
The Effect of Oral Contraceptives on the Oral Health

In A Group of Egyptian Females

A comparative study

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بسم الله الرحمن الرحيم
قالوا سبحانك لا علم لنا إلا ما علمتنا إنك
أنت العليم الحكيم

صدق الله العظيم

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This work is dedicated:

*To my deeply beloved father and mother, for their support,
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To my sisters, brothers and the soul of my uncle Athmad.

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LIST OF ABBREVIATION

- **CAST:** Caries Assessment Spectrum and Treatment.
- **CFU:** Colony Forming Unit.
- **DMFS I:** Decayed Missed Filled Surface Index.
- **DMFT I:** Decayed Missed Filled Teeth Index.
- **et al:** et alia (and others).
- **FDASU- REC:** Faculty of Dentistry Ain Shams University - Research Ethics Committee.
- **FSH:** Follicle Stimulating Hormone.
- **GI:** Gingival Index.
- **ICDAS:** International Caries Detection and Assessment System.
- **LH:** Luteinizing Hormone.
- **PI:** Plaque Index.
- **P. intermedia:** Prevotella intermedia.
- **pm:** post meridiem.
- **std:** standard.
- **WHO:** World Health Organization.

INTRODUCTION

Oral health, as a state, does not occur in isolation but is deeply-rooted in the wider framework of general health. It both affects and is affected by the general health of the individual, and in the case of females, this relationship is, highly pronounced due to the role played by the steroid sex hormones in the life cycle of the female.

It is well established that variation in the endogenous reproductive hormone levels during periods such as puberty, pregnancy and menopause makes a notable decline in the level of oral health of the female. This decline in the oral health status of the females extends to include, not only the general systemic and psychological well-being of the female, but also the whole community population especially during the early childhood period.¹

Hormonal contraceptives including their content of estrogen and progesterone have been a focus of research since their introduction in the last century with some reports claiming that unwanted side effects are associated with their use.²

Most of the reported oral side effects concentrate on gingival and periodontal inflammation. Some studies also report the occurring of changes in oral microbiota, localized osteitis, alterations in salivary flow rate, changes in salivary components and gingival melanosis in oral tissues. Other studies show that most of these side effects are associated with the high dose formulations. These high dose formulations have been changed dramatically since 1976 resulting in low dose brands.³

The different results and conclusions that are encountered in different studies, concerning the effect of hormonal contraceptives on the oral health, prompted this current study to further elaborate on previous investigations conducted. The intention of this work is to estimate the risks associated with the use of hormonal contraceptives, by comparing female hormonal contraceptive users with female nonusers.

REVIEW OF LITERATURE

Oral Health

World Health Organization (WHO) defines health as “a complete state of physical, mental and social well-being and not merely the absence of disease and infirmity”. It also defines oral health as “a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual’s capacity in biting, chewing, smiling, speaking, and psycho-social well-being”. According to this definition, oral health is more than intact teeth and a good-looking smile. Consequently the core elements of oral health can be stated as:

- Disease and conditions which also includes pain and discomfort;
- Physiological function and the capability to perform actions that includes the ability to speak, smile, chew, and swallow;
- Psycho-social function and the capacity to speak, smile, and interact in social and work circumstances without feeling uncomfortable or embarrassed.⁴

It is noteworthy that this definition not only moves dentistry from exclusively treating disease, it also creates awareness of the different dimensions of oral health, and it emphasizes that oral health does not occur in isolation but it is lodged solidly in the wider framework of general health. When acting according to this renewed view of oral health, the goal of dentistry will be to secure a functional, pain free, aesthetically and socially acceptable dentition for the life span of people, taking into account not only the prevention of ailments of the oral cavity, but also the aspects of the individual’s life which can affect the oral health.⁵

The extended meaning of oral health does take into consideration the importance of alleviation of oral afflictions as a first step, and because dental caries and periodontal disease are the most commonly confronted ones on a global scope, focusing on them in most ongoing research is quite anticipated.⁴

Dental caries is caused by the interplay between the tooth surface, the bacterial dental plaque and the carbohydrates from food, in which the bacteria metabolize the carbohydrates and produce acids, which over time decay tooth surface. These three factors associated with dental caries are modifiable, i.e., refined carbohydrate intake can be reduced, the tooth surface can be reinforced by appropriate fluoride application and the dental plaque can be controlled by regular meticulous oral hygiene measures. It has been implied that if dental plaque is removed from the teeth surface within twelve hours of its deposition, that tooth surface dissolution from exposure to acids of fermentable carbohydrates will be reversed within 10 minutes due to the remineralizing properties of the human saliva. However, if the dental plaque is not removed within twelve hours, it takes the saliva an exceedingly long time to remineralize the tooth surface, and the cariogenic bacteria has a better opportunity of causing damage; for that reason, it is recommended that people brush their teeth at least two times daily. Treatment of dental decay is inevitable to restore the tooth function, and if left untreated dental decay can lead to extensive destruction of the tooth structure, pain, and infection, the latter can result in abscess formation or septicemia.^{6, 7}

Periodontal disease starts as a chronic inflammation of the gingiva, which is widely spread, and for the majority of individuals completely reversible. When the chronic inflammation proceed to periodontitis, it destroys tooth-supporting tissues including bony structures which leads rapidly to tooth loss.⁸ Some specific bacteria are connected to the cause but there are other important risk factors that include tobacco use, unhealthy diet, genetic factors, stress and excessive alcohol consumption⁹ Periodontal disease may also be associated with systemic afflictions such

as diabetes, cardiovascular and respiratory diseases and adverse effects of pregnancy.¹⁰ Periodontal disease largely goes unnoticed by affected individuals until it reaches an advanced irreversible stage, and as in all chronic diseases, effective lifelong self-care in association with appropriate professional care, is crucial to preventing disease progression and tooth loss.^{11,12}

Oral Health Evaluation

How an individual estimates his or her oral health can be subjected to some moderating factors such as age, culture, income, experience, expectations, and adaptability, but the objective assessment of oral health is considered as a critical feature of dental activities and practice. There are a number of standardized tests, known as indices, used to measure oral health of the individuals and communities to give adequate comparable information. These indices fit themselves well to quantitative evaluation and electronic data processing.⁴

Bulman (1986) suggested three major areas for evaluation of oral health: dental, periodontal, and prosthetic to describe the total effect of the disease processes in the oral cavity. Some of the commonly used indices for assessing an individual's dental health are the Decayed Missed Filled Teeth Index (DMFTI), Decayed Missed Filled Surface Index (DMFSI), Caries Assessment Spectrum and Treatment (CAST), and International Caries Detection and Assessment System (ICDAS). Other indices are dedicated to measure other aspects such as Plaque Index (PI) and Oral Hygiene Index for dental plaque, Gingival Index (GI) and Papillary Marginal Index for gingival inflammation, Periodontal Index for periodontal diseases; in addition to others which measure enamel defects of dental fluorosis; and others for malocclusion assessment.¹³

Measuring salivary flow rate also helps in determining oral health status considering the critical role that saliva plays in the maintenance of oral health. A variety of conditions are associated with the decline in the salivary gland function, some of them are increasing in dental caries,

periodontal disease, mucositis, angular cheilitis and altered taste.^{14,15} Conversely, systemic diseases, medications, and diet are known to cause disturbances in the salivary secretion and composition.^{16, 17}

Importance of Maintaining Oral Health in Females

Maintaining good oral health is important to being a healthy individual and it plays a role in an individual's longevity and happiness. Apparently, there are certain portions of the community who are at a higher risk of developing poor oral health, and using dentistry, not only to treat already existing conditions, but also to adopt a primarily preventative measures can greatly improve oral health of the whole community. In a similar manner to the other aspects of human health, oral health differs between males and females. The origin of the differences may be related to hormones that influence the female's reproductive life, and when focusing on oral health and its importance, the female has special circumstances that are discussed in the following points;¹⁸

- Inferior oral health of the female not only negatively affects the general health and quality of life of the female herself, but it affects her descendants during fetal and early childhood life. Inadequate nutrition of the pregnant female during this early stage of life, influenced by incapability to masticate, or persisting pain due to oral diseases, or the partial or complete loss of teeth, or due to any other systemic reason, leads to defective enamel of the fetus, which in turn is more susceptible to decay. Poor nutrition in other circumstances leads to developmental birth defects such as orofacial clefts. As a consequence, pregnant females are recommended to focus on maintaining appropriate oral health, as well as eating healthy nutritious foods that are rich in calcium, phosphorus and vitamins necessary for proper fetal development.¹⁹
- Since mothers can transmit cariogenic bacteria to young children and potentially fetuses¹⁹, it is important for the female to establish good oral health through a system of adequate oral hygiene measures together with a limitation in cariogenic food consumption. Furthermore, it has been