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Achieving an Active Lifestyle within a Walkable Environment: Assessment of Before and During the COVID-19 Pandemic

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ABSTRACT

Having an active lifestyle has been regarded as one of the main factors for maintaining a healthy and happy life. However, previous studies have pointed out that most Malaysian adults are reported to be physically inactive due to lifestyle changes such as increasingly sedentary lifestyles, decreased physical activity (PA), and growing reliance on automobiles for mobility. Subsequently, the COVID-19 pandemic has further impacted the quality of the urban population's active lifestyles, particularly the disruption resulting from movement restriction control orders which has limited the ability to maintain an active lifestyle. This scenario has the potential to negatively impact the health and mental state of the population if it continues without intervention by relevant stakeholders. Therefore, this study examined the patterns of PA and body mass index (BMI) and assessed the association between PA and a walkable environment to maintain an active lifestyle in Kuala Lumpur city centre before and during the COVID-19 pandemic. In this study 'walkable environment' refers to a physical attribute that encourages walking for functional and recreational purposes and 'active lifestyle' refers to walking being the main physical PA that contributes to health as part of people's regular routine. This study adopted the mixed method approach through an online questionnaire survey, combined with the observation of selected areas and content analysis of written documents. The findings show that most respondents perceived that walking was the main PA that contributes to health. In terms of effects, walkable environments have been shown to have a positive impact on PA and health by encouraging an active lifestyle.

1. Introduction

As the capital city, Kuala Lumpur has the highest population in Malaysia with nearly 1.8 million people in 2019 (Draft Structure Plan 2040, 2021). Kuala Lumpur City plays an important role in generating economic activity. Hence, migration from rural areas to urban areas takes place because of job opportunities and a

steady increase in GDP *per capita* (ETP, 2013). In 2020, the population in Kuala Lumpur increased 2.79% which places Kuala Lumpur among the fastest growing Asian City economies in the world and one of the world's key hubs for Islamic Finance. However, Malaysia is also known for having Southeast Asia's most obese population. According to the Institute for Public Health (2020), 50% of adults in Malaysia are overweight

or obese. The World Health Organization (2016) defines normal-weight persons as those having a Body Mass Index (BMI) between 18.5 and 24.9kg/m^2 and overweight or obese persons as those having BMIs greater >= 25 and 30kg/m^2, respectively. These values were found more frequently (55%) among the female population. Overweight and obesity have been linked to various factors, including physical inactivity, unhealthy dietary habits, alcohol intake, socioeconomic conditions, and genetic factors (Chan *et al.*, 2017).

Notably, there has been growing concern that urban sprawl and the built environment are among the factors that contribute to the increased obesity rates, mainly through sedentary lifestyles and growing reliance on automobiles for mobility. Obesity increases injuries and disability, while reducing work productivity. Obesity is also a leading risk factor for non-communicable diseases (NCDs) such as chronic heart disease, stroke and diabetes. High blood sugar, high blood pressure and high cholesterol are major risk factors for cardiovascular disease (CVDs). In most middle and high-income countries, including Malaysia, (CVDs) are the leading causes of death (see Institute for Public Health, 2020).

Modern lifestyles are increasingly sedentary lifestyles. Currently, about 1 in 4 (7.1 million or 36.9%) of Malaysian adults are reported to be physically inactive. The least physically active members of the population are females (28%) and urban dwellers (27%). Physical inactivity is the 4th leading risk factor for global mortality (WHO, 2019). Recommended PA for adults aged 18-64 years involves taking short walks which can increase the levels of PA to achieve at least 150 minutes of moderate-intensity PA per week. However, the COVID-19 pandemic has further impacted the quality of active lifestyle among urban populations through the disruptions resulting from the movement restriction orders. This scenario has the potential to negatively impact the health and mental state of the population if it continues without intervention by related stakeholders (Totosy De Zepetnek *et al.*, 2021; Yang and Xiang, 2021).

The Director General of Health, Tan Sri Dr Noor Hisham Abdullah, has revealed that some individuals are at high risk of mental health problems during the COVID-19 pandemic including depression, especially when under extreme stress, extensive commitment during work from home and the effect of isolation from social networks (Sinar Harian, 5th July 2021).

Even more worrying, is that when depression fails to be identified and treated properly it can increase the risk of suicide. Table 1 shows statistical data from Polis Diraja Malaysia (PDRM) which reveal an increase in the number of suicide cases in Malaysia (Sinar Harian, 5th July 2021). Thus the authorities are not only worried about the increase in daily COVID-19 cases but also the daily increase in suicide cases. According to the My Health for Life (2020), one of the tips for mental health care during the COVID-19 pandemic is to do light exercise or physical activity (PA) (Institute for Public Health, 2020) such as walking or by appreciating the built environment in an area.

Table 1 Total Number of Suicide Cases in Malaysia

Year	2016	2018	March 2021
Total Number of Suicide Cases	609	631	336

Source: *Sinar Harian (5th July 2021).*

Hence, this study examined the patterns of PA and body mass index (BMI) and assessed the association between PA and a walkable environment to maintain an active lifestyle in Kuala Lumpur city centre before and during the COVID-19 pandemic.

2.   The COVID-19 Pandemic and it Impact on Active Lifestyle

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that results in energy expenditure (Caspersen *et. al.*, 1985) such as walking, exercising and cycling. Many studies have been conducted about walking being the main PA that contributes to health. Therefore, walking refers to any trip made on foot and is one of the main PAs that contribute to the greatest gains in the health of populations (Dickinson and Lumsdon, 2010; Cleland *et. al.*, 2008).

Besides, physical activity (PA) also relates to active travel. However, active travel does not include walking, cycling or other physical activity (PA) if that is undertaken for recreational purposes (Dagmar Kohler, 2014). Active travel or active mobility relates to regular physical activity (PA) undertaken as a means of transport. It includes walking or bicycling and other non-motorised vehicles used as public transport. These are also included in the definition as they often involve some walking or cycling to and from pick-up or drop-off points. Furthermore, the main factor in order to achieve successful economic development and population growth is good accessibility. Thus, in this study, 'active lifestyle' refers to walking as the main PA within people's regular routine that contributes to health and wellbeing.

Numerous studies have addressed the impact of a good access system in a variety of transportation-related environmental and social benefits that enhance the economic growth in a city. There are several problems that are important to highlight on the significance of walkability in cities, such as (1) rapid urbanisation changing active lifestyles; and (2) a lack of appreciation of the built environment as part of an active lifestyle. This proportion may in fact rise because of socio-economic disruptions stemming from the ongoing COVID-19 pandemic (Yang and Xiang, 2021). This involves possible future COVID-19-related, social sector closures such as offices, schools and other economic activities. In this study, 'walkable environment' is defined as a physical attribute that encourages walking either for functional or recreational purposes.

Further, according to National Physical Plan 3 (2016) the highest energy consumption in Malaysia comes from the transportation and industrial sectors (40%) while the other sectors remain steady at below 10%. This clearly shows that Malaysian cities still need to strive to achieve a sustainable

environment as both transportation and industries are the biggest contributors towards low quality environments in urban areas.

Besides, according to the Malaysian Automotive Association (2020), the total number of registered vehicles had increased by 40% from 2016 until 2020 as shown in Table 2. This proves that private vehicle demand is high and increasing and that driving private vehicles is still the main preference for urban dwellers that who are willing to spend more time driving private vehicles (Bilyamin, 2014) in Kuala Lumpur City Centre. Thus, the number of private vehicles, the time spent in them on the road, drivers' body weight, mental health issues and NCDs all increased in step with the growth of sedentary urban lifestyles and increased physical inactivity. Therefore, a comprehensive study is needed to examine in detail the issues behind this phenomenon.

Table 2 Total Number of Registered Vehicles in Malaysia in the Years 2016-2020

Year	2016	2018	2020
Number of Vehicles	10,781,390	15,717,241	17,486,589

Source: Malaysia Automotive Association (2020)

The changes in individual lifestyle behaviours, such as a lack of physical activity (PA) and increased sedentary behaviours associated with rapid urbanization, may lead to increasing numbers of overweight and obese people. A recent study in Italy reported that in terms of gender, women showed lower levels of PA before the pandemic lockdown and hence had a higher risk of being overweight (Orlandi *et. al.,* 2021). However, women were reported to have a lower tendency to reduce the levels of PA as compared to men. The pattern of low PA and the increased sedentary lifestyle that leads to weight increase is also a sign of psychological suffering and of the effects of restricted movement orders due to COVID-19 (Orlandi *et. al.,* 2021).

Despite extensive evidence of the beneficial effect of PA on body weight (see Caspersen *et. al.,* 2009; Maher *et. al.* 2013, Sarma *et. al.,* 2014) studies on the association between PA levels and being overweight and obese for the Malaysian population, as well as any relationship with the COVID-19 pandemic, are lacking.

Notably, Addy *et. al.* (2004) classified walking behaviour into three levels namely: (i) regular walkers - who walk more than 150 minutes per week, (ii) irregular walkers - who walk between 10 to 150 minutes per week and (iii) non-walkers - who walk less than 10 minutes per week. He used these to measure walking behaviour in order to check whether walking is the main PA that offers the greatest gains in the health of populations.

Hence, this study is crucial to identify the patterns of PA (regular walkers, irregular walkers and non-walkers) among adults with an overweight/obese BMI ($\geq$ 25-30 kg/m^2) and to assess the association between PA and the walkable environment before and during the COVID-19 pandemic in Kuala Lumpur city centre. It is important to identify the previously underdeveloped overall picture of how the built environment influences PA in order to maintain an active lifestyle and explore if and how it has changed during the pandemic.

3.   Background Study Area

The case study area is in the city centre of Kuala Lumpur. The selection of the study area was based on its physical, functional and social-cultural characteristics. According to the Draft Structure Plan 2040 (2021), these areas also commonly share the following characteristics: (a) located within the main commercial nodes within Kuala Lumpur city centre; (b) display varied economic activity (commercial or landmarks or shopping areas or historical areas or mixed use or development); (c) located within a transportation transit area; (d) receive significant concentrations of pedestrians, shoppers and tourists; (e) display a three-fold increase in population in year 2020; (f) experience pollution by vehicle movement or travel patterns and (g) show the impact of major development on the urban environment.

4.   Methodology

This study adopted a mixed method approach through an online questionnaire survey, combined with qualitative data from field observation to investigate the phenomena in the study area along with content analysis of selected written documents.

In this study, the main target group of respondents are the public as main users within the Kuala Lumpur (KL) city centre area. The main users selected as the sample in this study include the static users such as (daily) office workers and mobile users such as pedestrians on weekdays whose lifestyles are exposed directly to the impact of development and the COVID-19 pandemic.

This study adopted probabilistic sampling involving randomly chosen samples with a certain characteristic to represent a large population (Creswell, 2007). Besides, the National Survey of Pedestrians (2002) used this technique. It is noted that the random approach can also reduce any biases from researchers (Chua, 2006).

The research is concerned with non-modifiable factors (gender, age, ethnicity, marital status, household income, professional category, profession sector, car ownership and BMI) and modifiable factors such as PA patterns (regular walkers, irregular walkers and non-walkers). Since the population involved is varied, the key users among the public need to be identified within the samples to represent the whole population of Kuala Lumpur. According to Lynch and Gary (1984), direct feedback can be made more efficient by determining the behaviour or activity that is of interest.

The Google Forms platform was utilised (Lupton, 2021) and was divided into several parts that represent respondents' background profile, daily activities (trip based) and perception of using pedestrian walkways before and during the COVID-19 pandemic.

This study uses a 4-point Likert-scale from 'strongly disagree' to 'strongly agree' (National Pedestrian Survey, 2002; Chua, 2008 and 2020; Ujang, 2008; Abdul Rahman, 2011). It is important to describe the factors that influence respondents to choose to walk. According to Chua (2006), an odd-numbered scale will increase the reliability over using even numbers that will force the respondent to agree or disagree. It is important to avoid bias from the respondent. Likert-scale with 5 points results mostly pointed to neutral points. The result is unreliable (Chua, 2006).

The real phenomenon, real behaviour, emotions, characteristics and environment cannot be understood by only using numbers (Creswell, 2009; Chua, 2020). The qualitative method is important to identify the problems and obtain a realistic picture of the issues involved through crosschecking between the data collected, the related theories and the observations made. Therefore, this study represents mainly the quantitative (questionnaire survey) result supported by the qualitative (observation) data to get a realistic description of the phenomenon.

5.   Findings and Discussions

In order to answer this study objective, the findings and discussions focus on (1) the profile of the respondents, (2) body mass index (BMI) data (3) walking behaviour patterns (4) PA patterns and (5) PA and the walkable environment. There are limitations to observing the BMI and walking behaviour patterns to support the numerical questionnaire survey or quantitative data. Therefore, the data is explained in detail using the descriptive data.

5.1   *Profile of Respondents*

Table 3 summarises the profiles of the respondents (N=406). Most of them are women (N=274, 67%), between 20-29 years old (N=209, 51%), Malay (N=369, 91%), single (N=238, 59%), holders of a bachelor degree level of academic achievement (N=204, 50%), with a household income between RM1500-RM3000 and RM6000 and above (N=118, 29% respectively), employed in the private sector (N=165, 41%), vehicle owners (N=343, 84%) and BMI (N=207, 51%). The results show most younger-age respondents still prefer to own a private vehicle and are willing to drive to get to work in Kuala Lumpur City Centre. This is because most respondents are working in the private sector 41% (N=165) with only 29% (N=119) working in the government sector and other sectors. The Draft KLCP 2040 also mentioned that the population structure in the study area is drastically different during weekdays because of the influx of people with better jobs in KL City Centre.

In terms of sample residence, 64% (N=259) were non-residents and 36% (N=147) were residents in KL City Centre. The percentage of the respondents in terms of residency status closely reflects the actual population distribution in the KL City Centre (Department of Statistics, 2010). This finding is important to identify the predominant KL City Centre population during weekday's activity. According to The Draft

KLCP 2040 the population of KL City Centre is drastically different on different days (weekdays and weekend) as compared to other Malaysian States. The finding shows that most respondents are non-residents because of the limitations of affordable houses, the high cost of living and the poor environment in the city centre (The Draft KLCP 2040; Syafii H. and Shareh Musa S.M, 2011).

Private vehicle ownership among the respondents was reported to be very high. Only 16% (N=63) of respondents did not have any type of private vehicle compared to 84% (N=343) that did. The main users are employed and spend more time in Kuala Lumpur City Centre and on the road. It is discovered that the issues of traffic congestion and accident cases during peak hours are expected to increase. This is because only the main users can choose to reduce the impact of automobiles and improve the urban environment to spend more time in the city centre.

Table 3 Profile of respondents in Kuala Lumpur City Centre

Profile	Category	Number of Respondents (N)
Gender	Men	132 (33%)
	Women	274 (67%)
Age	20-29	209 (51%)
	30-39	136 (33%)
	40-49	40 (10%)
	50-59	21 (5%)
Ethnicity	Malay	369 (91%)
	Chinese	20 (5%)
	Indian	7 (1.7%)
	Others	10 (2.3%)
Status	Married	168 (41%)
	Single	238 (59%)
Academic achievement	STPM and below	40 (10%)
	Diploma	107 (26%)
	Bachelor/ Degree	204 (50%)
	Bachelor Master above	55 (14%)
Household Income	Below 1500	75 (18%)
	1500-3000	118 (29%)
	3000-6000	95 (23%)
	6000 and above	118 (29%)
Employment	Government	119 (29%)
	Private sector	165 (41%)
	Self Employed	42 (10%)
	Others	80 (20%)
Vehicle Ownership	Motorcycle	33 (8%)
	Car	167 (41%)
	Motorcycle & car	143 (35%)
	None	63 (16%)
BMI	Underweight	35 (9%)
	Normal weight	164 (40%)
	Overweight/ Obese	**207 (51%)**
Total of Respondents		**406 (100%)**

Table 4 summarises the profile of respondents that fall under the categories of 'overweight' and 'obese'. Out of the total of 406 respondents, the majority (51% N=207) are at risk of various chronic disease categories when the result shows overweight or obese compared to normal-weight 40% (N=162) before the COVID-19 pandemic.

However, during the COVID-19 outbreak, most of the respondents remained in the same category but the numbers involved somewhat increased. Most respondents are at risk of various categories of chronic disease when the results show overweight or obese 58% (N=235) compared to normal-weight 35% (N=142) during the pandemic.

Table 4 Majority of respondents are in category of Overweight and Obese or Various Chronic Diseases Category

		Overweight &Obese			
		Before COVID 19		During COVID 19	
Gender	Men	54	(26%)	31	(13%)
	Women	153	(74%)	204	(87%)
Age	20-29	93	(45%)	68	(29%)
	30-39	79	(38%)	132	(56%)
	40-49	23	(11%)	23	(10%)
	50-59	13	(6%)	13	(6%)
Ethnicity	Malay	180	(87%)	214	(91%)
	Chinese	11	(5%)	14	(6%)
	Indian	10	(5%)	1	(0%)
	Others	5	(2%)	5	(2%)
Status	Married	95	(46%)	181	(77%)
	Single	112	(54%)	54	(23%)
Academic achievement	STPM and below	25	(12%)	25	(11%)
	Diploma	39	(19%)	52	(22%)
	Bachelor/ Degree	114	(55%)	129	(55%)
	Bachelor Master above	30	(14%)	30	(13%)
Household Income	Below 1500	36	(17%)	36	(15)
	1500-3000	54	(26%)	73	(31%)
	3000-6000	49	(24%)	49	(21%)
	6000 and above	68	(33%)	78	(33%)
Employment	Government	62	(30%)	71	(30%)
	Private sector	81	(39%)	92	(39%)
	Self Employed	25	(12%)	40	(17%)
	Others	32	(15%)	32	(14%)
Vehicle Ownership	Motorcycle	32	(15%)	32	(14%)
	Car	81	(39%)	92	(39%)
	Motorcycle & car	66	(32%)	82	(35%)
	None	29	(14%)	29	(12%)
		51% (N=207)		**58% (N=235)**	

Figure 1 shows the profile of respondents who are overweight and obese in Kuala Lumpur City Centre before the COVID-19 pandemic as being mostly women (74% N=153), aged between 20-29 (45%, N=93), Malay (87%, N=180), single (54%, N=112), bachelor degree (55%, N=114), income more than RM6000 (33%, N=68), employed in the private sector (39%, N=81) and own private vehicle users (71%, N=179). This result is similar to Orlandi *et. al.* (2021) who noted that women also showed lower levels of PA before the pandemic lockdown and hence had a higher risk of being overweight.
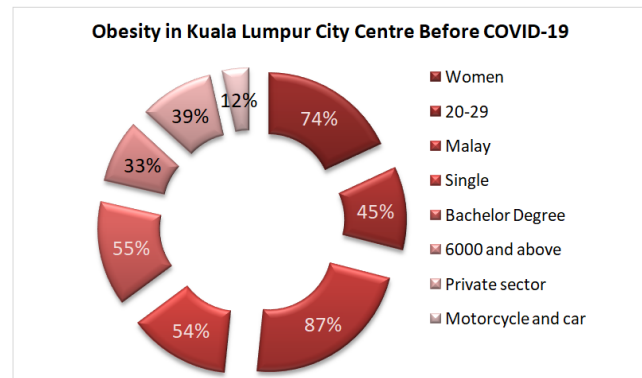

Figure 1 Obesity in Kuala Lumpur City Centre before the COVID-19 Pandemic

As compared to during the COVID-19 pandemic, Figure 2 shows the results have increased. The majority of those being overweight and obese in Kuala Lumpur City Centre during the pandemic are still mostly women (87% N=204), aged 30-39 (56%, N=132), Malay (91%, N=214), married (77%, N=181), Bachelor degree holders (55%, N=129), have an income more than RM6000 (33%, N=78), employed in the private sector (39%, N=92) and users of their own private vehicle (71%, N=206).
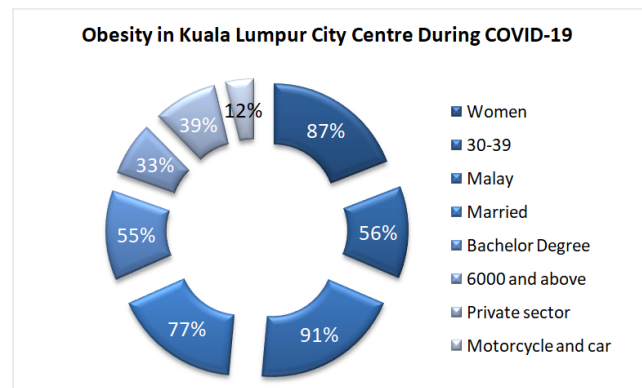

Figure 2 Obesity in Kuala Lumpur City Centre during COVID 19 Pandemic

The results show, there are changes in the data for age and marital status during the COVID-19 pandemic as compared to before the pandemic. The age category changed from 20-29 to 30-39 years old and the marital category from single to married for respondents who are overweight or obese in Kuala Lumpur City Centre. In this case, the data shows the single respondents could still engage in PA during the pandemic even though there are limitations in the ability to maintain an active lifestyle for those who have families and have to remain indoors and face limitations on their PA (taking short walks only). The majority of respondents remained at home during the pandemic; hence only minimum walking steps can be counted.

Figure 3 The majority of overweight and obese individuals in Kuala Lumpur City Centre during the COVID 19 pandemic are women and married.
Source: News. (14Jan 2021)

5.2   *Body Mass Index (BMI)*

Figure 4 shows the prevalence of normal-weight persons as those having Body Mass Index (BMI) between 18.5 to 24.9kg/m², and overweight or obese persons as those with a BMI >= 25 and 30kg/m² respectively before and after COVID-19. In Ireland, being overweight or obese is categorized as a group at risk of having various categories of chronic diseases such as diabetes, osteoarthritis, cancer and vascular disease (Institute for Public Health, 2015). Figure 4 reflects the outcome of the behaviour and lifestyle changes during the pandemic. Movement restriction orders have resulted to drastic reductions in outdoor travel for all purposes and limited PA to only taking place indoors. Thus, opportunities for outdoor PA such as walking, exercising or cycling were limited.
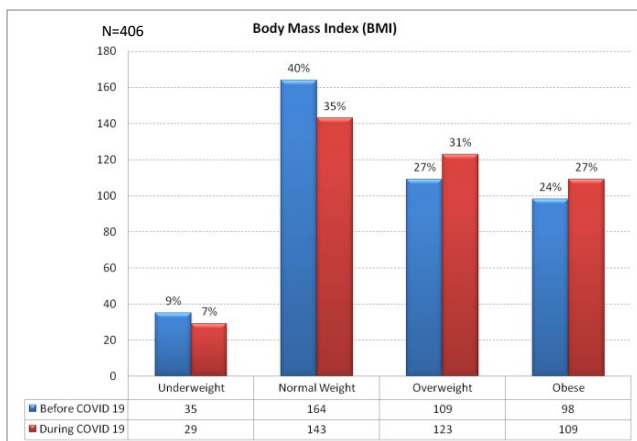

Figure 4 Body Mass Index (BMI) Before and During the COVID-19 Pandemic

The prevalence of abdominal obesity increased steadily with age until the age of 50 to 59 years. However, the rising prevalence of being overweight or obese in Malaysia is not an isolated case, but part of a global pandemic that began long before COVID-19 (Roth *et.al;* 2004; Swinburn *et.al*, 2011 and Popkin *et al*., 2012). Indeed, this growing prevalence of overweight and obesity are normally attributed to risk factors not only PA and environmental factors, but also related to increased food intake

(Wan Muda, 2020). Total daily availability of calories per capita in Malaysia rose from an estimated 2,430 kcal in 1961 to 2,923-2,990 kcal in 2007, a 20% increase over 40 years (Khor, 2012). During the same interval, fat and sugar intake of Malaysians had increased (Institute for Public Health, 2020) by 80% and 33% respectively. Therefore, a Chi-Square Test was employed to test the significance level of the frequency of BMI in relation to the pandemic.   With reference to Figure 4, the result of the relationship indicates a value of $p<.05$, (p=.003). Hence, it depicts a strong relationship (r=.714) between BMI and adopting an active lifestyle before and during the COVID-19 pandemic.

5.3   *Patterns of Walking Behaviour*

As mentioned earlier, there are 3 levels of walking behaviour namely 'non-walkers', 'irregular walkers' and 'regular walkers' (Addy *et. al*., 2004). However, Figure 5 shows the numbers were drastically changed 'non-walkers' (79%, N=322) during COVID-19 pandemic compared to only 20% (N=80) 'non-walkers' before the COVID-19 pandemic. Only 1% (N=5) respondents were 'regular walkers' during the COVID-19 pandemic as compared to 12% (N=50) before the COVID-19 pandemic.
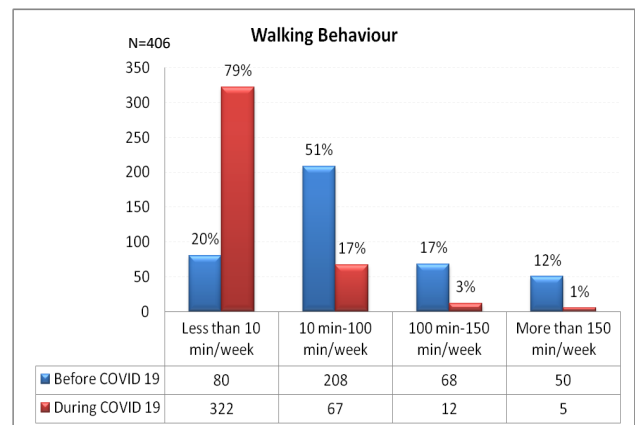

Figure 5 Walking Behaviour Patterns Before and During the COVID-19 Pandemic.

Therefore, a Chi-Square Test was employed to test the significance level of frequency of walking behaviour in relation to the pandemic. With reference to Figure 5, the result of the relationship indicates the value of $p<.05$, (p=.013). Hence, it depicts an average relationship (r=.511) between walking behaviour and adopting an active lifestyle before and after the COVID-19 pandemic.

5.4   *Physical Activity (PA) Patterns*

Based on Figure 6, most respondents (41%, N=166) chose to walk before the COVID-19 pandemic but during the pandemic the majority of respondents (77%, N=311) preferred to do other activities. Before the COVID-19 pandemic 31% (N=124) of respondents chose exercising but during the pandemic this fell to only 13% (N=54).

Findings indicate 6% (N=24) chose cycling activity before the COVID-19 pandemic but during the pandemic there was no cycling activity recorded (N=0). The finding shows most respondents are performing minimum indoor physical activity. This is because there was a limitation on doing outdoor activities such as walking, exercising or cycling.
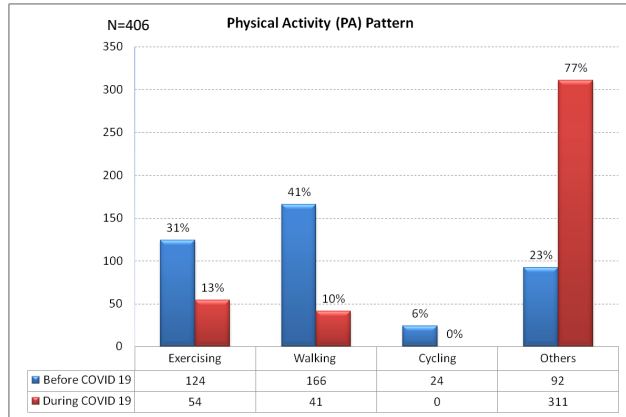

Figure 6 Physical Activity (PA) Patterns Before and During the COVID-19 Pandemic.

Figure 7 shows the prevalence of exercising, walking, cycling and other PA before and during the COVID-19 pandemic. This result, supported by field observations, shows that 1 in 100 people will walk in the Kuala Lumpur City Centre area (refer Figure 7). This is because movement restriction orders have resulted in a drastic reduction in outdoor travel for all purposes and limited PA to only taking place indoors.

Figure 7 Walking Behaviour Patterns during COVID-19 pandemic.
Source: Field study (2021)

Therefore, a Chi-Square Test was employed to test the significance level of the frequency of walking behaviour and adopting an active lifestyle. The value of $p<.05$ shows that the frequency of walking behaviour is significantly related to adopting an active lifestyle (p=.000). It depicts an acceptable relationship (r=.620) between walking behaviour and adopting an active lifestyle before and after the COVID-19 pandemic. The respondents are still aware that walking is the main PA that contributes to health (80%; N=323) followed by the

environment (10%; N=40), social interaction (8%; N=32) and economic factors (3%; N=11).

5.5   Physical Activity (PA) and Walkable Environment

During the COVID-19 pandemic, most of the respondents are classified as non-walkers with a walking duration of less than 10 minutes per week. Therefore, a Cramer's V test analysis was employed to test the correlation between PA and the walkable environment factors.

Based on an observation survey, places with a walkable environment motivate more people to walk in the area. Based on Figure 8, 2 in 3 people in Kuala Lumpur City Centre still appreciate and are attached to a walkable environment to do light exercise such as walking in the older areas of the City. The result shows that movement restriction orders have resulted in drastic reductions in outdoor travel for all purposes but it is still acceptable to walk in a neighbourhood area while appreciating the quality of urban design.

The quality of urban design succeeds in attracting people to continue walking behaviour while applying the Standard Operation Procedure (SOP) of keeping a 1.5m to 2m distance between people during movement restriction orders. Significantly, the older people still agreed that the quality of urban design remains important for maintaining a healthy and active lifestyle even during movement restriction orders.

Figure 8 There are public in the pedestrian walkway during COVID 19 pandemic and appreciate the urban design quality.
Source: Field study (2021)

Besides, based on Table 5 the result of Cramer's V test analysis shows that the strongest correlation is between PA and Urban Design Quality factor (r=.971) and is higher than .50. The Cramer's V test analysis shows that the correlation value between PA and Sense of Place is r=.884 also higher than .50 which presents a very strong relationship. The Cramer's V coefficient value r=0.209 to 0.315 indicates weak correlation between PA and the other factors (Access and Linkages, Uses and Activity, Enjoyable, Comfort and Safety). However, there are significant relationships between PA and all walkable

environment factors. The p value is lower than .05 (p<0.5). The Cramer's V Approximate Significance is p=0.000 to 0.048.

Table 5 Correlation between the physical activity (PA) and Walkable Environment Factors

	Cramer's V value	Approximate significance
Urban Design Quality	.971	.005
Access And Linkages	.315	.000
Uses and Activity	.209	.001
Enjoyable	.293	.000
Comfort	.230	.048
Safety	.524	.000
Sense of place	.884	.000

6.   Conclusion

To date, empirical research in PA and the built environment has succeeded in showing that walking is the main PA that contributes to greatest gains in health. Walking relates to PA when walking behaviour is being integrated into people's regular routine and later becomes a behaviour or lifestyle. The determining factors that impact walking behaviour in Kuala Lumpur are critical because the respondents known as irregular walkers before and during the COVID-19 pandemic have become non-walkers. This means that they are not walking on a regular basis to gain any health benefits.

This situation is even more worrying when the result shows the obese population is increasing during the COVID-19 pandemic. Indeed, the physically inactive population also increased with the results showing that the majority of respondents are not walking, exercising or cycling during the COVID-19 pandemic. Physical inactivity is the 4th leading risk factor for global mortality (WHO, 2019). These results may warn of an emergency when the walking behaviour changed from irregular walkers to non-walkers and obesity and physical inactivity have increased.

This study has succeeded in identifying that walking behaviour is significantly related to having an active lifestyle.   An active lifestyle is achieved when walking is the main PA that contributes to health and becomes part of people's regular daily routine. This is because walking is an easy and doable physical activity during the COVID-19 pandemic as either an indoor or outdoor activity. As mentioned earlier in Figure 6, the findings indicate 6% (N=24) chose cycling activity before the COVID-19 pandemic but during the pandemic there are no cycling activities recorded (N=0). This finding shows most respondents are performing minimum outdoor physical activity due to the limitations imposed by movement restriction orders.

The finding related to Figure 8 is based on observation. It was reported that urban design quality managed to attract the attention of pedestrians even during the COVID-19 pandemic. The built environment and walkable environment play important roles in supporting public perceptions and motivation towards greater PA to sustain an active and healthy lifestyle.

In terms of effects, walkable environments have been shown to have a positive impact on PA and health, economic value and social connection, although the latter is only weakly supported because of the problem of self-selection bias.

The pattern of low physical activity increased the sedentary lifestyles that lead to weight increase and are also a sign of psychological suffering arising from the movement restriction control orders. It is noticed that one of the mental healthcare tips during the COVID-19 pandemic was to do light exercise or physical activity (Institute for Public Health, 2020) such as walking in a residential area or by appreciating the built environment through appreciating the quality of urban design within a residential area. This suggests that the walkable environment can play an important role in motivating PA.

After all, a walkable environment needs to be further extended as one of the measures to be embraced as post-pandemic city planning begins. There are several initiatives to maintain an active lifestyle during the COVID-19 pandemic: (1) start with small-scale PA such as continuing to walk in a neighbourhood area while appreciating the quality of urban design; (2) maintain more than 150 minutes walking per week in order to classified as a regular walker with an active lifestyle; (3) maintain a 1.5m to 2m distance between yourself and individuals you encounter while doing PA during movement restriction orders; (4) appreciate the quality of urban design while maintaining an active lifestyle. The built environment can also reduce mental problems such as stress by providing the public with a harmonious atmosphere. Finally, results have shown that there is a relationship between the built environment and physical activity (PA).

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