Effect of Tea on Gingivitis: A Community-based Study

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Abstract Pharmacological values of tea have been found by medical researchers in many countries. Catechin compounds found in tea impart several health benefits including mitigating dental ailments. However, whether dento-clinical properties of catechins are camouflage of additive like milk or not has remained unexplored. A survey-based study involving community people suffering from gum disease (gingivitis) has been carried out to understand whether hot water extract of tea (known as brew) without milk has any relevance in reducing gingivitis. The survey reveals a strong negative linear correlation ($r = -0.807^{**}$) between drinking tea without milk and reduction of gingivitis. The results also reveal that frequency of gingivitis amongst people who drink tea with milk is more ($r = 0.696^{*}$) as compared to the people who drink tea without milk. Tea made from *Tinelli 17/1/54* cultivar of *Camelia sinensis* L. O. Kunte var, *Assamica* has been used in the study as this cultivar is ubiquitous in tea growing areas and can produce different categories of black tea – strong CTC tea, mild flavored orthodox tea and milder green tea.

Keywords Black tea; Catechin; Gingivitis; Tea brew

Introduction Dental problem in India continues to be a significant issue. The issue is significant because of socio-economical status and lifestyle of Indian population. Withal, slapdash care of teeth compounds dental related ailments in India. Generally preventive dental treatment is not considered to be a primary health care issue amongst common populace. In most cases dental treatment receives secondary importance, in some cases it remains even a tertiary issue. Owing to social taboo and mental stigma, people do not consider dental problem as the most essential health-related issue. Unlike in developed nations, it is hardly experienced in India that people do undertake dental care at the right time; they visit dentist once the dental ailment assumes serous gravity. It is like fighting with the “consequences” rather than finding the “causes” of dental problems. It is a universally recognized notion that dental diseases *e.g.* plaque, gingivitis, crooked teeth, deformed facelift due to malaligned maxilla and mandible, bad breath etc inflict not only a plethora of health problem, but also creates an emotional pressure on human being. Amongst all dental diseases gingivitis is the most common one; it is a serious problem in the world population. People of all ages suffer from this disease. Symptoms of gingivitis include bad breath and bleeding gums when teeth are brushed. At times the gums become red and swollen. In absence of treatment at its early stage, patient suffers from receding gums. Advanced stage of gingivitis includes loss of tooth even.

Tea has been found to have many health benefits. History as well as today in regions without access to safe drinking water, the boiling of water to make tea (*call it brewing*) has been effective in reducing water borne diseases by destructing pathogen microorganisms and to control dental diseases (*en.wikipedia.org/wiki/Health_effects_of_tea*). Tea (*Camelia sinensis*) of *Theacea* family contains a series of catechins *viz.* epicatechin, epicatechin gallate, and epigallocatechin (*Ganguly, 1993; Har, 1993; Ishigami and Har, 1993*). These catechins have been found by many researchers around the world to wean away dental diseases in economically affordable, socially acceptable and culturally adaptable way (*Kempler et al., 1977;*....)
Onishi et al., 1981; Yu et al. 1992; Tadashi and Hara, 1993; Ooshima et al., 1994; Soukoulis and Hirsch, 2004; Moezizadeh, 2013). The caries inhibitory effects of extract from tea (Black, Oolong, Green and White tea) have been studied both in vitro and in vivo. But the exact mechanism by which tea prevents dental caries is yet to be fully explored. Common habit of making tea in India is to boil water and mixing it with tea to make brew, and addition of different additives to brew e.g. milk, ginger, cardamom, lemon juice, sugar etc.

Based on available information on the health benefits of beverage made out of tea and with a view to understand the role of tea extract on prevention of gingivitis, a survey work has been done amongst some dental patients of three districts of West Bengal (Burdwan, Purulia and Bankura). No pre-set experimental treatment has been imposed in the study; the fundamentals of the study were based on Fuzzy logic as appended below:

- Whether tea is good or bad
- Whether tea with or without milk is good or bad
- To find out whether any correlation exits between tea drinking habit and the frequency of gingivitis amongst community patients
- Finally, an attempt was made to delve into the fact whether or not addition of milk reduces dento-clinical properties of catechins

Tea made from a particular variety (Tinali 17/1/54) is the Prima Donna in this study as this variety can produce a wide range of black teas and can adapt to any agro ecological conditions. There are about 214 known cultivars available in different tea gardens of Assam and West Bengal states of India. Apart from these known varieties, there are myriads of tea varieties found in tea gardens which are not yet taxonomically designated. Out of all these varieties, Tinali 17/1/54 has several positive features viz. (1) it can adapt to any agro ecological condition – right from mean sea level to up to 7500 feet above mean sea level, (2) it can fairly produce green leaf throughout the year, (3) it can produce strong liquored tea, flavored tea, and green tea (4) it exhibits resilience to vicissitudes of weather condition and more importantly (5) it is a very good field blender i.e. it can be blended with green leaf harvested from other tea varieties. Owing to its versatile nature, enquiries about its availability are received even from African tea growing counties.

1 Materials and Methods

The dental patients coming from Bankura, Burdwan and Purulia districts of West Bengal to the outdoor department of Burdwan Dental College & Hospital were first categorized on the basis of who were suffering from gingivitis. The ones suffering from gingivitis were clubbed in a single group. Thereafter, the patients suffering from gingivitis and drinking tea were sub categorized. Span of the study was 278 days. Process for categorization of patients is given below:

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**DENTAL PATIENTS COMING TO OUTDOOR DEPARTMENT**

**PATIENTS WHO SUFFER FROM GINGIVITIS**

**PATIENTS SUFFERING FROM GINGIVITIS BUT DRINK TEA**

**PATIENTS SUFFERING FROM GINGIVITIS AND DRINKING TEA WITH MILK**

**PATIENTS SUFFERING FROM GINGIVITIS AND DRINKING TEA WITHOUT MILK**
A data sheet on a simple questionnaire was prepared to note down their habits of drinking tea. The questions asked to them were: (a) Whether a patient drinks tea or not? (b) How many times a day a patient drinks tea? (c) Do they use milk with tea? These data collected from the information provided by the patients were then collated and analyzed statistically to make inference whether any correlation exists between tea drinking habit and reducing effects of gingivitis. An attempt was also made to know whether adding milk with tea brew had any deterring effect on gingivitis. The sample questionnaire has been presented in Table 1. Three separate questionnaires were prepared for three different districts.

### Table 1 Questionnaire on tea drinking habit

<table>
<thead>
<tr>
<th>District</th>
<th>Patient profile (Name/Age/Sex)</th>
<th>Average daily intake of tea</th>
<th>Nature of tea drinking habit</th>
<th>Gingivitis patients who drink tea with milk</th>
<th>Gingivitis patients who drink tea without milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bankura</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purulia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burdwan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2 Results and Discussion

The number of patients surveyed from three districts viz, Bankura, Burdwan and Purulia was 2658, 2665 and 2732, respectively. Numbers and percentages of all the patients who drink tea with or without milk in the three districts are given in Table 2.

### Table 2 Tea drinking habit in three districts of west bengal

<table>
<thead>
<tr>
<th>District</th>
<th>Number of patients surveyed</th>
<th>Number of patients who drink tea with milk</th>
<th>Number of patients who drink tea without milk</th>
<th>Percentage of total patients drinking tea with milk</th>
<th>Percentage of total patients drinking tea without milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bankura</td>
<td>2658</td>
<td>1462</td>
<td>1196</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>Burdwan</td>
<td>2665</td>
<td>1546</td>
<td>1119</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Purulia</td>
<td>2732</td>
<td>1475</td>
<td>1257</td>
<td>54</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>8055</td>
<td>4483</td>
<td>3572</td>
<td>56</td>
<td>44</td>
</tr>
</tbody>
</table>

It has been found that prevalence of gingivitis among the people who drink tea with milk is high. A positive linear correlation exists ($r=0.696^*$) between patients who drink tea with milk and occurrence of gingivitis. This could be due to the residual acid action of milk added to tea. In contrast to this finding, frequency distribution of this disease is significantly low in case of patients who drink tea without milk. This is evident by the occurrence of a very strong negative linear correlation ($r=0.807^{**}$). This corroborates the findings by Tadashi and Hara (1993) and Soukoulis and Hirsch (2004). This survey work bears an index that tea extract imparts role in reducing gingivitis when it is consumed without additive like milk. This finding portends a notion that complex compounds present in milk possibly suppress beneficial effects of catechins in so far as reduction of gingivitis is concerned (Figure 1). The figures show that percent reduction of gingivitis is ~ 73% in case of patients who have taken 4-5 cups of tea daily without milk whereas the percent reduction of the disease in case of patients who have taken tea with milk is ~ 27% only (Table 3).

### 3 Conclusion

Scattered information makes us reasonable to say that tea has some amount of role in reducing gingivitis Present findings are based on a survey targeting a few community people. However, further structured and clinical studies are required before coming to meaningful conclusion on positive effects of catechins in reducing gingivitis. The study also throws a thin spectrum of light that dento-clinical properties of catechins in reducing gingivitis are possibly silenced once milk is added to tea. This requires proper scientific and clinical validation.
Figure 1 Effect of milk-added tea in reducing gingivitis

Table 3 Reduction of gingivitis by tea (with or without milk)

<table>
<thead>
<tr>
<th>District</th>
<th>Reduction of gingivitis by tea with milk</th>
<th>Reduction of gingivitis by tea without milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bankura</td>
<td>351 (24%)</td>
<td>909 (76%)</td>
</tr>
<tr>
<td>Burdwan</td>
<td>417 (27%)</td>
<td>817 (73%)</td>
</tr>
<tr>
<td>Purulia</td>
<td>457 (31%)</td>
<td>918 (73%)</td>
</tr>
<tr>
<td>Average</td>
<td>1225 (27%)</td>
<td>2593 (73%)</td>
</tr>
</tbody>
</table>

References

https://doi.org/10.1177/00220345770560011701
PMid:264871
https://doi.org/10.5834/jdh.31.158
PMid:6948004
https://doi.org/10.1159/000261636
PMid:8033186
Research Association, India, 107-108
PMid:15293818