remember to lock the wheels of the wheelchair.

Toothbrushing

Back And Forth Strokes

1. Put toothbrush bristles at the child's gum line at a 45-degree angle. Press gently, and use short back-and-forth strokes. Start with the upper teeth, brushing the outside, the inside, and the chewing surfaces. Do the same for the lower teeth. Be sure to brush each tooth. Gently brush the tongue, too.

Side To Side Movement

Place the toothbrush vertically to clean the inside and upper and lower surfaces of the teeth

Roll Method

For children who want to help brush their teeth, try the —roll method.

Let the child hold the toothbrush, and turn her wrist a little. Follow the shape of the teeth. Or try the —circular method. With the child's lips closed over the toothbrush handle, put the toothbrush inside the cheek and the tips of the bristles lightly touching the teeth. Use a gentle, fast, wide, circular motion.

Tooth brush selection

Manual tooth brushes are most commonly used oral hygiene aids because of its cost effectiveness and ease of availability. A variety of tooth brushes are commercially available with different designs and angulations, to serve specific requirements of patients. The choice of brush is a matter of individual preference, there is no demonstrated superiority of any one type of brush. Ease of manipulation by patient is an important factor in brush selection. The effectiveness of and potential injury from different types of brushes depends to great degree on how the brushes are used.

ADA specification for acceptable brushes are as follow:

Length 1-1.25 inches. Width 5/16-3/8 inches. Surface area 2.54-3.2 cm.

Number of rows 2-4 rows of bristle. Number of tufts 5-12 tufts per row. Number of bristle 80-85 bristle per tuft.

Various Brushing Techniques

1. Sulcular: Bass
2. Vertical : Leonard
3. Roll: Rolling stroke, .
4. Horizontal- Modified stillman
5. Vibratory: Stillman,
6. Physiologic: Charter, Bass
7. Circular: Fones
8. Scrub-Brush

Tooth-brushing duration

Frandsen and later Brothwell et al. did not make conclusions regarding the optimal duration of tooth brushing. Recent reports have concluded that tooth-brushing duration is an important variable in plaque removal efficacy. However, scientific investigations into the ideal brushing time have been problematic. While it is believed that increased brushing time does result in more plaque removal, the brushing technique used can confound study comparisons. Some have recommended three minutes as ideal for manual brushing.

Tooth-brushing frequency

Frandsen reported that confusion surrounded optimum brushing frequency. He reiterated that the quality of brushing is likely a more important factor than the frequency. Frandsen concluded that findings from the previous workshops, which had identified a brushing frequency up to two times a day, was still substantiated and that no significant gains could be achieved by increasing this frequency.¹⁰ The Brothwell update, while concluding that studies have suggested that increased brushing frequency is indeed related to improvements in periodontal health, asserted that no optimum frequency had yet been established.

Tooth-brushing force

Most of the literature surrounding tooth-brushing force has examined its impact on gingival abrasions and recession and hard-tissue abrasions. Fewer studies have looked at the relationship between force and plaque removal efficacy. The optimal force has been found to be between 300 to 400 g. Manual tooth brushing has been associated with greater levels of toothbrushing force and perception of force with manual toothbrushes is less accurate.

Rinsing behaviour

An important determinant of anticaries efficacy of a fluoride toothpaste is the rinsing behaviour after brushing. The volume of water used and the vigour of rinsing after toothbrushing affect the fluoride concentration in the mouth and caries experience.

Amount of toothpaste

One clinical trial (Type 2) of dentifrices containing 1000, 1500 and 2500 ppm F reported that the fluoride concentration was more important than the amount of toothpaste applied. Since very young children may swallow a large amount of toothpaste, thereby increasing the risk of fluorosis, parents should supervise very young children and place only a small amount of toothpaste (smear or pea size) on the brush.



a. Baby tooth brush with a smear



b. Pea-size toothpaste of toothpaste

Fig 2:- Toothpaste Size.

Powered toothbrushes

A Cochrane systematic review and meta-analysis published in 2003 compared tooth brushing with powered toothbrushes to various manual toothbrushes. Approximately 25 powered toothbrushes were clustered into six modes of action: side-to-side (moves laterally), counter oscillation (adjacent tufts independently rotate in one direction, then the other, and in opposite direction to adjacent tufts), rotation oscillation (brush head rotates in one

direction and then the other), circular (brush head rotates in one direction), ultrasonic (bristles vibrate at ultrasonic frequencies [> 20 kHz])

The only cluster that removed more plaque (7%) and reduced gingivitis more effectively (17%) than manual tooth brushing in both the short (≥ 28 days) and long term (≥ 3 months) was the rotational oscillation powered toothbrush cluster. The authors concluded that both manual and powered toothbrushes were effective in reducing gingivitis, possibly preventing periodontitis, and preventing tooth decay if using fluoridated toothpaste.

Flossing

Flossing is an essential part of the tooth-cleaning process. It removes food particles and plaque between teeth that brushing misses. Flossing should, typically begin between 2 and 2½ years of age. Children usually need assistance with flossing until they are 8 to 10 years of age.

Flossing tools, such as pre-threaded flossers or floss holders, may be helpful for children who are just learning how to floss. Some children may find it easier to use a loop of floss, which is created by taking a piece of floss about 10 inches long and tying the ends together into a circle. Parents (and older children) can hold the floss tightly between the thumbs and forefingers to floss.¹¹

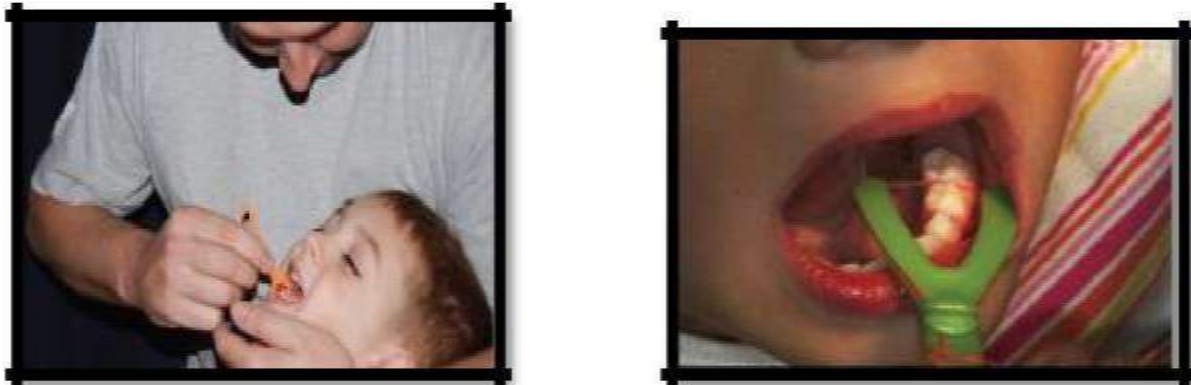


Fig 3:- Flossing.

Application of habit management

Oral habits are associated with dentoalveolar and/or skeletal deformation in some patients. The amount of dentoalveolar skeletal deformation is related to the frequency, duration, direction, and intensity of certain habits and should be assessed by the dentist. Changes that can occur to the dentoalveolar structures may include anterior or posterior open bite, interference of normal tooth position and eruption, alteration of bone growth, and cross bites. The dentist can provide the patient and parent with information regarding consequences of a habit. Treatment modalities to control habits may include patient/ parent counseling, behavior modification techniques, myofunctional therapy, and appliance therapy.

Non-Nutritive Habits

Oral habit behaviors include, among others, digit sucking, pacifier sucking, lip sucking and biting, nail-biting, bruxism, self-injurious habits, mouth breathing, and tongue thrust. Nonnutritive sucking behaviors (eg, finger or pacifier sucking) are considered normal in infants and young children and usually are associated with their need to satisfy the urge for contact and security.



(a)Thumb sucking



(b)Pacifier use



(c)Finger sucking

FIG 4:- Oral Habits.

Injury Prevention

Pre-three injury prevention

Accidental injury is not prevented but can be controlled by proper education, modification of the environment, giving specific advice about particular childhood dangers at a particular age in a specific environment rather than general advice and avoiding a mismatch of a child's skills with environment. A starting toddler's parent would be counseled on the risks inherent in fall, for example, as the child begins to ambulate. A child's life is a series of windows of vulnerability to particular type of injuries. All primary care professionals share responsibility to counsel families about unintentional injury¹²

Ensuring safety and preventing injuries must be an ongoing priority for parents as their children progress from infancy through adolescence. However, the nature of their efforts evolves over time. Safety issues in infancy relate primarily to the infant's environment and interactions with parents. Parents must modify the environment to prevent suffocation, motor vehicle-related injuries, falls, burns, and other hazards. A young child's emerging independence and rapidly increasing mobility presents new safety and injury prevention challenges and necessitates further environmental modifications, or —childproofing.

Physical activities play an important role in the child's life. Parents also should be encouraged to model safe behaviors, such as wearing seat belts and bicycle helmets. Children should follow traffic rules and safety guides concerning bicycle riding, skating, skiing, and other similar activities. The use of protective gear, such as helmets, eye protection, mouth and wrist guards, and life jackets or personal protective devices, is not negotiable and should be used at all times by everyone.

Electrical injury prevention

For children younger than 12 years, most electrical injuries are caused by power cords.

1. Inspect your power cords and extension cords. Replace any cords that have broken or cracked external covering and any cord that has exposed wire.
2. Do not allow children to play with any electrical cord.
3. Limit use of extension cords and be sure the cord is rated for the current (measured in amps) that will be drawn by the device being powered.
4. Use outlet covers to protect infants from exploring electrical outlets.
5. Update old, ungrounded electrical outlets to grounded (3-prong) systems. Replace outlets near any water (sink, tub) with fused (GFCI) outlets.



FIG 5:- Electrical Injury.

Dental Home¹³

The dental home is a locus for preventive oral health supervision and emergency care. It can be a repository for records and the focus for making specialty referrals. When culture and ethnicity are barriers to care, the dental home offers a site adapted to care delivery and is sensitive to family values.

The concept of dental home is an evolving one, with many conceptual elements borrowed from the definition of the medical home propagated by American Academy of Pediatrics (2002) but a working definition, according to American Academy of Pediatric dentistry(2008-2009) is:

—The dental home is the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated and family centered way. Establishment of a dental home happens no later than 12 months of age and includes referral to dental specialists when appropriate

The dental home advantage

The dental home embraces the importance of early intervention with optimal preventive strategies chosen based on the risk of the patient and would encourage the first dental visit by approximately 1 year of age. Parents may welcome professional support and anticipatory guidance to ensure that their children have healthy mouths at this age. Practitioners can provide personalized preventive approaches for children based on their families' histories, the oral examination and the risk factors identified.

Another advantage of the dental home is that preventive intervention can be personalized to the needs of the child. Risk assessment remains an emerging science, and, although empirical suggestions are available for children who are at greater risk, the observations of the practitioner still are valid. An individualized preventive program can be recommended for optimum protection of children in different risk categories within a good cost-benefit range.

Specialized care referral

Another feature of the dental home would be coordination of specialized care for the child. When a child has been observed over a period, appropriate recommendations can be made for other treatments such as orthodontic referral and observation. Using age-related guidelines and recommendations from the orthodontic community, appropriate scheduling of referrals can be made to optimize treatment and eliminate numerous referrals before treatment is initiated.

It is known that after children are 2 or 3 years of age, dentists see them more frequently than do primary care medical providers. This provides a wonderful opportunity for the primary dental provider to recognize changes in growth and development that can be discussed with the parent, as well as make appropriate recommendations to seek further consultation from the child's physician. The continuous care provided by a dental team also would recognize other developmental milestones that may suggest needed attention. For example, dental practitioners can observe problems with speech development at periodic visits, discuss them with the parents and make appropriate referrals to speech pathologists.

Caries Risk Assessment¹⁴

Caries risk assessment is the determination of the likelihood of the incidence of caries (ie, the number of new cavitated or incipient lesions) during a certain time period or the likelihood that there will be a change in the size or activity of lesions already Risk assessment procedures used in medical practice normally have sufficient data to accurately quantitate a person's disease susceptibility and allow for preventive measures. Even though caries-risk data in dentistry still are not sufficient to quantitate the models, the process of determining risk should be a component in the clinical decision making process.

An individualized risk assessment of an infant or toddler will help both health care providers and parents/ caregivers identify and understand the factors associated with ECC, so that a cooperative and proactive preventive care plan can be developed. The specific information gained from a systematic assessment of caries risk guides the dentist in the decision-making process to establish treatment and preventive protocols for children with oral disease and for those deemed to be at risk.

Risk assessment:

1. Fosters the treatment of the disease process instead of treating the outcome of the disease;
2. Gives an understanding of the disease factors for a specific patient and aids in individualizing preventive discussions;
3. Individualizes, selects, and determines frequency of preventive and restorative treatment for a patient; and
4. Anticipates caries progression or stabilization.

Conclusion:-

Parent's knowledge on Infant oral health care was inadequate. Health professionals, who are the first to come into contact with expectant and new mothers, need to disseminate appropriate and accurate information about oral health-care for infants, especially the use of nursing bottle at night, the value of tooth brushing, and regular dental visits. A matter of high priority is the development and implementation of wide scale, long-term programs of health education, and promotion for expectant new mothers. As our society for pediatric dentistry strives to achieve the goal that every child has a fundamental right to his or her total oral health it is the responsibility of the health-care professional involved with children to provide comprehensive care for the child. Preventive dental assessment and

treatment program can be incorporated into the well-baby visits provided by pediatricians. By examining the infant for oral problems and by providing early preventive counseling, it is possible to prevent many forms of dental disease and thus promote the total health of child patients.

Medical students lack adequate knowledge on IOH; hence, there is an increasing need to increase the knowledge of medical students through effective strategies. Although the dental student's knowledge was significantly better than the medical students, they need to be emphasized on certain aspects of IOH. Parent's knowledge on IOH was inadequate irrespective of the locality most of the pediatricians avail little knowledge regarding ECC and infant oral health care during their curriculum, and majority of them were not aware about pedodontics as a speciality in Dentistry. They also reported the issue of lack of knowledge of the main risk factors for oral diseases, and they also believed that they had an important responsibility in preventing oral diseases in children. Hence, there is a need to educate health care professionals on infant oral health care by conducting health education programs and incorporating the same in medical curriculum so as to promote good oral health.

Hence it is important to build a proper model of dental care among children and parents counselling whether prenatal or post-natal plays an important role in the overall development of oral-dental tissues in children and infants.

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