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# Taste Preferences and General Health Status with special emphasis on *Madhura Rasa*: A Survey Study

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## ABSTRACT

**Study background:** *Madhura Rasa* is the one mentioned first among six *Rasas* of *Ayurveda*, with life supporting attributes mentioned to it. It is even highlighted as *Ajanma Satmya*. The same *Rasa* that is essential for *Dhatu Vriddi*, has description of adversities it can cause when overused.

**Objectives:** The present survey study attempts to find a nexus between general health conditions and taste preferences of individuals, with special emphasis on *Madhura Rasa* (Sweet taste).

**Materials and methods:** A self-validated survey was designed using Google forms, with 11 questions that included particulars of participants and their taste preferences and health conditions. The Google form was circulated in the month of November 2021 and responses were accepted for 24 hours. The data thus collected was analyzed and expressed in terms of percentage.

**Results and discussion:** From the data collected through online survey, it was observed that majority of the respondents had a liking for sweet taste and the trend of liking sweet taste showed a variation as mentioned in previous research works in relation to age, gender etc. There was a higher magnitude of occurrence of symptoms and disorders related to *Madhura Atisevana* in individuals who opted that they like sweet taste.

**Conclusion:** Although a variation in preference and liking for *Madhura Rasa* was seen among different age groups, gender and religion, Sweet taste remained the most liked and preferred taste among the volunteers of the survey. A relation between *Atiyoga Lakshana* development and liking for sweet taste could be elicited through the data obtained.

**Key Words** *Ayurveda, Madhura Rasa, Atisevana, Sweet Taste, Taste preference*

Received 22<sup>nd</sup> July 22 Accepted 23<sup>rd</sup> August 22 Published 10<sup>th</sup> September 2022

## INTRODUCTION

*Ayurveda* emphasizes on *Rasa panchaka* of a *Dravya*, be it *Ahara* or *Aushadha*, to analyze or describe its effect on human body. Of these, *Rasa* plays a major role as it is perceived through *Pratyaksha pramana* (by direct utility of sense organs)<sup>1</sup>. *Ayurveda* accepts six *Rasas*, based on

the conclusion of a brainstorming debate among seers that was held in the presence of *Acharya Punarvasu Athreya*. *Madhura* (sweet), *Amla* (Sour), *Lavana* (Salty), *Tikta* (Bitter), *Katu* (Spicy) and *Kashaya* (Astringent) were the *Rasas* upheld at this symposium as the only 6 *Rasas* present<sup>2</sup>. *Madhura Rasa*, from the six, is

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mentioned first and is regarded as the one that is 'Ajánma saatmya' <sup>3</sup>. An exhaustive description of the sequel of consuming each taste in terms of benefits and adversities can be found in classics of Ayurveda under the rubrics of *Guna-Karma* and *Atisevana Janya Vyadhi/Lakshana* <sup>4,5,6</sup>.

*Madhura rasa* is the one that brings about *Sarva Dhatu Vardhana, Bala, Ojovridhhi, Pushti* etc. that form the frame of essentials for a healthy body and mind. But the same, when over used can put one under the hardships of *Sthoulya, Medo vikara* etc. Incidence of obesity, intake of processed and refined food, sugars, fast foods, Junks, Hyperlipidemias, PCOS, Thyroid disorders are all becoming perennial in recent era, which is an alarm to health care system for finding means to protect the generations to come by preventing these.

The present survey study reported here, is one such attempt in finding a nexus between general health conditions and taste preferences of individuals, with special emphasis on *Madhura Rasa* (Sweet taste).

## MATERIALS AND METHODS

### Developing survey items

A self-validated questionnaire was developed with prime focus on liking *Madhura Rasa*, assessing taste preferences, general health condition and presence of symptoms of mentioned under *Atisevana* of *Madhura Rasa*. It was ensured that the questions were framed in English only using simple language, thereby facilitating to answer easily. A total of 11 questions comprising the survey are tabulated below. [Table 1].

**Table 1** Questionnaire with options

Question No.	Type of question	Question	Options
1	Mandatory	Age	• Open ended
2	Mandatory	Sex	• Male • Female • Others • Prefer not to say
3	Optional	Religion	• Open ended
4	Mandatory	Food habits	• Vegan • Vegetarian • Mixed ( Veg and Non Veg)
5	Mandatory	Height in cm / ft	• Open ended
6	Mandatory	Weight in Kg	• Open ended
7	Optional	BMI	• Open ended
8	Mandatory	Do you like sweet taste?	• Yes • No • Maybe
9	Mandatory	Please rank the following tastes based on your order of preference	• Multiple choice grid – 1 <sup>st</sup> to 6 <sup>th</sup> preference to be given for Sweet, Sour, Salty, Spicy, Bitter and Astringent.
10	Mandatory	Are you diagnosed of any of the following conditions?	• Diabetes mellitus • Hypothyroidism • Obesity • PCOS/PCOD • None

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11	Mandatory	Do you have any of the following symptoms?	<ul style="list-style-type: none"> <li>• Lack of appetite</li> <li>• Excessive sleep</li> <li>• Lethargy</li> <li>• Sweet taste in mouth</li> <li>• Dislike for food</li> <li>• None</li> </ul>
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The above table enlists the survey questions with the choices included for each.

**Conduction of the survey**

**Approval of the study**

Since the present study did not involve any intervention, an ethical clearance from Institutional ethics committee was not sought. The respondents were free to access the survey and answer it at their will. However, only those surveys where all the mandatory questions were answered could be submitted for consideration.

**Setting of the study**

The questionnaire was circulated as a Google form through platforms like WhatsApp, Instagram et cetera with access to general population who received the link, from 26<sup>th</sup> November 2021 and the responses were accepted for a period of 24 hours.

**METHOD OF DATA COLLECTION AND ANALYSIS**

The responses where volunteers had answered all mandatory questions were automatically considered by the software and responses were stored in google spread sheet that updated data

automatically after each response submission.

The spread sheet was downloaded after closure of the survey and the data was taken for analysis.

The analysis was carried out with the help of Microsoft Excel 2019. A descriptive analysis of responses followed by expression of data in the form of percentage (%) was done for all the items of the survey.

**RESULTS**

**Gender and age**

The survey received 133 responses in a span of 24 hours. Among the volunteers, 76.69% were female, 22.55% were male and 0.75% preferred not to say. The age of volunteers ranged from 16 to 64, with 63.9% of them aged between 21 and 30. The age group based distribution of participants is tabulated below in Table 2. The percentage of total volunteers belonging to each age group, percentage of total men, women and those who chose to not say are expressed in % with respect to each category's total participants.

**Table 2** Age group based distribution of participants

Age group	Total %	Male (in %)	Female (in %)	Prefer not to say (in %)
11-20	5.26	6.66	4.90	0
21-30	63.99	56.66	66.66	0
31-40	15.03	6.66	17.64	0
41-50	7.51	16.66	4.90	0
51-60	6.76	10	4.90	100
61-70	1.50	3.33	0.98	0

The above % are calculated with respect to total number of volunteers in total % column, with respect to total number of male female and prefer not to say volunteers respectively. (n=133)

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**Religion**

The religion of the participants was an optional question and 11.27% of them chose not to respond. Among the responses received, Hindu, Christian, Muslim, Humanity and Indian were the options seen with maximum being Hindu. The distribution into each of these religions has been represented in the pie chart below [Fig 1].

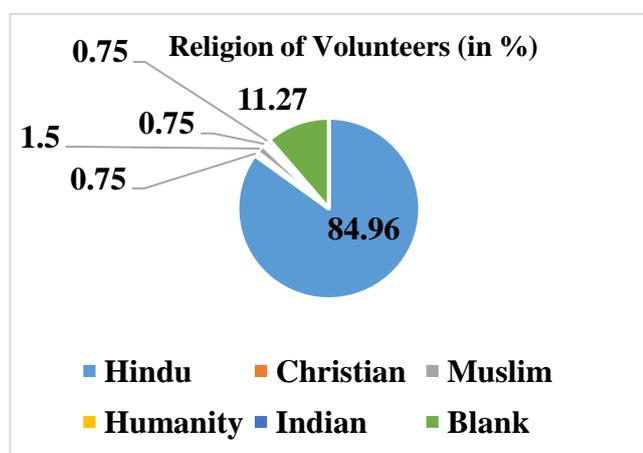


Figure 1 Pie chart representing the religion of volunteers of the survey (in %). (n=133)

**Food habits**

The food habits of the volunteers are represented in terms of % of those who chose the respective options in the pie chart below [Fig 2]. Maximum participants were vegetarians.

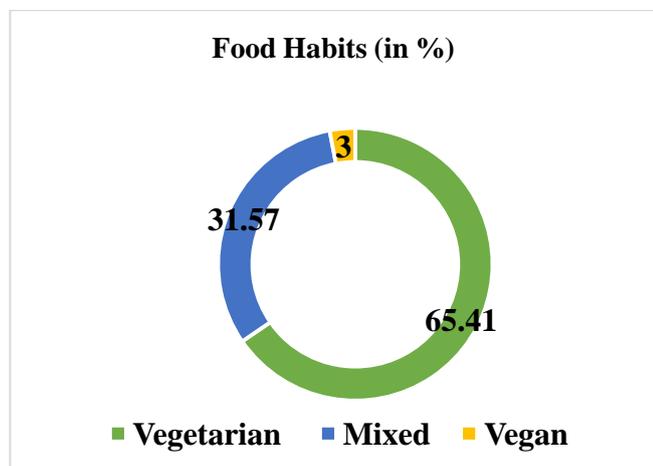


Figure 2 Pie chart representing the food habits of volunteers of the survey (in %). (n=133)

**Body Mass Index**

The BMI of volunteers was determined using their height and weight details collected and were grouped as Underweight [BMI < 18.5], Healthy weight [BMI: 18.5 – 24.9], Over weight [BMI: 25-29.9] and Obese [BMI >30]. The results are represented below in Fig 3 in terms of %.

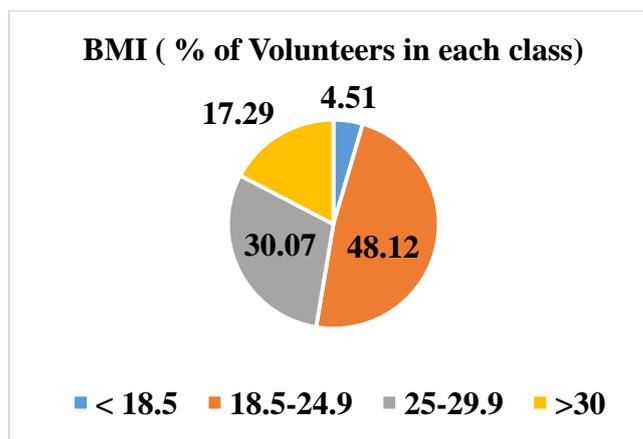


Figure 3 Graph representing % of volunteers in each class of BMI. (n=133)

**Linking sweet taste**

In response to the query about whether the volunteer likes sweet taste, 69.17% of them said they like sweet taste. A total of 13.53% respondents chose a No as answer while maybe was opted by 17.29%.

**Liking sweet taste and Age**

Liking of sweet taste with respect to age has been represented in the table below [Table 3].

Table 3 Liking of sweet taste with respect to age groups (in %)

Age	Yes	No	Maybe
11-20	57.14	28.57	14.28
21-30	63.52	15.29	21.17
31-40	85	5	10
41-50	80	10	10
51-60	77.77	11.11	11.11
61-70	100	0	0

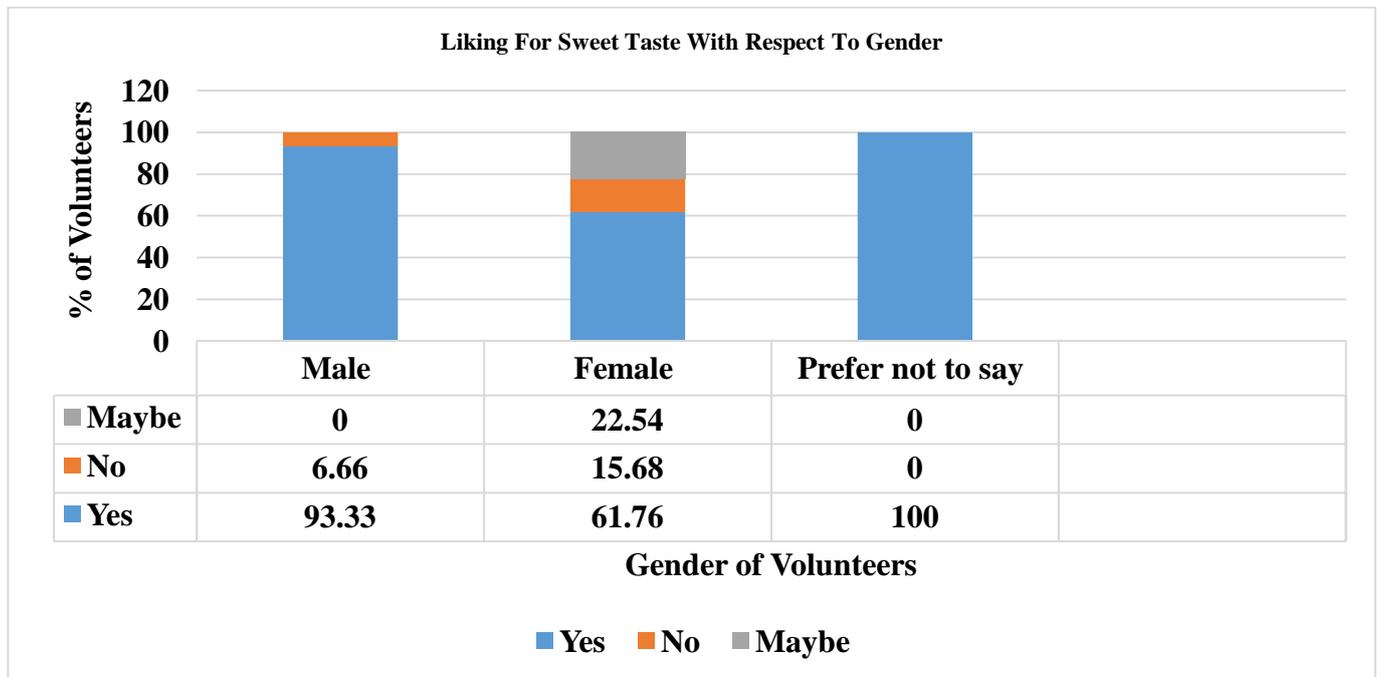
The above table represents the values in % calculated with the total number of volunteers in each class.( Ex. : if there are X number of

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volunteers in 11-20 age group and Y number of them have opted yes, then  $Y/X \times 100$  gives the percentage of respondents of that age group who have chosen yes as their answer).

**Liking for sweet taste and gender**

Liking for sweet taste with respect to gender was analyzed using the data obtained and the responses are plotted in the graph below [Fig 4].



**Figure 4** Liking for Sweet taste with respect to Gender (in %). 93.33% of Men, 61.76% women and 100% of those who preferred not to say, opted yes for whether they like sweet taste.

**Liking for sweet taste and food habit**

Liking for sweet taste in relation to food habits of volunteers has been represented below [Table 4]. It can be seen that 66.66% of vegetarians, 73.80% of those having mixed food habits and 75% of vegans who participated in the survey, like sweet taste.

**Table 4** Food habit and liking for sweet taste

Food habit/Liking for sweet taste	Yes	No	Maybe
Vegetarian	66.66 %	14.94%	18.39%
Mixed	73.80%	9.52%	16.66%
Vegan	75%	25%	0%

**Liking for sweet taste and gender**

The below table [Table 5] represents the % of respondents belong to each BMI class and their respective choices regarding liking of sweet taste

The table represents % distribution of volunteers of different food habits and their liking for sweet taste.

**Table 5** BMI and liking for sweet taste

BMI / Liking for sweet taste	Yes	No	Maybe
< 18.5	50%	33.33%	16.66%
18.5 – 24.9	64.06%	18.75%	17.18%
25 – 29.9	80%	10%	10%
>30	69.56%	0%	30.43%

The table represents the relation between BMI and choice of liking sweet taste. A decrease in percentage of those who don't like sweet taste can be seen as the BMI increases.

**Preferential ranking of sweet taste**

Responses related to preferential ranking of sweet taste had a descending % of preference from 1<sup>st</sup> to 6<sup>th</sup>. The percentages are shown in the table below.[Table 6]

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**Table 6** Preferential ranking of sweet taste

Preference	% of respondents who chose sweet
1 <sup>st</sup>	29.80
2 <sup>nd</sup>	27.81
3 <sup>rd</sup>	16.55
4 <sup>th</sup>	11.92
5 <sup>th</sup>	5.29
6 <sup>th</sup>	7.28

The above table represents preferential ranking of sweet taste by the survey volunteers.

### Data related to diagnosed conditions

For the query regarding the volunteer being diagnosed of the enlisted disorders [ see table : for question], 74.43% of them reported none of the conditions while 25.56 % respondents chose one or more conditions. Among those who reported to have been diagnosed with one or more condition, 70.58% of them had also reported that they like sweet taste, 26.47% of them opted they may like sweet taste while only 2.94% respondents reported that they do not like sweet taste.

### Data related to symptoms present

The survey included a question where symptoms were mentioned and volunteers were to choose if they have any of the symptoms irrespective of their diagnosed conditions addressed in the previous query. Here, 27% of respondents who had no known diagnosed conditions, had one or more symptoms.

A total of 31.57% volunteers had had one or more symptoms irrespective of diagnosed conditions. Among these volunteers, 59.52% had reported that they like sweet taste, 28.57% chose maybe they like sweet taste while only 11.90% disliked sweet taste.

## DISCUSSION

The survey was an attempt to screen the relation between taste preferences and general health status with special emphasis on *Madhura rasa*. An online survey was conducted using Google forms which were circulated far and wide among general population limiting any possible bias in data collection.

The survey questionnaire included basic details of participants like their age, gender, food habits etc. which were all framed to analyze any possible relationship between these criteria and health status in connection with taste preference.

*Madhura rasa* is mentioned as *Aajanma Saatmya*, something that is conducive to a person right from birth. When a trend for liking for sweet taste is observed in relation to age, liking for sugars/sweets was found to decline with age and more so in case of women. It can be noted that a similar observation was seen in the present study as well where more men opted that they like sweet taste than the number of women who chose so. This maybe physiological expression of the *Aagneya guna* of *Arthava* and *Soumya Guna* of *Shukra* affecting the liking and preference for *Madhura Rasa* which is *Soumya*.

Taste sensitivity with respect to sweet taste was noticed among vegans, vegetarians and non-vegetarians across different studies conducted previously<sup>7</sup>. A close link has been reported between sweetness sensitivity and tendency of adopting an omnivore diet in several species of experimental animals, which was in turn linked

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to TAR1Rs gene constrains<sup>8</sup>. In this study, very low number of participants with mixed diet opted a 'No' for liking of sweet taste. This can be a tendency of compensating the magnitude of spices included in Indian cuisine of non-vegetarian dishes and incorporating a balance among *Rasas* consumed and *Doshas*.

A trend of increased liking for sweet taste was observed among participants as the BMI range increased and none among the obese category chose that they do not like sweet taste. Similarly, dislike for sweet taste was inversely related to increase in BMI of participants. Sugar and Fat rich diet are attributed as causes leading to rise in obesity across different studies<sup>9,10</sup> irrespective of usage of non-nutritive sugars. A liking for sweet taste and over consumption of it leads to pathogenesis of obesity that goes on like a vicious cycle with involvement of cravings etc.

Although there are no direct references for religion and taste preference interrelation, a link between food habits and religion is widely published. Lactovegetarian diet, mostly seen among Hindus is said to be less spicy and more of *Satwik* nature than the religions with different food cultures that include spicy choices to a larger extent.<sup>11</sup> 69.17% of participants said that they like sweet taste. *Madhura rasa* being *Ajanma Saatmya* can be the reason behind such major liking. *Madhura rasa* karmas mentioned in classics include *Sarva Dhatu Vardhana*, *Balakara* etc. that are all essential for survival. Carbohydrates form a major part of the macronutrients consumed. End product of

digestion of all sources of food gets to glucose in order to meet the energy requirements and anabolic activity in the body. Thus *Madhura rasa* plays a major role in nutrition and growth justifying its title for being *Ajanma Saatmya*.

Preferential ranking for sweet taste saw a rise in preference for it in 1<sup>st</sup> choice compared to 6<sup>th</sup> and above. With maximum participants of the survey liking sweet taste, it only seems justified to see such a tendency with respect to preferential ranking.

With respect to the question regarding diagnosed disorders among respondents, the list included the conditions that are commonly seen in present day like Diabetes mellitus, PCOS, Obesity etc. which are linked to the lifestyle, food habits and consumption of sugars and non-nutritive sugars used as additives in various forms. These conditions are the ones comparable to those mentioned in *Madhura rasa Atisevana* context like *Sthoulya*, *Meha*, *Meda* and *Shleshma Vikaras* etc. among those who reported to have one or more condition diagnosed, 70.58% of them had opted to like sweet taste and only 2.94% of them did not like sweet taste. A liking and preference that could have led to excess craving and consumption of *Madhura Pradhana Dravyas* can logically explain the scenario.

When the symptoms mentioned in *Madhura rasa Atisevana* were questioned among participants, 31.57% of them reported one or more symptoms among whom only 11.90% disliked sweet taste. Here again, liking and usage of *Madhura rasa* in higher degree can be the root cause of developing

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symptoms such as lack of appetite (*Agnisaada*), excessive sleep (*Atinidra*), Lethargy (*Alasya*), Sweet taste in mouth (*Madhurasyata*), etc. as mentioned in classics<sup>4,12</sup>.

An overall analysis of each parameter questioned to the participants was done and conclusions were drawn.

## CONCLUSION

*Madhura Rasa*, being mentioned as *Ajanmasatmya* was found to be liked by most of the participants of the survey. *Madhura Rasa* is the one having *Sarva Dhatu Vardhana Karma, Balya*, etc. which may be attributed to carbohydrates that generally form major part of macronutrient intake. Percentage of men who liked sweet taste was higher than the percentage of women who liked sweet taste. It was noted that among those with BMI above 30, none of the participants disliked sweet taste, strongly suggesting a relation between weight and over indulgence in sweet taste.

Taste preference with respect to *Madhura Rasa* varies in relation to age, gender and religion but fairly remains the most liked and preferred taste among the six *Rasas*. An assuring relation can be discerned between development of *Atisevana Janya Vyadhi* and sweet taste preference among the participants of the survey. Similar survey in larger population can help elicit the relation with lucidity.

## Funding

The study was not funded by any funding agency in any form.

## Acknowledgement

All the faculty members and PG Scholars of Department of PG Studies in Dravyaguna, Sri Sri College of Ayurvedic Science and Research, Bengaluru are acknowledged for their help in circulating the Google form links of the survey through social media platforms.

## Conflict of Interest

None

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