



TASTE PERCEPTION A PREDICTOR OF DENTAL CARIES: A RESEARCH BASED ANALYSIS

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ABSTRACT This is an original research paper based on clinical findings in pediatric population of 6-14 years age group from a regular dental OPD over 1-1.5 years duration. 6-n-propylthiouracil or PROP an anti-thyroid medication has been used to discriminate non-tasters from medium tasters, and supertasters. Sugar consumption has always been co related to dental caries. It's a new horizon when we can identify early in life the ones more prone on basis of their taste perception. **Materials and methods:** 122 Candidates were selected randomly from a dental OPD in the age group of 6-14 years and their taste perception and dental caries experience were documented after taking parents written consent. **Results:** Caries experience of supertasters was found to be much less compared to non-tasters and tasters with mean DMFT of 0.48, 1.45 and 1.38 respectively. The result was statistically highly significant with a p value of 0.0034. Mean deft was found to be 4.4, 2.2 and 0.75 among non-tasters, tasters and supertasters respectively with $p < 0.0001$ which is statistically highly significant. **Conclusion:** Clinical applications of findings from this study indicate that taste perception can be used as an early indicator of dental caries.

KEYWORDS :

INTRODUCTION

Dental Caries is known to be a multifactorial disease and there are still some less known facts which can be explored further. Taste perception is one such arena. Scientists have discovered that the bitterness of saturated 6-n-propylthiouracil (PROP) is heritable and follows an incompletely dominant pattern. 6-n-propylthiouracil or PROP an anti-thyroid medication can be used to discriminate non-tasters from medium tasters, and supertasters (Fox, 1931)¹. The general Labelled Magnitude Scale by Green has repeatedly been proven to be a valid instrument to classify individuals as tasters or nontasters (Lucchina 1998)² thus, had been used to classify subjects in this study. Sweet, sour, salt, and bitter substances are all more intense to supertasters than to non-tasters. Sucrose is sweeter to tasters than to non-tasters. A significant relationship of sugar frequency to dental caries was found by Anderson CA et al (2009)³.

AIM

To analyse the possibility of early detection of caries prone children based upon taste perception, so that appropriate steps for prevention of dental caries can be taken.

SPECIFIC OBJECTIVES OF THE STUDY

1. To differentiate super-tasters, tasters and non-tasters using 6-n-propylthiouracil impregnated strips or PROP strips among 6-14 year children (divided in groups, Group I: 6-8years, II: 9-11years, III: 12-14 years)
2. To correlate dental caries to taste perception

GENERAL OBJECTIVES OF THE STUDY

1. To determine possibility of early detection of Dental caries in children to be able to take early precautionary measures.
2. To study the role of taste perception in dental caries

MATERIALS AND METHODS:

A. DEFINITION OF POPULATION:

6-14 years old children who had reported to the Out Patient Department and could communicate.

B. INCLUSION AND EXCLUSION CRITERIA:

1. Inclusion Criteria:

- Patients of 6-14 years of age.
- Patients whose parents had given their consent
- Patients who could effectively communicate and passed the two-tier test post training on use of the gLMS scale

2. Exclusion criteria:

- Patients with systemic diseases.
- Patients who had taken antibiotics within a month of beginning the study.
- Patients who were using mouthwashes or other medications which might alter / diminish taste perception.
- Subjects with obvious flu/colds/middle ear infections, or oral problems such as recent teeth extractions which could have

damaged the chorda tympani that innervates fungiform papillae and possibly caused loss of papillae, were excluded.

- Patients who gave unsatisfactory or ambiguous responses after training.

C. SAMPLE SIZE :

122 samples were studied. (54 Males, 68 Females)

D. SAMPLE DESIGN:

Patients were selected randomly from the outdoor. Their caries statuses were checked by clinical methods and DMFT (as per WHO guidelines) were recorded first to avoid investigator bias. PROP test was then conducted on all patients after getting written consent from their guardians.

E. CONTROL REQUIRED OR NOT:

Not required

I. METHOD OF DATA COLLECTION:

Patients were selected randomly from outpatient department as per inclusion and exclusion criteria, irrespective of gender. The procedures were explained to the guardians of the children and their written consents were obtained. All procedures were conducted between 10 am to 11:30 am each day to exclude possibilities of diurnal or circadian variations. In the beginning each individual was trained on using the gLMS scale and only those who passed the two tier test were included in the study.

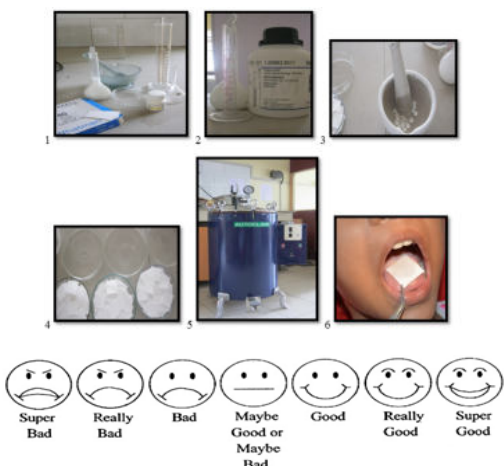
All prospective subjects were first briefed upon the test procedure. Then they were given a plain piece of filter paper to acquaint them with the taste/ perception/ sensation of a plain filter paper. This was done to exclude possibility of any false positive or false negative responses. Then the participants were differentiated into super-tasters, medium tasters and non-tasters using 6-n-propylthiouracil (PROP) strips, prepared by the investigator in the Pharmaceutical laboratory)

PREPARATION OF THE PROP STRIPS

The pure sample of 6-n-propylthiouracil was obtained from the pharmaceuticals in the form of PTU tablets 50mg, (MacLeods Chemicals, Mumbai, India) and the PROP strips were prepared in the Department of Pharmacy, Guru Nanak Institute of Pharmaceutical Science and Technology, Kolkata, India. Whatman filter paper (40 Ashless Circles, 125mm, Whatman International Ltd Maldstone, England) were cut into 2 × 2 cm strips and sterilized in an autoclave at 121°C for 15 min. PTU tablets were crushed in a sterile mortar and pestle, ethyl alcohol was used to dissolve 10 mg/mL of PROP in a beaker. Per 5 ml of solution taken in a beaker, 10 sterilized Whatman filter paper strips were then soaked for 1-hour for the complete absorption of the drug. Those strips with approximately 1.6 mg of the drug impregnated each were selected for the study purpose.

Images Key: 1,2,3. Armamentarium for preparation of PROP strips. 4. PROP strips. 5. Autoclave 6. Clinical Testing of taste perception 7. 7-

point hedonic gLMS scale of taste perception for children



DECAYED, MISSING, FILLED CARIES INDEX (DMF CARIES INDEX)

DMF index was introduced by Klein, Palmer, and Knutson in their studies of dental caries in Hagerstown, Maryland in 1938.

The DMF, an irreversible index, is applied to permanent teeth. D for decayed teeth; M, teeth missing due to caries; and F, filled.

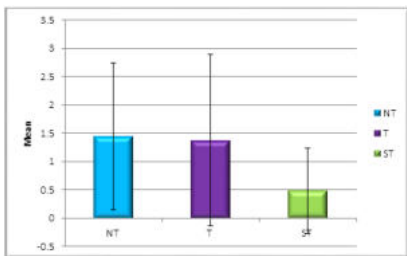
RESULTS:

Table 1: Distribution of MEAN DMFT in three taster groups

Group	Number	Mean	SD	Minimum	Maximum	Median	p-value
NT	29	1.4483	1.2980	0.0000	4.0000	2.0000	0.0034
T	53	1.3774	1.5220	0.0000	6.0000	1.0000	
ST	33	.4848	.7550	0.0000	2.0000	0.0000	

p-value: 0.0034, Statistically significant

Difference of mean DMFT in three taster groups was statistically significant. Super-tasters had significantly lower mean DMFT compared to Non-tasters and tasters.



Graphical Representation 1

DISCUSSION

Dental caries is the single most common chronic disease according to the first ever United States Surgeon General's report on oral health in America published in (May 2000)⁴. Dental caries is five times more common than asthma and seven times more common than hay fever.

The study sample consisted of 122 subjects all whom qualified for the study and belonged to the age group of 6-14 years. There were 54 males and 68 females.

In this study 30.3% were found to be super-tasters and 23.8% were non-tasters. This finding was similar to that reported by BRENT P-J LIN (2003)⁵ who reported that Supertasters accounted for approximately one-third of the sample population, 31% of 150 subjects to be specific. But the finding again varied from that reported by BARTOSHUK et al., (1994)⁶ where Supertasters accounted for about 25% of the population. Though, their study was conducted on Caucasians, whereas this present study was conducted upon Indian children Caries experience of supertasters was found to be much less compared to non-tasters and tasters with mean DMFT of 0.48, 1.45 and

1.38 respectively. The result was statistically highly significant with a p value of 0.0034.

1. Among the 122 healthy school children aged 6-14 years, supertasters accounted for approximately one-third (30.3%) of the sample population; medium tasters accounted for approximately half (45.9%); while only 23.8% of the sample population were nontasters.

2. Majority of the nontasters were sweet likers and preferred strong tasting food products, while majority of the supertasters were sweet dislikers and preferred weak tastes.

3. The caries experience was significantly higher in nontasters than in supertaster children.

CONCLUSION

Clinical applications of findings from this study can be placidly focused on the fact that 6-n-propylthiouracil (PROP strip) sensitivity can be used as a diagnostic tool for early detection of dental caries risk.

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