

## HEALTH RELATED BEHAVIORAL CHANGES DURING COVID-19 MOVEMENT CONTROL ORDER (MCO) AMONG MEDICAL STUDENTS IN INSTITUTE OF HIGHER EDUCATION SABAH, MALAYSIA BORNEO: A QUALITATIVE STUDY

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### ABSTRACT

SARS-CoV-2 virus created a huge health impact due to isolation, quarantine, or lockdown. University students also affected with the closure of institute and switch in teaching methods. The objective of this study is to explore the health-related lifestyle changes among university students during the implementation of movement control order. Secondly, we aimed to convoke suggestions and recommendations to promote healthy living amidst university students. This research implemented qualitative method via using a semi-structured interview. Three focus group discussions were conducted consisting of 12 participants recruited from snowball sampling method. Utilizing verbatim transcription approach, an inductive thematic point was sketch for data analysis. Seven male and five female students with a mean age of  $20 \pm 1.3$  years (range 19-23) were recruited into this study. Four themes identified from the interview. Firstly, physical health influence by administrative roles to physically inactive and less sport activity. Secondly, mental health concern towards mixed emotions, coping strategy, psychological adjustment, and mental health issues. Thirdly, variation and self-prepare food, food supply, dietary habit and dietary pattern contribute to changes in food intake. Fourthly, student lifestyles modulate to sleep hygiene, alcohol consumption, online classes problem, individual factors, and other unhealthy activities. Finally, some students experience no difference in the surrounding transformation, yet they still experience health-related behavioural changes in other aspect linked to health. It is recommended that holistic pandemic management involving students to consider aspects not limited to learning but also their mental health, physical health, and nutrition status.

Keywords: Covid-19, health, behaviour, student, education institute.

### INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus has spread globally requiring declaration of pandemic by World Health Organization in March 2020. This unprecedented public health event comes with huge health impact not only due to the virus itself but also due to isolation following quarantine or lockdown. Movement control order (MCO) was found to be effective in reducing Covid-19 transmission in Malaysia. However, several health-related behavioral patterns have been reported to be associated with MCO. A study in France involving older adults reported that COVID19 pandemic has affected physical activity among study respondents<sup>1</sup> while in Italy it was found that a significant psychological and physical impact among adults has been reported following COVID-19 pandemic<sup>2</sup>. Institute for Health Behavioral Research survey shown that MCO has impact on physical activity, eating behaviour, and mental health among Malaysian adults<sup>3</sup>. Among Pakistan university students, lockdown was associated with

mixed emotions, both positive and negative<sup>4</sup>. Numerous studies have reported that MCO was associated with mental health issues such as depression, anxiety and stress among students<sup>5-7</sup>. Online classes problems<sup>8,9</sup> and physical distress were also reported to be associated with MCO<sup>10,11</sup>. On top of that, dietary and sleeping habit were reported to be affected due to MCO both in positive and negative ways.

Physical activity has been proven to benefit overall health to an individual, which improve the clinical conditions that mostly associated with severe COVID-19 infection. According to World Health Organization (WHO), physical activity is defined as any bodily movement of skeletal muscles that require energy consumption, including activity while working, playing, and carrying out household chores, which at least 150 minutes of moderate intensity physical intensity per week or 75 minutes of vigorous-intensity activity<sup>12</sup>. Nevertheless, gym and public recreational park are among places that has been ordered to closed to avoid social gathering and

prevent the spread of the infectious disease. Among those who are attending the physical activity program, the attendance of the program was greatly affected due to the fear of meeting potentially infected person<sup>3</sup>.

Quarantine measures that were taken by several government in the world as one of public health measures to reduce the spread of COVID-19 can be considered as a stressful event. During these current new norms, staying at home and working from home also has a bad reflection toward increase of unhealthy behaviours. It is even worse if the individual living alone during MCO because a study proved that there is a significant increase risk of unhealthy behaviour (smoking and alcohol consumption) in people who living alone compared to others<sup>13</sup>. Furthermore, sleeping pattern and habit also has changed during the movement control order and it is for the worse<sup>14</sup>. Physical activity, dietary habit and mental health are among reported health-related behavioural changes related to MCO in Malaysia. Some adults had been reported having higher frequency of food intake, higher frequency of sugary drink intake and eating more fast food and instant food as compared to before the MCO<sup>2</sup>. Females were more anxious than male's counterpart, especially those who had been staying alone without friends or families. Financial constraints, online class, being uncertain about the future due to COVID-19 and the MCO itself were among the common stressors towards anxiety and depression among those university students<sup>6</sup>. Most of the studies done pertinent to this issue was in quantitative form which unable to explore common themes to explain the association, igniting the need to comprehend the underlying mechanism of how lockdown is associated with health-related behavior changes. It is important to understand in depth how MCO affect health-related behavior among Malaysian. This study tries to answer the question of how does MCO affect Malaysians' health behavior and what are the changes in health-related behavior that arise during MCO. The objective of this study is to explore the health-related lifestyle changes among university students during the implementation of movement control order. Secondly, we aimed to convoke suggestions and recommendations to promote healthy living amidst university students.

## METHODS

We administered a qualitative method to study the importance on from the health perspective among the medical students staying in the campus during movement control order. This study was conducted at one of the higher education institute

in Kota Kinabalu. Students stay in accommodation provided by the university consisting of terrace houses and apartments. Students stay in accommodation provided by the university consisting of terrace houses and apartments and their movement were restricted within the respective area only. Student staying within the campus have access to canteen, sport facilities, library and health clinics. Counselling session established by the university for all students to support their wellbeing.

The sampling technique that has been used in this study was snowball sampling. This sampling method helped to include the unreachable participants who were in the same situation to deliver their opinions and experience. There were approximately 380 students enrolled in the faculty. Our sampling method via snowballing managed to recruit 12 participants to be part of the focus group discussion. A huge number of participants doesn't indubitably drive to more details and seize the risk of monotonous data<sup>15</sup>. During the course of our study, the university campus was closed, and the movement of students was restricted to the hostel. Therefore, Google meet was an alternative option suitable to proceed with our study. During the dialogue, the camera was turned on so that the researchers will be able to observe the response and reaction of the participants. The session was recorded by the chief researcher. To maintain confidentiality, only researchers would have access to the video. A semi-structured interview questions were prepared by the research team targeting to opt the factors shaping medical student's health including diet, physical activity, mental status, and other health-related behaviour. After an intensive brainstorming session with experts who were well versed in the focus group experience, the questions were established from the pertinent literature review<sup>4</sup>. After secured verbal consent and introduction session given, subsequent questions concentrated on the main objectives of this study, which was to pinpoint factors influencing students' diet, physical activity, mental health, and other health related behaviour were done. At the end of the session, students were asked to propose ideas concerning health promotion and intervention strategies to revamp student behaviour and health during the lockdown. Moderators wielded side questions in order to keep the focus group discussions in the right direction and avoid swerving from the main issues. The list of questions has been used were shown in Table 1.

**Table 1: List of questions during focus group discussion**

Question type	Question
Opening	1. What's your name and where you are staying?
Introduction	2. Can you describe a healthy person?
Transition	3. In relation to health among university student, what comes to your mind? 4. What is your perception and feelings about this lockdown? 5. What are the main health-related behaviour changes in your life during lockdown? (physical activity, dietary changes, mental health & others) 6. What factors influenced those changes mentioned in question 5? 7. What are the barriers or enabler of health-related behaviour can you identify during lockdown?
Key	8. Mention main coping strategies you used to deal with those changes and challenges during lockdown? 9. We are planning to help students to improve their lifestyle during lockdown. Can you suggest some advice on how to promote healthy lifestyle among students during this pandemic?
Ending	10. Do you have any remarks, suggestions, additions?

The informants' profile was analyzed in SPSS Statistic 26 and expatiated descriptively in the result section. Our team implemented verbatim transcription method to aggregate data from the informants. The interview was recorded and rewritten in Microsoft Word via Windows Media Player. Subsequently, data was transcribed and was analysed using thematic analysis. First, the researcher explored the data sets competently and introduced an open coding system. In the second step, coded information are shared among the researchers to counter check and reach an agreement for any controversial. Then, established codes with identical characteristics are organized into subcategories and further arranged into main categories. Through this approach, we were able to clinch the factors and ponder the feasible association and propinquity to the dependent variable. Triangulation methods was implemented to attain consensus from the researchers in order to avoid uncertainties and controversy contents.

## RESULTS

### *Respondent profile*

Three focus group discussions were conducted consisting of four participants per group. The sample (n=12) consisted of seven male and five

female students with a mean age of  $20 \pm 1.3$  years (range 19-23). Each focus group discussion lasted between 90 to 120 minutes. Additional sample characteristics are described in Table 2.

### *Focus Group Discussion Analysis*

One framework of health-related behavioral changes during Movement Control Order (MCO) in university students were developed based on content analysis of the focus group discussion (Figure 1). Our study established five subthemes which include physical activity, mental status, diet, lifestyles, and no perceived changes. The most appropriate narratives were chosen to illustrate each subtheme (Table 3). Physical health influence by administrative roles to physically inactive and less sport activity. Secondly, mental health concern towards mixed emotions, coping strategy, psychological adjustment, and mental health issues. Variation and self-prepare food, food supply, dietary habit and dietary pattern contribute to changes in food intake. Student lifestyles modulate to sleep hygiene, alcohol consumption, online classes problem, individual factors, and other unhealthy activities. Some students experience no difference in the surrounding transformation.

**Table 2: Participant’s characteristics**

Participants	Age	Gender	Academic year	Residency	Smoking status	Alcohol intake	Body Mass Index
Miss 1	21	Female	Year 2	Resident	No	No	Normal
Miss 2	19	Female	Year 1	Resident	No	No	Normal
Miss 3	23	Female	Year 2	Resident	No	No	Normal
Miss 4	21	Female	Year 3	Resident	No	No	Normal
Miss 5	19	Female	Year 1	Resident	No	No	Underweight
Mr. 6	21	Male	Year 3	Resident	No	Yes	Normal
Mr. 7	20	Male	Year 2	Resident	No	No	Underweight
Mr. 8	22	Male	Year 3	Resident	No	No	Obese
Mr. 9	19	Male	Year 1	Resident	No	No	Overweight
Mr. 10	19	Male	Year 1	Resident	No	No	Underweight
Mr. 11	20	Male	Year 2	Resident	No	No	Normal
Mr. 12	20	Male	Year 2	Resident	No	No	Normal

**DISCUSSION**

***Physical health***

Physical activity has been identified to be beneficial to so many health outcomes. Studies has been consistently identified that physical activity led to various health benefits such as improved physical and physiological health and positive health outcomes in areas of mental health and well-being<sup>16</sup>. According to World Health Organization (WHO), physical activity is defined as any bodily movement of skeletal muscles that require energy consumption, including activity while working, playing, and carrying out household chores, which at least 150 minutes of moderate intensity physical intensity per week or 75 minutes of vigorous-intensity activity<sup>12</sup>. Measures taken to contain the COVID-19 include isolation, social distancing, and quarantine. Quarantine and other lockdown instruments show promise in reducing the number of COVID-19 infections and deaths. It is reasonable to assume that lockdown leads to reduced levels of physical activity in the general population.

From present study, physical inactivity has been mentioned by our informants as one of changes in health-related behavior following the MCO. The informants also mentioned that they had prolonged inactivity for more than 10 hours per day (Table 3a).

“I spent almost 10-11 hours sitting in front of the laptop per day due to online classes” (Miss 1, 21 years old, female).

“I have less physical activity like walking due to MCO” (Mr. 6, 21 years old, male).

The finding was consistent with an online survey among adult’s internet user in Malaysia, which found that majority of the respondents practicing sedentary lifestyle (69.0% with prolonged sitting and 85.5% had screen time more than 30 minutes)<sup>2</sup>.

Similar observation also was made in a cross-sectional online survey, which found that physical activity was reduced and coupled by increase in daily screen time following the COVID-19 related quarantine measures<sup>17</sup>. The decline in the physical activity is subsequently accompanied by increase in sedentary (sitting) behavior. The statement is supported by a finding from an international online survey that was conducted to identify the effect of home confinement during COVID-19 outbreak, which found that home confinement negatively affects the physical activity intensity levels and increase daily sitting time from five hours to eight hours per day<sup>18</sup>. However, mixed finding was observed in an online study in Canada, where 40% of active individuals, were becoming more active since COVID-19.

Meanwhile, 40.5% of inactive individuals were reported to become more less active<sup>19</sup>. Prospective study shown that active individuals becoming more physically active in a stressful time as one of their strategies to cope, while stress has a negative effect on physically inactive individuals, especially during the acute stress<sup>20</sup>.

Thus, even though most of informants had identified that MCO had affect their physical activity, some individuals may also

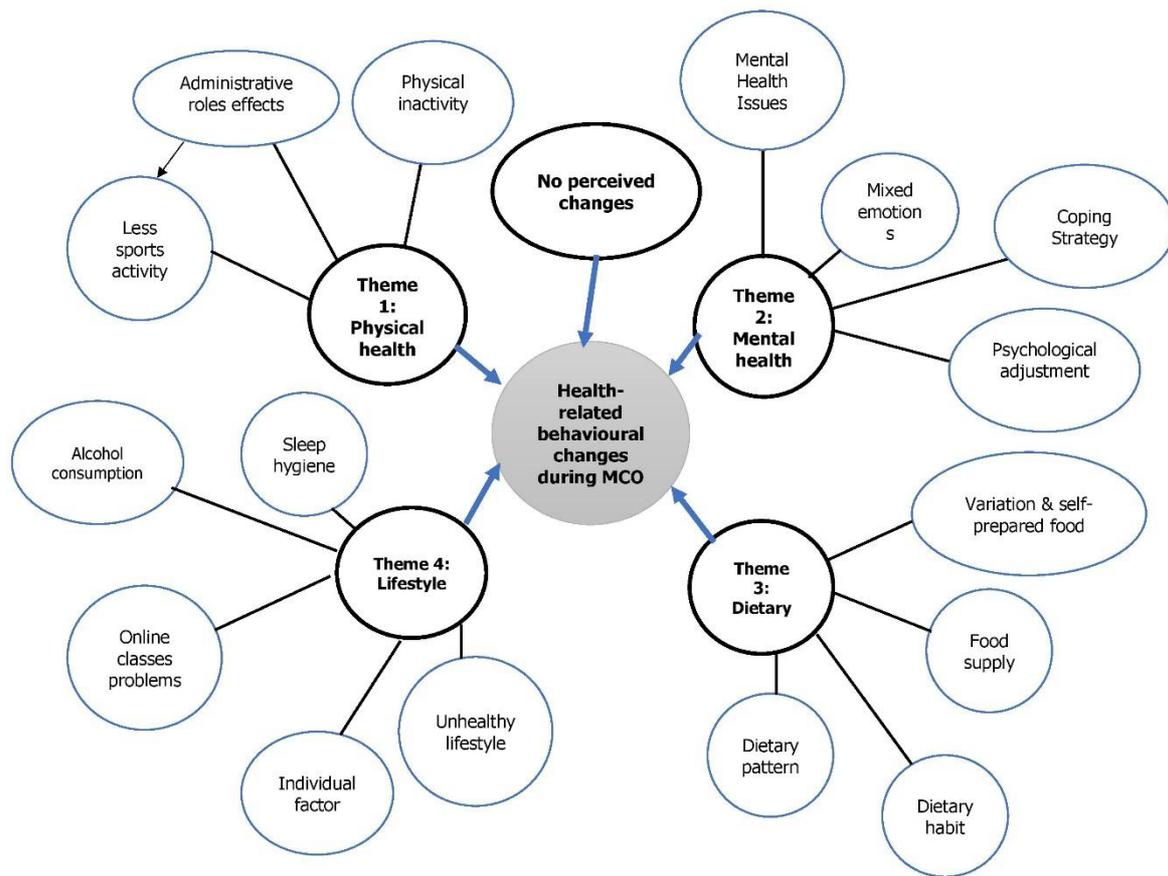


Figure 1: Thematic model of Health-related behavioural changes among university students during MCO

maintain their physical activity, or even increase, their level of physical activity at this time which is likely serve as a protective factor against the health-related problem.

“Now we are allowed to go to sports complex to play sports. If I don’t have class, I will go and play” (Mr. 6, 21 years old, male).

University is a place where there is clear life transition for most of young adults, which it represents a step towards personal independence on their daily life. Prior to the COVID-19 era, university has provided the quite an unlimited opportunity for campus communities to positively shape physical activity behaviors in their students. Environmental factors such as provision of gym and recreational parks are among examples that could promote the physical activity. However, during the COVID-19 era, most of these facilities has been ordered to closed to avoid social gathering and prevent the spread of the infectious disease especially COVID-19. Our informants have identified that the role of authority in the university contributed on their physical health.

“The authorities should introduce new games involving physical activities. From what I saw in social media, they have lot of games like treasure hunt and so on.” (Miss 3, 23 years old, female)

“I think the authorities should do at least two or three physical games which involved only resident students” (miss 4, 21 years old, female).

In addition, the transition of physical class into online class further worsened the state of physical activity among the students. This is because the environment factor as well as the role of authority, are likely to interact with psychosocial factors which could influence the physical activity patterns<sup>21</sup>.

Previous study found that, 15, has been associated with the risk of mortality, as well as the development of major non-communicable diseases, independently of other sociodemographic factors and pre-existing health conditions<sup>22</sup>.

One of the pathways that was suggested is that certain health behaviors contribute to increased health risk, with socially isolated and lonely individuals having less favorable lifestyles, such as the absence of physical activity<sup>23</sup>. Furthermore, the implementation of lockdown measures could lead to reduced social ties in between individuals which possibly lead to decrease in physical activity<sup>3</sup>.

**Table 3a: Theme Physical Health of Health-related behavioural changes among university students during MCO.**

Subtheme	Narratives
Less sports activity	<p>“In the afternoon before this I was going out of campus to play basketball but right now, I cannot do that”.</p> <p>“I cannot play volleyball, so I move to online games”.</p> <p>“During the first MCO, we cannot go to sports complex”.</p> <p>“We tried to play football in the university but suddenly the authority came and stopped us”.</p> <p>“I usually play football but during MCO I am not able to do so”.</p> <p>“We have less sports activity due to MCO”.</p> <p>“Before this we have sports day or family day but now no more”</p>
Physical inactivity	<p>“I spent almost 10-11 hours sitting in front of the laptop per day due to online classes”.</p> <p>“I have less physical activity like walking due to MCO”.</p> <p>“Before this we had something to do after class but now class finishes at 5pm then do not know what to do, sit at home only scrolling through handphone and social media”.</p> <p>“Because of MCO, we are restricted to go to places. Cannot go to church, cannot go out”.</p> <p>“Due to online classes I use less energy. Before this physical class I need to switch between classes but now I only sit in front of laptop”</p> <p>“During MCO, we sit on the chair for 24 hours because the online classes also sit on the chair. After the online class, we do our revision also on the chair and we also eat on the chair”</p>
Administrative Roles Effects	<p>“I’m thinking of doing activities among our residents like doing Zumba, cooking, and all. But I’m not sure during MCO how we can do it. But I think we need someone to talk to, someone to do activities with”.</p> <p>“Now we can go to sports complex to play sports. If I don’t have class, I will go and play”.</p> <p>“Regarding the barrier, it is rules and regulations. I’m afraid to do sports because the authorities might come and get us”.</p> <p>“I think the online lecture, I think they need to amend the lecture timetable, because right now it’s like continuous class. To make more break in between the classes. So that we can encouraging the students to go out for exercise”</p> <p>“The authorities should introduce new games involving physical activities. From what I saw in social media, they have lot of games like treasure hunt and so on.”</p> <p>“I think the authorities should do at least two or three physical games which involved only resident students”</p>

The informants also suggested that campus administration or any other authorities to facilitates the physical activities in the university during lockdown. Activities that were suggested is any physical games such as Zumba, treasure hunt, cooking and so on.

“I’m thinking of doing activities among our residents like doing Zumba, cooking, and all,” (Miss 2, 19 years old, female).

While this measure could help the students to improve their health, the campus administration also could concurrently ensure the compliance towards standard operating procedure to prevent COVID-19 transmission.

**Dietary intake**

Optimal nutrition and dietary nutrient intake are known to improve immune system of individuals and reduce the likelihood of several cardiovascular and metabolic risk, which in turn could possibly reduce the severe impact of COVID-19 infection<sup>24</sup>. Quarantine measures that were taken by several government in the world as one of public health measures to reduce the spread of COVID-19 can be considered as a stressful event. The stress could affect many aspects in people’s life, including the dietary intake.

From the results, it was found that the dietary intake of our informants has changed greatly since the implementation of MCO (Table 3b). Intake of unhealthy, processed food, irregular meal, and

overconsumption of food have been mentioned by our informants to be the unhealthy changes that occurred after during MCO. This could be referred to the snacking behavior that characterized the unhealthy dietary intake among our informants.

“Ordering a lot of fast food as well and Maggie and so on, just try to survive this MCO” (Mr 7, 20 years old, male).

“Most of the time we eat fast food, processed food, instant noodles and so on” (Mr 8, 22 years old, male)

Snacking behavior can be defined as the consumption of foods and drinks between meals including milk drinks, regular soft drinks, sports drinks and energy drinks<sup>25</sup>. Snacking behaviors are likely to increase by stress and other psychological issue. Previous study found a variety of reasons that influence the snacking behavior including opportunity induced eating and coping with negative emotions<sup>26</sup>. Furthermore, the snacking behavior also can be driven by psychological reaction such as boredom, increased amount of food being purchased, paired with increased levels of perceived stress<sup>27</sup>. Moreover, another factor that could affect the unhealthy dietary pattern, especially among students is the use of electronic devices and increased in screen time, through the effect of sedentary lifestyle<sup>28</sup>.

“Before this we had something to do after class but now class finishes at 5pm then do not know what to do, sit at home only scrolling through handphone and social media,” and “Most of the time we eat fast food, processed food, instant noodles and so on,” (Mr. 8, 22 years old, male)

The statement is supported by an international online survey, which found that the food consumption and meal pattern (the type of food, eating out of control, snacks between meals, number of main meals) becoming more unhealthy following home confinement period<sup>18</sup>. Meanwhile, a study conducted among 1097 Poland adults found that following the nationwide quarantine, almost half of the respondents reported eating and snacking more, where this tendency is more frequent among overweight and obese individuals<sup>29</sup>.

The informants reported that food availability is one of issue that affects the dietary changes among them. The food availability problem is mainly affecting the students that residing in campus. During the first MCO, the informants mentioned that there is not enough food supply provided by campus administration. Meanwhile during current MCO, food supply is mainly bought from the grocer inside the campus, where there is the issue of affordability and accessibility to buy adequate and nutritious food.

“If Grab food, for me it’s expensive” (Miss 2, 19 years old, female).

“They restrict it for five items per person which I think is not enough. During the last MCO I did quite good in my diet, it was okay, but now we do not have free food supply.” (Mr. 12, 20 years old, male).

Therefore, as described by the informants, students believed that they have limited choices, and they might be more likely to buy foods that are fast, convenient, and inexpensive. The finding was supported by previous study which concluded that, the main reason that contribute the changes in dietary pattern during COVID-19 pandemic were increase in food price and decrease in availability of nutritious food<sup>30</sup>. Furthermore, previous study also states that, physical environment such as availability and accessibility, appeal and prices of food products are among factors that influenced the healthful food choices<sup>31</sup>.

Even though some of the informants indicate that MCO as a barrier to healthy dietary intake, it is also may be perceived as an enabler towards healthy dietary intake. As described by our informants, implementation of MCO makes the informants felt that they need to reduce the amount and frequency of meals, as well as increasing consumption of vegetables as their way to stay healthy.

“I also cut down the rice taken because contain a lot of carbohydrates. So, this is the way I do it” (Miss 1, 19 years old, female).

“I take more vegetables that is provided in café than meat” (Mr 12, 20 years old, male).

Students that stay at home during MCO have different view on the dietary intake. They tend to have dietary intake healthier compared to their friends that stayed in campus residents. The pattern of dietary intake might be influenced by family members. Parents serves as models for eating behavior and could transmit dietary attitude to the offspring<sup>31</sup>. Furthermore, as described by our informants, the food supply at home is unlimited as they stay with the family. Thus, the family tend to have self-prepared food and less likely to consume unhealthy, processed food. The finding is consistent with a survey among adults in Malaysia, which found that majority of them (72.4%) had complete daily meals (ate breakfast, lunch, and dinner), and 94.4% ate home cooked food<sup>2</sup>. Consistent finding also observed by Kantar Worldpanel, which estimated a 38% increase in the number of meals consumed at home during the lockdown period<sup>32,33</sup>. Even though, the students that stayed at home have better option to healthy diet, they are also more likely to consume food more than

**Table 3b: Theme Dietary Intake of Health-related behavioural changes among university students during MCO**

Subtheme	Narratives
Dietary pattern	<p>“I also cut down the rice taken because contain a lot of carbohydrates. So, this is the way I do it”.</p> <p>“Before this my mealtime is fixed but now it is inconsistent”.</p> <p>“Since most of the time I’m in the room, whenever I see the wallet, I want to order food”.</p> <p>“I didn’t do so many physical activities, so, I need to lessen the food that I’m going to eat, just from triple-a-day meal to like single meal a day”</p>
Dietary habits	<p>“Ordering a lot of fast food as well and Maggie and so on, just try to survive this MCO”.</p> <p>“On top of MCO, they tend to eat more fast food and so on.”</p> <p>“I don’t eat instant and fast food since I’m at home”.</p> <p>“Most of the time we eat fast food, processed food, instant noodles and so on”</p>
Food supply	<p>“They restrict it for 5 items per person which I think is not enough”.</p> <p>“During the last MCO I did quite good in my diet, it was okay, but now we do not have free food supply.”</p> <p>“I take more vegetables that is provided in café than meat”.</p> <p>“If Grab food, for me it’s expensive”.</p> <p>“I’m at home. So, when I open the fridge and cabinet, foods already there”</p>
Variation & self-prepared food	<p>“I could suggest increasing variation of shops in UMS. Because students are not allowed to buy the groceries outside and the option for us inside the campus is very little”</p> <p>“We cannot go out to buy food, hence we can order our food via food delivery, so I suggest cooking”.</p>

usual, as observed by previous survey<sup>2</sup>. Informants also make some suggestion to improve dietary intake, especially during MCO. The students could replicate the meals that they usually consumed while eating outside. This is one of good way to have healthy diet as self-prepared food is more likely using fewer additives and preservatives<sup>32</sup>. Furthermore, the informants also suggested that the campus administrator could play a role in improving the dietary intake among students by increasing variation of food, as well as provision of vegetables in cafeteria and in grocer.

**Mental health Issues**

This study was able to catch the roller coaster of emotions what the students are going through during the movement control order which comparable to the study done in Pakistan which reported the student had mix emotion of happiness, sadness, anger, feeling annoyed and fear<sup>4</sup>. In detail, the study able to identify that there was a mix mental health issues among student such as stress, anxiety, and depressed. The finding was similar to a quantitative study which was done among students who were living in University Residential Colleges, reported around two in ten of the student are suffering from some kind of mental health issues<sup>34</sup>. Social

distancing is one of the important new norms to be followed in this current MCO, which totally defy human nature and one of the major concerns among students in our study (Table 3c). We human being are always revolved around connectivity with each and another, which makes us seek for human affection<sup>35</sup>. Hence this movement control order puts a tremendous burden on them whereby the students feel lost of connectivity and feel lonely.

“First and foremost, as a student I felt a lot of struggles with online classes. It makes me feel really sad, anxious and sometimes lead to depression too” (Miss 3, 23 years old, Female). The emotions also are dependent on the stressors which the student encounter during the movement control order and quarantine period whereby some faced fear of getting infected and also anxious of the uncertainty of the future related to their education which is all online at the moment<sup>36</sup>. In this critical situation many students have manage to find some kind of coping mechanism which is mainly interacting with friends and family support. A study done in Italy also had a similar conclusion whereby family support able to reduce the sense of loneliness and has a critical role as a mitigation solution to

reduce depressive symptoms<sup>37</sup>. In this emotion roller coaster, which the students are going through we able to find a silver lining in term of psychological adjustment. The students able to self-adapt to the situation in a positive way in term of realizing this movement control order is necessary to keep all safe, everybody have to play their part to break the chain of infection and online classes gives more time for themselves.

Hence, some emotion distress is important in a good way in leading people into changing certain behaviour in term of defensive reaction when they feel helpless<sup>36</sup>.

### **Lifestyle**

People tender to adapt and change lifestyle according to the environment they are situated in good or bad way<sup>38</sup>. In our study we able to document the same effect whereby the student behaviour and lifestyle changed during the movement control order, involving factor such as sleep hygiene, alcohol consumption, unhealthy lifestyle, individual factors, and online classes problem (Table 3d). In our study reported that movement control order had a positive impact on alcohol consumption which is contrary with a study which done by Knell reported 38.5% of respondent claims their alcohol consumption had increased during movement control order<sup>39</sup>. "My drink buddy going back, I stopped drinking already" (Mr.6, 21 years old, Male).

Another study also showed there is a significant increase risk of unhealthy behaviour (smoking and alcohol consumption) in individual who are living alone during movement control order compared to others and most likely we unable to see this effect in our study in view of smaller sample size<sup>13</sup>. Sleeping hygiene is one of the concern parts we able to detect in our study which caused by movement control order. Even though the students get to sleep long hours around 16 hours sometimes, but it is not a peaceful sleep according to them. An experimental study among student nurse also came to a conclusion that although student spent more time in bed, overall sleep quality was worsen during the movement control order<sup>14</sup>.

It is a public concern in view of Poor sleep quality has a short- and long-term consequences which include reduce productivity, somatic pain, mental health diseases, non-communicable diseases and even communicable diseases because individual can become more sustainable to infection<sup>40</sup>.

Meanwhile, sedentary lifestyle also one of the biggest concerns seen in our study whereby students spend almost 10 to 11 hours in front of laptop everyday attending online classes followed by scrolling social media and playing video games after classes. This promotes sedentary lifestyle which can lead to non-communicable diseases which were proved in one the study that reported 36% prevalence of non-communicable diseases were positively associated with sedentary lifestyle<sup>41</sup>. Another study among children also revealed that during this MCO period there has been great decrease in physical activities and great increase in sedentary lifestyle<sup>42</sup>. Online classes itself has been proved to have negative effect on functional health<sup>43</sup> and adding to it movement control order had nurture unhealthy lifestyle such as playing a lot of video games and spending a lot of time on social media among the students and there is a study which has a significant association between time spent playing video games and overweight in 18 years old girls<sup>44</sup>

### **No perceived changes**

Interestingly, some of our study informants reported no perceived changes in terms of their health-related behavior (Table 3e). "I do not feel there was much effect on me." (Miss 7, 20 years old, Female) Behavioral changes following MCO are consistently mentioned in previous studies<sup>17,18,29,32</sup>. Perceived no behavioral changes might be due to limited or no changes in the environment following the acute stress. As described by the informant, which states that there are no changes in behavior because they are staying at home during the MCO. According to Ecological Model of Health, there are four major determinants of health behavior, which are intrapersonal factor, interpersonal factor, and community and institution. While campus ecology determined the environment influence towards individual behavior for those staying in campus, different influence is experienced by those staying at home. For those who are staying at home, they might have less restriction on the social isolation, less restriction from the authority, together with social support and positive influence that is gained from family and surrounding community, makes them less likely to be affected from behavioral change during MCO.

**Table 3c: Theme Mental Health of Health-related behavioural changes among university students during MCO**

Subtheme	Narratives
Mental Health Issues	<p>“The real depressing part is when u have nothing to do you just go to sleep”.</p> <p>“I think we need counsellor services. At least we have someone to talk to when we are stress or worry especially for resident students”.</p> <p>“First and foremost, as a student I felt a lot of struggles with online classes. It makes me feel really sad, anxious and sometimes lead to depression too”.</p> <p>“I felt rather sad and anxious at times.”</p> <p>“My feelings about MCO are stress because of online learning”</p> <p>“I feel at one point feeling crazy and depressed because cannot go out during MCO.”</p> <p>“I was scared because I do not have any support here”.</p> <p>“I feel very sad. Because MCO stop us from going to face to face class. It is a big deal for us clinical students”.</p> <p>“Feel alone now, less social with people just focusing on class”.</p> <p>“I have a mixed feeling of sad, happy and stress.”</p> <p>“I cannot accept that I cannot go to hospital attachment I feel very sad”.</p> <p>“I’m worried with people coming in and out from here which means we have the risk to get infected with Covid-19”.</p>
Mixed Emotions	<p>“My perception about MCO is that MCO is so annoying, depressing and burdening”.</p> <p>“I feel angry and stress because of the restriction”.</p> <p>“I am worried a lot more”.</p> <p>“I feel excited attending medical school but turns out online classes makes me feel anxious”.</p> <p>“But I can say my feeling is at first like totally didn't expect that this thing will happen. This, uh, MCO is locked down”.</p> <p>“I felt a little bit adapted to the situations currently because on like, I'm seeing my friends, basically the support, the supportive friends that I have.”</p>
Coping Strategy	<p>“I have constant video calls with my parents and family, so that I don't feel lonely”.</p> <p>“If I feel stress, I will talk to my friends or I call my parents”.</p> <p>“...having conversation with my parents, 5 times or 3 times a week, that is the maximum, apart from those very busy days. Minimum 3 times in a week I try to communicate with them asking them. It's like give me a soothing feeling to my heart and it's like a remedy for the loneliness”.</p> <p>“Try to talk with my parents and share my problems. Surround myself with group of friends and share problems”.</p> <p>“I just call my parents If I am worried. Or else I will tell my friends here or my friends in Tawau, just to let it out. It helps even though I am still worry.”</p> <p>“What makes me happy is if I heard my mum planning to bring me out”</p>
Psychological Adjustment	<p>“My perception is that this MCO must be done so that we will have the SOP, it helps in controlling the pandemic.”</p> <p>“I think with the current situation on the health-related behavior among the students, all the university management and everyone need to remind people surrounding them there is pandemic goes around and we are still fighting against this Covid19”.</p> <p>“For university students MCO saves time since everything is online, so I don't have to walk to faculty, and I don't have to wait for bus.”</p> <p>“So, we have to play our part and our role in a curving this pandemic by practicing good hygiene”.</p> <p>“I think we need to get use to the online situation now”.</p> <p>“Overall, is that, to me, everything is improving from the beginning. All is actually depending on how I see; I already start getting to use to this thing”</p>

**Table 3d: Theme Lifestyle of Health-related behavioural changes among university students during MCO**

Subtheme	Narratives
Online class problems	<p>“Sedentary lifestyle is like almost 10 to 11 hours sitting in front of the laptop every day”.</p> <p>“This passive lifestyle is because of the online class that uses less energy”.</p> <p>“I just sit there listen and watch, that’s thing makes me lose concentration easily and can get distracted”</p>
Unhealthy lifestyle	<p>“Before this we had something to do after class, but now class finishes at 5pm then do not know what to do, so sit at home only scrolling through handphone and social media”.</p> <p>“I tend to play games a lot and I don’t focus to lecture anymore”</p>
Individual factor	<p>“I think most of the problems that affect me is due to my discipline”.</p> <p>“I can choose to change my sleeping cycle, but I choose not to, because I feel, I’m attached to this kind of sleeping cycle”</p>
Sleep hygiene	<p>“I have insomnia so I have to keep awake during the day so that I can sleep at night but during this MCO I cannot do anything to tired myself hence I cannot sleep at night”.</p> <p>“When I get up, I feel lost, if bad day I sleep around 16 hours”.</p> <p>“Disruption in sleep probably because wanted to catch up with online class”.</p> <p>“I shift my sleeping cycle to morning, instead I do things at the night, I think I can get more focus”.</p> <p>“Irregular sleeping pattern because sometimes sleep early or late, longer sleeping duration or shorter than usual, sometimes can sleep well and sometimes cannot”</p>
Alcohol consumption	<p>“My drink buddy going back, I stopped drinking already”</p>

**Table 3e: Theme No Perceived Changes of Health-related behavioural changes among university students during MCO**

Subtheme	Narratives
No Perceived Changes	<p>“I do not feel there was much effect on me. Because before this also I like staying at home.”</p> <p>“I am not affected with mental health issues due to MCO”.</p> <p>“I don’t have many changes in terms of the eating habits”.</p> <p>“But as for me personally, I can accept everything, and I am okay”.</p> <p>“The first moment the MCO is like initiated, like during March, I’m feeling nothing, to be exact”</p>

**Strengths of the study**

In this study, there are a few strengths. Our research adds substantial evidence to the limited literature exploring the changes in health-related behaviour among university students during the MCO period, as this is the first time the MCO has engaged university students on campus. In addition, this is one of the earliest studies to behaviour. Furthermore, the research team preferred focus group discussions over all other methods such as in-depth interviews, since this dynamic group interactions helped to get better insight into the factors and interactions behind the university student’s health related behavioural changes during MCO. This research provide insight into everyday account of the informants’ life and health-related behavioural changes through their narratives.

**Limitation of the study**

One of the limitations in this study is that in the sample selection, whereby study population are not diverse. Our study population is only limited to medical students that might have relatively similar perception regarding healthy behaviour that might introduce implicit bias and thus limiting the generalizability of our research findings. However, inclusion of medical students in this study might provide general ideas on the students’ way of thinking especially during early phase of pandemic and potentially provide valuable information for policy maker in university in planning and designing an improved outbreak preparedness strategy, which is include addressing the needs of the students.

## CONCLUSIONS AND RECOMMENDATION

It can be concluded from our research that its findings provided a comprehensive and in-depth understanding of the health-related behavioural changes among students during COVID-19 lockdown by using focus group discussion. We found that during the pandemic, students experienced health related-behavioural changes involving physical health, mental health, dietary and lifestyle. Even though some informants perceived no changes in certain aspect, they still experience health-related behavioural changes in other aspect linked to health. Our results should be considered a first step towards the development of tailored and effective intervention programs aiming to improve university students' health-related behaviours amidst the pandemic.

It is recommended that this study should be taken as a first step toward the planning of appropriate and effective intervention programs to improve health-related behaviours of university students in the midst of the epidemic. The results of this study can be absorbed and used in implementing a proactive and conducive epidemic management plan among university students by taking into account and considering all health-related behavioural factors. It is recommended that a holistic program that includes physical activity, mental health, nutrition and others should be designed and prepared in advance for students to face any difficulties that occurs during pandemic. Students should also be emphasized on the importance of maintaining mental health, nutrition and physical activity at all times to ensure their quality of life and learning throughout the pandemic period. For future studies, the research is recommended to be carried out in a large sample size and should emphasize on presenting quantitative data on the significance and value of each study. We also suggest for researchers to investigate further those with nonperceived changes and explore on the associated factors. this study can be a good reference to expand and implement the scope of the study to higher education and secondary school students.

**Conflict of interest:** The authors declare that they have no competing interests.

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