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Effects of *Camellia sinensis* (Green Tea) on Oral Health in Suburbs of Lahore Pakistan: An Empirical Study

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ABSTRACT

Introduction: Before the development of the pharmaceutical industry, herbal products were used for curing various conditions. **Objectives:** The main objective of the study is to find the effects of *Camellia Sinensis* (Green tea) on oral health in the Suburbs of Lahore Pakistan. **Material and methods:** This cross-sectional study was conducted in Bakhtawar Amin Medical and Dental College from 2020 to 2021. The data was collected from 200 participants to find their oral health after using green tea. The age range for this study was 18 to 50 years male and female who used green tea on regular basis. Written consent was taken from all of them. The sample size was calculated by the WHO calculator. **Results:** In the present study, the mean age range was 32.65±10.87 years. Therefore, the socioeconomic status was considered to be homogenous. Male are higher in number than females. Knowledge of the participants regarding oral health is described in table-2. Females scored more favorably in knowledge and behaviors concerning dental health particularly a significant difference (P <0.05) in brushing habits was observed between the two genders. Twenty-four (06%) participants mentioned that they used miswak, as believed it to be the best oral care from the religious point of view. **Conclusion:** It is concluded that there is an explicit association between the consumption of green tea and oral health. It is also evident that green tea products have been used for preventing and treating several oral and periodontal diseases.

INTRODUCTION

Before the development of the pharmaceutical industry, herbal products were used for curing various conditions. The concept of using natural and herbal products is very old. Humans have used these products for curing various diseases and become popular accordingly. In terms of oral care, the most commonly used herbal product is "*Miswak"* that become popular in several communities as an effective, cheap and efficient way of maintaining oral hygiene. Similarly, the beneficial effects of using various types of tea leaves have been a common topic of discussion in the general public and professionals [1]. According to Chinese legend, tea has a known history of over 4000 years ago which was discovered accidentally by an emperor, while according to other sources the Chinese have been drinking tea since 3000 B.C., and over millions of acres are devoted to its cultivation [2].

Green tea (botanical name of the tea plant is *Camellia Sinensis*) belonging to the family *Theaceae* has been explored in recent years for its beneficial effects on oral health. It can be available as a shrub or evergreen tree. Its leaves may vary from exstipulate, lanceolate to obovate up to 30 cm long, 2–5 cm broad, pubescent, sometimes becoming glabrous, serrate, acute, or acuminate [3]. Drinking green tea is a common habit of people all over the world for about 4000 years. Green tea is obtained from the leaf of a tree in Southeast Asia, called *Camellia sinensis*. Many varieties of green tea are produced in different countries, depending on the growing conditions, harvesting time, and processing [4]. Green tea contains various health-promoting bioactive compounds which have been used for many centuries. It is known as a functional food that has more positive health effects than only its nutritional effect. It has anti-oxidant, anti-inflammatory, antimicrobial, and anti-mutagenic properties. It contains a variety of enzymes, amino acids, carbohydrates, lipids, sterols, related compounds, dietary minerals, and phytochemicals such as polyphenols, flavanols, and caffeine. The most important compounds of green tea are polyphenols [5]. Polyphenols exist in many plants such as fruits, vegetables, teas, and cocoa. Green tea compounds, especially polyphenols impart many health benefits like antioxidant, anti-inflammatory, hypoglycemic, and hypolipidemic properties, depression or hypertension, and other biological properties; which can be related to tea's abilities on metal chelating, free radical scavenging, and antioxidant activity [6].

OBJECTIVES

The main objective of the study is to find the effects of *Camellia Sinensis* (Green tea) on oral health in the Suburbs of Lahore Pakistan.

MATERIAL AND METHODS

This cross-sectional study was conducted in Bakhtawar Amin Medical and Dental College from 2020 to 2021. The data was collected from 200 participants to find their oral health after using green tea. The age range for this study was 18 to 50 years male and female who used green tea on regular basis. Written consent was taken from all of them. The sample size was calculated by the WHO calculator. The designed questionnaire contained closed-ended questions and some were multiple-choice items with alternative statements. The questions asked were about demographic characteristics like age, sex, class, family income and habits like cigarette smoking and chewing tobacco, and duration of use of green tea. The participants were then subjected to questions like oral self-care, utilization of professional dental services, most recent dental visit and its reason, and finally knowledge of oral health. The questionnaire was pretested for validity and respondent understanding of the questions. The dental volunteers were given training and then they asked the questions verbally from the participants in their mother language (Urdu) and filled the questionnaire to assess the outcome of the study.

STATISTICAL ANALYSIS

The data was entered through a trained computer operator and imported into a statistical package for social sciences (SPSS) version 17 for statistical analysis. Frequency distribution tables were produced with percentages.

RESULTS

In the present study, the mean age range was 32.65±10.87 years. Therefore, the socioeconomic status was considered to be homogenous. Male are higher in number than females. Knowledge of the participants regarding oral health is described in table-2. Females scored more favorably in knowledge and behaviors concerning dental health particularly a significant difference ($P < 0.05$) in brushing habits was observed between the two genders. Twenty-four (06%) participants mentioned that they used miswak, as believed it to be the best oral care from the religious point

of view. While 27.5 % were not cleaning their teeth every day. The Interdentally cleaning habit was observed only in 03% of cases. Females were observed to consume more sweets, snacks, and soft drinks as compared to males (table 2, figure 1).

Table No. 1: Oral Health Knowledge of the Respondents (10-18 Years)

Knowledge	**Frequency (%)**
Daily brushing frequency decreases the problem	
Yes	45.76
No	19.56
Do not know	33.56
The high content of green tea increases the problem	
Yes	60.76
No	7.0
Don't Know	32.25
Effect of green tea on oral health	
Yes	33.45
No	16.78
Do not know	2.21
Oral problems	
Consult a physician	21.5
Consult a dentist	34.5
Consult a Hakim	5.5
Not care	34.56

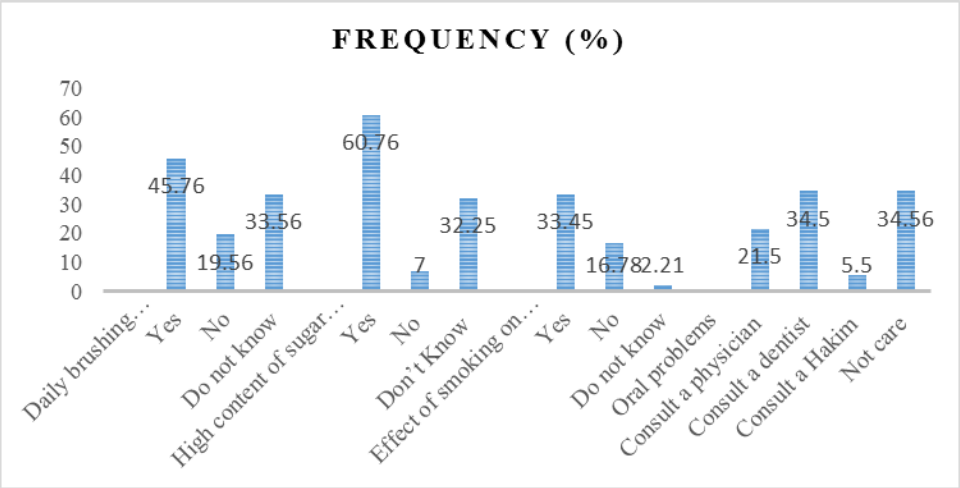

Figure No. 1: Shows the Oral Health Knowledge of Respondents

Out of the total participants, 191 were brushing and 96 were not. Significantly more females reported brushing their teeth. The habit of daily brushing was more prevalent in the young age group when compared to age 45–50 years but the difference was not significant statistically.

Table No. 2: Relationship between Demographic Variables and Tooth Brushing

SOCIO-DEMOGRAPHIC VARIABLES	FREQUENCY (%)	BRUSHING DAILY (*N* = 191) (%)	*P* VALUE*
GENDER			
MALE	176(61.3)	101(57.4)	0.001
FEMALE	111(38.7)	90(81.1)	
AGE			
18-35	105(36.6)	71(67.6)	0.771
35-50	182(63.4)	120(65.9)	
USING TOOTH BRUSH			
YES	251(87.5)	187(74.5)	<0.001
NO	36(12.5)	4(11.1)	

***Estimated using Chi-Squared test.**

DISCUSSION

Daily consumption of green tea has been associated with a lower risk of cancer, cardiovascular disease, diabetes, hyperlipidemia, and inflammatory bowel disease (IBD). EGCG compound in green tea is effective in weight loss by increasing metabolism. It has also other health effects on the skin, joints, and livers. Dental enamel is comprised of hydroxyapatite crystals. The solubility of hydroxyapatite rises with the decrease in pH which is harmful to the tooth enamel [7]. The EGCG extract from green tea causes a reduction in acid production and maintains pH by inhibiting the enzyme lactate dehydrogenase which is responsible for producing lactic acid from pyruvate [8]. Preventing the adhesion of bacteria to the glycoprotein layer is an additional mechanism explaining the anticariogenicity. A study has concluded that rinsing the mouth for 1 week with green tea mouthwash significantly reduces the salivary levels of *Streptococcus mutans* and *Lactobacillus* [9]. Reports have proved that green tea decreases the susceptibility of dental caries in both humans and animals [10].

CONCLUSION

It is concluded that there is an explicit association between the consumption of green tea and oral health. It is also evident that green tea products have been used for preventing and treating several oral and periodontal diseases. In a world scenario of antibiotic resistance and a growing number of side effects of such agents as chlorhexidine, which is not suitable for chronic disease management, the development of new, more patient- and eco-friendly agents, should be encouraged.

REFERENCES

1. Cabrera C, Giménez R, López MC (2003). Determination of tea components with antioxidant activity. J. Agric. Food Chem., 51(15): 4427-4435.
2. Hirasawa M, Takada K, Makimura M, Otake S (2002). Improvement of periodontal status by green tea catechin using a local delivery system: A clinical pilot study. J. Periodontal Res., 37: 433-438
3. Liao S, Kao YH, Hiipakka RA (2001). Green tea: biochemical and biological basis for health benefits. Vitam. Horm., 62: 1-94.
4. Khurshid, Z., Zafar, M. S., Zohaib, S., Najeeb, S., & Naseem, M. (2016). Green Tea (*Camellia Sinensis*): Chemistry and Oral Health. *The open dentistry journal*, *10*, 166–173. https://doi.org/10.2174/1874210601610010166.
5. Nadeem M, Datoo F, Bugti AA, Ayaz A, Mahfooz M. *Effects of black tea and green tea on periodontal health status among dental students at pakistan.* 2014.

6. Wu C., Wei G., Wilson M. Tea as a functional food for oral health. Food constituents and oral health. In: Wilson M., editor. *Food constituents and oral health: Epigallocatechin gallate Suppresses Cariogenic Viru-Current status and future prospects.* Florida, U.S.A.: CRC Press LLC; 2009. pp. 396–417.
7. Zafar M.S. Effects of surface pre-reacted glass particles on fluoride release of dental restorative materials. *World Appl Sci J.* 2013;28(4):457–462.
8. Javed F., Al-Rasheed A., Almas K., Romanos G.E., Al-Hezaimi K. Effect of cigarette smoking on the clinical outcomes of periodontal surgical procedures. *Am. J. Med. Sci.* 2012;343(1):78–84. doi: 10.1097/MAJ.0b013e318228283b.
9. Hirao K., Yumoto H., Nakanishi T., Mukai K., Takahashi K., Takegawa D., Matsuo T. Tea catechins reduce inflammatory reactions *via* mitogen-activated protein kinase pathways in toll-like receptor 2 ligand-stimulated dental pulp cells. *Life Sci.* 2010;86(17-18):654–660. doi: 10.1016/j.lfs.2010.02.017.
10. Beretta G., Furlanetto S., Regazzoni L., Zarrella M., Facino R.M. Quenching of α,β-unsaturated aldehydes by green tea polyphenols: HPLC-ESI-MS/MS studies. *J. Pharm. Biomed. Anal.* 2008;48(3):606–611. doi: 10.1016/j.jpba.2008.05.036.