Consequences of Madhurarasa Atiyoga: A Case–Control Study

Manisha Talekar, Deshmukh P Nareshrao, Govind Reddy

ABSTRACT

Introduction: According to classical Ayurvedic texts, balanced intake of madhurarasa in diet helps to maintain physiological health, but its excessive intake produces signs and symptoms, such as Sthoulya, Aalasya, Nidradhikya, Ananabhilasha Agnimandya, Anaha, Galaganda, Gandamala, Gala Shopha, and Asyamadhurya.

Aims and objectives: To establish the relationship between excessive use of madhurarasa and signs/symptoms produced by it.

Materials and methods: A case–control survey study was planned wherein totally 356 volunteers were interviewed personally. Subjects with particular symptoms were considered as a case, while healthy volunteers were considered as controls.

Results: Odds ratio for Sthoulya, Aalasya, Nidradhikya, Ananabhilasha Agnimandya, Anaha, Gala Shopha, and Asyamadhurya with 95% confidence interval (CI) was found to be 1.92 (1.17–3.1), 1.28 (0.68–2.45), 1.89 (1.03–3.47), 1.32 (0.70–2.47), 1.82 (1.13–2.96), 1.93 (1.09–3.44), 2 (1.16–3.45), and 1.93 (1.18–3.14) respectively.

Conclusion: From the above-obtained results, it is concluded that madhurarasa is a risk factor for Sthoulya, Nidradhikya, Aalasya, Anaha, Galaganda, and Asyamadhurya. The study supports the Ayurvedic classical claim regarding atiyoga of madhurarasa.

Keywords: Karya-karaṇa vada, Madhurarasa, Risk factor.


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Conflict of interest: None

INTRODUCTION

The Ayurvedic science of healing is woven around the concept of rasa or taste, which determines the influence of various foods on the human body. All foods are classified into six rasas, viz., madhura, amla, lavana, katu, tikta, and kashaya. A balanced diet includes a healthy combination of all rasa and harmonizes physical and emotional health. Dominance of a particular rasa in meals can result in imbalance of dosha.

Ayurveda searches for the causes of health as well as diseased conditions. Palatability is a significant factor for preference of food by an individual. Madhurarasa is one of the major organoleptic entities in foods of the present day, which always tempts the consumer to consume it immediately. Being guru, snigdha, and sheeta guna, madhurarasa has the ability to promote longevity and strengthen body tissues. Madhurarasa has the dominance of pithi and aap mahabhuta in its formation or composition. Many dietary articles containing madhurarasa include milk and milk products (butter, ghee, and cream), grains (especially rice, wheat, and barley), many legumes (beans and lentils), sweet fruits (bananas, mangos, dates, etc.), and certain cooked vegetables (carrots, sweet potatoes, and beets).

This rasa is formed by the dominance of pithi and aap mahabhuta, it shows their characteristics mainly in samyakayoga. Physiologically, madhurarasa performs following functions: Saptadhatuvardhana; Jeevana Ayushya; Shadindriyaprasadana; Balavarnyakara; Trishta-Dahaprashamana; Trachya; Keshya; Kanthya; Prinsana; Tarpana; Bruhava; Shhairyakara, Chhinkshatsandhanakara, Ghrita-Mukha-Kanthashthita-Jilvapralladana, and Murchhaprashamana Karma. Diseases are the mirror images of the excess or low quantities of food consumed by human beings. According to Karya Karana Vada, every cause has an effect. That is why even though madhurarasa possesses valuable properties, when used in excess in isolation, it causes vitiation of Kaptha that results in Sthoulya, Aalasya, Nidradhikya, Ananabhilasha Agnimandya, Anaha, Galaganda, Gandamala, Gala Shopha, and Asyamadhurya.

In this study, during history taking of the patient, it was observed that madhurarasa-dominant Ahara was being consumed in their diet. However, the relationship between excessive use of madhurarasatmaka Ahara...
and the disease conditions related to it has not been validated until date. Thus, a case–control survey study was conducted to trace the relationship between these two variables. Among signs/symptoms mentioned by the classics, symptoms, such as Sthoulya, Aalasya, Nidradhikya, Anannabhilasha, Agnimandya, Anaha, Galashopha, and Asyamadhurya were selected to justify the classical claims. Hence, participants who have particular symptoms were considered as a case for that symptom. To find out the cause and effect relationship between excessive use of madhurarasa and sign/symptoms produced by it and also to create an awareness in the current population regarding excessive use of madhurarasa, this study has been undertaken.

AIMS AND OBJECTIVES

To establish the relationship between excessive use of madhurarasarasatmaka ahara and signs/symptoms produced by it and also to create awareness in the current population regarding excessive use of madhurarasa.

MATERIALS AND METHODS

A population (of cases)-based case–control study was conducted in the residential area of Jaipur, Rajasthan (India).

Cases

The participants of either gender belonging to the age group of 15 to 60 years, who have symptoms of madhurarasa Atiyogya as mentioned in the classics, i.e., Sthoulya, Aalasya, Nidradhikya, Anannabhilasha, Agnimandya, Anaha, Galashopha, and Asyamadhurya, were considered as cases. Sthoulya was assessed with the help of the height–weight chart and all who were showing various Lakshana of Sthoulya mentioned in Charaka were considered as Sthula. Aalasya, Nidradhikya, Anaha (Aamaja), Anannabhilasha, Asyamadhurya, etc., were subjective criteria. Hence, the grades of 0 and 1 were used to observe these Lakshanas. Galashopha was assessed by Lakshana “Gale Utsedhamatram Galashundyadikam Na Tu Galaganda” as commented by Gangadhara in the Jalpakalpataru commentary. The pathological investigations, i.e., thyroid profile, ultrasonography of the neck, were done when needed to exclude the other causes for Galashopha. Agnimandya were assessed by Abhyavaharaaashakti and Jaranashakti.

Controls

The participants of either gender belonging to the age group of 15 to 60 years who were not suffering from the above symptoms, i.e., Sthoulya, Aalasya, Nidradhikya, Anannabhilasha, Agnimandya, Anaha, Galashopha, and Asyamadhurya were being compared with cases. To assemble a control series for particular cases series, the neighbor/colleague of these cases were interviewed.

Sampling Method

Convenience sampling method through which madhurarasa-exposed persons can be traced easily was applied for the study. Consumers at bakery product shops, restaurants, dairy house, fruit shops, and hostel students of the institution, who are more prone to exposure of madhurarasarasatmaka ahara, such as dairy products, corn, pasta, starchy vegetables, cream, wheat, rice, sweet potatoes, banana, dates, etc., were personally interviewed and divided into exposed and unexposed groups. Participants with excessive intake of madhurarasarasatmaka Ahara were considered as the exposed group and participants with normal intake were considered under unexposed group.

Preparation of Proforma

To gauge the excessive ingestion of madhurarasa, screening of the local population was done based on specially prepared questionnaires on the consumption of madhurarasarasatmaka Ahara routinely (Table 1). The questionnaire of survey proforma was open-ended and designed in both Rajasthani and English language. In the survey study, it was observed that the local population of Jaipur were frequently taking madhurarasarasatmaka Ahara, such as milk and dairy products, corn, pasta, starchy vegetables, cream, wheat, rice, sweet potatoes, banana, and dates in excessive quantities. The quantity of each sweet food item was recorded and categorized into normal intake and excessive intake, such as monitoring the intake of buffalo milk of more than 2 glasses/day for more than a month in the last 1 year was considered as excess intake of the sweet food. In madhurarasa Atiyog group (exposed group), those participants who consumed excess of the madhurarasarasatmaka Ahara ultimately were categorized as exposed group, while those who consumed sweet-tasting foods below this estimated level were categorized under unexposed group. Likewise, the quantification of madhurarasarasatmaka Ahara, viz., dairy products, corn, pasta, starchy vegetables, cream, wheat, rice, sweet potatoes, banana, and dates, was also done.

Statistical Analysis

For each symptom, i.e., Sthoulya, Aalasya, Nidradhikya, Anannabhilasha, Agnimandya, Anaha, Galashopha, and Asyamadhurya, data were presented in a 2 × 2 table. The OR was analyzed to estimate the relative risk of a symptom for the excessive use of madhurarasa; 95% CI was also analyzed to observe whether that data were statistically significant.
RESULTS

For this survey study, totally 356 participants were interviewed. Participants with excessive intake of madhurarasa were distributed with regard to age and gender (Table 2). According to the age group, OR with 95% CI were calculated and found to be 0.6732, 1.300, and 2.022 in young-, middle-, and old-aged participants respectively. This shows a positive association between madhurarasa Atiyoga and age. The values may be due to a decrease in the tolerability toward sweet-tasting foods as age progresses. No difference in the OR was observed between males and females, which indicates that there is no relationship between Atiyoga of madhurarasa and gender. Cases and controls of each symptom according to exposure of excess madhurarasa are shown in Table 3.

The OR of 1.92 for Sthoulya, which is calculated based on the number of exposed and unexposed subjects in the case and control groups, shows a strong association of Sthoulya with excess use of madhurarasa. The 95% CI of 1.17 to 3.1 indicates that the ORs of Sthoulya cases are significantly higher for madhurarasa Atiyoga because they do not contain the numeral 1.

The OR of 1.28 for Aalasya, calculated based on number of exposed and unexposed subjects, and CI (0.68–2.45) indicate that OR of Aalasya cases is not significantly higher for madhurarasa Atisevana group at 95% significance level because the CI contains numeral 1.

The OR for excessive Nidradhikya is 1.89 and this shows a strong association of excessive sleepiness with excess use of madhurarasa. The 95% CI of 1.03 to 3.47 indicates that the OR of Nidradhikya cases is significantly higher for madhurarasa Atiyoga than for the control group. The other symptoms such as Anannabhilasha, Agnimandya, Aanaha, Galashopha, and Aasyamadhurya also show strong associations with excessive intake of madhurarasa. The ORs and CIs for these symptoms indicate that they are significantly higher for the case groups compared to the control groups.

Table 1: Prepared primary proforma to evaluate excessive use of sweet taste

<table>
<thead>
<tr>
<th>Madhurarasa predominant food articles</th>
<th>Occasionally/seasonal routine</th>
<th>Duration</th>
<th>Ml/mg/no./week</th>
<th>Upper limit for normal consumption (minimum for 1 month)</th>
<th>Atiyoga yes/no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo’s milk</td>
<td></td>
<td></td>
<td>5 L/week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy products</td>
<td></td>
<td></td>
<td>3 L/week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cream</td>
<td></td>
<td></td>
<td>50 gm/week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td></td>
<td></td>
<td>16 pieces/week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food item of wheat and rice</td>
<td></td>
<td></td>
<td>10 kg/week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td></td>
<td></td>
<td>4 kg/week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banana</td>
<td></td>
<td></td>
<td>3 kg/week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dates</td>
<td></td>
<td></td>
<td>2 kg/week</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Distribution of cases and overuse of madhurarasa with respect to age and gender

<table>
<thead>
<tr>
<th>Age (years) and gender groups</th>
<th>Total subjects with overuse</th>
<th>Positive cases of overuse</th>
<th>Total subjects with balanced diet</th>
<th>Positive cases with balanced use</th>
<th>OR</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>15–30 (young)</td>
<td>88</td>
<td>60</td>
<td>122</td>
<td>56</td>
<td>0.6732</td>
<td>0.4267–1.062</td>
</tr>
<tr>
<td>31–45 (middle)</td>
<td>52</td>
<td>24</td>
<td>40</td>
<td>24</td>
<td>1.300</td>
<td>0.6454–2.618</td>
</tr>
<tr>
<td>46–60 (old)</td>
<td>39</td>
<td>18</td>
<td>15</td>
<td>14</td>
<td>2.022</td>
<td>0.8075–5.064</td>
</tr>
<tr>
<td>Male</td>
<td>68</td>
<td>44</td>
<td>110</td>
<td>50</td>
<td>0.7025</td>
<td>0.4237–1.165</td>
</tr>
<tr>
<td>Female</td>
<td>88</td>
<td>50</td>
<td>90</td>
<td>40</td>
<td>0.7822</td>
<td>0.4701–1.302</td>
</tr>
</tbody>
</table>

Table 3: Distribution of cases and controls for individual symptoms and estimates of OR

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Groups</th>
<th>Exposed</th>
<th>Unexposed</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sthoulya</td>
<td>Cases</td>
<td>44</td>
<td>41</td>
<td>1.925</td>
<td>1.17–3.1</td>
</tr>
<tr>
<td>Aalasya</td>
<td>Cases</td>
<td>20</td>
<td>24</td>
<td>1.28</td>
<td>0.68–2.45</td>
</tr>
<tr>
<td>Nidradhikya</td>
<td>Cases</td>
<td>25</td>
<td>24</td>
<td>1.89</td>
<td>1.031–3.472</td>
</tr>
<tr>
<td>Anannabhilasha</td>
<td>Cases</td>
<td>20</td>
<td>26</td>
<td>1.323</td>
<td>0.7064–2.476</td>
</tr>
<tr>
<td>Agnimandya</td>
<td>Cases</td>
<td>46</td>
<td>45</td>
<td>1.829</td>
<td>1.130–2.961</td>
</tr>
<tr>
<td>Aanaha</td>
<td>Cases</td>
<td>30</td>
<td>26</td>
<td>1.93</td>
<td>1.090–3.442</td>
</tr>
<tr>
<td>Galashopha</td>
<td>Cases</td>
<td>35</td>
<td>30</td>
<td>2.006</td>
<td>1.166–3.453</td>
</tr>
<tr>
<td>Aasyamadhurya</td>
<td>Cases</td>
<td>45</td>
<td>42</td>
<td>1.931</td>
<td>1.184–3.149</td>
</tr>
</tbody>
</table>
higher for madhurarasa Atiyoga because it does not contain numeral 1.

Odds ratio (1.32) regarding anorexia shows fair chances of Anambabhilasha in people consuming madhurarasa in excess. The CI (0.70–2.47) indicates that data are not significant up to the 0.05 level because CI contains 1.

The 1.82 OR and 1.13 to 2.96 CI at 0.05 level for Agnimandya indicate significant association between exorbitant intake of madhurarasa and Agnimandya.

Odds ratio (1.93) regarding Aanaha for the exposed group compared with unexposed group indicates moderate positive association between exposure and outcome. The CI (1.09–3.44) at 95% level also indicates that the result is statistically significant because it is beyond 1.

For Galashopha, there was a moderate association between intake of madhurarasa and Galashopha as at the 95% CI, the OR was found to be 2 and CI (1.16–3.45) does not contain 1.

The 1.93 OR and 1.18 to 3.14 CI at 0.05 level for Aasyamadhurya indicate significant association between excessive intake of madhurarasa and Aasyamadhurya.

**DISCUSSION**

In Ayurveda, Karana (cause) is defined as that which produces the Karya (effect). There is no effect without cause; both cause and effect are closely related. According to the concept of the disease formation, Nidana (cause) is the main culprit of many diseases. Ayurveda attaches greater importance to Nidanas and describes them in detail as causes of diseases. This is mainly intended so as to focus on the attention of the physician and layman also.

The theory of cause and effect relation with regard to madhurarasa Atiyoga and its repercussions has been proved to some extent here, which is clear from the statistical analysis. The association between Karana and Karya is assessed in this study. The physiological and pathological effects of Rasa (taste) are mentioned in Charaka Samhita and other Ayurvedic classical texts. This is a unique concept of Ayurveda. Classical texts also opine that the effect of a particular Rasa is indirectly the effect of a Draavya, which is the abode of that particular Rasa. So here, the effect of madhurarasa Atiyoga (excessive intake of sweet taste) should be understood as Atiyoga of madhurarasa Aahara (excessive intake of food articles having sweet taste).

In Ayurveda science, there is no quantifying method for assessment of Atiyoga of Rasa, but the term Atiyoga (excess intake) can be gauged in two ways, i.e., in high quantity and/or for longer duration. In this survey study, the concept of Atiyoga was considered as the higher dose for longer duration and then consumption of each sweet food item routinely used was measured. Many people were asked about the routinely consumed sweet item’s uptake pattern and after that the normal and excessive use of it was determined. Further to this, it was discussed with the faculty of the institute and then finalized.

Totally, 44 participants, who were revealed as obese, ingested madhurarasa Aahara, such as milk and dairy products, corn, pasta, cream, rice, banana, and dates regularly. It is no surprise that consuming too much of madhura Ahara can lead one to gain weight. Excess of sugar to the body not immediately required for energy can easily be converted to triglycerides, a type of fat that can then be stored around the waist as well as in the hips and thighs. Sugary beverages, such as soft drinks and fruit-flavored punches, are the worst offenders because the calories in the liquids do not influence satiety and can even lead to a person craving for more. With time, many studies have validated the association between sugar, especially in beverages, and obesity. Hence, it is suggested that madhurarasa is one of the main associates of obesity (Sthoulya).

In the case of Nidradhikya, Nidra is due to the dominance of Tamaguna, Shleshma, and Mana. Due to the aggravation of Kapha, Nidradhikya is present in which the person always feels sleepy. This is due to the aggravated Guru-Manda Gunas of Kapha. Madhurarasa, if consumed in excess, causes Atisvapna.

Regarding Agnimandya, madhurarasa is the Guru and Snigdha of all the tastes and its excessive use leads to vitiation of Agni, which is the root cause of every disease. Agni is responsible for biotransformation of different materials. So, vitiation of Jatharagni leads to vitiation of Dhatvagni and Bhutagni. This vitiated Jatharagni does not digest even the lightest of food substances, resulting in indigestion and Ama formation. This Ama formation is also responsible for Aanaha (Aamaja).

In Aamaja Aanaha, the digestion process slows down, making the stomach bloated. In Aasyamadhurya, madhurarasa coats the tongue as it is Pichchila. It is termed as Upalepa. Kapha has madhurarasa in Niramavastha. Thus, Atiyoga of it creates a constant feeling of madhurarasa in the mouth. Bodhaka Kapha is present in the mouth cavity, which is responsible for it. Galashopha shows a positive association between excessive use of madhurarasa and these symptoms. Guru-Manda-Sheeta Gunas of Kapha creates this Lakshana.

**CONCLUSION**

The present study revalidates the repercussions mentioned in Ayurveda classical literature regarding excessive use of madhurarasa, which might be a risk factor for Sthoulya, Agnimandya, Nidradhikya, Aanaha, Aasyamadhurya, and
Galashopha. A positive association between such types of symptoms and age shows a decrease in palatability of madhurarasa as age progresses. This study supports the Ayurvedic classical claim regarding the excessive use of madhurarasa and symptoms produced by it.

REFERENCES


हिंदी सारांश
मधुर रस अतिरिक्तता के परिणाम: एक केस-कंट्रोल अध्ययन

मनिशा तालेकर, रेणुमुख पी नरेशचार, आर गोविंद रेडी
शारीरिक आयुर्विज्ञानिक ग्रंथों के अनुसार, आहार में मधुर रस की संयुक्तता वाटा का सेवन शारीरिक स्वास्थ्य को बनाए रखने में मदद करता है, लेकिन इसके अलावा सेवन से स्वीत्य, आलस्य, निद्रात्य, अनन्मितायण, अभिमान, आहार, गलगम, गण्डमला, गलशरीफ और आर्समस्तुंच इलायरी लक्षण उत्पन्न होते हैं। इसी उदाहरण को लेकर मधुर आहार और उसके अलावा उपयोग से उत्पन्न लक्षणों के बीच संबंध स्थापित करने के लिए एक प्रयास किया गया। उसके लिए एक केस कंट्रोल संस्थागत अध्ययन किया गया था जिसमें कुल 356 इक्कुक प्रतिभागियों से व्यक्तिगत पुनरुत्थान से बातचीत की गई, जिनमें प्रश्न लक्षणों के साथ प्रतिभागियों को केस के रूप में, जबकि वस्तु श्रृंखला प्रतिभागियों को कंट्रोल के रूप में दिया गया था। मधुर रस का अल्पक्षण सेवन गाणे के लिए मधुर रस प्रयास आहार द्वारा जैसे हेली उत्पत्ति, मकर, पाला, रैरी लामिजिया, जेल, रेड, चावल, गिन्न आदिए, के लिए और खुद आदि की वाटा तथा आवृत्ति को नियंत्रित किया गया था। डाटा 2 × 2 तालिका में व्याख्यात किए गए थे और Odds ratio प्रतिपक्ष लक्षण के लिए निम्नलिखित गया। परिणाम में देखा गया कि स्वीत्य, आलस्य, निद्राएक्य, अनन्मितायण, अभिमान, आहार, गलशरीफ और आर्समस्तुंच इन लक्षणों के लिए Odds ratio 95% confidence interval के साथ क्रमशः 1.92 (1.17–3.1), 1.28 (0.68–2.45), 1.89 (1.03–3.47), 1.32 (0.70–2.47), 1.82 (1.13–2.96), 1.93 (1.09–3.44), 2 (1.16–3.45) और 1.93 (1.18–3.14) पाए गए। उपरोक्त प्रतिपक्ष परिणामों से यह निष्कर्ष निकाला गया है कि मधुर रस अतिरिक्तता रहने स्वीत्य, निद्राएक्य, अभिमान, आहार, गलशरीफ और आर्समस्तुंच इन लक्षणों के लिए एक जोड़क कारक है। प्रस्तुत अध्ययन मधुर रस अतिरिक्तता के बारे में आयुर्विज्ञानिक शारीरिक दायें का समन्वय करता है।