

COVID-19 CONFINEMENT CHANGED DIETARY BEHAVIOUR IN INDONESIA

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ABSTRAK

Pandemi telah mempengaruhi berbagai sektor dan menyebabkan perubahan di berbagai bidang. Perilaku diet pun dapat berubah karena pandemi COVID-19. Penelitian sebelumnya terkait perilaku diet selama pandemi COVID-19 telah dilakukan di beberapa negara. Namun, studi tentang pola konsumsi di Indonesia selama pandemi masih terbatas. Pengamatan kami berfokus pada perubahan perilaku diet masyarakat Indonesia selama masa pembatasan COVID-19. Untuk mencapai tujuan tersebut, dilakukan studi potong lintang dengan menggunakan kuesioner online yang disebarluaskan melalui media sosial. Informasi responden terkait dengan sosio-demografis dan situasi selama masa pembatasan aktivitas di luar rumah dikumpulkan. Selain itu, responden juga ditanyai tentang konsumsi sayur, buah, suplemen dan vitamin, minuman ringan, snack, dan jamu atau empon-empon selama masa pembatasan COVID-19. Hasilnya akan bermanfaat bagi industri dan pemerintah karena minimnya informasi terkait perilaku diet selama karantina COVID-19 di Indonesia. Hasil penelitian menemukan bahwa peningkatan dan penurunan konsumsi kelompok makanan tertentu terjadi karena situasi ekonomi, stres dan kecemasan, serta aksesibilitas terhadap makanan. Keterbatasan beraktivitas di luar rumah akibat COVID-19 juga mengubah cara responden dalam mempersiapkan makanan. Kondisi ini juga dipengaruhi oleh meningkatnya kesadaran responden akan pola hidup sehat. Pengamatan lebih lama disertai informasi Indeks Massa Tubuh atau IMT mampu menggambarkan dampak perilaku diet selama pandemi COVID-19 terhadap kecenderungan munculnya penyakit kronis.

Kata kunci : COVID-19, Indonesia, pandemi, pembatasan, perilaku diet

ABSTRACT

Pandemic has affected various sectors and caused alteration in many fields. Dietary behaviour might change due to COVID-19 pandemic. Previous studies related to dietary behaviour during COVID-19 pandemic had been done in several countries. However, there is limited study on consumption pattern in Indonesia during pandemic. Our work focused on observing the changes in dietary behaviour of Indonesian during COVID-19 confinement. In order to reach the purpose, a cross-sectional study was conducted by using online questionnaire distributed using social media. The information of respondents related to socio-demographic and situation during confinement were gathered. Furthermore, respondents were also inquired about the consumption of vegetable, fruit, supplement and vitamin, soft drink, snack, and *jamu* or *empon-empon* during COVID-19 confinement. The results will be useful for industries and government due to the lack of information related to dietary behaviour during COVID-19 confinement in Indonesia. The results found an increasing and decreasing consumption of certain food group due to economic situation, stress and anxiety, and also food accessibility. COVID-19 confinement also changed the way in preparing meal. This condition was also affected by the increasing of respondents' awareness on healthier lifestyle. A longer observation accompanied by Body Mass Index information is able to illustrate the impact of dietary behaviour during COVID-19 pandemic on chronic disease tendency.

Keywords : confinement, COVID-19, dietary behaviour, Indonesia, pandemic

INTRODUCTION

On March 2, 2020, Indonesia announced the first COVID-19 (Coronavirus

Disease of 2019) case. To prevent the rise in the number of patients, government encouraged citizens to limit their activities outside home and promoted the hashtag

"#dirumahaja" or "#stayathome". It is well established that limiting activities outside home promote changes in food intake and food purchasing. This condition is happened to the populations of Kuwait (Husain & Ashkanani, 2020) and Spain (Rodriguez-Perez, et al., 2020), as well as about half of the Italian population (Scarmozzino & Visioli, 2020) (Di Renzo, et al., 2020).

Restrictions on activities outside the house, as well as the uncontrollable spread of the virus, induce tension and anxiety in society. According to the findings of a study (Roy, et al., 2020), COVID-19 caused anxiety, and more than 80% of respondent reported mental health problems and required therapy. This psychological condition is linked to the respondents' economic situation as a result of the pandemic. Obesity risk can be increased directly or indirectly due to psychological disorders. The association of stress or poor emotion regulation and dietary behaviour had been studied. Poor emotion regulation is associated to emotional eating. Due to higher energy requirement, people under stress more likely to consume high-calorie food (Tan & Chow, 2014) (van Strien, 2018). Therefore, stressful situations tend to increase the body's fat deposits. Meanwhile, the onset of sleep disorder during stressful condition is another factor that contributes to the risk of obesity (Tomiyama, 2019).

Changes in eating habits might be driven by several issues, such as food availability, boredom, or the desire to enhance health and immunity, in addition to psychological factors. The appearance of panic buying at the beginning of confinement led the availability of food to run out. As a result of the scarcity of food, food consumption and food purchasing behaviour may shift (Rodriguez-Perez, et al., 2020). Then, limitation on activities outside home, as well as a lack of mobility, can lead to boredom. According to the study's findings, boredom increases people's consumption of food and soft drink (Moynihan, et al., 2015). Furthermore, fear about the spread of COVID-19 has prompted

individuals to take a variety of preventative measures, including adjustments in consumption patterns. Consuming nutritious meals is one of way in order to maintain or boost the body's immunity (Rodriguez-Perez, et al., 2020). As a result, better dietary behaviour may emerge when confinement is imposed. Moreover, information related to dietary behaviour during COVID-19 confinement in Indonesia is limited. Therefore, the purpose of this research was to investigate the changes of dietary behaviour in Indonesia due to COVID-19 confinement. Our finding will be useful for industries and government, especially in developing new product and assigning related policy.

METHOD

A cross-sectional study was developed to investigate dietary behaviour of Indonesian population in the time of COVID-19 confinement. In order to collect data and information, an online survey was created. People who were at least 18 years old and living in Indonesia were allowed to participate as respondents on this survey. Participation was voluntary and anonymous. However, respondents were previously informed about the purpose of the research.

The questionnaire, which was validated and pilot tested previously, was divided into four sections. First section was about socio-demographic questions. Second section consisted of 4 questions related to the condition after confinement. Third section consisted of 9 questions about dietary behaviour before and after the confinement. In the last section, respondents were asked about food intake, reason of dietary behaviour alteration, and possibility to eat healthier food after the pandemic. Questionnaire was developed using a web-based survey tool (ZOHO Survey) and distributed by social media. Data was gathered from June 20th 2020 to July 1st 2020. The questionnaire could be reached by <https://survey.zohopublic.com/zs/0ubNOW>. Data collection was discontinued when more

than 500 questionnaires had been gathered. Sample size from population of Indonesia was determined at confidence level of 95% and margin of error of 5%.

Information of height and weight reported by respondents was then converted into Body Mass Index (BMI). BMI was calculated as the ratio of weight (kg) to height (m²). Body status was classified based on Ministry of Health Republic of Indonesia (Kementerian Kesehatan RI, 2014) as severely underweight (<17.0), underweight (17.0 to 18.4), normal weight (18.5 to 25), overweight (25.1 to 27), and severely overweight (>27.0). Descriptive analysis was applied to demographic and anthropometric parameters of respondents. Data are presented as number and percentage. Chi-square test was employed to assess the association of variables.

RESULTS

Characteristics of Respondents

The online questionnaire was completed by 502 people, although only 471 people completed it entirely. According to Table 1, females outnumbered males (72.19 %) and the majority of respondents held a bachelor's degree (72.40 %). A total of 35.89 % and 34.18 % of respondents were between the ages of 18 to 30 and 31 to 40, respectively. Furthermore, people with incomes ranging from Rp. 3,000,000 to Rp. 4,999,999 (32.27 %) and less than Rp. 1,000,000 (28.87 %) dominated the sum of respondent. Then, according to BMI status, 2.76 % of respondents were categorized as severely underweight, 7.43 % as underweight, 58.6 % as normal, 9.34 % as overweight, and 21.87 % as severely overweight with a BMI score more than 27.0. Table 2 describes the respondents' circumstances. Over half of the respondents reported that their economic situation became unstable (62.21 %) as a result of COVID-19 confinement and they spent more time at home than before (91.93%).

Table 1. Characteristics of Respondents

Age		
	N	%
18 - 30 years old	169	35.89
31 - 40 years old	161	34.18
41 - 50 years old	75	15.91
> 50 years old	66	14.01
Gender		
	N	%
Male	131	27.81
Female	340	72.19
Last Education		
	N	%
High School (SMA)	39	8.28
Diploma	16	3.40
Bachelor	341	72.40
Postgraduate	75	0.16
Income		
	N	%
< Rp.1.000.000	136	28.87
Rp.1.000.000 - Rp.2.999.999	65	13.80
Rp.3.000.000 - Rp.4.999.999	152	32.27
Rp.5.000.000 - Rp.7.999.999	58	12.31
Rp.8.000.000 - Rp.9.999.999	15	3.18
> Rp.10.000.000	45	9.55
BMI Status		
	N	%
Severely Underweight	13	2.76
Underweight	37	7.86
Normal	281	59.66
Overweight	44	9.34
Severely Overweight	96	20.38

*N represents the amount in numbers, while % represents the amount in percentage

Food Intake during Confinement

Changes in the consumption of vegetable, fruit, soft drink and snack, as well as fast-food, are demonstrated to show the impact of restricting activities outside home (Figure 1). According to our results, there was a change in consumption behaviour during COVID-19 confinement. Consumption of vegetable, fruit, and supplement or vitamin was increase. A total of 35.88 % of respondents reported an increase in vegetable intake, 45.44 % reported an increase in fruit intake, and 47.56 % reported an increase in supplement or vitamin intake.

Table 2. Respondents' Situation During the Pandemic

Is your economic situation affected by pandemic?		
	N	%
Not	178	37.79
Yes	293	62.21
Are you spending more time at home than before?		
	N	%
Not	38	8.07
Yes	433	91.93
Are you doing more exercise than before?		
	N	%
Not	248	52.65
Yes	223	47.35
Has your weight changed?		
	N	%
Do not change	243	51.59
Yes. increase	146	31
Yes. Decrease	82	17.41

*N represents the number in numbers. while % represents the amount in percentage

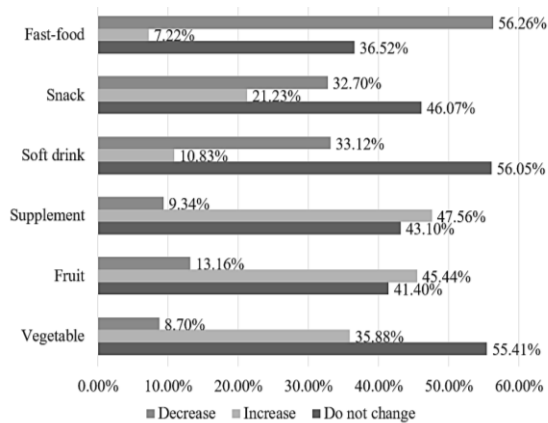


Figure 1. Changes in consumption during restrictions on activities outside the home

Correlation of age, last education, income, and economic situation to the consumption of vegetable, fruit, supplement, and vitamin was examined by using chi-square test. The chi-square test findings at the 5% confidence level revealed that intake of vegetable was substantially linked with income levels and economic situation during pandemic (Table 3). Moreover, similar correlation was found on the consumption of fruit and supplement or vitamin during pandemic.

Table 3. Correlation of Vegetable Intake to Respondents' Characteristics

	Consumption Of Vegetable						p-value
	Do not change		Increase		Decrease		
	N	%	N	%	N	%	
Age (years old)							
18 - 30	101	38.7	49	29.0	19	46.4	0.230
31 - 40	81	31.0	67	39.7	13	31.7	
41 - 50	40	15.3	29	17.2	6	14.6	
> 50	39	14.9	24	14.2	3	7.3	
Last Education							
High School	24	9.2	11	6.5	4	9.8	0.369
Diploma	7	2.7	7	4.1	1	2.4	
Bachelor	192	73.6	117	69.2	33	80.5	
Postgraduate	38	14.6	34	20.1	3	7.3	
Income (million IDR)							
< 1	77	29.5	37	21.9	22	53.7	0.010
1 - 3	32	12.3	27	16.0	6	14.6	
3 - 5	81	31.0	63	37.3	8	19.5	
5 - 8	40	15.3	16	9.5	2	4.9	
8 - 10	7	2.7	7	4.1	1	2.4	
> 10	24	9.2	19	11.2	2	4.9	
Is your economic situation affected?							
No	107	41.0	65	38.5	6	14.6	0.005
Yes	154	59	104	61.5	35	85.4	

*N represents the number in numbers. while % represents the amount in percentage

Table 4 and 5 showed that the intake of fruit, as well as supplement or vitamin, were correlated to income and economic situation of respondents ($p < 0.05$). The impact of the

Table 4. Correlation of Fruit Intake to Respondents' Characteristics

	Consumption Of Fruit						p-value
	Do not change		Increase		Decrease		
	N	%	N	%	N	%	
Age (years old)							
18 - 30	75	38.7	68	31.8	26	41.9	0.303
31 - 40	67	34.4	74	34.6	20	32.3	
41 - 50	33	16.9	36	16.8	6	9.7	
> 50	20	10.3	36	16.8	10	16.1	
Last Education							
High School	19	9.7	16	7.5	4	6.5	0.087
Diploma	7	3.6	5	2.3	3	4.8	
Bachelor	135	69.2	154	72.0	53	85.5	
Postgraduate	34	17.4	39	18.2	2	3.2	
Income (million IDR)							
< 1	62	31.8	43	20.1	31	50.0	0.001
1 - 3	29	14.9	27	12.6	9	14.5	
3 - 5	56	28.7	83	38.8	13	20.9	
5 - 8	22	11.3	30	14.0	6	9.7	
8 - 10	4	2.2	10	4.7	1	1.6	
> 10	22	11.3	21	9.8	2	3.2	
Is your economic situation affected?							
No	73	37.4	99	46.3	6	9.7	< 0.0001
Yes	122	62.6	115	53.7	56	90.3	

*N represents the number in numbers. while % represents the amount in percentage

pandemic on the family economics was strongly connected with respondents' fruit intake.

The majority of respondents who claimed a decline in vegetable intake stated the shift was a result of economic impact during pandemic (48.8 %) and difficulties in obtaining items (19.5 %). Meanwhile, the majority of respondents who claimed that there was a decline in fruit consumption stated that this condition was affected by economic problem (64.6 %) and increasing of fruit product costs (19.4 %). Based on Table 5, the change of supplement or vitamin intake was correlated to income, economic situation, and also age group ($p < 0.05$). Supplement and vitamin intake relatively increase during pandemic, in order to improve immunity of the body.

Table 5. Correlation of Supplement or Vitamin Intake to Respondents' Characteristics

	Consumption of Supplement or Vitamin						<i>p-value</i>
	Do not change		Increase		Decrease		
	N	%	N	%	N	%	
Age (years old)							
18 - 30	77	37.9	70	31.2	22	50	0.023
31 - 40	59	29.1	92	41.1	10	22.7	
41 - 50	37	18.2	29	12.9	9	20.5	
> 50	30	14.8	33	14.7	3	6.8	
Last Education							0.076
High School	20	9.9	15	6.7	4	9.1	
Diploma	6	3.0	8	3.6	1	2.3	
Bachelor	144	70.9	159	71.0	39	88.6	
Postgraduate	33	16.3	42	18.8	0	0	
Income (million IDR)							< 0.0001
< 1	66	32.5	44	19.6	26	59.1	
1 - 3	34	16.8	26	11.6	5	11.4	
3 - 5	64	31.5	79	35.3	9	20.3	
5 - 8	23	11.3	33	14.7	2	4.6	
8 - 10	3	1.5	10	4.5	2	4.6	
> 10	13	6.0	32	14.3	0	0	
Is your economic situation affected?							0.001
No	76	37.4	96	42.9	6	13.6	
Yes	127	62.6	128	57.1	38	86.4	

*N represents the number in numbers. while % represents the amount in percentage

Changes in soft drink, snack, and fast-food consumption were inversely linked to changes in vegetable, fruit, and supplement or vitamin intake. Table 6 shows chi-square result of snack consumption.

Table 6. Correlation of Consumption of Snack to the Characteristics of Respondents

	Consumption of Snack						<i>p-value</i>
	Do not change		Increase		Decrease		
	N	%	N	%	N	%	
Age (years old)							0.867
18 - 30	75	34.6	38	38	56	36.4	
31 - 40	71	32.7	32	32	58	37.7	
41 - 50	37	17.0	16	16	22	14.3	
> 50	34	15.7	14	14	18	11.7	
Last Education							0.388
High School	17	7.9	11	11	11	7.2	
Diploma	7	2.8	2	2	6	4.0	
Bachelor	154	71.3	68	68	120	77.6	
Postgraduate	39	18.1	19	19	17	11.2	
Income (million IDR)							0.009
< 1	50	23.0	26	26	60	39.0	
1 - 3	30	13.8	12	12	23	14.9	
3 - 5	75	34.6	31	31	46	29.9	
5 - 8	28	12.9	14	14	16	10.4	
8 - 10	12	5.5	2	2	1	0.7	
> 10	22	10.1	15	15	8	5.2	
Is your economic situation affected?							< 0.0001
No	101	46.5	41	41	36	23.4	
Yes	116	53.5	59	59	118	76.6	

*N represents the number in numbers. while % represents the amount in percentage

Chi-square test indicated significant correlation ($p < 0.05$) of income and economic situation on the consumption of snack. Pandemic might result in derivation on purchasing ability of respondent. Then,

Table 7. Correlation of Consumption of Fast-food to the Characteristics of Respondents

	Consumption of Fast-Food						<i>p-value</i>
	Do not change		Increase		Decrease		
	N	%	N	%	N	%	
Age (years old)							0.056
18 - 30	70	40.7	18	52.9	81	30.6	
31 - 40	57	33.1	10	29.4	94	35.5	
41 - 50	20	11.6	4	11.8	51	19.2	
> 50	25	14.5	2	5.9	39	14.7	
Last Education							0.090
High School	19	11.1	5	14.7	15	5.7	
Diploma	5	2.9	1	2.9	9	3.4	
Bachelor	113	65.7	24	70.6	205	77.4	
Postgraduate	35	20.4	4	11.8	36	13.6	
Income (million IDR)							0.022
< 1	47	27.3	14	41.2	75	28.3	
1 - 3	25	14.5	4	11.8	36	13.6	
3 - 5	46	26.7	7	20.6	99	37.4	
5 - 8	26	15.1	3	8.8	29	10.9	
8 - 10	11	6.4	0	0	4	1.5	
> 10	17	9.9	6	17.7	22	8.3	
Is your economic situation affected?							0.059
No	76	44.2	9	26.5	93	35.1	
Yes	96	55.8	25	73.5	172	64.9	

*N represents the number in numbers. while % represents the amount in percentage

decreasing of snack consumption was related to economic situation during pandemic or purchasing ability. Income and economic situation were correlated to the change of fast-food intake (Table 7). Meanwhile, the change of soft drink intake was only correlated to economic situation (Table 8) based on chi-square test ($\alpha = 5\%$).

During COVID-19 confinement, respondents tended to minimize consumption of soft drink, snack, and fast-food. A decline in intake of soft drink, snack, and fast-food was reported by 33.12 %, 32.70 %, and 56.26 % of respondents, respectively.

Table 8. Correlation of Consumption of Soft drink to the Characteristics of Respondents

	Consumption of Soft Drink						p-value
	Do not change		Increase		Decrease		
	N	%	N	%	N	%	
Age (years old)							
18 - 30	94	35.6	17	33.3	58	37.2	0.157
31 - 40	84	31.8	15	29.4	62	39.8	
41 - 50	42	15.9	13	25.5	20	12.8	
> 50	44	16.7	6	11.8	16	10.3	
Last Education							
High School	22	8.3	7	13.7	10	6.4	0.802
Diploma	9	3.4	1	2.0	5	3.2	
Bachelor	190	72.0	36	70.6	116	74.4	
Postgraduate	43	16.3	7	13.7	25	16.0	
Income (million IDR)							
< 1	73	27.7	14	27.5	49	31.4	0.208
1 - 3	35	13.3	12	23.5	18	11.5	
3 - 5	80	30.3	16	31.4	56	35.9	
5 - 8	37	14.0	6	11.8	15	9.6	
8 - 10	11	4.2	2	3.9	2	1.3	
> 10	28	10.6	1	2.0	16	10.3	
Is your economic situation affected?							
No	114	43.2	16	31.4	48	30.8	0.024
Yes	150	56.8	35	68.6	108	69.2	

*N represents the number in numbers. while % represents the amount in percentage

Our results also found that 40.13 % of respondents consumed Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon* during the limitation of activities outside home, while the remainder did not. *Empon-empon* have grown increasingly popular after COVID-19 instances began to spread in Indonesia due to

the capability against infections and strengthening body immunity (Sastrawidana & Saraswati, 2020). According to Google Trends, the words *jamu*, herbs, or *empon-empon* have surged in popularity in the beginning of pandemic. Based on the chi-square test findings, an increase in intake of vegetable, fruit, and supplement, as well as a decrease in consumption of soft drink and fast-food, has a significant connection ($\alpha = 5\%$) to intake of Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon* (Table 9).

Table 9. Correlation of Herbal Drink (*Jamu*), Herbs, or *empon-empon* Consumption with Other Food Groups

	Consuming herbal drink/herbs/ <i>empon-empon</i>				P-value
	No		Yes		
	N	%	N	%	
Vegetable Consumption					
Do not change	166	58.87	95	50.26	0.00021
Increase	83	29.43	86	45.5	
Decrease	33	11.7	8	4.23	
Fruit Consumption					
Do not change	128	45.39	67	35.45	< 0,0001
Increase	106	37.59	108	57.14	
Decrease	48	17.02	14	7.41	
Supplement or Vitamin Consumption					
Do not change	138	48.94	65	34.39	0.0001
Increase	112	39.72	112	59.26	
Decrease	32	11.35	12	6.35	
Soft Drink Consumption					
Do not change	172	60.99	92	48.68	0.002
Increase	34	12.06	17	8.99	
Decrease	76	26.95	80	42.33	
Snack Consumption					
Do not change	137	48.58	80	42.33	0.243
Increase	61	21.63	39	20.63	
Decrease	84	29.79	70	37.04	
Fast-food Consumption					
Do not change	109	38.65	63	33.33	0.032
Increase	26	9.22	8	4.23	
Decrease	147	52.13	118	62.43	

*N represents the number in numbers, while % represents the amount in percentages.

Food Preparation

Figure 2 shows statement of respondents regarding their behaviour on preparing meals during COVID-19 confinement. A total of 49.47 % of respondents reported an alteration during the restriction on activities outside home. As

many as 46.71% respondents stated that they were becoming more frequent to cook meal at home, while 2.76% stated that they were becoming more frequent to buy meal during confinement. Meanwhile, the remainder stated that there is no change about their way in preparing meal during confinement, 48.83% normally cook meal and 1.70% buy meal. Changes in intake of vegetable, soft drink, and fast-food are substantially linked ($p < 0.05$) with the technique of meal preparation, according to the chi-square test.

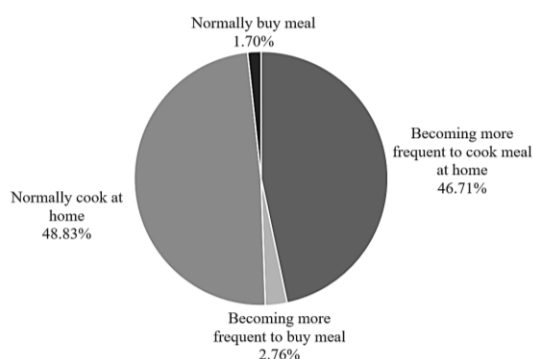


Figure 2. Food preparation during COVID-19 confinement

Factors Driving Changes in Dietary Behaviour

Various variables may affect dietary behaviour. People's desire to eat food that is healthy and able to boost the body's immunity may lead to an increase in consumption of vegetable, fruit, and supplement or vitamin, as well as a decrease in consumption of snack, soft drink, and fast-food. This statement is supported by the survey results, which revealed respondents' attitudes toward better eating habits. The majority of respondents stated that after the epidemic was over, they would adjust their eating habits in a healthy way. A total of 89.81% respondents decided to apply healthier diet after pandemic. However, 2.76% and 7.43% respondents were decided not to apply healthier diet and not sure to apply healthier diet after pandemic, respectively. Identification on the reason of respondents who believed there was a change in their dietary behaviour during

COVID-19 confinement was also done. The purpose was to identify the effects of stress or boredom, economic situation, and accessibility on the changes in overall dietary behaviour experienced by respondents. As many as 8.07% of respondents stated that their dietary behaviour had changed due to difficulties in obtaining commonly consumed foodstuffs, 15.71% stated that their dietary behaviour had changed due to economic problem, and 17.62% stated that their dietary behaviour had changed due to psychological factors such as stress or boredom (Figure 3).

Meanwhile, those who believe they have not experienced changes in dietary behaviour or who have other explanations that are more underlying the changes in dietary behaviour select the "other" option (58.59%). The other explanations stated by respondents were eagerness to have a healthier lifestyle, availability of time, eagerness to reduce expense, insecurity to contracting the virus while buying food outside home, and a change in appetite.

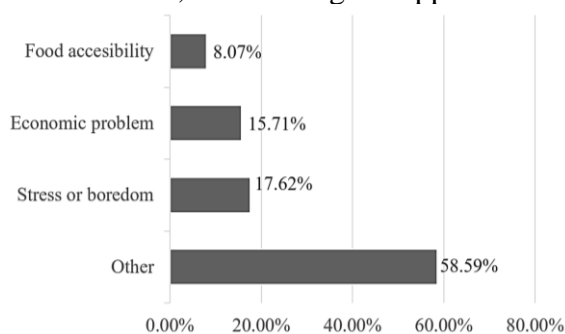


Figure 3. Reason of changing consumption behaviour

Changes in dietary behaviour caused by economic problems were dominated by respondents who stated that consumption of vegetable (43.24%) and soft drink (43.24%) did not change during COVID-19 confinement, but consumption of fruit (43.24%), snack (64.86%) and fast-food (70.27%) decreased, and have become accustomed to cooking at home (55.41%). Furthermore, changes in dietary behaviour due to stress or boredom were dominated by respondents who stated that they became more frequently cooking at home (55.42%),

but did not experience changes in consumption of vegetable (60.24 %), fruit (48.19 %), snack (39.76 %), soft drink (57.83 %), and fast-food (43.37 %). Meanwhile, the reasons for the difficulty of accessing food that they want to consume were dominated by respondents with increased consumption of vegetable (42.11%) and soft drink (52.63%), fruit consumption (55.26%) and snack (42.11%), and more frequently cooking at home (73.68%).

DISCUSSION

This study examines dietary behaviour that emerge in Indonesian society during COVID-19 confinement. The results reveal a change in the respondents' consumption patterns. Desire to change consumption patterns in a healthier direction was suspected as the basis for this alteration. However, there were other factors that contribute to this alteration, such as economic situation and socioeconomic characteristic of respondent. The changes in dietary behaviour include increasing or decreasing consumption of particular food groups as well as ways of preparing food for daily consumption.

Characteristics of Respondents

Socioeconomic factors are associated to COVID-19 health awareness and food choice. Therefore, dietary behaviour was correlated to several socioeconomic factors. Based on our result, income level and economic situation were significantly correlated ($p < 0.05$) with lowering consumption of vegetable, fruit, supplement, snack, and fast-food.

Based on Table 1, the result of this survey was dominated by female and participants with bachelor's degree. Female tended to choose food based on nutritional composition and health benefit. Moreover, female was seemed to have higher knowledge and good practices toward COVID-19 than male. People with low

education level seemed to have lower knowledge and good practices toward COVID-19 (Saeed, Elbarazi, Barakat, Adrees, & Fahady, 2021). Lower education level also seemed to reduce the importance of health in choosing food (Marsola, Cunha, de Carvalho-Ferreira, & da Cunha, 2020). However, people aged 18-29 had higher knowledge but lower level in good practice toward COVID-19.

Restriction on activity outside home and mobility had a substantial influence on currency exchange rates and GDP growth, which indirectly impacts the economic stability of business players at all levels (Caraka, et al., 2020). It was also reported that the pandemic had an impact on practically all economic sectors, including tourism, trade, health, and home sector (Susilawati, Falefi, & Purwoko, 2020). This condition was showed by respondents' situation (Table 2). Most of them stated that pandemic had affected their economic situation.

In terms of body weight, 51.59 % of respondents said it had not changed, while 31 % and 17.41 % reported increasing and decreasing of body weight, respectively. This data, however, cannot indicate the direct effect of COVID-19 confinement. In terms of activities, 91.93 % of respondents spent more time at home. This shows that the survey was taken at a period when confinement was applied. Furthermore, 52.65 % of respondents claimed that they did not participate in additional physical exercise, while the others claimed that they exercised more under COVID-19 confinement.

Food Intake during Confinement

An increase in vegetable and fruit consumption followed by a decrease in snack, soft drink, and fast-food consumption indicated a positive change in consumption patterns (Figure 1). In Spain, the same thing happened. A survey of Spanish citizens conducted after the COVID-19 pandemic revealed a surge in the Mediterranean diet (Singhal, 2020), which is a healthy diet that

involves the consumption of olive oil, vegetable and fruit, and nuts. The change in dietary behaviour towards a healthy lifestyle was expected to reduce the prevalence of degenerative diseases due to unhealthy consumption patterns. Increased consumption of vegetable and fruit also occurred in Italy (Husain & Ashkanani, 2020). One of the reasons for this consumption choice could be concern about the spread of the COVID-19 virus and increasing public awareness of a healthy lifestyle. Although the survey results suggested that the majority of respondents prefer a healthier dietary patterns, there were also respondents who experienced a decrease in consumption of vegetable and fruit. Economic situation affected by COVID-19 pandemic was correlated to the change of vegetable (Table 3), fruit (Table 4), and supplement or vitamin consumption (Table 5). Most of them stated that decreasing of fruit and vegetable consumption was due to economic factors affected by the pandemic, as well as the difficulty in obtaining the desired product. The COVID-19 pandemic has led to instability in the community's economy so that it is difficult to fulfill all daily needs (Rodriguez-Perez, et al., 2020). Although it didn't last long, the emergence of COVID-19 cases in Indonesia had also caused panic buying in some areas, this was believed in contributing to the difficulty of getting the desired product.

Restrictions on activities outside home may cause stress that triggers changes in diet and food choices (Scarmozzino & Visioli, 2020). Stress will cause hormonal changes that affect the consumption desire and appetite. In addition, increased time spent at home can also increase boredom. It can be said that this condition can trigger the consumption of comfort foods such as snack and soft drink which tend to contain a high sugar, salt, or fat (Di Renzo, et al., 2020). Therefore, data collection on the consumption of snack and soft drink, as well as fast-food was carried out through this study. The results showed a decrease in the

consumption of snack and soft drink, as well as fast-food by most of the respondents. Table 6, 7, and 8 show significant correlation of economic situation to the change of snack, soft drink, and fast-food consumption.

Nonetheless, some respondents report an increase in food and soft drink consumption, as well as fast-food. In Italy, respondents who tend to experience anxiety and worry during the pandemic consumed more comfort food in the form of chocolate, ice cream, desserts, and snack (Husain & Ashkanani, 2020). This is similar with the trend of increased snack consumption that occurs as a result of boredom and anxiety (Roy, et al., 2020).

This study also looked at the intake of supplement or vitamin, Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon*. Supplement or vitamin consumption appeared to increase during periods of restricted activity outside home. The increasing of supplement or vitamin intake was most likely driven by the respondent's desire to boost the body's immunity. Data on the consumption of Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon* showed the efforts to boost the body's immunity. For a long time, Indonesians have employed Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon* as substances with varied health advantages.

According to the Great Indonesian Dictionary (KBBI), Indonesian traditional herbal drink (*jamu*), is medicine made from roots, leaves, and so on, while herbs are related to plants whose leaves, flowers or roots can be used for food and medicine. Meanwhile, the term *empon-empon* is used for rhizomes (ginger, turmeric, temulawak, etc.) which are used as traditional ingredients. Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon* are considered to boost the body's immunity and against viruses (Tan & Chow, 2014).

With the emergence of COVID-19, this causes Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon* to become popular. This assertion is supported by

survey results, which reveal that over half of all respondents consumed Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon*. According to the survey, respondents consumed ginger, turmeric, red ginger, lemongrass, black cumin, *kencur*, cinnamon, deaf, cloves, *temulawak*, pepper, galangal, and betel as raw materials for Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon*. Honey and lime were also mixed as additives for traditional herbal drink. Based on Table 9, the change of vegetable, fruit, supplement, soft drink, and fast-food consumption was significantly correlated ($p < 0.05$) with consumption of herbal, *jamu*, or *empon-empon*. Respondents who tended to consume more vegetable and fruit and less soft drink and fast-food also tended to consume Indonesian traditional herbal drink (*jamu*), herbs, or *empon-empon*.

Food Preparation

The respondent's awareness on healthier lifestyle also affected their food preparation style. Almost half of the respondents claimed that they modified the way of preparing food, notably by cooking at home (Figure 2). Self-handling of foodstuffs can boost consumer confidence in the safety and hygiene of products. In reality, research have found that consuming prepared or self-cooked food is correlated to a lower risk of diabetes and a healthier lifestyle (van Strien, 2018). In the Kuwait community, there is an increase in the frequency of cooking at home (Tomiya, 2019). According to the findings of a study conducted in Kuwait, more time spent at home is one of the factors behind this transformation. Meanwhile, according to the our results, respondents who increased the consumption of vegetable while reduced the consumption of soft drink and fast-food tended to cook at home more frequently. This demonstrated that the factors driving changes in the amount of vegetable, soft drink, and fast-food consumption also led changes in the way food is prepared.

Factors Driving Changes in Dietary Behaviour

Aside from economic situation, the pandemic gave impact on the supply of food that the general public can access. The availability of accessible food is related not only to panic buying during the start of the pandemic, but also to the issues with the food supply chain system and the difficulty of food and beverage entrepreneurs in reaching consumers during COVID-19 confinement. Therefore, this survey also gathered information to examine the impact of the economic situation, access to food, and stress or boredom on changes in general dietary behaviour.

According to our results regarding the reasons for changes in consumption patterns, it was known that limited access to food, economic problems, and stress or boredom have all contributed to changes in respondents' dietary behaviour. The changes were known to be more driven by stress or boredom conditions, as well as economic concerns, when compared to limited access to food. Most respondents reported a decrease in consumption of fruit, snack, and fast-food as a result of economic concerns. The pandemic is predicted to affect the Indonesian economy (Moynihan, et al., 2015). Economic conditions affect the purchasing ability of food by the community which in turn may alter dietary behaviour. Meanwhile, respondents who increased their consumption of fruit and snack mentioned that difficulties in obtaining desired food ingredients as the reason.

Furthermore, changes in the way of preparing food to cooking at home were known to dominate respondents who stated that stress or boredom as the basis of their dietary behaviour changing, as well as difficulty accessing the desired food ingredients. This demonstrated that respondents' limited activities outside home made it difficult for them to access fast-food, therefore they tended to cook at home. Conditions of stress or boredom also had a role in changing the way food is prepared by respondents.

Most of respondents stated that they tended to choose healthier diet due to COVID-19 pandemic. It could be affected by the characteristic of dominant respondent. Female and also people with higher education were tended to have good knowledge and practice toward COVID-19 (Saeed, Elbarazi, Barakat, Adrees, & Fahady, 2021). They also had higher health awareness in selecting food (Marsola, Cunha, de Carvalho-Ferreira, & da Cunha, 2020). This situation indicated that changes in dietary behaviour might be correlated to respondents' attitude.

CONCLUSION

Overall, COVID-19 confinement in Indonesia resulted in adjustment on dietary behaviour. Based on our results, most of respondents experienced an increasing of fruit and supplement or vitamin intake and decreasing of fast-food intake during confinement. Nearly half of respondents changed their way in preparing meal and tended to cook meal at home. According to respondents' opinion, COVID-19 pandemic encouraged them to follow healthier lifestyle. This alteration may give a positive impact on health status and chronic disease prevention. Our findings may describe dietary behaviour of Indonesian citizen during restriction on activities outside home due to COVID-19 pandemic. The results can be utilized for developing food products or determining related policies. However, several limitations are found on this research. The observation was limited to several food groups; those were vegetable, fruit, snack, soft drink, fast-food. And the time range of observation was not able to describe BMI status of respondents.

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