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PATHWAYS OF NEIGHBOURHOOD OBESOGENIC ENVIRONMENT DURING COVID-19: IMPACTS AND WAY FORWARD

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Abstract

Prior to the COVID-19 outbreak, obesity is already a pandemic illness on its own. It has been a public health priority in developing countries especially Malaysia where the obesity rate in the country is one of the highest in South East Asia. Early studies have concurred that the presence of COVID-19 makes anatomising the obesity pandemic even more urgent as impaired metabolic health increase complications and mortality in COVID-19 patients. COVID-19 induced movement restriction orders and related policies by the Malaysia government are believed to have altered the country's food and physical activity environments. The paper expanded the original Neighbourhood Environment, Health Behaviours and BMI (NEHB-BMI Model) where the pathways of neighbourhood obesogenic environment that reflects COVID-19 induced changes to the constructs from the perspective of Malaysia is presented. Through the discussion, three key variables were added to the model: 1) government environment; 2) establishment/business environment; and 3) individual psychosocial factors. Exploring the impacts of COVID-19 to the obesogenic environment constructs paves way to gauging insights by allowing associations between the presented variables to be tested in future studies, especially in the South East Asian region where such studies are very limited.

Keyword: Neighbourhood obesogenic environment, COVID-19, Malaysia

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INTRODUCTION

Globally, obesity is a known risk factor for non-communicable diseases (NCDs) and is recently linked to increase complications among COVID-19 patients (Sim et al., 2020; Sanyaolu et al., 2020) which can lead to higher mortality rate. Being the fattest country in Southeast Asia, Malaysia's National Health and Morbidity Survey 2019 revealed that every five in 10 adults is prevalence to being overweight or obese. Nearly 67% of COVID-19 victims in Malaysia who were brought-in-dead to hospitals had at least one underlying NCD (Ministry of Health Malaysia, 2021a). As such, in the wake of COVID-19, those with obesity and other underlying comorbidities have been categorised as high-risk groups.

Currently (September 7, 2021), Malaysia has recorded a cumulative of 1,880,734 COVID-19 cases with 18,802 of fatalities and 1,609,930 of recovered patients (Ministry of Health, 2021b). Movement restrictions enforced by the Malaysia government are based on severity of aerial infection. It ranges from the less strict Recovery Movement Control Order (RMCO) to most strict Enhanced Movement Control Order (EMCO) and total lockdown, where each has its own sets of policies. With different types of movement restrictions enforced by location, it has now become an important factor influencing the environment.

As COVID-19 cases continue to surge on daily basis, the World Health Organization (2021) advised the public to maintain a good nutrition intake, stay hydrated and be physically active despite the movement restrictions. Supported by studies done during the COVID-19 pandemic, maintaining regular physical activity level (Aman & Masood, 2020) and a balanced diet (Christofaro et al., 2021), hand in hand, is essential to building strong body immune system and maintaining a healthy weight during quarantine. While physical activity and dietary behaviours were previously thought to be an individual choice, Ecological System Theory (Bronfenbrenner, 1992) presents the possible influence of environment to individual behaviours.

Though systematic reviews (Papas et al., 2007; Xu & Wang, 2015) attested the significance of association between built environment and obesity. An environment is considered as obesogenic when the physical, health and social contexts discourage healthy behaviours and facilitates obesity (Kirk, Penney & McHugh, 2010). Given the presence of COVID-19 and its potential impacts to our environment, it calls for a need to identify pathways that explains the obesogenic environment and health behaviours in Malaysia during the pandemic.

To date, a framework that describes Malaysia's obesogenic environment that explicitly studies the dynamics between energy intake (food environment and diet quality) and energy expenditure (physical activity environment and physical activity level) as well as social factors is still inconclusive. As such, the paper uses the Model of Neighbourhood Environment, Health Behaviours and BMI (NEHB-BMI Model) (Figure 1) developed by Majid et al. (2021) as a foundation for further discussion. The model suggests that the

food and built environments at the neighbourhood level have influences over individual health behaviours i.e., diet quality and physical activity as well as body mass index (BMI). Two groups of confounding variables considered in the model are socio-demographic characteristics including age, race, gender, highest education level and monthly household income: as well as neighbourhood socioeconomic status (SES).

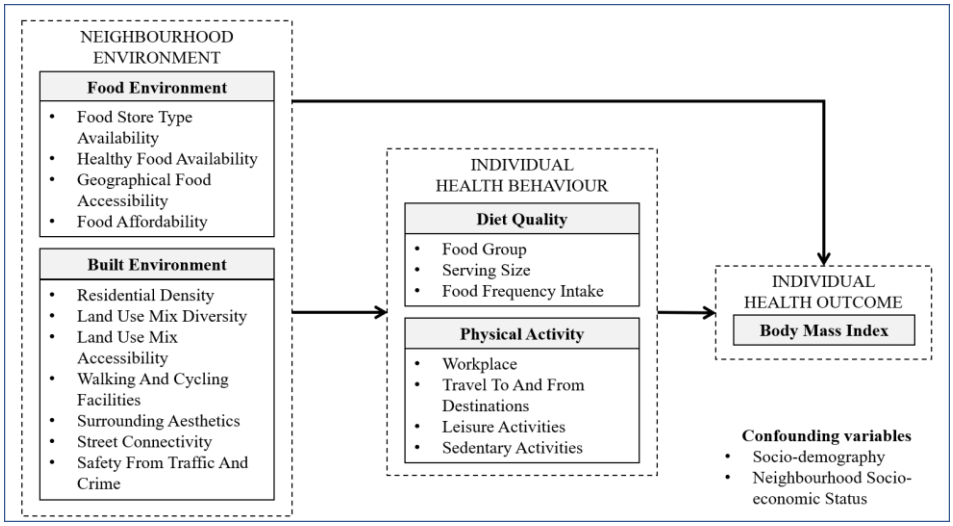

Figure 1: Model of Neighbourhood Environment, Health Behaviours and BMI (NEHB-BMI Model)
Source: Majid et al. (2021)

Currently in Malaysia, limited studies have been done on linking COVID-19 to the variables and constructs presented in the NEHB-BMI Model. Hence, content analysis on secondary data related to impacts of the pandemic towards Malaysia's obesogenic environment are collected from local newspapers, official government statistics and official government press releases as well as reports from legitimate organisations.

IMPACTS ON THE NEIGHBOURHOOD FOOD ENVIRONMENT

Inability of Non-Fast-Food Restaurants to Respond to Changes in Consumer Behaviours

A restaurant's responsiveness to the changes in consumer behaviours during the pandemic can determine its business survival, thus affecting neighbourhood food availability which can either encourage or discourage an obesogenic environment. When movement restrictions were announced by the Malaysia government, restaurants that have already incorporated digital infrastructures into

their business models prior to the pandemic are doing better than those that did not. Comparing fast-food and non-fast-food restaurants, Kee, et al. (2021a) highlighted that the former swiftly adapted to the new food environment thus becoming more customer-centric, while the latter was heavily impacted where around 2,000 recorded non-fast-food restaurants nationwide faced business closures. As pointed out by Richardson et al. (2015), more availability of fast-food restaurants than non-fast-food restaurants can further sustain an obesogenic environment which is detrimental to the diet quality of the affected population.

Public Health Messaging Limiting Visitations to Healthy Food Establishments

As healthy food stores are often set in large areas which tend to collect crowds such as grocery stores, supermarkets and wet markets, these places are more vulnerable to virus exposures. As such, it can be observed that public health messaging such as those released by the Federation of Malaysian Consumers Associations (2021) specifically warn consumers against frequent visits to those three places mentioned above to avoid being exposed to COVID-19. These kinds of messages can stunt revenue – affecting business survival. It is apparent as the Malaysia Retail Sales Report 2021 noted that supermarkets and hypermarkets in Malaysia had negative growth of monthly retail sales which is a trend that has persisted since year 2020. Small businesses including local grocery stores (Fabeil, Pazim & Langgat, 2020) also faces highest risk of business closures during these trying times. Furthermore, wet markets nationwide have been experiencing temporary shutdowns due to unexpected virus outbreaks from time to time (Ministry of Health Malaysia, 2020b). With the absence of similar health messaging, continuous positive revenue growth was reported for convenience stores in the Malaysia Retail Sales Report 2021 since year 2020. Hence, public health messaging is speculated to contribute to the decline of access to quality and selection of healthy foods within a neighbourhood, which then further encourages the obesogenic environment.

Restrictions To Movement and Food Accessibility Leading to The Rise of Home-Cooks

Strict movement restrictions forbidding more than 10-kilometre travels most of the time during the pandemic forces Malaysians to settle for food that are available and accessible to them within the radius. Here, their diet qualities can be directly impacted by the distribution and variety of food stores in their neighbourhoods. This is similar for those who rely on online delivery services where they are also somewhat confined to the food stores that are nearer to them as delivery charges gets higher for farther places. During these times, there are also those who turned to cooking at home due to having cleanliness concerns (Norshariani, 2020), creating the rise in “MCO cooks”. Newfound interests and

elevated skills in cooking at home are more prominent among those living in urban areas, whom prior to the pandemic relies more on dining out (Ali & Abdullah, 2017). As home-cooking often yields better diet quality such as greater daily consumption of fruit, vegetable or fresh raw vegetable (Norshariani, 2020), this may help in discouraging the obesogenic environment.

IMPACTS ON THE NEIGHBOURHOOD PHYSICAL ACTIVITY ENVIRONMENT

Higher Residential Density and Overcrowding Increases Risk Exposures

Higher density residences are naturally overcrowded, thus has been suspected (Alberta Health Services, 2020) and found to be positively associated with risk of COVID-19 infection (Huang et al., 2020). Similarly, most of the areas enforced with EMCO in Malaysia were of low-cost high-rise government housings such as the People's Housing Project (PPR) and flats (Bernama, 2021a; Harun, 2021); indicating a higher rate of COVID-19 infection within those vicinities. Living in higher populated residential areas can facilitate to developing sedentary behaviours as inhabitants are instructed not to loiter outdoor unnecessarily to limit risk of exposure.

Restrictions to Destinations and Operations of Activities

Higher land-use diversity and accessibility are said to result in more physical activity (De Bourdeaudhuij et al., 2005; Tung et al., 2016; Nordin & Nakamura, 2020) as it motivates destination to destination travelling (Chen & Lau, 2008). However, land use mix diversity and accessibility in Malaysia is severely affected as the government has set restrictions to visit public places like recreational parks and shopping malls (National Security Council, 2020a). Schools and other activities listed under non-essential services had to be closed temporarily as well (National Security Council, 2020b). As Huang et al. (2020) found a positive correlation between transport facility density with COVID-19 infection rate, the instruction to limit public transport ridership capacity for buses, rails and taxis by the National Security Council (2021) in Malaysia was called for. All these coupled with the encouragement to work from home by the government, can result in a significant drop of work, destination travelling and leisure-time physical activities.

Involuntary Physical Inactivity Due to Movement Restrictions

Prior to COVID-19, Malaysia neighbourhoods with greater walking and cycling facilities (Sreeramareddy et al., 2012; Law, Taib & Saad, 2014), street connectivity (Abdullah, Mirzaei & Haron, 2016), safety from traffic (Law, Taib & Saad, 2014) and crime (Cheah, Chang & Saimon, 2012; Saimon, Choo & Bulgiba, 2015; Abdullah, Mirzaei & Haron, 2016) as well as have a more pleasant surrounding aesthetics (Law, Taib & Saad, 2014; Abdullah, Mirzaei & Haron,

2016) have been linked to higher physical activity level regardless of the studied population. With COVID-19-related government policies enforced since March 2020, past concerns such as traffic congestion and crime rate were found to be declining (Fuad, 2021). Ideally, this would facilitate to higher physical activity among residents. However, outdoor activities and travelling are limited with movement restrictions in place. As such, even with the presence of encouraging built environmental features, involuntary physical inactivity can start to develop over time.

Higher Dependence on Online Technology and Working from Home Leading to Sedentary Lifestyles

Increasing dependence on online technology can cause physical inactivity (Yi, Samat & Muda, 2017), while working from home (WFH) has been linked to more sitting time and screen time (McDowell et al., 2020). With the presence of COVID-19 further normalising the trend of WFH, this has further propelled Malaysia's dependence on digital infrastructures. In fact, a recent national level survey by Mohammad, Mazalan & Wan Saidin (2020) on Malaysians' WFH experience revealed that the majority of respondents are favouring this new working method. This can be a detrimental trend which encourages sedentary lifestyles leading to higher BMI and other independent health risks (Warburton & Bredin, 2016).

DISCUSSIONS

The COVID-19 crisis is believed to have incurred unexpected changes specifically to the food and physical activity environments. It is speculated to worsen Malaysia's inherent obesogenic environment. From the impacts of COVID-19 presented above, a framework that conceptualises obesogenic environment pathways based on an ecological model of health perspective is proposed. Figure 2 shows the addition of three main variables to the original NEHB-BMI Model includes; 1) government environment which may be gauged by federal- and state-level policies and public health messaging; 2) establishment/business environment which may be gauged by their responsiveness to change, business model sustainability and marketing efficacy; and 3) psychosocial factors.

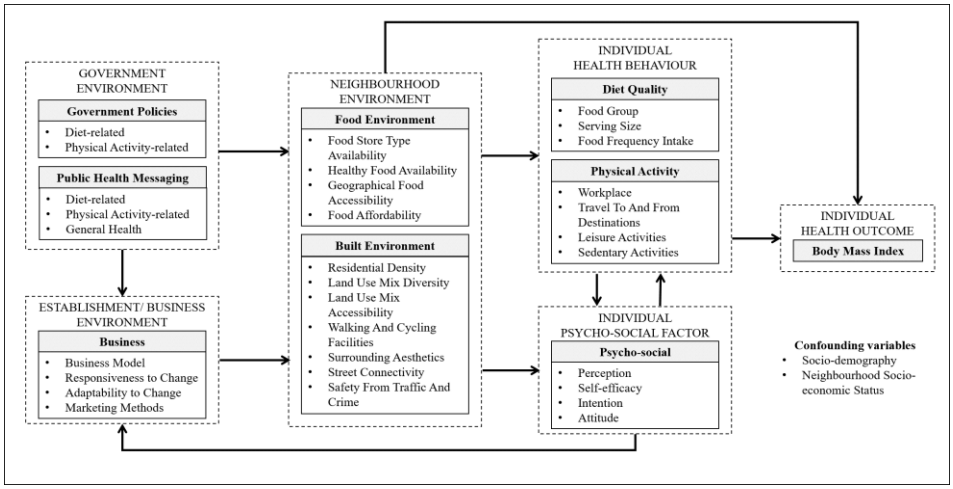

Figure 2: Proposed conceptual framework/ pathways of obesogenic environment impacted by the COVID-19 pandemic from Malaysia's perspective
Source: Author (2021)

When confronted with public health issues, studies have relentlessly punctuated not only on the importance, but also the need of inter-agencies collaboration between the government and related authoritative entities. The pandemic has become a platform to showcase how powerful government policies and public health messaging can have on the health environment. By controlling the operations of essential and non-essential services, it can influence the availability, accessibility and diversity of neighbourhood food and physical activity environments. This can then influence individual diet, physical activity level and BMI. The experience should be capitalised for future public health directives from planning and implementation to monitoring and achieving a desired environment that is no longer obesogenic.

It can also be observed that the food and physical activity environments are very much dependent on the sustainability and survival of related establishments. The businesses' ability or inability to respond to the changes in consumerism and operating climate can determine its availability and accessibility to customers. With COVID-19 measures in place, there is a need to assess the neighbourhood's availability, density and accessibility of food and physical activity-related establishments. This can give an indication of whether a person's neighbourhood environment is obesogenic or not. As such, two new pathways were drawn from the government environment and establishment/ business environment to the neighbourhood environment to indicate the direct impacts. Next, as the government environment is also assumed to have a direct

impact on the establishment/ business environment; the relationship between government environment and neighbourhood environment may be mediated by the establishment/ business environment.

When presenting the impacts of COVID-19 to the obesogenic environments, elements of individual psychosocial factors are always present. It ranges from motivation and perceived benefits to exercise, fear of infection, dependence on technology, opinions on working from home as well as eating attitudes and cooking skills. Hence, it is hypothesised that individual health behaviours may be influenced by individual psychosocial factors and vice versa. Also, a pathway was drawn from individual psychosocial factors to establishment/ business environment as it is speculated that cooking skills for example, may influence frequency of ordering online food services and thus affect sustainability of businesses.

The original pathways from neighbourhood environment to individual health behaviours and BMI are retained. As the neighbourhood environment is hypothesised to influence individual psychosociality, an additional pathway was drawn to reflect the direct relationship. With that in place, the association between neighbourhood environment and individual health behaviours can then be mediated by individual psychosocial factors, and subsequently influencing BMI. Socio-demography and neighbourhood SES remain as confounding variables in this framework. The framework can be used as a guide to understand the construct dynamics and develop measures to better manage the obesogenic environment from Malaysia's perspective. It is undeniable there are a large pool of variables that can potentially affect the obesogenic environment pathways during COVID-19. However, the paper is selective in identifying only those of highest impact yet are less estimated concurrently in this climate.

CONCLUSION

Globally, different countries are faced with different scenarios brought about by the pandemic and hence have to endure different government measures from time to time. As such, each country's environmental changes, health behaviours and health outcomes can be different. Having learnt that COVID-19 patients with obesity and other underlying comorbidities can increase complications and mortality, studies of the obesogenic environment is an urgent matter. This is more apparent for Malaysians as the population has a high rate of overweight and obese prevalence even way before the occurrence of COVID-19. In an effort to understand the pathways of the neighbourhood obesogenic environment that may have been impacted by COVID-19, variables and constructs that were believed to have induced or experienced change are identified and discussed. Public health-related interventions strategies during these recent times must consider the impacts of COVID-19 on the environment and individual behaviours as the pandemic has undoubtedly shaped a new normal that may alter results of previous

studies. Future research of neighbourhood obesogenic environments necessitates additional exploration of policy-, business- and psychosocial-related factors concurrently. Moreover, the re-examination of environmental factors and further assessment of inter-relationships between identified variables are highly recommended.

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