Original Research Article

COVID-19 pandemic: impact of lockdown and hospital classification on neurological patients

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ABSTRACT

Background: COVID-19 pandemic has impacted human life by the steps taken to mitigate it. The restriction of movement and earmarking hospitals exclusively for catering to the COVID-19 patients might have affected the health of non-COVID-19 patients adversely. This study was aimed to assess the impact of lockdown and hospital classification in neurological patients.

Methods: This study was conducted in the Department of Neurology in a 1000 bedded teaching hospital which has been earmarked as COVID dedicated hospital (the red hospital). The patients who attended the outpatient department and discharged from the Neurology department, prior to the lockdown, were contacted telephonically and asked to report their difficulties, if any, in the procurement of prescribed medication, medical consultation, monitoring drug side effects, and symptom control, etc. Patients were grouped into those who needed close surveillance and routine follow up.

Results: Out of 1201 patients 646 could be reached. The average age of our population (n=646, female 56.4%) was 39.63 ± 15.52 years. In the study group, the prescription breach was found in 343 patients (53.10%), management breach was in 449 (69.50%), confidence breach was in 398 (61.61%) and adverse effect on drug availability was found in 330 (53.10%) patients. In the close surveillance group (n=420), the patient's health was deemed to be at risk in 328 (78.10%) patients as compared to 161 patients (71.24%) in routine follow up group with a significant p value of 0.05.

Conclusions: Our results suggest that lockdown and classification of hospitals to cater exclusively to COVID-19 patients has significantly ill-affected the health of the non-COVID subjects.

Keywords: COVID-19 pandemic, Lockdown, Impact of lockdown on health, COVID-19 hospital classification, Health delivery system in COVID-19, SARS-CoV-2

INTRODUCTION

There were several unexplained cases of fever with upper and lower respiratory tract symptoms including pneumonia increasingly being reported from Wuhan, China.[1] The agent responsible for this outbreak has been confirmed to be a novel virus, the novel SARS-CoV-2 virus.[2] The ongoing pandemic of COVID-19, a disease caused by the novel SARS-CoV-2, is now a global public health emergency.[3]

To fight pandemic India, on 24 March 2020, resorted to the lockdown for the betterment of public health, however, restriction of movement and public transport unavailability hampered the patients follow up. This unprecedented and sudden change in the health delivery system included classifying a hospital into the red (those allowed to cater exclusively to the laboratory-confirmed COVID-19 cases) or the yellow (those earmarked to cater only to the suspected cases of COVID-19 or the green

(reserved for non-COVID patients). The routine patients were suddenly orphaned and unable to take follow-up to their long known physicians because of this classification. One recent study from China supports the need to pay attention to the health of people who were not infected by the virus, especially for people who stopped working during the outbreak.[4]

Further, in cities, the underprivileged population routinely utilizes the low-cost health services provided by the local practitioners and rural-based medical college hospitals. Suspended transport facility, closure of private practices, and classifying rural-based medical college hospitals as a red category, in particular, might have affected the health of the person with chronic medical conditions requiring meticulous monitoring. One study from France stated a decrease in 26% of all emergency department visits during the lockdown, which comprises a decrease of 34% of strokes, 32% of transient ischemic attacks, 36% of seizures, 64% of unstable angina, and 42% of appendicitis.[5] It is known that regular follow-ups are imperative for the patients and have a pivotal role in keeping their well being. A study conducted in 2016 at WellSpan York Hospital for ischemic stroke between October 2012 and June 2013 suggested that neurology follow-up at any time for patients with acute ischemic stroke may reduce short-term readmissions. Those patients who never attended their neurology follow-up appointment trended toward an increase in readmissions at 0 to 30 days.[6] A study in 2010 found that the patients who were hospitalized and discharged for heart failure from hospitals with higher early follow-up rates had a lower risk of 30-day readmission.[7] Early post-discharge follow-up may help to minimize gaps in understanding of changes to the care plan or knowledge of test results, as the study shows 65% of patients who were readmitted within 30 days missed their recommended outpatient appointments in the stroke clinic.[8]

This study is designed with objective to bring out the potential impact of lockdown and hospital classification to deal COVID-19 pandemic, upon the health of the non-COVID i.e. routine patients. There was no such study on neurological patients reported from India in this pandemic of COVID-19.

Aims and objectives

Aims and objectives of the study was to correlate the impact of lockdown and hospital classification with age and gender in routine patients, with accessibility to hospital and disease type in routine patients; to assess the impact of drug availability (dose and brand) on the health of routine patients and to assess the patient's awareness about hospital classification and the willingness among routine patients to follow up in the designated red zone COVID hospital.

METHODS

This is an observational, cross-sectional survey-based study conducted in the Department of Neurology at SAMC and PGI, Indore. Our hospital being red zone hospital is a dedicated COVID-19 hospital. The data was collected from successive patients who had consulted in the outpatient department and inpatients discharged from December 2019 to March 2020 (before the lockdown was implemented). They were telephonically contacted and after explaining the purpose of the call and obtaining verbal consent, a pre-formed questionnaire made by faculty members of department of Neurology of SAMC and PGI, Indore, was read out to them and they were asked to respond at their free will and their answers were used anonymously for the same. The patients who were not willing to answer were considered non-consenting and thus excluded from the study. Questions were designed in a way to understand the impact of lockdown on patient's health either due to the non-availability of needed prescription for medicines, changing pharmaceutical brands, and missing the required follow up. Patient-related variables were collected including patient age, gender, and residence. The diagnosis of the patient was recorded. Questions were asked about symptoms/health of patients and their family members, ease of availability of prescribed drugs in terms of doses and brands, approachability of treating doctor/hospital by the patient, follow up. Further, the patients' awareness about hospital classification (into red, yellow, and green for COVID-19 pandemic management by local administration of the city) and their willingness to follow up in red zone hospitals were asked.

The patients were divided into two groups i.e. close surveillance group and routine follow-up group. The close surveillance group included patients who needed close monitoring of their disease, monitoring for side effects of prescribed drugs and their dose modifications and it included patients with the diagnosis of stroke, epilepsy, headache with red flag signs, radiculopathies, neuropathies, peripheral vertigo, and others requiring close follow-ups for their monitoring. The routine follow-up group included patients of primary headache, neck pain, back pain, myofascial pain, and others who do not require close follow up and called routinely after 2-3 months.

Performa A questionnaire (attached as Annexure 1) mainly consisted of questions focusing their symptom control, drug availability, awareness of hospital classification, last follow-up, follow-up outside, and patient's control of their co-morbidities, and patient perception of impact on health due to lockdown.

Then Performa B (attached as Annexure 2) was filled by us based on the classification in two groups i.e. close surveillance needed (assessed by the investigator/doctor based on the diagnosis of the patient and the treatment prescribed to the patient) vs. routine follow up group,

Prescription breach defined as any reduction in dose, change in brands or molecules being taken by the patient or any discontinuation (permanent/temporary) of the prescribed drugs. Management breach defined as denoting any breach in the management protocols needed for a patient to remain in good health and will include, monitoring prothrombin time/international normalized ratio (for those on anticoagulants), monitoring of blood pressure and sugar, doing physiotherapy, monitoring of patients on immunosuppressive therapy (as per relevant diagnosis). Confidence breach defined as for any difficulty faced by the patient is visiting the doctor personally/physically in case he wants to and is forced to either change the doctor or consult on phone. Patient health at risk was defined as assessed by the investigator/doctor and if the answer to any one of the questions in 2,3,4,5 is yes, then this will be answered as yes. The faulty perception was defined as - if there is a discrepancy in the answers of questions 6 and 7, which will be deemed as faulty perception.

The data were tabulated and statistically analyzed with appropriate statistics. Statistical software, SPSS version 17.0 trial was used for analysis. The non-parametric test, Pearson's Chi-Square test, Student T test used to investigate the association. Comparison of means and proportions also used to see the associations.

Patient's identity confidentiality and anonymity have been maintained. The study has been approved by the research and ethical committee of our institute.

RESULTS

Out of 1201 contacted patients, communication could be established with 646 patients (Figure 1). The average age of our population (n=646) was 39.63±15.52 years with a minimum age of 5years and a maximum of 86 years. The mean age of the male group was 42.16±16.97 years and

in the female group was 37.42±13.77 years. In this study population of 646 patients, 301 patients were males (46.59%) and 345 patients were females (53.41%), this difference in proportion being statistically significant with a p value of 0.014 (95%CI=1.37-12.22). There were 263 patients (40.71%) from rural areas, 383 patients (59.29%) from an urban background, 430 patients were locals and 216 were outsiders (Table 1).
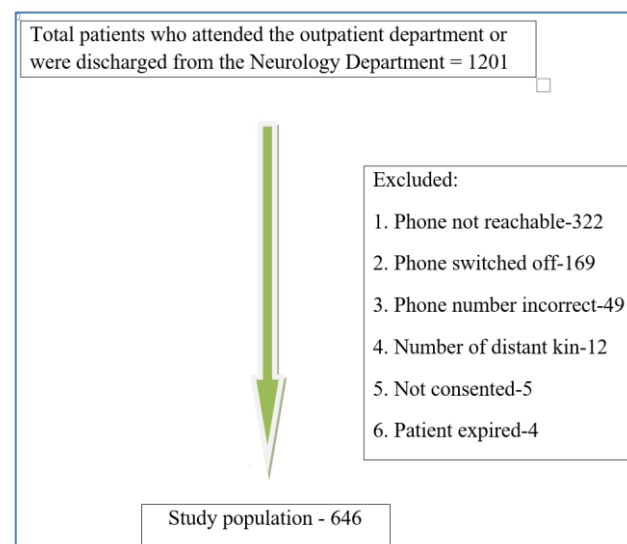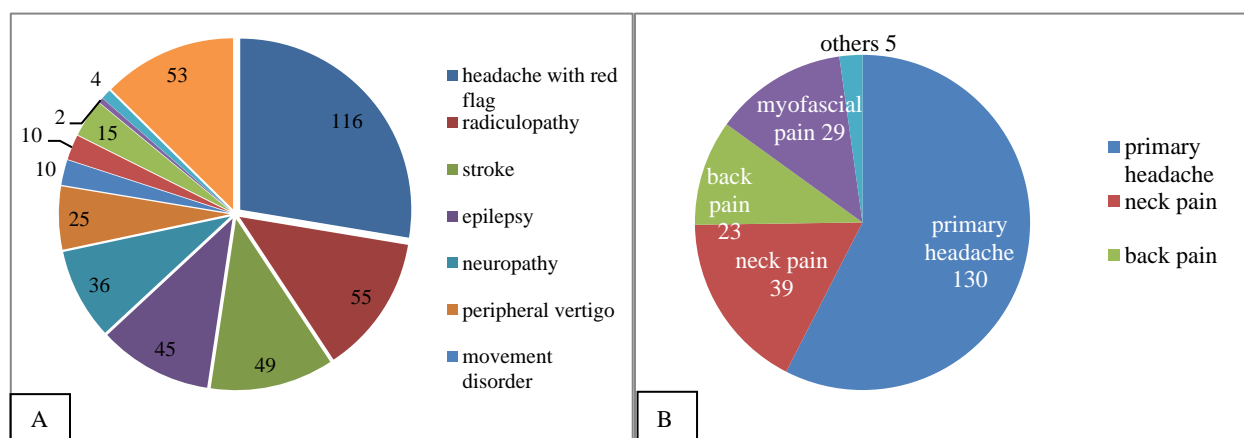

Figure 1: Study population.

In the study group, a prescription breach was found in 343 patients (53.10%), a management breach was seen in 449 (69.50%), the effect on drug availability was found in 330 (53.10%) and confidence breach was seen in 398 (61.61%), hence all these breaches indicates towards affected health of patients. The mean age of the patients in the ill-affected group (n=489) was 39.43±15.54 yrs. Females (n=262) in the affected group outnumbered the males (227) with a statistically significant difference in proportions (p value 0.025).

Table 1: Demographic profile and different breach in total population (n=646).

Variable		Values	P value
Mean age (years)	Males	42.16±16.97	0.0001*
	Females	37.42±13.77	
Gender (%)	Male	301 (46.59)	0.014*
	Female	345 (53.41)	
Rural/urban (%)	Rural	263 (40.71)	0.0001*
	Urban	383 (59.29)	
Local/outsider (%)	Local	430 (66.56)	0.0001*
	Outsider	216 (33.44)	
Management breach (%)		449 (69.50)	
Affect on drug availability (%)		330 (51.08)	
Prescription breach (%)		343 (53.10)	
Confidence breach (%)		398 (61.61)	

Table 2: Close surveillance and routine follow up group and variables (n=646).

Variable	Close surveillance follow up group N (%)	Routine follow up group N (%)	P value
	420 (65.01)	226 (34.98)	0.0001*
Males	236 (56.19)	65 (28.76)	<0.0001*
Females	184 (43.81)	161 (71.24)	<0.0001*
Rural	175 (41.67)	88 (38.94)	0.317
Urban	245 (58.33)	138 (61.06)	0.317
Local	275 (65.48)	155 (36.90)	<0.0001*
Outsider	145 (34.52)	71 (31.42)	0.236
Pt perception health affected	169 (40.24)	72 (31.86)	0.036*
Pt perception health not affected	251 (59.76)	154 (68.14)	
Pt health deemed at risk	328 (78.10)	161 (71.24)	0.053*
Pt health not at risk	92 (21.90)	65 (28.76)	
Faulty perception	159 (37.86)	89 (39.38)	

Figure 2: (A) Diagnosis distribution of close surveillance patients; (B) diagnosis distribution of routine follow up patients.

We then reviewed the diagnosis of all 646 patients from their hospital records and divided the patients into two groups- one that needed close medical surveillance and the other needed routine follow-up and there were 420 (65.01%) patients in the first group and 226 (34.98%) patients in the second group respectively and diagnosis distribution shown in Figure 2 (A and B).

In the study group, locals were more in the close surveillance group as a comparison to that in routine follow-up group with a statistically significant p value of <0.0001 (Table 2).

There is a significantly proportional difference between close surveillance group and routine follow-up group concerning the patient's perception of being ill-affected. However, it was found to be higher in the close surveillance group. Henceforth there is a significant association between patient's perceptions of being ill-affected in the close-surveillance group of patients with a p value of 0.036 (Table 2).

There is a poorly significant (p value 0.053) proportional difference between close surveillance group and routine follow-up group with respect to the patient's health deemed at risk. It was found that there is association although poorly significant between patient's health deemed at risk due to lockdown in the close-surveillance group of patients.

Table 3: Fear to visit red category hospital in aware patients (n=345).

Patients awareness	N (%)	P value
Fear to visit red hospital-yes	284 (82.32)	<0.0001 (95%CI-58.45-69.82)
Fear to visit red hospital-no	61 (17.68)	

In the close surveillance group (n=420), the patient's perception was found to be faulty in 159 (37.86%) patients as compared to 261 (62.14%) patients in which perception was correct. Out of these 159 patients with

faulty perception, 133 (83.65%) had their symptoms controlled. Those patients aware of red hospitals (COVID-19 dedicated hospitals) classified by the local administration have fear of visiting red hospitals for follow-up and their numbers are significant. 345 patients were aware of the hospital classification system, 284 patients (82.32%) out of 345 feared in visiting COVID dedicated hospitals and 61 patients (17.68%) had no fear of visiting COVID hospital and their difference of proportion was significant (p<0.0001) (Table 3).

DISCUSSION

COVID-19 pandemic has put a lot of burden over the health care systems for delivery of health services to these patients in countries like India carrying 17.7% of the world's total population.[9] The management of this pandemic has already deployed a lot of hospitals and health care workers. This has lead to the scarcity of resources and paucity of health care workers for providing health care, especially to the routine patients (non-COVID-19). An article published in The Center for Infectious Disease Research and Policy (CIDRAP) reported that the COVID-19 pandemic and resulting lockdown could have a devastating impact on the global tuberculosis (TB) burden in the coming years.[10]

Our study had analyzed the impact of lockdown and hospital classification, especially yellow and red category hospitals on delivery of health care services to the neurological patients that required close surveillance and frequent follow-ups for the appropriate management of disease, monitoring the side effects of prescribed drugs and modification of their dosages.

We found the patient's health was deemed to be at risk in 78.10% of the patients who needed close surveillance of their disease and in 71.24% of patients in routine follow-up group. Around 62.14% of patients in close surveillance group perceived correctly that their health was ill-affected and this was statistically significant with a p value of <0.05, suggest that our observation and patient's perception of health being affected due to lockdown was similar. The significant number of patients (559/646) did not take consultation with any health care provider center or hospital due to restriction of movement, absence of public transport, unavailability of a physician at private clinics and hospitals, no information regarding follow-up facility in hospitals to non-COVID routine patients.

In South Africa, the lockdown (restrictions on movement) and the risk of contracting COVID-19 in health care facilities have brought major reductions in the use of health services, thereby compromising continuity of care for people with HIV, TB, and chronic non-communicable diseases.[11]

One study by Sharma et al suggested that a majority of older hospitalized patients had frequently missed their follow up and this increased their morbidity and put the burden on their family.[12] In the two large studies in cardiology, patients discharged from hospitals with the highest rates of early follow-up by a cardiologist had a lower risk of 30-day mortality, consistent with other studies of cardiology care for heart failure.[13,14] It is imperative to have regular follow up for all Neurological patients to get short and long term morbidity and mortality benefits.

There were 159 (37.86%) patients, having a faulty perception of not being impacted by the lockdown. The reasons for patient's faulty perception of health being not influenced were studied and it was found that 83.65% of these patients had their symptoms controlled and they did not develop any new symptoms and 57 (35.85%) patients had no effect on drug availability and were taking the medications regularly. Additionally, they might be denying their affection due to fear of visiting the hospital in this period of COVID-19 pandemic and probably their ignorance towards regular follow-ups. Whether the decision of the lockdown would be fruitful in controlling the morbidity and mortality due to COVID-19 is ambiguous as given by some studies. A study from Sweden found that a strict lockdown does not protect old and frail people-a population the lockdown was designed to protect. Neither does it decrease mortality from COVID-19, which is evident when comparing the UK's experience with that of other European countries. There are very few things we can do to prevent this spread, a lockdown perhaps delay severe cases for a time being, but once restrictions are abated, cases will reappear.[15-17]

The hospitals were classified as red, yellow and green categories in our city and red category hospitals were dedicated for only COVID-19 patients management and due to this classification, 284 (82.32%) patients were not willing for follow up in our hospital because of fear that they might get infected in red category hospital. As per administration policy, only COVID-19 patients were allowed to take treatment from the red hospital. This might be one of the important reasons why people were not coming to follow up and other factors like non-availability of public transport to reach hospitals due to lockdown. We had also looked at the fact and observed that a significant number of patients could not be able to seek medical consultation to other medical facility providers. In a city of Daegu, the South Korea population of around 2.4 million and limited resources has significantly controlled the spread of SARS-CoV-2 virus spread, morbidity, and mortality not amongst the general population but also to health care providers. In the Daegu city, the health system allows for the continued care of non-COVID-19 patients by isolation and triage mechanisms in the same hospital where serious COVID-19 patients were also treated.[18] Therefore health administrations should pioneer caring for the health of the non-COVID-19 patients while making policies to deal with COVID-19 pandemic. All patients should seek medical care when needed avoiding any delay and this should be expressed loudly and clearly while the outbreak is still ongoing by the public health authorities. Patients need to be reassured and should know precisely that a specific COVID-free pathway has been planned in each

facility with dedicated resources to avoid nosocomial infections.[5]

Humans have evolved to be social and being isolated from family, friends, and colleagues due to restriction can be annoying and awful for most people and can result in psychological and physical health problems. An increase in levels of anxiety, aggression, and depression are possible psychological effects of isolation in lockdown.[19] We need to contain the health and psychological damage to our population by immediately diverting maximum resources towards strengthening our healthcare system.

CONCLUSION

The health of routine patients (non-COVID) has been affected in this era of the COVID-19 pandemic. Therefore, the health administrations that are taking novel measures to provide efficient and better health services to COVID-19 patients should also be concerned for routine patients and should make short term and long-term solutions with engaged effective leadership, oriented team-work, and collaboration across institutions. Our focus should not lose the sight of health for routine patients who are being negatively impacted in this COVID-19 era.

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ANNEXURE 1

Effect of lockdown and hospital classification on health delivery system

Department of Neurology, SAIMS

Name: Age/Sex:_____

Neuro OPD No.: Study ID: _____

Diagnosis: _____

Last OPD Follow Up: Date/Month/Year

Follow Up due Date: Date/Month/Year

Address: Contact No. _____

Performa A Questionnaire

1. How are your symptoms since last follow up ?
   Aggravated / Same as before / Controlled

   If Aggravated what symptoms?

   Any new symptoms ? Y / N If Yes what?...

2. Are you able to get your medicines easily? Y / N
   If No why?...

3. Are you getting the same tablets as prescribed? Y / N
    If No why?...

4. Are you taking the medicines in the same doses as prescribed? Y / N
   If No why?...

5. Have you seeked follow up anywhere? Y / N
   If Yes where?...

6. Are you aware of the hospital classification in different categories? Y / N
   If Yes ….will you change the hospital because SAIMS is RED hospital? Y / N

   If Yes why?..

   If No why?...

7. Will you be comfortable to change your doctor due to lockdown pressure ? Y / N
8. Would you prefer telephonic or online consultations over in person OPD follow up? Y / N
9. Your blood pressure is Controlled / Uncontrolled / Not checked
10. Your blood sugar is Controlled / Uncontrolled / Not checked
11. Impact of lockdown on your health on a scale of 1 – 10
    Affected 1 – 3 (mild) 4 – 7 (moderate) 8 – 10 (severe) Not affected

12. Is any of your family member adversely affected because of medical reasons? Y / N, if yes -how

ANNEXURE 2

Neuro OPD no. _____   Study Id_____

Performa B

Interpretation of Excel

Heading	Yes	No
Close surveillance needed		
Prescription breach		
Affect on drug availability		
Management breach		
Confidence breach		
Patient health at risk (as per assessment of doctor)		
Patient perception		
Faulty perception		
Fear in visiting covid dedicated hospital		