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A cross-sectional study on understanding and attitude of peri-urban Malaysians towards monosodium glutamate use

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Abstract

The aim of this research was to explore the understanding of peri-urban Malaysians toward monosodium glutamate (MSG) use and their attitude toward its use and whether there were any correlations among the respondents' understanding, attitude, and their demographic profile. This was a cross-sectional study which involved 600 respondents. The respondents were conveniently approached and recruited from Gurun and Jitra, in Kedah region and Kampung Lemal, Kampung Cherang Hangus, Pasir Mas, and Rantau Panjang, in Kelantan region. Information about the understanding and attitude of peri-urban Malaysians toward MSG use were collected using an interview-administered structured questionnaire. The study incorporated an interviewer so that the uneducated were not left out and also to reduce the non-response rate. Slightly more than half of the respondents (53%) were aware that there are only a few unwanted effects attributed to the consumption of MSG. This showed a significant association with the age of respondents ($p = .014$), with 41.5 percent (out of 53%) from the age group above 35 years. A significant association was also noted between income and the bad effects caused by MSG consumption ($p = .016$) with a high propensity among those earning below MYR 2,000. This study revealed a relatively high percentage of respondents who were using or had previously used MSG. Significant associations were found between respondent's income and their understanding of MSG, with the higher income respondents having a better understanding.

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Introduction

Monosodium glutamate (MSG) is the sodium salt of glutamic acid. It is extensively used as a food enhancer to increase the deliciousness of foods (Center for Food Safety & Applied Nutrition, 2012). 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 (Win, 2008). Various marketed brands such as Veplus®, V-ji® and Ajinomoto® contain MSG. Hydrolyzed proteins like textured protein, autolyzed plant protein, and hydrolyzed vegetable protein which are used widely nowadays (Center for Food Safety & Applied Nutrition, 2012) mostly contain manufactured free glutamic acid and are thus being used on labels instead of labeling the product as containing MSG.

The U.S. Food and Drug Administration (FDA) and other organizations have regarded MSG safe for the general population (Center for Food Safety & Applied Nutrition, 2012; Jinap & Hajeb, 2010; Walker & Lupien,

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2000). However, there has been growing apprehension regarding the safety of MSG due to reports of side effects and adverse effects after the consumption of food containing MSG (Shi et al., 2011; Tarasoff & Kelly, 1993). The first published report by a scientist of a reaction to MSG was in 1968 where numbness, weakness, and palpitations were reported after consuming Chinese restaurant food (Kwok, 1968). MSG has also been purported to trigger headaches and asthma exacerbation (Jinap & Hajeb, 2010; Stevenson, 2000; Veettil, Rajiah, & Kumar, 2014). However, a review by Geha et al. (2000) reported that the consumption of MSG is not associated with any adverse reaction. That study was the one of the largest to date on the potential adverse reactions of glutamate and recommended MSG as a rather harmless food flavoring agent. Therefore, the question regarding the safety issues associated with MSG use is still unanswered. In a Jiangsu nutrition study data from 1,282 adults indicated no association between MSG intake and weight gain (Shi et al., 2010). Similarly, a study reported no association between MSG use and asthma in Chinese adults (Shi et al., 2012). However, another study on the effect of MSG on fibromyalgia symptoms and irritable bowel syndrome reported that dietary glutamate probably contributed as an “add on” to fibromyalgia symptoms in some patients (Smith, Terpening, Schmidt, & Gums, 2001). Although there has been increasing awareness of the usage and safety of MSG consumption within the past decade, it has been reported that Asian countries generally use more MSG compared to western nations (Beyreuther et al., 2007).

The daily intake of MSG in Malaysia was reported to be 0.37 g/day (Lölinger, 2000). A study conducted in the Klang Valley, Malaysia showed that ethnic Chinese consume more MSG compared to the Malays, and though the consumption of condiments by the Chinese and Malay households was comparable, the Chinese respondents reported using a variety of condiments (Mohsin, 2009). This can be observed in the population living in the urban areas. A study conducted in Nigeria on 240 randomly selected consumers of MSG and Food Grade Bullion Cubes (FGBC) reported that nearly three-quarters of the respondents were aware of the health problems associated with MSG (Unae, 2010). In another study, out of those three-quarters of respondents, nearly half experienced some health-related problems following the consumption of MSG and FGBC (Radam, Yacob, Bee, & Selamat, 2010). On the contrary, a 14-day feeding trial exhibited no health complications in the investigated respondents. Peri-urban Malaysian consumers were aware of MSG and the illnesses attributed to MSG and for that they were ready to pay a premium of MYR 0.43 for food products with “No added MSG” labeling. This shows that Malaysians in the urban area perceived MSG as unhealthy and would opt for food products with no MSG added. The evaluation by Prescott and Young (2002) found that the respondents had negative attitudes toward MSG.

There is a dearth of information regarding the understanding and attitude of peri-urban Malaysians toward MSG use. In fact, peri-urban is a term used to describe the intermediate area between an urban and rural area, more concisely the area around the urban settlement. This study

was conducted in peri-urban areas like Gurun and Jitra, in Kedah region and Kampung Lemal, Kampung Cherang H Angus, Pasir Mas, and Rantau Panjang, in Kelantan region.

The aim of the study was to explore the understanding and attitudes of MSG practice among of peri-urban Malaysians and to determine if there were any correlations among the respondents' understanding, attitude, and their demographic profile. There has been no study that has dealt with this issue so far which has commented on the usage of MSG as a dietary constituent in peri-urban areas in Malaysia and therefore, the current research would be in the public interest.

It is expected that the output of this exploratory study will provide baseline data on the level of understanding and attitude of peri-urban Malaysians toward the use of MSG.

Methods

Study Design

This was a cross-sectional study carried out in Gurun and Jitra, in Kedah region and Kampung Lemal, Kampung Cherang H Angus, Pasir Mas, and Rantau Panjang, in Kelantan region in Malaysia. Information on the understanding and attitude of peri-urban Malaysians toward MSG use was collected using an interview-administered structured questionnaire. The study incorporated an interviewer so that the uneducated were not left out and also to reduce the non-response rate (Jamshed et al., 2014).

Study Population and Sampling

The sample size was determined based on a response rate of 50 percent at the 95 percent confidence level and a 5 percent margin of error (Maharajan, Rajiah, Num, & Yong, 2015), so that the total sample size required for this study was 385. Convenient sampling was done. Six hundred respondents participated regardless of gender, ethnicity, and occupation from the selected regions. The exclusion criteria included those who had a communication barrier and those who were not willing to participate in the study.

Development of Questionnaire

Questionnaire items were constructed in accordance with the study objectives. The questionnaire consisted of three sections with a total of 15 questions. Five questions evaluated the understanding of MSG using a Likert scale of 1–5 reflecting ‘almost to none’. Five questions evaluated attitude toward the use of MSG using a Likert scale of 1–5, reflecting ‘every time to very rare’. The questionnaire was constructed in the English language and was not translated to other languages as the interviewers were pharmacists or provisionally registered pharmacists (Rajiah & Saravanan, 2014).

Validation of Questionnaire

Information was collected by interviewing the respondents using a structured questionnaire. The content of

the questionnaire was piloted among 20 respondents in each of the selected regions (Mathew & Rajiah, 2014) to validate whether the respondents were able to comprehend the questions being asked. As a result, the questionnaire was validated and modified accordingly (Rajiah, Maharajan, & Nair, 2016). Furthermore, reliability of the questionnaire was assessed and the value of Cronbach-alpha was .78 for the survey instrument.

Statistical Analysis

Both descriptive and inferential analyses were applied using the Statistical Package for the Social Sciences, SPSS® version 20. Descriptive statistics were used to analyze the frequency, percentage, and mean. Correlation analysis was performed to measure the association between the demographic characteristics (Saravanan, Kingston, & Gin, 2014) and responses to understanding and attitude toward MSG.

Results

Demographic Characteristics

Out of the 600 respondents, 81 percent were female while 19 percent consisted of males. Nearly half of the females (49%) were in the age group above 35 years. More than three-quarters of the respondents (84%) had their own business. The full demographic characteristics of respondents are summarized in Table 1.

Understanding Toward Monosodium Glutamate

More than half of the respondents (69%) answered that they had never come across the term monosodium glutamate (Figure 1), while 88 percent answered that they were aware of the purpose of using MSG (Figure 2).

Table 2 shows the frequency analysis of respondents' understanding toward MSG. Most of the respondents (97%) had never heard of the hidden names of MSG (hydrolyzed vegetable protein, autolyzed plant protein, and textured protein). Three-quarters of the respondents (75%) knew

Table 1
Demographic characteristics of the respondents

Characteristic	Frequency (n)	Percentage (%)
Gender		
Female	486	81.0
Male	114	19.0
Age (years)		
<18	18	3.0
18–25	144	24.0
26–35	96	16.0
>35	342	57.0
Occupation		
Business	504	84.0
Others	96	16.0
Income per month(MYR)		
<500	288	48.0
500–1,000	216	36.0
1,001–2,000	66	11.0
>2,000	30	5.0

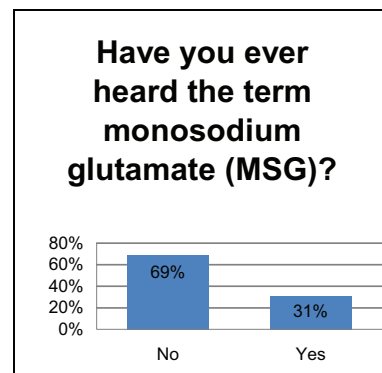


Figure 1 Percentage of respondents who have heard the term 'monosodium glutamate'

very few of the various marketed products that contain MSG. The most common marketed product that they were aware of was Ajinomoto. Slightly more than half of the respondents (53%) were aware that there are only a few unwanted effects attributed to the consumption of MSG. This had a significant association with the age of respondents ($p = .014$) with 41.5 percent (out of 53%) being from the age group of above 35 years. In terms of association between ethnicity and understanding about MSG, a significant association was noted between the various marketed products containing MSG ($p = .007$) and the bad effects of MSG with a higher propensity among the Malay community. There was a statistically significant association with respect to age ($p = .001$) and occupation ($p = .001$) and respondents' limited understanding toward the hidden names of MSG. In the light of the association between different independent and dependent variables, the association between income and understanding of the various marketed products of MSG was significant ($p = .018$). Likewise, a significant association was also noted between income and the bad effects caused by the MSG consumption ($p = .016$), with a high propensity noted among those earning below MYR 2,000 (Tables 2 and 4).

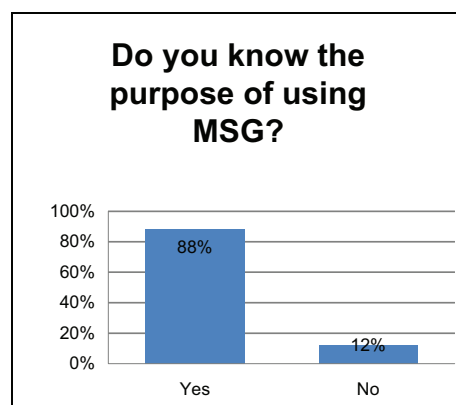


Figure 2 Percentage of respondents knowing the purpose of 'monosodium glutamate'

Table 2
Respondents' understanding of MSG as per demographic profile

Item	Gender	Age	Ethnicity	Occupation	Income
Have you ever heard of any hidden names of MSG?	.867	.001**	.999	.001**	.275
Do you know the various marketed products containing MSG?	.441	.838	.007**	.100	.237
Do you know there are unwanted effects of MSG?	.586	.014*	.826	.963	.749

* $p < .05$, ** $p < .01$

Attitude Toward the use of Monosodium Glutamate

Respondents' attitudes toward the use of MSG are presented in Table 3, with only 6 percent having bought MSG and 8 percent using it every time in their cooking. More than one-quarter of the respondents (28%) who were older than 35 years answered that they feel MSG gives taste to food most of the time. The full results are shown in Table 3.

Interestingly, income can also contribute toward the buying attitude of peri-urban Malaysians ($p = .018$) with a higher tendency being noted among those earning more than MYR 2,000. There was a significant positive correlation ($r = .742$; $p < .001$) between the understanding score and the income of the respondents. A strong significant correlation was evident ($r = 0.745$; $p < .001$) between attitude score and the age of the respondents (Tables 3 and 4).

Discussion

The concept of understanding MSG in a selected population living in peri-urban areas as well as their attitudes toward MSG use was explored. 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)". However most of them knew a few marketed products containing 'MSG', with the marketed brand, Ajinomoto being the most common, because Malaysia has a multiethnic population and MSG is not common among all ethnicities. It is commonly used by the

Table 3
Respondents' attitude toward MSG as per demographic profile

Item	Gender	Age	Ethnicity	Occupation	Income
I often buy MSG products	.117	.497	.778	.690	.018*
I often use MSG in cooking	.509	.358	.818	.241	.035*
I feel MSG is needed in my cooking	.609	.725	.707	.156	.201
I feel MSG gives taste to my food	.707	.031*	.679	.065	.232
I feel MSG can cause bad effects when consumed	.715	.304	.799	.058	.016*

* $p < .05$ **Table 4**
Correlation between the respondents' attitudes toward MSG use and demographic profile

Characteristics	Correlation coefficient	p Value
Gender		
Female	.342	.912
Male	.333	.999
Age (years)		
<18	.112	.291
18–25	.123	.122
26–35	.324	.321
>35	.745	.000*
Occupation		
Business	.112	.333
Others	.121	.900
Income per month(RM)		
<500	.123	.321
500–1,000	.133	.432
1,001–2,000	.134	.302
>2,000	.742	.000*

* $p < .001$

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. Although a large majority answered that they knew the purpose of using MSG, it cannot be concluded that the respondents had the correct understanding of the purpose of using MSG because it was a closed-ended question and thus the extent of their understanding toward the purpose of using MSG could not be assessed in depth.

From the results, it was evident that slightly less than half of the respondents knew about very few unwanted effects of MSG. 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 (Radam et al., 2010). Another similar finding was reported by Unae (2010) where nearly three-quarters of the respondents were aware of the health problems caused by MSG.

Although the majority of respondents perceived MSG gave taste to the food and they felt that cooking was incomplete without using MSG, only a small percentage of respondents bought and used MSG in their cooking frequently. The low frequency of using MSG may be attributed to the image that MSG is unhealthy and causes health problems. This can be supported by the study Unae (2010) in which nearly half of the respondents did not use MSG due to their belief that it causes disease. Furthermore, Unae (2010) reported that MSG was consumed provided it was fortified with micronutrients. This showed that there are still concerns over the safety usage of MSG; despite all the published scientific reports that regarded MSG consumption as safe (Geha et al., 2000).

In the current study, an association was evident between ethnicity and attitude toward MSG use, with the Chinese tending to use MSG. This was also in accordance with statistics on world MSG consumption which showed that China and Taiwan had the highest consumptions of MSG compared to any other country (Tarasoff & Kelly, 1993; Unae, 2010; Walker & Lupien, 2000).

One limitation of the study was that the respondents may not have been representative of the general population in the entire region. However, although the

respondents may not reflect the general population, they may be representative of those from the peri-urban area. Age and educational levels of the participants were other limitations as the age of the participants was not categorized as a continuous variable and educational qualification were not considered.

Conclusions

This study revealed a relatively high percentage of respondents who were using or had previously used MSG. Significant associations were found between respondent's income and their understanding of MSG, with higher income respondents having a better understanding. The respondents were more aware of the brand Ajinomoto compared to the term 'MSG'. Awareness of MSG in rural areas gives peri-urban Malaysians a chance to understand and analyze their use of MSG in the future for better health care and health outcomes. This study can be extended to other regions of Malaysia to determine the understanding and attitude of the urban population toward monosodium glutamate use.

Conflict of Interest

The authors declare that they have no conflict of interest.

Acknowledgement

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References

- Beyreuther, K., Biesalski, H. K., Fernstrom, J. D., Grimm, P., Hammes, W. P., Heinemann, U., et al. (2007). Consensus meeting: Monosodium glutamate – an update. *European Journal of Clinical Nutrition*, 61(7), 928. <https://doi.org/10.1038/sj.ejcn.1602775>.
- Center for Food Safety & Applied Nutrition. (2012). *Food additives & ingredients - questions and answers on monosodium glutamate (MSG)*. Retrieved from <https://www.fda.gov/Food/IngredientsPackagingLabeling/FoodAdditivesIngredients/ucm328728.htm>.
- Geha, R. S., Beiser, A., Ren, C., Patterson, R., Greenberger, P. A., Grammer, L. C., et al. (2000). Multicenter, double-blind, placebo-controlled, multiple-challenge evaluation of reported reactions to monosodium glutamate. *Journal of Allergy and Clinical Immunology*, 106(5), 973–980. <https://doi.org/10.1067/mai.2000.110794>.
- Jamshed, S. Q., Elkalmi, R., Rajiah, K., Al-Shami, A. K., Shamsudin, S. H., Siddiqui, M., et al. (2014). Understanding of antibiotic use and resistance among final-year pharmacy and medical students: A pilot study. *The Journal of Infection in Developing Countries*, 8(6), 780–785. <https://doi.org/10.3855/jidc.3833>.
- Jinap, S., & Hajeb, P. (2010). Glutamate. Its applications in food and contribution to health. *Appetite*, 55(1), 1–10. <https://doi.org/10.1016/j.appet.2010.05.002>.
- Kwok, R. H. (1968). Chinese-restaurant syndrome. *New England Journal of Medicine*, 278(20), 1122–1124. <https://doi.org/10.1056/nejm19680402781419>.
- Löfliger, J. (2000). Function and importance of glutamate for savory foods. *The Journal of Nutrition*, 130(4), 915S–920S.
- Maharajan, M. K., Rajiah, K., Num, K. S., & Yong, N. J. (2015). Knowledge of human papillomavirus infection, cervical cancer and willingness to pay for cervical cancer vaccination among ethnically diverse medical students in Malaysia. *Asian Pacific Journal of Cancer Prevention*, 16(14), 5733–5739. <https://doi.org/10.7314/apjcp.2015.16.14.5733>.
- Mathew, E., & Rajiah, K. (2014). Assessment of medication adherence in type-2 diabetes patients on poly pharmacy and the effect of patient counseling given to them in a multispecialty hospital. *Journal of Basic and Clinical Pharmacy*, 5(1), 15. <https://doi.org/10.4103/0976-0105.128251>.
- Mohsin, K. (2009). *Assessment of free dietary glutamate intake among Malays and Chinese in the Klang Valley, Malaysia* (Unpublished master's thesis). Malaysia: University Putra Malaysia.
- Prescott, J., & Young, A. (2002). Does information about MSG (monosodium glutamate) content influence consumer ratings of soups with and without added MSG? *Appetite*, 39(1), 25–33. <https://doi.org/10.1006/appe.2002.0492>.
- Radam, A., Jacob, M. R., Bee, T. S., & Selamat, J. (2010). Consumers' perceptions, attitudes and willingness to pay towards food products with "No Added Msg" labeling. *International Journal of Marketing Studies*, 2(1), 65–77. <https://doi.org/10.5539/ijms.v2n1p65>.
- Rajiah, K., Maharajan, M. K., & Nair, S. (2016). Pharmacy students' knowledge and perceptions about adverse drug reactions reporting and pharmacovigilance. *Saudi Pharmaceutical Journal*, 24(5), 600–604. <https://doi.org/10.1016/j.jsps.2015.03.021>.
- Rajiah, K., & Saravanan, C. (2014). The effectiveness of psychoeducation and systematic desensitization to reduce test anxiety among first-year pharmacy students. *American Journal of Pharmaceutical Education*, 78(9), 163. <https://doi.org/10.5688/ajpe789163>.
- Saravanan, C., Kingston, R., & Gin, M. (2014). Is test anxiety a problem among medical students: A cross sectional study on outcome of test anxiety among medical students? *International Journal of Psychological Studies*, 6(3). <https://doi.org/10.5539/ijps.v6n3p24>.
- Shi, Z., Luscombe-Marsh, N. D., Wittert, G. A., Yuan, B., Dai, Y., Pan, X., et al. (2010). Monosodium glutamate is not associated with obesity or a greater prevalence of weight gain over 5 years: Findings from the Jiangsu Nutrition Study of Chinese adults. *British Journal of Nutrition*, 104(03), 457–463. <https://doi.org/10.1017/s0007114510000760>.
- Shi, Z., Yuan, B., Taylor, A. W., Dai, Y., Pan, X., Gill, T. K., et al. (2011). Monosodium glutamate is related to a higher increase in blood pressure over 5 years: Findings from the Jiangsu Nutrition Study of Chinese adults. *Journal of Hypertension*, 29(5), 846–853. <https://doi.org/10.1097/HJH.0b013e328344da8e>.
- Shi, Z., Yuan, B., Wittert, G. A., Pan, X., Dai, Y., Adams, R., et al. (2012). Monosodium glutamate intake, dietary patterns and asthma in Chinese adults. *PLoS One*, 7(12). <https://doi.org/10.1371/journal.pone.0051567>.
- Smith, J. D., Terpening, C. M., Schmidt, S. O., & Gums, J. G. (2001). Relief of fibromyalgia symptoms following discontinuation of dietary excitotoxins. *The Annals of Pharmacotherapy*, 35, 702–706. [https://doi.org/10.1345/15426270\(2001\)035<0702:rofsfd>2.0.co;2](https://doi.org/10.1345/15426270(2001)035<0702:rofsfd>2.0.co;2).
- Stevenson, D. D. (2000). Monosodium glutamate and asthma. *The Journal of Nutrition*, 130(4), 1067S–1073S.
- Tarasoff, L., & Kelly, M. (1993). Monosodium L-glutamate: A double-blind study and review. *Food and Chemical Toxicology*, 31(12), 1019–1035. [https://doi.org/10.1016/02786915\(93\)90012-n](https://doi.org/10.1016/02786915(93)90012-n).
- Unae, H. (2010). Consumer knowledge, attitude and practice towards the use of monosodium glutamate and food grade bullion cubes as dietary constituents. *Pakistan Journal of Nutrition*, 9(1), 76–80. <https://doi.org/10.3923/pjn.2010.76.80>.
- Veetil, S., Rajiah, K., & Kumar, S. (2014). Study of drug utilization pattern for acute exacerbation of chronic obstructive pulmonary disease in patients attending a government hospital in Kerala, India. *Journal of Family Medicine and Primary Care*, 3(3), 250. <https://doi.org/10.4103/2249-4863.141622>.
- Walker, R., & Lupien, J. R. (2000). The safety evaluation of monosodium glutamate. *The Journal of Nutrition*, 130(4), 1049S–1052S.
- Win, D. T. (2008). MSG – flavor enhancer or deadly killer. *AU Journal of Technology*, 12(1), 43–49.