A Case study of Nutrition and Immunity Knowledge and Health Behaviour during the COVID-19 pandemic among grade 10-12 students.

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Abstract

Background: Health behavior including Food consumption of Thai people has changed due to economic and social changes, resulting in health conditions, eventually. Unexpectedly, the biological disaster, COVID-19, has been a cause of death for millions of people around the world, especially people with health conditions. To avoid having a health condition, we could have good health practices such as eating good foods, getting enough rest, taking exercise, etc.

Objective: To assess Nutrition and Immunity related knowledge, and Health Behavior during COVID-19. And to study factors affect Health Behaviors of participants.

Method: Cross-Sectional Study was used to gather information by using questionnaires through an online platform; Google Form. Students from grades 10 to 12 who could access the internet participated in the questionnaires. There were 138 students who participated in this study.

Result: From the study about Nutrition and immunity knowledge and health behavior during the COVID-19 pandemic, there were 138 participants. Most participants illustrated Nutrition and Immunity Knowledge at a low score (M=5.63, SD=1.35), for Health Behavior score, most participants showed a moderate level of score (M=66.78, SD=11.85). Taking vitamins and supplements was a predictive factor for health behavior during COVID-19.

Conclusion: The only factor affecting health behavior of participants during COVID-19 pandemic was vitamin and supplement intake during COVID-19. Immunity in our body can be improved in mainly 2 ways 1) taking vaccination when needed 2) having good health behavior such as eating good foods, taking enough rest, and taking exercise. To have people practise good Health Behavior to strengthen immunity, education especially nutrition and immune system knowledge should be provided to the public which can be easily accessed.

Keyword: food consumption, immune system, COVID-19

Background information

COVID-19 is a contagious disease caused by the coronavirus. COVID-19 emerged in December 2019 and spread quickly and resulted in a total of 551,527,297million infected people and 6,355,525 million deaths worldwide, as of 30 June 2022. Thailand had 2,695 cases per day as of 30 June 2022. The disease can be spread from person to person through the respiratory system, such as through droplets of mucus from the nose or saliva from the mouth. But these droplets do not go very far because of their weight they tend to fall on objects or surfaces. When those objects or surfaces are touched without cleaning the contact organs then bring it to the eyes, nose or mouth, that causes infection and spreading germs in a wide area.

Protecting yourself and society from contracting the novel coronavirus, or COVID-19, is a measure that all citizens should take and cooperate. To help prevent and reduce the risk of disease including reducing the spread of infection in society, keeping distance between yourself and others[1]. COVID-19 vaccination to stimulate immunity It may not prevent 100% of infection, but it can prevent serious illness[2]. Vaccination is the safest way to protect yourself from infectious diseases. When vaccinated Your body builds up immunity, which helps you fight off germs. If it gets into the body Vaccines contain pathogens, or may contain weakened or inactivated ones, but still have the ability to induce immunity. It is important to have a healthy body and good health behaviors. It

is something that helps strengthen the body's immune system to fight various diseases at full efficiency. Having a healthy and strong body enhances natural immunity caused by food consumption, behavior, exercise and rest.

Nowadays, health behavior including the food consumption of Thai people has changed rapidly due to economic and social changes, resulting in consumption tastes having to adjust more patterns of consumption of food from other countries, including a variety of imported raw materials or a combination of culture and traditions. These foods are very popular among teenagers, mostly starch, sodium, fat and sugar in a relatively high amount, when eaten frequently in large quantities, will accumulate in the body until it becomes fat. These could have effects on health to the point of self-harm, such as obesity, hyperlipidemia, high blood pressure, etc[3].

This study aims to study knowledge about nutrition for enhancing immunity and health behaviours. of students in grades 4-6 in Bangkok during the COVID-19 outbreak, as Bangkok is a densely populated area. Also, classes in most schools are crowded. It is easy to spread and get infected without proper protection. Boosting your natural immunity through good nutrition is something everyone can do every day.

Objective of the study

1. To assess Nutrition and Immunity related knowledge, and Health Behavior during COVID-19
2. To study the factors that affect Health Behavior during COVID-19

Conceptual Framework

To have good health behavior which strengthens immunity, we need to have knowledge and understanding as well as good health practice. This study assesses Nutrition and Immunity Knowledge and Health Behavior during COVID-19. Under Health Behavior Theory by Pander's, indicated that having good health behavior is attributed from 3 factors 1) personal factors 2) cognitive behavior when it comes to health and support from other people 3) outcome behaviors. In this study, we mainly focus on the second factor (cognitive behavior when it comes to health) which consists of knowing the benefits and challenges of having the correct attitude as well as knowing what one can do when it comes to food consumption to strengthen the immune system. All of this will influence hygienic behaviors a illustrated in figure 1

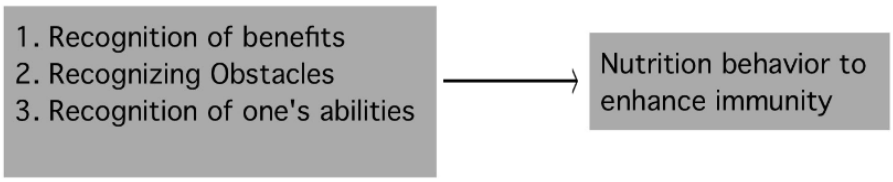

Figure 1

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 who could access the internet participated in the questionnaires. There were 138 students who participated in this study.

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 is comprehensive by the following contents; 1. Nutrition and Immunity 2. Information about COVID-19 3. Health Behavior 4. Research that is related to health behavior. This research instrument was brought to nutrition experts, immune system experts, and a researcher in the field, tested by 3 people and tested with a group of 10 students between 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, class level, study program, parent's occupation, congenital disease, vitamin intake during the COVID-19 pandemic. 2). Knowledge and understanding about Nutrition and Immunity. And 3). Health Behavior during the covid-19.

A questionnaire to measure level of knowledge and understanding regarding nutrition and immunity, and health behavior, the details are as follows.

A questionnaire to measure nutrition and immunity knowledge consists of 11 questions. 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 8.8-11, or 80-100 percent, interpreted their knowledge and understanding about nutrition and immunity, it is at a high level. If the total score is between 6.6-8.7, or 60-79 percent, interpret their knowledge as at a medium level. And scores between 0-6.5 or 0-59 percent, interpreted their knowledge as at a low level.

A questionnaire measuring health behavior during COVID-19, consists of 18 questions. The question is a measure of behavior, choose 1-5, where 1 means not practiced and 5 means regular practice. The score for the health behavior level during covid-19 ranged from 18-90. The interpretation of the scores was as follows: Behavior scores are at high level. A score range between 72-90, or 80-100 percent. If a behavior score is moderate. A score range between 54-71, or 60-79 percent. And is a behavior score being at a low level. A score range between 18-53, or lower than 60 percent.

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 an invitation to participate in this research questionnaire.

Data Analysis

We use descriptive statistics to analyze participants' characteristic data, level of knowledge and understanding regarding nutrition and immunity and health behavior; using frequency, percentage, mean and standard deviation. Inferential Statistics used to analyze factors affecting safe health behavior during COVID-19 were Multi Regression Analysis

Ethical Consideration

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;

The researcher has explained the objectives and process of proceeding the research. Sample groups have freedom to decide whether to accept or decline to participate in this research. If the sample group is undesirable to participate in the research, it is not necessary to inform the researcher of the reasons. 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. The information from the survey respondents will be kept confidential and the names of the respondents were not identified.

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

Result

From a total of 138 participants, the majority was female (n=106, 76.8%) and 32 participants were male (23.4%). Grade 12 students were a majority group of participants (n=99, 71.7%), followed by grade 11 (n=28, 20.3%) and grade 10 (n=11, 8%). Majority of participants studied Maths-Science program (n=119, 86.2%), the rest studied other program than Maths-Science program (n=19, 13.8%). Majority of participants worked as an employee (n=41, 29.7%), followed by freelance (n=30, 21.7%), teacher (n=21, 15.2%), health science field (n=18, 13%) business owner and others shared the same proportion of share (n=14, 10.1%). 84.1 % (n=116) of participants reported on congenital disease and 15.9% (n=22) reported that they had congenital diseases. Majority of participants (n=87, 63%) did not take any vitamins or supplements during COVID-19 pandemic, following by taking vitamins and supplements than usual (n=26, 18.8%) during COVID-19 pandemic and taking more vitamins and supplements than usual n=25, 18.1%) during the pandemic.

Concerning nutrition and immunity related knowledge, participants showed a low level of knowledge score (M=5.63, SD=1.35). Female participants (M=5.60, SD=1.35) showed a higher knowledge score than male

participants (M=5.50, SD=1.36). Grade 11 participants reported the highest knowledge score (M=5.71, SD=1.36), followed by grade 12 participants (M=5.62, SD=1.41) and grade 10 participants (M=5.45, SD=0.83). Participants who studied other programs than Maths-Science showed a higher knowledge score (M=5.68, SD=1.16) and Maths-Science participants (M=5.62, SD=1.39). Whose parents worked in health science field showed the highest knowledge scored (M=5.83, SD=0.98), followed by whose parents who worked as an employee (M=5.83, SD=1.39), freelance (M=5.80, SD=1.49), teacher (M=5.42, SD=1.16), business owner (M=5.29, SD=1.20), and other (M=5.07, SD=1.68), respectively. Participants who reported not having congenital disease had a higher (M=5.63, SD=1.36) knowledge score than who reported having one (M=5.59, SD=1.33). Group of participant who took vitamins and supplements more than usual during the COVID-19 pandemic showed the highest knowledge score (M=5.76, SD=1.42), followed by participant who did not take any vitamins and supplements during the COVID-19 pandemic (M=5.69, SD=1.40) and participants who took vitamins and supplements at the same amount as usual (M=5.30, SD=1.12), subsequently.

For health behavior during the COVID-19 pandemic, most participants report a moderate health behavior score (M=66.78, SD=11.85). Male participants (M=70.63, SD=11.39) had a higher health behavior score than female participants (M=65.62, SD=11.80). Grade 10 participants showed the highest health behavior score (M=69.63, SD=9.55) among them, followed by grade 11 participants (M=68.29, SD=11.66) and grade 12 participants (M=66.04, SD=12.14). For the study program, participants who studied Maths- Science program (M=66.78, SD=11.63) and other programs (M=66.78, SD=13.50) had the same level of health behaviour score. For parent occupation, participants whose parents worked as a teacher (M=69.52, SD=10.36) had the highest health behavior scores (M=69.52, SD=10.36), given followed by worked as other choices (M=69.35, SD=8.68), employee (M=67.39, SD=11.19), business owner (M=67.21, SD=13.07), health science (M=65.72, SD=14.49) and freelance (M=63.26, SD=12.37). Participants who reported not having congenital disease had a higher health behavior score (M=67.55, SD=11.83), and for those who had congenital disease (M=62.72, SD=11.35). For taking vitamins and supplements during the COVID-19 Pandemic, participant who took more vitamin and supplements during the pandemic showed the highest health behaviour score (M=75.00, SD=10.62), followed by participants who took the same amount of vitamins and supplements same amount as usual during COVID-19 (M=66.23, SD=9.37), and participants who did not take any vitamins and supplements during the pandemic (M=64.58, SD=11.92).

Table No. 1 Participants' characteristic, nutrition and immunity related knowledge and health behavior during COVID-19 pandemic

Variable	n (%)	Nutrition and Immunity Related Knowledge M (SD) (1-11)	Health behaviour during COVID-19 penademic M (SD) (18-90)
Gender			
Male	32(23.4)	5.50 (1.36)	70.63 (11.39)
Female	106(76.8)	5.60(1.35)	65.62(11.80)
Class			
Grade 10	11(8.0)	5.45(0.82)	69.63(9.55)
Grade 11	28 (20.3)	5.71(1.36)	68.29(11.66)
Grade 12	99 (71.7)	5.62(1.41)	66.04(12.14)
Study Program			
Math-Science	119(86.2)	5.62(1.39)	66.78(11.63)
Others	19 (13.8)	5.68(1.16)	66.78(13.50)

Parent Occupation			
Health Science	18(13.0)	5.83(0.98)	65.72(14.49)
Employee	41 (29.7)	5.83(1.39)	67.39(11.19)
Business Owner	14 (10.1)	5.29(1.20)	67.21(13.07)
Freelance	30(21.7)	5.80(1.49)	63.26(12.37)
Teacher	21(15.2)	5.42(1.16)	69.52(10.36)
Other	14(10.1)	5.07(1.68)	69.35(8.68)
Congenital Disease			
No	116 (84.1)	5.63(1.36)	67.55(11.83)
Yes	22 (15.9)	5.59(1.33)	62.72(11.35)
Vitamin and Supplement Intake During COVID-19			
No	87 (63.0)	5.69(1.40)	64.58(11.92)
Yes, same amount as usual	26 (18.8)	5.30(1.12)	66.23(9.37)
Yes, more than usual	25(18.1)	5.76(1.42)	75.00(10.62)
Total	138 (100)	5.63 (1.35)	66.78(11.85)

From an analysis of multi regression, the only factor affecting health behavior of participants during COVID-19 pandemic was vitamin and supplement intake during COVID-19 ($p<0.01$, Beta =0.303). Gender, Class level, study program, parent occupation, having congenital disease and nutrition and immunity related knowledge were not affecting health behavior of participants during COVID-19 of this study.

Table 2. Factors affecting Health behavior of participants during COVID-19 pandemic

Variable	B	S.E.	Beta	t	Sig. (p)	95.0% Confidence Interval for B	
						Lower Bound	Upper Bound
Gender	-4.746	2.261	-0.170	-2.009	0.038	-9.220	-0.272
Class	-0.907	1.557	-0.048	-0.583	0.561	-3.988	2.173
Study Program	0.698	1.395	0.041	0.500	0.618	-2.062	3.459
Parent Occupation	0.096	0.617	0.13	0.156	0.876	-1.124	1.317
Congenital Disease	-5.535	2.626	-0.172	-2.108	0.037	-10.730	-0.339
Vitamin and Supplement Intake During COVID-19	4.586	1.231	0.303	3.726	0.000	2.151	7.021
Nutrition and Immunity Related Knowledge	-0.631	0.710	-0.072	-0.889	0.376	-2.036	0.774

Discussion

From the study about Nutrition and immunity knowledge and health behaviour during the COVID-19 pandemic, there were 138 participants. Most participants illustrated Nutrition and Immunity Knowledge at a low score (M=5.63, SD=1.35), for Health Behaviour score, most participants showed a moderate level of score (M=66.78, SD=11.85). Male participants had a higher Health Behaviour during COVID-19 score (M=70.63, SD=11.39) than female participants (M=65.62, SD=11.80). Female participants had a higher Nutrition and Immunity related knowledge score (M=5.60, SD=1.35) than male's (M=5.50, SD=1.36) . Grade 11 students showed the highest score of both Nutrition and Immunity related knowledge score (M=5.71, SD=1.36) and Health Behaviour score (M=68.29, SD=11.66). For parent's occupation, whose participants who worked in health science field showed the highest knowledge about Nutrition and Immunity (M=5.83, SD=0.98) while participants whose parents worked as a teacher showed the highest Health Behaviour during COVID-19 score (M=69.52, SD=10.36). Participants who had no congenital disease reported a higher of both Nutrition and Immunity knowledge (M=5.63, SD=1.36) and Health Behaviour score (M=67.55, SD=11.83) than those who had one. Those who took vitamins and supplements more than usual during the COVID-19 pandemic showed the highest score of both Nutrition and Immunity Knowledge score (M=5.76, SD=1.42) and Health Behaviour score (M=75.00, SD=10.62). Taking vitamins and supplements was a predictive factor for health behaviour during COVID-19.

From this study the result showed that most participants had low knowledge scores regarding Nutrition and Immunity Knowledge. This may be because high school students acquired most of their knowledge from their schools. Nutrition lessons being taught at school were somehow at an introductory level. Immuno-Nutrition knowledge is usually being taught at a college level and it is a specific topic[6]. This could explain why most participants earned a low knowledge score regarding this topic. Grade 11 participants had the highest knowledge score among other class levels, it could be because grade 11 participants were both mature enough as well as had some free time to follow news knowledge regarding the COVID-19 than grade 12 or 10 students[7]. Participants whose parents worked in the health science field show the highest knowledge score regarding Nutrition and Immunity. This could be attributed to their acquired knowledge from their parents who should have in-depth knowledge about this matter while health behavior score was not in the top three. This may be because of health-science-parents were working very hard[8]. that did not have time to strictly instruct their child compared to teacher parents whose child showed the highest health behavior scores. Participants who reported not having congenital disease had a higher score of both Nutrition and Immunity Knowledge (M=5.63, SD=1.36) and Health Behaviour Score (M=67.55, SD=11.83) than those who had one. This result was in consisted with Noprada Masuwan[9] that conducted a study about Factors influencing Health Behavior of Grade 10-12 students in Nakhon Pathom that participants who reported not having congenital disease had a better health knowledge and health behavior than those who had one and in line with Napatsawan Reawreab's [10]. For taking vitamins and supplements during COVID-19 were they only predictive factors, in this study, on health behavior during COVID-19. Taking extra vitamins and supplements during COVID-19 could help strengthen immunity to prevent COVID-19[11] therefore participants who took more vitamins and supplements than usual had some knowledge regarding nutrition and immunity and this group of people should be more aware of health behavior during COVID-19.

Conclusion

From the study about Nutrition and immunity knowledge and health behavior during the COVID-19 pandemic, there were 138 participants. Most participants illustrated Nutrition and Immunity Knowledge at a low score (M=5.63, SD=1.35), for Health Behavior score, most participants showed a moderate level of score (M=66.78, SD=11.85). Taking vitamins and supplements was a predictive factor for health behavior during COVID-19.

Recommendation

Immunity in our body can be improved in mainly 2 ways 1) taking vaccination when needed 2) having good health behavior such as eating good foods, taking enough rest, and taking exercise. To have people practise good Health Behavior to strengthen immunity, education especially nutrition and immune system knowledge should be provided to the public which can be easily accessed.

References

1. Department of Disease Control. COVID-19 situation, measures, problems and obstacles for prevention from travellers [internet]. 2021. [cited on 2022 May 01]. Available from: https://ddc.moph.go.th/uploads/files/20174202108200252 38.pdf

2. Department of Disease Control. COVID-19 Vaccination guideline during the pandemic 2021 in Thailand No. 2 [Internet]. 2021 [cited on 2022 May 01]. Available from: https://ddc.moph.go.th/vaccine-covid19/getFiles/11/1628849610213.pdf

3. Paveenapat Nithitantiwat and Warangkana Udomsapaya.Food Consumption Behaviour among Thai Adolescents, Impacts, and Solutions.Journal of Phrapokklao Nursing College Vol.28 No.1 January - June 2017. Available from: https://he01.tci-thaijo.org/index.php/pnc/article/download/117888/90429/

4. Suree Thamikbaworn. Pander's Health Promotion Theory. [Internet]. 2010 [cited on 2022 May 01] Available from: http://www.nurse.ubu.ac.th/sub/knowledgedetail/PD.pdf

5. Phattranid Mohthong, Wanida Thongkod and Supannee Ungpanyasawat. Determination of sampling sized by Yamane formular [Internet]. 2017 [cited on 2022 15 May 01] Available form: http://sc2.kku.ac.th/stat/statweb/images/Eventpic/60/Seminar/01_9_Yamane.pdf

6. Chaowarit Pumipak. Teacher manual for Health Education and Physical Education 1. 1st Published. Bangkok; Wattanapanich Publisher; 2008.

7. Sujitra Uratanamanee, Supawadee Lerdsamran. Stress Anxiety and Depression of High School Student Teenagers in Preparing for University Admission. Journal of Psychiatric Nurse and Mental Health; 2017: 31(2), 78-94.

8. Nittaya Pensirinapa. Burnout Syndrome among Health Personal during Pandemic of COVID-19. Journal of Council of Community Public Health 2021; 3(3), 1-16

9.Noprada Masuwan. Factors influencing Health Behavior of Grade 10-12 students in Nakhon Pathom. Institute for Urban Disease Control and Prevention Journal; 2022; 6(2).

10.Napatsawan Reawreab. Knowledge, Attitude, and COVID-19 Preventive Behaviours among Thai people in Pa Kor Subdistrict, Mueang District, Phang Nga Province. Institute for Urban Disease Control and Prevention Journal; 2022; 6(2).

11. Preawpachim. Foods enhancing immunity during the COVID-19 pandemic. [Internet]. 2021 [cited on 2022 May 01]. Available from: https://www.rama.mahidol.ac.th/atrama/issue037/healthy-eating