ORIGINAL ARTICLE

Food Accessibility and Movement Control Order: Analyzing Impact of First Lockdown on Access to Food

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ABSTRACT

Introduction: The emergence of the coronavirus has highlighted the weaknesses of the global economy, especially in terms of food supply and demand. While various research has been established on the disruption of the COVID-19 to the food supply chain, little is known on the extent of the food supply issues in Malaysia and what it means for our future. As such, this research focuses on addressing these questions: does COVID-19 affect food supply? Who's at risk of food supply disruption? And what are the long-term impacts? **Methods:** This cross-sectional study carried out online data collection utilising the snowball sampling method. 3 months of data collection yielded data from 666 respondents. Chi-square analysis was carried out to determine the association between food accessibility before and after the first MCO . **Results:** Most of the respondents are below 35 years of age, with only 20% reported food supply disruption. 12% reported food shortage during the initial MCO which was significantly associated with gender, level of education and income. A significant difference between food accessibility before and during the initial MCO was also found. **Conclusion:** Data indicates that food access disruption was brief, due to initial confusion with travel restrictions and panic buying. While the initial MCO did cause a food accessibility issue, the paper revealed instead the potential food security issue that exists regardless of the pandemic. Access to food is a human right and this paper highlights the possibility of exploring an independent food system to address existing problems.
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INTRODUCTION

At the start of the COVID-19 pandemic, countries worldwide had taken strong controlling actions, which included efforts such as home confinement, social/physical distancing, temporary closure of industries and educational institutions, as well as remote working, all in an effort to reduce the virus transmission. Since the first nation-wide and global lockdown in March 2020, Malaysia's federal and state governments have continued to adjust restrictions amid ongoing measures to curb the outbreak. To some extent, the lockdowns were successful, where early analysis found that disease transmissibility dramatically decreased approximately three weeks after the first Movement Control Order (MCO) and remained low for the remaining duration (1). However, since the first initial MCO, cases have since increased and the lockdown itself has also given rise to numerous concerns, particularly regarding their destructive impact on the global economy (2).

Movement restrictions during the first wave of COVID-19 pose some serious challenges to the global economy, with the Malaysian economic sector reporting losses in trade and distribution of goods and services worth up to 3.5 billion Malaysian Ringgit (RM) by June 2020 (3). Apart from that, the COVID 19 pandemic has caused millions of people to lose jobs and steady income, contributing to an already rising case of global food

insecurity, with impacts expected to continue beyond 2022 (4). Clearly, the food and agriculture sector were among the ones most at risk, as both the pandemic and the lockdowns had affected the distribution and supply of food all over the world. In Malaysia especially, as restrictions of movement were enforced on workers, restaurants, and shops, causing border closure and trade restrictions during the initial MCO, the food supply chain was interrupted. This includes those involved in food productions, food processing, food distribution and finally, food consumption. Part of this is due to logistical challenges as a result of government-imposed restrictions, but also due to panic-buying, which occurred within days of the announcement of the first MCO in March 2020.

Recent evidence suggests that although highly stable, the food system and food supply in Malaysia relies largely on land transportation, whose sole purpose is to carry products from farms to the market (5). The farms, which are usually located at a distance away from the cities, would distribute food and produce using lorries to wholesale markets before the food is then supplied to shops, wet markets and open markets. While this system has been working in Malaysia for years and years without any major problem, the MCO has interrupted the transport of produce from farms and food suppliers (6), which in turn caused a deficit of food supply in the market. This means that although food and produce are plentiful, the restrictions to transportation and lockdown which causes food markets to close had led to a shortage of food supply among the public consumers.

The COVID-19 pandemic has brought about a major reflection and attention on global food systems, an issue that this study hopes to shed some light on. The food system, according to the United Nations (UN) Food System Summit held in 2021, '...includes the related resources, the inputs, production, transport, processing and manufacturing industries, retailing, and consumption of food as well as its impacts on environment, health, and society' (7). Not only that, more than 820 million individuals slept starving every night before the pandemic, and COVID-19 has added almost 130 million more to that statistic, all of whom are facing a long-term food crisis triggered by the pandemic (8). In fact, the problem related to the food system and food insecurity is expected to worsen due to the adverse effects of climate change (9). In light of this problem, this research aims to address the following question: Are Malaysians vulnerable to any disruptions (in the form of MCO) on our existing food system?

MATERIALS AND METHODS

Data collection

The questionnaire was developed and face validated with the assistance of two researchers from the field of environmental sciences. A pilot study for both the 'Bahasa Malaysia' and the English version was carried out to determine the suitability of the questions, the flow of the questionnaire as well as the length of time taken to answer. The pilot study was conducted with 30 purposefully sampled participants in March 2021, and minor changes to the questions were made based on their comments.

The first section of the questionnaire includes the respondents' demographic backgrounds such as gender, employment status, monthly income, residence location and family members. This is followed by food-related activities prior to COVID-19, which includes owning a farm, buying habits, as well as the frequency of cooking and eating out. Following that, the final section consists of three additional questions related to the initial MCO; 1] two close ended questions on food accessibility before and after the initial lockdown; and 2] an open-ended question on the cause of food inaccessibility. Data collection was carried out in April 2021 until June 2021 by utilizing a snowball sampling method. Snowball sampling is a convenient method to obtain participants that are either unknown to the research or inaccessible (10, 11). For this research, snowball sampling is done via the dissemination of questionnaires using social media, where participants are recruited via Facebook, Whatsapp and email.

Samples

In terms of the sample selection criteria, we only collect data from respondents that are at least 18 years of age. They can be either Malaysians or non-Malaysians but must have lived at least 1 year in Malaysia before the pandemic and are still living in this country at the time of data collection. The consent statement and the respondent's criteria is stated at the start of the online questionnaire. However, data cleaning was also done to ensure that the data of anyone younger than 18 years old will be taken out from the analysis

As for the sample size, this research utilized the Raosoft sample size calculator for a population size that is bigger than 20,000 people, with 5% margin of error, 95% confidence level and 50% response distribution. Calculation indicated that this research needed at least 377 respondents.

Ethics

This research has received ethical approval from UiTM Research Ethics Committee, Universiti Teknologi MARA, UiTM with Ref: (REC/02/2021 (MR/84). Throughout the study, the anonymity and the privacy of the respondents were kept confidential and were used for research purposes only.

Statistical Analysis

All data were analyzed using IBM SPSS Statistical software version 21 (IBM SPSS Statistics, Inc., Chicago,

IL, USA). Prior to data analysis, continuous variable was subjected to normality testing by looking into its histogram and Kolmogorov Smirnov test. Following that, all categorical data were presented as frequencies and percentages. Chi-square analysis was carried out to determine the associations between sociodemographic factors and food-related activities, while Kruskal-wallis was carried out to determine the significant difference between food accessibility before and after the initial MCO in March 2020. Results with p-values < 0.05 were considered significant.

RESULT

Data from a total of 666 respondents were included in the final data analysis, with all information tabulated in Table I. Mean age is 32.7 (data obtained were originally in a continuous format, but were categorized after) with almost 50% of the respondents aged 25 years old and below. This is followed by approximately 24% in the 26 - 35 years old category while the remaining respondents were reportedly aged 36 years old and above with the oldest respondent being 81 years old. The respondents were also largely female at 69%, and almost half had full-time jobs. Those who worked part-time or are retired both make up approximately 8% of the sample, with 27% students and less than 10% unemployed. Of the 666 respondents, half of them graduated with a Bachelor's degree, followed by Diploma at 18%. Among those who responded to the questionnaire, a small percentage had a Doctorate, with only one respondent having only a primary school education. In terms of income, half of the respondents were earning less than RM 2500, and approximately 16% refused to provide their income.

Apart from that, the majority of the respondents are living in Selangor (34.5%) while the remaining respondents make up between 3% and 8% from each of the other states, including the Federal Territory of Kuala Lumpur (WP Kuala Lumpur). Additionally, over 74% of the respondents are living in a two-generational household (either living with kids or with parents) and only 3% are living alone. To summarize, the descriptive analysis

Table I: Sociodemographic characteristics of the study population (*n*=666)

Characteristic	Total n=666, n (%)
Gender	
Male	204 (30.60)
Female	462 (69.40)
Age groups, years	
25 and below	316 (47.40)
26-35	159 (23.90)
36-45	64 (9.60)
46-55	48 (7.20)
Above 56	79 (11.90)
Occupation	
Full-time worker	313 (47.00)
Part-time worker	56 (8.40)
Retiree	55 (8.30)
Students	180 (27.00)
Unemployed	62 (9.30)
Education level	
Primary school	1 (0.20)
Secondary school	73 (11.00)
Certificate	41 (6.10)
Diploma	121 (18.10)
Bachelor's degree	341 (51.20)
Master's degree	74 (11.10)
Doctorate's degree	15 (2.30)
Monthly income	
Private and Confidential	110 (16.50)
RM 2,500 and below	341 (51.20)
RM 2,501 - RM 3,169	51 (7.60)
RM 3,170 - RM 3,969	28 (4.20)
RM 3,970 - RM 4,849	25 (3.70)
RM 4,850 - RM 5,879	32 (4.80)
RM 5,880 - RM 7,099	16 (2.40)
RM 7,110 - RM 8,699	15 (2.30)
RM 8,700 - RM 10,959	16 (2.40)
RM 10,960 - RM 15,039	11 (1.70)
RM 15,040 and above	21 (3.20)
State	
Sabah	20 (3.00)
Selangor	230 (34.50)
Kelantan	32 (4.80)
WP Kuala Lumpur	39 (5.90)
Terengganu	30 (4.50)
Pulau Pinang	51 (7.60)
Sarawak	33 (5.00)
Kedah	52 (7.80)
Perak	34 (5.10)
Melaka	31 (4.70)
Negeri Sembilan	33 (5.00)
Johor	36 (5.40)
Perlis	19 (2.80)
Pahang	26 (3.90)
Household composition	
Single person household	21 (3.20)
Married with children / Living with parents	494 (74.20)
Living with spouse (without children) or housemates	80 (12.00)
Extended family	71 (10.60)

CONTINUE

from Table I indicated that most of the respondents are below 35 years of age, with a large majority of those below 25 years old. Most are either married or are living with parents working, both full or part-time, or still studying. Because of this younger demographic, it stands to reason that most are making less than RM2500 and are disproportionately located in the Selangor/Kuala Lumpur area.

In the following table, a chi-square test was carried out to determine the association between sociodemographic factors and food consumption and purchasing patterns prior to COVID-19 (Table II). This information is relevant to the objectives, in order to determine whether or not there are any significant changes to food consumption and purchasing patterns after the initial MCO in March 2020. From the results indicated in Table II, while the majority of respondents did not produce their own food

Table II: Sociodemographic factors related to food consumption and related activities prior to COVID-19 pandemic (*n*=666)

Item	Total *n*=666 *n* (%)	Age	Gender	Occupation	Educational level	State	Household composition	Monthly income
		Chi-squared test						
Farming		0.036*	0.001*	0.001*	0.021*	<0.001*	<0.001*	0.019*
I do not produce anything	372 (55.90)							
I produce less than half of what we eat	257 (38.60)							
I produce more than half of what we eat	24 (3.60)							
I produce everything or almost everything we eat	13 (1.90)							
Buying groceries and produce from the markets		0.258	0.077	0.137	0.777	0.001*	0.011*	0.967
I mostly buy groceries/ produce from markets	499 (74.90)							
I sometimes buy groceries/ produce from markets	137 (20.60)							
I never buy groceries/produce from the market	4 (0.60)							
I rarely buy groceries/ produce from the market	26 (3.90)							
Cooking at home		0.158	<0.001*	0.119	0.406	0.390	<0.001*	0.376
I never cook at home	11 (1.70)							
I always cook at home	377 (56.60)							
I sometimes cook at home	207 (31.10)							
I rarely cook at home	71 (10.60)							
Eating out		<0.001*	<0.001*	0.0002*	0.012*	0.002*	0.001*	0.018*
Never	27 (4.00)							
Rarely	282 (42.30)							
Sometimes	332 (49.90)							
All the time	25 (3.80)							

*p-value is significant at 0.05

prior to the pandemic (farming), approximately 38% do grow a small amount of produce at home (vegetable garden) but still rely largely on markets. Not only that, this variable is significantly associated with all analysed sociodemographic variables - age, gender, occupation, educational level, the state that they are residing in, household composition and income. Following that, although more than 70% of the respondents rely mainly on markets for groceries/produce, it is not significantly associated with any of the socio demographic variables, with the exception of household composition and the state they are currently residing in. Majority of the respondents also frequently or sometimes cook at home, and this is significantly associated with gender and household composition. Finally, the last variable in Table II also asked regarding the habit of eating out, with more than 80% reported that they either rarely or only sometimes eat out. Similar to the farming variable, eating out is significantly associated with all sociodemographic variables.

Another analysis in this study focuses on determining association between food supply, behavior and consumption pattern with sociodemographic variables during the first MCO (Table III). Based on the data, only 20% of the respondents reported disruptions to access to food supply, while less than 15% reported difficulties in buying food. Both of these variables are significantly associated with age, occupation, educational level and the state that they resided in. Following that, approximately 12% of the respondents experienced food shortage, and this is significantly associated with gender, educational level and income. Final variable in this analysis is changes to eating habits, with almost half indicating that MCO had changed their eating habits, a factor that is significantly associated with age, occupation, educational level and income.

Apart from the variables analyzed in Table I through Table III, the questionnaire also had one follow up question that was descriptively analyzed. This is the follow up to the question that asks whether respondents had difficulties obtaining or buying food (Table III, variable 2). From the questionnaire, more than one third of the 13.97% respondents who indicated that they had difficulty in buying food during the first MCO cited financial constraints while the rest gave other reasons. Not only that, final analysis (Table IV) indicated that there is a significant difference regarding access to food supplies before the pandemic and during the first MCO.

Table III: Sociodemographic factors related to the changes of food supply, behavior and consumption during the COVID-19 pandemic in Malaysia (n=666)

Changes due COVID-19 pandemic	Total *n*=666 *n* (%)	Age	Gender	Occupation	Education-al level	State	Household composition	Monthly income
		Chi-squared test						
Accessibility to food supply		<0.001*	0.071	<0.001*	0.008*	0.005*	0.872	0.468
Yes	132 (19.80)							
No	462 (69.40)							
Uncertainty	72 (10.80)							
Difficulties in obtaining/buying food		0.006*	0.197	0.001*	0.028*	<0.001*	0.703	0.421
Yes	93 (14.00)							
No	549 (82.40)							
Uncertainty	24 (3.60)							
Food shortage		0.829	<0.001*	0.826	<0.001*	0.363	0.714	0.007*
Yes	81 (12.20)							
No	585 (87.80)							
Eating and drinking habits		0.003*	0.196	<0.001*	<0.001*	0.140	0.469	0.010*
Yes	332 (49.80)							
No	334 (50.20)							

*p-value was significant at 0.05.

Table IV: Changes of accessibility to food supplies before and after COVID-19 outbreak

Variable	Before COVID-19 outbreak	After COVID-19 outbreak	*Z*-statistic [a]	*p*-value[a]
Food accessibility	1.00	1.00	-12.136	< 0.001

[a] Wilcoxon Signed Ranks Test

DISCUSSION

Based on the results, most of the respondents do not have any access to an independent food system (farming or vegetable garden) making them vulnerable to disruptions to food supply. While this situation - the reliance on industrial sources of food supply - reflects the global urban scenario, there is a shift in both research and practice that look towards an independent food system as a major contributor to food accessibility. A recent article has even carried out an analysis that supports the idea of an independent food system (12), one which not only generates more job opportunities to the community, but allows for a more resilient food supply, that may withstand future shocks to the global food supply chain. Although this research focuses on generating an independent regional food system, the same concept applies to smaller, personal vegetable or community gardens. In fact, several articles had published data on the benefits of fostering local agriculture projects, one which was supported by and served small communities (13, 14). These projects were critical in not only reducing the social inequality gap but were also critical in making the communities it served more resilient and independent. Perhaps, this may be the answer to addressing the challenge of food accessibility we are facing in Malaysia.

The second point that this paper would like to discuss is the low percentage of food supply disruption as well as lack of access to food reported by the respondents during the first MCO. This reflects the researcher's own experience, in that food distribution was only interrupted for a few days, largely due to confusion between travel restrictions as well as panic buying. However, the significant difference found between food accessibility before and during the first MCO (refer Table IV) indicates that a subset of the Malaysian population was directly affected by the MCO. This corresponds to global research done on food accessibility during pandemic that utilizes data from over 80 countries, highlighting that the pandemic worsens food accessibility and security issue in vulnerable populations and regions, prompting people to reduce food intake or make significant changes to dietary habits (15). While the majority of the respondents in our study are earning a low income (below RM2500 monthly) which indicates possible vulnerability to food access, most are actually below 25 years of age and are living with families. This could affect the percentage of respondents experiencing food supply disruptions as those within this age group are most often students with low financial burdens. Regardless, the fact that a small percentage of the population having food access issues even before the pandemic highlights a problem that plagues a subset of the Malaysian population. Poverty and food security are major issues, and access to safe and nutritious food is a human right, not a privilege (16, 17), a fact which was brought to attention again during the 2021 United Nations (UN) Food Systems Summit. Unfortunately, as reported during the summit, most countries, including Malaysia, are not on track to achieve neither the World Health Organization's nutrition targets nor UN's Sustainable Development Goals (SDGs) (Sustainable Development Goal 2: Zero Hunger) (18). What this means is that the government needs to conduct targeted food security assessments for vulnerable populations, as they are more at risk of continuous food insecurity and inaccessibility, not simply because of the pandemic but in spite of it.

CONCLUSION

This research highlights critical food accessibility issue that goes beyond the pandemic. While there are limitations, for instance possible recall bias as the data requests information on the first MCO which started a year prior to data collection, special attention was put during data interpretation and discussion. Not only that, almost half of the respondents are below the age of 25 years old, which may affect the food accessibility status as those within this age group are frequently students with low financial burdens. However, this research collected data from over 600 respondents, therefore the researcher is confident that the results are robust. Not only that, climate change is expected to produce more vulnerable populations as well as more extreme weather that affects the resiliency of food systems. While this research highlights that initial MCO and perhaps the following MCOs had little in the way of disruptions, there are those who are more vulnerable than others which does not bode well for the future. As discussed in the previous section, a shift to more independent food systems and targeted food security monitoring and food supply policies for vulnerable populations is very much needed as it is a problem that exists despite the pandemic. In fact, disasters, bigger and more extreme ones, are expected to occur more frequently in the future, largely due to climate change, so it's imperative that we start now. Future research should also look into the food supply chain, or other elements of the food system, mainly food supplier, producer and identify the problems they are facing. While food accessibility affects only a small sample of the respondents, food accessibility is a human right and no one should have lack of access to it, during a disaster, or otherwise. Strengthening all elements of the food supply chain is

critical in ensuring the resilience of the food system, that is crucial in avoiding future problems.

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