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Student Knowledge on Food Additives: Do They Really Care?

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Abstract--- *For centuries, food additives have proven to be beneficial in a variety of foods. Consumers demand and enjoy a food supply that is flavorful, nutritious, safe, convenient, colourful and affordable. However, excessive intake of food additives can harm the body in many ways. The main goal of this study was to identify student knowledge on food additives, the risks of taking food with additives and examine their food intake practice. This study involved 187 students who attended various fields of study at Universiti Putra Malaysia. Questionnaires in the form of a quantitative survey were distributed to the sampel. Findings showed that students' knowledge on food additives was at a moderate level with a mean value of 2.47 (SD.59), meanwhile mean for student knowledge on risk of taking food additives was 3.90 (0.91). Findings also showed that the mean value for frequency of food consumption within the period of six months among the students was low with of 2.69, (SD .90). This finding indicates that students are consuming food with additives continously regardless of having knowledge about the risk of taking it. There is a need to take into consideration to strengthen students' knowledge on healthy food intake for a better life in future.*

Keywords--- *Food Additives, Home Science Education.*

I. INTRODUCTION

World Health Organization [1] reported that 60% (16.8 million) of 28 million people experience problems caused by lifestyle and eating disorders. Obesity also affects other infectious diseases such as high blood pressure, diabetes, kidney cancer, bone decay, heart attack and others [2]. Even the 2011 National Health and Morbidity (NHSM) survey showed 63% of adults aged 18 years and above had at least one non-communicable diseases (NCDs) risk factor (either overweight/obesity, high blood pressure, high blood sugar or high blood cholesterol). Statistics of Health Report show 73% of deaths per year in all government hospitals in Malaysia are caused by non-communicable diseases and obesity-related problems caused by eating fast food. Furthermore, the mortality rate among Malaysians also increases every year [3].

Food additives can either be natural or artificial which are used and selected according to the intended purpose [4]. They are not only used in the production of convenience foods as they can be added to all kinds of processed food offered for consumption. Food additives are chemicals added to foods to be kept fresh or to enhance their colour, flavour or texture [4]; [5]. The growth in the use of food additives has increased enormously in the past 30 years, totalling now over 200,000 tonnes per year [6]; [7]. Therefore, it has been estimated that as today, about 75% of the Western diet is made up of various processed foods. Each person is now consuming an average of 8-10 lbs of food additives per year, with some possibly eating considerably more [7].

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The use of food additives in adequate quantities as prescribed in legal standards by the food industry can reduce health risk. However, both food manufacturers and consumers should take responsibility for ensuring the use of additives is controlled [4]. The main purpose of adding preservatives is to prevent the growth of micro-organisms which could cause food spoilage and lead to food poisoning. Additionally, the usage of preservatives can extend the shelf-life of consumer products. However excessive use of preservatives in the long term can cause adverse side effects and certain health problems [6]; [8].

In previous research, it was reported that food additives and preservatives induce oxidative stress, cytotoxicity, genotoxicity and bio-molecular damage [9]. Eating unhealthy or consuming fast food can also pose a risk to students as it will cause students to be in a degraded physical condition to focus on learning [2]. Students may find themselves not understand the content of the lectures presented by the lecturers and may even affect the performance of student examination results.

Immediate effects may include headaches, change in energy level, and alterations in mental concentration, behaviour, or immune response [10]. Long-term effects may increase one's risk of cancer, cardiovascular disease and other degenerative conditions. Some modern synthetic preservatives have become controversial because they have been shown to cause respiratory or other health problems [10].

Consumption of food with additives can also cause students' cognitive development to be stagnant, hence, making it difficult for them to remember and memorize. This is due to the high content of dyeing and seasoning which can cause dizziness, nausea, drowsiness and forgetfullness [8], [11]. In addition, this will promote lazy learners in students who may be easily stressed and angered when confronted with problems. Feelings of depression may also arise when he/she is unable to solve problems or make wise decisions [2].

Mansor [12] in her study found that lack of awareness towards food additives among students lead to high food shopping habits. According to Gokce et al [13] graduate students tend to have higher academic pressure and less spare time. Thus, their economic conditions is better compared to students from high school. Hence, they can decide where to eat by themselves and they are more likely to consume take-out food due to the time saved. Furthermore, some fast-food restaurants such as KFC and McDonald's offer convenient delivery service [14]. This finding is supported by Ismail & Aniyah [14], whereby time factor and tight schedule of learning makes students choose to buy simple, convenient and easily prepared foods such as Maggi and instant crackers. Therefore, students tend to consume fast food rather than complete foods which provide balanced nutrients.

This study adopted the Planned Behavior Theory (TPB) introduced by Fishbein & Ajzen [15]. This theory was used to predict an individual's intention to engage in a behavior at a specific time and place. It was intended to explain all behaviors over which people have the ability to exert self-control. According to this theory, intentions are determined by three variables namely attitudes, subjective norms and perceived behavioral control. According to this theory, the researcher can investigate students' behavior intention in taking their daily foods. It can thus be identified whether knowledge acquired or other factors motivate students to choose their food [16].

Therefore, the aim of the present study is to investigate the knowledge level of university students on food additives, knowledge on the risk of taking food with additives and to determine the frequency of food consumption within the period of six months.

II. METHODOLOGY

This study uses a quantitative design and the survey was conducted descriptively to measure students' knowledge on food additives, knowledge on the risk of taking food with additives and determine the frequency of food with additives

consumption among the respondents for a period of six months. Data gathered were analysed descriptively and statistic inferential were used to explain the possible meaning of a phenomenon, and allows participats to reveal their perception of a phenomenon [17].

THE SAMPLE

The sample of the study consisted of 185 final year students from five bachelor degree programs studying in Universiti Putra Malaysia for the academic year of 2016/2017. Random sampling technique was used in this study to select subjects with convenient accessibility and proximity [17].

INSTRUMENT AND DATA COLLECTION

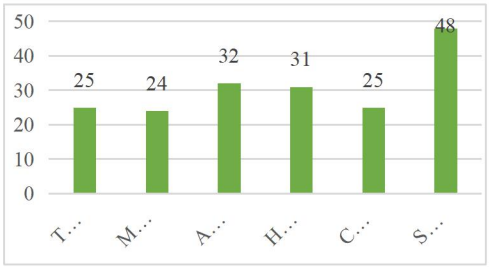
For the purpose of this study, a questionnaire was developed by the researcher based on previous literature and adapted it into the local context and culture. A total of 30 multiple choice questions were used to measure respondents' knowledge on food additives (Section A) and 25 likert scale items were applied to measure respondents' knowledge on the risks of taking food with additives (Section B) as well as the frequency of food additives intake within six months (Section C). Data obtained by the questionnaires were analysed by using SPSS Statistical Package of Social Science version 23. Descriptive Statistics (mean, standard deviation and percentage) and inferential statistics were used to interpret the findings of the study. Cronbach Alpha of 0.85, 0.92 and 0.76 were gained for the three sections and the reliability value for the whole instruments are valued at 0.83.

III. FINDINGS

DEMOGRAPHY OF RESPONDENTS

Findings from the study show that a majority of the respondents are female (68.6%) followed by male (31.4%). The respondents consisted of 48 students from Bachelor Education of Sport Science, followed by students from Bachelor Education of Agriculture (32), Bachelor Education of Home Science (31), Bachelor Education of TESL and Counseling (25 each) and Bachelor Education of Malay Language (24) students.

Table 1: Distribution of respondents by Bachelor Programe.



According to the respondents, they gained knowledge about food additives through internet reading (36.8%), information from teachers (16.8%), reading magazines (14.1%), watching television (13%), reading books (11.9%) and getting information from parents (7.6%).

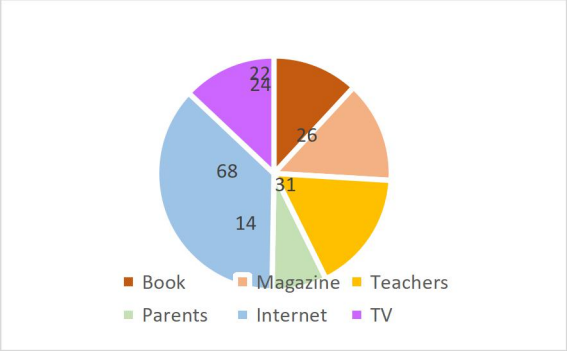


Figure 1: Sources of knowledge on food additive

KNOWLEDGE ON FOOD ADDITIVES

Table 2 shows the distribution of respondents' knowledge on food additives. The findings indicate that 62.7% of the respondents have moderate knowledge on food additives. Respondents with high knowledge on food additives only account to 12.4% and the rest 24.9% have low knowledge on food additives. This finding is in parellel with Tek [18] who reported that their respondents have sufficient knowledge about food additives. Findings also show that students from bachelor education of Home Science have a higher knowledge level on food additives compared to other group of students.

Table 2: Distribution of respondent knowledge on food additive.

Knowledge Level	Number of respondent (n)	Percentage %
Low	46	24.9
Moderate	116	62.7
High	23	12.4
	185	100%

KNOWLEDGE ON RISK OF TAKING FOOD WITH ADDITIVES

In terms of knowledge on the risks of taking food with additives, data in Table 3 indicate a mean value of 3.90 with a standard diviation of 0.91. Findings indicate a majority of the respondents agree and strongly agree that food additives can be harmful to health (87.6%), taking food with additives can cause obesity (80.5%), fast food intake causing various diseases (72.4%), kidney disease and diabetes can be caused by eating additives (73.5%) and eating fast food contributes to increased mortality (72.5%).

On the contrary, the findings also indicate that there are still respondents who are uncertain and disagree that taking food with additives will make people bad-tempered (45.4%), pickle containing sulfur dioxide can cause fatigue and breathless (42.7%), excessive intake of food dye can damage red blood cells and hemoglobin concentration (34.6%), excessive intake of food additives can make someone sleepy (31.9%) and artificial sweeteners can cause brain and cognitive damage (28.7%).

Table 3: Distribution of respondent knowledge on the risk of taking food additives.

Item	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Food additives can be harmful to health	1 (0.5%)	3 (1.6%)	19 (10.3%)	61 (33%)	101 (54.6%)
Food additives can cause obesity	1 (0.5%)	8 (4.3%)	27 (14.6%)	80 (43.2%)	69 (37.3%)
Artificial sweeteners can cause brain and cognitive damage	0 (0%)	14 (7.6%)	39 (21.1%)	68 (36.8%)	64 (34.6%)
Pickle containing sulfur dioxide can cause fatigue and breathless	2 (1.1%)	16 (8.6%)	61 (33%)	66 (34.6%)	40 (21.6%)
Food additives makes people bad-tempered	2 (1.1%)	23 (12.4%)	59 (31.9%)	65 (35.1%)	36 (19.5%)
Fast food intake causing various diseases	3 (1.6%)	15 (8.1%)	33 (17.8%)	86 (46.5%)	48 (25.9%)
Excessive intake of food dye can damage red blood cells and hemoglobin concentration	0 (0%)	21 (11.4%)	43 (23.2%)	77 (41.6%)	44 (23.8%)
Excessive intake of food additives can make someone sleepy	4 (2.2.%)	16 (8.6%)	39 (21.1%)	73 (39.5%)	53 (28.%)
Kidney disease and diabetes caused by eating additives food	4 (2.2.%)	14 (7.6%)	31 (16.8%)	86 (46.5%)	50 (27.0%)
Eating fast food contributes to increased mortality	2 (1.1%)	11 (5.9%)	38 (20.5%)	83 (44.9%)	51 (27.6%)

FREQUENCY OF FOOD WITH ADDITIVES INTAKE WITHIN 6 MONTH

Furthermore, the study found that the mean value of food intake containing additives over the course of six months was 2.69 with a standard deviation of 0.90. This data indicates that the food intake practices adopted by the respondents are not in line with their knowledge.

From Table 4, it can been seen that more than 50% of the respondents prefer to take fast food such as fried chicken (77.3%), french fries (69.2%), burger (59%), instant noodle (61%), chocolate (69.7%), ice cream (60%) and flavoured snack (54.6%). Meanwhile, food such as carbonated water (54.6%), canned salted nuts (56.2%), canned sardines (53%), jelly (57.3%), and pizza (57.9%) were taken by respondents less than 5 times in a period of 6 months. Moreover, 75.7% of respondents did not take canned red beans as one of their menu. This shows that the food intake practices of fellow respondents do not match with their knowledge and awareness on food additives.

Table 4: Frequency of food with additives intake within 6 month

	Frequency of food intake in 6 month			
List of food:	0	<5	6-10	> 10
Instant noodle	5 (2.7%)	67 (36.2%)	53 (28.6%)	60 (32.4%)
Burger	4 (2.2%)	72 (38.9%)	59 (31.9%)	50 (27.1%)
Pizza	21 (11.4%)	86 (46.5%)	42 (22.7%)	35 (18.9%)
Fried Chicken	3 (1.6%)	38 (20.5%)	52 (28.1%)	91 (49.2%)
French Fries	8 (4.3%)	48 (25.9%)	55 (29.7%)	73 (39.5%)
Chocolate	6 (3.2%)	50 (27.0%)	47 (25.9%)	82 (43.8%)
Cake	6 (3.2%)	80 (43.2%0	49 (26.5%)	50 (27.0%)
Ice Cream	7 (3.8%)	67 (36.2%)	52 (28.1%)	59 (31.9%)
Jelly	25 (13.5%)	81 (43.8%)	42 922.7%)	37 (20.0%)
Flavoured Snack	9 (4.9%)	75 (40.5%)	50 (27.0%)	51 (27.6%)
Pickle	35 (18.9%)	77 (41.6%)	35 (18.9%)	38 (20.5%)
Carbonated water	24 (13%)	77 (41.6%)	52 (28.1%)	32 (16.8%)
Canned Salted Nuts	27 (14.6%)	77 (41.6%)	48 (25.9%)	33 (17.8%)
Canned Sardines	17 (9.2%)	81 (43.8%)	53 (28.6%)	34 (18.4%)
Canned Red Beans	69 (37.3%)	71 (38.4%)	28 (15.1%)	17 9.2%)

IV. DISCUSSION

Overall, findings shows that respondents have moderate knowledge on food additives. Among the respondents, it was found that students from Bachelor of Home Science have a significantly higher knowledge on food additives compared to students from other bachelor programs. These findings are in parallel with Wang et al [19] who found that students from Bachelor of Home Economics have higher knowledge on food additives in fast food. The topic of nutrition learned in their program benefits them by straying away eating unhealthy food especially fast food which contains food additives.

Moderate level on food additives knowledge among the respondents may be due to less exposure about it. They are not fully educated in specific of what food additives are, the category of food additives, the short-terms and long-terms effects of excessive intake on mental and physical health. This statement is supported by Lee et al [20] whereby students are not exposed to knowledge about food additives unless they find it on their own. Consumers do not receive adequate information regarding food additives, which leads to confusion and vague apprehensions about purchasing processed foods. Some are very concerned regarding issues related to unhealthy food and they certainly have an awareness of it. On the contrary, they are people who do not prioritise their behavior in food lifestyle and consume anything they please. Demographic findings also show that most of the respondents rely on self-awareness to get information on the internet. These findings are in line with Lee et al [20] where it was reported that most respondents received information on food additives through broadcast

media, and the internet. Only 7.6% of the respondents stated that they received knowledge on food additives from their parents.

These findings indicate that Malaysian parents are less concerned with providing information and educating children about healthy foods. Most parents worry about healthy eating habits but Malaysian parents are less concerned about the content of food which has extra additives and the repercussions of their consumption on children's development. This causes the children to be unaware that their food intake is not healthy. Hence, it is not surprising that today, people are often shocked by the statistics that many teenagers have experienced kidney failure, diabetes and other chronic diseases. This is due to the habits of having fast food and other preservative foods which contains unhealthy substances. Students do not realize that their daily food intake is unhealthy.

In terms of knowledge on the risks of taking food additives, findings state a high mean value. These findings indicate that respondents have the awareness on its risks. All of them agreed that food additives can be harmful to their health especially obesity. However, there are students who do not realise that food additives can give negative effects to the brain and cognitive, fatigue, short-temperedness, damage blood cells and make them sleepy. These are the symptoms that are often found in our students today.

Food consumption practices for a period of 6 months among the respondents shows contradictory findings. Even though they knew the effects of taking excessive food additives, it doesn't stop them from consuming it. This finding is in line with previous research done by Gokce [13]. Their findings also found that although the knowledge levels on food additives of the students were high in general, it was observed that the frequency of food consumed daily was high too. Unparalleled result between action and knowledge might be due to several factors such as time constraints to get or to prepare nutritious meals [21]; [14], shortage of healthy food provider and influenced by media and simple lifestyle. Therefore, an education-based strategy Jiang [21] on the enhancement of health consciousness serve as an intervention mean to adverse effects of this unhealthy diet and should be taken by the management of the college or university.

V. CONCLUSION AND SUGGESTION

This study is supported by the Planned Behavior Theory, which indicate careless attitude (selfish, don't care), subjective norm (influenced by friends, media, lifestyle) and perceived behavioural control (time constrain, financing) influence a person's intention and behavior of taking fast food. Various factors might contribute to an unhealthy lifestyle or habits and of course, self-awareness alone is not enough. Therefore, in-depth knowledge of food additive substances needs to be updated from time to time.

It is evident that food chains are fast growing. The demands towards convenience foods and reasonably long shelf life of processed foods are increasing. Without food additives, it would be impossible to maintain the high standards of security, selection and convenience in our food supply [22]. In preparation for the future of a healthy generation, it is important for everyone to be aware of the types of chemicals and food additives when consuming food [9]. If use of food additives is a must due to their advantages, then they should be the natural ones which have minimal effects and those that are generally recognized as safe [8]; [23] One must avoid from taking artificial preservatives whereby chemical substances may produce health hazards.

Therefore, the younger generation must be educated not only about healthy food but together with knowledge on harmful food. A good place to start is with preschool students until tertiary students by providing reliable information via efficient implementations required to transform knowledge into practice [13]. Promotion of continuous campaigns such as

"SAY NO TO FAST FOOD" or "THE FAST YOU TAKE, THE FAST YOU GO" among the consumers can help consumers to be more cautious and sensitive on food safety. This indirectly helps increase the sense of responsibility among food entrepreneurs or provider to ensure that the food produced is safe to consume. As suggessted by Abdulmumeen [6], one should promote organic foods which are free from artificial additives. Additionally, one must look for foods that are not packaged and processed, but enjoy nature's own bounty of fresh fruits, vegetables, grains, beans, nuts and seeds. Foods that should be consumer resemble what they look like when they were originally grown.

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