Knowledge and Awareness of Monosodium Glutamate (Ajinomoto Salt) among Students

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Authors’ contributions

This work was carried out in collaboration between both authors. Author SS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author DG managed the analyses of the study. Both authors read and approved the final manuscript.

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ABSTRACT

The aim of the study is to evaluate the knowledge and awareness of monosodium glutamate(MSG) (Ajinomoto salt) among dental students. A cross-sectional study was conducted among 100 dental undergraduate students in Chennai. A pre-structured questionnaire was used for the survey. The responses were obtained and the data were extracted and analyzed statistically for understanding about MSG among students as well as their attitudes toward MSG. 56% of participants were aware and 25% were not and the remaining 19% of participants were heard somewhat. We concluded that the level of awareness about the health hazards caused by the consumption of products containing Monosodium Glutamate (MSG) as a food additive was not adequate.

Keywords: Monosodium glutamate; Ajinomoto salt; health; Chinese salt; awareness.

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1. INTRODUCTION

Globalization has affected all aspects of human life and has also influenced the eating habits of human beings. Processed food is gradually replacing healthy and nutritious food [1]. Various food preservative agents are available and they mostly include salts [2]. Monosodium Glutamate is a sodium salt of Glutamic acid, which is the most abundant naturally occurring on essential amino acid readily available in the market and is mentioned in ingredient lists of eatables as Ajinomoto, Chinese salt, Sodium glutamate and is mainly used as a taste enhancer [3].

Glutamic acid operates as a neurotransmitter in our brain. It is an excitatory neurotransmitter, which stimulates nerve cells to relay its signal [4]. Individuals guarantee that MSG prompts intertemporal glutamate in the mind and exorbitant incitement of nerve cells.

The flavor of MSG (which differs from the usual four basic tastes of sweet, sour, salty, and bitter) is referred to in Malaysia as “umami” or described as savory and broth-like. Although MSG has been used in food since it was first produced in 1909, recent concerns have developed over the safety of consuming large amounts of this compound over a prolonged period of time as it can lead to many health-related issues [5]. Food and Drug Administration (FDA) and the Federation of American Societies for Experimental Biology (FASEB), has given recommendations that if the food contains less than 0.5 g of MSG, it will not produce adverse effects on health. Many types of research on animals have led to the conclusion that MSG can be the cause of adverse health effects affecting every organ and system of the human body ranging from obesity to brain damage [6].

Animal studies indicate that monosodium glutamate (MSG) can induce hypothalamic lesions and leptin resistance, possibly influencing energy balance, leading to overweight. He K et al examined the association between MSG intake and overweight in humans. They conducted a cross-sectional study involving 752 healthy Chinese (48.7% women), aged 40–59 years, randomly sampled from three rural villages in the north and south China. The prevalence of overweight was significantly higher in MSG users than nonusers. Their research provided data that MSG intake may be associated with an increased risk of overweight independent of physical activity and total energy intake in humans [7].

The term “Chinese restaurant syndrome” (CRS) was first used more than four decades ago. At the onset of symptoms, patients experience complaints such as a burning sensation at the back of the neck, blistering on both arms and occasionally on the anterior thorax, general weakness, fatigue, and palpitations. These symptoms occur 20 minutes after the consumption of a meal rich in MSG [8].

Beneficial effects glutamate has also been reported. Glutamate is the major excitatory neurotransmitter in the central nervous system. Beyond this function, glutamate also plays a key role in intermediary metabolism in all organs and tissues, linking carbohydrate and amino acid metabolism via the tricarboxylic acid cycle. Under both physiological and pathological conditions, we have recently found that the ability of glutamate to fuel cell metabolism selectively relies on the activity of two main transporters: the sodium–calcium exchanger (NCX) and the sodium-dependent excitatory amino-acid transporters (EAATs). In ischemic settings, when glutamate is administered at the onset of the reoxygenation phase, the coordinate activity of EAAT and NCX allows glutamate to improve cell viability by stimulating ATP production [9].

It is expected that the output of this study will provide baseline data on the level of understanding and attitude of students toward the use of MSG. Previously our department has published extensive research on various aspects of prosthetic dentistry [10–20], this vast research experience has inspired us to research about the knowledge and awareness of monosodium glutamate (Ajinomoto salt) among students. The aim of the study is to evaluate the knowledge and awareness of monosodium glutamate(MSG) (Ajinomoto salt) among dental students.

2. MATERIALS AND METHODS

A cross-sectional study was conducted among 100 dental undergraduate students in Chennai. A pre-structured questionnaire was used for the survey. The questionnaire was subjected to expert review to ensure content and face validity. Approval for the study was obtained from the Institutional Review Board before the study. Data collection lasted for 3 weeks and completed questionnaires were retrieved. The exclusion
criteria included those who had a communication barrier and those who were not willing to participate in the study.

The questionnaire was prepared to ask general details of the person and then questions based on various health aspects of monosodium glutamate (MSG). Questionnaire items were constructed in accordance with the study objectives. The questionnaire consisted of three sections with a total of 16 questions. The first three questions were about their personal details. The rest of the questions were based on the awareness of MSG and its side effects. The questionnaire was reviewed and approved by two external researchers.

A sample size of 100 was chosen. A total of 100 participants’ responses were recruited into the survey using a website called survey planet. The responses were obtained and the data were extracted and analyzed statistically for understanding about MSG among students as well as their attitudes toward MSG.

3. RESULTS AND DISCUSSION

The question asked the common participants where they are aware of Ajinomoto and the results as the graph shows. 56% of participants are aware and 25% were not and the remaining 19% of participants were heard somewhat [Fig. 1]. For the question asked to the participants whether they used Ajinomoto on a regular basis, 12% of participants said yes and 55% were not, and the remaining 33% of participants said they didn’t know [Fig. 2]. For the question asked to the participants whether they are aware of the harmful effects of Ajinomoto, 27% of participants said yes and 37% were not, and the remaining 36% of participants said somewhat [Fig. 3]. For the question asked to the participants whether MSG causes metabolic syndrome, 24% of participants said yes and 76% were not known [Fig. 4]. For the question asked to the participants whether MSG can affect the fetal brain cells in pregnant women results, 20% of participants said yes and 80% were not aware of it [Fig. 5]. For the question asked participants whether MSG can trigger migraines, 29% of participants said yes and 71% said no to the question [Fig. 6]. For the question asked to participants whether MSG can cause cardiac illness, 30% of participants said yes and 70% said no to the question [Fig. 7]. For the question asked to the participants whether MSG can cause neurodegenerative disorders, 25% of participants say yes and 75% say no to the question [Fig. 8]. For the question asked to the common participants whether MSG can cause leptin resistance 13% of participants said yes and 87% said no to the question [Fig. 9]. For the question asked to the participants whether they think MSG increases hypertension, 48% of participants said yes and 52% said no to the question [Fig. 10]. For the question asked to the participants whether they think MSG can trigger insomnia and the results are as the graph shows 28% of participants say yes and 72% say no to the question [Fig. 11]. For the question asked whether the participants think, MSG is carcinogenic 33% of participants said yes and 67% said no to the question [Fig. 12].

The concept of understanding MSG among students as well as their attitudes toward MSG use was explored [21]. Most of the respondents appeared to have little understanding of MSG and they were not frequent consumers of MSG. In addition, some of them did not know or had never heard of the term “monosodium glutamate (MSG)” [22]. It is commonly used by the Chinese but they do not use the term MSG and that may be the reason they were not aware of it, even though it is marketed in brands that they are familiar with [23]. A large majority answered that they had no correct understanding of the side effects of using MSG thus the extent of their understanding toward the purpose of using MSG can be easily seen.

From the results, it was evident that slightly less than half of the respondents knew about very few unwanted effects of MSG [7]. This finding was similar to a study, in which nearly the same number of respondents had heard or read about the illnesses caused by MSG. Another similar finding was reported where nearly three-quarters of the respondents were not aware of the health problems caused by MSG [24].

Preclinical studies have associated MSG administration with cardiotoxicity, hepatotoxicity, neurotoxicity, low-grade inflammation, metabolic disarray, and premalignant alterations, along with behavioral changes. However, in reviewing the available literature, it was detected with several methodological flaws, and these studies may have limited relevance for extrapolation to dietary human intake of MSG risk exposure. Clinical trials have focused mainly on MSG effects on food intake and energy expenditure. Besides its well-known impact on food palatability, MSG enhances salivary secretion and interferes with
carbohydrate metabolism, while the impact on satiety and post-meal recovery of hunger varied in relation to meal composition. Reports on MSG hypersensitivity or links of its use to increased pain sensitivity and atopic dermatitis were found to have little supporting evidence. Many of the reported negative health effects of MSG have little relevance for chronic human exposure and are poorly informative as they are based on excessive dosing that does not meet with levels normally consumed in food products. Hence further clinical and epidemiological studies are needed, with an appropriate design, accounting for both added and naturally occurring dietary MSG [25].

Henry-Unaeze HN reported high quality MSG is safe for all life-cycle stages without respect to ethnic origin or culinary background. MSG researchers are advised to employ appropriate scientific methodologies, consider glutamate metabolism and its normal food use before extrapolating pharmacological rodent studies to humans [26].

One limitation of the study was that the respondents may not have been representative of all the students in the entire region [27]. However, although the respondents may not reflect them all, they may be representative of those from Chennai. Age and gender of the participants were other limitations as the age of the participants was not categorized as a continuous variable and gender was not considered [28].

Fig. 1. The question asked to the students was if they are aware of Ajinomoto and results as the graph shows. 56% people are aware and 25% were not and the remaining 19% people were heard somewhere.
Fig. 2. The question asked to the students was whether they used Ajinomoto on a regular basis as the graph shows. 12% people said yes and 55% were not and the remaining 33% people said they didn’t know.

Fig. 3. The question asked to the students was if they were aware of harmful effects of ajinomoto and results in the graph shows 27% people said yes and 37% were not and the remaining 36% people said somewhat.
The question asked to the students was if MSG causes metabolic syndrome results in the graph shows. 24% people said yes and 76% do not know.

The question asked to the students was if MSG can affect the foetal brain cells in pregnant women results are in the graph shows. 20% of people said yes and 80% did not know about it.
Fig. 6. The question asked to the students was if MSG can trigger migraine and results are in the graph shows. 29% of people said yes and 71% said no to the question.

Fig. 7. The question asked to the students was if MSG can cause cardiac illness and results in the graph shows. 30% of people said yes and 70% said no to the question.
Fig. 8. The question asked to the students was if MSG can cause neurodegenerative disorders and results in the graph shows 25% people said yes and 75% said no to the question.

Fig. 9. The question asked to the students was if MSG can cause leptin resistance and results in the graph shows 13% people said yes and 87% said no to the question.
Fig. 10. The question asked to the students was if they think MSG increases hypertension and results in the graph shows 48% people said yes and 52% said no to the question.

Fig. 11. The question asked to the students was if they think MSG can trigger insomnia and results in the graph shows 28% people said yes and 72% said no to the question.
Fig. 12. The question asked to the students was if they think MSG is carcinogenic and results in the graph shows 33% people said yes and 67% said no to the question.

4. CONCLUSION

We concluded that the level of awareness about the health effects and hazards caused by the consumption of products containing Monosodium Glutamate (MSG) as food additives were not adequate. Print and social and electronic media can play a very fruitful role in this regard. More awareness on the effects of Ajinomoto salt should be brought forward by schools and institutions.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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