

# Factors Affecting Food Consumption Behaviour during COVID-Pandemic Among Thai People Aged 15-20 Years Old In Bangkok, Thailand

Kornchanok Benjatikul<sup>1</sup>, Intukorn Kedlap<sup>2</sup>, Pitchapat Thanapatcharoen<sup>3</sup>, Natchapat Wongnam<sup>4</sup>, Nannapas Poolsawat<sup>5</sup>, Thonpol Sujinhammasarn<sup>4</sup> and Puchita Chokcharoenying<sup>6</sup>

<sup>1</sup>emin.benja@gmail.com

<sup>1</sup>St. Andrews International School, Bangkok 10110, Thailand

<sup>2</sup>Sarasas Ektra School, Bangkok 10120, Thailand

<sup>3</sup>Patumwan Demonstration School, Bangkok 10330, Thailand

<sup>4</sup>Bodindecha (Sing Singhaseni) School, Bangkok 10310, Thailand

<sup>5</sup>Sukhondheerawith School, Nakhon Pathom 73110, Thailand

<sup>6</sup>Mahidol University International Demonstration School, Nakhon Pathom 73170, Thailand

## Abstract

**Background:** The Covid-19 pandemic has affected the entire world, including every province of Thailand, spreading rapidly causing several measures to take place. To control the epidemic, lockdown measures were implemented. Suspension of international travel, abstaining from meeting up in large groups to name a few examples. Eating out in restaurants is a common aspect in people's lives, especially in Bangkok. Due to the Covid-19 pandemic, bangkokians face the heightening need for read-to-eat food more than ever. This in turn has caused a difference in people's behaviour towards food consumption.

**Objective:** To study about knowledge and understanding of food consumption and the factors influencing food consumption behaviour during the spread of COVID-19.

**Method:** A questionnaire to measure cognition about food safety consumption. During the COVID-19 outbreak and food consumption behaviour during the COVID-19 pandemic

**Result:** A total of 428 participants, aged between 15-20 years old, revealed a low-level knowledge of food consumption and a moderated level of food consumption behaviour ( $M=48.68$ ,  $SD=8.12$ ). Gender, Age, Class Level, Parents' Occupation, Household Income and Nutrition related Knowledge affected Food consumption behaviour {Multiple  $R = .111$ ,  $F=7.443$ ,  $p<0.001$ ,  $df(7,419)$ }. These factors could predict 11% ( $R\text{ Square} = 0.111$ ). When considered all factors it had been found that Nutrition related knowledge was the only statistically significant predictive factors for food consumption behaviour ( $Beta=0.16$ ,  $t=3.41$ ,  $p<0.01$ )

**Conclusion:** Participants had a low level of food consumption knowledge and a moderate level of food consumption behaviour. Providing knowledge or health educational programs regarding food consumption and nutrition should be done in order to improve knowledge and understanding as well as appropriate food consumption behaviour among people aged 15-20 years old, especially during COVID-19 pandemic.

**Keywords:** Covid 19 , Food consumption behaviour, Food, Bangkok

## 1. Introduction

The covid-19 pandemic has affected the entire world including Thailand, spreading rapidly and causing various measures to be placed, such as lockdowns, suspension of international travel, and abstaining from being in groups in small crowded areas. These measures have altered the lives of all people globally.<sup>1</sup>

Generally, eating out in restaurants is common, especially in Bangkok. However, due to the lockdowns, people were forced to eat in, and the demand for ready-to-eat food skyrocketed. The growing trend correlated with the severity of the Covid-19 outbreak in Bangkok. This, in turn, made people's consumption behaviour drastically different to what it was before the pandemic.

According to the World Food Quality Situation Report, food products originating from Asian countries contain the most food problems.<sup>2</sup> Besides the raw materials, unsafe chemicals or microorganisms discovered in these food products, one factor that affects food safety as a whole is the service of preparing and cooking these ready-to-eat foods.<sup>3</sup> Providers of food, whether it'd be the chef, handler, butcher etc. must build trust and confirm that the food is safe by showing a clear, proper pathway in the preparation, cooking, and delivery process of food, from the manufacturer to the consumers.<sup>3</sup>

Safety measures have been placed on all food service establishments like restaurants, and shops.<sup>4</sup> Even so, we can ensure the safety of consumers by educating the consumers and letting them adjust their behaviour to reduce the risk of disease or contamination. With the Covid-19 outbreak, 47% of individuals rather buy food and eat at home due to their concern over their own safety.

In this study, our research team aimed to study food consumption behaviour during the COVID-19 epidemic by measuring the general knowledge on safe food consumption, prevention of COVID-19, and their current food consumption behaviour during this outbreak of highschoolers in Bangkok. We chose this age group because the majority were stuck at home doing online learning and were forced to take care of their own food consumption.

All tables should be numbered with Arabic numerals. Headings should be placed above tables, left justified. Leave one line space between the heading and the table. Only horizontal lines should be used within a table, to distinguish the column headings from the body of the table, and immediately above and below the table. Tables must be embedded into the text and not supplied separately. Below is an example which authors may find useful.

## **2. Procedure**

### **2.1 Objective**

1. To study knowledge and understanding about food consumption during the COVID-19 outbreak.
2. To study the factors affecting food consumption behaviour during the COVID-19 outbreak.

### **2.2 Research methodology**

Cross-Sectional Study was used to gather information by using questionnaires through an online platform; Google Form. Students from grades 10 to 12 in Bangkok participated in the questionnaires.

### **2.3 Population and sample**

The population of this study consisted of students in grades 10 to 12 in Bangkok. That can access the internet (exact numbers are unknown). The sample size was calculated by Taro Yamane's formula. The sample size was 400 people. A total of 427 samples were actually collected.

### **2.4 Instrument and equipment in this study**

Use an online questionnaire (Google Form) developed by the researcher according to the process of creating a questionnaire to collect research information. It comprehensive by the following contents; 1. Food safety consumption guidelines 2. Prevention of COVID-19 infection 3. Research that related to consumption behavior and preventive behaviors against COVID-19. This research instrument was brought to food experts, prevention and control of infection, tested by 3 people and tested with a group of 10 students during 15-20 years old. To test the difficulty of the questions and have been improved and revised according to the advice of experts. This questionnaire consists of 3 parts 1.A question about the personal information of respondents. Includes questions about gender, age, level, parent's occupation, family incomes, weight changes during COVID-19. 2. Knowledge and understanding about safe food consumption during the covid-19 pandemic. And 3. Food consumption behaviour during the covid-19.

A questionnaire to measure the cognition of food safety during the covid-19 outbreak and food consumption behaviour during the COVID-19 outbreak, the details are as follows.

1. A questionnaire to measuring about food consumption during covid-19 outbreak, consists of 23 questions, to estimate knowledge about food safety consumption choices and prevention of covid-19 infection. The question type is 4 choices, choose 1 answer. If it's correct, 1 point is given. The interpretation of the scores is as follows:

If the total score is between 18-23, or 80-100 percent, interpreted their knowledge and understanding about safe food consumption during the covid-19 outbreak, it is at a high level. If the total score is between 14-17, or 60-79 percent, interpreted their knowledge and understanding about food safety consumption during the covid-19 outbreak, it is at a medium level. And scores between 0-13 or 0-59 percent, interpreted their knowledge and understanding about safe food consumption during covid-19 outbreak is at a low level.

2. A questionnaire measuring the level of food consumption behaviour during COVID-19, consists of 13 questions. The question is a measure of behaviour, choose 1-5, where 1 means not practiced and 5 means regular practice. The score for the food safety behaviour level during covid-19 ranged from 13-65. The interpretation of the scores was as follows: Behaviour scores is at high level. A score range between 52-65, or 80-100 percent. If a behavior score is moderate. A score range between 39-51, or 60-79 percent. And is a behavior score being at low level. A score range between 13-38, or lower than 60 percent.

## 2.5 Data Compilation

In this study collected data using an online questionnaire (Google Form) by sending this questionnaire to students in grades 10 to 12 through online platforms such as the line group. All students of each grade can access to an invitation to participate in this research questionnaire.

## 2.6 Data Analysis

Statistics used to analyse demographic data. A cognition about safe food consumption during the covid-19 outbreak and consumption behaviour during the covid-19 outbreak. These are Descriptive Statistics, Frequency, Percentage, Mean and Standard Deviation. Inferential Statistics used to analyse factors affecting safe food consumption behaviour during COVID-19 were Multiregression Analysis

## 2.7 Ethical Considerations

In this research, the researcher is aware of the ethics of research and consider about potential effects that may occurs with sample group and the operation is performed as follows;

- 1.The researcher has explained the objectives and process of proceeding the research.
- 2.Sample group have freedom to decide whether to accept or decline to participation in this research.

3. If the sample group undesirable to participate in the research, it is not necessary to inform the researcher the reasons.

4. After the sample group has been informed of Ethical Consideration. If the sample group is willing to participate in this research, select the option “consent” to participate in this research through Google Form.

5. The information from the survey respondents will be kept confidential and the names of the respondents were not identified.

The researcher respects the right of research participants. Request permission to collect data from a sample group that willing to participate and answer the question voluntarily. Explain the purpose of the research until they understood. Including keep the information confidential and not revealing it individually. And sample group has the right not to answer questions or leave the research at any stage.

### 3. Results

A total of 427 people participated in this study. Majority of participants were female (n=283, 66.3%) and 144 (33.7%) male. Age group of 17-18 years old (n=284, 66.5%) were the biggest groups, followed by the 15-16 age group (n=103, 24.1%) and age group of 19-20 years old (n=40, 9.4%). Grade 12 was the largest group of participants (n=212, 49.6%); whereas the remaining participants had an education of Grade 11 (n=106, 24.8%), College (n=66, 15.5%) and Grade 9-10 (n=43, 10.1%) respectively. The parents of this survey participants were business owners (n=137, 32.1%), employees (n=125, 29.5%), freelance (n=46, 10.8%) and others (n=119, 27.9%). These parents of the survey participants earn the household income at more than Baht 150,000 (n=128, 30%), Baht 80,001-150,000 (n=106, 24.8%), Baht 40,001-80,000 (n=91, 21.3%), Baht 20,001-40,000 (n=74, 17.3%) and less than Baht 20,000 (n=28, 6.6%). Lastly, the survey reported the survey participants gaining weight of 1-3 Kg. (n=142, 33.3%) and 3 Kg. (n=65, 15.3%), losing weight of 1-3 Kg. (n=65, 15.2%) and more than 3 Kg. (n=42, 9.8%), and having no weight change (n=75, 17.6%). Unfortunately 38 participants (8.9%) reported that they didn't know of their weight change during COVID-19.

For Food Consumption related knoweldge, the results showed that most participants had low Food Consumption related knoweldge score (M=10.69, SD=3.11). Female participants had a higher knowledge score (M=10.97, SD=3.47) than males'. Age group of 17-18 years old showed the highest score (M=10.82, SD=3.16) while the 19-20 years old group had 10.75 score (SD=3.23) and the 15-16 years old group had 10.28 (SD=2.92). Grade 12 participants showed the highest knowledge scores (M=10.86, SD=3.13), followed by college participants (M=10.68, SD=3.31), grade 11 students (M=10.52, SD=3.09) and grade 9-10 participants (M=10.23, SD=2.78) consecutively. Participants whom had parents worked as freelance processed showed the highest knowledge scores (M=11.33, SD=2.70), followed by parents who worked in other group (M=10.47, SD=3.62), participants whose parents own a business (M=10.26, SD=3.04) and participants whose parents work for a company (M=11.12, SD=2.73) respectively. Household income group which earned more than 150,000 Baht monthly indicated the highest nutrition related knowledge score (M=10.95, SD=2.99), followed by a group of household which earned 80,000-150,000 Baht monthly (M=10.91, SD=3.7), a household group which earned 20,000-40,000 Baht per month (M=10.66, SD=3.01), a household group which earned 40,001-80,000 Baht per month (M=10.56, SD=3.28) and <20,000 Baht monthly household income group (M=9.14, SD=2.90). A group of participants who gained weight more than 3 kilograms had the highest nutrition related knowledge scores (M=11.00, SD=3.18), followed by a group of participants who lose weight more than 3 kilograms (M=10.86, SD=2.55), participant group which gained 1-3 kilograms (M=10.84, SD=3.24), participant group which lose 1-3 kilograms and a group which didn't aware of their weight change had the lowest nutrition related knowledge score (M=9.81, SD=2.62)

Food Consumption Behavioural Score, participants reported a moderate level of food consumption behaviour score ( $M=48.68$ ,  $SD=8.12$ ). Males had higher average scores than females, which was  $M = 49.68(SD=8.94)$  and female  $M = 48.18 (SD=7.64)$ , the group of respondents age between 15-16 years old,  $M = 48.89 (SD=8.77)$ , the group of respondents age between 17-18 years  $M = 48.65 (SD=7.50)$ , the group of respondents age between 19-20 years  $M = 48.40 (SD=10.53)$ , the group of students from grade 9-10 had the highest knowledge of Food Consumption Behavioral  $M = 50.77 (SD=9.57)$ . Secondly, was grade 11,  $M = 49.10 (SD=9.03)$ , grade 12  $M = 48.33 (SD=6.83)$  and college  $M = 47.79 (SD=9.25)$ , respectively. The highest food consumption behavior score for self-employed parents was  $M = 51.24 (8.42)$ . Secondly, employees  $M = 50.52 (7.89)$ , others  $M = 48.70 (SD=7.78)$  and Business Owner  $M = 46.14 (SD=7.87)$ . A group of family with a household income between 80,001-150,000 baht had the highest understanding of Food Consumption Behavioral Score  $M = 49.61 (SD=7.17)$ , followed by a group of family with a household income between 40,001-80,000 baht  $M = 49.05 (SD=7.95)$ , and a group of family with a household income less than 20,000 baht  $M = 48.75 (SD=9.31)$ . A group of family with a household income between 20,001-40,000 baht  $M = 48.46 (SD=9.34)$  and an income over 150,000  $M = 47.77 (SD=7.98)$ . The respondents with Weight Loss more than 3 kilograms had the highest Food Consumption Behavioral Score  $M = 52.17 (SD=10.19)$ , followed by Weight Gain 1-3 kilograms  $M = 49.72 (SD=6.73)$ , No Change  $M = 49.12 (SD=8.93)$ , Weight Loss more than 1-3 kilograms  $M = 49.12 (SD=7.94)$ , Weight Gain 3 kilograms  $M = 46.69 (SD=7.93)$  and Don't know  $M = 42.76 (SD=5.7)$ .

Table 1. Demographic Characteristic of Participants, Food Consumption Related Knowledge and Food Consumption behavioural score (n=427)

Variable	n (%)	Food Consumption Knowledge n (SD)	Food Consumption Behavioural Score n (SD)
Sex		(23)	(13-65)
Male	144 (33.7)	10.13 (3.47)	49.68 (8.94)
Female	283 (66.3)	10.97 (2.88)	48.18 (7.64)
Age			
15 - 16	103 (24.1)	10.28 (2.92)	48.89 (8.77)
17 - 18	284 (66.5)	10.82 (3.16)	48.65 (7.50)
19 - 20	40 (9.4)	10.75 (3.23)	48.40 (10.53)
Class			
Grade 9 - 10	43 (10.1)	10.23 (2.78)	50.77 (9.56)
Grade 11	106 (24.8)	10.52 (3.09)	49.10 (9.03)
Grade 12	212 (49.6)	10.86 (3.13)	48.33 (6.83)
College	66 (15.5)	10.68 (3.31)	47.79 (9.25)
Parent's Occupation			
Employee	125 (29.3)	11.12 (2.73)	50.52 (7.89)
Business Owner	137 (32.1)	10.26 (3.04)	46.14 (7.87)
Freelance	46 (10.8)	11.33 (2.70)	51.24 (8.42)
Others	119 (27.9)	10.47 (3.62)	48.70 (7.78)
Monthly Household Income (Baht)			

< 20,000	28 (6.6)	9.14 (2.90)	48.75 (9.31)
20,001 – 40,000	74 (17.3)	10.66 (3.01)	48.46 (9.34)
40,001 – 80,000	91 (21.3)	10.56 (3.28)	49.05 (7.95)
80,001 – 150,000	106 (24.8)	10.91 (3.17)	49.61 (7.17)
>150,000	128 (30)	10.95 (2.99)	47.77 (7.98)
Weight changed during Covid-19			
Weight loss > 3 kg	42 (9.8)	10.86 (2.55)	52.17 (10.19)
Weight loss 1-3 kg	65 (15.2)	10.31 (3.26)	49.12 (7.94)
No Change	75 (17.6)	10.80 (3.17)	49.12 (8.93)
Weight Gain 1-3 kg	142 (33.3)	10.84 (3.24)	49.72 (6.73)
Weight Gain 3 kg	65 (15.2)	11.00 (3.18)	46.69 (7.93)
Unsure	38 (8.9)	9.81 (2.62)	42.76 (5.71)
Total	427	10.69 (3.11)	48.68 8.12)

Gender, Age, Class Level, Parents' Occupation, Household Income and Nutrition related Knowledge were variables which affect Food consumption behaviour {Multiple R = .111, F=7.443,  $p < 0.001$ , df (7,419)}. These variables could predict 11% (R Square =0.111). When considered all variable it had been found that Nutrition related knowledge was the only statistically significant predictive factors for food consumption behaviour (Beta=0.16,  $t=3.41$ ,  $p < 0.01$ ) (Table 2)

Table 2. Factors affecting Food Consumption Behaviour of Participants

Variable	B	S.E.	Beta	t	Sig.	95.0% Interval	Confidence for B
						Lower Bound	Upper Bound
Sex	-1.959	0.809	-0.114	-2.422	0.016	-3.548	-0.369
Age	1.834	0.983	0.126	1.866	0.063	-0.098	3.765
Class	-2.076	0.648	-0.217	-3.205	0.001	-3.349	-0.803
Parent's Occupation	-0.282	0.247	-0.054	-1.144	0.253	-0.767	0.203
Household Income	-0.003	0.318	0.000	-0.010	0.992	-0.628	0.622
Weight Change during Covid-19	-1.382	0.278	-0.240	-4.965	0.000	-1.930	-0.835
Food Consumption related Knowledge	0.419	0.123	0.160	3.410	0.001	0.177	0.660

#### 4. Discussion

The study was conducted during the covid-19 outbreak. In addition to consuming food according to the principles of nutrition, the consumption of food that is safe from pathogenic microorganisms, including covid-19 are the goal of this study and the prevention of covid-19 infection is also important. In this study can estimate food consumption knowledge scores during the covid-19 outbreak, which compose of questions about nutrition and food safety. From the results, it was found that 428 respondents were in the age group



between 15-20 years old. They had a low level of knowledge about proper food consumption. The result found that males had higher knowledge about proper food consumption than females. A respondent who is studying in grade 12, a respondent whose parents are self-employed, a group of family with income more than 150,000 baht per month and the weight changing group and gaining weight more than 3 kilograms has the highest knowledge score. In terms of food consumption behaviour scores during the covid-19 outbreak, it was found that males had higher behaviour scores than females. A group of students from grade 9-10, self-employed parents, the weight changing group and gaining weight more than 3 kilograms have the highest consumption behaviour scores during covid-19 outbreak. The variable that can predict the food consumption behaviour during the covid-19 outbreak is knowledge about proper food consumption. When considering each section, it was found that the three most correct answers were: 1. Which food has the most sugar? There were 101 correct, representing 23.65 percent. Secondary, 2. How many times a week should they eat breakfast? There were 95 correct, representing 22 percent. And lastly, 3. Which is the healthiest sandwich for lunch? There were 90 corrects, representing 21.07 percent. The three least correct answers were: (1) According to the Integrated Food Safety Program report for fiscal year 2019, which meat was found to be the most contaminated with antimicrobial resistance. There were 16 corrects, representing 3.17 percent. (2) Which cleaning method is the best way to reduce pesticide residues off fruits and vegetable? There were 21 corrects, representing 4.9 percent. (3). What is the recommended maximum intake of alcohol per day? (The amount depends on the size and strength of the drink). There were 22 corrects, representing 5.15 percent. This may be because most of the respondents were students and most of the students probably lived with their parents. Most of these people have educated and learned from their daily life with families and school. Living with their parents, they may be prepared food or meals, there is no need to cook or buy it yourself. They did not pay attention to nutrition, resulting in knowledge scores about food consumption and food safety is low.

In addition, knowledge of food safety did not learn in high school. This may cause most students to have less knowledge about food safety. It was different from a study of Aravan Mungvongsa and Koonwadee Khangwa (2020)<sup>5</sup>. They studied the factors that related to food consumption behaviour of high school students. It was found that the respondents had a moderate level of knowledge about food consumption and a study of Salalin Dokkhem (2011)<sup>6</sup> who studied food consumption of junior high school students in Bangkok. It was found that the students had the exact information about food consumption at a good level. When analysing food consumption behaviour scores, it was found that the most practised behaviours were; (1) Pay more attention to hygiene, especially during the situation of covid-19, have an average score of 4.27. Secondary, (2) Select to eat a sanitary food that is free from contamination, have an average score of 4.19. And last one (3) Drink at least 8 glasses of water a day, have an average score of 3.89. Most of the respondents had a moderate food consumption score. The result found that males had higher scores than females. The respondents who were studying in grades 9-10 had the highest consumption behaviour scores. This may be because students in grades 9-10 were the youngest in the study group. They obey their parents and consume food according to the guidelines that have been taught, when compared to other older groups. Which may have more personality, as you can see from Table 1. Consumer behaviour scores decreased among respondents who study at higher classes. It is in the same direction as Muntina Chapha (2014)<sup>6</sup> who studied nursing students with inappropriate consumption behaviour. When analysed the weight change during the COVID-19 outbreak. It was found that the group with a weight loss more than 3 kilograms. had the highest consumption behaviour score. This may be because 1. This group was aware of weight control especially during the covid-19 outbreak which has been locked down. 2. Stressed due to lockdown. Many lifestyle behaviours need to be adjusted. Agreeable with the study of Aravan Mungvongsa and Koonwadee Khangwa (2020)<sup>7</sup> who studied the factors that related to food consumption behaviour of high school students. It was found that the respondents had a moderate food consumption behaviour score by personal factors, there was a positive relationship with consumption behaviour. Salalin Dokkhem (2011)<sup>6</sup> Who studied the food

consumption of junior high school students in Bangkok, found that the proper consumption behaviours were at a moderate level. A gender, GPA, and parent's highest education, influenced the knowledge of food consumption of junior high school students. From the study, it was shown that the sample group, which is a citizen aged between 15-20 years old, still lacked cognition about the right consumption of food. Because most of them live with their parents, taking care of food for their children. But the sample group had food consumption behaviour during the covid-19 outbreak at moderate level. Maybe because they were told and taught by their parents. In addition, the outbreak of COVID-19. This causes the increase of awareness and caution about hygiene. However, from the studies of Salalin Dokkhem (2011). It was found out that although the students had the right knowledge of food consumption, they may not see the importance of food consumption, therefore they did not apply in their real life. Knowledge of proper consumption, It is a variable that affects consumption behaviour. During the covid-19 outbreak, should promote the instruction for sample groups to increase the level of proper food consumption behaviour.

## 5. Conclusion

A total of 428 participants, aged between 15-20 years old, revealed a low-level knowledge of food consumption and a moderated level of food consumption behaviour ( $M=48.68$ ,  $SD=8.12$ ). Gender, Age, Class Level, Parents' Occupation, Household Income and Nutrition related Knowledge affected Food consumption behaviour {Multiple  $R = .111$ ,  $F=7.443$ ,  $p<0.001$ ,  $df (7,419)$ }. These factors could predict 11% ( $R\text{ Square}=0.111$ ). When considered all factors it had been found that Nutrition related knowledge was the only statistically significant predictive factors for food consumption behaviour ( $Beta=0.16$ ,  $t=3.41$ ,  $p<0.01$ )

## 6. Suggestion

Nutrition and food consumption knowledge should be provided to people aged 15-20 years olds in order to improve food consumption behaviours through various media that can reach out to this group of people.

## References

1. Ministry of Public Health. Public Health Practice Guidelines for the Management of the COVID-19 Epidemic in the Requirements issued under Article 9 of the Royal Decree on Government Administration in Emergency Situations 2005 (No. 1). Nonthaburi: Ministry of Public Health; 2020.
2. World Health Organisation (2020). Almost 1 in 10 people in the world – fall ill after eating contaminated food. Retrieved from: <https://www.who.int/news-room/fact-sheets/detail/food-safety>
3. Science Centre of Education (2021). Food Safety from Farm to Table. Science Centre of Education. Retrieved from <https://sciplanet.org/content/7949#>
4. Ministry of Public Health (2019). Public Health Guideline for Street Foods during the COVID-19 pandemic. Retrieved from [https://covid19.anamai.moph.go.th/web-upload/2xdcaaf3d7f6ae30ba6ae1459eaf3dd66/m\\_document/6736/34164/file\\_download/af453a81c00ded5c821b4b77e1f997e2.pdf](https://covid19.anamai.moph.go.th/web-upload/2xdcaaf3d7f6ae30ba6ae1459eaf3dd66/m_document/6736/34164/file_download/af453a81c00ded5c821b4b77e1f997e2.pdf)
5. Aravan Mungvongsa, Koonwadee Khangwa (2019). Factors Related to Food Consumption Behavior of Senior High School Students In Watjuntrawart (Sukprasarnrat) School Phetchaburi Province. Hua Hin Sook Jai Klai Kangwon Journal: Vol. 5 No.1 January-April 2019. Retrieved from: <https://he01.tci-thaijo.org/index.php/hhsk/article/download/207622/165360/>
6. Pilot Officer Salalin Dokkhem (2014). The Food Consumption of junior high school Students in Bangkok. Journal of The Police Nurse: Vol. 6 No. 2 July - December 2014. Retrieved from: <http://libdms.nida.ac.th/thesis6/2554/b175689.pdf>
7. Sqn. Ldr. Muntina Chapha (2014). Nutritional Knowledge, Attitude toward Food, Food Consumption Behavior, and Nutritional Status in Air Force Student Nurses.2014. <https://he01.tci-thaijo.org/index.php/policeurse/article/view/27828/23927>