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Consumer Knowledge, Attitude and Practice Towards the Use of Monosodium Glutamate and Food Grade Bullion Cubes as Dietary Constituents

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Abstract: The knowledge attitude and practice in use of Monosodium Glutamate (MSG) and food Grade Bullion Cubes (FGBCs) by 240 respondents randomly selected from the rural and urban areas of Enugu and Nsukka in Enugu state were investigated. Information was obtained by means of questionnaires feeding regime and focus group discussions. The feeding regime involved a sample of 15 subjects randomly selected from university students who previously complained of some problem after consumption of MSG. The results showed that 98.3% of the respondents were currently using food flavour enhancers (MSGs and FGBCs) in cooking stews, soups, pottages, pepper soups, moi moi, sauce and others. Consumption of FGBCs in terms of number of households was 95.8% and MSG 49.6%. Consumption was on a daily basis. The low and high category of users of FGBCs consumed 14 g and 24 g/person/week respectively while for MSG it was 0.9 g and 6.6 g/person/week, respectively. In addition, a total of 82.5% and 42.5% have knowledge of FGBCs and MSG respectively. The major medium of information was Radio (50%). Results also showed that 95% used FGBCs because it is affordable, while 54.6% used MSG because it is generally good. A total of 71.3% were aware of the health problems associated with MSG. Out of this number, 45% have experienced it. The 14-day feeding trials showed no health problems on the subjects investigated. Nutrition education, information on safety of MSG, fortification of MSG and consumption of fortified foods are recommended.

Key words: Monosodium glutamate, food flavour enhancers, consumer knowledge

INTRODUCTION

Addressing the global crisis of hidden hunger and its consequences including nutritional anemia and the double burden of malnutrition is paramount in the agenda of many countries. Evidence suggests that vitamins and minerals deficiencies create public health problem that affects over 2 billion people (Borwankar *et al*., 2007; Kraemer *et al*., 2007). Nigeria, like most third world countries is faced with a serious problem of micronutrient malnutrition (WHO/UNICEF, 1994). This problem has been controlled successfully in developed countries (Mehansho *et al*., 2003) and some other countries like Haiti and Kenya (Van Hees *et al*., 2008); the Philippines and Indonesia by fortification (single, double and multiple) of food vehicles like MSG and bullion cubes (Nnanyelugo, 1998).

In Nigeria, the Federal Government/United Nations Children's Fund (FGN/UNICEF) consultative group has selected FGBCs and MSG as the best food vehicles for fortification with micronutrients at the industrial level. The selection was largely on taste and low cost -a critical advantage in reaching the population at risk. However, there has been controversy on the safety of MSG. Efforts to show that MSG posed no significant health hazard need to be strengthened in order to ease the constraint in food fortification strategy for micronutrient deficiency control. It becomes pertinent at this point to investigate the consumer knowledge, attitude and practice towards the use of MSG and FGBCs as dietary constituents.

Objectives: The main objective is to determine the consumer knowledge, attitude and practice towards the use of FGBCs and MSG as dietary constituents.

Specific objectives:

- To determine the consumer knowledge about MSG and FGBCs
- To assess the availability and cost of these FGBCs and MSG
- To determine the mode of utilization and storage of FGBCs and MSG
- To find out the frequency and amount of consumption of FGBCs and MSG
- To identify the common meals used by consumers in consuming these FGBCs and MSG
- To find out some of the problems encountered by consumers in using these flavour enhancers

MATERIALS AND METHODS

The study was conducted in two towns of Enugu state-Enugu and Nsukka, which were purposefully selected because they represent the different socio-economic groups needed for the research. The sub-areas include the urban and rural areas. Information on the knowledge, attitude and practice in use of FGBCs and

MSG of 240 respondents randomly selected from the sub-areas were obtained by means of questionnaires and focus group discussions. More information was also obtained by means of feeding regimes and weighed food intake that involved a sample of 15 subjects randomly selected from university students who previously complained of some problems following the consumption of MSG. Values from food consumption tables were used to calculate daily food intakes and mean daily nutrient intake. Adequacy of diets was determined using recommended intake of nutrients. The responses to the questionnaires and focus group discussions were subjected to statistical analysis and presented.

RESULTS

Demographic and housing characteristics: Of the 240 respondents interviewed, most (52.10%) were mothers. The study populations was made up of large families whose sizes ranged from 1-13 with mean (SD) of 6.4 (2.2). With regards to the respondents housing characteristics, most (61.3%) reside in modern houses, 39% in mud houses while 8.8% live in raffia huts. Also, 45% live in owner-occupier houses, 35.8% in normal rent and 14.2% in normal/subsidized while only 5% in free houses. The major source of water was tanker/truck/vendor (37.9%), followed by pipe-borne (22.9%), stream (18.3%) rain (15.4%) and borehole/well (5.4%). Electricity supply was mostly by PHCN only 59.2%, followed by rural electricity (17.9%), PHCN/Rural Electricity/Generating set (1.3%) and generating set (0.4). The remaining 21.3% had no electricity.

Food consumption patterns of households: The responses indicated that the study of households consume a total of 615 meals per day, with a mean (SD) of 2.6 (0.5). On the whole, 32.1% have adequate meals, 67.1% have meals distributed collectively and 98.3% consumed food flavour enhancers (FGBCs and MSG). The frequency of consumption of food flavour enhancers indicates that consumption was on a daily basis. Most respondents (32.6%) consume FGBCs 2 days per week; MSG most (38.7%) consume it 5 days per week (Fig. 1 and 2).

The quantitative consumption profile shows an average of 21 g FGBCs per person per week; MSG, 3.9 g per person per week. FGBCs and MSG was consumed most often with soup, stew or pottages. In addition to these regular dishes, many of the respondents prepared delicacies such as pepper soup, *moi moi* and tapioca sauce with them. Of the respondents that consume food seasonings 86.7% store FGBCs while 29.2% store MSG. Only 14% store food seasonings in refrigerators; the remaining 86% store at room temperature. The availability and affordability of FGBCs and MSG shows that they are obtainable in the whole study area (Fig. 3).

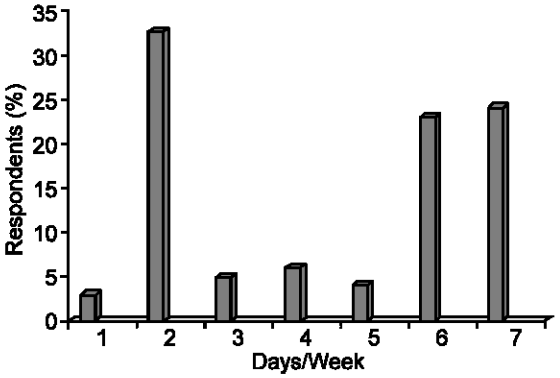

Fig. 1: Weekly frequency (%) of consumption of FGBCs

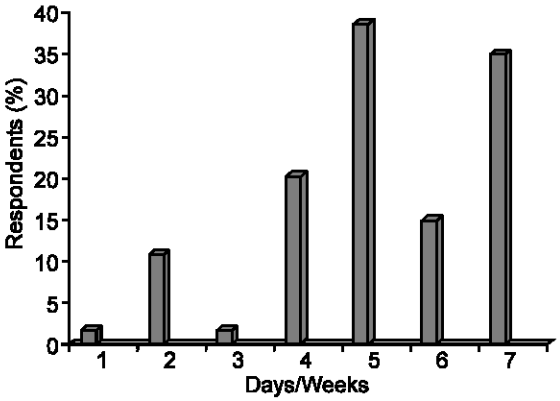

Fig. 2: Weekly frequency (%) of consumption of MSG

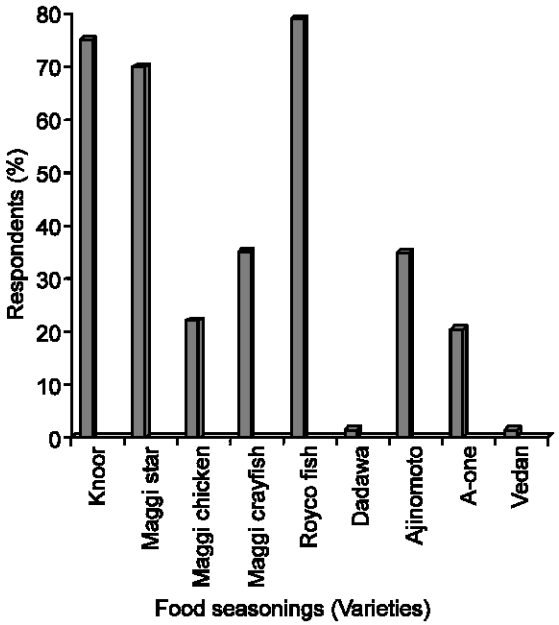

Fig. 3: Availability and affordability of food seasonings

Most (93.3) will increase purchase of food seasoning with increased income (Fig. 4).

Table 1: Knowledge of FGBCs and MSG

Food flavour enhancer	Variety	Heard of		Seen		Used	
		Number	%	Number	%	Number	%
FGBCs	Knoor	239.0	99.6	238.0	99.2	198.0	82.5
	Jumbo	190.0	79.2	130.0	54.2	6.0	2.5
	Maggi star	238.0	99.2	237.0	98.8	118.0	78.5
	Maggi chicken	232.0	96.7	223.0	92.9	86.0	35.0
	Royco fish	238.0	99.2	236.0	96.3	197.0	82.1
	Doyin	76.0	31.2	69.0	28.8	3.0	1.3
	Dadawa	126.0	52.5	115.0	47.9	9.0	3.8
MSG	Ajinomoto	230.0	95.8	223.0	92.9	102.0	42.5
	A-one	222.0	92.5	218.0	90.8	51.0	21.3
	Vedan	104.0	43.3	40.0	16.7	3.0	1.3

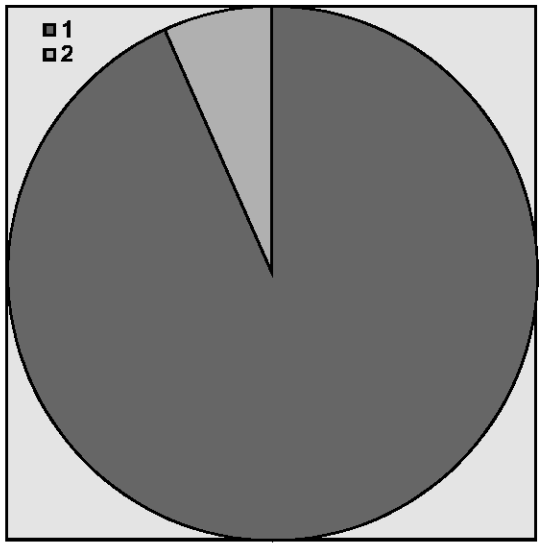

Fig. 4: Effect of extra money on purchase of food seasoning. 1-will increase purchase (93.3%); 2-will not increase purchase(6.7%)

Knowledge, attitude and practice in used of FGBCs and MSG: Knowledge was determined by heard of, seen and used. Many have knowledge of the various food seasonings (Table 1).

The major source of information was Radio (50%), Television (47.7%), friends (47.1%) and relations (35.8%). The least was market display (0.8%) (Fig. 5).

The main reason for the use of FGBCs was because it was affordable (95%), while for MSG, other reasons like desirable and causes no disease arises (54.6%). The remaining 45.4% do not use it because it is not desirable, cause disease and not affordable (Table 2).

The respondents' attitude towards FGBCs is positive as 80.8% will encourage its use and 82.5% will consume it if fortified with micronutrients. But for MSG, most (68.3%) will not encourage its use though an appreciable number (57.5%) will consume it if fortified. Majority (67.5%) adds the food flavour enhancer during cooking, 32.5% before cooking and none after cooking.

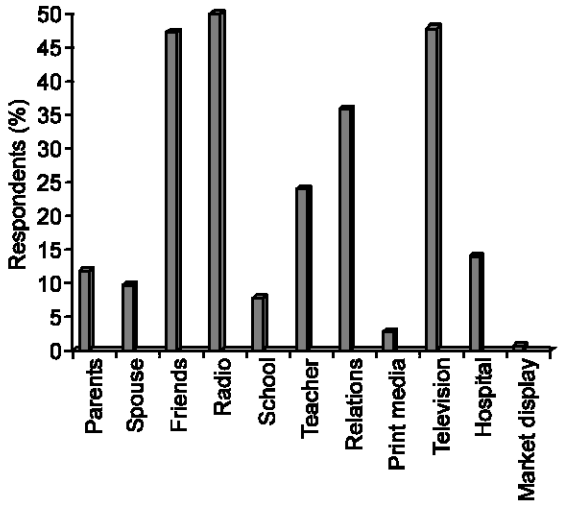

Fig. 5: Medium of first information about FGBCs and MSG

Table 2: Reasons for use and non-use of FGBCs and MSG

Flavour enhancer	Reasons for use and non-use	Respondents	
		Number	%
FGBCs	Affordable	112	93.3
	Not affordable	8	6.7
MSG	Affordable, desirable and causes no disease	131	54.6
	Causes diseases	69	28.8
	Not desirable	31	12.9
	Not affordable	1	0.4
	Not good at all	8	3.3

FGBCs, MSG and health of consumers: Nearly three quarters of the respondents were aware of the belief that FGBCs (MSG) causes health problem. Some had experienced it (45%), heard of it from friends (47.9%) or family members (32.9%). The most frequent health problems encountered was diarrhoea (54%) (Table 3).

The feeding trial on a sample of 15 university students in which the quantity of MSG in meals was increased progressively from 0-1.3 g/meal showed that the consumption of MSG in meals produced no health problem, rather, it improved their appetite and makes

Table 3: Health problems repeatedly associated with FGBCs and MSG

Type of Health Problem	Respondents	
	Number	%
Abdominal upset	38	28.3
Headache	1	0.8
Vomiting	29	22.0
Diarrhoea	54	40.9
Worm	10	7.6

good food taste better. The final BMI of most (93.3%) respondents improved at the end of the feeding trial.

The correlation analysis between knowledge and use of FGBCs and MSG shows that knowledge of food seasonings significantly determines it use ($R = 0.9170$; $p>0.05$); as knowledge increases, the usage also increases. Furthermore, the consumption was affected by availability ($p>0.05$). T-test between respondents that have health problems and those that do not showed that health was not affected by consumption of FGBCs and MSG ($p<0.05$).

DISCUSSION

The results showed that most of the respondents interviewed were in the middle and low-income groups when their housing characteristics were considered. This could explain the inadequate meals collectively consumed by most of the families (67.1%). A greater proportion (98.3%) of the study population consumed FGBCS and MSG. This popularity of food seasonings is similar to the situation in countries like Philippines and Taiwan, where MSG is consumed by essentially all households (Giacometti, 1979; Solon *et al*., 1985; Egbuta, 1993; Ajinomoto, 1994; Schiffman, 1996). The fact that many consume FGBCs and MSG indicates a positive mark for their use in food fortification with micronutrients as this will go along way to reducing or eliminating the micronutrients deficiency problem in the area.

The high frequency of consumption of FGBCs and MSG may be attributed to preference or the fact that they are gaining wider acceptability and may be loosing the image of causing health problems. This is supported by the positive relationship between knowledge and use of FGBCs and MSG. The average quantitative consumption of FGBCs (21 g) in the study area is high compared with that of the entire country which is 13g per person per week (Report of vitamin A Bench Mark Survey, 1997). For MSG 3.9 g per person is lower than that of the national survey (7 g/person/week).

These differences may be due to the size of people used in the studies or the activity of the sales promoters of MSG or the presence of the information on the health effect slogan as it were of MSG by the study population. Furthermore the fact that the study population consumes more of FGBCs than MSG shows the awareness of this belief. This indicated a strong need for nutrition advocacy and massive dissemination of information about the safety of MSG to the public. The high frequency of consumption of these food seasonings to some researchers like Olney (1969) and Olney *et al*. (1973) may pose the risk of toxicity. But since the quantity consumed by the study population is less than the RDA 1-9 g of MSG for 60 kg man per day (FAO/WHO, 1974) and is lower than that consumed in Taiwan, 3 g per person per day (Giacometti, 1979) the problem of toxicity does not arise. Moreso, MSG is consumed as an additive in food and the effect of meal and water on plasma glutamate have been demonstrated by several workers like Anantharaman (1979) and Tung and Tung *et al*. (1980). The study population used FGBCs and MSG only in cooking soup and stew. These culinary utilization data is important information for food processors.

The major storage condition (room temperature) used by the study population gives an insight as to whether the potency of fortificants will be maintained under these conditions. The respondents reported that these seasonings are available throughout the year and all over the area. This is line with the report o vitamin A Bench Mark Survey (FGN/UNICEF, 1997). The respondents showed the desire to purchase more food seasonings with extra money this is not surprising since it is known that as income increases, the purchasing power of the consumers increases.

Many of the respondents have either heard, seen or used the FGBCs and MSG. This is in line with the report of vitamin A Bench Mark Survey (FGN/UNICEF, 1997). The presence of reasons like “not healthy, not desirable, causes diseases” in using MSG goes to show the extent of ignorance about MSG by the study population. These views expressed by some of the respondents were contrary to the scientific report on the safety of MSG. (FAO/WHO, 1974; Filer *et al*., 1979; Tung and Tung, 1980; JECFA, 1988; SCF, 1991; AMASCA, 1992; FDA, 1992; Ajinomoto, 1994; FASEB, 1995; Schiffman, 1996; Reeds *et al*., 1997).

Many had either experienced health problem or heard of it from friends or from family members. This could mean that for them the health problem may reduce the level of consumption somewhat but not be a substantial constraint.

The results of the semi-controlled feeding trial support the report of research on safety of MSG in that all the trial subjects did not experience any discomfort or health problems when MSG meals were fed. They reported that MSG meals improved their appetite. This explains the increase in weight of majority of the subject during the feeding trial.

Conclusion: Nutrition education, information on the safety of MSG, concerted action to raise the consciousness of involved professionals, drawing their

attention to the magnitude of the problem as well as its consequences for individuals and for public health, timely approval of fortification of MSG with micronutrients, political actions such as specific laws to establish clear mechanisms of control and supervision of existing and new programmes, industry compliance with public health policies on the subject and consumption of fortified foods are recommended.

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