CENTRE FOR DISASTER MANAGEMENT

Centre for Disaster Management (CDM) is a research and training centre, and a unit of Lal Bahadur Shastri National Academy of Administration (LBSNAA), Mussoorie, Department of Personnel & Training (DoPT), Government of India. The CDM is a Nodal agency for training in Incident Command System (ICS). The Centre is involved in training officers belonging to the IAS and other Group-A civil services at induction as well as at Mid-Career level in various aspects of disaster management through classroom sessions, case studies, experience sharing presentations, panel discussions, workshops, mock drills. Apart from conducting training programmes on fire safety, search and rescue, IRS, DRR, DDMP, school safety, the centre is involved in various types of documentation and publication activities in terms of case studies, documentation of best practices, research papers, books and posters in national and international journals and developed course specific training materials in the area of Disaster and Emergency management and Science and Technology.

ISBN: 978-81-928670-6-9

COVID-19 GOVERNANCE IN INDIA
(A Special Issue under Disaster Governance in India Book Series)
Series - 6 (March, 2024)

Centre for Disaster Management (CDM)
Lal Bahadur Shastri National Academy of Administration (LBSNAA),
Mussoorie - 248179, Uttarakhand
EPABX: 0135-2222000 (Extn-2385)
Telephone: 0135-2632655; Fax: 0135-2632350, 2632720
Email: cdm.lbsnaa@nic.in

COVID-19
GOVERNANCE IN INDIA

SERIES - 6

(A Special Issue under Disaster Governance in India Book Series)

Centre for Disaster Management
Lal Bahadur Shastri National Academy of Administration,
Mussoorie - 248179, Uttarakhand

COVID-19
Governance In India

(A Special Issue under Disaster Governance in India Book Series)

Series - 6

Centre for Disaster Management
Lal Bahadur Shastri National Academy of Administration, Mussoorie - 248179,
Uttarakhand

COVID-19
Governance in India
(A Special Issue under Disaster Governance in India Book Series)

ISBN: 978-81-928670-6-9
Series- 6
(March, 2024)

Centre for Disaster Management
Lal Bahadur Shastri National Academy of Administration
Mussoorie - 248179, Uttarakhand
EPABX: 0135-2632489, 2222000 (Extn-2385)
Telefax: 0135-2632655; Fax: 0135-2632350, 2632720
Email: cdm.lbsnaa@nic.in

ISBN: 978-81-928670-6-9
Copyright@2024, CDM, LBSNAA

Editorial Advisors
Shri. Kunal Satyarthi, IFoS
Joint Secretary
National Disaster Management Authority (NDMA), Government of India,
NDMA Bhawan, A-1, Safdarjung Enclave, New Delhi

Ms. Sowjanya, IAS
Joint Director
Lal Bahadur Shastri National Academy of Administration, Mussoorie, Uttarakhand, India

Editorial Board
Shri Sanjeev Kumar Jindal, CSS
Joint Secretary (DM),
Ministry of Home Affairs (MHA), New Delhi

Dr. Akhilesh Gupta
Secretary, SERB
Department of Science & Technology, New Delhi

Shri Sarbjit Singh Sahota
Emergency Specialist, Disaster Risk Reduction Section,
United Nations Children's Fund (UNICEF), UNICEF India Country Office, New Delhi

Col V N Supanekar (Retd)
Former Director & Professor,
Center for Disaster Management, YASHADA, Pune

Prof. Mahua Mukherjee
Professor, Department of Architecture & Planning &
Joint Faculty and Ex-Head, Centre of Excellence in Disaster Mitigation and Management, IIT Roorkee

Shri Abhiram G. Sankar
Deputy Director & Director, CDM
Lal Bahadur Shastri National Academy of Administration. Mussoorie, Uttarakhand

Managing Editor
Dr. Pankaj Kumar Singh
Associate Professor
Centre for Disaster Management,
Lal Bahadur Shastri National Academy of Administration, Mussoorie, Uttarakhand

Associate Managing Editor
Dr.Pasala Eswara Rao
Research Officer
Centre for Disaster Management,
Lal Bahadur Shastri National Academy of Administration, Mussoorie, Uttarakhand

Designed and processed by
Vidya Art Press, Dehradun

DIRECTOR'S MESSAGE

Sriram Taranikanti, IAS
Director,
Lal Bahadur Shastri National Academy of Administration, Mussoorie

The unprecedented COVID-2019 crisis has underlined the criticality of effective response as never before. Responsiveness has emerged as a yardstick for measuring the success of Governments across the world in tackling this calamity. Adopting a multi-pronged cross-departmental approach, supported by the collective expertise and experience of specialists and frontline workers has become the need of the hour.

Needless to say, the crisis is far from over, and the road ahead is long and challenging. Although the strategic initiatives systematically taken in the past few years have placed us in an enviable position of being in significant control of the situation, massive challenges still remain and there is no room for complacency. Hence, to define the way forward more comprehensively, the importance of period feedback, analysis and interpretation of programmes, plans and policies to reassess their status from time to time, cannot be overstated.

As the world bravely battled against COVID-19, the gravest health crisis of times, we have seen a total paradigm shift in the way we live and work. The pandemic has led to the emergence of a new and radical construct of societal norms and governance. The country has adopted a cross-departmental approach in the formulation and implementation of the COVID-19 protocol geared towards engineering a sustainable ecosystem for co-existing alongside COVID-19. The country has set forth novel strategies curated to sensitize, motivate and inspire citizens to collaboratively combat the deadly virus, through virtual awareness platforms, digital campaigns and institutionalisation of health, educational, agriculture, industrial and employment operations both in the rural and urban areas.

The lockdown provided an opportunity to not only upgrade our level I, II and III COVID care facilities in the states and to stock up our supplies but also to forge new partnerships with the best health professionals from India and abroad to train our doctors on the latest protocols for COVID patient management. There have been a number of success stories, which all have contributed to our overall understanding of such kind of management, thus adding significantly to the learning process.

I would like to thank the Centre for Disaster Management, Lal Bahadur Shastri National Academy of Administration who have worked on those success stories and have been able to compile a special issue titled: COVID-19 Governance of India, Series-6. Hopefully, the document will be equally useful for both the trainees and the administrators in the field. I want to congratulate the CDM Team for this publication and also place on record my appreciation for the contribution made by the faculty & staff of CDM who contributed in various capacities for bringing out this book.

I would also urge all to go through this compilation carefully and add to the knowledge base.

(Sriram Taranikanti)

PREFACE

Abhiram G. Sankar, IAS
Director,
Centre for Disaster Management

The COVID Pandemic that gripped the entire world has underlined the criticality of effective response as never before and once again highlighted need of health facility preparedness. Responsiveness has emerged as a yardstick for measuring the success of Government across the world in tackling this calamity. Government of India's integrated, multi-pronged action plan of containment and development involving cross Departmental approach, supported by the collective expertise and experience of specialists as well as frontline workers, paid rich dividends.

As the world bravely battles against COVID, the gravest health crisis of times, we have seen a total paradigm shift in the way we live and work. This issue highlights emergence of a new and radial construct of societal norms and governance. The novel initiatives undertaken by various district administrations adopting a cross departmental approach in formulation and implementation of COVID-19 protocol geared towards engineering a sustainable ecosystem for co-existing with COVID. The articles also highlight, all-inclusive approach adopted by administration involving community has set forth novel strategies curated to sensitize, motivate and inspire citizens to collaboratively combat the deadly virus, through virtual awareness platforms, digital campaigns and institutionalisation of heath, educational, agriculture, industrial and employment operations both in the rural and urban area.

The COVID Pandemic provided an opportunity to not only upgrade our health care facilities in the states but also to forge new partnerships with the best health professionals from India and abroad, and to upgrade and modify our protocols for COVID like patient management.

Needless to say, similar crisis may recur in future also new variants have emerged challenging the medical and scientific fraternity, in more ways than one. The strategic initiatives we have systematically under taken in these past few years placed us in significant control of the situation.

I would like to thank the Centre for Disaster Management, Lal Bahadur Shastri National Academy of Administration who have been able to compile the best practices adopted by District Administrations, PSUs and Institutions in the form of a Special issue of COVID-19 Governance of in India, Series-6.

I would urge all of you to go through this compilation carefully and add to the knowledge base for disaster management in the country, and will be useful for both the trainees and the administrators in the field. I would like to congratulate CDM Team for publication at the opportunity time.

(Abhiram G. Sankar)

CONTENTS

Augmentation of Hand Sanitizer production capacities in India – A case study

Department of Food & Public Distribution
Ministry of Consumer Affairs, Food & Public Distribution
Government of India

1.0 Introduction

The emergence of novel pathogens, bacterial or viral, has always posed serious challenges to public health around the globe. One of these dangerous pathogens is "severe acute respiratory syndrome coronavirus 2" or SARS-CoV-2, more commonly known for causing corona virus disease 2019 or COVID-19, which has been declared a global pandemic by the World Health Organization in early 2020. Reported to be having its origin in China, the emergence of this pandemic has risen to be a significant global public health concern and led to extensive use of hand disinfectants given its contagious nature. The SARS-CoV-2 can persist and remain infectious on surfaces for up to several days. The recent study reveals that transmission of SARS-CoV-2 is possible in the form of aerosol and fomite and the virus can remain viable and infectious in aerosols for hours and on surfaces up to several days, depending on the inoculum shed.

Hence, it is crucial to interrupt the transmission chain of the virus through contact isolation and strict infection control tools. Apart from maintaining social distancing following face masks, appropriate hand hygiene is of utmost importance as hands may get contaminated from direct contact with patients, leading to the transmission and spread of the disease. The studies on SARS-CoV outbreak settings showed that the efficient hand hygiene reduces transmission considerably. Given the dangers imposed by this disease, in the line of WHO recommendations, Government of India vigorously promoted and encouraged hand hygiene through hand washing or use of hand sanitizer.

2.0 Types of Hand Sanitizers, ingredients, efficacy, mechanism of action and recommended formulation

Hand sanitizer can generally be categorized into two groups: alcohol-based (ABHS) or alcohol-free (NABHS) (Figure 1). The common mode of delivering the active ingredient in hand sanitizers, whether ABHS or NABHS, is liquid, foams, gels, and sprays. There is limited research in literature on comparing the efficacy of various sanitizer delivery systems on virucidal efficacy. The reported studies suggest that there could be some varying differences in efficacy due to the method of mechanical friction that could contribute to physical removal of pathogens, but there needs to be further research conducted to compare the efficacy between the various hand sanitizer delivery systems. The most common primary active ingredient of NABHS, benzalkonium chloride, a quaternary ammonium, is a commonly used disinfectant. Disinfectants with benzalkonium chloride are generally less irritating than those with alcohol, though more recent evidence suggests it may cause contact dermatitis more often than previously thought. Although ABHS are less user-friendly on skin than NABHS, ABHS predominate in health care settings given their low cost and efficacy of reducing infectious transmission.

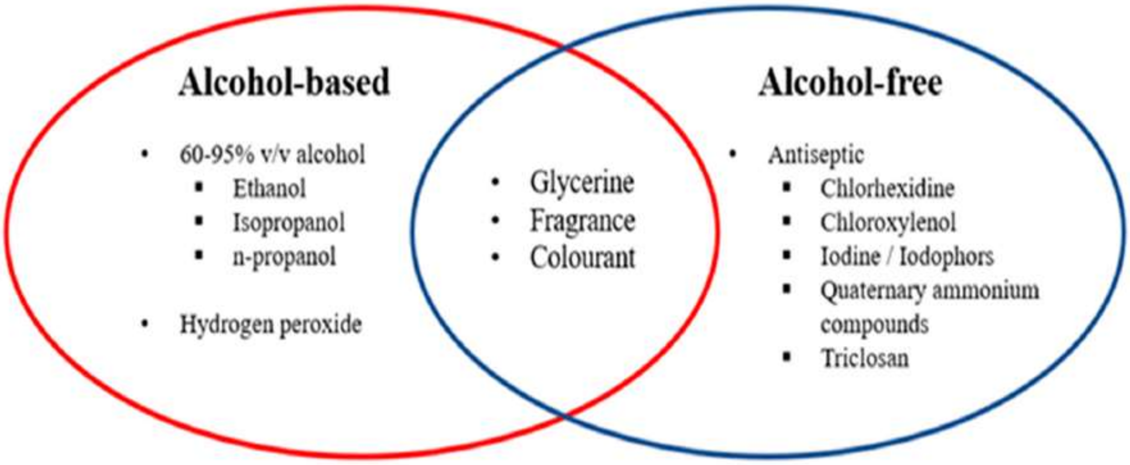


Figure 1: List of alcohol, non-alcohol compounds, and commonly used excipients in hand sanitizers.

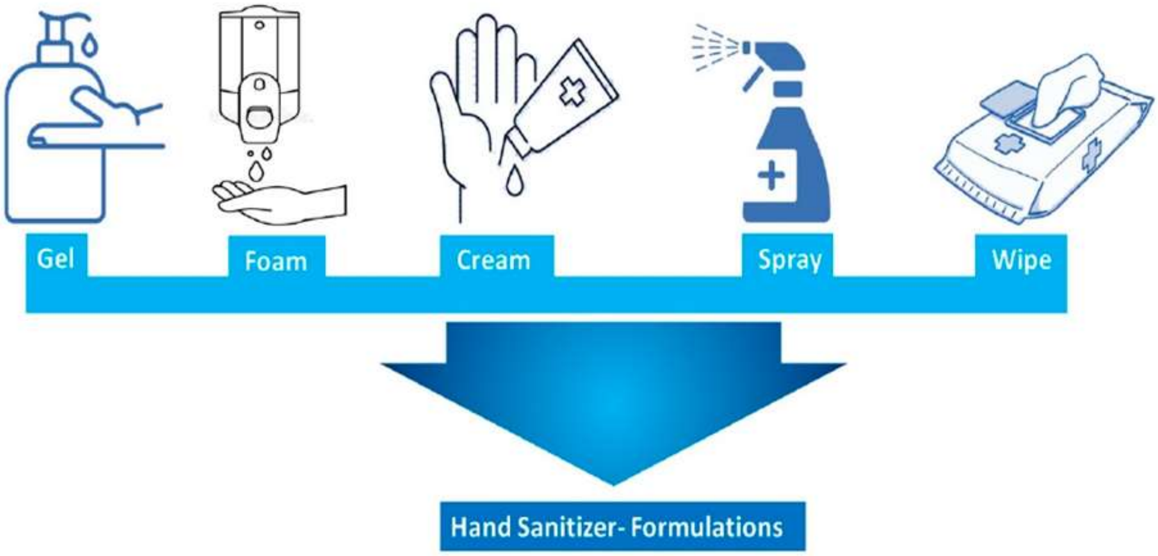


Figure 2: Various types of hand sanitizer usage forms

Hand sanitizer preparations containing alcohol can include ethanol, isopropyl alcohol, n-propanol, or a combination of these, water, as well as excipients and humectants. Solutions containing alcohols between 60% and 95% in volume are most prevalent and effective. Humectants are included to prevent skin dehydration and excipients help stabilize the product as well as prolong the time needed for the evaporation of alcohol, thereby increasing its biocidal activity. Alcohols have broad-spectrum antimicrobial activity against most vegetative forms of bacteria (including Mycobacterium tuberculosis), fungi, and enveloped viruses (human immunodeficiency virus [HIV] and herpes simplex virus). However, they are ineffective against bacterial spores that are found most commonly in raw materials. The addition of hydrogen peroxide (3%) may be a solution to this issue. Keeping hands clean is a fundamental and essential step to avoid getting sick while limiting the transmission of germs to others. The hand washing is recommended with soap and water whenever possible as it remarkably reduces the amount of all types of microbes and dirt on the skin surface.

Both the soaps and alcohol-based sanitizers work by dissolving the lipid membranes (viral envelope) of microbes, thereby inactivating them. Thus, the sanitizer serves as an alternative when the soap and water are not readily available. While less is known regarding the specific mechanism of action of alcohol agents against viruses compared to bacteria, it is understood that ethanol has a broader and stronger virucidal activity than propanol's or isopropanol. In fact, concentration of ethanol in the range 60-85% has shown to be highly effective against enveloped viruses and thus is effective against the majority of clinically relevant viruses.

In both healthcare and community settings, ethanol-based hand sanitizers have become a popular alternative to the traditional hand washing with soap and water. Ethanol-based hand sanitizers have been utilized as an effective alternative to hand washing to prevent the spread of bacterial and viral infections, making it one of the essential protocols in decreasing healthcare burden. WHO recommended ethanol-based sanitizer formulations comprises ethanol 80% v/v, glycerol 1.45% v/v, hydrogen peroxide (H_2O_2) 0.125% v/v. And in order to make one litre hand sanitizer, one has to pour following ingredients into a 1000 ml graduated flask followed by top up the flask to 1000 ml with distilled water or water that has been boiled and cooled; shake the flask gently to mix the content:

a. ethanol 96% v/v, 833.3 ml;
b. H_2O_2 3%, 41.7 ml;
c. glycerol 98%, 14.5 ml

When the concentration of ethanol in the starting ingredient is not exact, the calculation should be adjusted accordingly to ensure a final concentration of at least 80% ethanol. The amount of ethanol needed is to be calculated by using the following equation:

$$\frac{(\textit{final \% alcohol}) \times (\textit{final volume of preparation})}{(\textit{starting \% alcohol})} = \textit{volume of starting ingredient required}$$

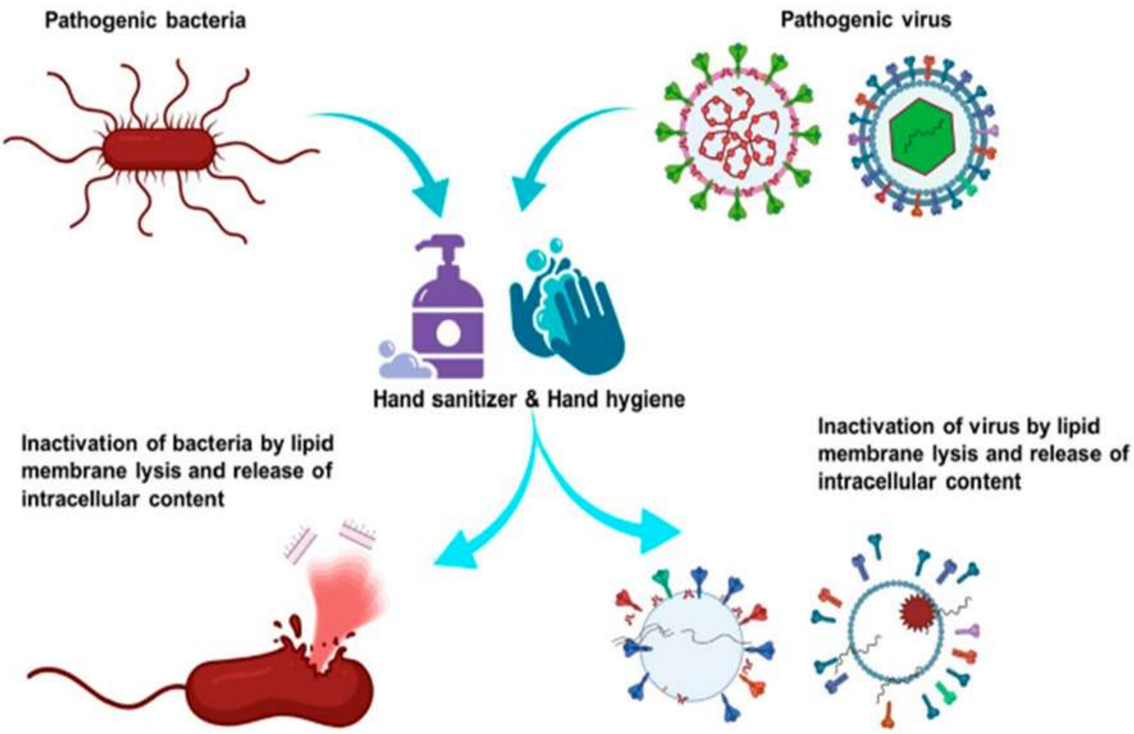


Figure 3: Illustration of alcohols antiviral mechanism

3.0 Augmentation of Ethanol Based Hand Sanitizer Production capacities in India

In India, as coronavirus threat spread, the demand for hand sanitizers sharply increased. At the very start of the COVID pandemic i.e. in March 2020, it became very clear that the alcohol based hand sanitizer is going to play a pivotal role in the fight against COVID-19. However, it was also noted with concern that the production capacity of alcohol based hand sanitizer in India was almost negligible and the available capacity would not be able to cater the huge upcoming demand. The price of alcohol based hand sanitizer in the market was ruling as high as Rs 700 for 500 ml of the bottle and even at this high rate the sanitizer was not available in required quantities. Prior to COVID-19, the annual sale of hand sanitizers was only about 10 lakh litre per annum and was mainly used in the hospitals. As mentioned earlier, the production capacity of alcohol based hand sanitizer in India was almost negligible and it was pretty clear that the available capacity would not be able to cater the huge upcoming demand considering the size of Indian population. Keeping in view the immediate requirement of augmentation of ethanol/ethyl alcohol based sanitizer production capacity in a very short span of time and being nodal department for the production of ethanol under Ethanol Blended with Petrol (EBP) programme, the Committee of Secretaries (CoS) entrusted the task of immediate augmentation of sanitizer production capacity to the Department of Food & Public Distribution (DFPD), Government of India.

Once the task was entrusted, a meeting was immediately convened in DFPD under the Chairmanship of Joint Secretary (Sugar) with Sugar Mill Associations, Distillery

Associations and Medical Equipment Manufacturer Associations to assess the requirements and bottlenecks in the production of hand sanitizer and to prepare a road map to ensure smooth movement of raw material required for the production of sanitizer, as the whole country was under lockdown and movement of vehicles was highly restricted. For production of hand sanitizer as per WHO standards, ethyl alcohol is the main constituent of hand sanitizer and being a state subject, alcohol comes under the purview of the state governments. For better synergy and coordination, Excise Commissioners/Food and Drug Authorities/Cane Commissioners of the State Governments were contacted personally and were apprised of the gravity of the situation and were taken on-board.

To ensure the adequate availability of Ethyl Alcohol/ Ethanol to the manufacturers of hand sanitizer, all the State Governments/UT Administrations were requested to issue licenses to the distilleries for manufacturing hand sanitizers. It was also requested that if it was felt that the sufficient quantity of Ethyl Alcohol/ Ethanol or hand sanitizer was not available in that particular state, then adjoining states / UTs may be approached to ensure adequate quantity of hand sanitizer to the public and hospitals.

States were advised by the Government of India to give all necessary permissions without delay. States were also requested to waive the excise duty on ethanol/ethyl alcohol used for the purpose of making sanitizers. To ensure the sufficient availability of sanitizer in State and Central Government Hospitals, States were requested to negotiate with distilleries for supply of sanitizer in bulk to the hospitals at low rates. States were requested to dispense with the formalities for starting production of sanitizers and were requested to consider providing post facto approval for such permissions/formalities. Industry was also requested to provide hand sanitizer to state run hospitals, farmers, public places etc. at free of cost under CSR.

State Governments/ UT Administrations were also requested to exempt raw material production for hand sanitizers/ ethanol, including packing material from lockdown/ transport. To facilitate the State Governments, the contact details of office bearers of Indian Sugar Mills Association, All India Distillers Association, Association of Indian Medical Device Industry and other Associations were shared. Details of distilleries / other units, which were granted licenses for the manufacturer of sanitizer, were shared regularly with the state Governments and other stake holders so that they can remain updated. States were regularly requested to grant license to more and more distilleries. States were also requested to rope in deodorant manufacturing units, so that manufacturing of hand sanitizer can be boosted.

With the collective efforts of DFPD & State Governments along with Sugar Mill Associations, All India Distillery Associations, 912 distilleries/independent manufacturers were accorded permissions to produce hand sanitizer. To ensure availability of raw material being used for hand sanitizers, vide notification dated 19.03.2020, raw materials used for manufacture of hand sanitizer were declared as essential commodity. To ensure the availability of sanitizer at affordable rates, the retail prices of hand sanitizer were also fixed by Department of Consumer Affairs vide Notification dated 21.03.2020. Due to these timely interventions, the rate of sanitizer came down heavily and started selling as low as Rs 150 per litre.

As a result of the collective efforts of DFPD/State Governments, the production capacity of hand sanitizer was enhanced from meagre 10 lakh litre per annum to more than 30 lakh litre per day in such a short span of time. Now India is also exporting hand sanitizer to other countries.

4.0 Education

It was considered essential to educate the entrepreneurs and upcoming sanitizer producing units on various aspects of sanitizer production and quality control. Thus, an online workshop was organized by National Sugar Institute, Kanpur, a subordinate office of this department on 9th June, 2020 on the topic "Sanitizer Production and Quality Control" with a view to help the industry to produce sanitizer as per the World Health Organization (WHO) guidelines to fight COVID-19 and also to inspire young entrepreneurs for setting up such units. The training also included quality control procedures focusing pre-production analysis of raw material and post production analysis of produced sanitizer.

The institute also established the analytical facilities for testing ethanol based hand sanitizer and large number of ethanol based hand sanitizer samples received from different manufactures were analysed in the laboratory. This helped the sanitizer producers in quality control and providing sanitizers as per WHO standards.

5.0 Successes, Challenges and Lessons Learnt

The policy interventions and campaign taken up by the Central & State Governments, various sugar and alcohol producing organizations, NGO’s etc. increased the hand hygiene compliance across various segments of the society. The success to control the COVID-19 is specially contributed to availability of hand sanitizer, as hand hygiene compliance increased with the use of hand sanitizer as hand sanitizer is more handy and conveniently be used at any place, whereas frequent washing of hands require availability of water. By augmenting required supplies, publicity & trainings, an environment was created for using hand sanitizers. The regular monitoring through feedback on “Response to COVID-19” by the Government of India also enabled success of hand sanitizer. To monitor the progress and to remove hindrances in real time, social media platforms were used extensively.

During the lockdowns, ensuring availability of hand sanitizers at every place was a challenge. To ensure sufficient availability of sanitizer at all times in all parts of the country, Department of Food & Public Distribution, Government of India coordinated with all the

Chief Secretaries/Administrators of States/UTs and requested them to further augment market linkages of hand sanitizer from distilleries and other units to wholesalers/retailers. With continuous feedbacks and coordination with industry and Government, reach of sanitizer to all parts of the country was ensured.

The distilleries also took real ownership of the project related to production of hand sanitizer and their distribution. Utilizing readily available WHO guidelines, undertaking training programme on virtual platform and incorporating the same, all contributed to the success of programme. However, the intervention required some initial cost with respect to purchase of bottles and dispensers and also required machinery particularly filling & sealing machines.

Due to the efforts made, after few months, production of sanitizer was enhanced considerably and the availability of sanitizer was not a problem in India. However, it was observed that though the sanitizer in bulk is available in plenty but its availability in small bottles / dispensers was still posing a problem. To overcome the problem of bottling, states were requested to accord necessary permissions, so that other industries can purchase sanitizer in bulk and bottle it as per the requirement. All the State Governments were also requested to explore the possibility of roping in bottle manufacturers, including deodorant manufacturers, to address the shortage of sanitizer bottles/ pumps.

Although use of hand sanitizer may not be a replacement for hand washing with soap (running water) at various places, yet with lack of infrastructure or emergent need of making hand sanitizer available became an acceptable alternative to improve the infection prevention and control.

6.0 Conclusion

The production of hand sanitizer is cost effective and is feasible to integrate into existing operations. This intervention has the potential to have a high impact for a relatively low investment of financial and organizational resources. The impact is especially high in facilities where there are inadequate hand hygiene resources, such as functioning sinks, water, soap etc.

References

1) https://www.who.int/infection-prevention/publications/hand-hygiene-2009/en/
2) https://apps.who.int/iris/bitstream/handle/10665/44102/9789241597906_eng.pdf?sequence=1&isAllowed=y&ua=1
3) https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf?ua=1
4) https://brandequity.economictimes.indiatimes.com/news/business-of-brands/how-brands-in-india-addressed-the-surge-in-hand-sanitiser/75273326

5) https://www.icis.com/explore/resources/news/2020/03/23/10485458/india-boosting-ethanol-output-for-sanitisers-on-coronavirus-pandemic
6) https://theconversation.com/coronavirus-not-all-hand-sanitisers-work-against-it-heres-what-you-should-use-133277
7) https://www.business-standard.com/article/economy-policy/sugar-mills-boost-production-capacity-of-hand-sanitisers-to-100k-l-per-day-120032801036_1.html
8) https://www.cnbc.com/2020/03/27/coronavirus-the-history-of-hand-sanitizer-and-why-its-important.html
9) https://www.worldometers.info/coronavirus/

Descriptive Epidemiology of COVID-19 in Sonitpur district from 1st January to 31st December, 2020

Dr. Subhalaxmi Borah*, Amu Saikia, Chiranjib Choudhury, Dr. Rumi Patar Bora, Dr. J. Ahmed, and Manvendra Pratap Singh

Abstract

The first case of COVID-19 positive of Sonitpur District came on 20/05/2020 that travelled from Haryana. As the stranded population entered the district, the number of cases started rising. The study included all cases diagnosed with COVID-19 in the Sonitpur District, reported from 1st January – 31st December, 2020. During the study period, Sonitpur District has tested approximately 133762.2 per million, with a positivity rate of 4.6%. The total cases per million were 6181 in the District. Amongst the 8182 COVID-19 positive cases, 5993 (73.3%) were asymptomatic, while 2189 (26.7%) were symptomatic. The trend of positive cases was decreasing. The peak was observed in the month of August and then decreased till December. The district has recorded a recovery rate of 99.48%. Active search and early detection of symptomatic elderly patients with comorbidities had reduced the mortality (CFR 0.28%).

Keywords: COVID-19, Epidemiology, Sonitpur, Surveillance, Incidence

1.0 Introduction

Corona viruses are large group of viruses that cause illness in humans and animals. The outbreak of Novel coronavirus disease (COVID-19) was initially noticed in a seafood market in Wuhan city in Hubei Province of China in late December 2019. WHO (under International Health Regulations) declared this outbreak as a Public Health Emergency of International Concern (PHEIC) on 30th January 2020. WHO subsequently declared COVID-19 a pandemic on 11th March 2020 (NCDC, DA 2020:913-917). India reported the first case of coronavirus disease 2019 (COVID-19) on January 30, 2020, in a medical student who travelled from Wuhan, China (Bhosale S, Kulkarni AP 202: 88-90). In the beginning, COVID-19 cases in India were associated with international travel among returnees from COVID-19 affected countries. Since then, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection has spread across all states (COVID-19 BULLETIN-22 2020).

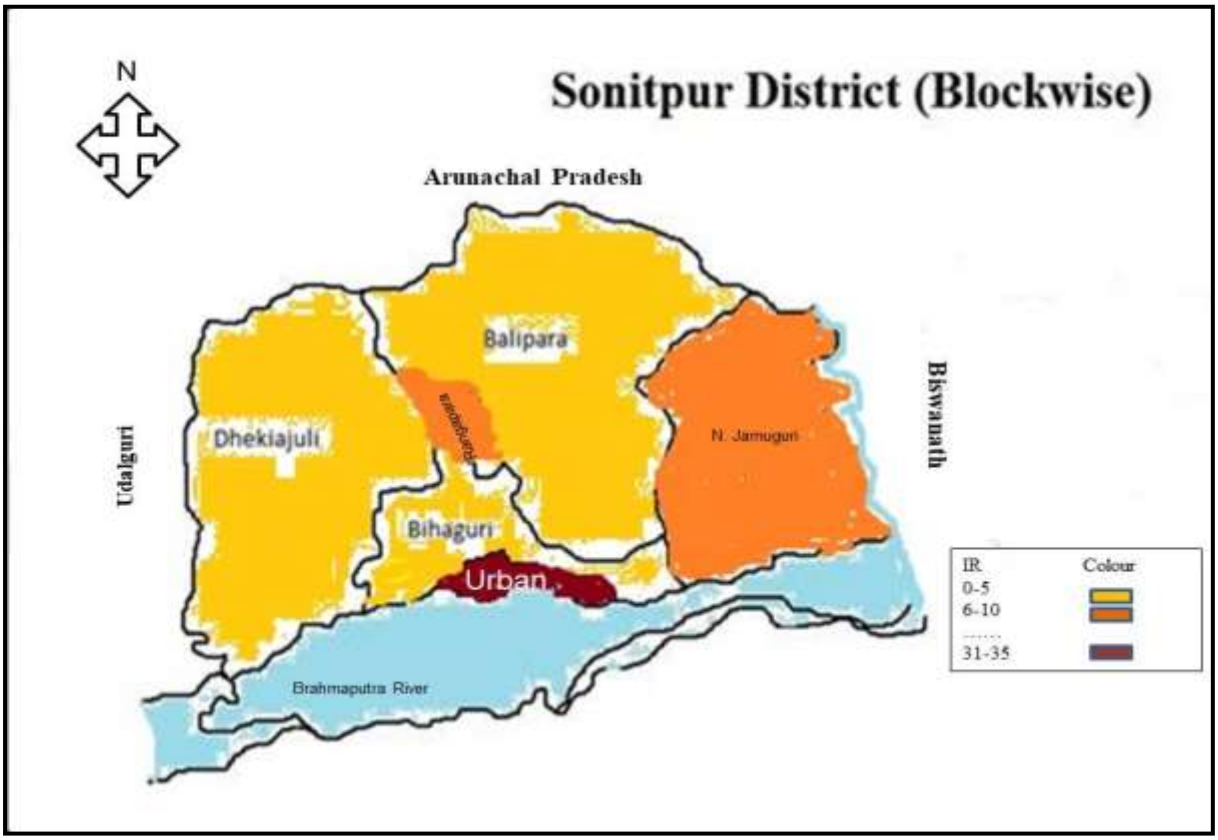
The health authorities of Assam state initiated laboratory-based surveillance, traditional infection control and public health strategies to contain the spread (COVID19 information Portal GoA 2020, David M, Lokeshkumar P, Suraj SD 2020:89-98). These included tracing, testing and tracking of contacts and isolating COVID-19 positive subjects (GoA, Containment zone, buffer zone and red zone order 2020). The state implemented several public health measures, including retrospective contact tracing, survey for influenza-like illness and strengthening the laboratory network under the Integrated Disease Surveillance Programme (IDSP) (SOP for Assam Community Surveillance Plan (ACSP) for COVID-19 2020, GoA, and a Targeted Surveillance Drive in the name of Assam Targeted Surveillance Program 2020).

Several innovative measures were taken to tackle COVID-19 in the initial months. For example, invoking powers under Epidemic Diseases Control Act, the District has started screening of both international and domestic travellers. Followed guidelines on COVID-19 outbreak prevention and control for dissemination of useful information to health staff and public. Information Education Communication (IEC) activities were strengthened-Public announcements initiated at railway stations, Bus stations and airport; all news channels/theatres broadcasted videos on COVID-19 prevention. Messages related to COVID-19 were also circulated on Social media handles. Legal Action was also initiated against people who tried to propagate false news related to COVID-19 on the social media. Capacity building of staff was initiated-Training videos were prepared for training of Staff of Health Department and other line departments. Emergency District and Block Levels Rapid Response Teams (RRTs) were prepared for containment of outbreak response promptly. Interdepartmental coordination meetings were held in Deputy Commissioner's Office to plan further activities and evaluate the actions taken in the district. All primary and secondary contacts of the first positive case in the district were traced immediately for strengthening surveillance activities. District Control rooms with Call centers were made 24*7 functional. Directions to identify a greater number of isolation beds in the already designated hospitals and to equip more hospitals in the district with facilities for isolation and management of symptomatic cases. Directions were given to district officials to identify private hospitals that were willing to admit symptomatic patients abiding the guidelines.

From March 25, 2020, the country was under complete lockdown until May 31, 2020, in four phases (Bhatnagar T, Kumar MS, Kumar VS, Manickam P, Rade K, Shah N 2020:419-23). The first phase of the lockdown was from March 25, 2020, to April 14, 2020. The second phase of lockdown was from April 15, 2020, to May 03, 2020, the third phase of lockdown from May 04–17, and the fourth phase from May 18–31, 2020. From the beginning of the third phase, the Government of India issued guidelines permitting inter-district and inter-state travel for stranded persons. Consequently, the first case of COVID-19 positive came on 20/05/2020 that travelled from Haryana. As the stranded population entered the district, the number of cases started rising.

2.0 Materials and methods

2.1 Study population: The study included all cases diagnosed with COVID-19 in the Sonitpur District, reported from 1st January – 31st December, 2020. Case identification was carried out by the Health staff of the district, which included the Integrated Disease Surveillance Programme (IDSP) team, and the Block health authorities of all the Block-PHCs. Reporting of Influenza-Like Illness (ILI) and Severe Acute Respiratory Illness (SARI) cases was mandatory for even private health care providers. The contacts of COVID-19 positive people who were in quarantine were monitored. With respect to domestic and international travellers, the state had a policy of testing of all passengers. Most of the travellers were from COVID-19 affected countries or states within India. Upon arrival in to the district, they were immediately subjected to testing. If tested positive, they were hospitalized and if negative, were quarantined for 14 days with a repeat test being carried out between 7th and 10th day of quarantine (GoA SOP for COVID-19 Testing 2020).



Map of Sonitpur District

2.2 Case definitions: A suspect case of COVID-19 was essentially based on the criteria defined by the Ministry of Health and Family Welfare, Government of India described elsewhere [Control. NCDC 2020]. Briefly, any person with a recent history of international travel (14 days), domestic travel from high burden states of Maharashtra, Gujarat, Delhi, and Tamil Nadu and anyone within the state with symptoms of ILI and SARI as well as known high-risk contacts of confirmed COVID-19 patients were also included. Asymptomatic SARS-CoV-2 cases were defined as those with positive SARS-CoV-2 RT-PCR in the absence of symptoms (Organization W.H. 2020).

2.3 Laboratory testing: Testing for SARS-CoV-2 was done initially at Guwahati Medical College & Hospital. This was quickly ramped up to 2 laboratories inside the district namely Tezpur Medical College & Hospital and Defence Research Laboratory, resulting in an enhanced capacity for testing and identification of COVID-19 cases across Sonitpur. Nasopharyngeal and oropharyngeal swabs collected into virus transport medium from suspected cases were subjected to an RT-PCR for detection of SARS-CoV-2 RNA using the Indian Council of Medical Research (ICMR) guidelines for testing (Bhushan A. Kaur H. Narayan J. Rana S. Vijay N 2020:424-437). RT-PCR kits approved by ICMR were used in the testing. All positive and negative results were entered immediately upon their availability into the ICMR portal, NHP COVID-19 Portal and shared with the district/state surveillance teams to facilitate immediate tracing of contacts. From 16th July, 2020, the Rapid Antigen Test kits were also used at various screening centers and subsequently in all OPDs of Govt. and private hospitals.

2.4 Data collection: All the socio-demographic, clinical, and risk factor details (travel history, symptoms, comorbidities, etc.) of patients for every suspected case was collected on the day of sampling and entered into a standardized line list by the surveillance teams in the respective Screening Centers. The line list also included information about the type of sample, date of sample collection, date of testing, type of RT PCR kit used, and the test results, as well as the details of contacts. All contacts were traced based on the information provided by the individual and subjected to testing as per the national guidelines (ICMR N.D. Advisory 2020). All the data was maintained in a centralized database by the Integrated Disease Surveillance Programme (IDSP) team. Every effort was made to ensure that missing data, if any, was collected from the subjects by the surveillance team. All the data were de-identified before extraction and analysis. The study has been reported in accordance with the RECORD guidelines.

2.5 Data analysis: The data analysis from the line list was based on the date of collection of a sample. The trends in the positivity rate over time were described month-wise. The number tested per million was computed by using a District-specific population denominator.

2.5.1 Descriptive epidemiology of cases by time, place and person: The frequencies of characteristics of cases were described by age, gender, residence, type of exposure (contact or travel), and symptoms. The presence of any symptoms at the time of specimen collection was also recorded. The date of specimen collection was used to draw the epidemic curve.

2.6 Statistical analysis: All the data were entered into the excel sheet and analysed using the Statistical Package for Social Sciences (SPSS, version 26).

3.0 Results

3.1 Testing: Figure: 1 and 6 presents the Block PHC-wise distribution of cases. The highest number of COVID-19 cases was identified in the Dhekiajuli BPHC, followed by Urban PHC and Defence & Para-military Cantonment areas. But, if the Incidence per 1000 population is considered then Defence & Para-military Cants was showing highest IR% followed by Urban PHC. During the study period, the Sonitpur District has tested approximately 133762.2 per million, with a positivity rate of 4.6%. The total cases per million were 6181 in the District. Sonitpur followed contact tracing diligently with the number of contacts (54·7) traced for each positive case detected.

3.2 Description of cases by time, place, and person: The age, gender distribution, and clinical details of all the COVID-19 cases in Sonitpur District are presented in Table: 1. To understand the dynamics of SARS-CoV-2 transmission within the state, a detailed analysis of the data available in the line list was undertaken. Amongst the 8182 COVID-19 positive cases, 5993 (73.3%) were asymptomatic, while 2189 (26.7%) were symptomatic. This study showed a maximum percentage of COVID-19 positive cases from contacts followed by traveller. Assam state undertook two very good practices viz. ATSP (Assam Targeted Surveillance Program) and ACSP (Assam Community Surveillance Program), where the surveillance team made house to house and high risk spots such as petrol pumps, truck stations, godowns etc. survey (SOP for Assam Community Surveillance Plan (ACSP) for COVID-19 2020, GoA, A Targeted Surveillance Drive in the name of Assam Targeted Surveillance Program 2020). The teams record presence of any SARI/ILI cases and accordingly they arrange for tests and hospitalization. SARI/ILI cases were also recorded from OPDS of all hospitals. A 7% SARI/ILI exposure was recorded in the present study (Figure 2). The age distribution revealed that maximum cases were found in the age group 18-44 years and least cases in the age group 0-5 years (Figure 5). The gender distribution revealed a male predominance in the cases (Table: 2 & 3 and Fig: 3).

Table 1: Age and Gender wise distribution of COVID-19 cases

Sl.No	Age Group (Years)	Number of Cases	Male	Female
1	0-5	103	58	45
2	0 - 17	431	237	194
3	18 - 44	5249	3813	1436
4	45 - 64	2059	1448	611
5	65 - 74	288	221	67
6	75 & above	155	102	53
TOTAL		**8182**	**5821**	**2361**

Table 2: Gender wise incidence of COVID-19 cases

Gender	COVID-19 Cases	Population	IR% (1000)
Male	5821	688254	8.5
Female	2361	635311	3.7
Total	8182	1323565	

Figure1: Month wise trend of COVID-19 cases and deaths in Sonitpur District from January to December, 2020

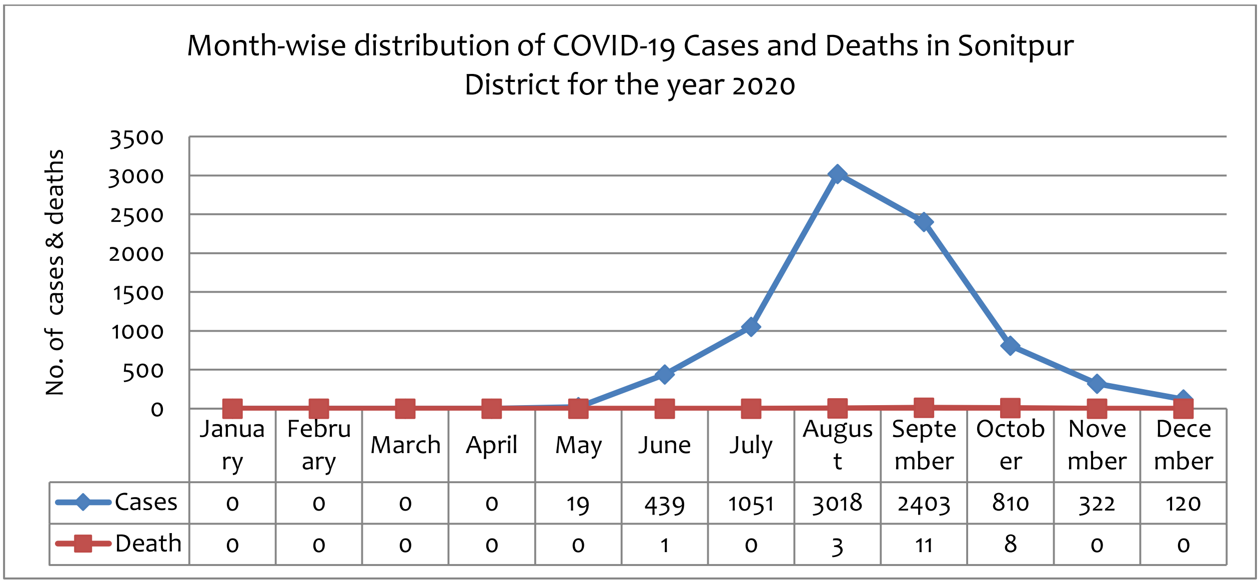


Figure 2: Exposer wise distribution of COVID-19 cases

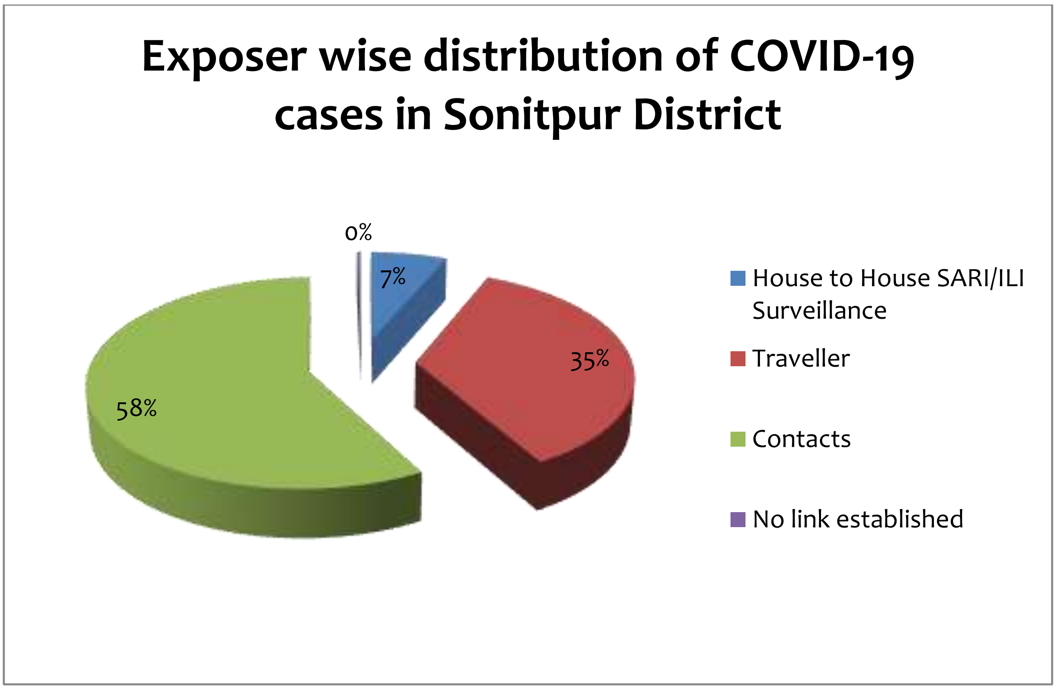
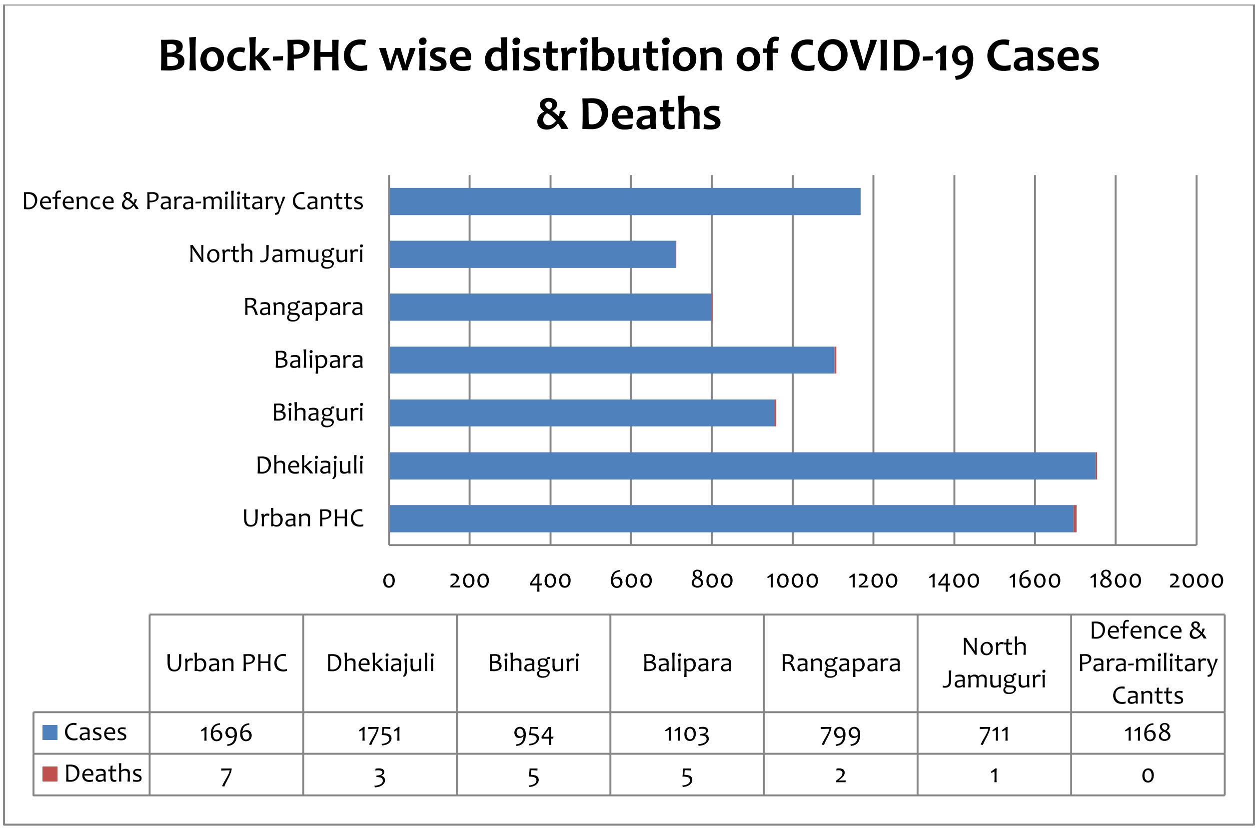


Figure 3: Block-PHC wise distribution of COVID-19 cases and deaths



	Urban PHC	Dhekiajuli	Bihaguri	Balipara	Rangapara	North Jamuguri	Defence & Para-military Cantts
🟦 Cases	1696	1751	954	1103	799	711	1168
🟥 Deaths	7	3	5	5	2	1	0

Figure 4: Block-PHC wise incidence of COVID-19 cases

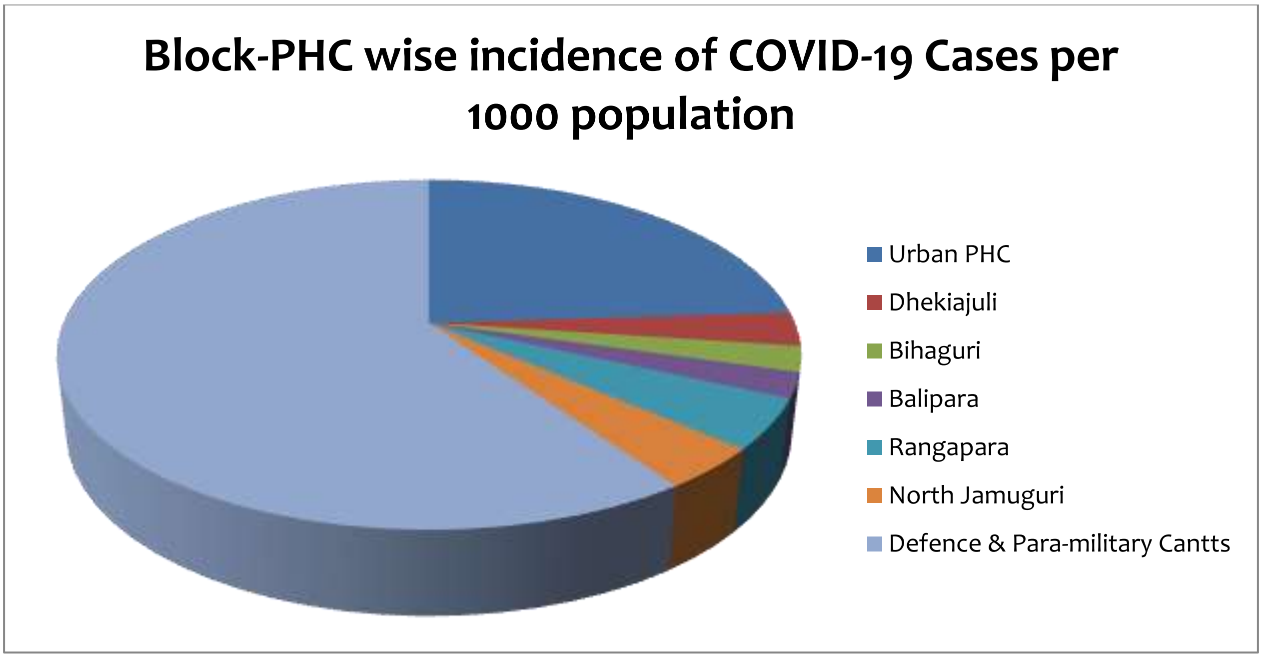


Figure 5: Age wise distribution of cases

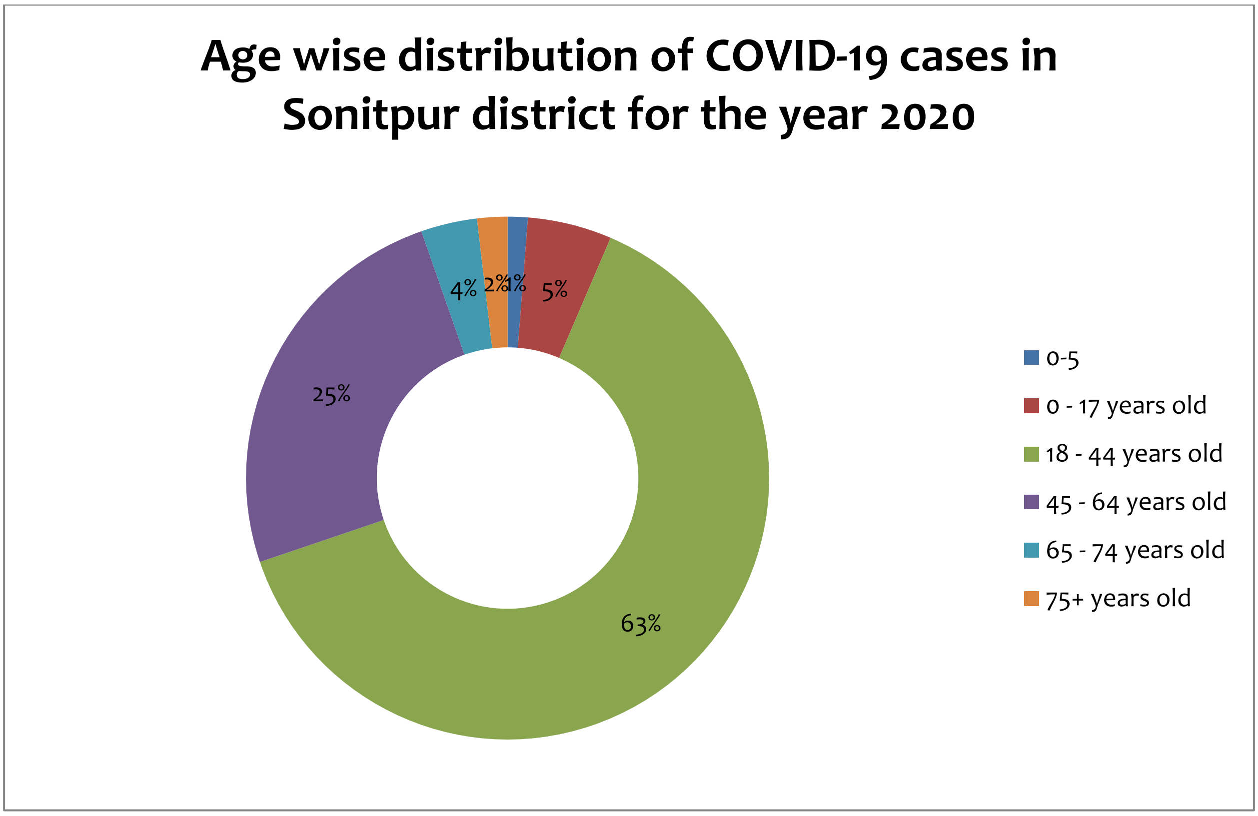


Figure 6: Incidence map of COVID-19 cases Block-PHC wise in Sonitpur District (Defence and Paramilitary cantts excluded in the map)

4.0 Discussion

This study describes the epidemiology of SARS-CoV-2 infections in the district of Sonitpur, Assam, India. Before April, 2020, there were no COVID-19 cases in the district. SARS-CoV-2 infection was introduced into the state by people travelling from other parts of the country. At the initial period (from 19/05/2020 to 07/06/2020), all cases were travellers from other states of the country, thereby suggesting that this was the main mode of introduction of SARS-CoV-2 into the district. It is presumed that these subjects had acquired the infection at the place where they initiated their travel. Alternatively, it is possible that they acquired it during their travel from fellow passengers. First case without travel history to other states reported on 08/06/2020. He is a cancer patient and was undergoing treatment in a hospital at Guwahati and perhaps he got the infection at the hospital or during his travel to Guwahati. From then, the positive cases from contacts started showing. From the detailed epidemiological analysis of data in this study, it emerges that both symptomatic and asymptomatic cases contributed to the transmission and spread of SARS-CoV-2 infection. The majority of the COVID-19 cases in Sonitpur were asymptomatic at the time of specimen collection, and this is similar to the results reported in India as well as other Asian countries (Day M 2020: 1375) and in contrast to what is reported in several western countries (Oran D.P. Topol E.J 2020:362-367). Most of the asymptomatic cases in this study were young adults or middle-aged (Table 1: <46 years of age).

The present study showed that Urban PHC has the highest incidence of COVID-19 cases (Figure 4) and it goes as per recent reports of SARS-CoV-2 seroprevalence studies carried out across India that have indicated that substantial transmission has occurred in rural areas although it was higher in urban settings (Murhekar M, Selvaraju S 2020, Murhekar M.V. Bhatnagar T. Selvaraju S. Rade K. Saravanakumar V. Vivian Thangaraj J.W. 2020:48-60). Sonitpur district has many Defence and Para-military Base cantonments extending up to Arunachal Border. In the study, the military persons entering the district were extensively tested. They showed the highest incidence of COVID cases. As they were kept inside the military arrangements, so in the study they were mentioned as a separate group. This group is not shown in the map as they keep on moving after completing the quarantine protocol of GOI. The trend of positive cases was decreasing. The peak was observed in the month of August and then decreased till December. The district has recorded a recovery rate of 99.48%.

5.0 Conclusion

In conclusion, the findings of this study demonstrate that, during the early phase of the pandemic, spread of SARS-CoV-2 infection in the district occurred from inflow of stranded persons from other parts of the country. While preventive measures such as use of face masks, social distancing, isolation, quarantine and hand washing has helped in the containment of the spread of SARS-CoV-2. Active search and early detection of symptomatic elderly patients with comorbidities had reduced the mortality (CFR 0.28%). Further, a robust surveillance system and testing of all individuals in high-risk settings has helped the district to control and manage the spread of SARS-CoV-2.

References

1) COVID-19 outbreak in March 2020, Kerala. NCDC Disease Alert, IDSP Newsletter, 2027375/2021/0/0/NCDC, Vol.5Issue04 2020:913-917
2) Bhosale S, Kulkarni AP. Is a problem shared, a problem halved? Not always! The novel coronavirus COVID-19 outbreak. Indian J Crit Care Med 2020;24(2):88–9.
3) BBMP COVID-19 WAR ROOM BULLETIN-22; 14-04-2020 https://bbmp.gov.in/PDF/coronavirus/aprilwarroom/COVID_Bengaluru_14April_2020 Bulletin English.pdf. 2020.
4) COVID19 information Portal GoA, Department of Health and Family Welfare, https://COVID19.assam.gov.in/wp-content/uploads/2020/05/laboratory-SoP.pdf.
5) David M, Lokeshkumar P, Suraj SD. COVID-19 (CORONAVIRUS): a global emergency outbreak and its implications in India. Int J Zool Appl Biosci 2020:5(2):89-98.

6) GoA, Containment zone, buffer zone and red zone order dated 21/05/2020 https://COVID19.assam.gov.in/wp-content/uploads/2020/05/Containmnet-zone-buffer-zone-and-red-zone-order.pdf.
7) SOP for Assam Community Surveillance Plan (ACSP) for COVID-19. https://COVID19.assam.gov.in/training_modules/sop-for-assam-community-surveillance-plan-acsp-for-COVID-19
8) GoA, A Targeted Surveillance Drive in the name of Assam Targeted Surveillance Program https://COVID19.assam.gov.in/wp-content/uploads/2020/06/A-Targeted-Surveillance-Drive-in-the-name-of-Assam-Targeted-Surveillance-Program.pdf
9) Kumar MS, Bhatnagar T, Manickam P, Kumar VS, Rade K, Shah N, et al. National sero-surveillance to monitor the trend of SARS-CoV-2 infection transmission in India: protocol for community-based surveillance. Indian J Med Res 2020;151 (5):419–23.
10) GoA SOP for COVID-19 Testing. https://COVID19.assam.gov.in/advisories-notifications-issued-by-government-of-assam/page/11
11) Control. NCDC. The updated case definitions and contact-categorization. New Delhi: NCDC, Directorate General of Health Services, Ministry of Health and Family Welfare,
12) Organization W.H. Clinical Management of COVID-19: Interim Guidance May 27. 2020. 2020.
13) Bhushan A. Kaur H. Narayan J. Rana S. Vijay N. ICMR COVID Study Group. Laboratory surveillance for SARS-CoV-2 in India: performance of testing & descriptive epidemiology of detected COVID-19, January 22 - April 30, 2020. Indian J Med Res. 2020; 151: 424-437
14) ICMR N.D. Advisory Strategy of COVID 19 testing in India (Version 2, 3 and 4).
15) Day M COVID-19: four fifths of cases are asymptomatic, China figures indicate.
16) BMJ. 2020; 369: m1375
17) Oran D.P. Topol E.J. Prevalence of asymptomatic SARS-CoV-2 infection: a narrative review.Ann Intern Med. 2020; 173: 362-367
18) Murhekar M, Selvaraju S. Findings from the second nationwide household Serosurvey. Lancet. 2020; (BT) (SSRN-Preprints)
19) Murhekar M.V. Bhatnagar T. Selvaraju S. Rade K. Saravanakumar V. Vivian Thangaraj J.W. et al.Prevalence of SARS-CoV-2 infection in India: findings from the national serosurvey, May-June 2020. Indian J Med Res. 2020; 152: 48-60

Public health and clinical response - Some best practices followed during Pandemic in Kollam District

Dr. Sreelatha*, Dr Sandhya, Dr. Hari Kumar, Dr Manikandan, Dr. Anu, Dr. John Mathew, Dr. Timmy Rodrigrier George, Priyanka Sajeev, Dileep Khan

Abstract

Being a pandemic, extraordinary effort was needed from the whole team from top to bottom for the coordination and control of pandemic activities. The activities can be divided into 3 phases where in the first phase (JAN-APRIL), the focus was on creating awareness regarding the disease, preparation of protocols, procedures and action plan. Surveillance played a key role in phase2 (MAY-AUG). "Testing, Tracing and Treating" became the key principles in this phase. Surge prevention plan coupled with strengthening of lockdown measures and quarantine measures was activated. In Phase 3 (SEP-DEC), district intensified surge prevention plan through IEC, strengthening of testing, tracing and treating. Morbidity and mortality reduction by strengthening the post COVID Clinics and NCD Clinics was a milestone in the pandemic mitigation efforts. Specific action plans were formulated to prevent post-election surge, post- festival surge and the anticipated surge in connection with school reopening.

Keywords: Surveillance; Pandemic; Tracing; Surge; Quarantine

1.0 First Phase (Jan-April)

First case of COVID-19 pandemic was reported in Kerala on 30th January 2020. Soon after, the District administration started its pandemic preparedness activities by giving awareness to all departments and schools and colleges on the pandemic and its preventive measures. Surveillance of hotels, pilgrimages, tourist destinations where foreigners were staying were done from district level. Imparted the awareness and instructions through IEC; Do's and don'ts in relation to COVID-19 was given to general population. District Rapid Response Team (RRT) was made functional along with RRTs in all hospitals. In collaboration with IMA, sensitized the Private sector doctors. Government Medical College, Kollam was identified as COVID hospital and District Hospital, Kollam Kollam as back up hospital. Five Ambulances were parked at five different spots- Karunagappally, Punalur, Kottarakkara, Kollam and Parippally for taking patients for swab testing. Swab test was arranged in five major hospitals across the district. With the introduction of universal mask wearing, district health department with the support of district Collector, instructed the Drug controller to ensure the availability of mask and sanitizer at reasonable rate. Production of mask was also done at district level. Border surveillance and travel surveillance were strengthened. Strong inter-departmental collaboration paved the way forward to fight against the pandemic. Paid and unpaid quarantine centres were arranged by Revenue department and LSGD [Local Self-Government Department]. Border pass verification done by health along with revenue and Police. 24x7 control room was set up at district Collectorate, Civil Station, Kollam. The first case was reported in the district on March 27,2020.

2.0 Second Phase (May-Aug)

With the first case reported on March 27, 2020, the district has started its COVID 19 treatment facility at GMC, Kollam. Detailed plan was made to identify the hospitals for taking up new cases and to tackle the increased number of cases. First cases were reported as clusters and later case load increased. With this, the DH, Kollam followed by 12 other major private hospitals had started managing the COVID cases. CFLTC's (COVID First Line Treatment Centers) and CSLTC's (COVID Second Line Treatment Centers) were established. Home treatment started in the district when the patient load exceeded 70% of the total bed strength of CFLTCs. Later, for those who doesn't have facility at home to manage the COVID, the step down CFLTC/Domiciliary care centre (DCC) was set up in the district.

As more and more treatment centres started, to avoid confusion, a referral protocol was drafted in the district under the leadership of District collector which channelized the referral based on the symptom categorization of the patient. Referral audit was done to identify the gaps and take the measures to rectify it.

Testing at field level was done with five mobile WISKS and decentralization of testing up to PHC/CHC level done.

IECs in the form of print media/audio visuals/social media and banners/posters etc was functional throughout the process.

Death audits was conducted by the team with expert panel under District Collector during this period that helped to identify the implementation areas where more attention is needed.

Centralized referral of patients was done initially which later changed to decentralized referral approach in which each PHC/CHC MO will refer the COVID patients in their area to higher centre based on the symptom categorization as per district referral protocol.

Infrastructure development and HR recruitment done during this phase. Comprehensive contact tracing was conducted with the help of route map of the patient from district level. District cluster team was formulated and specific cluster containment activities were initiated in the district.

Migrant screening was strengthened in the district with the inter-sectoral coordination of LSGD and Revenue department. Transportation of the migrant workers to their native place was completed with the help of Labour Development. DPMSU was set up at collectorate where coordination of ambulance server, Lab surveillance, home treatment follow up were done. 24*7 call centre was functional.

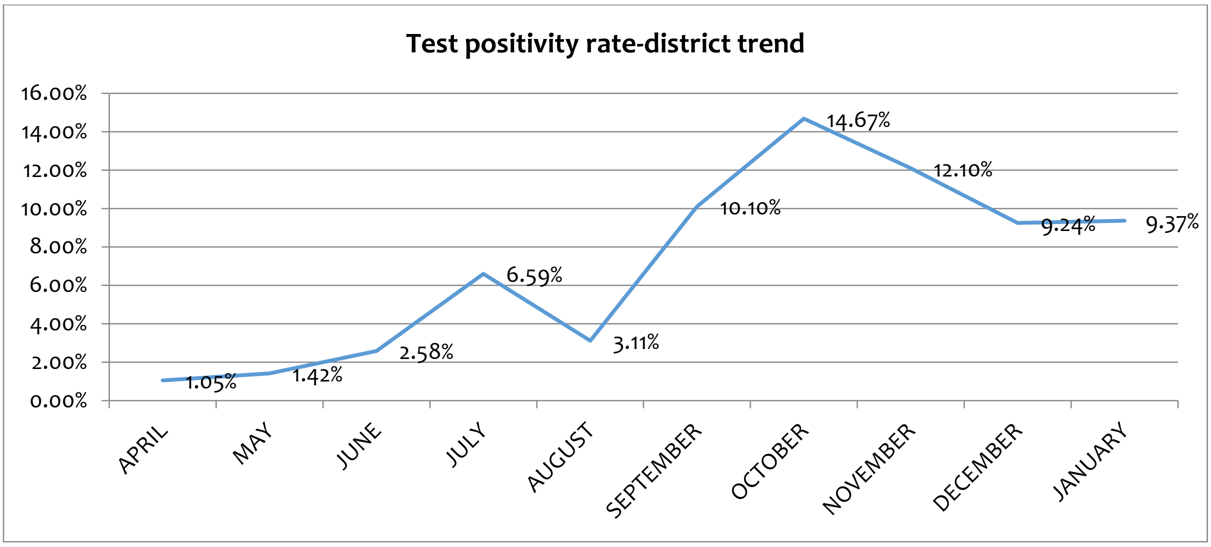


Fig 1: District TPR Trend over months

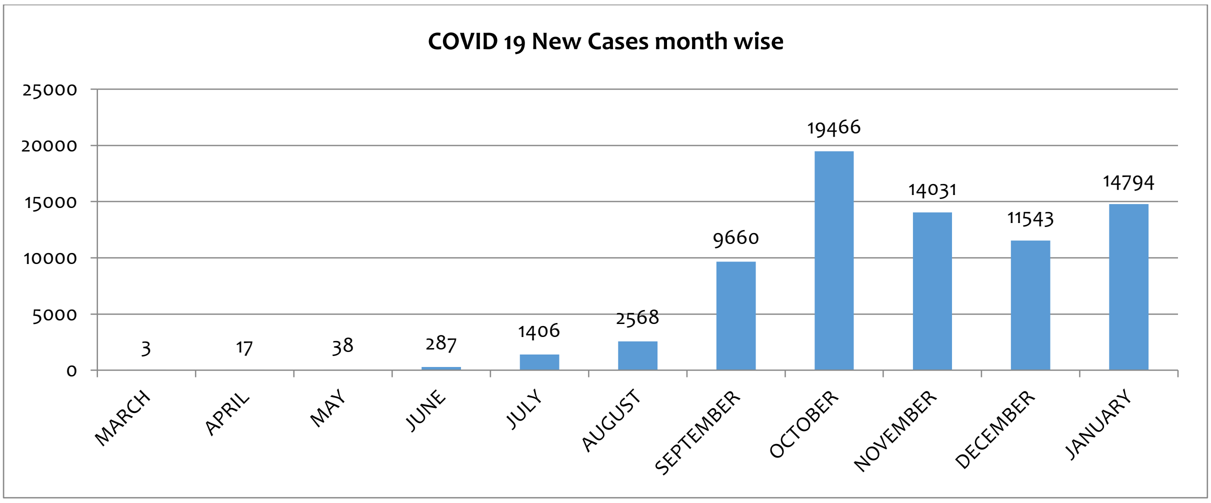


Fig 2: COVID 19 new cases month wise trend

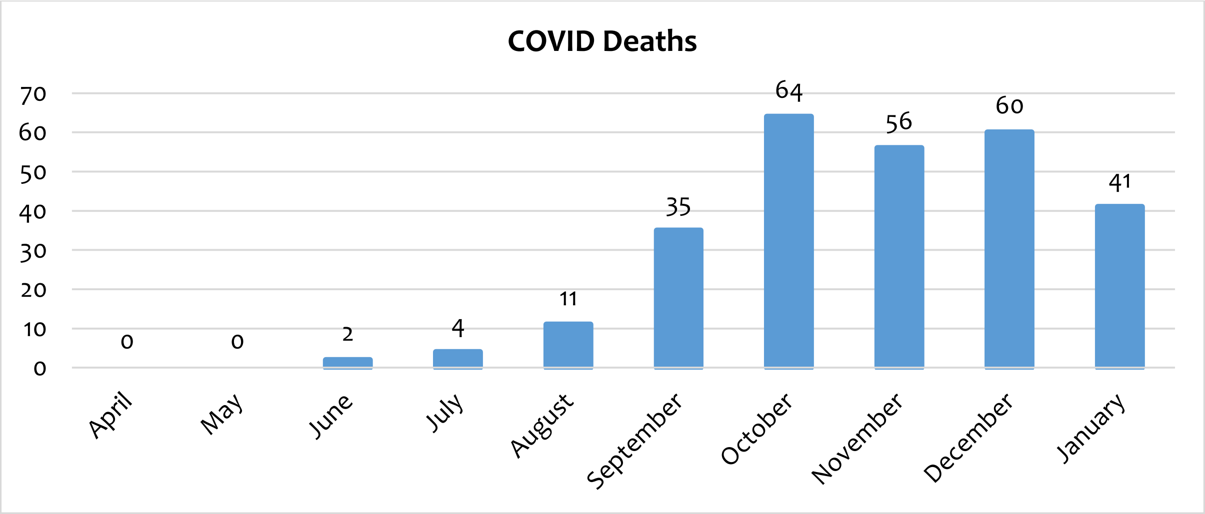


Fig 3: COVID 19 deaths month-wise trend

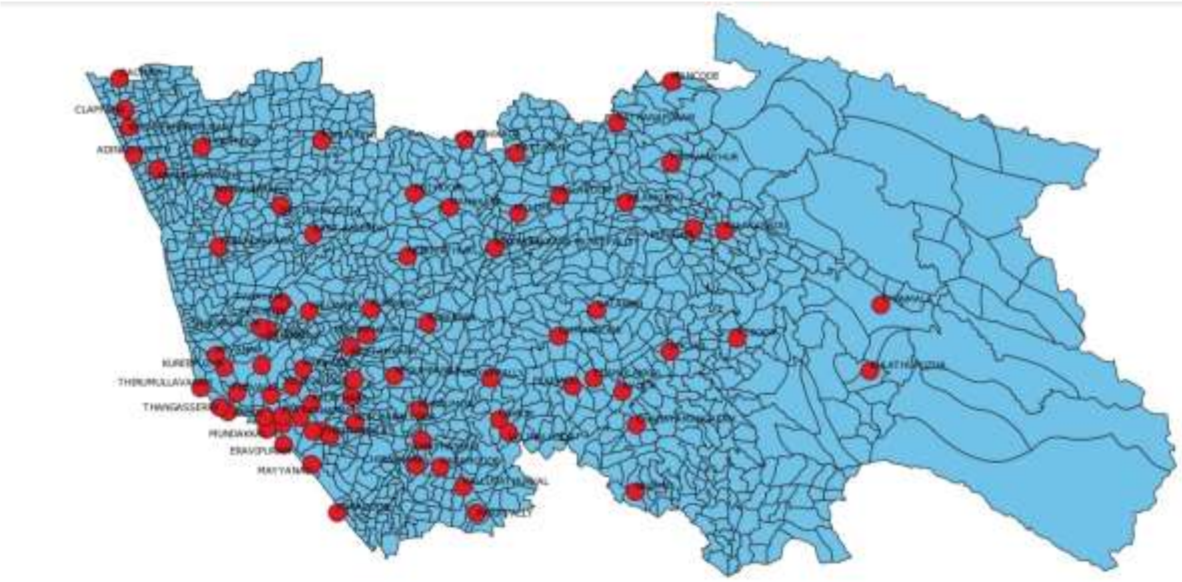


Fig 4: GIS mapping of death cases

3.0 Third Phase (Sep-Dec)

More focused activities were planned and implemented during this period. In the context of school reopening/election/festivals/Sabarimala pilgrimage, special arrangements, trainings, testing facilities are strengthened including establishing of step KIOSKS at various places.

Along with the "Triple zero campaign" launched in the district which emphasized on zero infection, zero transmission and zero disease thereby reducing the morbidity and mortality associated with COVID by strengthening the testing, tracing and treating (target oriented decentralized approach in a phased manner). First phase focused on vulnerable population in the context of election that includes people who worked in connection with election. Second phase focused on closed contacts, crowded places and clusters. Third phase focused on ILI surveillance (100% testing among ILI cases) and cluster areas (100% testing in cluster areas) along with these strengthening of IEC.

The closed cluster group also plays a role in increasing awareness among population and preventing further spread of disease. The death rate in Kollam district also less than state level and recovery rate is remarkable with the focused activity on health. With the good coordination and with the help of various departments led by DDMA team headed by District Collector, Kollam district is expecting to bring the R0<1.

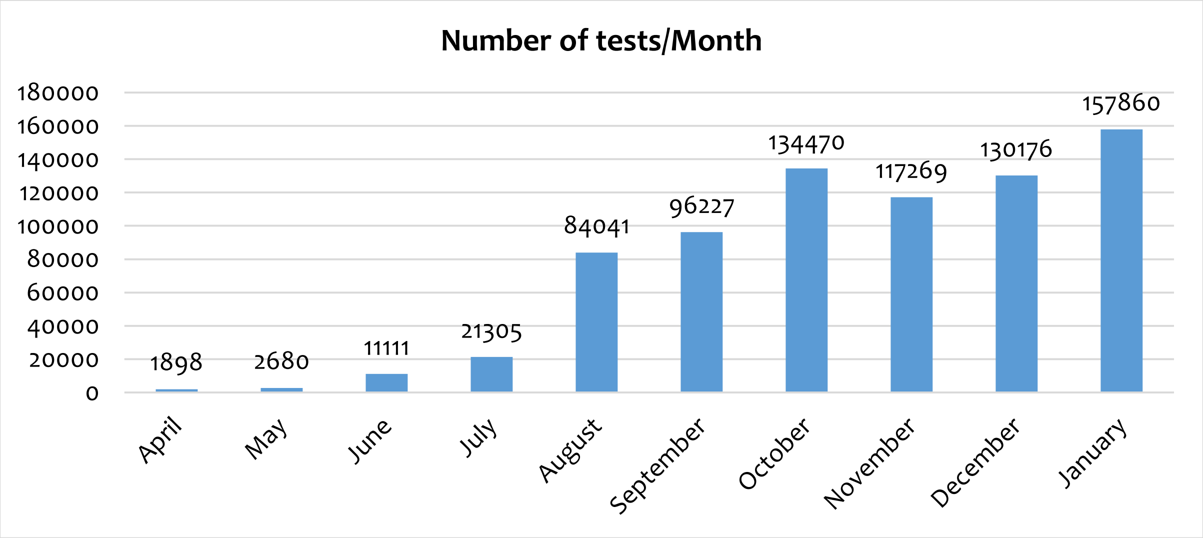


Fig 5: Number of Tests done in the district each month

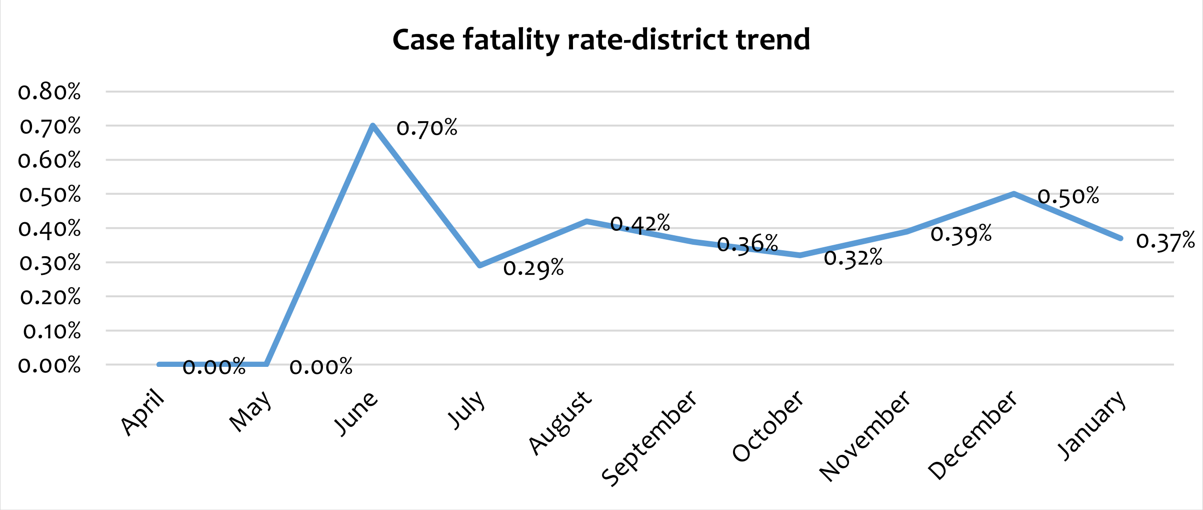


Fig 6: Case fatality rate district trend over months

References

1) NO. DCKLM/1527/2020-DM(2) dtd 26/08/2020
2) NO.3/F2/2020 health 11/11/2020
3) NO.PHI-78737/2020/DHS dtd 11/11/2020

4) NO.31/F2/2020 27 Nov 2020
5) SOP Surveillance &Response-UK Passenger Dec 2020 MOHF
6) Technical paper-COVID 19
7) Reduction in all-cause mortality in Kerala during COVID19 Pandemic
8) NO.31/f2/2020 H&FWD 24/01/2021
9) NO.31/F2/2020 H& FW 22/AUG/2020

Heteroscedasticity Corrected Models to Forecast COVID-19 Spread in Kerala

Unnikrishnan T.* and Ajitha T.K

Abstract

The long run relationship between number of COVID-19 active, confirmed and recovered cases in Kerala over a period from 30.01.2020 to 16.01.2021 have been analysed. The concept of heteroscedasticity correction were utilized to develop forecasting models. The model clearly depicts that the number of persons having COVID-19 before 1 week has a significant role to forecast current number of COVID-19 cases in Kerala. Based on the weekly confirmed, cured and active COVID -19 cases we can easily project them a week ahead using time series models so as to materialize instantaneous remedy measures.

Keywords: COVID-19, Kerala, Time Series, Heteroscedasticity correction, Regression

1.0 Introduction

An attempt is made to analyse the long term relation between active cases and the confirmed and recovered cases using time series models. Time-series models may be classified as empirical or dynamical. The present work deals with empirical models in the sense that it is based on the variability of past realized observations.

2.0 Materials and Methods

The data pertaining to number of COVID-19 cases confirmed, recovered and number of active COVID-19 cases over a period from 30.01.2020 to 16.01.2021 were collected from the website of Department of Public Health, Government of Kerala, (https://dashboard.kerala.gov.in/index.php). Weekly number of cases was worked out and data were arranged as another time series. Here an attempt is made to study the behaviour of active number of COVID -19 cases in Kerala by considering weekly data on the number of cases confirmed and number of cases recovered.

Apart from the change in measure of central tendency, the non-stationarity in a time series might have arisen due to the heteroscedastic (non-constant variance) behaviour of the series. With heteroscedasticity, although estimated parameters remain unbiased and are consistent, the estimated covariance matrix among the parameter estimates will be incorrect (Rencher, 2000). This can lead to low statistical power or inflated Type I error rates (Box, 1954). Procedures for the unbiased estimation are given in Cohen et al. (2003), Rencher (2000) and Seber and Lee (2003). Rosopa *et al.* (2013) presented a set of procedures that can be used to assess whether heteroscedasticity exists, as well as how to proceed with data analysis in the presence of heteroscedasticity.

Heteroscedasticity in the regression $Y_t = \beta_0 + \beta_1 x_t + \beta_2 x_t + \varepsilon_t$, means that the variance of ε_t is not constant, but changes whenever some other variable changes. The other variable may be the explanatory variable X or Z or time t. There are several ways to write this, but one way, using X and Z along with their squares is Var (ε_t)=$(\alpha_0 + \alpha_1 X_t + \alpha_2 {X_t}^2 + \alpha_3 Z_t + \alpha_4 {Z_t}^2)^2$.

The variance Inflation Factor VIF(j) = 1/(1 - R(j)^2), where R(j) is the multiple correlation coefficient between variable j and the other independent variables if the value of VIF came to be below 10 which ensures absence of multi-collinearity in the model.

3.0 Results and Discussion

From the daily data, weekly data were worked out and arranged in a sequence. ACF and PACF were worked out to test the stationarity of the data and found it non-stationary. Hence heteroscedasticity corrected models were worked out to solve the problems.

3.1 Heteroscedasticity Corrected model to forecast number of COVID-19 cases

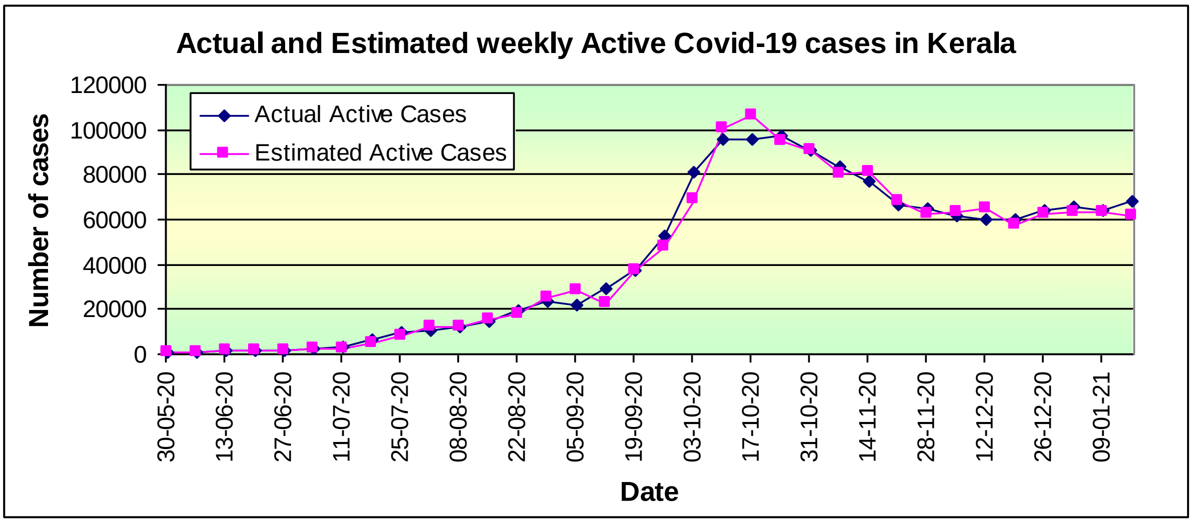


Fig. 1. Actual and Estimated weekly COVID-19 active cases in Kerala

Since the data were non-stationary, it was observed that heterogeneity was present in the data. Hence normal regression models could not be worked out and so heteroscedasticity corrected models were tried and the estimated parameters of the models were obtained. The final model for finding expected number of active cases in the next week is obtained as:

$$A_t = 1.99874*C_{t-1} - 0.257827*R_{t-1} + 327.93$$

where A_t is the active cases in the present week, C_{t-1} is the number of Confirmed patients in the previous week and R_{t-1} denotes the number of cases recovered in previous week. The adjusted R^2 is 0.9946 indicating 99.46 percent of variation in the confirmed number of patients can be estimated from the number of cases. The Durbin Watson statistics was

1.90 which is near to two which ensures no auto correlation in residuals. A combined plot of the actual and estimated number of cases is given in Fig 1. The residual auto correlation showed that the model is a good fit to the data.

3.2 Heteroscedasticity Corrected model to forecast number of cases Recovered from COVID-19

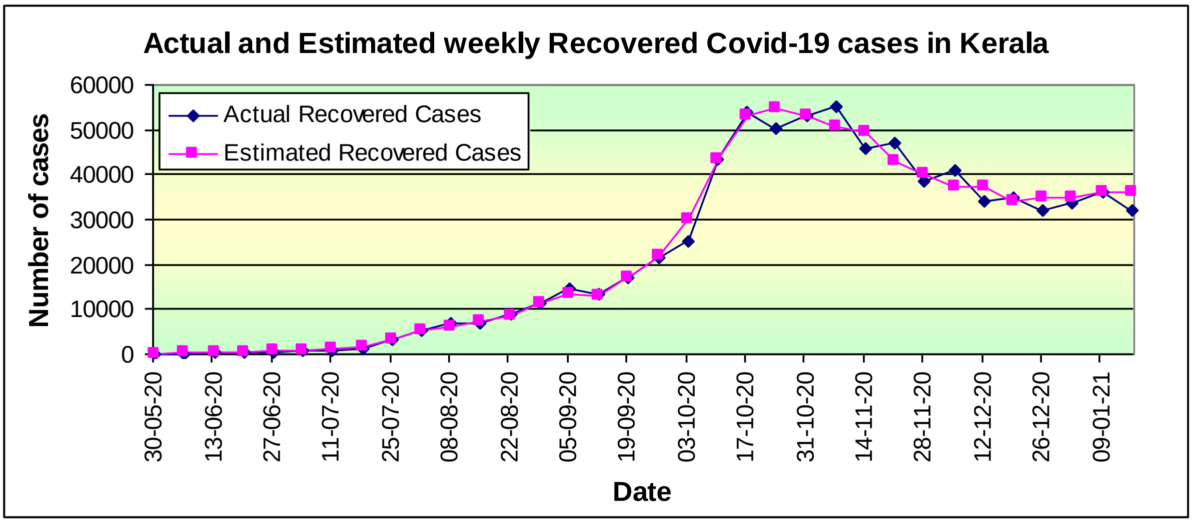


Fig. 2. Actual and Estimated weekly number of recovered COVID-19 cases in Kerala

Heteroscedasticity corrected models for forecasting number of recovery from weekly cases were estimated and the parameters of the models were obtained.

$$R_t = 0.565914{*}C_{t-1} + 0.248874{*}A_{t-2} - 58.3892.$$

Where R_t denotes the recovered number of patients in the present week, C_{t-1} is the number of Confirmed patients in the previous week, and A_{t-2} is the active cases before two weeks. The adjusted R^2 is 0.9925 indicating 99.25 percent of variation in the recovered number of patients which can be estimated from the sequence of non-overlapping weekly data. The decimal part coming in the estimates is to be avoided using greatest integer function. The Durbin Watson statistics was 2.6, which is optimum and the variance Inflation Factor for the series were below 10, which ensures no problem of multi-collinearity in the model. A combined plot of the actual and estimated number of recovered cases is given in Fig 2. The residual ACF showed that the models are good fit.

4.0 Conclusion

Excellent parsimonious linear regression models could be developed using the concept of heteroscedasticity correction for residuals to forecast spread of COVID-19 cases in Kerala. This model can be very effectively utilized in planning recommendations and policies to be adopted at least a week in advance. The model clearly indicates that the number of persons received the COVID-19 infection in a week from present has a significant role in judging current figure. Knowing the details of confirmed number of COVID-19 cases and cured COVID-19 cases we can easily project it to a week ahead using the models developed so that instantaneous remedial measures can be implemented. The forecasted number of cases for February 2021 shows cases are concentrating around 5000 daily. Hence more remedial measures and actions should be taken to break the chain of COVID-19 spread in Kerala at the earliest.

References

1) Akaike, H. (1973). Information theory and an extension of the maximum likelihood principle. In B. N. Petrov and F. Csaki (Eds.), *Second international symposium on information theory* (pp. 267281). Budapest: Academiai Kiado.
2) Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, 19, 716723.
3) Box, G. E. P. (1954). Some theorems on quadratic forms applied in the study of analysis of variance problems, I. Effect of inequality of variance in the one-way classification. *Annals of Mathematical Statistics,* 25,290–302. doi:10.1214/aoms/1177728786
4) Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.).
5) Cottrell, A. and Lucchetti, R. (2011). gretl user's guide GNU regression, econometrics and time-series library,
6) Gao, Y., Zhang, Z., Yao, W., Ying, Q., Long, C., & Fu, X. (2020). Forecasting the cumulative number of COVID-19 deaths in China: A Boltzmann function-based modeling study. *Infection Control & Hospital Epidemiology*, 1-3. doi:10.1017/ice.2020.101
7) Hansun and Seng. (2016). A New Approach of Brown's Double Exponential Smoothing Method in Time Series Analysis. *Balkan Journal of Electrical and Computer Engineering*. 4. 10.17694/bajece.14351.
8) KleinA.G., GerhardC., Büchner, R.D., Diestel, S. and Engel, K.S. (2016). The Detection of Heteroscedasticity in Regression Models for Psychological Data, *Psychological Test and Assessment Modeling*, Volume 58(4), 567-592
9) Lampis, F. and Díaz-Emparanza, I. and Banerjee, A. (2015) How to use SETAR models in gretl. *Computational Economics*, Spring (2). pp. 231-241.
10) Mahwah, N.J., Erlbaum, DeShon, R. P., and Alexander, R. A. (1996). Alternative procedures for testing regression slope homogeneity when group error variances are unequal. *PsychologicalMethods, 1,* 261–277. doi:10.1037/1082-989X.1.3.261
11) Nishiura H., Kobayashi T., Miyama T., Suzuki A., Jung S. and Hayashi K. (2020). Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19). *medRxiv*. 17 Feb 2020.
12) Rencher, A. C. (2000). *Linear models in statistics*. New York, NY: Wiley.

13) Rosopa, P.J. Schaffer,M.M. and Schroeder, A.N. 2013. Managing Heteroscedasticity in General Linear Model Psychological Methods ,*American Psychological Association*, Vol. 18, No. 3, 335–351

14) Seber, G. A. F., & Lee, A. J. (2003). *Linear regression analysis* (2nd ed.), Hoboken, NJ: Wiley. doi:10.1002/9780471722199

15) Shen, M. Peng, Z., Xiao, Y., Zhang, L. (2020). Modelling the epidemic trend of the 2019 novel coronavirus outbreak in China *bioRxiv* 2020.01.23.916726; doi: https://doi.org/10.1101/2020.01.23.916726

16) Siettos C I, Russo L. (2013). Mathematical modelling of infectious disease dynamics. *Virulence*. 4(4):295–306. doi: 10.4161/viru.24041.

Vaccine Diplomacy: Mobilized Approach to Fight the COVID-19 Pandemic Empowered by Vaccine

NK Prasanna1* and SK Varshney

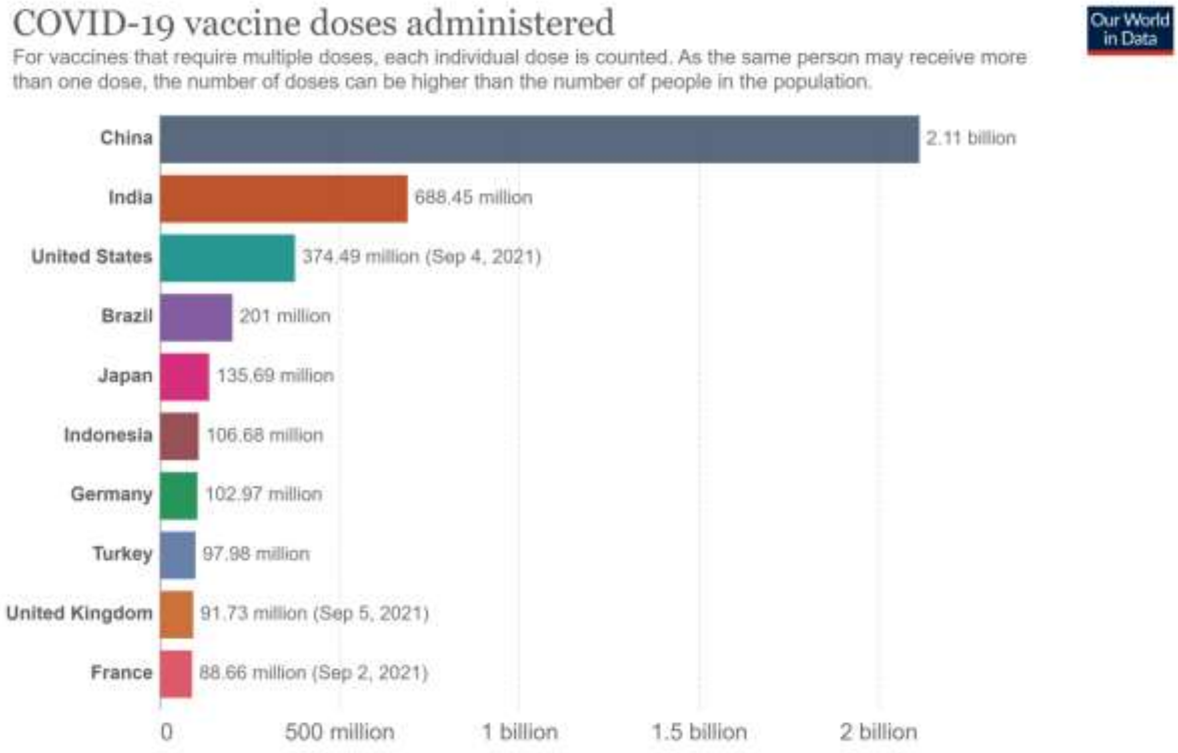
Abstract

The development of vaccines has emerged as a global tool to harness the potential of diplomacy. Vaccine diplomacy is a branch of global health that focuses on the distribution and usage of vaccinations all over the world. Though difficult to implement on ground, it is nonetheless as important as the process of its development. From making indigenous vaccines to its distribution to needy countries, all boost the regime of vaccine diplomacy. Decent diplomacy calls for sharing vaccines with other countries, which has been achieved through the mechanism of COVAX facility aimed at not only promoting healthy international relations but also be a great step towards strengthening global bonds of humanity. History is witness to the fact of pandemics serving as a reminder of the need of increasing vaccine development capacity throughout time. The Indian government was also one of the first to participate in "vaccine diplomacy," which aimed to help countries that otherwise fell far short of easy access to new vaccine candidates. The development of vaccines to combat this fatal disease has been a journey with a definite social impact for everyone, particularly for countries that had previously been powerless in reducing infection rates.

Keywords: Vaccine, Diplomacy, COVAX, Pandemic, Indigenous

1.0 Introduction

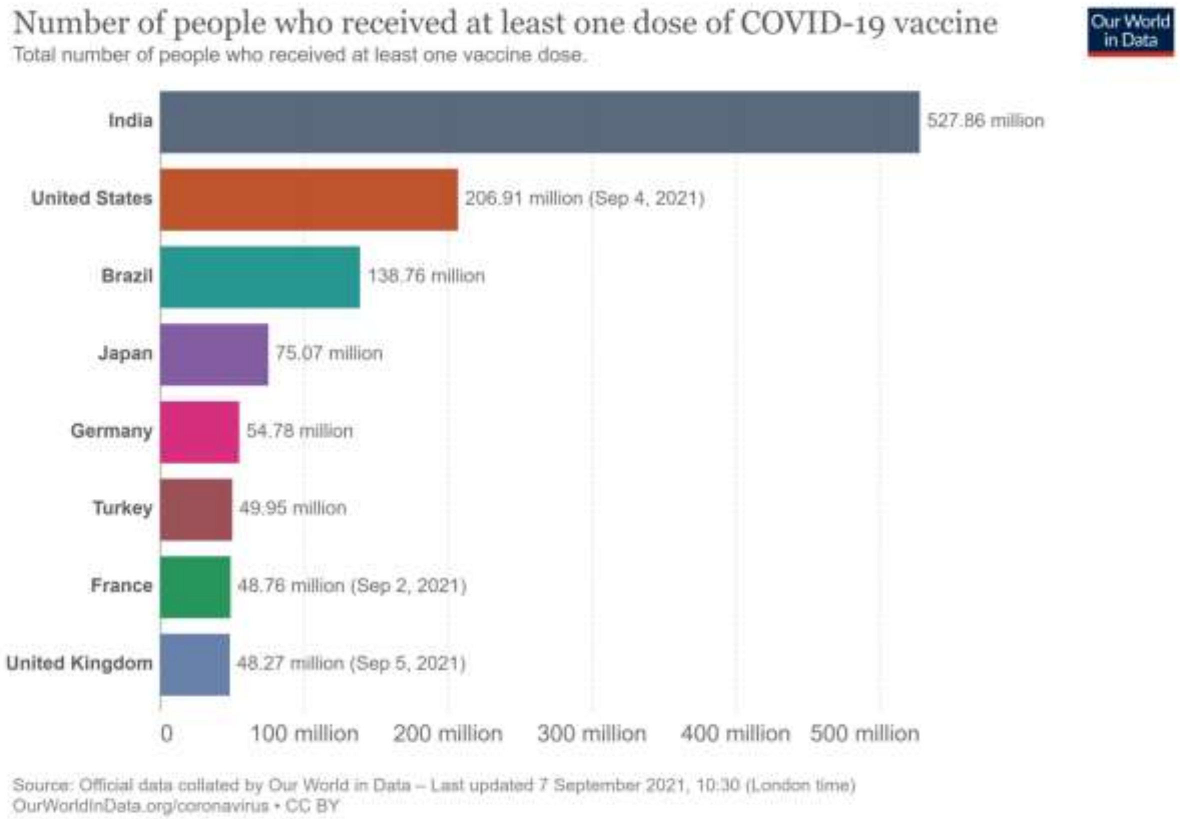
Vaccine has undeniably aided diplomatic relations, allowing antagonistic and disputing nations to join together and find a definitive answer to shared global concerns as fast as feasible[1]. With the advent of COVID-19 vaccines, home-grown country wide vaccines when distributed all around the world can play a critical role in country branding as a technique for projecting soft power[2].In recent times, the world’s vaccination drive has gained a considerably wide media coverage at a global scale. As of 23 August 2021, 08:00 IST (GMT+5:30)] 58,25,49,595 population have been vaccinated in India. In addition, the vaccination has been imported and exported by several countries to fulfil the demand for COVID-19 vaccines. Global cooperation for building and harnessing such vaccine diplomacy is commendable. International organisations such as the World Health Organization and the World Trade Organization have stressed the need for international collaboration in maintaining the seamless movement of vaccines and other critical medical supplies across countries. Over the past two decades, India has earned the title of "world pharmacy," thanks to its robust generic pharmaceutical sector, which has been delivering inexpensive medications that meet international quality standards to worldwide markets [3]. India has launched two important ways to combat the scourge of the COVID-pandemic, in keeping with its historical position as a source of inexpensive medications. The first is to make vaccinations widely available, in response to mounting evidence that making COVID-19 vaccines available to everybody is important. The second initiative is a World Trade Organization (WTO) joint request with South Africa that seeks a temporary waiver from the application and enforcement of four types of intellectual property rights (IPRs) [4, 5, 6].



Source: Official data collated by Our World in Data – Last updated 7 September 2021, 10:30 (London time)
OurWorldInData.org/coronavirus • CC BY

2.0 BRICS

In 2009, the BRICS (Brazil, Russia, India, China, and South Africa) collaboration was formed. Through developmental projects, the BRICS seek to contribute to the 2030 Agenda for Sustainable Development (2030 Agenda) and its 17 Sustainable Development Goals (SDGs).The way this organisation treats the coronavirus illness 2019 (COVID-19) has global implications, with a high likelihood of effecting the achievement of some of the SDGs. The BRICS COVID-19 collaborations in vaccine research, treatments, and other accessories have been scrutinised [7]. It brings together nations that account for more than 40% of global population and 25% of global area [8]. It is quite a challenge to fathom the complete import of BRICS without comprehending the present and prospective geopolitical set-up and conflicts, particularly those between India and China which underscores the importance of Indo-China geopolitics. [9].



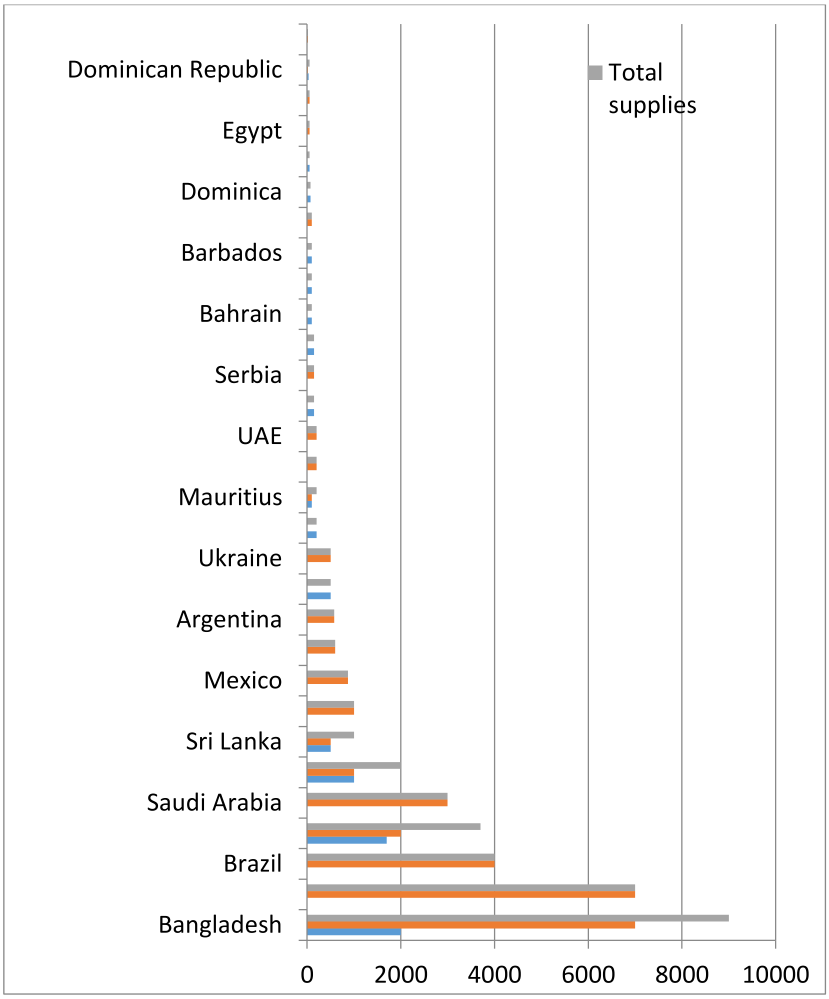
Number of people who received at least one dose of COVID-19 vaccine

Total number of people who received at least one vaccine dose.

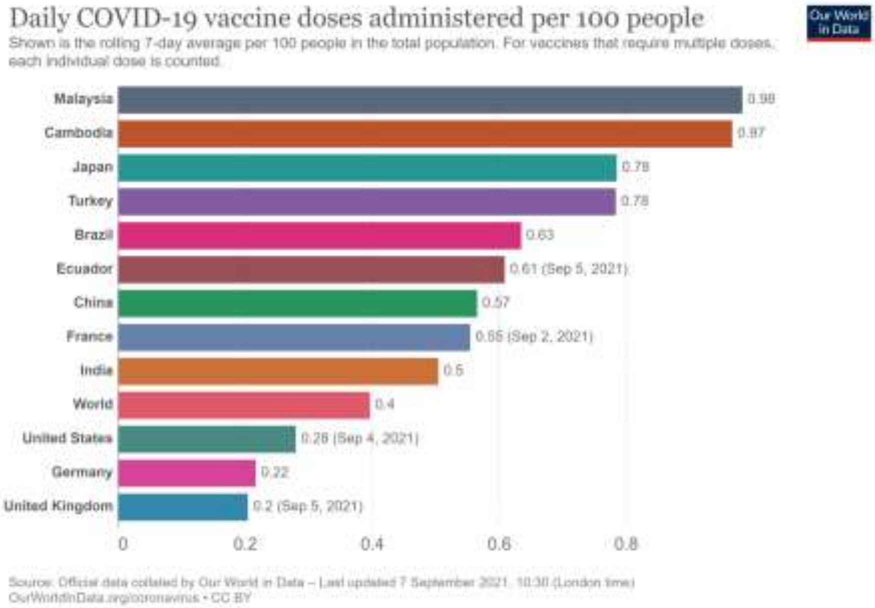
Source: Official data collated by Our World in Data – Last updated 7 September 2021, 10:30 (London time)
OurWorldInData.org/coronavirus • CC BY

India was a trailblazer in its 'vaccine diplomacy,' as were many other countries devoted to global vaccination collaboration. India is a vaccine superpower, producing around 60% of the world's vaccines. It has supplied 66.4 million doses of COVID-19 vaccines to over 90 countries before halting exports in April, including Southeast Asian countries (i.e.) Cambodia, Laos, and Myanmar. According to data released by the Ministry of External Affairs, approximately 6.64 crore doses of the COVID-19 vaccine were exported to 95 countries, with 3.58 crore doses going to 26 countries under commercial contracts, 1.07 crore going to 47 countries as grants, and 1.98 crores going to 47 countries through the COVAX facility. Other countries received supplies via grants, gifts, commercial shipments, or as part of India's pledges under the World Health Organization-backed COVAX initiative, which attempts to guarantee fair worldwide vaccine distribution [10, 11].

Vaccine diplomacy allowed India to not only strengthen its ties with the Bangladesh government but also reclaim the trust of its citizens. As a result, it's no surprise that Bangladesh was the first country to receive vaccines from India as part of the government's Vaccine Maitri initiative [11]. Through its diplomatic outreach with vaccinations, India emerged as a first response to the COVID-19 problem in its near neighbourhood [12]. Bhutan received the first cargo from the Serum Institute of India in Pune in January 2021, containing 0.55 million doses on a grant basis [13]. In March, India suspended vaccine shipments after being struck severely by the pandemic's second wave [14]. This ruling has had ramifications in many nations.



Indias COVID-19 vaccine Supplies:
Source: Ministry of external affairs:Vaccine supply(Table)



Public health should be prioritised before economic gain and international trade laws meant to safeguard IPRs in a worldwide public health catastrophe like the COVID-19 pandemic need accentuated and highly focused attention.

In October 2020, India and South Africa, both of which have significant generic medicine manufacturing infrastructure, requested a temporary waiver of IPRs (drugs and vaccines) relevant to the "prevention, containment, or treatment of COVID-19" under WTO regulations. On equipment (patents, copyrights, trade secrets, and industrial designs), a waiver would allow governments to develop equipment and vaccines without the need for authorization from IPR holders. This move would abolish the monopolistic aspect of IPRs, which grants holders exclusive rights and allows them to impose procedural licensing limitations.

Conclusion

At a time when the COVID-19 crisis and vaccine diplomacy had given India a much-needed platform to push regional cooperation in South Asia, being forced to cease shipments on the one hand and expanding Chinese influence on the other can have serious political and strategic consequences.

While safeguarding the lives of its citizens is paramount, India should increase its manufacturing capacity to the point where it can restart vaccine delivery to other nations, particularly those in its close vicinity. Not only does trade in vaccines and other critical health products help save lives, but it also helps build more resilient healthcare systems across South Asia in advance of potential future pandemic waves.

References

1) SK Varshney and N K Prasanna. Vaccine diplomacy: Exploring the benefits of international collaboration. *Current Trends in Biotechnology and Pharmacy.* Vol. 15 (1) 110-114 January 2021.
2) Seow Ting Lee. Vaccine diplomacy: nation branding and China’s COVID-19 soft power play. *Place Branding and Public Diplomacy.2021.*
3) https://www.indiachinainstitute.org/2021/03/04/indias_vaccine_diplomacy/
4) https://www.globalpolicyjournal.com/blog/08/04/2021/indias-vaccine-diplomacy
5) Jeffrey Gettleman, Emily Schmall and Mujib Mashal, “India cuts back on vaccine export as Infections Surge at Home”, The New York Times, March 25, 2021, https://www.nytimes.com/2021/03/25/world/asia/india-COVID-vaccine-astrazeneca.html.
6) https://moderndiplomacy.eu/2021/07/17/vaccine-equity-and-beyond-intellectual-property-rights-face-a-crucial-test/
7) GodwellNhamo (2021) COVID-19 Vaccines Development Discord: A Focus on the BRICS and Implications for Africa’s Access and Affordability Matters, Politikon, 48:2, 278-296,

8) Sharma, J., and S. K. Varshney. 2020. "Role of Indian Science Diplomacy in Combating COVID-19."Science Diplomacy Review 2 (2): 35–48.
9) Rahmati, F., M. A. Ali, and M. Kamraju. 2020. "A Study on India-China Current Geopolitical Issues and Implications." International Journal of Scientific Research in Engineering and Management 4 (6): 1
10) COVID-19 Updates, "Vaccine Supply", Ministry of External Affairs, Government of India, https://mea.gov.in/vaccinesupply.htm.
11) https://thewire.in/trade/time-for-india-to-reinvigorate-vaccine-diplomacy-in-south-asia
12) https://thediplomat.com/2021/05/dont-write-off-indian-vaccine-diplomacy-yet/
13) https://orfonline.org/wp-content/uploads/2021/06/ORF_SpecialReport_145_VaccineDiplomacy-Neighbourhood.pdf
14) https://asia.nikkei.com/Spotlight/Asia-Insight/India-s-COVID-second-wave-disrupts-vaccine-export-plans

Comprehensive COVID-19 Management at NALCO S&P Complex, Angul, Odisha – Evidence Based Best Practices

Dr. Chinmaya K Barik, Madhumita James*, Swarnalata Prusty, Kunmun Sahoo

Abstract

In the history of communicable diseases for the first instance, we have encountered this highly contagious 2019nCoV. We at NALCO faced this deadly virus with our various indigenously developed techniques & methodologies. With the purpose to identify the disease, trace, contain it & curtail the route of transmission our team moved forward. For the above mentioned purpose, we developed different methods like awareness creation & training, screening protocols, mobility & transit control, surveillance & contact tracing, COVID care centre, containment zones management, infection prevention & control, digitalization of data. By successfully implementing the above mentioned methods we got a positive result in the face of controlling & containing the disease in our township. Hence it concludes that our techniques & methods to contain the disease are self-reliant, precise & accurate.

Keywords: COVID Care Centre, Community Based Activities, Digital Health

1.0 Introduction

SARS CoV 2 or the COVID -19 marked the advent of medical emergency in various parts of the world. India was also making every possible effort to combat this medical emergency in the best possible strategic way. Odisha detected its first COVID-19 positive case on 16th March, 2020. It did not take much time for the roots to spread to Nalco, (Smelter & Power Complex), Angul a neighbouring district, 120 kms from the state capital, Bhubaneswar. Nalco witnessed its first case on 20th March, 2020. It was an unplanned situation then. It triggered the medical team and administration to initiate, develop and run a series of strategic steps to combat the COVID-19 situation. The following section gives an overview of the developments made in Nalco, Angul during the pandemic time.

2.0 Awareness creation and training among health care staff, employees and sanitation workers

The medical emergency of SARS CoV-2 was novel in incidence and management. Our staff although competent lacked a comprehensive overview to handle and manage this situation at a personal and professional level. iGOT training modules released by Ministry of HRD, GOI in collaboration with the National Council for Teacher Education (NCTE) were accessed through the Diksha app. These predeveloped training modules were used to bridge the information gap. But as it had to be made accessible to medical staff, support staff, sanitation workers and employees working in the plant site in a shorter time span, training sessions were conducted by a team (four professionals, one doctor and three paramedics) who had received formal training from the District Headquarter Hospital, Angul. Live demonstration, distribution of leaflets, sharing of online training links and use of feedback forms were a part of the training session. Odia translations were used wherever it was appropriate. Nearly a mass of 170 staff including doctors could be reached out in four training sessions conducted on 17th and 18th of April, 2020. The next target group were employees and the executives at the plant site. As close to 2400 employees could be training in eight consecutive training sessions (File pic 1).

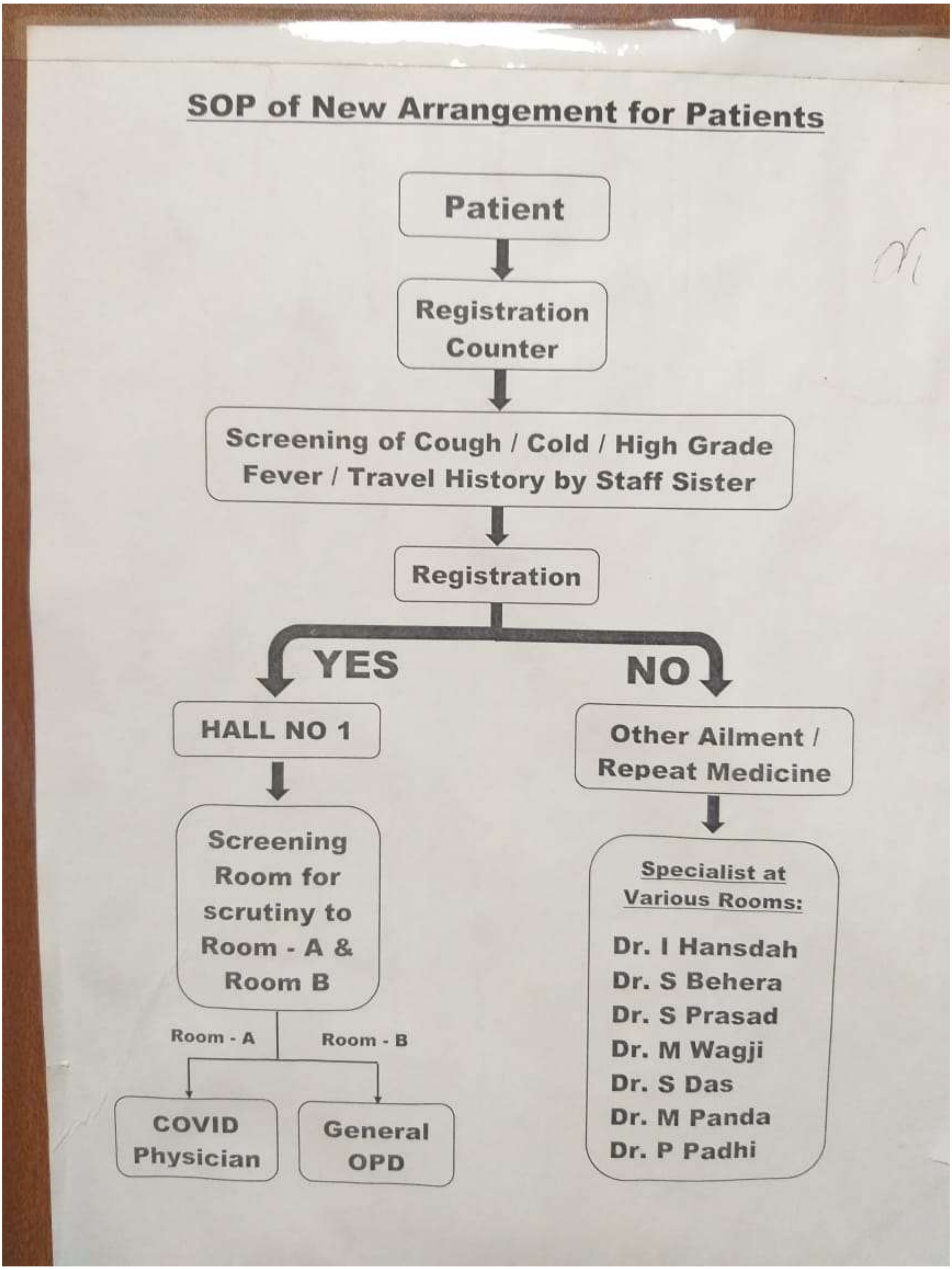
Training On iGOT Module For Covid-19 Pandemic in Hospital

A two-day training-cum-workshop (4 Sessions) for Covid-19 pandemic was organized for staff of different departments and functional areas of Nalco Hospital at S&P Complex, Angul, from 17th to 18th April 2020. This orientation training was imparted in integrated Govt. Online Training courses on DIKSHA platform, as advised by the Ministry of D/oPT, Govt. of India. Dr.(Mrs.) J. Ghosal, DGM(MS) &HOD, inaugurated the session, which was attended by altogether 115 participants. The programme was conducted by lead trainer Dr. C.K. Barik, Asst. Med. Suptd. & Nodal Officer Covid-19, in association with other trained staff members of Hospital.

File pic 1

3.0 Screening protocol for cases at the COVID Corner

One of our competent senior experienced doctors was appointed as Nodal Officer who was given the charge to develop, monitor and regulate the functioning of the COVID unit. With the advent of the first case of COVID-19 in Odisha in March 2020, 'COVID Corner' a segregated section was set up at Nalco hospital to deal with COVID positive cases. The ground floor hospital ward for indoor patients was evacuated and transfigured with all amenities as an Isolation ward for COVID-19 positive cases. SOP was generated by the Nodal officer which was eventually approved by the board of doctors of Nalco hospital (File pic 11). A prescribed form issue and guideline by the Govt. of Odisha (Ref No.HFW-SCH-I-EMER-0001-2020-8025/H, Dt. 16.03.2020 Odisha COVID-19 Regulations 2020; and Ref No.HFW-SCH-I-EMER-0001-2020-8301/H, Dt. 18.03.2020) was made mandatory to be filled for each case reporting at the COVID corner upon their return to Nalco township. They were then screened by the doctor on duty for any symptoms of cough, fever, illness, shortness of breath or respiratory distress. Cases passing the fitness criteria were issued fitness certificates which they had to submit on the day of joining duty. The details of the case screening protocol for cases reported at the COVID corner has been attached (File Doc 1).



SOP of New Arrangement for Patients

Patient

Registration Counter

Screening of Cough / Cold / High Grade Fever / Travel History by Staff Sister

Registration

YES

HALL NO 1

Screening Room for scrutiny to Room - A & Room B

Room - A

COVID Physician

Room - B

General OPD

NO

Other Ailment / Repeat Medicine

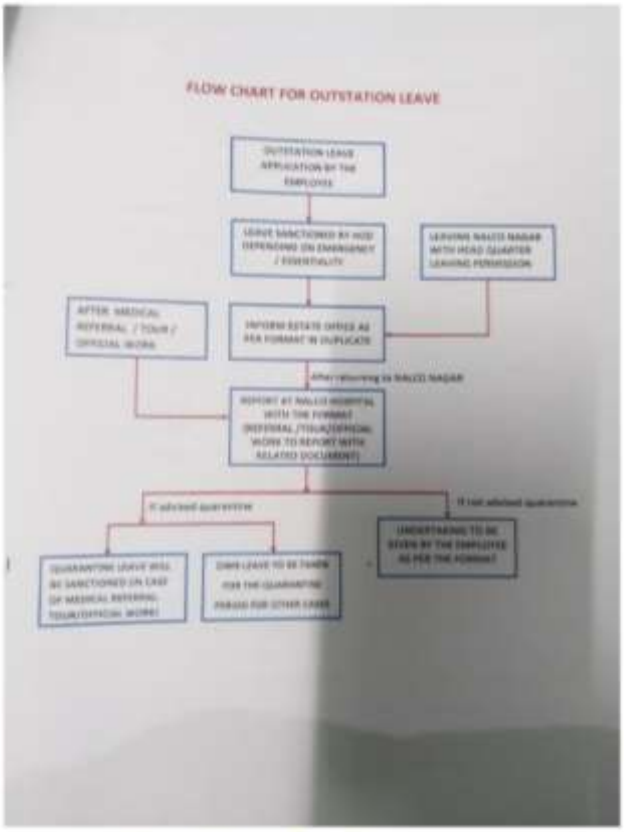
Specialist at Various Rooms:

Dr. I Hansdah
Dr. S Behera
Dr. S Prasad
Dr. M Wagji
Dr. S Das
Dr. M Panda
Dr. P Padhi

File pic 11

4.0 Mobility and Transit control in and around Nalco Township

One of the biggest challenges which posed a threat to the safety of netizens of Nalco township was the travellers moving in and out of the township post-lockdown. The administrative control was streamlined and tightened in this area as per the Govt. of India notification (Ref No HFW-D.O.NO.Z.28015/19/2020-EMR/Dt.30.04.2020). The Estate Dept. officials played a significant role in monitoring the transit of township netizens. Outstation leave was restricted only for cases of medical emergency and essential duty. Outstation official tours were minimised and largely managed on online modalities as far as possible. Thoroughfare of kin, kith, family members and elderly were monitored by frequent home guard patrolling within the Nalco township. Amusement parks, Gyms, Officer's Club, Community centres, restaurants and Kalyan mandap within premises were kept closed during the months of March until December when it was again made open to the netizens, though within a restricted time duration. Plant employees who required going on leave were asked to intimate the Estate office as well the Nalco hospital pre- and post-travel period. A written undertaking was collected from employees availing emergency leave. The flowchart depicting the stages of reporting following an outstation leave has been attached (File pic 2).



Flow Chart for Outstation.

File pic 2

To reduce manpower strength at the plant site owing to pandemic conditions staggered shifts and working hours were created for employees. Also work from home was encouraged on a larger scale as per the Nalco Circular Ref No. S&P/H&A/1449/2020 (File doc 2). This was notified through circular and was amended from time to time as per the situation of the COVID-19 status within the township.

5.0 Mobility and Transit Control in and around Nalco Township

The protocol for surveillance was maintained via a set of activities like through door to door surveillance by home guards, restricted movement in containment zones, intimation to the HOD of the Dept. in case of employee or their dependant detected with COVID-19 positive report, documentation of outstation leave by the Dept. as well in the Estate office and so forth.

Contact tracing was carried on door to door survey basis by a team of paramedics as per the WHO guidelines (Ref No WHO/2019-nCoV/Contact Tracing/2020.1). A comprehensive scrutiny and history were recorded from family members and at the duty place. Cases with high risk of contact were traced from the obtained survey reports. A contact period of two days prior to swab collection till the availability of reports was preset as the criteria for investing high risk cases. A format developed by the Govt. of Odisha was used to record the contact tracing history which was updated from time to time (File doc 3).

6.0 Quarantine and Isolation Facility Management in Nalco Township

Strict surveillance was imposed on employees and their dependants thoroughfare during the COVID pandemic pre-set period from April onwards. It is noteworthy to mention that Nalco township had been home to one of the high-risk suspected case who had come in close contact with the first identified COVID positive case of Odisha, a returnee from Italy. As per the Govt. of Odisha guidelines (Ref No HFW-SCH-I-EMER-0001-2020-8611/Dt.20.03.2020) the suspected case was traced and immediately shifted to the Isolation ward of Nalco hospital on 20th of March, 2020. He was later discharged after certification of COVID-19 negative report from RMRC, Bhubaneswar. Needless to say, both the medical team and management unit at Nalco, Angul were on guard and practiced stringent surveillance measures on travellers as well as returnees to the township from another district, state or country. Proposed protocol was followed to rehabilitate returnees from containment areas and hotspot zones during the months of April and May, 2020. What followed was the release of a series of circulars and guidelines from the Administrative management of Nalco, Angul.

The lockdown in March provided the much needed duration to set up Quarantine centres in our township premises. Initially, the stipulated quarantine period for asymptomatic cases was 21 days (Nalco Circular Ref No. S&P/H&A/1981/2020, File Doc 4) which was later eased to 14 days duration (Nalco Circular Ref No. S&P/H&A/4075/2020, File Doc 5) for persons with inter-state or inter-district travel history having containment and hotspot areas. However, persons with travel time within 72 hours were not put in quarantine unless they were symptomatic or they reported any complaints. Out of the two company Guest houses, one was remodelled and furnished to accommodate 22 families/ individuals who were advised to stay in quarantine (File pic 3). A nominal tariff (amount Rs 200/day per head) was levied from the persons availing this facility. Room services were provided along with the required medical requirements. In due course of time with easing of lockdown, systemic arrangements were made outside the township premises as well. Two hotels and one lodge in the nearby vicinity within the periphery of 2 kms to 3 kms from Nalco township were arranged as quarantine centres for the employees and their dependants. Room tariff was negotiated and fixed (amount Rs. 1400/ day per head) by the management. Separate quarantine facilities were set up for CISF personnel who were availing medical benefits from the company run Nalco hospital. Five CISF barracks were remodelled to accommodate 20 cases in each barrack. Regular close monitoring was done to ensure the supply of support services, meals, medicines, laundry and waste disposal from occupied rooms. A separate waste disposal unit was constructed for disposing of the garbage and sanitary articles collected from the rooms (File pic 4). Support Staff, catering staff and sanitation workers on duty were given formal training on donning and doffing of PPE kits with information related to COVID-19. Special attention was given to infection prevention within the building, occupied rooms and barracks. Supervision was done by the Nodal Officer on COVID-19 duty at a personal level on a daily basis. Additional security personnel were deployed on shift duty at the entry and exit points. Intercom connectivity was provided from the patient rooms to the COVID-19 corner unit in the Nalco hospital. The medical examination was conducted by the staff nurse twice a day and report was documented in the register. The discharge criterion from the quarantine centre was 14 days stay in isolation.

File pic 3

File pic 4

For those testing COVID-19 positive, they were immediately shifted to the COVID Care Centre (CCC) of Nalco situated within a periphery of 5kms from the Nalco township. Details of the CCC are furnished in the following sections. To brief, employees or their dependants with confirmed COVID 19 positive symptoms residing in 'C' and 'D' Type Company provided accommodations were treated in their respective residences. However, this facility was availed by the employees only after taking an undertaking (Consent form) from them stating the availability of a single room with attached bathroom in their flat. This step eased the caseload at the CCC which saw a high advent of COVID positive cases during the months of June to September. The records were routinely maintained by staff at the COVID Corner.

7.0 COVID Care Centre at Nalco, Angul

Nalco, Angul came out with the inauguration of its own COVID care Centre on the 22nd of August 2020 in the close periphery of less than 5kms of Nalco hospital (File pic 5). This is 50 bedded centre with 20 cabins, a waste disposal garbage bin and in-home catering facilities. The shifting protocol of COVID-19 positive cases detected at Nalco were followed as per Govt. of Odisha guidelines (Ref No GAD-COOD-MISC-0001-2018-17290/Gen.,Dt.23.07.2020) A team of medical staff comprising of four doctors and 30 paramedics were deputed on duty at this centre. Employees or their dependants with detected COVID-19 positive report and mild symptoms were the beneficiaries. Those with severe and acute ILI symptoms were shifted to Talcher COVID Hospital which was the only COVID hospital functioning under the Govt. of Odisha for Angul district. The discharge criteria for COVID positive cases was 17 days stay in isolation.

File pic 5

8.0 Testing facility at Nalco premises

Initially, it was a challenging phase for the management to set up a fully equipped testing unit at our own hospital premises. The motto test, track, treat was unbiasedly followed no matter what the nature of the adverse circumstances encountered. Civil dept. was involved in the remodelling and construction of an existing parking area for COVID test centre. Efforts were put in to ensure the testing unit was convenient and accessible both for the clinical staff and the patient. The project was completed by the Civil Dept. in a record time span of one week and inaugurated and functional since 28.10.2020. The picture of the newly constructed COVID testing Kiosk has been attached (File pic 6) and the same has been constructed as per Govt. of Odisha guidelines (Ref No HFW-SCH-I-EMER-0001-2020-8744/H/Dt.21.03.2020). The rollout was done with procurement of Rapid Antigen Testing Kit on 09.10.2020. The decision behind initiating the Rapid Antigen test was primarily to maintain a reasonable balance between 'Demand' and 'Service' chain so as to reach out to the needs of a considerably large proportion of potential patients reporting illness, Influenza-like symptoms, cold and cough at the COVID OPD in comparatively less time. The candidate selection criteria for 2019 nCov swab testing was followed as per the ICMR guidelines (Ref No Strategy for COVID-19 testing in India ICMR Dt: 17.03.2020 and Strategy for COVID-19 testing in India ICMR Version VI/Dt:04.09.2020).

Covid-19 Sample Collection & Rapid Antigen Testing Kiosk

The Covid-19 sample collection & rapid antigen testing facility for nCoV was inagurated on 10th November 2020 by ED(S&P) I/C Shri A.P.Panda, in presence of Shri S.N.Sahu GM(H&A) I/C, Dr.(Mrs.) J.Ghosal,DGM(MS),ShriS.K.Nath,AGM(IE) along with doctors & staffs of Nalco Hospital. Rapid antigen testing kits for Covid-19 have been procured to test the requisite persons and result will be obtained within 15 mins. Report results shall be intimated to the persons on same day. On opening day, 10 swab samples have been tested. The tests were coordinated & done by Shri A.K.Sahoo, Shri P.Panda, Mrs. S.L. Prusty, Miss Subhasmita Pradhan from Nalco Hospital, under the guidance of Dr. C.K.Barik,Nodal Officer Covid-19.

File pic 6

Further, to make tracking and reporting of COVID-19 testing more accessible and transparent the case statistics of the tests conducted were shared in the ICMR portal on a day-to-day basis as per the directives of ICMR (ECD/COVID-19/Misc./2020) dated July 16, 2020. The pass/ fail criteria were followed as per the ICMR guidelines. Cases with symptomatic positive reports were immediately enrolled under treatment action plan whereas those with symptomatic negative were further referred to the nearest State governed District Headquarter hospital (DHH) for availing RT-PCR test. Although collaborating with pathology labs (like Cure Well Lab, Swasthya Lab, Samal Care Diagnostics, Genex Diagnostic and a few others) functioning in private hospitals in the state was a viable option to approach for RT-PCR referrals, even at this juncture, a novel initiative was taken by our management to develop a partnership with the State-run DHH so as to minimise the cost of the referred RT-PCR tests. The result of this effort was complete non-payment for RT-PCR tests which was a matter of applause for the COVID management team. The financial benefit incurred from tested cases on these terms was reviewed and notified to our PSU management and the same has been submitted and awarded under Sarjana Suggestion in January 2021 (File pic 7). A cumulative total benefit of Rs. 74 Lakhs was incurred in the present financial year to the company.

नालको NALCO
NATIONAL ALUMINIUM COMPANY LIMITED
S & P COMPLEX, ANGUL

SARJANA SUGGESTION AWARD

is presented to

Ms. Kunmun Sahu

Per. No. 09576 Designation Nurse-I

Department Hospital

For implementing the suggestion,

Cost effective successful Covid-19 management

The suggestion has contributed immensely to achieve tangible and intangible benefits for the company.

(A P Panda)
Executive Director (S&P)

Date: 26.01.2021

नालको NALCO
NATIONAL ALUMINIUM COMPANY LIMITED
S & P COMPLEX, ANGUL

SARJANA SUGGESTION AWARD

is presented to

Ms. Kunmun Sahu

Per. No. 09576 Designation Nurse-I

Department Hospital

For implementing the suggestion,

Proactive role in inclusion of most successful confirmatory Covid-19 detection test in Nalco Hospital

The suggestion has contributed immensely to achieve tangible and intangible benefits for the company.

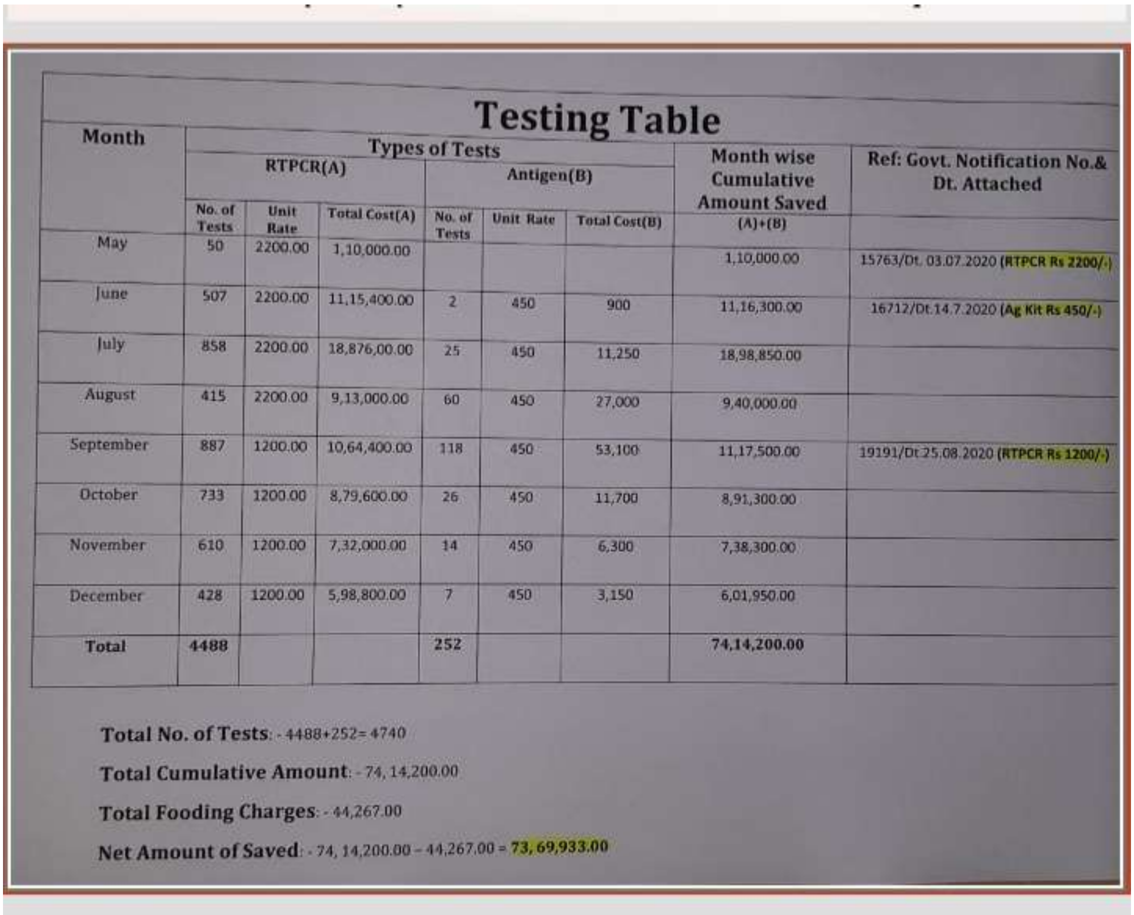
(A P Panda)
Executive Director (S&P)

Date: 26.01.2021

File pic 7

The cumulative testing sample of Rapid Antigen Test so far is 252 and RT-PCR is 4488 though the total swab sample collected is more than 5000. Prior to the testing unit at Nalco Hospital, swab sample collection of the suspected and high-risk cases was done by District Headquarter Hospital (File pic 8), Angul and tested at RMRC Lab, Bhubaneswar followed by SCB Medical, Cuttack. Total samples in each month since May 2020 onwards have been graphically represented in File pic 9 and File pic 10. 1. At present we focus on increasing testing capacity with an aim to empower and train more lab clinicians from Nalco hospital to meet the demand in future.

File pic 8



Testing Table

Month	Types of Tests						Month wise Cumulative Amount Saved	Ref: Govt. Notification No.& Dt. Attached
	RTPCR(A)			Antigen(B)				
	No. of Tests	Unit Rate	Total Cost(A)	No. of Tests	Unit Rate	Total Cost(B)	(A)+(B)	
May	50	2200.00	1,10,000.00				1,10,000.00	15763/Dt. 03.07.2020 (RTPCR Rs 2200/-)
June	507	2200.00	11,15,400.00	2	450	900	11,16,300.00	16712/Dt.14.7.2020 (Ag Kit Rs 450/-)
July	858	2200.00	18,876,00.00	25	450	11,250	18,98,850.00	
August	415	2200.00	9,13,000.00	60	450	27,000	9,40,000.00	
September	887	1200.00	10,64,400.00	118	450	53,100	11,17,500.00	19191/Dt 25.08.2020 (RTPCR Rs 1200/-)
October	733	1200.00	8,79,600.00	26	450	11,700	8,91,300.00	
November	610	1200.00	7,32,000.00	14	450	6,300	7,38,300.00	
December	428	1200.00	5,98,800.00	7	450	3,150	6,01,950.00	
Total	**4488**			**252**			**74,14,200.00**	

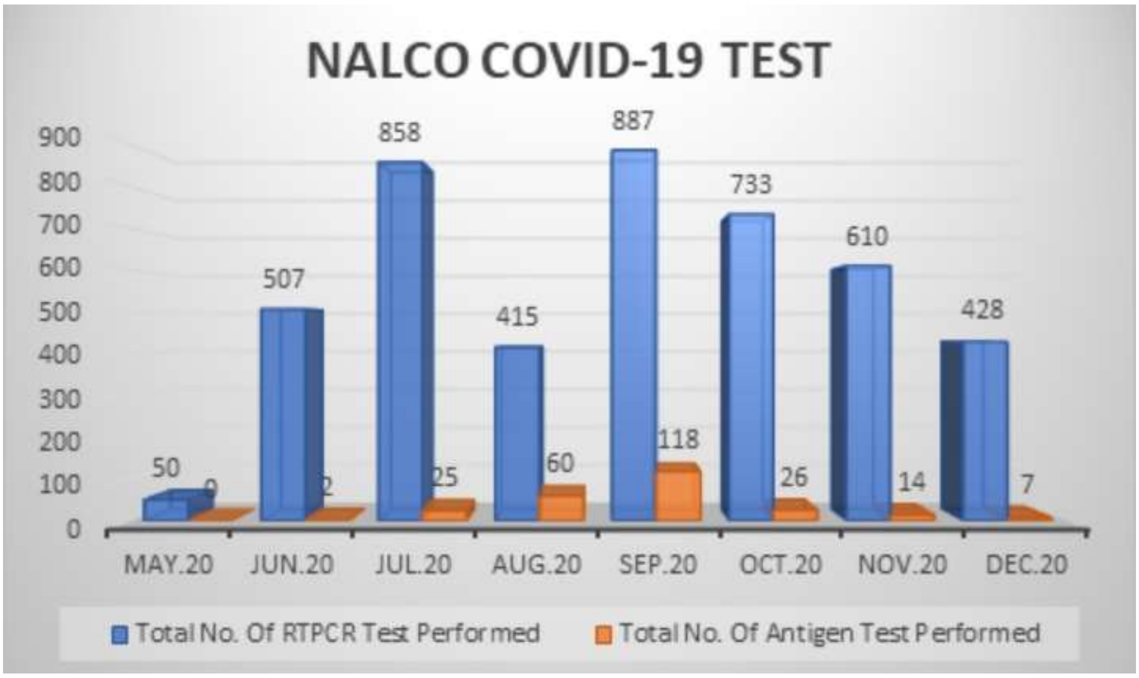
Total No. of Tests: - 4488+252= 4740

Total Cumulative Amount: - 74, 14,200.00

Total Fooding Charges: - 44,267.00

Net Amount of Saved: - 74, 14,200.00 – 44,267.00 = **73, 69,933.00**

File pic 9



File pic 10

9.0 Administration in Containment zones

Nalco township situated at Angul is home to 22000 residents which includes 5000 families. As the number is large, the growing figures of COVID-19-positive cases during progressive months in July and August 2020 were advised to remain in home isolation. This however was based on the fulfilment of requirements as per the guidelines of Govt. of India guidelines. Estate and Welfare dept. enforced and handled this unprecedented situation by barricading localities and flats in and around the home which was red-marked as ‘Home under Quarantine’ (Nalco Circular Ref No S&P/H&A/4573/2020, File doc 6, attached). A cluster of 4 to 5 double and/or triple storeyed flats were barricaded and identified as Containment zones by the Estate Dept. (File pic 12). The home guards on duty were in direct contact with the hospital COVID Corner staff so as to ensure strict surveillance in the containment zones. Trespassing and movement outside homes were strictly prohibited in these identified containment zones for a period of 14 days. Sanitisation was conducted in these zones on a daily basis (as per WHO/2019-nCoV/Disinfection/2020.1 guidelines). Medicines, food, milk, vegetables and essential commodities were made accessible to the residents on a call basis. Wide spread publicity was made on intranet and through posters regarding contact details of mobile vendors moving within the township (File doc 6). Logistics and Supply chains were supervised by the officials of Estate Dept. on priority basis. Garbage disposal from containment zones was done by workers using PPE kits which were under the administrative control of sanitation dept. Facilities were provided for transit of COVID-19-positive patients from their respective home to CCC through well-equipped Ambulances. Swab sample collection in these containment zones was done with utmost caution and care.

Barricading Area.

File pic 12

10.0 Extension of Health care and Community- based activities due to COVID-19

The disinfectant was sprayed in market areas in and around Nalco township within a periphery of 5kms radius (File pic 13). Similar activities were also carried in residential areas within the township. Sanitation activities were undertaken at Public places like Banks, Post offices and Police stations in vicinity areas. The employees in Quality Circle and Laboratory of Captive Power Plant, Nalco contributed by manufacturing 100 litres of hand sanitizers which were distributed in mass scale among the staff in the plant and office. This step was appraised by the management as it was a significant breakthrough especially when the road transport was severely hit due to the sudden lockdown and procurement and supply of infection control amenities was a matter of concern to the company. Sanitisation and fumigation activities were extensively carried out at Public places like Community centres, Transit house, Kalyan Mandap to control the spread of infection (File pic 14). Handmade masks prepared by paramedic staff of Nalco hospital were handed to the Nalconagar Police station as a token of gratitude for their tireless and relentless service to the society as early as April, 2020 (File pic 15). Help was extended to the needy and under privileged section of the society in Angul district by Nalco during lockdown period. Management took effortful steps to provide essential food items like rice, flour, pulses (arhar dal) and potatoes to migrant workers of the district through the District Administration in April, 2020. Nalco was in news for liberally volunteering in sanitization drive in nearby four neighbouring panchayats in the May, 2020. (File pic 16). It was mass sanitisation drive in Kandsar GP, Giranga GP, Kulad GP and Balaramprasad GP which covered more than 35 villages under their jurisdiction. The measures were conducted under the instruction of Hon'ble CMD, Nalco and supervision of ED (S&P) and GM (H&A). Members of CSR Dept. and Nalco Foundation in association with CISF Fire Wing were involved in this drive.

\

File pic 13

Sanitization Drive at Nalco Nagar

File pic 14

Bulletin on COVID 19 (8th to 14th April 20)
NATIONAL ALUMINIUM COMPANY LIMITED

FIGHT AGAINST COVID 19

At S&P Complex, Angul

Masks prepared by Paramedical staff of Smelter & Power Complex, handed over to Nalconagar Police station

File pic 15

PRESS CLIPPINGS

ନାଲ୍କୋ ପକ୍ଷରୁ ୪ଟି ପାରିପାର୍ଶ୍ୱିକ ପଞ୍ଚାୟତରେ ବିଶୋଧନ

ଅନୁଗୁଳ, (ସବ୍ୟୁ): ବିଶ୍ୱ ମହାମାରୀ କରୋନା ଭାଇରସ୍‌ରୁ ସମସ୍ତ କର୍ମଚାରୀ, ଠିକା ଶ୍ରମିକ, ଆନୁଷଙ୍ଗୀକ ସଂସ୍ଥାର ସମସ୍ତ କର୍ମଚାରୀ ତଥା ଏମାନଙ୍କ ପରିବାରବର୍ଗଙ୍କ ସମେତ ଏହାର ପାରିପାର୍ଶ୍ୱିକ ଗ୍ରାମବାସୀ ମାନେ ମଧ୍ୟ କିପରି ସୁରକ୍ଷିତ ରହିବେ ସେହି ଦିଗରେ ନବରତ୍ନ କମ୍ପାନୀ ନାଲକୋ ପର୍ଯ୍ୟାୟକ୍ରମେ ବିଭିନ୍ନ ପଦକ୍ଷେପ ମାନ ସମ୍ପାଦନ କରୁଛି। ଅନୁଗୁଳର ସ୍ମେଲଟର ଓ ପାୱାର ପ୍ଲାଣ୍ଟ ପରିସର ନାଲକୋ ଟାଉନସିପ ଏବଂ ଏହାର ପାର୍ଶ୍ୱବର୍ତ୍ତୀ ଅଞ୍ଚଳ ପରେ ନାଲକୋ କର୍ତ୍ତୃପକ୍ଷ ପାରିପାର୍ଶ୍ୱିକ ଗ୍ରାମ ମାନଙ୍କରେ ବିଶୋଧନ କାର୍ଯ୍ୟକ୍ରମ ହାତକୁ ନେଇଛନ୍ତି। ପ୍ରତିଷେଧକ ମୂଳକ ପଦକ୍ଷେପ ରୂପେ ଏଯାବତ୍ ୪ଟି ଗ୍ରାମ ପଞ୍ଚାୟତ ଯଥା- କାଣ୍ଡସର ଜି.ପି, ଗିରାଙ୍ଗ ଜି.ପି, କୁଲାଡ ଜି.ପି ଓ ବଳରାମପ୍ରସାଦ ଜି.ପିରେ ୧୫ରୁ ଊର୍ଦ୍ଧ୍ୱ ଗ୍ରାମରେ କରୋନାକୁ ପ୍ରତିହତ କରିବା ପାଇଁ ସୋଡିୟମ ହାଇପୋକ୍ଲୋରାଇଡ ଦ୍ୱାରା ସମସ୍ତ ଗ୍ରାମ, ସଭାଘର, ଓ ସ୍କୁଲ ଗୃହ ଇତ୍ୟାଦିକୁ ବିଶୋଧନ କରାଯାଇଛି। ପ୍ରଥମ ପର୍ଯ୍ୟାୟରେ ବିଶୋଧନ କାର୍ଯ୍ୟକ୍ରମ ସମାପତି ହୋଇଥିବା ଗ୍ରାମ ମାନଙ୍କ ମଧ୍ୟରେ ପିଣ୍ଡୁଆ, ଅମାନ୍ତପୁର, ଭାଲୁଧରି ସାହି, କଇଁପୁଲିଆ ସାହି, ପାଟଣା ସାହି, ବରଡଇବା, ଲକ୍ଷ୍ମଣପୁର, ଗିରାଙ୍ଗ, କୁଲାଡ, କାଣ୍ଡସର ଓ କନିଆଁବେଡା ଅନ୍ୟତମ। ପ୍ରକାଶ ଥାଉକି ନାଲକୋ ତରଫରୁ ଜିଲ୍ଲା ପ୍ରଶାସନିକ ସହାୟତାରେ ୫୦ ହଜାରରୁ ଊର୍ଦ୍ଧ୍ୱ ମାସ୍କ ବଣ୍ଟନ ମଧ୍ୟ କରାଯାଇଛି। କମ୍ପାନୀର ଅଧ୍ୟକ୍ଷ ତଥା ପରିଚାଳନା ନିର୍ଦ୍ଦେଶକ (ସିଏମଡି) ଙ୍କ ନିର୍ଦ୍ଦେଶରେ ଇ.ଡି (ଏସ.ଏଣ.ପି) ଓ ଡି.ଏସ (ପ୍ରଶାସନ ଓ ମାନବ ସମ୍ବଳ)ଙ୍କ ପ୍ରତ୍ୟକ୍ଷ ତତ୍ତ୍ୱାବଧାନରେ ସି.ଏସ.ଆର ବିଭାଗ ଓ ନାଲକୋ ଫାଉଣ୍ଡେସନ ବିଭାଗର କର୍ମକର୍ତ୍ତା ମାନେ ସି.ଏସ.ଆର ଏବଂ ଅଗ୍ନିଶମ ବିଭାଗ ସହିତ ମିଳିତ ଭାବେ ଏହି ବିଶୋଧନ କାର୍ଯ୍ୟକ୍ରମକୁ ସାନିଟାଇଜେସନ କୁ ସଫଳ ରୂପେ ସମ୍ପାଦିତ କରୁଛନ୍ତି।

The Samaya,
06.05.2020

File pic 16

11.0 Digital health schemes

During the pandemic when social distancing was practiced and observed as a law in order to ensure personal safety, Digital platform was a boon for communication. In order to ensure close surveillance of the inmates of the Quarantine centre and resort to their queries and complaints from time to time, the WhatsApp group ‘Township Disaster Management’ was formed and monitored by the Nodal officer. Relevant information was shared and updated time and again with related modifications in guidelines on quarantine, outstation permit, logistic supply in containment zones and other related matters. Another WhatsApp group was functional ‘COVID 19 RRT Banarpal’ which included members of District Headquarters Hospital, team of doctors, Nodal officer COVID-19 (Nalco) and district administrative officials. This group was formed with the purpose of promoting smooth coordination and report sharing among professionals at a subordinate level and administrative official as higher officials. The hierarchy of the COVID 19 management team of Angul district had access to this group.

Internally, Nalco Systems Dept. had taken formative steps to adapt the iGOT training modules released by the Ministry of Human Resource Development, GOI into the intranet which were made accessible to employees with the click of a button. This development helped to overcome time barriers and enabled a wider group of employees to access training modules as per their convenience.

In order to monitor and track the completion of Quarantine period and joining of duty by the employees, report was generated on daily basis on a prescribed format which communicated to the HOD of the respective Dept. via email. This ensured adequate coordination between the hospital staff and Dept. officials and helped cut down the chances of risk of exposure with employees who are advised for quarantine.

These were some of the measures undertaken by Nalco (Smelter & Power Complex), Angul in regard to combating COVID-19 pandemic. It is worth mentioning that these measures had been useful and beneficial in curtailing the no of COVID-19 cases at the Angul unit with a period of time. To conclude, these measures have not only proved to be effective but also it had been a learning experience both for the professionals and the netizens of Nalco township.

References

1) Govt. of Odisha No.HFW-SCH-I-EMER-0001-2020-8025/H, Dt. 16.03.2020 Odisha COVID-19 Regulations 2020
2) Govt. of Odisha No.HFW-SCH-I-EMER-0001-2020-8301/H, Dt. 18.03.2020
3) Govt. of Odisha HFW-SCH-I-EMER-0001-2020-8611/Dt.20.03.2020
4) Govt. of Odisha HFW-SCH-I-EMER-0001-2020-8744/H/Dt.21.03.2020
5) Govt. of India HFW-D.O.NO.Z.28015/19/2020-EMR/Dt.30.04.2020
6) Nalco Circular Ref No. S&P/H&A/1449/2020
7) WHO/2019-nCoV/Contact Tracing/2020.1
8) WHO/2019-nCoV/Disinfection/2020.1

9) Govt. of Odisha GAD-COOD-MISC-0001-2018-17290/Gen.,Dt.23.07.2020
10) Strategy for COVID-19 testing in India ICMR Dt: 17.03.2020
11) Strategy for COVID-19 testing in India ICMR Version VI/Dt:04.09.2020
12) Nalco Circular Ref. No. S&P/H&A/1981/2020
13) Nalco Circular Ref.No. S&P/H&A/4075/2020
14) Nalco Circular Ref No S&P/H&A/4573/2020