

Review-On Impact of Covid-19 on Indian Pharmaceutical Industries

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Submitted: 01-01-2022

Accepted: 10-01-2022

ABSTRACT:

The novel coronavirus disease 2019 (COVID-19) was characterized as a global pandemic by the WHO on March 11th, 2020. This pandemic had disturbed the health market, the pharmaceutical sector, and was associated with considerable changes; which may appear as positive impact as well as negative impact on pharmaceutical systems and supply chains. Pharma industry and supply chains are play an important role in the control of COVID-19, a pandemic that has mostly devastated public health systems and livelihoods in all over the world. This review article also shares New Normal impact of Covid-19, on Pharmaceutical Industry. Based on known transmissions & spreading routes, the Pharmaceutical Industry take part to avoid such impacts of transmissions & spread.

KEY WORDS: Pharmaceutical industry, positive impact, negative impact, covid-19, clinical trials.

I. INTRODUCTION:

Covid-19 pandemic is today's most serious international fitness catastrophe, as well as the universe's most ambitious endeavour. Ideally, COVID-19 is an enclosed RNA virus that is incredibly existing in humans and animals. The virus belongs to the Nidovirales order that consists of families, namely, Roniviridae, Arteriviridae, and Coronaviridae (1,2,3). The outbreak of novel pathogenic Coronavirus (2019-nCoV) was once recognized in Wuhan metropolis of Hubei Province of South China on thirty first December, 2019. The Coronavirus sickness first emerged in China in December 2019 and unfold globally rapidly. It used to be diagnosed as a Pandemic via the World Health Organization on eleventh March, 2020. The Coronavirus disorder has been officially named as COVID-19. COVID-19 is an infectious ailment brought about by utmost acute respiratory syndrome Coronavirus 2 (SARS-CoV-2). World Health Organization (WHO) had declared the outbreak a Public Health Emergency of International Concern

on 30 January, 2020 (4,5,6). The novel coronavirus sickness (COVID-19) has already affected over 6.9 million people, claiming greater than 400,000 lives in over 200 international locations all over the world. The novel coronavirus disorder has additionally infiltrated into India; hitherto over 250,000 instances have been mentioned from the country. With a population of more than 1.3 billion people, India may want to turn out to be the new epicenter of COVID-19. Due to the exquisite population density, bad socioeconomic prerequisites and fitness. The first case of COVID-19 in India was once said on January 30, 2020; the index affected person was once a scholar who had again from Wuhan. Thereafter, solely two greater instances have been pronounced in February (7). By taking into consideration the solemnity of the disease, at first, a 21-day nationwide lockdown (25 March 2020 to 14 April 2020: LD1.0) used to be introduced through the prime minister of India, "Shri. Narendra Modi" to manage the transmission of COVID-19 and due to which many industries, educational institutes, markets, as well as public gatherings have been shut down (8). Subsequently, extra cases got here to the forefront in the month of March and there has been a surge in the range of cases because the latter half of April 2020. As of June 9, 2020, in accordance to the Ministry of Health and Family Welfare (MoHFW), a total of 266,598 validated COVID-19 cases have been mentioned from 32 states/union territories. Most of the cases have been mentioned from the states of Maharashtra, Tamil Nadu, Delhi, and Gujarat. Hitherto, the MoHFW have stated 7471 deaths due to COVID-19 (9).

In India, the healthcare industries consist of each private zone and public sector. India perform an essential position in the international pharmaceutical sector, and has a great pool of scientists/engineers with excellent doable to steer the enterprise in advance to increased heights. The generic drugs manufactured in India and furnished international confer security and quality. India contributes to the 2nd largest share of

pharmaceutical and biotech workforce in the world. Indian pharmaceutical merchandise are exported to more than 200 international location in the world, with US being the key market.

The pandemics such as COVID-19 are additionally related with the pharmaceutical sector. With high rates of morbidity and mortality, and negatively have an impact on the socioeconomic popularity and livelihoods. The pharmaceutical enterprise performs a pivotal position in the provision of quality healthcare offerings in particularly for the duration of pandemics, when drugs supply chain can be Overwhelmed or shut down due to various motives (10,11). The COVID-19 pandemic affected world economics include pharmaceutical sector. While presently there is no effective treatment for this novel infectious disease. Pharmaceutical sectors are struggling to preserve natural market flow; as the latest pandemic impact get entry to essential medicines at an less costly price, which is the essential aim of each and every pharmaceutical system.

The coronavirus pandemic and its resultant lockdown adversely affected all most important sectors of the economy, however it has come as a boon in conceal to the Indian pharmaceutical sector. But additionally some part of pharmaceutical business was affected such as supply chain and import of active pharmaceutical elements from China, Covid-19 has supplied some opportunities in the pharmaceutical sector, specifically India.

II. INDIAN PHARMACEUTICAL INDUSTRY:

The pharmaceutical enterprise in India, US\$40 billion by means of value, world's third greatest by way of usual extent and world's biggest as provider of generic drugs globally, with 20%.3.5% share of complete international pharmaceutical exports by means of extent and value respectively to more than 200 nation and territories in 2021. As of 2021, most of pharmaceutical made in India are low cost generic drug which include most of pharmaceutical export of India. Patent drugs are imported. APIs are imported from China (66% supplies by volumeworth US\$2.4 billion) and Germany (US\$1.6 billion) as well as, Italy and Singapore. To foster an Atmanirbhar Bharat by improving the R&D, Make in India product improvement and high-value manufacturing capabilities, import substitution and domestic manufacture of active pharmaceutical ingredient (API) the authorities has

added a US\$2 billion incentive software which will run from 2021-22 to 2027-28. In terms of the world market, India presently holds an accountable share and is known as the pharmacy of the world and as the largest generic supplier. India won it's a secure position on the world scene with its innovatively-engineered generic drugs and active pharmaceutical ingredients (API), The country reports for around 30 per cent (by volume) and about 10 per cent (value) in the US\$70–80 billion US generics market.(12) In 2018–19, India exported nearly \$19 billion worth of pharmaceuticals to more than 200 countries, from the highly regulated markets of North America and Europe to countries with limited pharmaceutical industry capacity such as most of sub-Saharan Africa (SSA). The Indian Department of Pharmaceuticals review that formulations and biologicals account for 77% of the complete Indian exports and Indian companies provide 20% of the world supply of generics.(13,14,15)

III. IMPACT OF COVID-19 ON PHARMACEUTICAL INDUSTRIES:

As nations and industries proceed to cope with the unparalleled challenges introduced by way of novel coronavirus (COVID-19), a specific location of concern has been the uncertainty surrounding the influence of the COVID-19 pandemic on the world and Indian pharmaceutical industry. The COVID-19 disaster has demonstrated the significance of setting up a risk management system that focuses on assessing dangers ensuing from the loss of a supply chain amongst countries(16). The coronavirus pandemic and its resultant lockdown badly affected all important sectors of the economy, however it has come as a boon in disguise to the Indian pharmaceutical sector.

1. NEGATIVE IMPACT:

i. SUPPLY SHORTAGE OF BOTH ACTIVE PHARMACEUTICAL INGREDIENTS AND FINISHED PRODUCT

China and India are the world's main supplies of APIs, key starting materials (KSMs) and also finished pharmaceuticals. As they are struggling with the disease and also a slow-down in production, this may have contributed to shortage and also price increase in essential prescription medicines, including antibiotics. This is more critical when non-substitutional essential APIs, such as amoxicillin, potassium clavulanate, ceftriaxone potassium sterile, meropenam, vancomycin, gentamycin and ciprofloxacin are

being concerned. In India, the Indian Pharmaceutical Alliance (IPA) asked government to restrict of all pharmaceutical products, APIs and formulation to domestic consumption only. This shortage has already begun to affect API and bulk prices in Indian party trades. The average increase was reported to be about 10–15%; however, may reach to 50% in some cases(17,18)

ii. IMPACT ON CLINICAL TRIALS AND PATIENTS:

Ensuring the protection of patients enrolled in clinical trials to keep away from exposure to achievable COVID-19 infection was critical. Patients had been normally required to return to clinical sites/physician's offices, for more than one protocol-specified visits, which includes the series of blood samples for testing. Almost immediately, get right of entry to the clinical site had been constrained for more than few reasons: the site being shut down due to COVID-19 driven mandates by using local and state governments, the scarcity of PPE, issue of security the usage of public transportation and patients with active COVID-19 disease.(19,20). The monitoring of patients is per chance the most tremendous that the performing trials sites are presently facing. On the 18th March 2020, the US (United States) Food and Drug Administration (FDA) issued new guidelines for clinical trials' conduction all through this critical condition. The big limitations encountered are 'created' by means of social distancing and quarantine measures which forbid interplay between the find out about and trial personnel for study contributes and scheduled follow-up. The clinical trial's integrity is questionable due to the unfold of COVID-19 infection to trial participants and staff, which influences trial consequences with growing probability of trial dropout. Finally, there may also be restrained get admission to beds, clinical tests, and Personal Protective Equipment (PPE) as these may be diverted to clinical care facilities and staff to deal with COVID-19 patients. Due to the unexpected onset and great affect of COVID-19, its influence on managing clinical trials and research remains undetermined.(21,22,23)

iii. SUPPLY CHAIN AND DISTRIBUTION CHALLENGES:

As the COVID-19 pandemic continues to spread, it has exposed vulnerabilities of supply chains and logistics. It has disrupted health supply chains, affecting active pharmaceutical ingredients, shipping, procurements, finished healthcare

products and more.(24,25). The pipelines of Global supply chain from raw materials supply to transport of products, are heavily affected by the COVID-19 pandemic, and the disruptions are observed during all phases of the world supplier.(26)

iv. COVID-19 IMPACT ON MANUFACTURING PLANT:

At manufacturing plant there will be the most chance of growing the disorder but the Pharmaceutical Industry does take very excellent care to avoid cross contaminations as part of Good Manufacturing Practices (GMP). But now preserving in thinking seriousness of virus spread, the Pharmaceutical Industry has to take precautions to keep away from transmission and unfold all through tour in buses entry & exit procedures, exchange rooms, avoid hand contact to doors, handles etc. for the duration of the manufacturing operations at site.

Numerous operations like under have to be kept in mind:

- Supply chain of enter substances & finished products.
- Cleaning & sanitizing of Input Materials containers.
- Precautions at some point in storage in warehouse.
- Pre-cautions at some point of sampling & testing.
- Necessary care at some stage in difficulty of input materials.
- Precautions whilst coping with enter substances at some stage in manufacturing operations.
- Sanitization of all the things and all regions.
- Social Distancing proper from journey in Co. buses, entry & exit procedures, at some stage in manufacturing./packaging/testing etc. in the plant.(27)

2. POSITIVE IMPACT OF COVID-19 ON PHARMACEUTICAL INDUSTRIES:

i. INDIA IS A CENTER OF VACCINE DEVELOPMENT:

Of the two vaccines approved, Covishield is the more known. It's a model of the Oxford University-AstraZeneca vaccine that was found to have a common effectiveness of 70.4% in a peer reviewed analysis. Covishield is an Indian model made through the world's largest vaccines manufacturer, the Serum Institute of India, and phase III trials on an Indian cohort have begun, with 1600 human beings enrolled in November covaxin is India's first domestic produced vaccine



towards covid-19. It was developed by means of Bharat Biotech in collaboration with the Indian Council of Medical Research and the National Institute of Virology, and 25 800 humans have been registered for trials throughout the India. On twenty one January, The Lancet published Covaxin's phase I trial data, which giving it an approval for security and stating that it generates enough immune response, however stated similarly efficacy trials had been warranted. Both vaccines required two doses and work with the aid of priming the immune system with a SARS-CoV-2 spike protein. Covishield make use of a weakened model of adenovirus, whilst Covaxin make use of an inactivated SARS-CoV-2 virus extracted from an asymptomatic patient.(28,29)

ii. HERBAL DRUG INDUSTRIES:

Ayurveda is a traditional method of medicine, arise in India more than 3000 years ago. The word Ayurveda is originated from the Sanskrit phrases ayur (life) and Veda (science or mastery). The basic Ayurveda textual content Charaka Samhita, noted about epidemic management and defines immunity as the capability to preventing and arresting the development of disorder for maintaining balance . The Ayurveda will pay large emphasis on constructing strength of mind and body to cope with lots of stressors, consisting of infection. Same as an innate and acquired immunity, the Ayurveda term of immunity (Bala or strength) is categorized as natural (Sahaja), chronobiology (Kalaja), and acquired. In Ayurveda numerous remedy picks are available for improving immunity against respiratory illnesses, these consist of certain immunomodulators (known as Rasayana), local and systemic intercession. Local prophylaxis measures such as herbal decoctions, consumptions of warm water, gargling with medicated water, and steam inhalation described in Ayurveda for respiratory illnesses. These involvement can be shortly applied on giant scale with the advantages of simplicity, affordability, and acceptability. This is definitely evident that such standard measures can positively have an effect on mental health and immune characteristic via modulating psychoneuroimmune pathways. Presently, countless allopathic pills are beneath investigations for prophylactic use towards COVID-19 and it appears current prophylactic measures are insufficient. The prophylactic and therapeutic potential of standard and complementary medicine method such as Ayurveda and Yoga can be demonstrated efficacious prophylaxis and adjuvant

remedy of COVID-19. In India, quite a few initiatives have been taken to use the vast capacity of Ayurveda in this pandemic. The Ministry of Ayush, a nodal Ministry of Complementary and Alternative Medicine, has launched a set of recommendations for boosting immunity and measures for self-care via the use of Ayurveda standards . Further, the Indian Prime Minister in its address to nation additionally noted about using Ayurveda drugs for enhancing immunity in opposition to COVID-19. This has led to surge in an ultimatum of Ayurveda drugs.(30,31,32)

iii. SALE OF ANTIBIOTICS AND HYDROXYCHLOROQUINE IN INDIA DURING THE COVID-19 EPIDEMIC:

In India, azithromycin is usually utilized to deal with a vary of conditions, together with acute respiratory tract infections, bacterial dysentery, and enteric fever. This macrolide antibiotic used to be repurposed for the cure of COVID-19 based totally on in its hypothetical anti-inflammatory and immunomodulatory properties (33,34). On the other side, HCQ in India is in most cases utilized for remedy of autoimmune disorder, such as rheumatoid arthritis and systemic lupus erythematosus, and post-viral infectious arthritis, such as chikungunya arthritis, and is now not part of country wide malaria treatment official rules. It has been indicate that HCQ ought to have antiviral activity also indirect anti-inflammatory properties through the activation of CD8+ T cells and the depletion of pro-inflammatory cytokine response, thus leading to its large use in the management of COVID-19 as well as in pre- and post-exposure treatment to prevent a disease. However, an expanding the number of studies have observed no beneficial effects from the use of azithromycin and/or HCQ, and a number of security concerns have also been increased. The main result of interest for this study were the sales volumes of antibiotics and HCQ in India, using data get from IQVIA, which is a reliable source of drug sales data . IQVIA is a firm that gather over-the-counter (OTC) and prescription-based sales data by auditing sales from a representative panel of drug stockists. The data are then extrapolated to all stockists in the country the use of a proprietary projection algorithm. This debts for an estimated 95% of the total pharmaceutical market in phrases of cost income combining the retail sector, hospitals, and shelling out doctors.(35,36,37,38,39)

CONCLUSION:

Covid-19 pandemic affect all over world badly, which brings lots of changes in a pharmaceutical industries in India. COVID-19 pandemic aggravated the inequitable access to essential medicines in the public and private sectors of India. Governments in resource-limited nations want to make stronger in-country Private-Public Partnerships as well as topical treaties for Universal Health Coverage in context of the COVID-19 pandemic. It is also concluded that there is also significant positive impact on pharmaceutical industries in india as well as whole world.

ACKNOWLEDGEMENT:

The review was supported by ideal college of pharmacy and research kalyan ,we are greatly thankful to Ms.Alka Tyagi mam for informative guidance on this topic.

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