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Review Article

Women and Oral Health - A Brief Review

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ABSTRACT

Health is wealth goes an old adage. Keeping this in mind preservation of physical, mental and emotional health of an individual is an important goal of all health sciences since their very conception.
The oral cavity is said to be a mirror to the body, as various systemic diseases show early clinical manifestations within it. Off late, increased importance is being paid to the impact of oral health on the general well-being of the individual. Various studies have indicated an underlying relationship between presence of oral infections and occurrence of diseases such as diabetes & asthma.
Women, in particular are more susceptible to the development of complications secondary to the presence of oral diseases, such as intra- uterine growth retardation (IUGR) and gestational diabetes. For example, presence of chronic periodontitis is recognized as a risk factor for development of pre-eclampsia. The transmission of diseases from mother to the child is another area of concern.
This review article therefore attempts to present a holistic view of relation between womens' oral and systemic health.

Keywords: Atherosclerosis, Dental Caries, Gestational Diabetes, Maternally Derived Streptococcus Mutans Syndrome, Periodontal Disease, Pre-Term Low Birth Weight

INTRODUCTION

Health has been defined as complete physical, mental and social well-being of an individual, not just the absence of disease or infirmity.[(1)] Prevention of disease is said to be better than cure. The impact of oral health on systemic health has opened new avenues in this respect. Women are differently susceptible in this respect due to differences in hormones.

The two main oral diseases to widely impact humans are – Dental Caries and Periodontitis.

Periodontitis is a chronic infectious disease which destroys the attachment apparatus of the tooth, provides a favourable environment for microbes and generates a host response characterised by release of cytokines, and other pro-inflammatory mediators that may adversely influence overall health.[(2)] Periodontal Medicine studies the possible relationship between periodontal disease and systemic health. The term emphasises a two-way relationship between periodontal disease in an individual's systemic health and vice

versa.[3,4] This gives rise to the intriguing possibility that morbidity and mortality from systemic diseases may be reduced by improving periodontal health.

The concept of disease in one organ affecting other organs of the body is well established and is based on the re-interpretation of the focal infection theory.[5] This theory postulates that foci of oral microbes may contribute to systemic disease by[5,6,7] the spread of infection due to translocation of bacteria or due to the injury caused by microbial toxins and inflammatory response to either. Dental procedures are known to produce transient bacteraemia. But, this can also result from physiologic processes such as chewing or oral hygiene practices such as flossing, tooth brushing or even the use of a toothpick. The subsequent release of inflammatory mediators, results in platelet aggregation, adhesion and atheroma formation.[8] There was a statistically significant correlation between coronary artery disease and periodontitis.[9] Severe periodontal disease has been found to be associated with a 25% to 90% increase in risk for cardiovascular diseases (CVD).[10] In another study 91% of patients with CVD demonstrated moderate to severe periodontitis, while 66% of healthy people had periodontitis.

Women form the core of the family and their well-being impacts the entire household, particularly children. Changes in oral health affect women differently than men for instance for instance, despite having better oral hygiene maintenance women suffer more tooth loss than men. [11]

The difference in response has been attributed to hormonal differences e.g. puberty is associated with a major increase in the secretions of the sex steroids that modify oral flora. There is a higher incidence of black-pigmented Bacteroides and the increased prevalence of certain bacterial species such as Prevotella intermedia and Capnocytophaga species. Both estradiol and progesterone have been shown to selectively accumulated by P. intermedia as a substitute for vitamin K, and thus postulated to be acting as a growth factor for this microorganism. Capnocytophaga have been shown to correlate with an increased bleeding tendency leading to puberty gingivitis. Changes in tooth mobility, gingival swelling etc has been reported.[12,13]

Diabetes mellitus is a metabolic disorder characterized by hyperglycaemia due to the defective secretion or activity of insulin. Women are additionally susceptible to development of gestational diabetes. Untreated periodontal diseases could increase blood sugar levels, leading to poor glycaemic control and a subsequent higher risk of the complications occurring.[5] It is proposed that induced pro-inflammatory mediators produced during periodontal disease mediate insulin resistance and reduces insulin action. Non-surgical periodontal treatment such as scaling and root planning leads to elimination of pathogenic species and thereby controlling inflammatory reaction of the body, restoring insulin sensitivity in poorly controlled diabetics. [8]

Preterm low-birth weight (PLBW) was defined by the 29th World Health assembly in 1976, as a birth weight of less than 2500 grams with a gestational age of less than 37 weeks. Low birth weight can be a result of this short gestational period and/or retarded intrauterine growth. PT/LBW is associated with high risk for mortality in the first year of life, and with risk of several diseases in later life. The prevalence of preterm birth varies from 6% to 15% of all deliveries, depending on the population studied, and the prevalence has risen in recent years. It is known that various risk factors, such as older (greater than 34 years) and younger (less than 17 years)

maternal age, smoking and etc contribute to this adverse pregnancy outcome. An important contributory factor in PT/LBW is the effect LPS (lipopolysaccharide) present in bacterial cell wall which, can activate the macrophages and other cells to synthesize and secrete a wide spectrum of molecules, including cytokines IL-1ß, TNF-α, IL-6 and PGE2 and cross over the placental barrier, causing the physiological levels of PGE2 and TNF-α in the amniotic fluid to increase and induce preterm labour. Case control studies showed that preterm deliveries were 7.5-fold more common in women with severe periodontal disease than in those with good periodontal health. [2,14,15]

During pregnancy, the corpus luteum continues to produce oestrogen and progesterone causing pregnancy gingivitis, characterized by erythema, oedema, pain, hyperplasia, increased bleeding and increased tooth mobility. Authors claim that increased bleeding maybe associated with a high concentration of P. intermedia. The anterior region of the mouth is more commonly affected. Changes in pregnancy usually begin during the second month and the severity of the symptoms increases through the eight month, after which there is an abrupt decrease related to a concomitant reduction in sex steroid hormone secretion. [13]

Another feature of pregnancy noted in the oral cavity is increased incidence of pyogenic granulomas during pregnancy (prevalence of 0.2 to 9.6 per cent). This 'pregnancy tumour' appears most commonly during the second or the third month of pregnancy. [9] Gingiva is the most common site involved followed by tongue, lips, buccal mucosa and the palate. The pregnancy tumour develops as a result of an exaggerated inflammatory response to local irritations, then enlarges rapidly and bleeds easily, and becomes hyperplastic and nodular. Progesterone has been shown to down regulate IL-6 production by human gingival fibroblasts. This down-regulation can affect the development of localized inflammation, and gingiva becomes less efficient at resisting the inflammatory challenges produced by bacteria. [2]

With the onset of menopause, oestrogen levels decline rapidly, which can lead to osteoporosis. The rate of bone loss in postmenopausal women predicts risk of tooth loss—for every 1%-per-year decrease in whole-body bone mineral density, the risk of tooth loss increases more than four times. A study reported that women with severe osteoporosis were three times more likely than healthy, age-matched controls to be edentulous. Oestrogen replacement therapy was observed to improve bone density in postmenopausal women and was associated with significantly less gingival inflammation, lower plaque scores, and less loss of attachment. A study with postmenopausal women showed that the risk of tooth loss was significantly lower amongst postmenopausal hormone users, it was postulated that the anti-inflammatory effects of oestrogen, could protect against tooth loss.[16]

Bisphosphonates, the most commonly prescribed therapy for osteoporosis, inhibit systemic bone resorption and reduce the incidence of fractures. These have been associated with osteonecrosis of the jaw .This is a rare disorder characterized by exposure and loss of bone in the maxillofacial complex that is resistant or refractory to conventional therapy.[17] To prevent this possible complication, the association of oral and maxillofacial surgeons recommended a thorough oral examination before treatment with an intravenous bisphosphonate, and that "any unsalvageable teeth should be removed, all invasive dental procedures should be completed, and optimal periodontal health should be achieved."

They also proposed that "discontinuation of oral bisphosphonate for a period of 3 months prior to and 3 months after elective invasive dental surgery may lower the risk." [18]

Estrogen, in the oral contraceptives causes a variation in the coagulation and fibrinolytic factors in women leading to a greater incidence of clot lysis. Women on oral contraceptives experience a twofold-increase in the incidence of localized osteitis following extraction of mandibular third molars It has also been reported that there may be a spotty melanotic pigmentation of the skin with the use of oral contraceptives.[19]

The role of smoking as a risk factor for tooth loss due to periodontal disease and dental caries was assessed in postmenopausal women in a recent study, indicating a high degree of correlation between the two. [20]

The impact of dental caries on the general population is well established with pain leading to loss in efficacy to perform daily activities. In pregnancy, particularly women experience increased incidence of caries. This is believed to be due to prolonged lowering of intra-oral pH due to vomiting and reflux. [21]

Recent reports have explored the transmission of dental caries from mother to infant and its role in promoting early childhood caries. The term Maternally derived streptococcus mutans disease (MDSMD) was coined to describe the same. The genotype of Cariogenic Streptococcus mutans from mother and those which appear in the child have reported to be the same verifying that disease may spread from mother to child.[22,23,24]

In addition, oral diseases have been linked with 'modern epidemics' such as atherosclerosis, hypertension and are believed to be capable enhancing the risk and degree of target organ damage.[25,26]

Oral infections have also been associated with exacerbation of respiratory tract infections such as COPD and dysfunctions like Asthma due to the potential of periodontium to host respiratory pathogens and its propensity to induce systemic inflammation. [27,28,29]

In the past greater, emphasis was placed on the impact of various diseases such as immune disorders, diabetes on oral health. [8] Oral manifestation of various systemic diseases and infections e.g. measles, rubella have been discussed in literature in great depth. Recently several studies have highlighted the impact of oral disease on an individuals' overall well-being. It can be summarised that oral and systemic health are closely interlinked and the negligence of one could adversely impact the other. The proper maintenance of oral hygiene may allow better control of systemic diseases.

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