Battling against the great disruption to surgical care in a pandemic: experiences of 11 South and Southeast Asian countries

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ABSTRACT

Objectives The majority of the cancelled elective surgeries caused by the COVID-19 pandemic globally were estimated to occur in low- and middle-income countries (LMICs), where surgical services had long been in short supply even before the pandemic. Therefore, minimising disruption to existing surgical care in LMICs is of crucial importance during a pandemic. This study aimed to explore contributory factors to the continuity of surgical care in LMICs in the face of a pandemic.

Design Semistructured interviews were conducted over zoom with surgical leaders of 25 tertiary hospitals from 11 LMICs in South and Southeast Asia in September to October 2020. Key themes were subsequently identified from the interview transcripts using the Braun and Clarke’s method of thematic analysis.

Results The COVID-19 pandemic affected all surgical services of participating institutions to varying degrees. Overall, elective surgeries suffered the gravest disruption, followed by outpatient surgical care, and finally emergency surgeries. Keeping healthcare workers safe and striving for continuity of essential surgical care emerged as notable response strategies observed across all participating institutions.

Conclusion This study suggested that four factors are important for the resilience of surgical care against COVID-19: adequate COVID-19 testing capacity and effective institutional infection control measures, designated COVID-19 treatment facilities, whole-system approach to balancing pandemic response and meeting essential surgical needs, and active community engagement. These findings can inform healthcare institutions in other countries, especially LMICs, in their effort to tread a fine line between preserving healthcare capacity for pandemic response and protecting surgical services against pandemic disruption.

INTRODUCTION

The Coronavirus Disease of 2019 (COVID-19), officially declared a pandemic by the World Health Organisation (WHO) on 11 March 2020, has brought about unprecedented disruptions to surgical services globally. With a sudden increase, actual or anticipated, in demand for trained healthcare workers, personal protective equipment (PPE) and hospital facilities to treat patients infected with COVID-19, many hospitals were ordered by their governments to cancel elective surgeries to allow for redeployment of surgical teams and repurposing surgical care resources, or voluntarily did so to develop safety measures needed to continue providing surgical care during the pandemic. A study by the COVIDSurg Collaborative published in May 2020 estimated that 28,401,603 surgeries in 190 countries would be cancelled or postponed during the peak 12 weeks of disruption, the minimum duration of disruption as assessed by experts, caused by the COVID-19 pandemic and more than half of cancellations were expected to take place in low- and middle-income countries (LMICs).

Given that unmet surgical needs had been a chronic problem in LMICs even before the COVID-19 pandemic, with the magnitude of the issue ranging from 48% to 87% in the top five regions with the greatest shortages, the large number of cancellations of elective surgeries caused by the COVID-19 pandemic will only exacerbate accessibility issues of surgical care in these countries. As delay in surgeries can lead to morbidity and mortality, striving to maintain continuity of surgical care during the pandemic is especially important for the LMICs.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Qualitative design to contextualise the abstract numbers of cancelled surgeries such as those reported by the COVIDSurg Collaborative.
⇒ Focus on low- and middle-income countries where the shortfall of supply of surgical services preceded the COVID-19 pandemic.
⇒ Inclusion of both public and private healthcare institutions to examine the potential of, and challenges faced by public–private partnerships in maintaining surgical care continuity during a pandemic.
⇒ Lack of data on the impact of the pandemic and response strategies as experienced by the front-line healthcare workers and patients due to the aim to explore pandemic experience from a surgical leaders’ perspective.
Unfortunately, the scale and impact of the COVID-19 pandemic are unprecedented in modern history and there are no established guidelines for the surgical leaders in LMICs to follow to minimise disruptions to surgical care.\(^5\) Systematic analyses of the experiences by healthcare institutions in LMICs are lacking\(^7\) and each institution has to learn from their immediate past experiences. This study sought to bridge this gap by eliciting and analysing the experiences of a set of tertiary hospitals and specialist centres in South and Southeast Asia, which are among the top five regions in the world with the largest unmet surgical needs. Our goal was to bring to light key potential factors contributing to the resilience of surgical care delivery in resource-constrained LMICs during a pandemic. The findings from this study will serve as the basis to formulate hypotheses of effective response strategies to maintain surgical care continuity in a pandemic in LMICs, which will be subsequently tested quantitatively in a follow-up study. The ultimate findings are not only useful for the participating institutions to learn from their collective experiences, but also for informing the response strategies of other LMICs, in and beyond these regions, sharing similar challenges, in the preparation for future pandemics.

**MATERIALS AND METHODS**

A purposive sampling method was adopted to select urban tertiary medical centres from 11 South and Southeast-east countries: Bangladesh, Cambodia, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam. As we sought to capture the unique experiences of surgical care institutions in resource-constrained settings, only countries within the low- and middle-income brackets, as defined by The World Bank, were recruited for the study. The recruitment of the participants was coordinated by the SingHealth International Collaboration Office (ICO), which has existing contacts with the healthcare institutions in these countries. In order to examine how the healthcare system as a whole responded to the crisis of the COVID-19 pandemic, we decided to include healthcare institutions spanning the full spectrum of the disruptive impacts caused by the COVID-19 pandemic—from those whose surgical services were wholly disrupted to those that were only lightly affected. For the same purpose of maximum variation, we also included both public and a small set of private healthcare institutions. In total, the surgical leaders of 30 eligible institutions were invited by email to participate in the study. All the participating surgical leaders held both clinical and administrative appointments at the time of interview.

In-depth, semistructured interviews of the surgical leader(s) of each participating institution were conducted over Zoom in September to October 2020. All interviews were conducted in English except for one, in which an official translator (from the participant’s hospital) was engaged. Each interview was carried out by one of the two study team members trained in the method of conducting qualitative interviews according to an interview guide (online supplemental material 1) in the presence of one or two country representatives from the ICO to introduce the participants and to serve as a translator when needed. The average duration of the interviews was 59 min. A brief survey on pre-COVID-19 surgical capacities and their changes since the onset of COVID-19 (online supplemental material 2) was emailed to each participant before the interview to collect background information on the participating institutions.

All interviews were audiorecorded and transcribed verbatim. The transcription scripts were then analysed manually to identify key themes following the six steps outlined by Braun and Clarke\(^8\) to characterise the impacts of the COVID-19 pandemic on surgical care and key institutional strategies employed to respond to them. The two interviewers began by reviewing the full set of transcripts and familiarising themselves with the data. In the initial analysis, an inductive approach to the coding process was adopted, and the coding was carried out independently by the two interviewers, yielding a preliminary set of codes. The codes were then critically discussed, refined and subsequently crystallised into the final smaller set of themes. This collaborative open coding approach helped in ensuring that the emerging themes were comprehensively explored, assuring rigour of the study findings. The details of the findings will be presented in the next section followed.

**Patient and public involvement**

There was neither patient nor public involvement in this study. The surgical leaders in this study were recruited in the capacity of informants for their experiences in maintaining surgical care continuity during the pandemic.

**RESULTS**

Twenty-five healthcare institutions, coded as H1–H25, from 11 countries (median number of institutions/country=2) participated in this study, of which 18 were public institutions and 7 were private institutions. All except five institutions from five different countries were involved in treating the COVID-19 cases (henceforth referred to as COVID-19-treating institutions). Four of these five institutions were in the public sector and one was a private entity. Seventeen preinterview surveys were returned with six of them fully completed. A summary of the survey results are presented in online supplemental table 1.

In addition to information on surgical capacities collected through the survey, we also retrieved statistics on the severity of COVID-19 for each participating country at the time of the interview from the WHO official COVID-19 dashboard (online supplemental table 2) to provide context for our understanding of the response strategies adopted. The patterns of the impact of, and responses to the COVID-19 pandemic are described in the sections below, with detailed thematic findings in online supplemental table 3–5.
Impact of the COVID-19 on surgical services

First, elective surgeries suffered the greatest disruptions. Only two hospitals were able to maintain normal service provision owing partly to a relatively low national COVID-19 case count, and partly to their national strategies of having a dedicated COVID-treating institution, such that other hospitals could continue to provide normal healthcare services. Ten institutions closed their elective surgeries completely for durations ranging between two months and seven months. Five of these closures were ordered by their respective governments, in a bid to free up hospital resources for treatment of COVID-19 patients; the other five were self-initiated by the healthcare institutions due to a combination of different reasons, namely: shortage of essential manpower, in particular anaesthesiologists, limitation of general ward and intensive care unit (ICU) bed capacities, shortage of operating theatres, inadequate safety measures and protocols, and limited availability of PPE and screening test kits. The reasons were aptly summarised by the study participant from H6 where elective surgeries were cancelled for 3 months ‘mostly due to the decrease in ICU and wards capacity, (and) not enough PPE at the time’ and more importantly, due to ‘the unavailability of screening methods’. The other 13 institutions experienced 20%–80% reductions in the volume of elective surgeries, with 6 of them seeing a reduction of more than 50% for the same set of reasons described above, compounded by nationwide lockdowns and widespread public fear of visiting hospitals.

Second, surgical outpatient services saw a decrease in volume at a scale comparable to that of elective surgeries in all but two hospitals, where an opposite trend was observed. The reduction was partly imposed by healthcare institutions to minimise risk of infection by way of crowd management, and partly contributed by public fear of visiting hospitals during a pandemic. On the other hand, the paradoxical increase in patient volume reported by the two hospitals in this study was attributed to a reversal of medical tourism by affluent patients, due to international travel bans. Another important finding in outpatient surgical care was the increase in complications and severity of presenting conditions seen during consultations, postulated to be caused by delays in seeking treatment.

Finally, most participating institutions saw a brief period of decline in the volume of emergency surgeries mainly during the national lockdowns, but overall the workload of emergency surgeries maintained or increased. All the emergency departments accepted admission of all patients regardless of their COVID-19 status. For the five non-COVID-19-treating institutions at the time of the interview, time-critical emergency surgeries with unknown COVID-19 status were performed in a dedicated operating room/theatre, and non-time-critical emergency surgeries were referred to the designated COVID-19 treatment institutions if the patient was tested to be COVID-19-positive. In general, the participating institutions saw an overall increase in cancer cases, cardiac cases and obstetrics for emergency surgeries, likely due to closures of the respective elective surgical services.

It is worth noting that although surgical healthcare workers were reported to have been infected with COVID-19 in 13 participating institutions, the infections did not emerge as a main reason for the disruption of surgical services, and the sources of infections were often unknown.

Response strategies

Keeping healthcare workers safe and striving to provide essential surgical care emerged clearly as the twin guiding principles for the management of surgical care during the COVID-19 pandemic by all the participating institutions. The commitment that “your (healthcare workers) safety is my first priority” made by the participant from H8 was echoed repeatedly and resoundingly by other participants we interviewed. The keen sense of duty to “fulfil our obligations and responsibilities to help those who are sick, need urgent care” articulated by the participant from H16 was also evident in all the participating institutions’ effort to reach out to patients when they could not or were unwilling to seek hospital care.

Keeping healthcare workers safe

Overall, three themes emerged as key strategies to keep healthcare workers safe: redesigning facilities, implementing new infection control protocols, and attending to staff well-being.

Redesign of facilities

A zoning strategy was commonly used to segregate COVID-19-positive from COVID-19-negative patients. This was achieved by converting a campus, a building, a wing, a floor or multiple floors of a building into a zone or setting up a makeshift facility near the hospital for the management of COVID-19 cases. These zones or makeshift facilities have separate entrances and exits, segregating COVID-19-positive patients from the traffic flow of normal patients. The operating theatres, ICUs and general wards in the COVID-19 zones were re-engineered to be equipped with high efficiency particulate air (HEPA) filters, negative pressure airflow systems, and distinct gowning and de-gowning areas. Most institutions also designated a separate area for COVID-19-probable cases to prevent cross-infection. Doctors and nurses in H10, led by the surgical leader we interviewed, brought the redesign of facilities further by collaborating with technology companies to co-develop mobile isolation wards, screening stations and negative pressure intubation chambers, for additional protection of their healthcare workers working in high exposure risk situations.

Implementation of new infection control protocols

As operating on a patient with COVID-19 without adequate protection can result in catastrophic consequences, all the participating institutions in this study have, at variable speeds, developed and implemented safety guidelines. These guidelines serve to provide a standard on
the appropriate levels of PPE to use in different settings, infection control protocols for performing emergency surgeries and elective surgeries respectively, for inpatient and outpatient visits respectively, and protocols on manpower deployment and staff safety surveillance.

The highest level of PPE was mandated by all participating institutions for staff involved in surgical operations, unless the patient receiving surgery was confirmed to be COVID-19 negative. An initial shortage of PPE was experienced by all institutions at the start of the pandemic, but the supply shortages were resolved within one to three months. Some institutions (H6) reacted to quantity shortfalls by implementing rationing limits of one N95 mask per doctor per day, while other institutions (H23) reported having N95 masks of substandard quality. Thus, it was common for healthcare workers to procure masks of acceptable quality by their own means, to replace or supplement officially issued ones.

Measures to keep operating theatres safe included limiting the number of personnel allowed in theatre during procedures, sequential admission of the surgical team into operating theatre after completion of intubation by the anaesthesiologist, and segregating PPE donning and doffing areas.

It was a standard practice by all the participating institutions at the time of the interview to conduct preadmission COVID-19 screening test(s) for elective surgeries and to perform surgeries only on COVID-19-negative patients. The most commonly used screening test was RT-PCR, administered either to all patients, or to only those at high risk determined by a checklist of symptoms, travel and contact history. However, not all patients in all countries in this study sample could afford the test. As a result, two participating institutions had to admit a small number of patients without undergoing COVID-19 tests and observe for warning symptoms in the wards with extra precautions in place before proceeding with the surgeries. For time-critical emergency surgeries, the operations were generally performed with precautions taken as if the patients were COVID-19-positive. COVID-19 screening tests were performed after surgery to determine the patient’s COVID-19 status and the appropriate treatment was administered accordingly. For non-time-critical emergency surgeries, RT-PCR was also commonly used to ascertain the patient’s COVID-19 status, especially in the high-risk group of patients. There was great variability in the time taken for RT-PCR tests to become available in the participating institutions, ranging from three months to seven months after the start of the pandemic. The availability of adequate RT-PCR tests was found to be one of the key contributing factors to the resumption of elective surgical services during the pandemic.

The protocol of perimeter screening for outpatient visits was very similar across all the 25 institutions, consisting of temperature screening, self-reported symptoms, and declaration of travel and contact history. Two institutions also included oxygen saturation tests to increase their sensitivity in detecting COVID-19-positive cases. The guidelines on staff deployment generally followed both compassion and equity rules, with all healthcare workers taking turns to work in COVID-19 zones with the exception of those of advanced age, having major comorbidities or being pregnant. Split-team work arrangement was also a common practice adopted to prevent cross-infection. In general, regular RT-PCR tests of staff were used only when the risk of infection was deemed high, in an attempt to preserve testing resources.

**Attending to staff well-being**

Ensuring the safety of healthcare workers extended beyond prevention of infection, with many participating institutions taking additional measures in supporting the well-being of their staff. For example, H11 offered free accommodations for its staff to serve quarantine orders after work exposure to COVID-19, thus alleviating their concerns about the safety of their family members. H8 ensured that its staff was paid in a timely manner, in spite of delays in receiving government payment, after the institution was turned into a COVID-19-treating institution overnight. H20 organised donation drives to secure lunch and dinner delivery services for their healthcare workers over a period of two months spanning the lockdown period. Taken together, these actions demonstrated compassionate leadership, which has been shown to be key in forging resilience and solidarity of healthcare workers in the face of the COVID-19 pandemic.

**Reaching out to provide essential surgical care for patients**

With closure and reduction of elective surgeries and outpatient services, compounded by patients’ fear of seeking hospital care, most of the participating institutions had to take a proactive approach to ensure continuity of outpatient surgical care. Many institutions reached out to their patients through mass media and social media, by way of purposefully built telemedicine platforms, and by tapping on existing networks of community health workers. Interinstitutional outreach was also observed, whereby collaborations between public and private healthcare institutions were established.

**Mass media and social media**

Many institutions resorted to mass media and social media to remain connected with their patients when normal surgical care was disrupted abruptly during the height of the pandemic. For example, H7 published the phone numbers of the doctors in the local newspaper for patients to call when it was ordered to close its elective surgeries and outpatient services on short notice. Doctors in many institutions also gave out their personal phone numbers directly to their patients and offered consultations over the phone or social media platforms. At the time of the interview, six participating institutions were also preparing marketing materials to launch a ‘Safe Hospital Initiative’ campaign on mass media and social media, which was aimed at alleviating patients’ fear of hospitals during the pandemic.
Eleven participating institutions looked to telemedicine for provision of outpatient care when they had to reduce their outpatient capacity drastically. However, we found that both the sophistication of the telemedicine platforms and the uptake rate varied significantly across institutions. Only H16 and H20 were on-route to offering full-fledged telemedicine services, and were in the process of setting up dedicated facilities and specialised equipment in their hospitals. H8 offered telemedicine services in the form of a mobile application for communication between their community health workers and medical specialists in the hospital. In spite of the steps taken to set up telemedicine services, the uptake rate of telemedicine by both patients and doctors was generally low in all institutions, with the reasons cited being medico-legal issues and practical constraints such as limited coverage of broadband network or lack of affordable integrated medication delivery services and payment systems. While telemedicine has been reported in the literature to play a non-trivial role in helping healthcare institutions cope with the increased strains and workload during the pandemic, its full benefits are yet to be seen in our study sample of LMICs.

Community health workers
By “bringing them (patients) safely to the hospital, and then taking them back to the community and telling the community that it can be done safely and they do not have to die for want of treatment”, the participant from H8 explained the important role of community health works. Echoed by several institutions, community health workers were found to be an effective method of addressing patients’ fear of visiting the hospital during a pandemic. With the help of telemedicine platforms connecting these community health workers with medical specialists in hospitals, they serve as a proxy to bring specialist care to patients in the comfort of their homes. This was an important contribution to the continuity of outpatient care for patients who were unable to commute to hospitals during the lockdowns of the pandemic.

Outreach between public and private healthcare institutions
When public hospital H21 received a government order to vacate its wards for COVID-19 patients, it entered into a successful financial arrangement with a neighbouring private hospital, which allowed for the transfer of care of non-COVID-19 patients from its wards to the private hospital. Conversely, private specialist centre H17 attempted to reach an agreement with an adjacent public hospital to handle its elective surgeries, when the public hospital was overwhelmed by the demands of COVID-19 treatment. However, the attempt was hampered by the payment system, which had been designed for a healthcare system with rigid separation of public and private providers.

DISCUSSION AND CONCLUSION
This study showed that COVID-19 has caused significant disruptions to surgical care in all participating institutions with the exception of two, which were in countries with dedicated COVID-19 hospitals. These disruptions were multifaceted with multiple driving forces—the sudden increase in the demand of healthcare resources to treat COVID-19 patients, the need for healthcare institutions to adapt their work environment and processes to ensure safety of both staff and patients, and the widespread public fear of hospitals resulting in delayed health-seeking behaviour. While the response strategies employed by the various healthcare institutions were varied in the details, we found that there was clear convergence in the two guiding principles of keeping healthcare workers safe, while continuing to provide surgical care for the sick. We also found that while the pandemic by and large overwhelmed many public healthcare institutions in the study, some private healthcare institutions retained untapped capacity that could be potentially deployed to maintain surgical care continuity on a national level. Taken together, these findings suggest that four potential factors are important for mitigating the disruptive impact of the COVID-19 on continuity of surgical care in LMICs.

First, availability of affordable COVID-19 screening tests and comprehensive infection control measures are fundamental for delivering routine surgical care in a pandemic. Screening of patients and healthcare workers constitute the first line of defence in maintaining COVID-19-free hospital clean zones, while infection control measures (such as post exposure quarantines imposed by H24, strict time and space segregation seen in H3, H21 and H22, and the PPE policies adopted universally by all institutions) act as additional safeguards that minimise undetected virus spread. In practice, we found that although the adaptation of work processes and facilities for infection control were largely within the control of individual healthcare institutions, access to COVID-19 screening kits was managed at the national level, and LMICs are disadvantaged to compete for test kits with high-income countries due to resource constraints. Most of the participating institutions did not have the capacity to conduct RT-PCR preadmission screening tests until May or June 2020. Two institutions (H23, H24) did not have access to screening tests for a protracted period of time till October 2020. The WHO’s programme to supply 120 million rapid tests for COVID-19 to LMICs from October 2020 to March 2021 offers some hope to ease the shortage of screening tests in LMICs. Additional measures by global health agencies are needed to ensure sustainable supply and uninterrupted access in these LMICs.

Second, a whole-system approach in the allocation of healthcare resources facilitates continuity of surgical care by optimising healthcare resource utilisation. Our study showed that while many public healthcare institutions struggled with manpower and resource capacity shortages and were forced to reduce surgical care services to prioritise the care of patients with COVID-19, there remained unused capacity among private hospitals (H16–H19), which could be redirected to ease public sector workload. While ground-up efforts were made to forge partnerships
between public and private healthcare institutions (H14 and H16), the public–private collaboration was not without administrative setbacks and faced mixed reception. While H19, a private institution, took the initiative to allocate 30% of their bed capacity for treatment of public COVID-19 patients, it found ‘much difficulty in getting our private surgeons to accept the cases’ (H19). Despite the barriers, our study seemed to suggest that there was potential value of public–private partnerships among healthcare institutions and highlighted the importance of system preparedness to forge such partnerships for optimal pandemic response and minimising disruption to normal surgical care.

In addition, designating COVID-19 treatment centres and leaving other healthcare institutions to provide routine healthcare services can enable optimal resource allocation between pandemic-related and routine surgical care services, provided that the healthcare system as a whole has the capacity to do so. H2 and H25 were able to offer normal surgical care as a result of the realignment of healthcare services by their governments to centralise the treatment of COVID-19 cases in designated hospitals. This model was recommended by the participants from H6 and H7, upon reflecting on the lessons learnt from this pandemic, citing protection of healthcare workers’ physical and psychological well-being as potential benefits. This view is also echoed by the lessons learnt from the decision-makers and physicians from four designated COVID-19 hospitals in the USA.12 However, implementing this model has potential challenges due to the moral implication of deliberately placing one group of healthcare workers at higher risk than others. To ease the strain on healthcare institutions during a public health crisis, rapid construction of an isolation facility physically separate from the hospital as practised by H19 and the successful experience of Singapore in leveraging on telemedicine to care for the COVID-19 patients without the need for intensive care in purposely built community care facilities13 could be another model to consider without disproportionately increasing the risk of any particular group of healthcare workers.

Finally, community engagement is crucial to maintaining surgical care continuity during a pandemic. Fear-driven delay of hospital visits was a common phenomenon observed by all participating institutions which, left unmanaged, can compound the consequences of COVID-19 on surgical care. Participants from H13, H16 and H24 alike, felt that telecommunication tools and telemedicine have an important role to play in maintaining doctor–patient contact, arranging medical appointments, and also in providing reassurance and medical advice to patients. In particular, participant from H19 reflected that on hindsight “the move to teleconsultation should have been given more push to address the low census for outpatient visits”. Community health workers also proved to be an important bridge between patients and hospitals, and have the added benefit of bringing a personal touch to the engagement process which is much needed in a crisis situation. Participants from H8 and H22 found that by equipping their community health workers with telecommunication tools, they were able to bring specialist care into patients’ homes during the pandemic. Therefore, strengthening community healthcare network alongside enhancing telemedicine infrastructure is important for a resilient healthcare system in LMICs.

We acknowledge the following limitations in this study. First, we only studied the perspectives of surgical leaders and did not include any surgical healthcare workers or patients with surgical needs. As a result, we were unable to appreciate how these two groups made sense of the disruptions of surgical services and the organisational efforts to maintain service continuity amid a pandemic. Unfortunately, we were unable to overcome this limitation due to practical difficulties of recruitment and language barriers of interviews. Second, there is only one low-income country in South and Southeast Asia and we were unable to reach it, which will restrict the generalisability of our study findings to mainly middle-income countries. However, it is plausible to assume that the challenges confronting the middle-income countries are likely to be similarly faced by low-income countries due to their shared economic conditions and shortage of surgical services, and therefore, the response strategies adopted by the participating institutions will be relevant for low-income countries too. Third, the participating institutions were facing different degrees of severity of the COVID-19 outbreak at the time of the interview, which has invariably impacted the availability of resources and hence institutional responses to the crisis. While the exact degree of consensus in response strategies was not examined, and hence remain unquantified in our study, we have found variation in response strategies to be only in the details, with a rather clear convergence in guiding principles among all the institutions. With that in mind, the findings of this study should be applied with considerations of situational variability in future pandemic settings. Finally, we wish to highlight that our intention of adopting the qualitative approach to this study is to generate contextualised knowledge of the impact of and responses to the pandemic, with the aim of capturing a full spectrum of heterogeneous experiences from a set of healthcare institutions facing the same constraints of resource availability. At the point of data collection, the world remained in the thick of the pandemic, rendering it premature to quantify the effects of the institutional response strategies. However, the findings from this study will inform the formulation of specific hypotheses for quantitative testing of these effects in our subsequent quantitative study which will explore the value of various pandemic response strategies in the overall maintenance of surgical care continuity.

To conclude, while it is intuitive that non-essential or non-time-critical surgical procedures should be deferred in the acute phase of a pandemic for the conservation of healthcare capacity, a complete neglect of all surgical services for the purpose of redirecting healthcare...
resources to cope with the pandemic could cause downstream collateral damage, leading to increased mortality or reduction in lifespan as a result of delayed medical care. This qualitative study of the experiences of 25 healthcare institutions demonstrates that availability of appropriate screening tests, adequate infection control measures, realignment of healthcare resources taking a whole of healthcare-system approach and effective patient engagement were potentially critical to ensure continuity of essential surgical services while battling the great disruption of a pandemic like the COVID-19. A follow-up quantitative study in collaboration with the participating institutions in this study is currently underway to test these hypotheses.

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