

## Impact of Coronavirus Disease (Covid-19) Pandemic and Lockdown Over the Pattern of Hospitalisation, Surgical Burden and Changes in the Surgical Practices

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Conflict of interest: Nil

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### Abstract

**Objective:** To quantify the impact of Coronavirus disease (COVID-19) pandemic and lockdown over the pattern of hospitalisation surgical burden and changes in the surgical practices of patients at department of General Surgery, MY Hospital, Indore.

**Methods:** Data pertaining to the hospital admission in department of surgery, MY Hospital, Indore during the period of 25th March till 14th April 2019 and between January 1, 2020 to June 30, 2020 was collected and evaluated for multiple parameters like the duration and cause of admission in the hospital, treatment offered and outcomes. This data was thoroughly assessed and looked for the differences in monthly hospitalisation, disease specific hospitalisation rate, mortality status and other parameters during precovid, covid and post covid era.

**Results:** During covid phase, discharge percentage decreased from 74.70 % to 39.47 %, the LAMA percentage rose from 12.47 % to 31.58 % and death percentage increased from 12.65 % to 27.63 %. The emergency admissions were the major indications for admission during both the phases, however elective admissions fell from 233 (39.89 %) in the non-lockdown phase (2019) to 0 in the lockdown phase (2020). The percentage of non-referred patients increased during the lockdown phase (2020). The difference between the two groups was not found to be statistically significant. Overall conservative management was the most commonly followed approach in both the phases. The percentage of conservative management increased from 42.90 % during the Non-Lockdown phase (2019) to 73.68 % during the lockdown phase. All surgeries performed during the Lockdown 01 Phase were emergency surgeries.

**Conclusion:** The other changes in the surgical practices within the Department of Surgery included significant decrease in the number of elective admissions and elective surgeries, increased preference for conservative management over surgical management, increased preference for regional anaesthesia, a decreased mean duration of stay for a patient in the hospital. Changes noted in surgical practices also included significantly reduced number of laparoscopic procedures. These changes appear to be a response towards the COVID 19 pandemic to prevent the spread of infection within the hospital as well as an attempt to secure the healthcare resources for the mitigation of ongoing COVID 19 pandemic.

**Keywords:** Healthcare Resources, COVID 19 Pandemic, Lockdown phase, Coronavirus disease

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## Introduction

Surgery, as a specialty, is facing a great turmoil in the form of limited resource allocations due to possible diversion of resources to the areas needed more during the pandemic, limited space for patients as beds may get reserved for the care of COVID patients in case of further increase in the number of COVID patients. [1] Staff trained in surgical practice might be allocated the work for the care of Coronavirus patients in case of increasing burden. Surgeons, as a doctors may be needed to come up with the role of administrators and patient caring for the management of COVID positive patients to support the increasing demand of doctors dedicated for COVID patient treatment and care.

Considering the rapid spread of Coronavirus from one person to other and the possibilities of community spread, performing surgeries has new challenges for patients, surgeons and the surgical staff. Challenges are to anticipate the risk of patient being an undiagnosed COVID case and at the same time ensuring proper treatment to the patient and avoiding losses to the patient. This is particularly important to ensure safety of healthcare personnel and at the same time for the safety of surgical patients already admitted in the same vicinity.

All over the world, there has been promotion of approach to cancel all the routine surgical OPDs and all the elective surgeries in order to avoid the risk of exposure to COVID virus infection by limiting personal contacts. This also seems to have an impact of reducing the burden of elective cases over the healthcare system. [2]

With the increasing burden of COVID cases, there is grave need to actually know the impact of COVID and COVID associated lockdown over the spectrum of surgical patients getting admitted to a particular health facility and their surgical needs so as to ensure necessary changes in the healthcare services to avoid wastage and at the same time ensure optimum utilisation of human resources as well as capital resources. Coronavirus disease 2019 (COVID-19), has rapidly spread worldwide, necessitating proactive management decisions from clinicians and centres in an effort to mitigate the risk of infection. In order to focus local resources toward both urgent and non-urgent medical treatment of the over whelming number of infected patients, while ensuring the safety of patients and healthcare staff, elective surgeries have largely been postponed or cancelled. [3]

This study aims to quantify the actual differences in spectrum of patients and their surgical needs to help in giving proper insight about the changes expected and changes necessary to be done in dealing with situations similar to COVID 19 pandemic and lockdowns for the better management in such pandemics.

## Materials and Methods

**Study Design:** Observational Retrospective Comparative Cross sectional Study.

**Study Period:** Retrospective data of 6 months between January 1, 2020, and June 30, 2020; and 21 days between March 25, 2019, and April 14, 2019.

**Funding:** No specific funding was required.

**Study Size:** All cases admitted to department of Surgery, MY Hospital,

Indore between January 1, 2020, to June 30, 2020, and between March 25, 2019, and April 14, 2019.

**Study Population:** All Cases admitted in Department of Surgery, MY Hospital, Indore during the period January 1, 2020, to June 30, 2020, and between March 25, 2019, and April 14, 2019.

**Case Definition:** Patients admitted in the Department of Surgery, MY Hospital between January 1, 2020, to June 30, 2020, and between March 25, 2019, and April 14, 2019.

**Inclusion Criteria:** All patients aged 14 years and above admitted primarily in Department of Surgery during the above-mentioned period.

**Exclusion Criteria:** Patients not being admitted or being treated on OPD basis. Patients below 14 years of age were excluded from the study.

**Consent:** Written consent was obtained from the relatives of patients after explaining them the nature and purpose of the study. They were assured that confidentiality would be strictly maintained. The option to withdraw from the study was always open.

**Methodology:** After the clearance from Institutional Review Board and The Ethics

Committee, the data pertaining to the hospital admission in department of surgery, MY Hospital, Indore during the period of 25<sup>th</sup> March till 14<sup>th</sup> April 2019 and between January 1, 2020, to June 30, 2020, was collected and evaluated for multiple parameters like the duration and cause of admission in the hospital, treatment offered and outcomes. This data was thoroughly assessed and looked for the differences in monthly hospitalisation, disease specific hospitalisation rate, mortality status and other parameters during precovid and post covid era.

The patients admitted between 25<sup>th</sup> March 2019 and 14<sup>th</sup> April 2019 were taken as those admitted during the 21 days Non-Lockdown phase of 2019 and were compared with those admitted between 25<sup>th</sup> March 2020 to 14<sup>th</sup> April 2020, taken as admission during the 21 days of Lockdown 01 phase of 2020. The patients admitted between 1<sup>st</sup> January 2020 and 31<sup>st</sup> March 2020 were taken as admissions during the 3 months of Non Covid phase, these were compared with those admitted between 1<sup>st</sup> April 2020 and 30<sup>th</sup> June 2020 taken as admissions during the 3 months of Covid Phase.

#### Observation Chart

**Table 1: Analysis of total number of patients admitted and their outcomes between (pre- covid) and between (covid phase)**

Outcome Studied	1/01/2020 to 31/03/2020 (Pre COVID)	1/04/2020 to 30/06/2020 (During COVID)	p- value
Discharge	1372 (61.25%)	329 (63.39%)	<0 .0001
Lama	606 (27.05%)	80 (15.41%)	
Abscond	16 (0.71%)	5 (0.96%)	
Death	246 (10.98%)	105 (20.23%)	
Total Admissions	2240	519	

**Table 2: Analysis of indication for admission (elective vs emergency) for patients admitted between (pre- covid) and between (covid phase).**

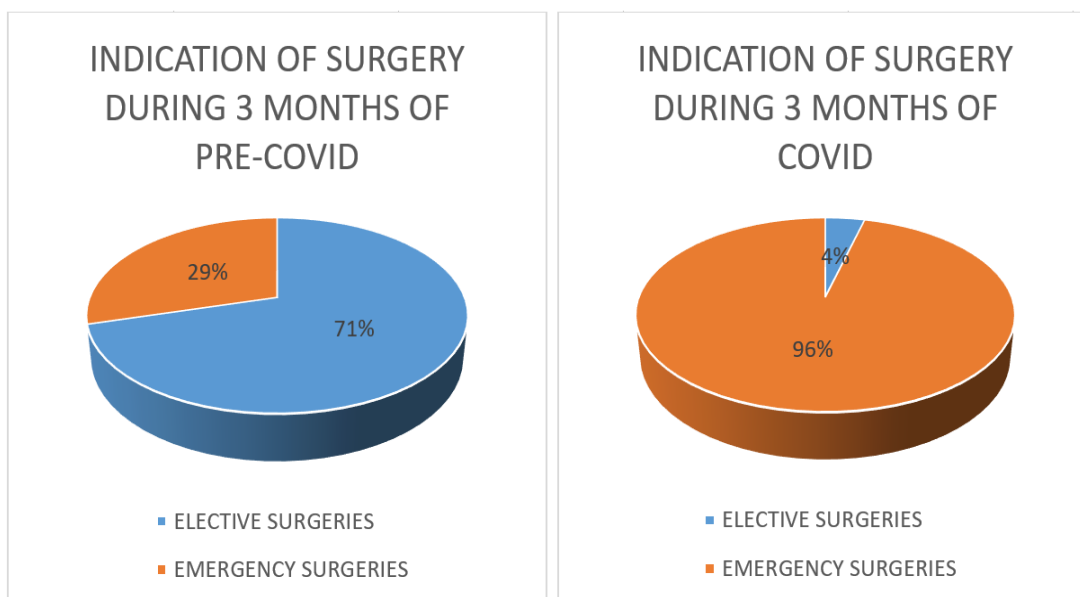
Indication Admission	For	3 Months of Pre-COVID	During 3 Months of COVID	p- value
Elective		666 (29.73 %)	14 (02.69 %)	<0.00001
Emergency		1574 (70.26 %)	505 (97.30 %)	
Total		2240	519	

**Table 3: Analysis of referral status during admission (referred/non referred) for patients admitted between (non-lockdown period) and between (during lockdown).**

Referral Status	Non- Lockdown Phase (2019)	Lockdown 01 Phase (2020)	p-value
Referred Status	305 (52.14 %)	35 (46.05 %)	0.3181
Non-Referred Status	280 (47.86 %)	41 (54.05 %)	
Total Admissions	585	76	

**Table 4: Analysis of type of treatment / management approach (conservative vs surgical) for patients admitted between (pre- covid) and between (covid phase).**

Type Of Treatment Approach	3 Months of Pre-COVID	During 3 Months of COVID	p-value
Conservative	1303 (58.16 %)	344 (66.28 %)	0.0007
Surgical	937 (41.83 %)	175 (33.71 %)	
Total Patients Admitted	2240	519	



**Table 5: Analysis of indication for admission (elective/ emergency) for patients admitted between (non-lockdown period) and between (during lockdown).**

Indication of Admission	Non- Lockdown Phase (2019)	Lockdown 01 Phase (2020)	p-value
Elective Admission	233 (39.89 %)	0 (0 %)	0.0001
Emergency Admission	352 (60.17 %)	76 (100 %)	
Total Admissions	585	76	

**Results**

The table shows a significant decrease in the total number of admissions during the lockdown 01 phase. The patient discharge percentage decreased from 74.70 % to 39.47 %, the LAMA percentage rose from 12.47 % to 31.58 % and death percentage

increased from 12.65 % to 27.63 %. The data analysed was found to be statistically significant.

The emergency admissions were the major indications for admission during both the phases, however elective admissions fell from 233 (39.89 %) in the Non-Lockdown

phase (2019) to 0 in the Lockdown phase (2020). The differences seen in the indication of admissions between both the groups was found to be statistically significant. The total number of referred patients was higher (52.14 %) during the Non-Lockdown phase (2019) while it reduced to 46.05 % during the Lockdown phase (2020). The percentage of Non-referred patients increased during the Lockdown 01 phase (2020). The difference between the two groups was not found to be statistically significant.

Overall conservative management was the most commonly followed approach in both the phases. The percentage of conservative management increased from 42.90 % during the Non-Lockdown phase (2019) to 73.68 % during the Lockdown 01 phase. The variation in the table is found to be statistically significant. During the Non-Lockdown phase of 2019, most of the surgeries were performed as elective surgeries with the total percentage being 62.15 % that fell down to 0% during the Lockdown 01 phase of 2020. All surgeries performed during the Lockdown 01 Phase were emergency surgeries. The data shown in the table is statistically significant.

#### **Statistical Analysis:**

The collected data was summarized by using frequency, percentage, mean & S.D. To compare the qualitative outcome measures Chi-square test or Fisher's exact test was used. To compare the quantitative outcome measures Independent t test was used. If data was not following normal distribution, Mann Whitney U test was used. SPSS version 22 software was used to analyse the collected data. p value of <0.05 was considered to be statistically significant.

#### **Discussion**

The current COVID-19 pandemic and the associated activities like implementation of widespread lockdowns have greatly affected the working of healthcare globally. Here, in this study we studied the

effect of COVID 19 pandemic over the various parameters pertaining to patient characteristics and surgical practices in the Department of General Surgery at M.G.M. Medical College and M.Y. Hospital, Indore. A total of 3344 patient admissions were thoroughly studied for various parameters. Out of these 3344 patients, 2759 patients were those admitted between 1<sup>st</sup> January 2020 and 30<sup>th</sup> June 2020 while the remaining 585 admissions were for patients admitted between 25<sup>th</sup> March 2019 and 14<sup>th</sup> April 2020.

Since the first confirmed COVID-19 case in Indore was identified on 22<sup>nd</sup> March 2020, the patients admitted between 1<sup>st</sup> January 2020 and 30<sup>th</sup> June 2020 were subdivided into two groups, those admitted between 1<sup>st</sup> January 2020 and 31<sup>st</sup> March 2020, labelled as the "Admissions during the 3 months of Pre-Covid Phase" or "Admissions during Pre-Covid Phase". On the other hand, the patients admitted between 1<sup>st</sup> April 2020 and 30<sup>th</sup> June 2020 were collectively labelled as "Admissions during the 3 months of Covid Phase" or "Admissions during the Covid Phase". [4]

Due to the guidelines to avoid elective admissions, only emergency patients were admitted during the Lockdown 01 phase of 2020, resulting in increased in percentage of emergency admissions from 60.17 % during the Non Lockdown phase 2019 to 100 % during the Lockdown 01 phase of 2020. Due to the travel restrictions and strict imposition of lockdown, the percentage of referred patients being admitted decreased from 52.14 % during the Non Lockdown phase to 46.05 % during the Lockdown 01 phase. The percentage of patients being treated by the conservative management increased from 57.09 % to 73.68 % during the Non-Lockdown phase of 2019 and Lockdown 01 phase of 2020, respectively, owing to increased emphasis over conservative management to avoid the increased risk of accidental transmission of Covid infection via surgical approach. [5]

International hospitals and healthcare facilities are facing catastrophic financial challenges related to the COVID-19 pandemic. Economic impact of COVID-19 pandemic on healthcare facilities and systems was studied by Kaye AD et al. Overall, a lack of preparedness was a major contributor to the struggles experienced by healthcare facilities around the world. Items such as personal protective equipment (PPE) for healthcare workers, hospital equipment, sanitizing supplies, toilet paper, and water were in short supply. These deficiencies were exposed by COVID-19 and have prompted healthcare organizations around the world to invent new essential plans for pandemic preparedness. In the future, world will benefit from preparing a plan of action to use as a guide in the event of a disaster or pandemic. [6]

Waseem S et al made a scoping review of the global burden of trauma during the COVID-19 pandemic. The COVID-19 pandemic has necessitated profound adaptations in the delivery of healthcare to manage a rise in critically unwell patients. In an attempt to slow the spread of the virus nationwide lockdown restrictions were introduced. COVID-19 pandemic has caused a reduction in the number of trauma patients; the services managing trauma have continued to function despite infrastructural, personnel and pathway changes in health systems. The substantial effect of the COVID-19 pandemic on elective orthopaedics is well described.

Birkmeyer JD et al studied the impact of the COVID-19 pandemic on hospital admissions in the United States. Hospital admissions in the US fell dramatically with the onset of the coronavirus disease 2019 (COVID-19) pandemic. Health system leaders and public health authorities should focus on efforts to ensure that patients with acute medical illnesses can obtain hospital care as needed during the pandemic to avoid adverse outcomes. [7]

Waters R et al studied the drastic reduction of orthopaedic services at an urban tertiary hospital in South Africa during COVID-19 which were lessons for the future response to the pandemic. The number of orthopaedic surgical cases, emergency theatre patient waiting times, and numbers of outpatient clinic visits, ward admissions, bed occupancies and total inpatient days for January - April 2019 (pre-COVID-19) were compared with the same time frame in 2020 (COVID-19). The COVID-19 timeframe included initiation of a national 'hard lockdown' from 26 March 2020, in preparation for an increasing volume of COVID-19 cases. COVID-19 and the associated lockdown has heavily impacted on both orthopaedic inpatient and outpatient services. Lockdown led to a larger reduction in the orthopaedic trauma burden than in international centres, but the overall reduction in surgeries, outpatient visits and hospital admissions was less. This lesser reduction was probably due to local factors, but also to a conscious decision to avoid total collapse of our surgical services. [8]

The effect of the COVID-19 lockdown on epidemiology, resource utilization, and outcomes at a large urban trauma center was studied by Chiba H et al. This study investigated the impact of the lockdown on the epidemiology and outcomes of trauma admissions. Data collection included demographics, mechanism of injury, prehospital transportation, substance use, injury severity, resource utilization, and outcomes. Trauma deaths were reduced by 27.9%, and the crude overall mortality was significantly lower during the lockdown period (4.1% vs. 5.9%,  $p = 0.046$ ). Intensive care unit admission rates, mechanical ventilation, and intensive care unit length of stay were all reduced. The COVID-19 lockdown in 2020 had a significant effect on the epidemiology, clinical characteristics, and critical care resource utilization of trauma admissions in a large academic trauma center. These

findings may help in planning and optimization of hospital resources during the pandemic. [9]

A systematic review was done by Riera R et al on delays and disruptions in cancer health care due to COVID-19 pandemic. People with cancer may experience disruptions or delays in health services. This systematic review aimed to identify the delays and disruptions to cancer services globally. The selection, data extraction, and methodological assessment were performed by two independent reviewers. The studies identified 38 different categories of delays and disruptions with impact on treatment, diagnosis, or general health service. The remarkable frequency of delays and disruptions in health care mostly related to the reduction of the COVID-19 burden unintentionally posed a major risk on cancer care worldwide. Strategies can be proposed not only to mitigate the main delays and disruptions but also to standardize their measurement and reporting. As a high number of publications continuously are being published, it is critical to harmonize the upcoming reports and constantly update this review.

Sevalie S et al studied the impact of the COVID-19 pandemic on hospital utilisation in Sierra Leone. The largest decreases were in surgical admissions, a 49.8% decrease ( $p < 0.001$ ) and medical admissions, a 28.7% decrease ( $p = 0.002$ ). Total operations decreased by 13.9% ( $p < 0.001$ ). Mean weekly referrals were lower in Q2 and Q3 of 2020 compared with 2019, suggesting findings were unlikely to be seasonal. Qualitative analysis identified both supply-side factors, prioritisation of essential services, introduction of COVID-19 services and pausing elective care, and demand-side factors, fear of nosocomial infection and financial hardship. The study demonstrated a decrease in hospital utilisation during COVID-19, the decrease is less than reported in other countries

during COVID-19 and less than reported during the Ebola epidemic.

Pandemics and measures undertaken against them may cause changes in behavior; therefore, changes in injury patterns during the coronavirus disease 2019 (COVID-19) outbreak can be expected when compared to the parallel period in previous years. The aim of this study by Rozenfeld M et al was to compare injury-related hospitalization patterns during the overall national lockdown period with parallel periods of previous years. The lockdown period of the COVID-19 outbreak led to a significant decrease in number of patients hospitalized due to trauma as compared to parallel periods of previous years. Nevertheless, trauma remains a major health care concern even during periods of high-impact disease outbreaks, in particular due to increased proportion of severe injuries and surgeries.

Further, the changes in the surgical practices and surgical burden over the Department of General surgery at M.Y. Hospital Indore not only influences the working of Department, but it might also have its effects over the ongoing surgical residency programmes currently running at the institution. The short term and long-term effects of such incidences over the ongoing surgical training programs and surgical trainees needs to be studied in detail in further studies.

### Conclusion

The total number of patients admitted decreased significantly due to the current COVID 19 pandemic and the imposed Lockdown, partly due to the change in surgical practice of giving preference to emergency cases for admissions and partly to the reduction in the number of patients reaching hospital for admission due to decrease in the number of trauma outside the hospital and the reduced number of referral made to our hospital due to the

imposed restrictions over free mobility due to Lockdown.

**Limitations:** The current study has only undertaken the accounts of patients admitted to Department of General Surgery at M.Y. Hospital, Indore between January 1, 2020 and June 30, 2020; and 21 days between March 25, 2019 and April 14, 2019. Despite of being the largest functioning tertiary care hospital of Indore, several cases may have been diverted to other nearby hospitals or many patients may have been treated at other levels of healthcare. Therefore the findings observed in our study, only reflect the experience of single hospital and cannot be reflected over the entire population. Further the COVID pandemic being a recent and an ongoing pandemic and the imposition of mass restriction measures like Lockdown over such a large population, for such a long period of time have not been witnessed in the recent past, resulting in a paucity of similar studies to compare our results

#### **Declarations:**

**Funding:** None **Conflicts of interest/Competing interests:** None **Availability of data and material:** Department of General Surgery at M.Y. Hospital, Indore **Code availability:** Not applicable **Consent to participate:** Consent taken **Ethical Consideration:** There are no ethical conflicts related to this study. **Consent for publication:** Consent taken

**What this Study Add to Existing Knowledge** The other changes in the surgical practices within the Department of Surgery included significant decrease in the number of elective admissions and elective surgeries, increased preference for conservative management over surgical management, increased preference for regional anaesthesia, a decreased mean duration of stay for a patient in the hospital. Changes noted in surgical practices also included significantly

reduced number of laparoscopic procedures. These changes appear to be a response towards the COVID 19 pandemic to prevent the spread of infection within the hospital as well as an attempt to secure the healthcare resources for the mitigation of ongoing COVID 19 pandemic. The lockdown and restriction of free mobility of citizens itself directly appears to have resulted significant drop in the number of trauma cases mainly road traffic accidents and assaults.

#### **Contribution by Different Authors**

**First author:** Jitendra Singh Yadav Senior Resident, Department of Surgery GRMC Gwalior; References and Discussion

**Second author:** Dr Khushal Rao Hurmade Senior Resident, Department of General surgery, AIIMS, Bhopal; References and Discussion

**Third author:** Dr Gajendra Dandotiya Senior Resident, Department of CTVS NSCB Medical college, Jabalpur; Data collection and statistical analysis

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