PENANG INSTITUTE MONOGRAPHS

#16

13 JULY 2021

How Has the Pandemic Affected Penang's Health Landscape?: A Preliminary Study

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How Has the Pandemic Affected Penang's Health Landscape?: A Preliminary Study

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EXECUTIVE SUMMARY

- This paper studies the health, physical well-being and lifestyle changes of Penangites and their management of common serious diseases and ailments, in the course of the Covid-19 pandemic.

- There have been both positive and negative changes to the health and lifestyle map of Penang, due to changing lifestyle habits stemming from the implementation of the various Movement Control Orders.

- Changes in the priority of patient care in hospitals due to the influx and surge in Covid-19 admissions have caused elective surgeries and non-emergency cases to be delayed. Patients and the general public are also reducing their visits to health facilities.

- For this study, two targeted surveys were carried out online; the first collected responses from individuals working (or used to work) in the healthcare sector in Penang during the pandemic, while the second was opened to the public. Both surveys gauge changes in public health habits and behaviours, as well as changes where lifestyle habits are concerned. Both surveys ran from May to June 2021 and gathered 31 and 81 responses respectively.

- Interviews with 7 medical doctors (1 general surgeon, 1 urologist, 1 paediatrician, 1 ophthalmologist, 1 haematologist, 1 general practitioner, 1 psychologist), 2 pharmacists, and 1 nurse from various hospitals and clinics in Penang were also conducted.

- Recommendations from the angles of telemedicine and telehealth, partnerships between public and private health sectors, equitable working policies for all healthcare workers and the dissemination of information on healthy living are suggested.

Introduction

Movement Control Orders (MCO) in Malaysia implemented since 18 March 2020 to curb the spread of the Covid-19 virus have brought about many changes to the health landscape. The delivery of public health services, as well as the general public's perception of their health situation, and even the need to seek medical services, have all been affected. In sum, the lockdown and the pandemic have caused major disruptions to the population's daily life and social orientation.

In order to gain some insight into these changes, Penang Institute conducted two targeted and related surveys in Penang, one designed for individuals working in the healthcare sector (doctors, nurses, pharmacists, etc.), and one designed for the general public. The demographics of the respondents for both surveys are detailed in Appendix B (health professionals) and Appendix C (general public).

Both surveys gauge changes in public health habits and behaviours, as well as changes in lifestyle habits. Both ran from June to May 2021 and gathered 31 and 81 responses respectively.

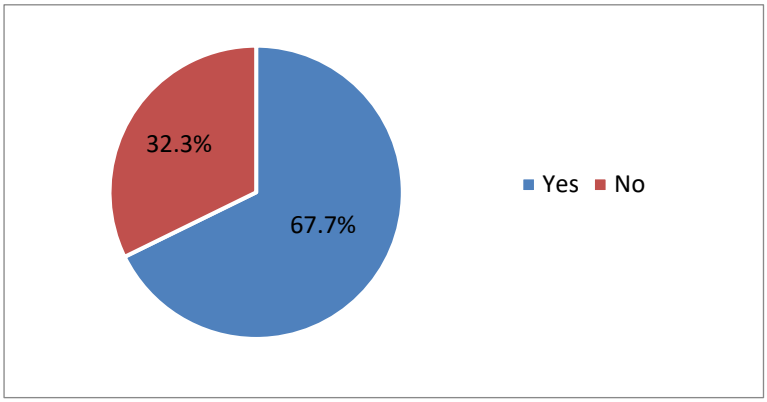
The surveys were also supplemented with semi-structured interviews with medical practitioners. This involved 7 medical doctors (1 general surgeon, 1 urologist, 1 paediatrician, 1 ophthalmologist, 1 haematologist, 1 general practitioner, 1 psychologist), 2 pharmacists, and 1 nurse from various hospitals and clinics in Penang.

Health Perception: An Overview

The perception of health in terms of awareness, patterns and concerns among medical professionals as well as the general public is used to depict the health landscape in Penang over the course of the pandemic. The medical professionals were also asked to consider the effect the pandemic has had on non-communicable diseases and infectious diseases (other than Covid-19).

As much as 67.7% of the medical professionals feel that people have become more aware of their health over the past year; while the rest think otherwise (Figure 1). This pattern is repeated in the interviews with medical practitioners.

Figure 1: Health practitioners' impressions on whether public health awareness has increased during the pandemic



When it comes to the general public, 85.2% of the respondents feel that they have become more concerned about their overall physical health. However, this is not reflected in them seeking more medical attention. Only 16% of the respondents had done so (Figure 3).

Figure 2: General public respondents on whether their concern over health matters increased during the pandemic

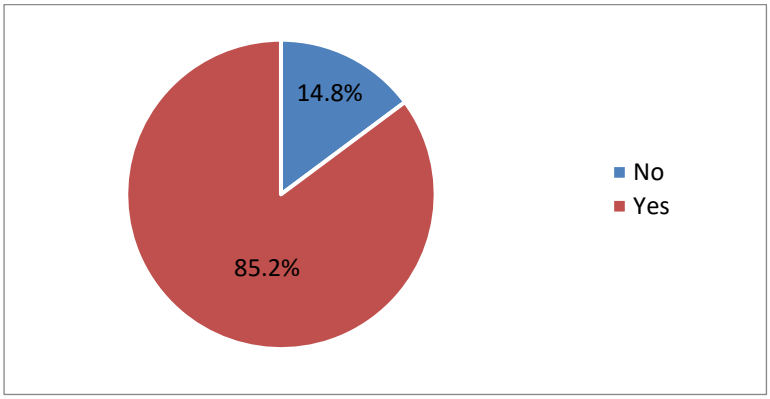
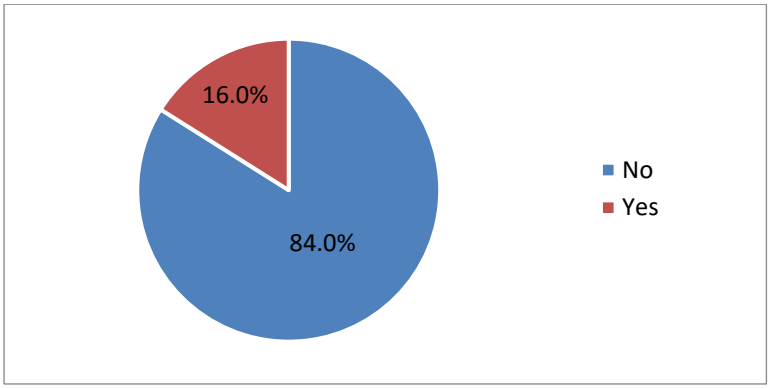


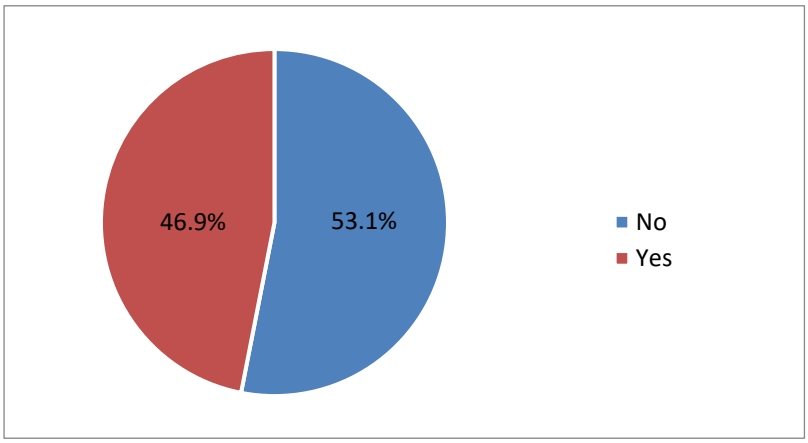
Figure 3: General public respondents on their seeking medical attention during the pandemic



As for improvements to physical health over the course of the pandemic, 53.1% of the respondents feel that their health has not improved; while the remainder have felt positive changes to their physical health (Figure 4).

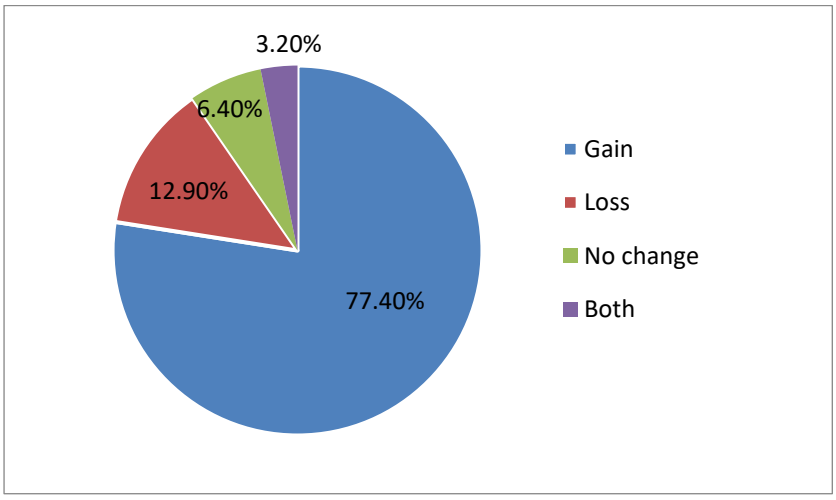
However, and more interestingly, 75% of those who state that they have not become more concerned about their health feel that their health has nevertheless improved over the past year. In contrast, 58% of those who have become more concerned about their health feel that their health has deteriorated.

Figure 4: General public respondents on improvement to their physical health during the pandemic



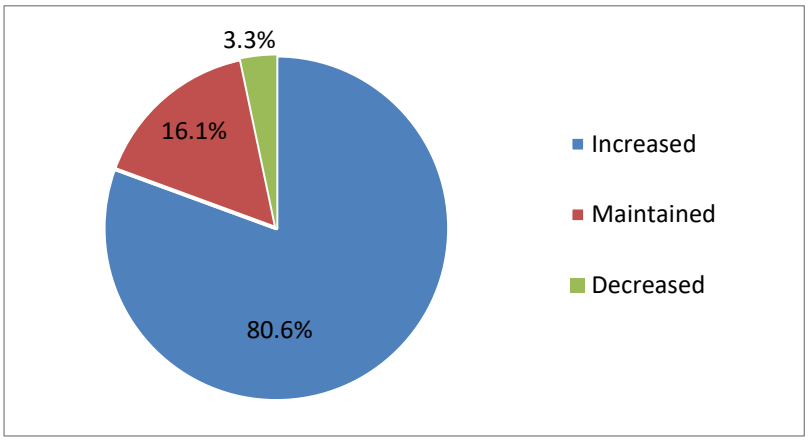
As shown in Figure 5, most of the medical professionals believe that there has been more weight gain (77.4%) among the public than weight loss (12.9%). Only 6.4% feel that the various MCOs have not had any impact on the public's weight while 3.2% suggest that both weight gain and weight loss have likely occurred.

Figure 5: Health practitioners' impressions on weight fluctuations among members of the public during the pandemic



Out of the 31 medical professionals, 80.6% believe that there has been an increase in the number of pregnancies over the past year (Figure 6). 16.1% do not think that there has been any change, while one respondent suspects the pregnancy rate of the public has decreased.

Figure 6: Health practitioners' impression on pregnancy rate over the past year



Opinions and observations among the medical professionals vary concerning the rate of chronic non-communicable diseases; they are not based on actual reported case figures. Data relevant to the time period are as yet not available.

A majority of the medical professionals feel that food intake and lifestyle-linked diseases has increased during the pandemic. Table 1 illustrates that 67.7% believe that diabetes cases have increased, followed by cardiovascular diseases (64.5%), and weight-related health issues (64.5%). A striking point raised by interviewees is that staying at home has encouraged people to pick up hobbies such as baking, which has led to a sharp increase in diabetes cases. In addition, cardiovascular cases have also escalated, possibly due to stress generated by the numerous MCOs.

Table 1: Health practitioners' observations on the rate of chronic non-communicable diseases cases during the pandemic

Chronic non-communicable diseases	*Increased*	*Maintained*	*Decreased*	*Unsure*
Diabetes	21 (67.7%)	5 (16.1%)	0 (0%)	5 (16.1%)
Cancer	2 (6.5%)	19 (61.3%)	0 (0%)	10 (32.3%)
Cardiovascular diseases	20 (64.5%)	7 (22.6%)	0 (0%)	4 (12.9%)
Weight-related health issues	20 (64.5%)	7 (22.6%)	1 (3.2%)	3 (9.7%)
Lung diseases	14 (45.2%)	7 (22.6%)	1 (3.2%)	9 (29.0%)
Kidney diseases	10 (32.3%)	11 (35.5%)	0 (0%)	10 (32.3%)
Liver diseases	5 (16.1%)	16 (51.6%)	0 (0%)	10 (32.3%)
Alzheimer's disease	6 (19.4%)	14 (45.2%)	0 (0%)	11 (35.5%)
Stroke	9 (29.0%)	11 (35.5%)	0 (0%)	11 (35.5%)
Autoimmune diseases	3 (9.7%)	16 (51.6%)	0 (0%)	12 (38.7%)

A substantial number of respondents feel that lung diseases, kidney diseases and strokes are on the rise as well—respectively 45.2%, 32.3%, and 29% of them thought so. Cancer (6.5%), liver diseases (16.1%), Alzheimer's disease (19.4%), and autoimmune diseases (9.7%) are least thought to have increased during the pandemic.

A majority of the medical professionals feel that diseases such as cancer (61.3%), liver diseases (51.6%), and autoimmune diseases (51.6%) remain at the same rate. 45.2% also believe that the rate of Alzheimer's disease is unchanged. Almost all respondents do not think that there has been a decrease in rate for all the listed diseases.

Roughly a quarter of the medical professionals think that cases of common infectious diseases, mosquito-borne diseases and food poisoning have increased (Table 2). At the same time, they do not think that cases in the other listed common infectious diseases have increased. Opinions are largely mixed where the rest of the diseases are concerned, but a substantial number feel that cases of tuberculosis, food poisoning, hepatitis, measles, leptospirosis, HIV, and typhoid remain unaffected by the pandemic.

Table 2: Health practitioners' observations on the rate of common infectious diseases cases during the pandemic

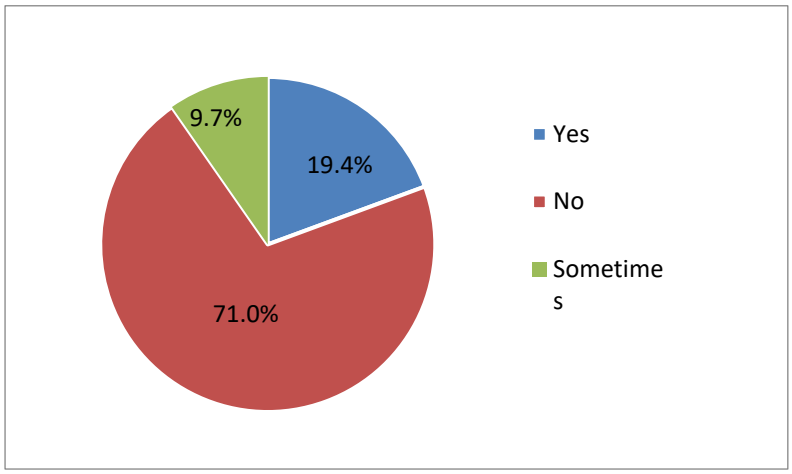
Common infectious diseases	*Increased*	*Maintained*	*Decreased*	*Unsure*
Mosquito-borne diseases	7 (22.6%)	9 (29.0%)	8 (25.8%)	7 (22.6%)
Tuberculosis	2 (6.5%)	14 (45.2%)	8 (25.8%)	7 (22.6%)
Hand, foot and mouth disease	2 (6.5%)	8 (25.8%)	11 (35.5%)	10 (32.3%)
Food poisoning	8 (25.8%)	11 (35.5%)	7 (22.6%)	5 (16.1%)
Hepatitis	1 (3.2%)	13 (41.9%)	5 (16.1%)	12 (38.7%)
Measles	2 (6.5%)	13 (41.9%)	5 (16.1%)	11 (35.5%)
Leptospirosis	1 (3.2%)	11 (35.5%)	8 (25.8%)	11 (35.5%)
Cholera	1 (3.2%)	10 (32.3%)	10 (32.3%)	10 (32.3%)
HIV	2 (6.5%)	13 (41.9%)	7 (22.6%)	9 (29.0%)
Typhoid	0 (0%)	15 (48.4%)	5 (16.1%)	12 (38.7%)

Other studies have stipulated increases in non-communicable diseases, partially due to delayed or foregone care. Gonzalez et. al. (2020) found that people with pre-existing conditions are likely to have increased risk developing a secondary chronic condition due to delayed medical attention. Any observed decrease in the percentage of non-communicable diseases would not accurately reflect the situation at hand, due the reduction of hospital visits and consultations in the time of the pandemic (Lim et. al., 2020; Feral-Pierssens et. al., 2020). In fact, there may be a future increase in demand for medical services, caused by delayed diagnosis or complications of non-communicable diseases. In terms of infectious diseases other than Covid-19, there has been no other existing studies considering this aspect.

Health Accessibility and Medical Care

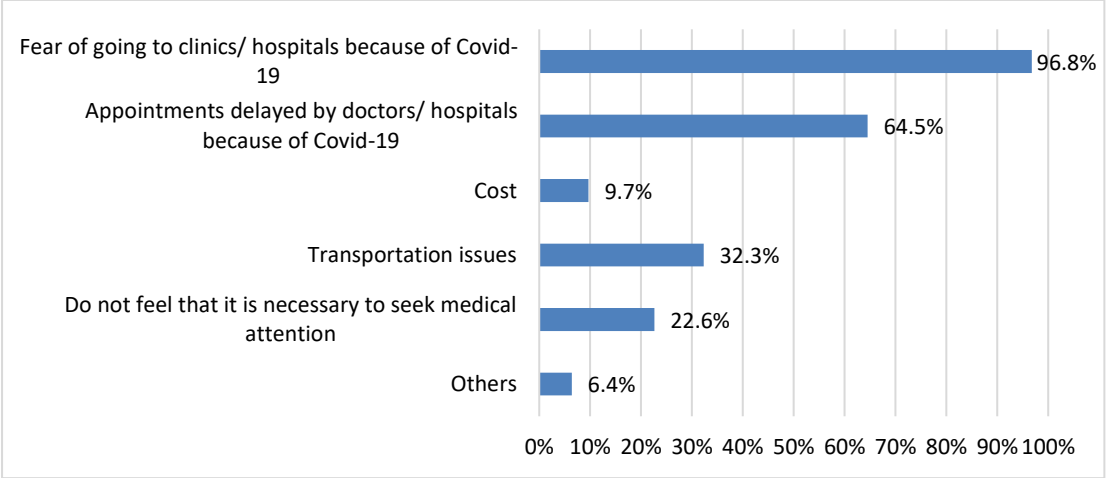
Accessibility to health services and medical care as well as adherence to medical appointments are important factors to consider in looking at the health overview of the population. The survey with the health professionals finds that a majority of them (71%) did noticed that many patients' appointments were postponed or cancelled in the past year (Figure 7). All interview informants agree that the number of non-surgical and non-cancer procedures decreased during MCO.

Figure 7: Health practitioners' observation of medical appointment attendance rates



Almost all the medical professionals (96.8%) feel that patients have been defaulting and/ or have been delaying medical appointments due to fear of going to clinics and hospitals during a pandemic (Figure 8). 64.5% also opine that many appointments have also been delayed by doctors or hospitals because of the pandemic. While not as significant as the abovementioned reasons, the respondents also feel that patients have not been keeping their appointments due to cost (9.7%), transportation issues (32.3%), necessity to seek medical attention (22.6%), movement restriction orders (3.2%), and preference for traditional treatments (3.2%).

Figure 8: Health practitioners' observations concerning reasons for patients defaulting and/or delaying medical appointments



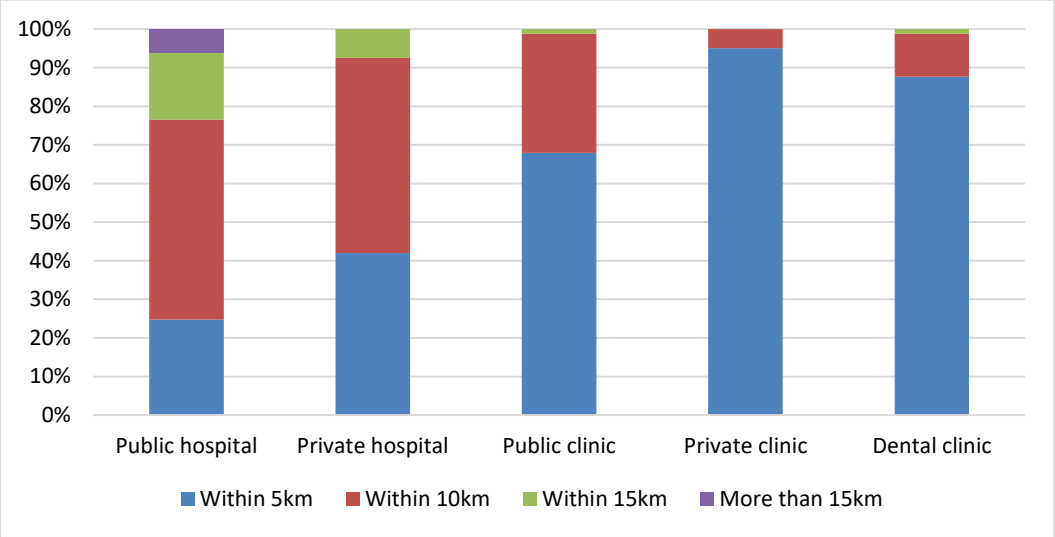
Note: Other reasons include patients cancelling due to movement restriction orders, and preference for traditional massage therapy

Respondents working in private hospitals also highlight that the drop in international patients has been inevitable due to the closure of international borders. However, there has been an increase in patients who seek treatment for symptoms associated with Covid-19.

The general public survey show that public health services have been considerably accessible to most of the respondents. Public hospitals are within a 10km distance for 76.6% of the respondents, with 24.7% within the 5km radius (Figure 9). Respondents are from Timur Laut and Barat Daya have had to travel more than 15km to public hospitals. Comparatively, a larger percentage of respondents cite a closer distance to private hospitals, with 50.6% within the 10km radius, and 42% within 5km.

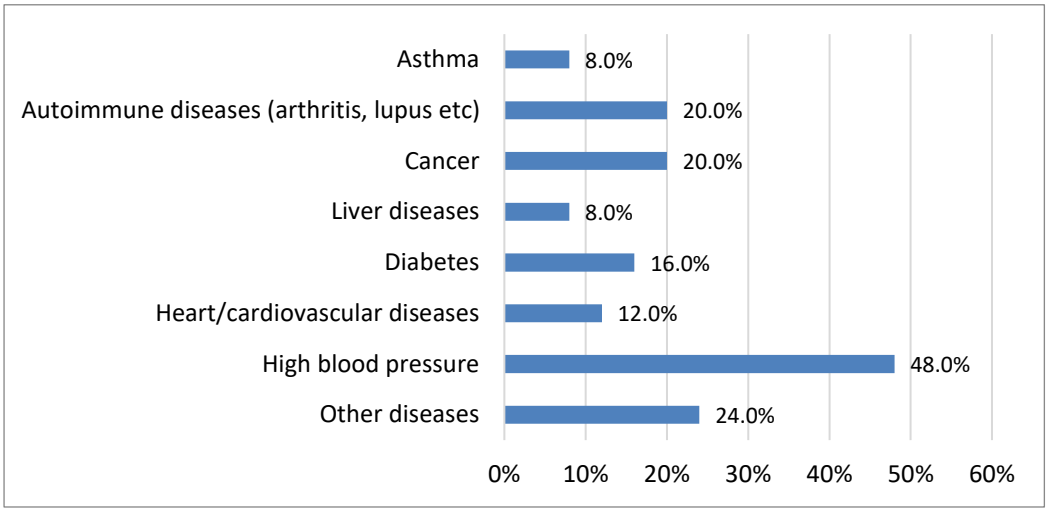
67.9% of respondents state that their travelling distance to public health clinics are 5km and below, while 30.9% have had to travel further, though not exceeding 10km, which indicates easy access to public health clinics. Conversely, private clinics and dental clinics are reported to be the most accessible to all respondents, with 95.1% respondents being within 5km of the former, and 87.7% of the respondents being within the radius of 5km of the latter.

Figure 9: Accessibility to health services by distance (km)



The health profile of the respondents showed that 30.9% are currently suffering from an illness or ailment that has lasted, and/or expected to last for more than 6 months. The survey found that high blood pressure is the medical condition that has the highest occurrence, with 48% of respondents affected (Figure 10), where 75% of these respondents are also afflicted by another medical condition. Following this, autoimmune diseases and cancer both recorded the second highest incidence of 20% respectively. Diabetic patients are 16% of overall respondents, where 50% of these respondents are also affected by an additional illness. Additionally, all patients who have cardiovascular conditions (16%) are also suffering from high blood pressure. As a whole, it is observed that almost half of the respondents (48%) suffered from more than one illness.

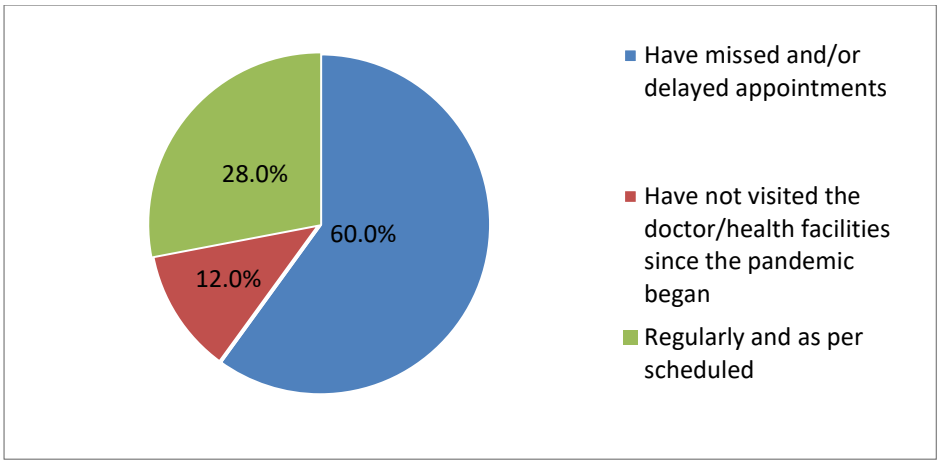
Figure 10: Types of illnesses suffered by respondents during the pandemic



Note: 1. Some respondents have had more than one medical condition; 2. Other diseases include: spinal issue, kidney disease, hypothyroidism, hepatitis B

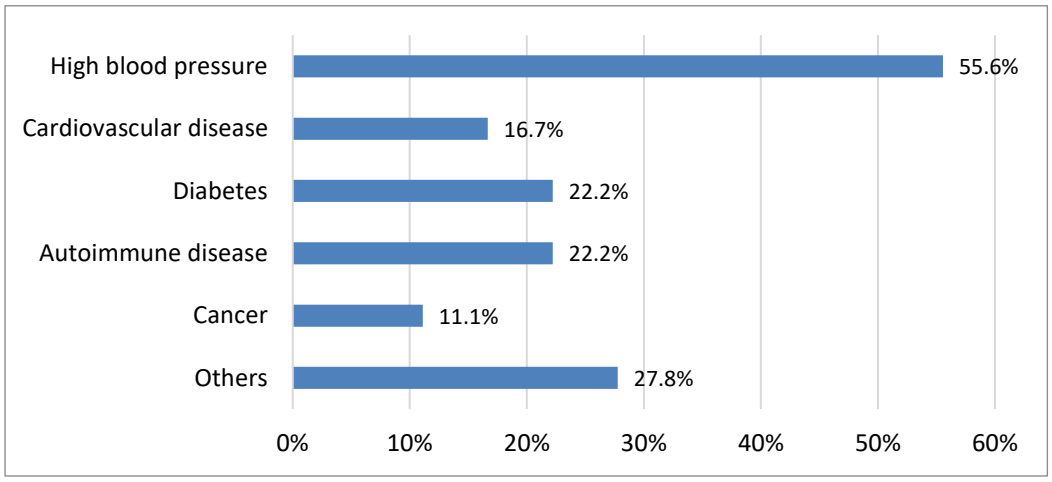
The survey also shows that a large percentage of respondents with medical conditions have not been keeping their medical appointments since the pandemic began. As it stands, 60% missed or delayed appointments, while 12% have not visited the doctor or kept an appointment over the course of the pandemic (Figure 11). However, all of these respondents keep to their regular schedule in taking their prescribed medications.

Figure 11: Adherence to medical appointments



Of those who have missed or delayed appointments, 55.6% has high blood pressure, and 22.2% are suffering from autoimmune diseases and/or diabetes, respectively (Figure 12). It is also somewhat concerning that even cancer patients have missed their appointments, or have had their appointments or procedures delayed; cancer is a chronic and serious disease that needs constant monitoring.

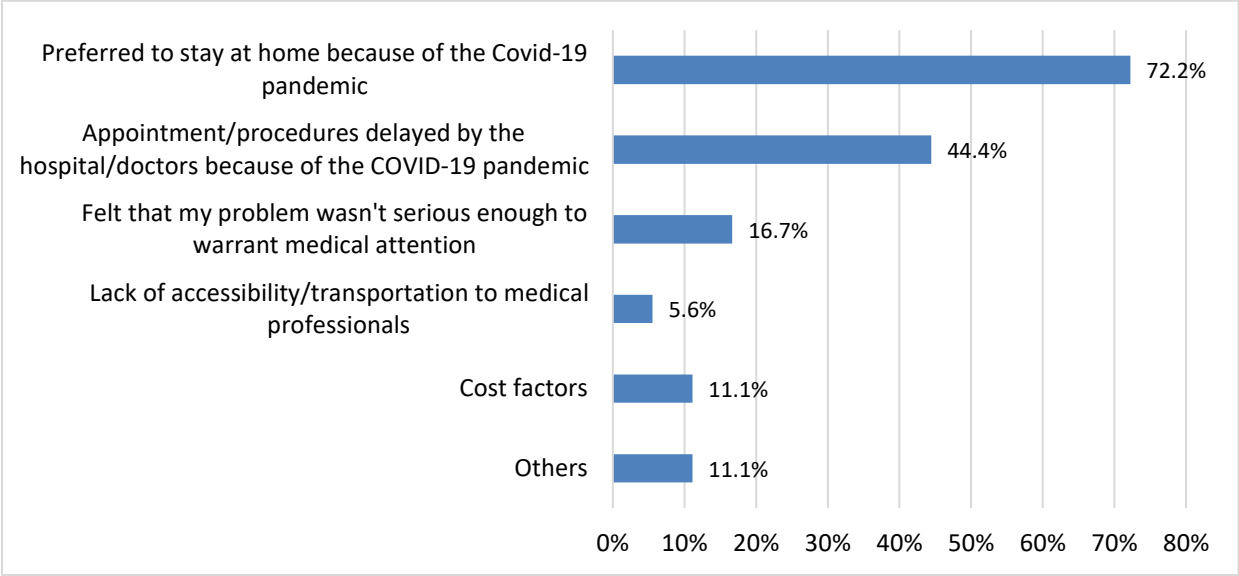
Figure 12: Respondents with medical conditions who have delayed/missed appointments



Note: Some respondents have more than one medical condition.

Among the many reasons cited by the respondents for missing or not attending to their appointments, the most frequently stated one (72.2%) is "preference to stay at home because of the Covid-19 pandemic" (Figure 13). Concurrently, 44% of respondents have not managed to keep to their appointments because of delays in medical procedures, or because of appointments being rescheduled due to the pandemic. While 16.7% feel that their problem is not serious enough to warrant medical attention, this reason is often combined with other factors, such as the preference to stay home, and costs.

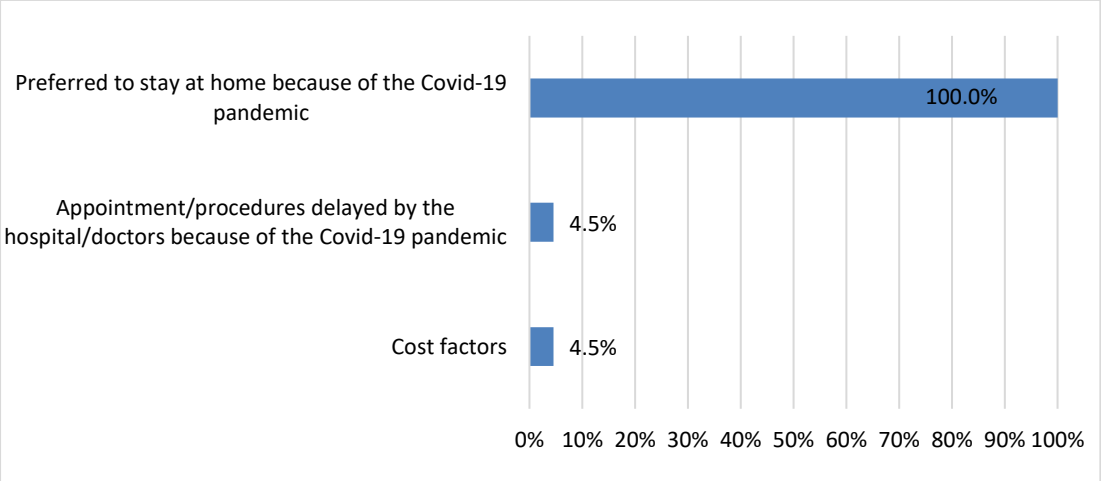
Figure 13: Reasons for not adhering to medical appointments



Note: 1. *Some respondents cite more than one reason why they miss medical appointments.*
2. *Other reasons include: forgetting the appointment, confusion between switch of doctors*

When it comes to respondents without pre-existing illnesses, 60.7% report that they have not delayed any routine health appointments or health checks over the course of the pandemic (Appendix A: Figure 1). For the respondents who have delayed their appointments, all of them have taken the choice to stay home and minimise their movement, again showing the influence of the pandemic when it comes to decision-making (Figure 14). Cost factors and the delay of appointments make up a very small percentage of the reasons cited (4.5% respectively).

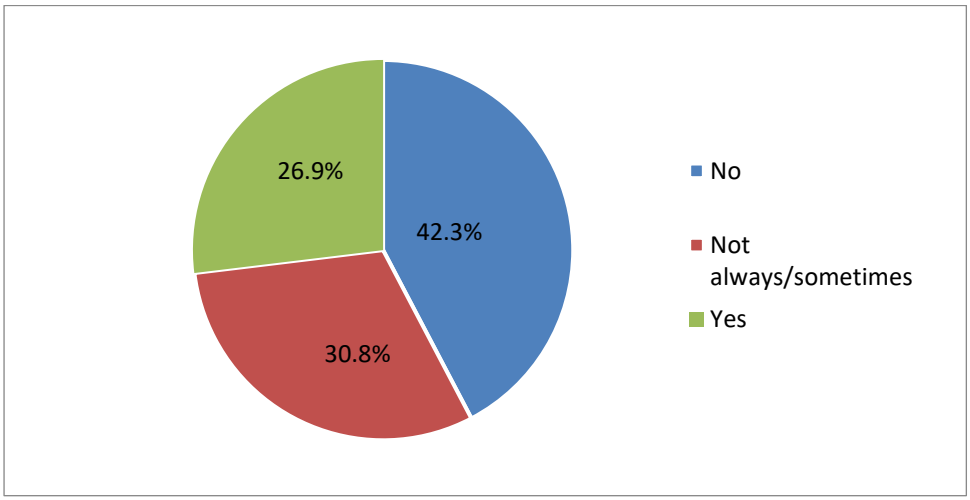
Figure 14: Reasons for not adhering to routine health checks



Note: Some respondents cite more than one reason why they adhere to routine health checks

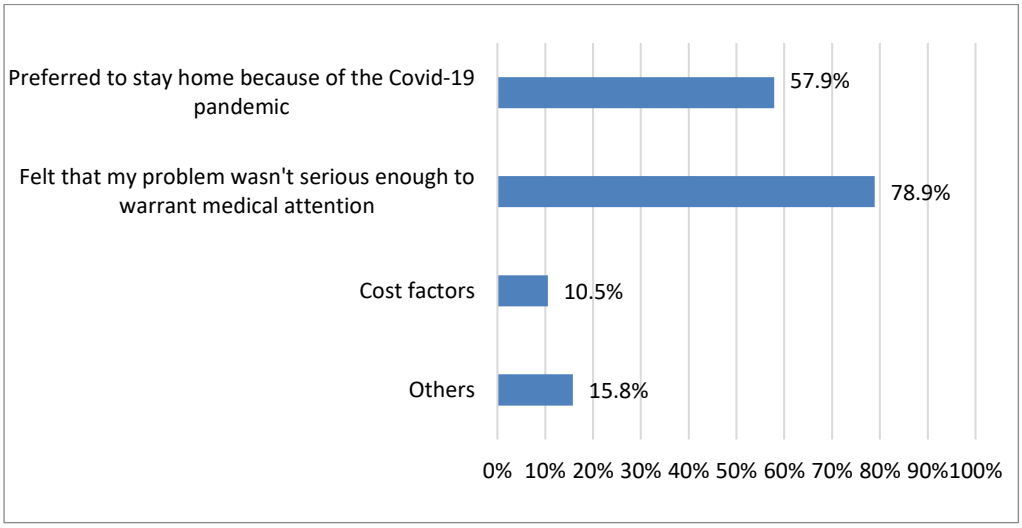
46.4% of this group of respondents acknowledge that they have encountered a medical problem over the course of pandemic (Appendix: Figure 2). Figure 15 shows that 42.3% have not seen a medical professional address their problem, whereas 26.9% have taken the initiative to seek medical advice. 30.8% of the respondents, however, have been seeking medical attention intermittently.

Figure 15: Percentage of respondents seeking health services for medical problems



As illustrated in Figure 16, a huge percentage of respondents (78.9%) consider the severity of their medical condition to be low, hence opting not to seek medical advice. However, 66.6% of these respondents cite preference to stay at home to be a simultaneous reason. Overall, the inclination to stay at home is a reason for 57.9% of the respondents.

Figure 16: Reasons for not seeking medical attention



Note: 1. Some respondents cite more than one reason why they do not keep medical appointments; 2. Other reasons include lack of accessibility/transportation to medical services, and lack of time due to role as a front-liner.

Of respondents who have sought not or who have intermittently sought medical advice when experiencing a health condition during the pandemic, 57.7% would have sought medical attention if there had been no pandemic, while 23.1% state that they might perhaps have done so (Figure 17). 19.2% assert that they would still not have needed medical advice.

Figure 17: Respondents who would have sought medical attention before the pandemic

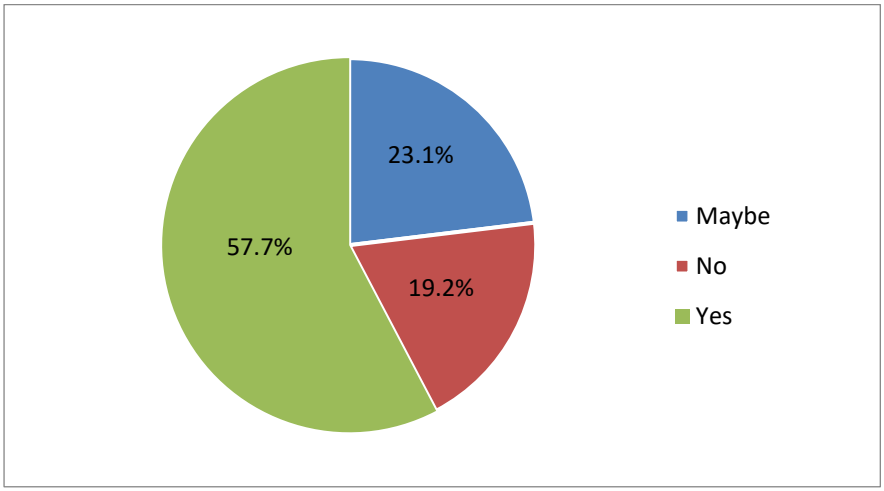


Table 4 shows that 14.3% of the respondents who have seen a medical professional for their condition would not have done so before the pandemic, while an equal percentage have been indecisive. However, 63.6% who have opted not to consult a medical professional would have acted differently pre-pandemic, while 18.2% would have made the same decision. For the percentage that state they do not always choose to see a health professional, 37.5% declare they would have made the choice to receive medical care, while 25% would not. Again, it is observed that the pandemic has wielded significant influence on respondents' decision to seek medical advice.

Table 4: Cross tabulation of respondents, on seeking medical advice before and after the pandemic

Sought medical advice for condition	Would have sought medical advice before pandemic		
	Yes	Maybe	No
Yes	71.4%	14.3%	14.3%
No	63.6%	18.2%	18.2%
Not always/sometimes	37.5%	37.5%	25.0%

As an overall observation, it is clear that the Covid-19 pandemic has resulted in the delay of medical care and treatment for other diseases and illnesses, primarily by reason of the patients being deferred by the health services, the patients' own decisions and/or the movement restriction orders.

As many as 85.7% of the respondents who have had their appointments and procedures delayed indicate public health as their primary method of healthcare, which again alludes to the effects of the pandemic on the public healthcare system. Unsurprisingly, the pandemic has caused a significant strain on public health services, where treatment for other diseases is seemingly but unintentionally pushed aside, due to the emergency of treating Covid-19 patients, a phenomenon that is experienced globally (Palmer et. al., 2020).

While some of these delays are caused by patients who default or postpone their appointments (discussed below), non-cancer and/or elective surgical procedures have also been deferred by the doctors or hospitals due to the lack of staff and to hospital beds being used for Covid-19 cases. Additionally, the interviewed health professionals voice concerns that as long as Covid-19 cases are high, other non-Covid patients' healthcare cannot be optimised. This situation eventually leads to (and will continue to lead to) higher incidences of complications for patients with pre-existing health conditions.

Equally worrying, perhaps, is the patients' own decision to postpone or avoid medical care, due to fear of contracting Covid-19 and/or abiding by the stay-at-home orders. The public survey indicates that even patients with considerably serious illnesses such as cardiovascular disease, diabetes and even cancer have delayed or missed medical appointments in an attempt to avoid leaving home. Masroor (2020) has termed this as the "collateral damage" of the pandemic, pointing out that unmet medical needs are associated with the increasing severity of pre-existing medical conditions, and will then, in the long run, lead to increasing mortality (also see Lim et. al., 2020).

Additionally, a study conducted by Czeisler and his colleagues (2020) found that a high proportion of respondents in the US had delayed and/or avoided medical care, and this included urgent and emergency care (also see Gonzalez et. al., 2020). They further postulated that potentially avoidable deaths increased in 2020 (when compared to previous years), indirectly because of the pandemic.

Ironically, the avoidance of medical care for fear of Covid-19 ranks high among those with pre-existing illnesses, since they presumably deem themselves more susceptible (Gonzalez et. al.,2021).

In the bid to circumvent a non-contracted illness, they, in turn, are compromising their general health situation. *The present survey accurately reflects this, with the preference to stay at home in a bid to avoid Covid-19 ranking high among respondents with medical conditions.* The health professionals echo these thoughts, and feel that the drop in patient attendance is hugely due to fear of Covid-19 infection. However, they also cite movement restrictions as one of the reasons, and that some patients are worried about being fined for crossing districts to reach their hospitals.

On the other hand, those without chronic diseases and pre-existing illnesses are also seen to delay on-emergency medical procedures and routine appointments, also due to the wish to minimise the risk of Covid-19 infection (Gonzalez et. al., 2020). Gonzalez's study also showed, however, that those without chronic conditions recorded a lower rate of missed appointments. Our survey mirrors these findings, with the percentage of missed appointments by respondents without pre-existing illnesses being 32.7% lower than those with medical conditions.

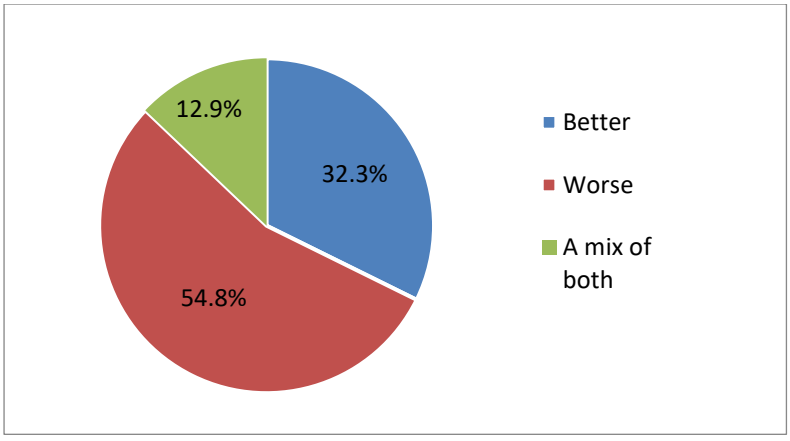
Concurrently, the inclination to seek health services for medical conditions developed during the pandemic is seen to be low, primarily also due to Covid-19 avoidance (Feral-Pierssens et. al., 2020; Gonzalez et. al., 2020). As indicated early, 78.9% of respondents in our public survey did not immediately obtain the services of medical professionals, but 52.6% of these respondents would have done so in pre-pandemic times. This situation is of some concern because if care avoidance continues, detection and diagnosis of new medical conditions will also be delayed, hence also resulting in effect in deferred treatment and potentially worse outcomes.

Lifestyle and Behavioural Changes

As lifestyle and behaviour are significantly important when considering the general health landscape, both surveys take an in-depth look into the changes brought on by the pandemic, if any. These changes are measured across food and diet, physical exercise, sleeping habits and adherence to non-pharmaceutical interventions (NPIs).

Medical professionals are asked if they think that lifestyle changes due to MCO are beneficial or detrimental to the health of the public in general. More than half of the respondents (54.8%) feel that the various MCOs have brought about negative lifestyle changes (Figure 18). At the same, 32.3% of the respondents believe that people's lifestyles have improved. The rest of the respondents feel that there has been a mix, and both good and bad lifestyle changes have occurred.

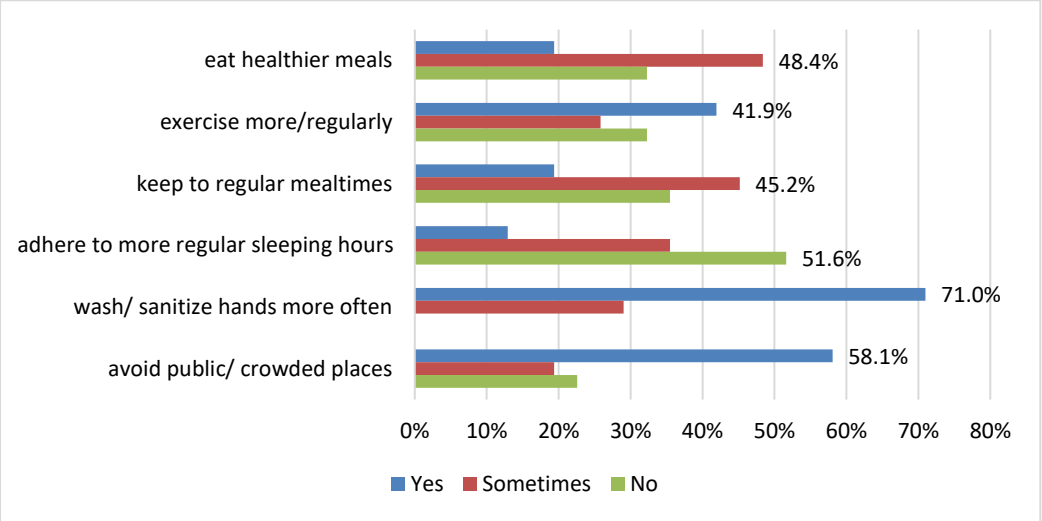
Figure 18: Health practitioners' observations on lifestyle changes due to the various MCOs



When it comes to eating habits, the medical professionals have mixed opinions, with more leaning towards negative opinions rather than positive ones. Answers are almost identical on whether people have been eating healthier meals and if they have kept to regular mealtimes (Figure 19). Only 19.4% of respondents feel that the public has been eating healthier meals since the start of the pandemic. About half (48.4%) of the respondents think that people have been eating healthier occasionally while a third (32.3%) of the respondents feel that most people have been eating healthier. Similarly, 19.4% of respondents believe that people have kept to regular mealtimes, 45.2% assume that people only sometimes do that, and 35.5% disagree that consistent mealtimes are kept.

More respondents feel that people have been exercising regularly (41.9%) than the contrary (32.3%). 25.8% of the respondents assume that most people have been sometimes exercising more during the pandemic. Interview respondents mention that there has been a general lack of motivation to exercise because of the restrictions to leave the house. When it comes to keeping to regular sleeping hours, a majority (51.6%) believe that poorer sleeping habits have been developed in the past year, which this is also reiterated by interview respondents, who further feel that altered sleeping patterns will lead to many health issues. Only 12.9% of the respondents feel that people have been adhering to more regular sleeping hours while 35.5% think that most people may only sporadically be doing that.

Figure 19: Health practitioners' observations on health habit changes due to the various MCOs

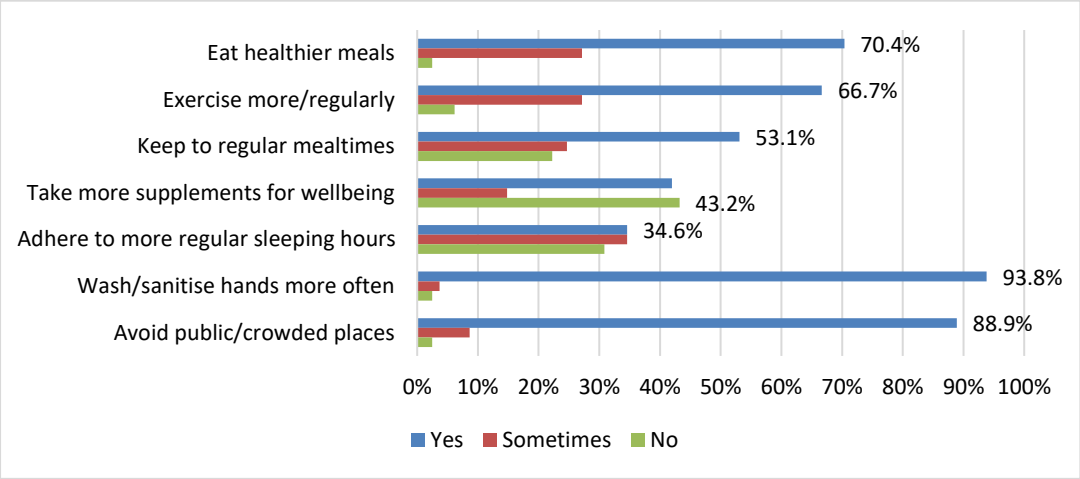


On a more optimistic note, 71% of the medical professionals believe that people are now washing and sanitising their hands more often. The rest of the respondents (29%) feel that people only do this occasionally. A substantial 58.1% of respondents opine that people have become more conscious about avoiding public and crowded places. An almost equal number of respondents feel that people either occasionally avoided public and crowded places (19.4%) or they still have not normalised a social distancing habit (22.6%). Overall, interview respondents agree that hygiene levels have improved, as people are more aware about masking and sanitising, while social distancing remains elusive, although through no fault of the patients, and that this has been due to limited space in the clinics and hospitals.

For the survey centred on the general public, the biggest change of behaviour is in the adherence to NPIs. Figure 20 shows that 93.8% of the respondents are washing and sanitising their hands more often, while 88.9% are avoiding crowded places.

As for changes in other lifestyle behaviours, 70.4% are attempting to eat healthier meals while 27.2% are sometimes doing so, but a lower percentage of 53.1% are trying to keep to regular mealtimes. When it comes to physical movement and exercising, 66.7% are increasing the frequency and regularity of their exercise routines, with 27.2% putting in occasasional efforts. Less than 50% of the respondents are taking more supplements (42%) or adhering to more regular sleeping hours (34.6%). More respondents are, in fact, not seeing the taking of supplements as beneficial to improving their health (43.2%).

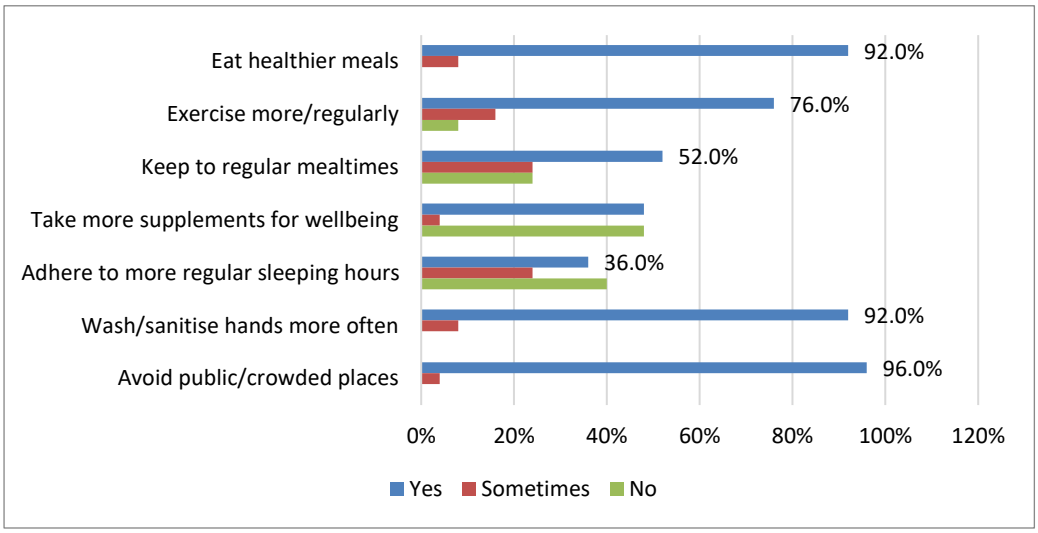
Figure 20: Changes in behaviours among respondents during the pandemic



Among respondents with existing illnesses and those without, different behavioural changes can be observed. When compared with overall respondents, these respondents may be just as inclined to increase the frequency of washing and sanitising (92%), but they are a lot more prudent in avoiding public and crowded places (96%) (Figure 21).

The resounding decision to eat healthier meals is significantly higher at 92%, but the adherence to regular meal times is comparable (52%). Additionally, no respondent has answered “no” to the practice of eating healthier meals. Furthermore, the increased regularity of exercise recorded a higher percentage at 76%. Other behaviours move along the same trend, but with this group of respondents being less liable to take supplements (48%).

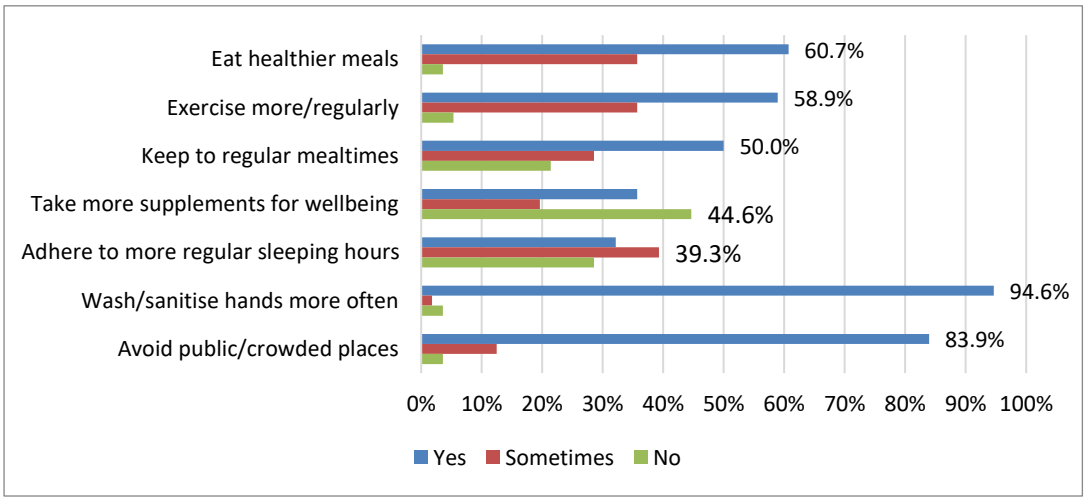
Figure 21: Respondents with pre-existing illnesses who have changed behaviours



When it comes to behavioural changes among respondents without pre-existing medical conditions, these record the highest propensity in increasing the practice of sanitisation (94.6%), but are a lot less judicious in avoiding crowded places (83.9%), especially when compared to respondents with illnesses (Figure 22).

The aforementioned group is also significantly less concerned with eating healthier meals and exercising more, recording the lowest percentages of 60.7% and 58.9% correspondingly, but with bigger percentages of "sometimes" (35.7% on both counts). The taking of additional supplements is also lower (35.7% yes, 44.6% sometimes). Other behaviours are not substantially different.

Figure 22: Respondents without pre-existing illnesses who have changed behaviours



In addition, 19.8% of the respondents report that they have gained weight, while an equal percentage observe the reverse (Appendix A: Figure 2). The remainder indicate a maintenance of pre-pandemic weight.

The two surveys showed very different results and interpretations on this issue. The medical professionals, overall, do not think that food and dietary habits have changed for the better. In contrast, respondents in the public survey assert that they have been eating healthier, with only 2.5%[1] stating a definitive "no" to the indicator of eating healthier meals. The adherence to regular mealtimes as indicated by the public is also considerably higher when compared to the perception of the health professionals on the issue.

Other studies have shown similar trends. Andrade (2020) has found that there was an increase of unhealthy eating habits due to the lockdown, which would then have resulted in potentially irreversible weight gain. This observation is echoed by the interviewed health professionals in our study, where they cite increased dependence on take-outs, or more sugary diets with the increase of home-baked desserts. Balanzá-Martínez and colleagues' (2021) research on a sample of Spanish respondents also found very little change in diet and nutrition habits.

However, there are studies that show improvement in eating habits. Chopra et. al.'s (2020) found an increase in intake of more nutritional food such as legumes, wheat, fruits and vegetables, and a decrease in intake of junk food and fast food (also see Kumari et. al., 2020). The consumption of home-made food, which presumably also represented a healthier option, had also increased, particularly during the periods of lockdown (Di Renzo et. al., 2020). These views, as stated, are reflected by the respondents' answers in our survey among the general public. The health professionals interviewed in our study also acknowledge the link between home cooked meals and healthier meals.

Undoubtedly, the closure of gyms and the ban on contact sports have contributed to the reduction of exercise, but both surveys see an increase in the *regularity* of exercise nevertheless. On this matter, respondents perceive themselves to be exercising more frequently, when compared to the perception of the medical professionals.

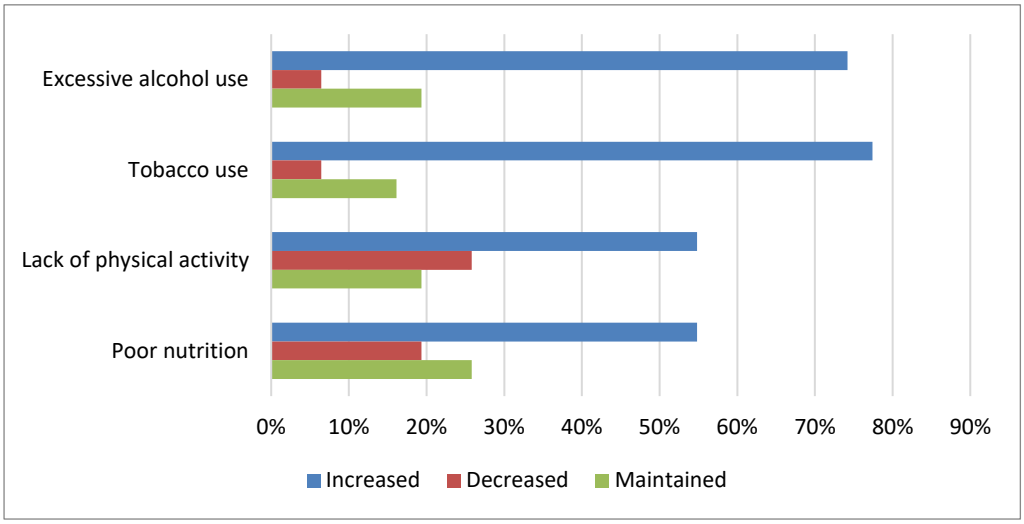
Other conducted studies support the observed trend, showing an increase in exercise and physical activity among respective surveyed respondents (Kumari et. al., 2020; Chopra et. al., 2020), although the percentage of increase was much lower than the one observed in our current survey. The research of Di Renzo and colleagues (2020) has further shown a correlation between exercise habits pre-pandemic and during the pandemic, where a higher frequency of pre-pandemic exercise (more than five times a week) led to a higher percentage of physical activity during the pandemic.[2]

The perceived compliance to NPIs is also significantly higher among the general public when compared to the observations of the medical professionals. Generally, the percentage of adherence to NPIs is higher than for those who choose not to adhere, especially in terms of hand-washing/sanitisation, disinfection and the avoidance of public spaces[3] (Kantor & Kantor, 2020; Crane et. al., 2021).

Moving on to risk factors and substance use, Figure 23 illustrates that the majority of the medical professionals feel that tobacco use (77.4%), poor nutrition (54.8%), lack of physical activity (54.8%), and excessive alcohol use (74.2%) have all increased during the pandemic. It is noteworthy that 25.8% of the respondents feel that physical activities have increased, indicating some mixed opinions when it comes to whether people have been more sedentary or active during the pandemic. This is also reflected in the earlier part of discussion, as well as in other published studies. One interviewee also highlighted the increase in drug abuse during this time.

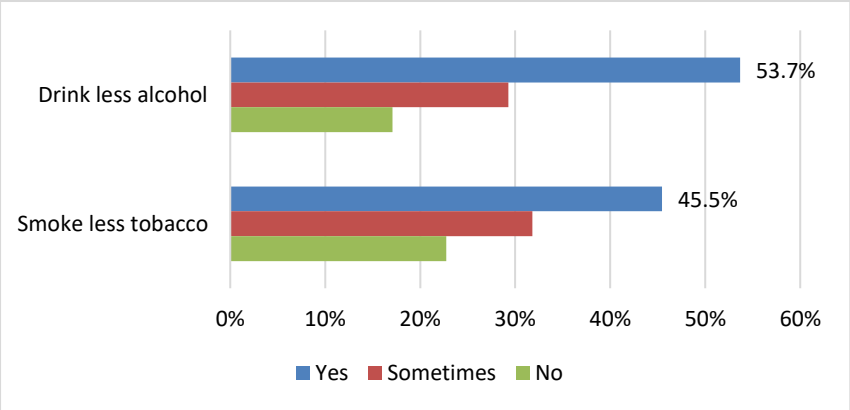
[1] The percentage of "no" for respondents with pre-existing illnesses is 0%, and 3.6%.
[2] The study simultaneously finds that there has been no change in exercise routine for those who did not exercise much to begin with, and those with a lower frequency of exercise have seen some decrease in activity during the pandemic.
[3] This includes the enforcement of public lockdowns.

Figure 23: Health practitioners' observations on major risk factors



Where the consumption of alcohol and tobacco among respondents from the general public is concerned, the survey finds that 49.4% of them do not drink, and 72.8% do not smoke. For those who do, 53.7% report solid efforts to reduce alcohol intake, while 29.3% intermittently does that (Figure 24). Likewise, 45.5% have made a conscious choice to smoke less, with 31.8% think that they have ended up smoking on less occasions.

Figure 24: Respondents by their alcohol and tobacco consumption



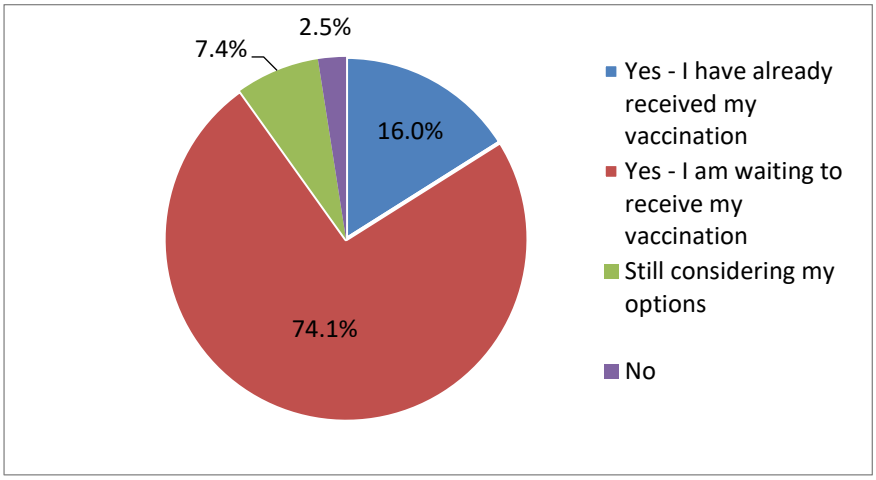
For respondents with pre-existing illnesses, 32% consume alcohol while 16% smoke. All smokers in this group report that they have been smoking less (Appendix A: Figure 4). As for the consumption of alcohol, 75% of them have made a conscious effort to drink less (50% yes, 25% sometimes).

The percentage of respondents who smoke and/or drink are higher among those without pre-existing medical conditions, at 58.9% and 32.1% respectively. However, only a third report definitively smoking less, with 38.9% occasionally making the effort (Appendix A: Figure 5). When it comes to alcohol consumption, more than half (54.5%) state that they are consciously drinking less, and 30.3% indicate that they sometimes do so.

Overall, the intake of alcohol and tobacco is hypothesised to have increased during the pandemic, due to the stress of the pandemic and the increase of psychosocial stressors from confinement (Dubey et.

al., 2020). However, some other studies have noted valiant attempts to reduce the consumption of alcohol and tobacco. Chopra and colleagues (2020) found that there has been a significant decrease in the consumption of alcohol and tobacco, while Di Renzo et. al.'s (2020) observed the same for smoking. Additionally, efforts to reduce the frequency of smoking and drinking are observed to be higher for those who smoked and drank heavily in pre-pandemic times (Jackson et. al., 2020). These results are also reflected in our study, where there is a prevailing trend among respondents to reduce consumption of alcohol and tobacco.

Figure 25: Respondents' vaccination perceptions



As a concluding note, and on the subject of vaccination, a majority of the respondents are receptive to receiving the vaccine, with 16% stating that they have at least received one dose of vaccination, while 74.1% are waiting for their scheduled appointments (Figure 25). Only 2.5% are choosing to refuse vaccination, while 7.4% are considering their options.

Recommendations

Based on the findings of this study, the following policy recommendations are suggested:

1. **Expanding and improving the use of telemedicine and teleconsultations**
   Digital and telehealth services have become increasingly important with the lockdowns and self-quarantine measures over the course of the pandemic. Having the option of teleconsultations for routine check-ups would allow patients to receive professional medical advice, especially with regards to non-emergency medical conditions, from the comfort and safety of their home.

   Teleconsultations are also effective for assessing the patients' condition and the requirement of medical treatment, efficiently triaging patients by urgency and deliberating the necessity for in-person consultations. It would decrease the need for patients to travel to hospitals, and reduce the risk of them being exposed to viruses like Covid-19, and hence, reduce the rate of defaults and delays in medical attention. In this sense, it would lessen the propensity of the public to make decisions based on risking exposure or to forgo medical attention. Medications could be delivered to patients' homes; it is suggested that delivery charges be absorbed by the hospitals.

   Furthermore, telehealth services should be permanently integrated into public and private health systems, and their full usage encouraged. For future and further improvements, more digitisation should be considered, where chatbots and webbots can be developed and used in conducting

initial assessment through a series of pre-determined and structured questions, before patients are referred to the suitable health professionals for further assessment and advice.

2. **Encouraging partnership and collaboration between public and private health systems**
The pandemic has undoubtedly put considerable strain on the existing healthcare infrastructure, and vulnerabilities in the areas of logistics, human resources, availability of equipment have been severely exacerbated. As such, a greater working relationship between the public health sector and the private health sector in alleviating some of these weaknesses should be encouraged and further explored.

There has been some collaboration between public and private hospitals during the pandemic. As Covid-19 treatment and management have been solely the responsibility of designated public hospitals, these institutions have faced shortage of medical equipment. Private hospitals have extended the loan of ventilators and offered support in taking in non-Covid-19 patients who needed urgent medical procedures (Brady, 2020). The federal government has also allocated RM100 million for health services rendered by the private sector for patients transferred from the public system (Batumalai, 2021).

The pandemic has shown that stronger integration between the two systems will increase the resilience of the overall health system. However, partnerships between the two health sectors will need to address short-, medium-and long-term challenges. Short-term strategies should focus on producing immediate and dynamic outcomes, while medium-term measures should include the formulation of policies that are more proactive and sustainable in building resilience. Long-term strategies are expected to be corrective, and should be able to address and combat future pandemics. The development of these policies can facilitate lasting and robust partnerships between the stakeholders.

3. **Establishing stronger working conditions for healthcare workers**
The contribution of the healthcare workforce in fighting the pandemic is immeasurable and invaluable. They have made numerous sacrifices at the expense of their families, personal lives and even their mental health. However, contract health workers in Malaysia face uncertainties when it comes to their employment.

In July 2021, a social media-led movement called ‘Code Black’ took place to raise issues of unjust treatments to contract healthcare workers in the public service (Kwan, 2021). Apart from being under the immense pressure of coping with the pandemic, healthcare workers have been overworked, underpaid, and they tend to lack job security.

The terms of employment and payment of these people need therefore to be looked into, and appreciation of the sacrifices of the country’s healthcare worker needs to be concretely shown.

4. **Disseminating information and advice on healthier living**
Since before the pandemic, social media has been one of the most powerful and far-reaching sources of public information. At the beginning of the pandemic, several videos by healthcare professionals and other concerned individuals went viral on social media; these explained in several languages and dialects the importance of wearing masks, sanitising frequently, and keeping social distances.

Public and private hospitals and clinics should be encouraged to share professional medical opinions and advice with the public via social media, especially for common diseases and illnesses in addition to information on Covid-19. This would spread awareness and ensure that the public receives accurate information from legitimate sources. Additionally, they should share comprehensive information on healthy diet and nutrition, and encourage detailed exercise-at-home measures to encourage a healthier lifestyle.

Virtual campaigns, talks, and live sessions where viewers can put questions to the medical professionals would greatly help those who have as yet not sought medical care. Even for viewers who do not have specific ailments, information on healthcare disseminated on social media would provide useful knowledge on what to look out for and how to take care of their health.

Vaccine information should also be liberally shared, in addition to detailing ways in which the general public can register for their vaccination appointments. A fully vaccinated population is one of the most important steps in neutralising the pandemic.

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Appendix A

Figure 1: Percentage of patients on keeping routinely scheduled health appointments

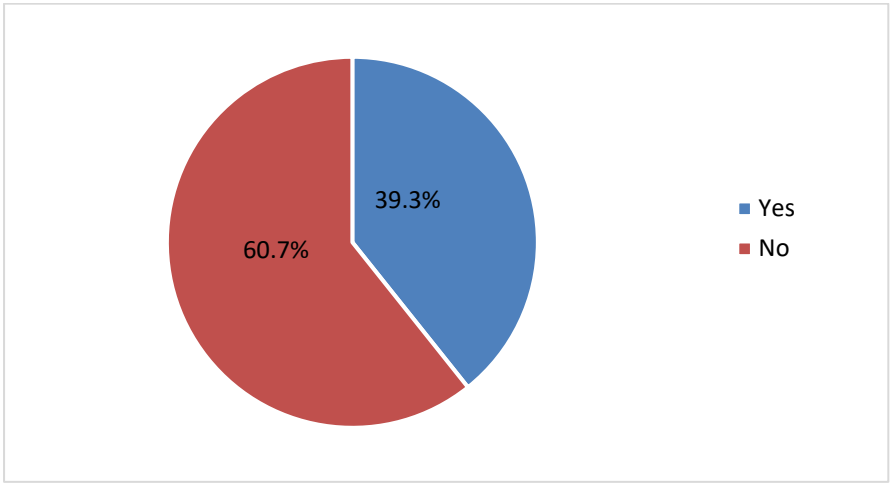


Figure 2: Percentage of respondents who have encountered a medical problem during the pandemic

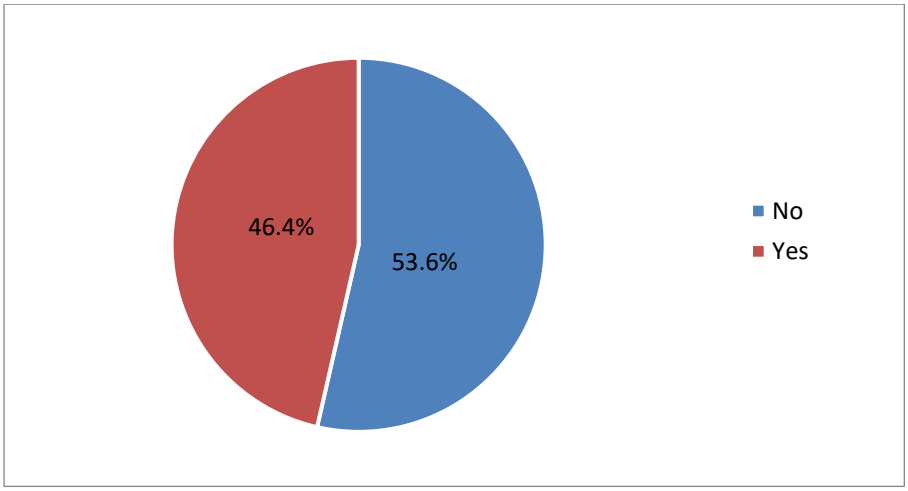


Figure 3: Perceived weight changes among respondents

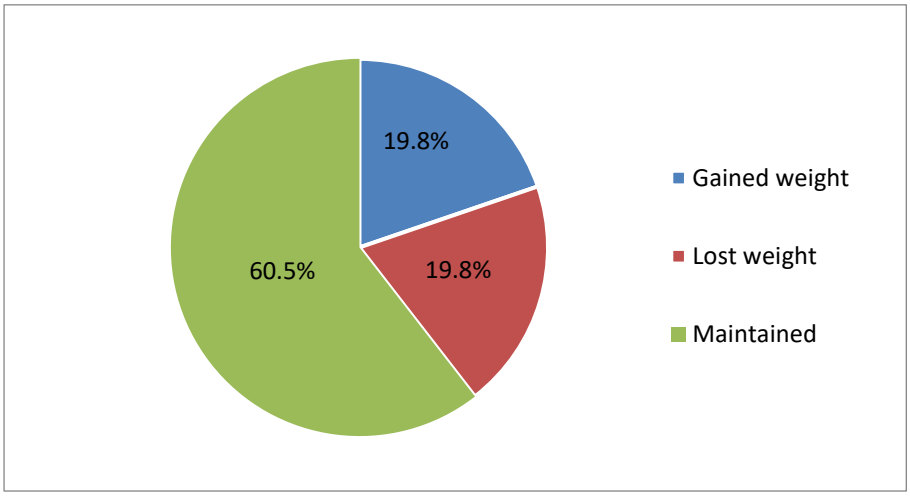


Figure 4: Alcohol and tobacco consumption among respondents with pre-existing illnesses

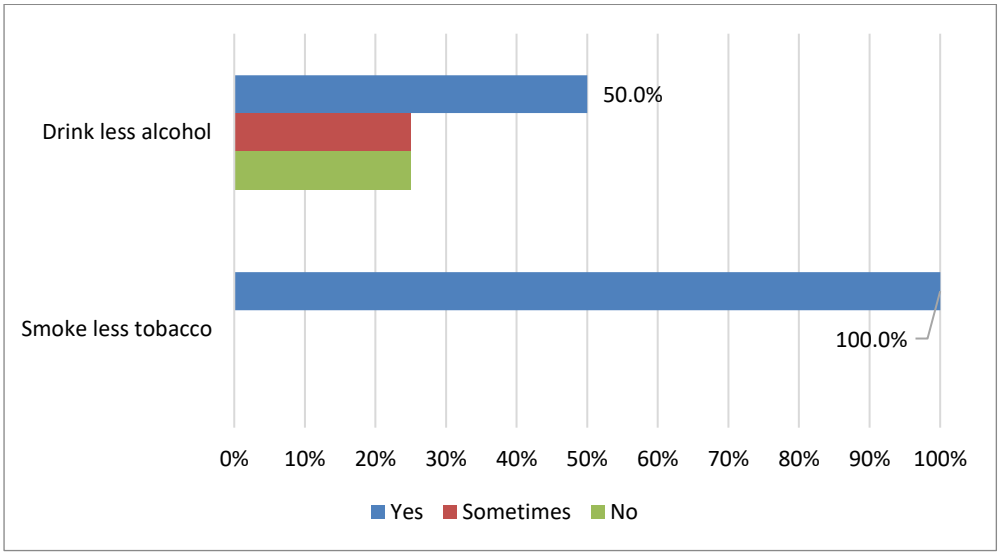
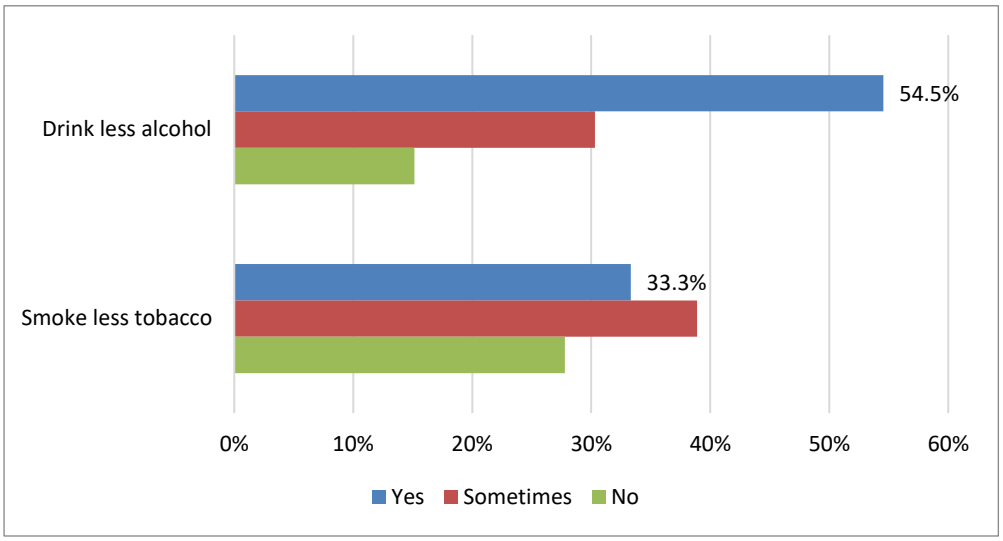


Figure 5: Alcohol and tobacco consumption among respondents with no pre-existing illnesses



Appendix B

Survey of health professionals – Demographic breakdown

From the survey targeting healthcare professionals, 67.7% of the respondents are medical doctors, followed by nurses and pharmacists, both at 9.7% each (Table 1). The survey has also been answered by 2 physical therapists, a dentist, and a quality assurance manager.

Table 1: Respondents according to healthcare practitioner type

Healthcare role	Number of respondents	Percentage
Medical doctor	21	67.7%
Nurse	3	9.7%
Pharmacist	3	9.7%
Physical therapist	2	6.4%
Dentist	1	3.2%
Quality Assurance Manager	1	3.2%
Total respondents	31	100.00%

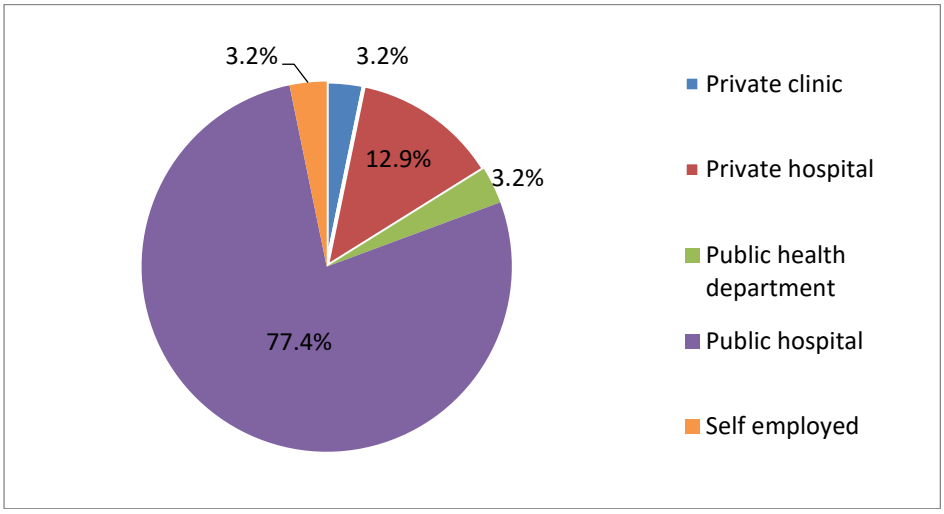
The respondents are also from different healthcare specialisations, yielding wide-ranging viewpoints for the survey. 16.1% specialize in Psychiatry while 9.7% are experts in Internal Medicine (Table 2). Each group of specialists in Urology, Emergency Medicine, Physical Medicine and Rehabilitation, Ophthalmology, and Medical Oncology make up 6.5% of the total. In the areas of Pathology, Obstetrics and Gynaecology, General Practice, Orthopaedics, General Dentistry, Outpatient Pharmacy, and Quality Assurance, one specialist each have participated in the study. The rest of the respondents work in other unspecified fields.

Table 2: Percentage of respondents by field of specialisation

Healthcare role	Number of respondents	Percentage
Psychiatry	5	16.1%
Internal medicine	3	9.7%
Urology	2	6.5%
Emergency medicine	2	6.5%
Physical medicine & rehabilitation	2	6.5%
Ophthalmology	2	6.5%
Medical oncology	2	6.5%
Pathology	1	3.2%
Obstetrics & gynaecology	1	3.2%
General practice	1	3.2%
Orthopedics	1	3.2%
General dentistry	1	3.2%
Outpatient pharmacy	1	3.2%
Quality assurance	1	3.2%
Not applicable	6	19.4%
Total respondents	31	100.0%

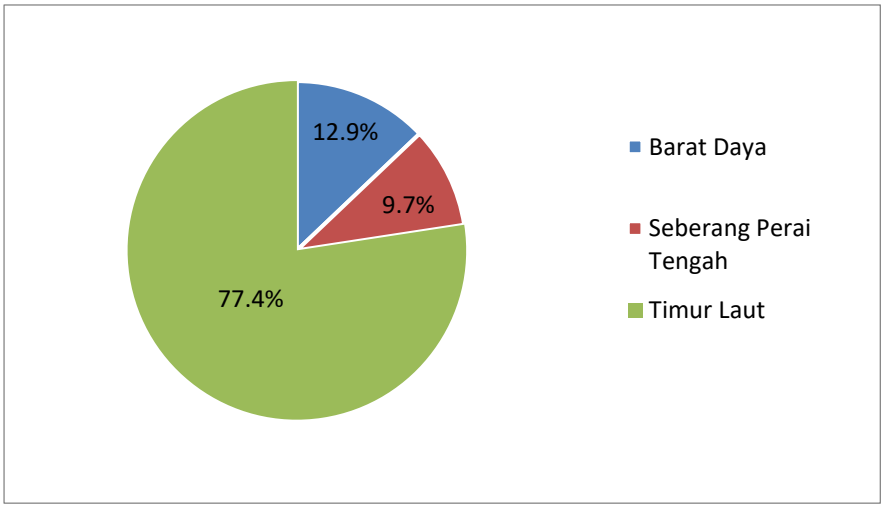
Out of the 31 respondents, 77.4% work in public hospitals and 12.9% in private hospitals (Figure 1). A respondent each from a private clinic, the public health department, and one who is self-employed, also participated.

Figure 1: Respondents by workplace



A majority of the medical professionals work in the North East (Timur Laut) district of Penang, and make up 77.4% of the total responses (Figure 2). 12.9% of respondents work in the South West (Barat Daya) district, while 9.7% in the middle district on the mainland (Seberang Perai Tengah).

Figure 2: Respondents by district of workplace



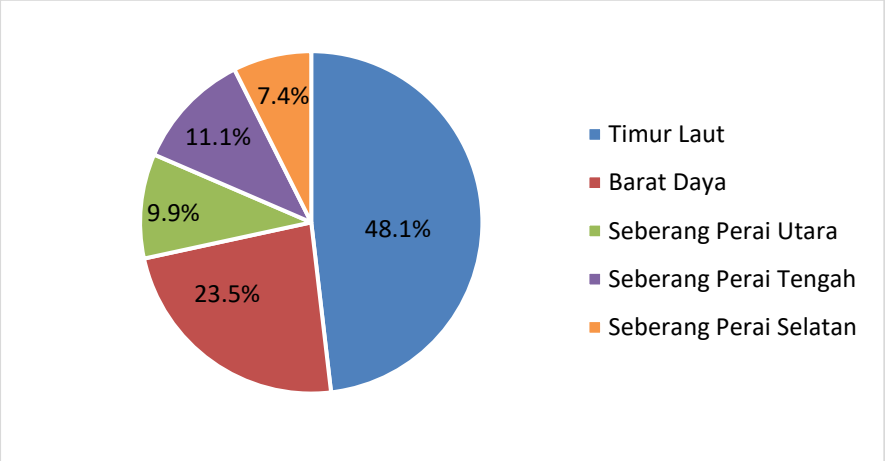
Appendix C

Survey of the general public – Demographic breakdown

This survey, conducted online from 1 June to 21 June, collected 81 responses.

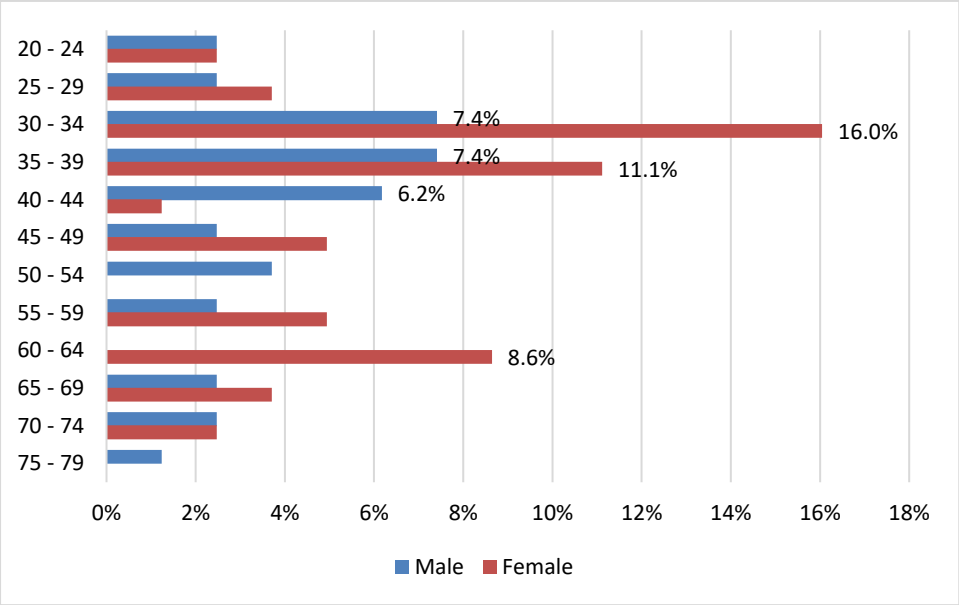
As many as 48.1% of the respondents are from Timur Laut, followed by Barat Daya at 23.5% (Figure 1). Fewer responses were collected from the mainland, and mainly from Seberang Perai Tengah (11.1%).

Figure 1: Respondents by district



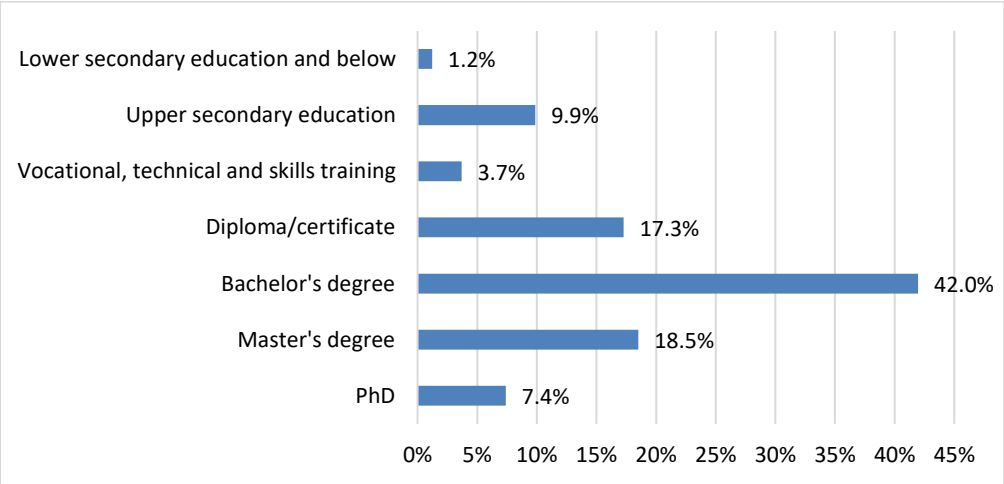
Of the 81 respondents, 59.3% are female, and the rest male. Respondents vary across different age groups, where the biggest are those aged 30 to 44 years, with a cumulative percentage of 49.4% (Figure 2). At 16%, the biggest proportion of female respondents are aged between 30 to 34 years, followed by those aged between 35 to 39 years (11.1%). As for male respondents, the highest percentages are found in the age groups of 30 to 34 and 35 to 39, with an equal percentage of 7.4%.

Figure 2: Respondents by sex and age group



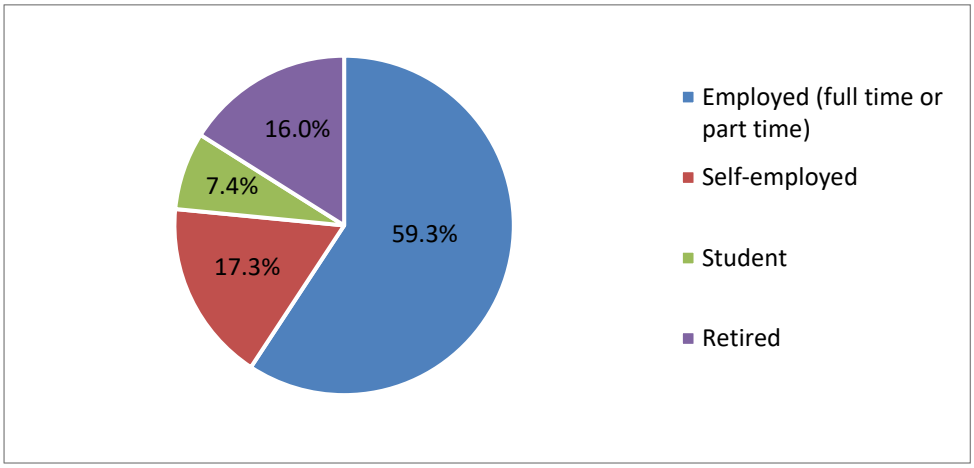
A majority of the respondents have tertiary-level education. Only 11.1% of respondents have an education level of upper secondary and below (Figure 3), while 42.0% hold a bachelor's degree (42.0%); 18.5% have a master's degree (18.5%), and 17.3% have a diploma or a certificate.

Figure 3: Respondents by level of education obtained



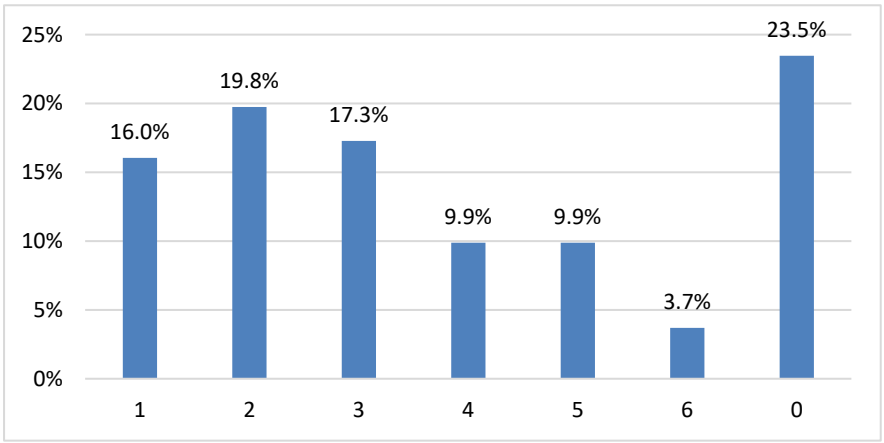
About 59.3% of the respondents are employed, either full time or part time, while 17.3% identify themselves as self-employed (Figure 4). As many as 23.4% of the respondents are not in the workforce (16% retired; 7.4% students).

Figure 4: Respondents by employment status



Of those in the labour force, 19.8% work as professionals; this represents the biggest percentage. Slightly fewer, at 17.3%, are the non-managerial executives (Figure 5). Clerical workers make up the smallest group, at 3.7%. Notably, self-employed workers are mostly involved in services and sales (35.7%).

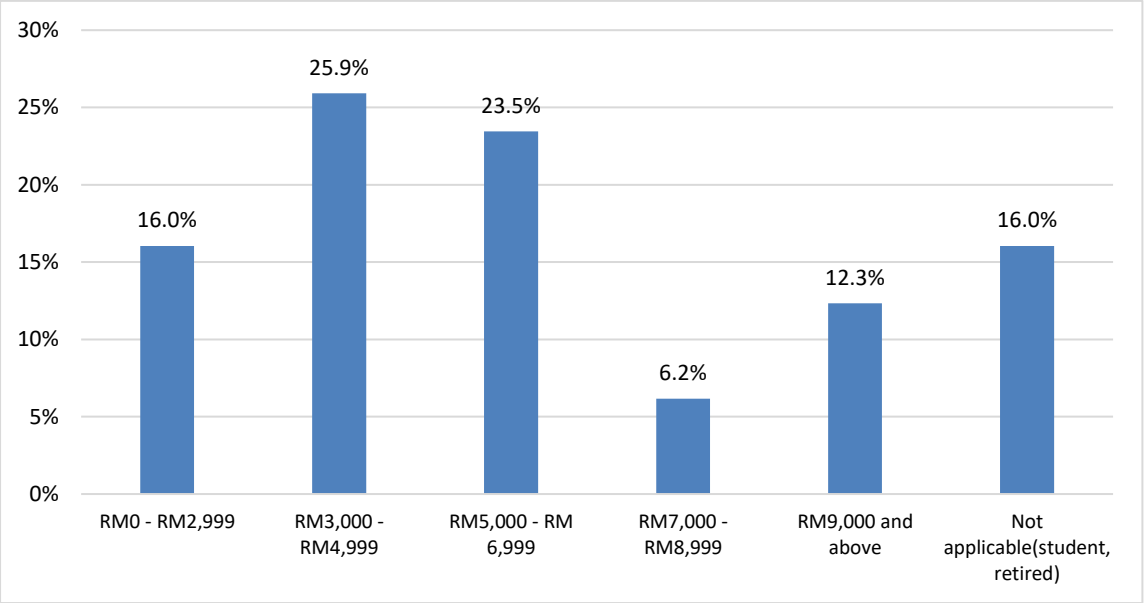
Figure 5: Respondents by occupational sector



Note:
1. Manager (general manager, senior management, director)
2. Professional (accountants, lawyers, doctors)
3. Non-managerial executives (analysts, planners etc.)
4. Technician and/or associate professionals (IT technician, lab assistant etc)
5. Services and sales worker (hospitality, sales person, customer service)
6. Clerical support worker (clerks, accounts clerk etc.)
0. Not applicable (unemployed, student, retired)

A majority of the respondents earn a monthly income between RM3,000 to RM4,999 (25.9%), while 23.5% are in the income range between RM5,000 to RM6,999 (Figure 6). 12.3% of the respondents are high-income earners, making RM9,000 and above. Lower-income earners (RM2,000 and below) make up 16% of the total. Among the retired, 46.2% report having a monthly income, presumably from a pension or dividends from investments.

Figure 6: Respondents by income level



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