ORIGINAL ARTICLE

# TASTE BLINDNESS AMONG MEDICAL STUDENTS

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**Introduction:** Modern research has reported variations in taste that results in food and beverage consumption. This is true that 15–25% of population is born with taste blindness to phenylthiocarbamide (PTC). This study aimed to see frequency of taste-blindness among the medical students of DG Khan Medical College, Pakistan. **Methods:** A cross-sectional study was conducted in which simple random sampling technique was applied. Medical students of DG Khan Medical College participated. Out of 381 students, 151 consented (78 female, 73 male) were evaluated for taste blindness. Age range was 17–23 years. A drop of 0.5% PTC solution was placed on the tongue and participants were asked to state the taste perceived. **Results:** Among males 13.70% and 14.10% females were taste blind to PTC respectively. On regional basis, 13.50% students of upper Punjab and 11.96% students of South Punjab were non-taster to PTC. **Conclusion:** So, 12.58% population of Punjab is taste blind.

**Keywords:** Taste blindness, non-taster, food preferences, Punjab, Pakistan

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## INTRODUCTION

Taste blindness is a genetic disorder in which insensitivity to bitterness and strong tastes, which was first time discovered by a chemist AF Fox in 1931. Eating habits and food preferences are variable both within and between populations. These variations are cultural and learned, because dietary habits are determined by genes and culture. Bitter taste sensitivity is regulated by genetic variations and it affects food preferences.[1]

It is current understanding that a relation exists between body mass index and taste threshold for different tastes.[2] Obesity may result from some disturbance of taste threshold for salt and sweet tastes.[3] Food preferences may be transmitted by human tradition and culture. Wrangham *et al* proposed that evolutionary increase in brain size was linked to the discovery of cooking.[4] Genes, ecology and culture interactions lead to determination of food preferences by people. Gene variations are associated with 25 genes and 8 pseudogenes on 3 chromosomes. American population is 25% taste blind, while 50% and 25% of population comprise of medium taster and super taster respectively.[5]

Taste blindness may have advantages and also risk factor for development of certain diseases. Non taster are less sensitive to bitter, e.g., flavonoids. Non-tasters prefer more fruits and vegetables and very spicy foods.[6] Non-tasters are known to be heavy smokers as they experience less irritation by smoke and lesser taste sensation to nicotine.[7] Some researchers reported genetic analysis of variable sensitivity and transduction mechanism for sweat, bitter, and umami taste.[8–9] In African population, an association existed between taste blindness and malaria, which suggested that eating more bitter plants would confer protection against malaria. Highly spicy food, a cultural tradition that reduces microbial contaminant of food.[10] Non-tasters had higher BMI than super tasters. Non-tasters have lower sensitivity to sugar, fat content of food, which resulted in high caloric intake and high BMI of non-tasters.[11]

The objective of this study was to evaluate frequency of taste-blindness among the medical students of DG Khan Medical College, DG Khan, Pakistan.

## SUBJECTS AND METHODS

This study was conducted in Physiology Department, DG Khan Medical College, Dera Ghazi Khan, Pakistan during April to June 2014. Out of 381 students 151 students consented to participate in study. Their ages were between 18 and 23 years. Among 151 participants, 73 were boys and 78 were girls. Subjects were divided into two groups, upper Punjab (n=59) and Southern Punjab (n=92). Personal information of the participants was recorded on a proforma. Subjects having history of head trauma or neurological problems, upper respiratory infection and enteric fever were excluded from the study.

A drop of 0.5% solution of Phenyl Thiocarbamide (PTC) was used to test the taste sensation. Subjects were asked to tell the taste perceived and then the subjects spitted out and washed mouth with water 2–3 times. Study population was classified into two groups, i.e., taster and non-taster. Taster and non-taster responses were recorded on the proforma.

## RESULTS

In this study out of 381 students in DG Khan Medical College, Dera Ghazi Khan, 151 students participated. Total participants from 1st year were (n=70); 2nd year were (n=29); 3rd year were (n=37); 4th year were (n=15); respectively. Study participants were 51.66% female and 48.34% were males. This study results showed that 12.58% of medical students were taste blind to phenylthiocarbamide (PTC) (Table-1). Majority (60.93%) of study participants were residents of

Southern Punjab; out of them 11.96% were taste blind; while 39.07% of study participants were for upper Punjab and 13.50% of them were found Taste blind (Table-2).

**Table-1: Sex-wise distribution of taster and non-taster groups**

| Class (n) | Male | Female | Taster | Non Taster |
|---|---|---|---|---|
| 1st year (70) | 24 | 46 | 62 | 8 |
| 2nd year (29) | 23 | 6 | 25 | 4 |
| 3rd year (37) | 22 | 15 | 31 | 6 |
| 4th year (15) | 4 | 11 | 14 | 1 |
| Total (151) | 73 | 78 | 132 | 19 |
| Percentage | 48.34 | 51.66 | 87.42 | 12.58 |

**Table-2: Non-taster distribution between upper and southern Punjab**

| | Upper Punjab | | Southern Punjab | |
|---|---|---|---|---|
| Class | Subjects | Non Taster | Subjects | Non Taster |
| 1st year | 29 | 3 | 41 | 5 |
| 2nd year | 16 | - | 13 | 4 |
| 3rd year | 9 | 4 | 28 | 2 |
| 4th year | 5 | 1 | 10 | 0 |
| Total | 59 | 8 | 92 | 11 |
| Percentage | 39.07 | 13.50 | 60.93 | 11.96 |

## DISCUSSION

Taste blindness is an inherited trait of human population. Some researchers worked on its genetic evolution and epidemiology to correlate with dietary preferences and implications on human health.[12–13] Wise *et al* reported that absolute taste detection and quality recognition showed individual differences.[14] Our eating habits and food preferences resulted mismatch food environments, which leads to obesity, and non insulin dependent Diabetes.[1] Supper tasters have increased swallowing apnea duration than non-tasters, which is potentially protecting against aspiration so mechanistic change is helpful.[15] In our study 12.5% population was non-taster to PTC, which is in accordance with Iqbal *et al*.[16] Among medical students in Punjab province, prevalence of non-taster to PTC is less than American population.[17]

Our study reported that 11.96% from South Punjab and 13.54% from upper Punjab were taste-blind. Recent advances in genetics are yielding new information regarding taste sensation, discovery of TAS2R family of taste receptor gene, TAS1R taste receptor gene. Some studies on inherited variation on sensitivity to taste PTC resulted to increase our understanding about bitter taste.[18–19] Spices intake has additional benefits, like antioxidants, so reduce oxidative tissue damage.[20]

Gomez reported turmeric consumption might lead to low prevalence of Alzheimer discase.[21] Taste Perception, taste threshold in obesity are complex and might be different among children, adults women and men, that need to be investigated.[22] Currently little is known about relation between salt and umami, sour tastes and body weight. These areas need further studies.

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