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Title:

Impacts of the COVID-19 pandemic on healthcare services in Malaysia from the perspective of healthcare providers: A cross-sectional analysis.

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Abstract: Malaysia implemented a movement control order (MCO) to curb the spread of the SARS-CoV-2 virus in March 2020. Despite healthcare services remaining operational, rising COVID-19 infections and MCO restrictions have forced healthcare professionals to seek a compromise between service capacity and standard operating procedure compliance. A cross-sectional survey was conducted among public and private sector doctors, dentists and pharmacists to determine how lockdown measures impacted healthcare services. Responses from 413 doctors, 193 dentists, and 163 pharmacists were analysed. Pharmacy services remained mostly unaffected throughout the MCO. In contrast, operational capacities for surgical and dental services were severely affected during the MCO. All service sectors reported restricting patients or accompanying individuals at the workplace, reductions in staffing capacity, and shortened patient contact time at various degrees. Many pharmacy and medical participants reported supplying extended medication supplies to patients. Adoption of virtual healthcare services was generally poor. All private service sectors suffered financial losses ranging between 59 to 75%. Periodic assessments of the healthcare system throughout the pandemic are required to identify which patients have their treatment compromised so that healthcare managers and policy makers can plan and implement appropriate interventions that help alleviate pressure within the health system.

Keywords: COVID-19, pandemic, impact, healthcare, lockdown, movement control order, Malaysia, medical services, dental services, pharmacy services

1. Introduction

The emergence of the novel SARS-Cov2 virus caught the attention of the World Health Organisation (WHO) and culminated to the declaration of the COVID-19 pandemic on the 11th of March 2020 [1,2] . With an infection rate that was higher than most other viruses linked to famous

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epidemics, and a significant mortality risk towards elderly and people with chronic diseases, governments worldwide had good reasons to implement lockdowns when the virus was detected within the population [3,4]. This helped curb the spread of the virus and buy time to gain vital information regarding the disease's transmission dynamics [5]. China was one of the first countries to introduce such measures, with strict lockdowns implemented nationwide [6]. Other countries globally soon followed suit with varying degrees of lockdown measures [7].

Malaysia was no exception to this trend. Initial cases could be traced back in January 2020, with numbers suddenly escalating after mid-March following a religious event that involved 1,600 people [8]. In response to the sudden surge of cases and deaths reported due to COVID-19 infections, the Malaysian government executed a Movement Control Order (MCO) to contain the virus [9]. Deemed as a partial lockdown, the MCO introduces enforced rules and regulations that prohibit mass movements and social gatherings of any kind. Travel restrictions were imposed to only allow travel within a 10 km radius from the place of residence. International travel was sanctioned while returning Malaysians from abroad were mandated to be medically screened and quarantined for two weeks. All businesses except those in the manufacturing, supplier, retailer and food industry were ordered shut until further notice. Apart from essential services, all public and private premises, including learning institution, were also ordered closed. Healthcare is among one of the few essential services that were allowed to remain operational during the MCO [10].

Despite remaining operational, various healthcare services in other countries have been reported to be operating at less than optimal capacity, due to factors related to the pandemic. Similar to what has transpired initially in Wuhan [11], countries such as the UK [12], India[13], and many others[14] had directed substantial medical and human resources towards combating the COVID-19 pandemic to the point where the healthcare system became jeopardised. Additionally, to comply with standard operating procedures (SOP) that enforce physical distancing, healthcare facilities imposed crowd control measures such as limiting staff numbers at the workplace, spacing

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out appointments, postponing non-urgent cases, and partial closure of certain services [15,16]. These factors cumulatively deprive other non-COVID infected patients from receiving timely, sufficient and effective medical care, thus becoming collateral casualties in the war against COVID-19 [17,18].

In light of COVID-19 restrictions and poorer access to healthcare due to lockdowns, healthcare practices have to adapt by implementing innovative means that limit patients coming to healthcare facilities whilst ensuring that they receive adequate healthcare. For instance, telemedicine or virtual healthcare is an alternative means of remotely providing consultations and care to patients without risking them being exposed to the virus at healthcare facilities [19]. Providing extended medication refills or employing methods that allow patients to refill prescriptions remotely are other means which help prevent overcrowding at healthcare facilities and reduce risks of viral transmissions [20–22].

The COVID-19 pandemic has certainly brought many changes and impacted modern healthcare practices. This is even more pronounced as the implementations of added restrictions during lockdowns force healthcare practices to seek a compromised balance between service capacity and SOP compliance, which subsequently can lead to non-COVID patients receiving lesser or postponed care. Given that this is the first time the Malaysian healthcare system is exposed to a pandemic of such magnitude and operating within a new normal, it is valuable to explore how the pandemic has impacted healthcare services in the country. This provides an estimate into the magnitude of backlog cases and extent of underserved or neglected patients that plague the Malaysian healthcare system. Such findings will enable policy makers to plan out measures that dampen the negative impacts suffered by the healthcare system which would eventually help to reduce the collateral damage caused by the COVID-19 pandemic. Moreover, findings from this study will allow policy makers to weigh out the benefits and compromises if a future MCO was declared, and pre-emptively strategise plans that can lessen the impact on collateral damage patients. Hence,

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a study was conducted to determine the impact of the COVID-19 pandemic on the provision of medical, dental, and pharmacy services in Malaysia from the perspective of healthcare providers (HCPs) during the MCO. The study also aimed to determine how these healthcare practices have changed in terms of staffing capacity, time spent with patients, and adoption of methods that help promote physical distancing. Lastly, the study investigated the financial impacts sustained by HCPs working in the private sector during the pandemic.

2. Methods

2.1 Study design and participants

A cross-sectional online survey was conducted between July to October 2020 among Malaysian HCPs of three professional classes, i.e. doctors, dentists, and pharmacists, who were either working in the public or private sector. These three classes were selected because they have autonomy over offered healthcare related services, rendering them influential in determining the operation of studied healthcare services.

Eligible participants included HCPs working in healthcare facilities and other places that are related to providing or supporting healthcare services. A link to the online anonymous Self-Administered Questionnaire (SAQ) was distributed on various social media platforms such as Facebook, Instagram, Twitter, LinkedIn, WhatsApp and Telegram to achieve a heterogeneous sample as much as possible. Associations linked to the three targeted professional groups were also approached to help disseminate the online survey in their social media page. Participants who were approached were also encouraged to share the survey link through their social network to enable a snowball recruitment effect.

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2.2 Study Instrument and Data Collection

We developed a self-administered questionnaire following a literature review of healthcare service delivery during the pandemic. The questionnaire was amended and finalised after undergoing face and content validation with five HCPs from each professional class currently practicing in the targeted healthcare facilities. 10 individuals belonging to each studied population pre-tested the finalised questionnaire. Responses collected from pre-testing were not included in the final analysis. We constructed a web-based electronic version of the finalised questionnaire using the Research Electronic Data Capture (REDCap) application hosted at the Clinical Research Centre based in Penang Hospital, Malaysia [23,24]. The platform was also subsequently used to collect and manage study data. An eligibility screening check-list was incorporated into the questionnaire to ensure inclusion criteria were fulfilled before allowing participants to participate in the survey. The first part of the questionnaire collected socio demographic information, profession, sector (public versus private practice), specialty and workplace. The second part of the questionnaire explored deeper into the impact or changes that the COVID-19 pandemic brought on to the Malaysian healthcare delivery system.

The government decided to initiate lockdown measures on a bi-weekly basis. The first phase of the MCO was launched on the 18th of March to 31st March [8]. The MCO was further extended to two more phases whereby the second and third MCO phase lasted from 1st April to 14th April and 15th April to 28th April respectively. Subsequently, the fourth MCO phase was supposed to run from 29th April to 15th May. However, this phase was cut short following the government's announcement to implement the first phase of the conditional movement control order (CMCO) starting from 4th May to 12th May. This decision was based on the observation that the cumulative case curve was flattening [25]. The CMCO comes with the easing of some restrictions imposed during MCO, along

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with the controlled reopening of the national economy. Since phase 4 consisted of only five days, for the purpose of this study, we decided to merge this period with the third MCO phase.

In order to detect intra and inter phase differences, the second part of our questionnaire investigated the impact and changes in all MCO phases, followed by the CMCO phase. For standardisation purposes, CMCO was labelled as phase 4 of the MCO in this study. The operational hours of the participant's workplace in each phase was inquired. Responses were categorised as either "Fully open", "Partially open", or "Fully closed". Partially open workplaces were defined as workplaces that either shortened operational hours or were incapable of offering certain services which would have functioned normally prior to the pandemic.

Participants were then asked to indicate whether certain changes to services were made during each MCO phase. These included limiting the number of patients or caregivers allowed into their workplace, reducing staffing or staff working hours, shortened patient contact time, providing patients with a longer medication supply and implementing virtual healthcare services. Participants were provided with a "Not applicable" option to select if these surveyed measures were inapplicable at their workplace. We included a brief section in our survey that inquired about changes in demand for both medical and dental services during the MCO. Participants were first asked to indicate which service was most affected during the investigated period. Subsequently, participants were asked about the changes in demand that occurred for several aspects related to that selected service. Responses were categorised as either "Yes, higher demand", "Yes, lower demand", or "No changes". Participants could select "Not applicable" if any particular aspect of the service does not apply to them. Lastly, private sector participants were asked on the existence of financial impacts sustained during the studied period. Affected participants were required to indicate the extent of the financial impact sustained using a sliding scale, with 0% meaning completely unaffected and 100% vice versa. Participants were not mandated to complete the entire survey and allowed to quit midway if they desired.

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Data analysis

Collected data were interpreted via descriptive analysis. We reported categorical variables in frequencies and percentages while continuous variables were reported in means and standard deviations. We reported operational hours during the four MCO phases as an aggregate for medical, dental and pharmacy services. To obtain a deeper understanding on which medical services were particularly affected, we reported operational hours of six different medical disciplines subdivided from medical services. These disciplines were public health, primary care, emergency & critical care, surgery, maternal & child health, and general medical. Public health services included technical and administrative roles associated with research centres, quality units, occupational health, and district health offices. Emergency & Critical care consisted of services related to anaesthesia, intensive care, emergency and trauma. Surgery related services composed of services offered by general surgery, neurosurgery, orthopaedics, ophthalmology, otorhinolaryngology and plastic surgery. Services provided by paediatrics, obstetrics and gynaecology were grouped under maternal & child health. Other medical disciplines such as internal medicine, cardiology, oncology, geriatrics, dermatology and psychiatry were grouped under general medical services.

We also reported in a descriptive manner the proportion of participants reporting the various changes to service provision as previously described, by each medical discipline, dental service, and pharmacy service. Provision of extended medication supply, virtual healthcare service implementation, and financial impact was reported descriptively as an aggregate for the three main health services investigated. We only included disciplines from general medical, maternal & child health, surgical, and primary care when reporting aggregated doctors who implemented extended medication supply provision because these disciplines are involved with prescribing for chronic diseases that require long term medication. We analysed data using R version 4.0.4 [26].

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3. Results

There were a total of 1,154 individuals who responded to our online survey. However, our final analysis only included participants who completed at least until the operational hours section located in the second part of the survey, which totalled 769 participants. Out of these analysed participants, 53.7% of them were doctors, 25.1% were dentists, and the remaining 21.2% were pharmacists. Our sample was not exactly representative of the healthcare professionals present in Malaysia particularly for doctors and dentists, whereby the reported ratio of the three groups studied was 70% doctors, 11% dentists, 19% pharmacist [27]. Table 1 describes the socio-demographics of our studied sample. The average age of our three professions sampled ranged between thirties to early forties. The proportion of males and females was almost equal among the doctors except for dentists and pharmacists whereby they were skewed towards having more females. Most of our participants worked in the public sector. In terms of designation, sampled doctors composed mainly of specialists (42.1%) and medical officers (40.0%), with the remaining being private general practitioners (17.9%). On the other hand, 88.6% of sampled dentists were dental officers, with the remaining dentists being dental specialists or consultants. More than half of our doctor and pharmacist participants work in the hospital, where else about a quarter of them work in primary care clinics. Most of our dentist participants work in dental clinics. Other workplaces that our sample of HCPs worked in included research centres, state health departments, MOH divisions, and non-governmental or private organisations.

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Table 1: Socio-demographic characteristics of survey participants

Demographic characteristics	Doctors (n = 413)	Dentists (n = 193)	Pharmacists (n = 163)
Age (years) ± S.D.	42.1 ±11.0	35.9 ±11.0	32.7±5.2
Gender, n (%)			
Male	208 (50.4)	54 (28.0)	38 (23.3)
Female	205 (49.6)	139 (72.0)	125 (76.7)
Sector, n (%)			
Public	262 (63.4)	136 (70.5)	138 (84.7)
Private	151 (36.6)	57 (29.5)	25 (15.3)
Workplace, n (%)			
Hospital	243 (58.8)	24 (12.4)	95 (58.3)
Primary Care Clinic	139 (33.7)	37 (19.2)	43 (26.4)
Specialist Clinic	15 (3.6)	16 (8.3)	0 (0.0)
Dental Clinic	N/A	115 (59.6)	0 (0.0)
Community Pharmacy	N/A	N/A	15 (9.2)
Others	16 (3.9)	1 (0.5)	10 (6.1)

Figure 1 describes workplace operational hours of the three services studied. In general, service operations were most affected during phase 2 where there was a substantial increase in participants reporting services being partially open. However, all services progressively recovered from phase 3 onwards. Among the three health services studied, pharmacy services remained mostly unaffected throughout the MCO as the proportion of pharmacists reporting undisrupted

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activities ranged from 72% to 85%. Apart from just one pharmacist reporting closure of pharmacy services during the start of MCO, no pharmacists reported cessation of services during the remaining MCO phases. The worst hit sector was dental services, with about 70% of dentists reporting partial operations within the first three phases. The proportion of dentists reporting fully operational dental services ranged between 20 - 23% during this similar period. Almost 15% of dentists reported service closure at the beginning of the MCO. However, there was substantial recovery observed in phase 4, with an approximate 20% increase and reduction in dentists reporting full operations and partial operations respectively. The proportion of dentists reporting service closure gradually declined over the four phases, with only about 3% of them still reporting closure during phase 4. Medical services were more divided in terms of being fully or partially operational. Between phase 1 to phase 3, about 48 – 53% of doctors reported that their service was fully functioning, while 46 – 42% reported partial operations. The situation improved during phase 4 whereby the proportion of doctors reporting fully open services rose to 68% while partial operation responses fell to 29.5%.

When we disaggregated medical service data to analyse the various medical disciplines, we found 17 observations that could not be categorised due to unclassifiable or vague information received from the participants. There was a varied pattern of operations across different disciplines, as shown in Figure 2. Emergency & critical care was the least impacted in terms of operational hours. Across all four phases, at least 80% of doctors reported fully functioning services. The second least affected discipline was general medical services whereby 55 – 62% of doctors reported full functional capacity from phase 1 to phase 3, before rising to 73.2% of doctors in phase 4. Doctors for primary care were somewhat equally divided between being fully or partially operational during the first three phases. This was similarly reflected by doctors from the maternal & child health discipline, except for the third phase, whereby almost 60% of doctors reported fully operational services. However, both these two disciplines saw an additional 16% of doctors reporting fully operational services during phase 4. Surgical services were the most impacted among all the six disciplines. Throughout phase 1 to phase 3, proportions of doctors answering full service operations remained

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below 40% while 60 – 70% of doctors reported partial operations. However, by phase 4, only 36.5% reported partial surgical services while full operations resumed for the remaining 63.5% of doctors. Public health services had a similar response pattern with surgical services, albeit with a much lesser and higher proportion of doctors reporting partial and full operations respectively. Service closure was minimal across the MCO.

The MCO brought forth SOPs which promoted physical distancing and this included limiting the number of patients or caregivers entering the treatment facility. Figure 3 shows that all services complied well with this regulation, with a positive response rate of about 70% and above. The proportion of participants in all services who reported such measures generally increased or remained fairly constant from phase 1 to 3, before starting to decline from phase 2 or phase 3 onwards. This generated a distinct peaking pattern at either phase 2 or 3 in the graph. However, this trend was an exception for primary care and dentistry. Primary care doctor proportions saw a steadily increasing trend from phase 1 to phase 4. On the other hand, dentistry participant proportions remained fairly constant throughout all four phases.

Figure 4 shows a general pattern of decline for reducing staffing capacity or working hours among all services throughout the MCO. Public health was an exception, with the proportion of doctors reporting such measures increasing in phase 4. Dental services were again the most impacted sector, with over 90% of dentists reporting a compromise in this aspect for the first two phases. This proportion declined slightly in phase 3 before dropping to almost half of dental participants in phase 4. The emergency and critical care sector was the least affected in this aspect. Less than 35% of doctors reported reductions in staffing or working hours during the first phase. This proportion steadily declined over future phases until it reached almost 20% by phase 4. About 60% of primary care and 50% of general medical practitioners reported implementing similar measures and this proportion remained relatively constant from phase 1 to 3, before dipping by about 10% in phase 4. Close to 60% of surgical and public health doctors reported compromising workforce

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commitments during phase 1 and phase 2. The proportion of surgical doctors declined from phase 2 onwards and fell over 20% by phase 4. Conversely, proportion of public health doctors reduced slightly by less than 10% in phase 3 before rising back up to about 4% in phase 4. Maternal & child health, and pharmacy services displayed a similar peaking pattern as previously described in Figure 3. The proportion of participants was highest at phase 2 (about 50%), before gradually declining to about 10 - 20% by phase 4.

As depicted in Figure 5, apart from dentistry, primary care, and emergency & critical care, the majority of services saw a peak in the proportion of participants reporting shortened patient contact, counselling or consultation time with service providers in phase 2, before recording a decline over the remaining phases. Dental services were again the worst impacted sector, having nearly 80% of dentists reporting such practices during the first phase. However, this proportion gradually declined to 60% by the fourth phase. Emergency and critical care was the least affected sector, with slightly above 40% of doctors reporting such practices at the beginning of the MCO, and slowly declining to about 35% by the fourth phase. On the other hand, the proportion of participants was higher with primary care, general medical and public health services, which stood at about 50% during phase 1. Pharmacy, maternal & child health, and surgical services had a higher proportion of participants, numbering at about 60%. Apart from primary care which gradually declined to approximately 35% of participants by phase 4, the proportion of participants from all these other services rose further by less than 10% in phase 2, before registering a decline of 15 – 28% of participants by phase 4.

Figure 6 shows the proportion of participants who provided longer medication supplies to patients during the MCO. Over 70% of pharmacists reported performing such measures in the first three phases, but this proportion declined to slightly less than 70% in phase 4. A similar pattern was observed in the medical sector, albeit with a slightly lesser proportion that numbered between 55 –

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60% of doctors in the first three phases. On the other hand, less than 20% of dentists reported practicing such measures.

The proportion of participants who reported providing virtual healthcare services is shown in Figure 7. Less than 20% of doctors and pharmacists provided virtual healthcare services at the start of the MCO. This proportion slowly increased to approximately 25% by phase 4. However, less than one tenth of dentists provided such services throughout the studied period.

Medical and dental services in the private sector were the most financially impacted, as shown in Table 2. Close to 98% of doctors and 87% of dentists responded to being financially affected, with the extent of the negative impact measuring approximately 60% on average. Conversely, only 54.5% of pharmacists responded to being negatively impacted financially. Despite being the group that was least affected, the extent of the impact was the largest, averaging close to 75%.

Lastly, we found that the majority of participants reported a drop in demand for all medical and dental services surveyed, as shown in Appendix A and Appendix B. The decline in demand was most apparent in the first three phases of the MCO. By the fourth phase, the proportion of doctors reporting a higher demand for services increased between 5 - 20%. Dental services recorded an even higher increase in participants reporting higher demand, ranging between 15 - 30%.

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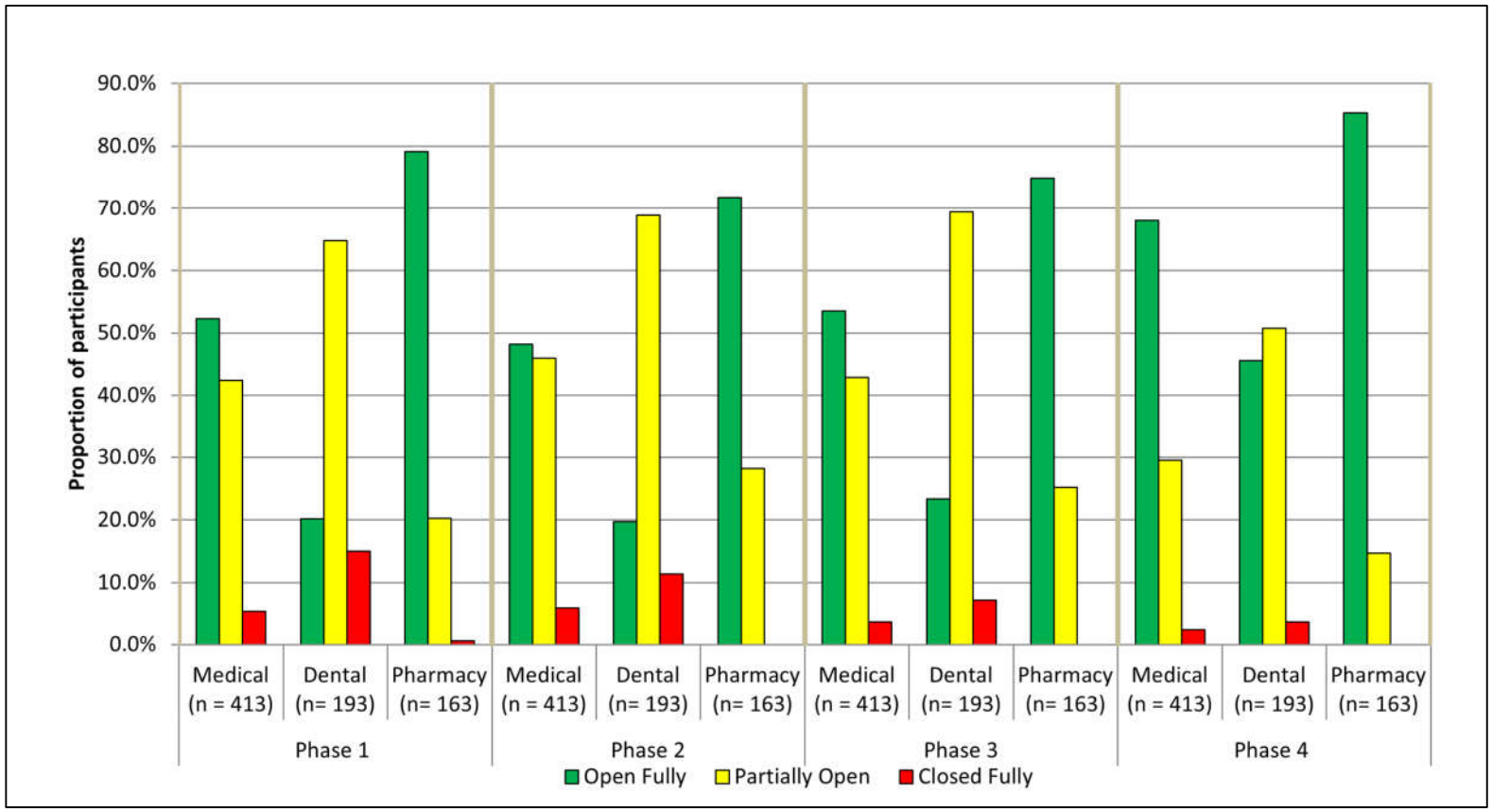

Figure 1: The proportion of participants in medical, dental and pharmacy services who reported length of operational hours over the course of the four MCO phases.

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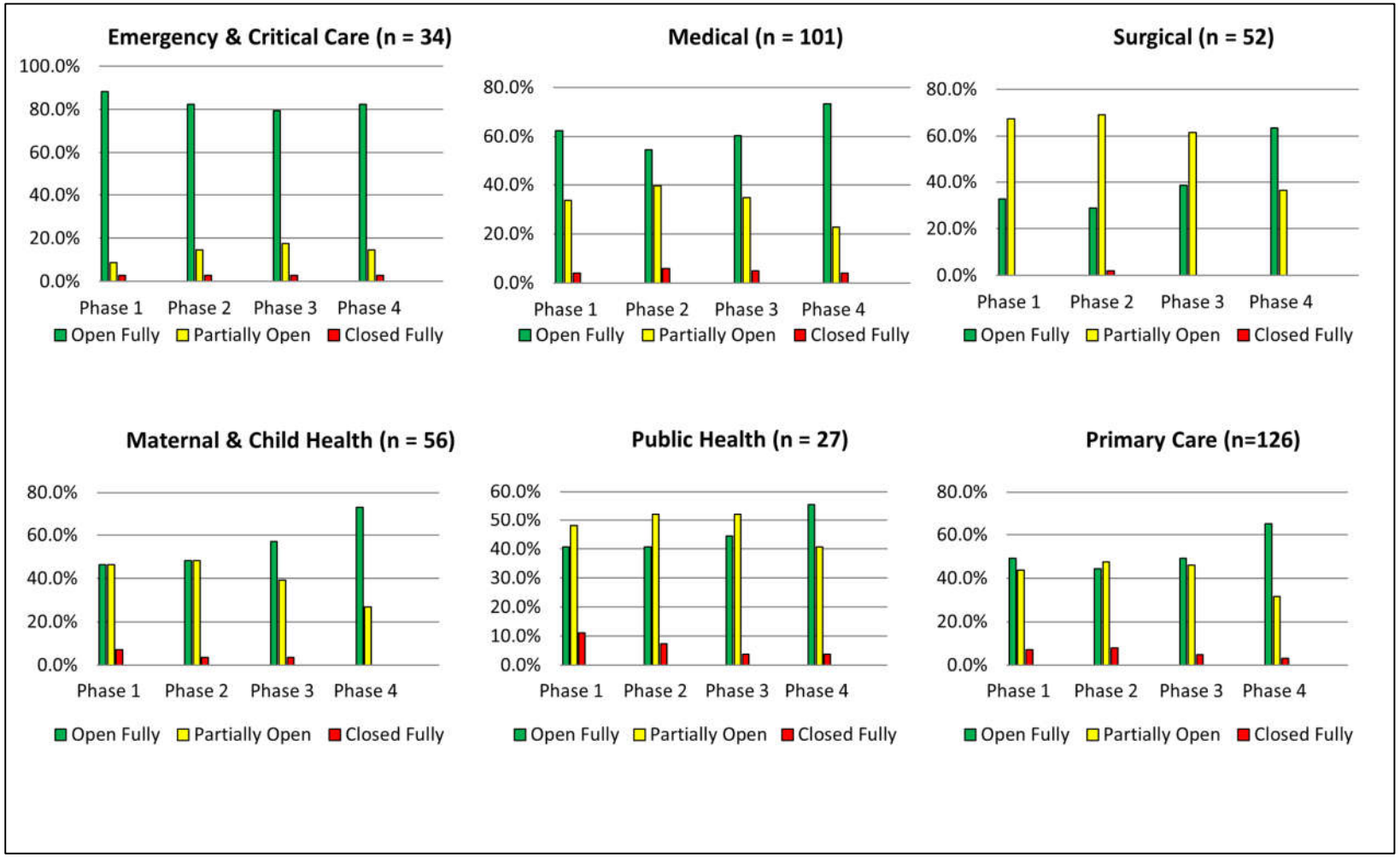

Figure 2: The proportion of doctors from different disciplines in the medical sector who reported length of operational hours over the course of the four MCO phases.

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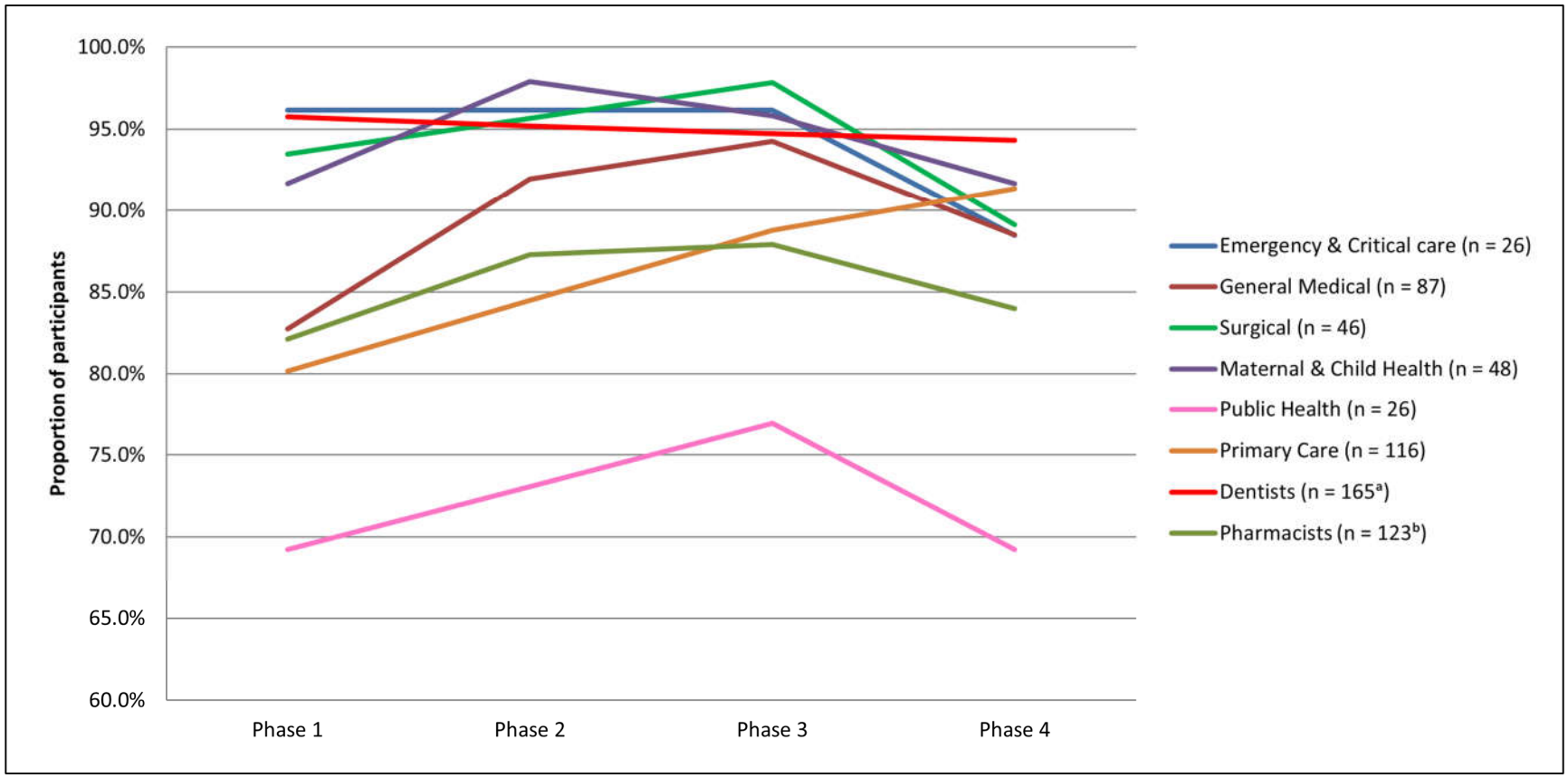

Figure 3: Proportion of participants who reported that the discipline or practice in which they were working in had imposed restrictions over the number of patients and caregivers who were allowed into the workplace, over the course of the four MCO phases.

a. The total number of dentists who answered this section was 165 for phase 1, 167 for phase 2, 171 for phase 3, and 176 for phase 4.

b. The total number of pharmacists who answered this section was 123 for phase 1, 126 for phase 2, 124 for phase 3, and 125 for phase 4.

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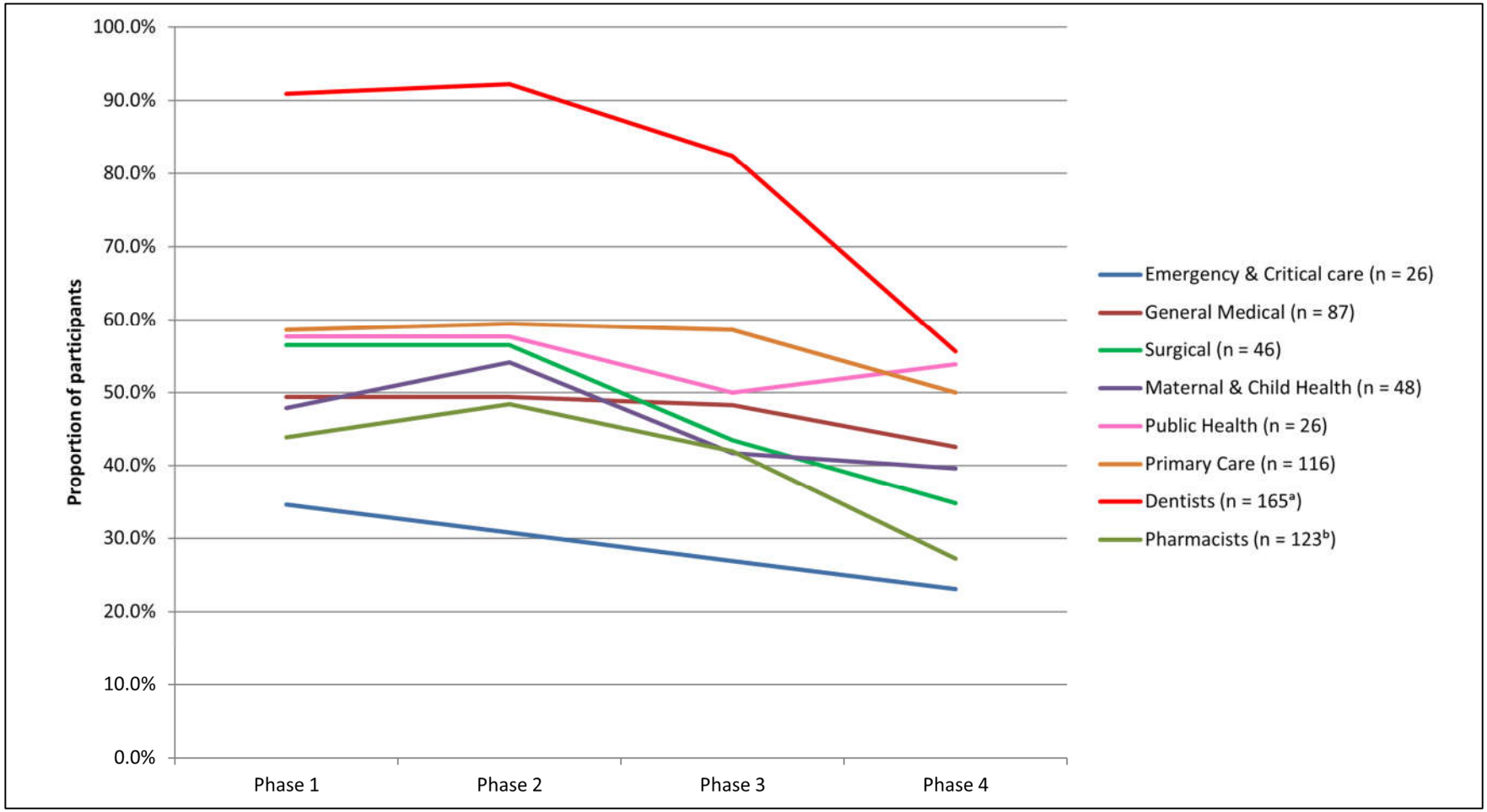

Figure 4: Proportion of participants who reported that the discipline or practice in which they were working in had reduced staffing or staff working hours, over the course of the four MCO phases.

a. The total number of dentists who answered this section was 165 for phase 1, 167 for phase 2, 171 for phase 3, and 176 for phase 4.

b. The total number of pharmacists who answered this section was 123 for phase 1, 126 for phase 2, 124 for phase 3, and 125 for phase 4.

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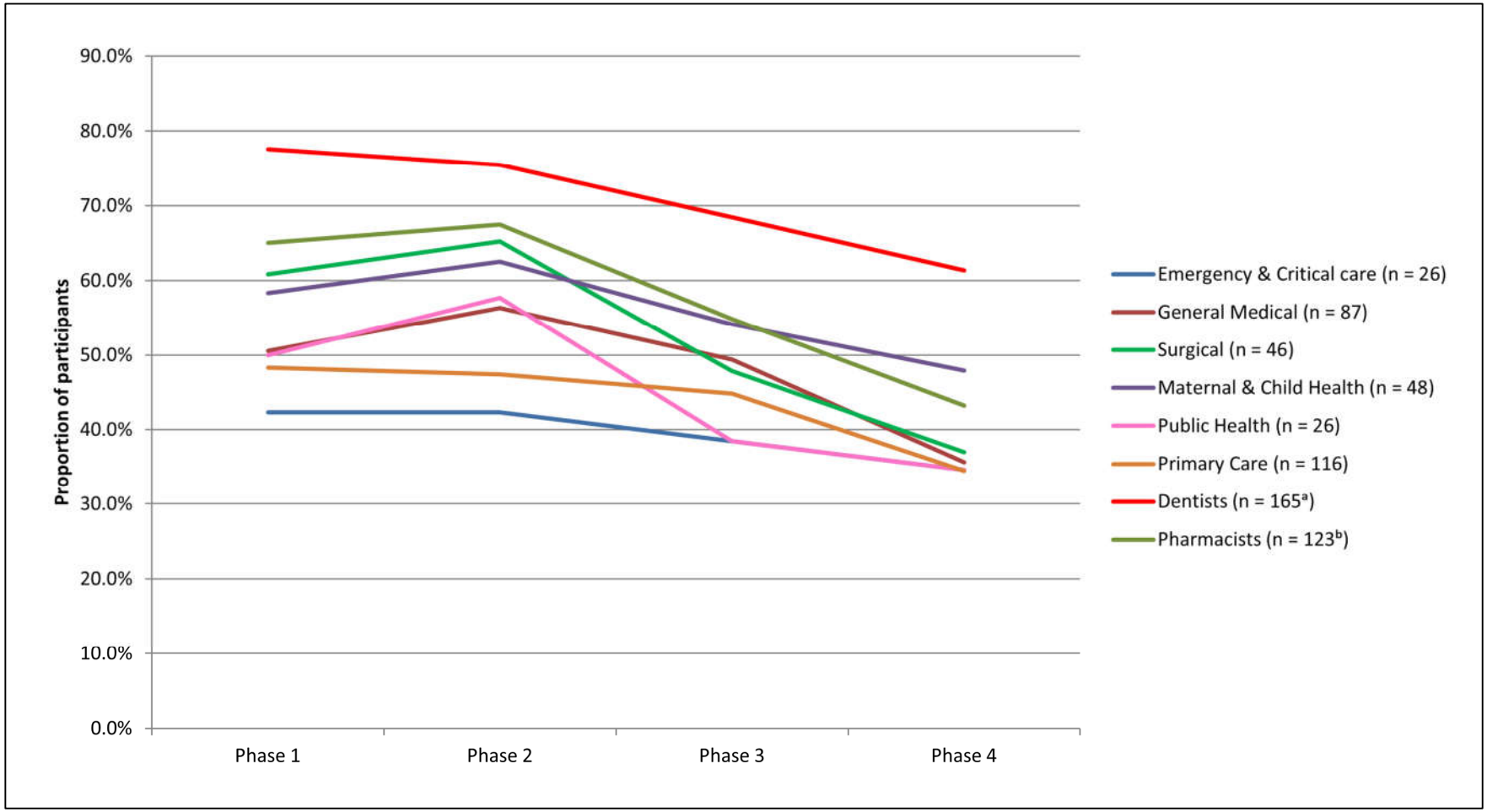

Figure 5: Proportion of participants who reported that the discipline or practice in which they were working in had shortened consultation, counseling or contact time with patients, over the course of the four MCO phases.

a. The total number of dentists who answered this section was 165 for phase 1, 167 for phase 2, 171 for phase 3, and 176 for phase 4.

b. The total number of pharmacists who answered this section was 123 for phase 1, 126 for phase 2, 124 for phase 3, and 125 for phase 4.

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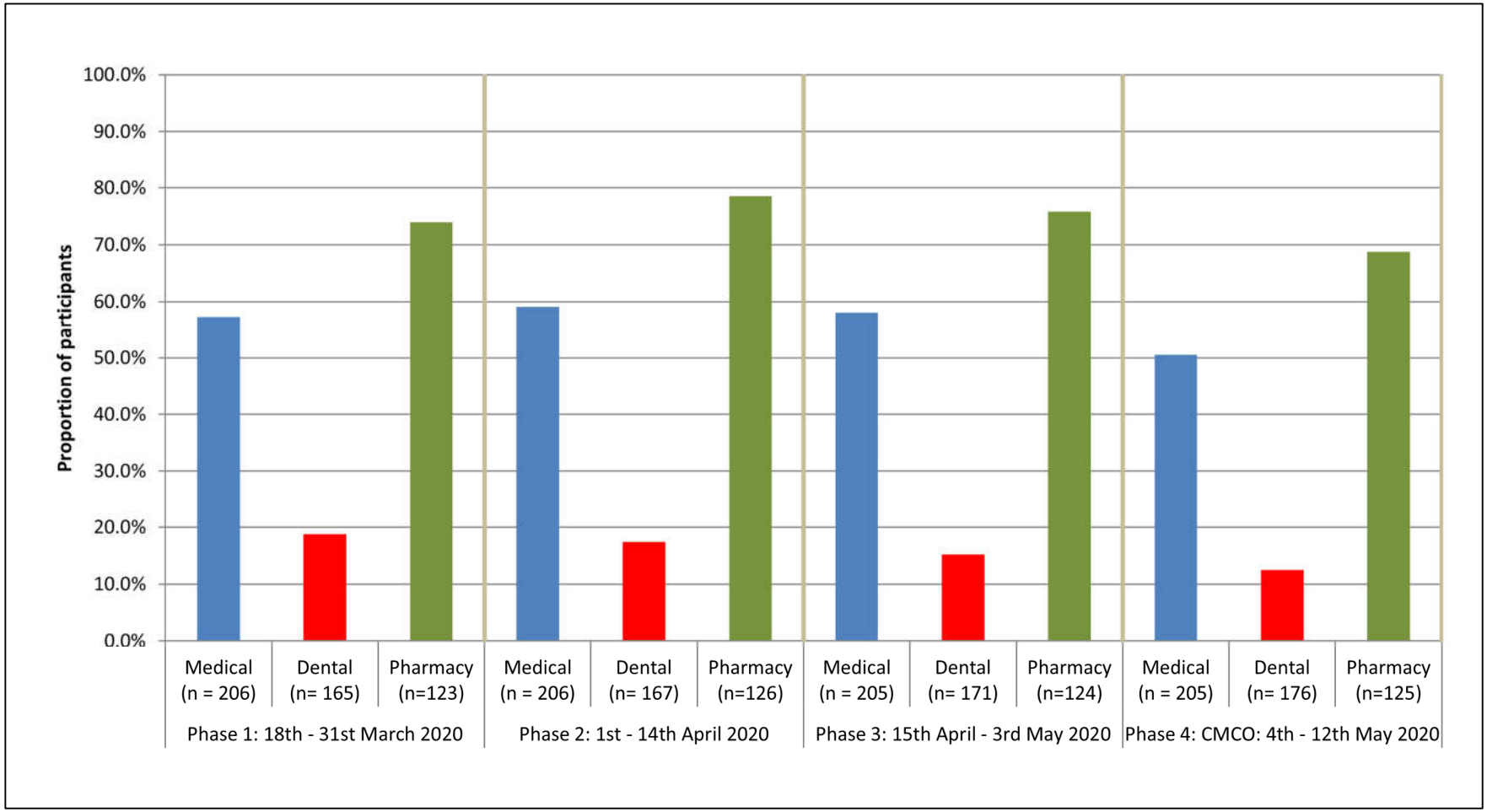

Figure 6: Proportion of participants from each healthare sector who reported providing patients with extended supply of medication, over the course of the four MCO phases.

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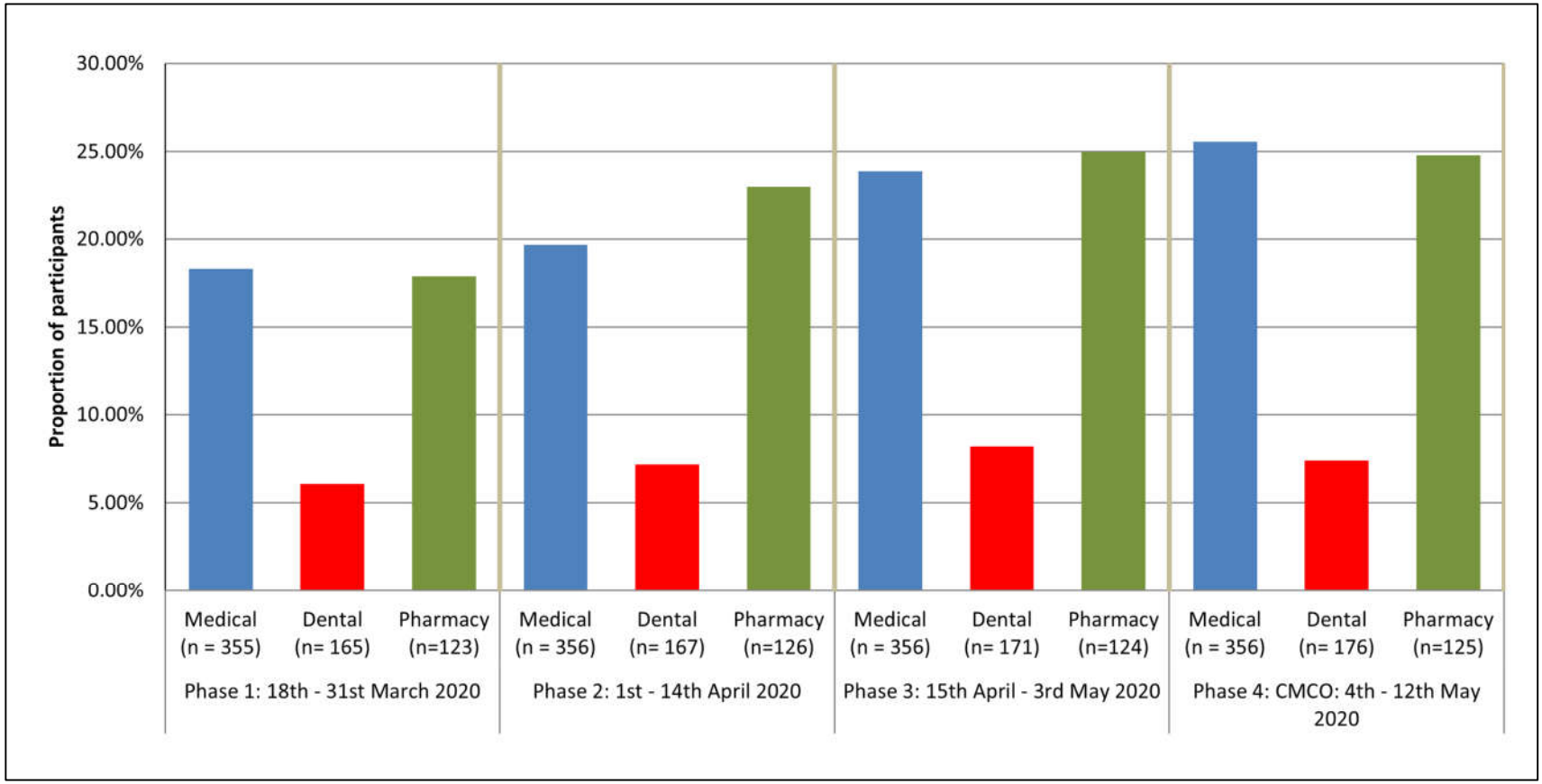

Figure 7: Proportion of participants from each healthare sector who reported implementing virtual healthcare services, over the course of the four MCO phases.

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Table 2: Presence and extent of financial impact experienced by each health professional class in the private sector during the MCO.

	Doctors (n = 141)	**Dentists (n = 53)**	**Pharmacists (n = 22)**
Suffered financial impact (%)	97.2	86.8	54.6
Extent of financial impact (%)	61.5 ±19.2	59.4 ±23.8	74.9 ±17.9

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4. Discussion

4.1 Overall impact on healthcare services

Generally, all healthcare services in Malaysia were affected at various degrees during the MCO. Heightened disruptions occurred during phase 1 and phase 2, after which progressive recovery was observed in subsequent phases. This trend relates to the reported effects seen from mid of phase 3 onwards when the infection curve started to flatten and decline [25]. Recovery was especially apparent during CMCO in phase 4 when strict restrictions were relaxed and number of cases significantly reduced. This could have provided opportunity for resource and staff reallocation within the healthcare system while also conferring healthcare provider confidence to increase operational and staffing capacity for other non-COVID related services. Our results reflect what most other countries experienced when responding to the COVID-19 outbreak. The WHO conducted an international key informant pulse survey which obtained results from 105 countries. Almost all countries reported partial disruptions in the provision of essential health services, with disruptions being greater in lower and middle income nations as compared to higher income nations [28].

4.2 Impact on dental services

Among the three major healthcare services compared in our study, dental services fared the worst in terms of operational capacity. Majority of our participants reported practices being partially operational with significant staffing reductions during the first three phases of the MCO. Moreover, less than a quarter of our participants closed their services during the MCO. This proportion is much lesser compared to a multi country survey which reported over 75% of their respondents shutting down practices [29]. This difference is accounted for by our sample having only 29.5% private sector dentists as compared to the latter survey having 65.5% of a similar group in their sample. Moreover,

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it is also found that private practices had higher likelihoods of being closed compared to public practices as a result of fears from the pandemic [29].

Nevertheless, dental services were severely compromised globally due to safety concerns and fear from the virus [29]. Studies have shown that the COVID-19 virus is primarily transmitted via respiratory droplets [30]. As such, dental procedures which are conducted face-to-face at close proximity with patients for long periods pose a high risk of viral transmission to both healthcare practitioner and patient [31]. Moreover, procedures using surgical and dental drills have been shown to produce aerosol and splatter which may contain blood and microorganisms [32–34]. Hence, the perceived risk of contracting the virus among dentists is high, causing the closure or limitation of dental services to emergency or selective care, as responded by over 80% of Malaysian dentists in a survey [35]. Similarly, other countries such as China, Korea, UK and America have suspended routine dentistry while limiting dental services to urgent or emergency cases [36–38]. Such measures which are largely driven by government guidelines and protocols [39,40] have led to tremendous operational and financial impacts worldwide [28,41],42], which is reflected in the large proportion of our dentists who reported financial losses. Although such measures resonate with the interim guidance issued by the WHO in August 2020 [43], various quarters have expressed their concern over the long term impacts and worsening health conditions that patients may suffer from the sustained lack of routine standard care [12]. Fortunately, our findings show signs of patients coming forward to seek treatment as soon as restrictions were eased, as observed with the substantial rise in demand for dental services when the country entered the CMCO phase.

4.3 Impact on medical services

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Our study showed surgical services to be mostly operating partially during the MCO as compared to all other medical disciplines, which mimics the trend seen with dental services. This similarity stems from surgical procedures sharing very similar characteristics with dental practice in terms of working in close proximity with patients and performing aerosol producing procedures [44]. Interim guidance published by international sources have led to surgical practices globally adapting by using appropriate protective equipment while making special pre-operative, operating room and logistical arrangements to mitigate cross infection [45,46]. Similarly, in response to the pandemic, the Malaysian MOH issued national guidelines detailing necessary precautions required when handling surgical patients [47,48]. Additionally, the guidelines recommend the postponement of elective surgeries to divert resources for the treatment of COVID-19 cases which are expected to flood the healthcare system, especially during lockdown periods. Apart from elective surgery postponement, various surgical sectors in Malaysia have reportedly limited outpatient services to only urgent and semi-urgent case, and prioritised emergency and oncology cases during the MCO [49–51]. A Malaysian general surgery department reported that total surgeries fell by as much as 55% during the first four weeks of the MCO, as compared to a similar period prior to the MCO. Most of this reduction is accounted for by elective operations which fell by 80% [52]. All these measures became key drivers behind surgical services being largely partially operational during the MCO. Similarly, a systematic review that investigated the impact of hospital lockdowns on surgical practices worldwide found that the most common measure adopted by hospitals during the pandemic was cancelling elective surgeries, followed by a reduction or cancelation of outpatient services [46]. Apart from resource conservation, such measures were crucial in an effort to decongest surgical wards which would usually house patients closely together [53]. Given this significant postponement of scheduled operations, it is imperative to have mechanisms that carefully select patients that are fit to be deferred and have their status monitored to ensure that they do not deteriorate.

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Apart from surgical services, a substantial proportion of doctors who provide primary care, maternal and child health, general medical, and public health services did report operating partially throughout the MCO, especially during the first three phases. Similarly, our survey captured considerable reports of reduced workforce in these sectors. Although our survey did not manage to capture the temporal nature of these two factors, efforts made to prepare and respond to the pandemic via facility restructuring, equipment prioritisation and workforce reallocation may have been the driving factor for such trends. Prior to the MCO being declared, the Malaysian MOH had witnessed how China dealt with the initial onslaught of the COVID-19 pandemic. This triggered the MOH to pre-emptively build surge capacity within its current healthcare system to prepare against a possible wave of COVID-19 cases. Health centres and diagnostic facilities were upgraded, spotting an over 80% increment of both laboratory and critical care bed capacity, while about 50% more ventilators were added to the MOH arsenal [54]. During the outbreak and the start of the MCO, these facility upgrades coupled with the steep rise in workload from activities such as contact tracing, mass screening, quarantine, monitoring and treatment, meant that the MOH demanded considerable human resource commitment from medical personnel [55]. As such, the MOH had to reallocate and recruit medical personnel from other service sectors to serve at various COVID-19 dedicated facilities during the height of the outbreak [51,56,57], which would explain the decline in available workforce reported in our results.

Personal protective equipment (PPE) shortages are another factor which may have contributed to the partial operational capacity of services observed in our results. The effectiveness of PPEs at protecting HCPs from viral exposure makes it a critical asset against the COVID-19 virus [58,59]. During the MCO period, there were reports that PPE supply was insufficient as supply chains were disrupted due to the sudden surge in demand globally [60,61]. Such circumstances meant that healthcare personnel had to prioritise PPE towards the COVID-19 cause while conserving and reducing PPE usage in their own respective services. Given the immense preparation and resource commitments necessary to counter against the pandemic's onslaught, the Malaysian government

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had to dedicate substantial public funding while simultaneously receiving aid from other private and non-governmental entities [55]. Such resource diversion may have forced a substantial proportion of the medical fraternity to partially operate by limiting offered services, which is a trend generally observed in healthcare systems globally [28,62,63].

Majority of doctors who offer emergency and critical care services report having no disruptions in operational hours. The WHO pulse survey also found a similar global pattern in which 62% of responding countries reported completely no disruptions to their emergency and critical care services [28]. Partial or complete disruption was only present in 15% of their surveyed sample. Acute and critical care remains a mainstay of the healthcare system when contending with the COVID-19 pandemic [64]. Due to the unpredictable and rapid nature of respiratory function decline among patients afflicted with COVID-19, timely emergency responses coupled with critical care are crucial towards rescuing patients. Hence, such services have to remain largely functional with minimal disruption throughout the pandemic, regardless of the degree of lockdown measures. Although we are uncertain about the extent of COVID-19 cases displacing other critical care needs, studies have observed a notable reduction in demand for other diseases and conditions such as emergency admissions for stroke, trauma, and motor vehicle accidents from "lockdown" effects [65–68]. Despite these reductions, the surge of COVID-19 patients amidst a backdrop of demand by other urgent critical patients has prompted various measures to optimally utilise scarce resources. This includes systematically triaging patients while properly equipping and managing essential emergency and critical care services, especially with regards to scaling-up oxygen supply and providing care to critically ill patients [69,70].

Almost all doctors in the private sector reported suffering negative financial impacts. Our survey revealed that the majority of participants reported a lower demand for all forms of treatment surveyed, which is reflective of the drop in healthcare utilisation among patients globally during the pandemic [71]. This universal decline in demand for healthcare could be the driving factor that

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caused widespread financial losses [72,73]. Many healthcare services globally are also experiencing financial threats due to the pandemic. 97% of surveyed medical practices in America reported experiencing negative financial impacts [74]. Moreover, there is the risk of service closure by small independent service providers which would further jeopardize the healthcare system's capacity and put further burden on public healthcare [75].

4.4 Impact on pharmacy services

Pharmacy services were largely unaffected throughout all the MCO phases, as evidenced by a large majority of pharmacy participants reporting undisrupted services. This observation meant that most pharmacy services remained fully operational during this period, regardless of sector. Pharmacists in the public sector operated as usual because they play a very diverse and crucial role in ensuring multiple auxiliary services remain functional to support patient care and efforts against COVID-19 [76]. For instance, the pharmacy division and its many executive arms were closely involved with managing the supply chain of various critical drugs and consumables that were central towards managing the COVID-19 pandemic in the country [61,77]. Other pharmaceutical services, such as outpatient pharmacy, inpatient pharmacy, and clinical pharmacy were conducted as usual, while taking extra care when handling patients [77]. Any virtual platform that allowed monitoring or counselling of patients remotely was used if the opportunity arose [78]. Essential pharmaceutical care services were modified to ensure undisrupted supply of medication to patients while minimising risk of viral transmission. This included promoting the usage of Pharmacy Value Added Services (VAS) that facilitates medication supply without needing patients to visit the pharmacy [79]. Postage medication, which is one form of VAS, became so popular that the postage volume increased by 3.6 folds during the MCO period as compared to the previous year[77]. Similarly, community pharmacies were allowed to operate throughout the MCO as they were categorised as essential services. Although operational, the number of customers and sales volume was reported to

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be in decline as the MCO phases progressed due to reduced consumer confidence and weaker spending power [80]. Some outlets were even forced to temporarily or permanently cease operations. Such predicaments have led to retail pharmacies sustaining financial impacts that were echoed among our pharmacists.

4.5 COVID-19 response measures among healthcare services

Our survey found that participants from all services generally restricted the number of patients or accompanying persons entering treatment facilities and work premises. However, there were lesser doctors from the public health disclipine reporting such restrictions. This may be due to their services being largely non clinical in nature, hence limiting the need for such restrictions to their work staff if deemed necessary. Neverthless, the large number of participants from clinical related sectors who reported implementing such crowd control measures is a positive sign given that it is in line with international guidance that promotes physical distancing [81,82]. Additionally, a large majority of participants from the medical and pharmacy sectors have reported providing patients with extended supplies of medication to patients. These patients with long term prescriptions were provided with two months' supply or more of medication instead of the usual one month [61,77]. Providing supplies that last longer than usual will help space out appointments or prescription refill schedules, which in return reduced patient load at healthcare facilities. More pharmacists reported implementing this measure since their core duties involve managing patient medication supply and processing medication refills for both old and new prescriptions, with the capability to decide supply duration based on stock levels [61]. Conversely, much fewer dentists supplied extended duration of medication to their patients. This is an expected finding given that treated dental conditions are usually acute and require medication that is used only when necessary or for short durations, such as analgesics, antibiotics and anti-inflammatories [83,84].

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The benefits of virtual healthcare or telemedicine services may not have been fully leveraged in the Malaysian healthcare system, since only less than a quarter of our participants applied such measures. Similarly, only 19.3% of doctors in the Malaysian orthopaedic practice reported implementing virtual healthcare during the pandemic's onset [51]. Although Malaysia enacted the Telemedicine Act back in 1997 to regulate the practice of telemedicine in the nation [85], the adoption of this practice within the healthcare system has not been widespread prior to the pandemic due to challenges that bar it from becoming mainstream [86,87]. A survey conducted in 2018 showed that only 15% of Malaysians had experience using telemedicine to consult doctors, with only 10% having intentions to repeat its use [88]. This generally low usage among Malaysians, coupled with lack of awareness, fear of confidentiality breaches, and infrastructure limitations, are some of the possible reasons for low virtual healthcare usage among HCPs during the early phases of the MCO [51], [89]. Implementation also relies on patient receptivity towards virtual healthcare services, since usage is dependent on digital literacy, infrastructure availability, internet connectivity and patient preparedness in accepting such changes in the way they are treated [90]. Such factors may pose barriers to certain socio demographic groups, particularly the elderly population who ironically require the most healthcare [86,90]. Hence, it is vital that policy makers and healthcare managers spend time addressing enablers and collaborate with international consortiums to foster wide spread virtual healthcare adoption, especially during moments where remote treatment is essential to break viral transmissions [91,92].

Despite a reduction in demand for healthcare services during the MCO, a large proportion of participants still reported spending lesser contact time with patients. Although unmeasured, the diversion of personnel and reduced staffing during the MCO to assist against COVID-19 may have affected healthcare personnel to patient ratio in other services, which could potentially deprive treatment capacity. Similarly during the height of the pandemic in Italy, substantial healthcare resources were diverted towards addressing COVID-19 infected patients. This left negative impacts

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on other healthcare services. A stroke management unit saw shorter hospitalisations and lesser patients completing stroke work-up as a result of interdisciplinary staff shortages, despite lower admissions compared to the previous year [93]. Additionally, reduced operational hours and limiting patient numbers in premises may have further restricted access to services within tight window periods. This would have further exacerbated time constraints that healthcare personnel have with scheduled patients. Apart from logistical factors, doctors may have also limited contact time with patients to restrict viral transmission. A study in India found that doctors were limiting their time spent with patients to curtail viral transmissions, as stipulated in government guidelines [94]. They also found that this situation negatively impacted communication effectiveness between doctor and patient. Although our study did not explore treatment quality, it is possible that this parameter was affected during the MCO given that time spent interacting with healthcare professionals affects treatment outcomes and patient satisfaction [95–97].

Figure 3 to Figure 5 showed peaks in participant proportions occurring during phase 2 or 3 of the MCO, suggesting that services were slow to adapt or respond towards implementing surveyed COVID-19 response measures. Our survey did not capture the reason behind this implementation lag time, but we hypothesized two possible reasons. The first reason is that there may have been a delay in receiving proper instructions to initiate recommended measures. Heads of service providers may have been caught by surprise from the sudden announcement made by the government regarding the MCO implementation. This meant that they required some time to strategise and plan future service conducts only after receiving guidelines and protocols from the top management, thus contributing to a lag time in implementation. Another reason could be that service providers were learning how to adapt their clinical practice to suit dynamic logistical factors based on experiences derived from a previous MCO phase. Qualitative interviews are required to verify these speculated reasons while simultaneously providing in-depth insights into the various motivations behind the many observations found in this study.

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4.6 Limitations

Our study results may not be generalizable to reflect the entire Malaysian healthcare system given the nature of how we collected data through convenience sampling via an online survey. The survey was also initiated when healthcare workers were busy battling surges of COVID-19 cases amidst a period of uncertainty. This may have limited the outreach of our survey link and subsequently affected the number of responses received, particularly in specific disciplines. Additionally, insufficient responses from the private sector prevented us from making fair public-private comparisons. Our sampling method may also have obtained survey participants originating from the same healthcare facility. This means that the proportion of responses obtained for each healthcare service may not accurately depict the impact experienced in those services. Nevertheless, since our participants are composed of a diversified pool of healthcare workers from all over Malaysia and responses are based on consecutive timelines throughout the first four phases of the MCO, our findings are capable of providing an overall gauge on the impact sustained in various service sectors while yielding operational trends during the MCO.

Our findings only reveal the impact of lockdown measures during a period where daily COVID-19 cases were below 1,000. We were not able to project a reliable measure of impact sustained if COVID-19 cases climbed further. The number of daily cases and how it interacts with different degrees of lockdown measures to impact health care services, while determining the threshold capacity before the Malaysian healthcare system deteriorates at various degrees, should be the focus for future studies. Measurable key performance indicators to quantify the magnitude of disruption and recovery experienced by the healthcare system should be utilised [98].

5. Conclusions

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The COVID-19 pandemic has affected the Malaysian healthcare system in terms of service operations, patient treatment capacity, and time spent with patients. This impact was more profound during the first three MCO phases, with signs of recovery from phase 4 onwards when the CMCO was declared. Among all services compared, surgical and dental practices sustained the highest collateral damage while combating COVID-19. Pro-active measures are required to resolve the backlog of cases and monitor patients who are in the waiting list.

The dispensing of longer medication supply and limiting the number of patients or caregivers allowed in healthcare premises were widely implemented to support the practice of physical distancing. However, the usage of virtual healthcare or telemedicine was still uncommon, which could signify a potential gap in effective patient management during a period when treating patients remotely becomes a boon for the healthcare system. Relevant stakeholders should explore practical methods that empower HCPs and patients towards using telemedicine, while simultaneously removing barriers that are hindering its widespread adoption.

Given the dynamic nature of how the healthcare system responds towards restrictions and resource diversion, there needs to be periodic objective assessments of healthcare treatment capacity at various stages of the pandemic. This provides information regarding which patients have their treatment compromised or neglected, so that healthcare managers and policy makers can devise early interventions to help alleviate pressure within the healthcare system. It is crucial that all relevant actors be constantly vigilant about implications garnered through activating levers that prioritise the fight against COVID-19. Being agile and resourceful to adapt based on foresight is key towards maintaining a functioning healthcare system amidst a background of uncertainty.

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Author contributions

Nicholas Yee Liang Hing, Chin Tho Leong, Ramani Subramaniam Kalianan**,** Wei Yin Lim, Ching Ee Loo, and Yuan Liang Woon have contributed to the conception and design of the study. Questionnaire development was performed by Nicholas Yee Liang Hing, Ramani Subramaniam Kalianan**,** Wei Yin Lim and Ching Ee Loo. Chin Tho Leong carried out the statistical analysis. Nicholas Yee Liang Hing wrote the original draft. All authors interpreted the results and critically reviewed the drafts of this manuscript. All authors read and approved the final manuscript.

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Institutional Review Board Statement

Our study was registered under the National Medical Research Register (NMRR) under the following registration number: NMRR-20-1040-54936. The study was ethically approved by the Medical Research Ethics Committee (MREC) of the Ministry of Health, Malaysia. Survey participation was voluntary and no personal identifiers were collected.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study. Participants consented to participation if they clicked on an informed consent button after reading the online survey's introductory section and participant information sheet.

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Data Availability Statement

The dataset used for this study belongs to the Ministry of Health, Malaysia. Hence, the dataset may be available from the corresponding author upon reasonable request.

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Conflicts of Interest

The authors declare no conflict of interest.

Abbreviations

COVID-19 : Coronavirus Disease 2019

SARS-CoV-2 : Severe acute respiratory syndrome coronavirus 2

Appendix

Appendix A: Proportion of doctors reporting changes in demand for various medical services across the four MCO phases.

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Table A1: Proportion of doctors that report changes in demand for medical routine follow-up visits across the four MCO phases.

	ROUTINE FOLLOW-UP VISITS			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 262)**	**% (n= 258)**	**% (n= 263)**	**% (n= 267)**
Higher demand	5.7%	3.5%	9.9%	21.0%
Lower demand	86.3%	91.1%	81.7%	64.4%
No Changes	8.0%	5.4%	8.4%	14.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A2: Proportion of doctors that report changes in demand for medical non-routine follow-up visits categorised as walk-ins across the four MCO phases.

	NON - ROUTINE FOLLOW-UP VISITS : WALK-INS			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 242)**	**% (n= 238)**	**% (n= 243)**	**% (n= 247)**
Higher demand	5.0%	5.5%	7.8%	19.0%
Lower demand	85.5%	88.2%	79.4%	66.4%
No Changes	9.5%	6.3%	12.8%	14.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A3: Proportion of doctors that report changes in demand for medical non-routine follow-up visits categorised as referrals across the four MCO phases.

	NON - ROUTINE FOLLOW-UP VISITS : REFERRALS			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 229)**	**% (n= 225)**	**% (n= 229)**	**% (n= 232)**
Higher demand	7.9%	8.9%	10.9%	16.8%
Lower demand	73.4%	74.2%	66.4%	57.3%
No Changes	18.8%	16.9%	22.7%	25.9%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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Table A4: Proportion of doctors that report changes in demand for inpatient services across the four MCO phases.

	INPATIENT SERVICES			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 90)**	**% (n= 89)**	**% (n= 88)**	**% (n= 89)**
Higher demand	11.1%	9.0%	10.2%	19.1%
Lower demand	88.9%	89.9%	83.0%	66.3%
No Changes	0.0%	1.1%	6.8%	14.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A5: Proportion of doctors that report changes in demand for elective surgeries across the four MCO phases.

	ELECTIVE SURGERIES			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 113)**	**% (n= 112)**	**% (n= 114)**	**% (n= 114)**
Higher demand	8.8%	8.0%	11.4%	21.9%
Lower demand	85.8%	88.4%	84.2%	67.5%
No Changes	5.3%	3.6%	4.4%	10.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A6: Proportion of doctors that report changes in demand for urgent or semi-emergency surgeries across the four MCO phases.

	URGENT / SEMI-EMERGENCY SURGERIES			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 108)**	**% (n= 107)**	**% (n= 108)**	**% (n= 108)**
Higher demand	13.9%	15.0%	18.5%	23.1%
Lower demand	63.0%	60.7%	51.9%	45.4%
No Changes	23.1%	24.3%	29.6%	31.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A7: Proportion of doctors that report changes in demand for emergency surgeries across the four MCO phases.

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EMERGENCY SURGERIES				
	Phase 1	*Phase 2*	*Phase 3*	*Phase 4*
Demand	**% (n= 105)**	**% (n= 104)**	**% (n= 105)**	**% (n= 105)**
Higher demand	12.4%	11.5%	16.2%	19.0%
Lower demand	55.2%	51.0%	42.9%	35.2%
No Changes	32.4%	37.5%	41.0%	45.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A8: Proportion of doctors that report changes in demand for day care procedures across the four MCO phases.

DAY CARE PROCEDURES				
	Phase 1	*Phase 2*	*Phase 3*	*Phase 4*
Demand	**% (n= 86)**	**% (n= 84**	**% (n= 85)**	**% (n= 86)**
Higher demand	9.3%	9.5%	10.6%	14.0%
Lower demand	87.2%	89.3%	84.7%	70.9%
No Changes	3.5%	1.2%	4.7%	15.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A9: Proportion of doctors that report changes in demand for imaging services across the four MCO phases.

IMAGING SERVICES				
	Phase 1	*Phase 2*	*Phase 3*	*Phase 4*
Demand	**% (n= 42)**	**% (n= 41)**	**% (n= 40)**	**% (n= 41)**
Higher demand	16.7%	14.6%	15.0%	22.0%
Lower demand	78.6%	85.4%	77.5%	63.4%
No Changes	4.8%	0.0%	7.5%	14.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A10: Proportion of doctors that report changes in demand for immunisation services across the four MCO phases.

IMMUNISATION SERVICES				
	Phase 1	*Phase 2*	*Phase 3*	*Phase 4*

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Demand	% (n= 46)	% (n= 46)	% (n= 45)	% (n= 47)
Higher demand	0.0%	4.3%	2.2%	4.3%
Lower demand	97.8%	93.5%	93.3%	85.1%
No Changes	2.2%	2.2%	4.4%	10.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix B: Proportion of dentists reporting changes in demand for various dental services across the four MCO phases.

Table A11: Proportion of dentists that report changes in demand for routine follow-up visits across the four MCO phases.

	ROUTINE FOLLOW-UP VISITS			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 142)**	**% (n= 146)**	**% (n= 150)**	**% (n= 156)**
Higher demand	8.5%	5.5%	18.7%	37.2%
Lower demand	83.1%	87.7%	72.7%	53.8%
No Changes	8.5%	6.8%	8.7%	9.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A12: Proportion of dentists that report changes in demand for routine follow-up visits categorised as walk-ins across the four MCO phases.

	NON - ROUTINE FOLLOW-UP VISITS (WALK-INS)			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 130)**	**% (n= 133)**	**% (n= 137)**	**% (n= 142)**
Higher demand	8.5%	9.0%	23.4%	42.3%
Lower demand	78.5%	79.7%	63.5%	40.1%
No Changes	13.1%	11.3%	13.1%	17.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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Table A13: Proportion of dentists that report changes in demand for non-routine follow-up visits categorised as referrals across the four MCO phases.

	NON - ROUTINE FOLLOW-UP VISITS (REFERRALS)			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 111)**	**% (n= 111)**	**% (n= 115)**	**% (n= 120)**
Higher demand	0.9%	3.6%	11.3%	20.8%
Lower demand	71.2%	70.3%	60.9%	50.8%
No Changes	27.9%	26.1%	27.8%	28.3%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A14: Proportion of dentists that report changes in demand for elective surgeries across the four MCO phases.

	ELECTIVE SURGERIES			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 46)**	**% (n= 45)**	**% (n= 48)**	**% (n= 48)**
Higher demand	4.3%	8.9%	12.5%	25.0%
Lower demand	84.8%	80.0%	75.0%	60.4%
No Changes	10.9%	11.1%	12.5%	14.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A15: Proportion of dentists that report changes in demand for urgent or semi-emergency surgeries across the four MCO phases.

	URGENT / SEMI-EMERGENCY SURGERIES			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 34)**	**% (n= 34)**	**% (n= 35)**	**% (n= 35)**
Higher demand	0.0%	2.9%	5.7%	14.3%
Lower demand	76.5%	73.5%	68.6%	57.1%
No Changes	23.5%	23.5%	25.7%	28.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A16: Proportion of dentists that report changes in demand for emergency surgeries across the four MCO phases.

	EMERGENCY SURGERIES			
	Phase 1	***Phase 2***	***Phase 3***	***Phase 4***
Demand	**% (n= 31)**	**% (n= 31)**	**% (n= 32)**	**% (n= 32)**
Higher demand	3.2%	3.2%	6.3%	9.4%
Lower demand	64.5%	64.5%	56.3%	46.9%
No Changes	32.3%	32.3%	37.5%	43.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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