Research paper on effect of COVID-19 on Medical and Digital technologies.

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Introduction

The COVID-19 lockdown had an enormous influence on people's health, both mentally and physically. It turned out to be one of the significant public health crises of the century. COVID-19 showed us the need to revolutionize medical technology. Rapid advancements were made in medical technology and are, in fact, still undergoing. We need to be mentally prepared for another pandemic that may strike us. Medical tech is not only needed for the advanced treatment of deadly diseases but also for the effects such diseases have on people's mental health. Companies such as Pfizer, as well as Bharat Biotech, started rapidly working on vaccines. The genome code of the virus was shared across scientists worldwide, leading to the fast development of vaccines. Medical technology comes into play here. In the US COVID-19 also led to the rapid adoption of telehealth. Before the pandemic, digital literacy regarding telehealth was very low, as only 10% of patients used telehealth.

Role and Use of Medical and Digital technology

Since the onset of the pandemic, 3D printing technology has come into Use. Health professionals should wear adequate face masks to prevent infections because small droplets in the air spread the virus. However, not all surgical masks are suited for Use by health professionals who require N95 respirators with a very close face fit and effective filtration of airborne particles. This technology helped to deal with the shortage of masks. Face shields are also being produced with the help of 3D printing technology. 3D printing has also proved very useful and essential for the rapid development of respirator valves. Respirators are a small piece of equipment essential in respirators, as the valve connects patients under intensive care to breathing machines. For instance, a 3D-printer company in Italy designed a prototype in less than three hours. In 24 hours, it put together 100 lives-saving respirator valves at a hospital in Italy that urgently needed them. Manufacturing systems were also made increasingly flexible to meet the urgent demand for medical devices such as ventilators. However, manufacturers like Tesla, Ford, and GM have altered their production lines to produce ventilators because car manufacturing is different from respiratory devices; but more is needed. Developing new medical technology involves risks.

Inorder to identify proteins that could be drug or vaccine targets for COVID-19, DeepMind, a Google AI subsidiary, has been using machine learning. In India, the COWIN app uses Bluetooth to identify whether the user is at risk or near an infected person. The global market for smart wearable medical devices is expected to grow at a rate of 18.0% over the next five years, reaching 265.4 billion US dollars.

Industry 4.0, or Fourth Industrial Connection, is also a term used to describe digital technologies. It is also known as smart manufacturing or an intelligent factory. In the current COVID-19 crisis, this sector has great potential for supply chain services. Essential health and clinical problems can be solved using modern technologies, such as artificial intelligence, cloud computing, big data analytics, Internet of Things. By using the most recent medical technologies, the Industry 4.0 generation can fight COVID-19. Digital technologies may also facilitate the mitigation and spread of COVID-19.

Governments worldwide developed technologies to deal with the virus more effectively. Supply chains were optimized for the fight against COVID-19. Experts say governments should forge partnerships with technology companies and humanitarian organizations to help people during the crisis. Pfizer was one of the first companies to develop a vaccine for COVID-19. It uses Artificial intelligence across the supply chain, which improves efficiency and effectiveness. Artificial intelligence models have changed how drugs are discovered over the last decade.

Due to the effect of COVID-19, Doctors in the US and worldwide started expanding the Use of digital media and digital technologies. Virtual Healthcare is expanding. Applications such as 'Ada' help people diagnose any illness they might have by identifying the disease and assessing symptoms. Healthcare organizations have been using webinars and virtual consultations to spread information and reach patients. During the deployment of vaccines, one of the significant challenges was that vaccine production and delivery required ultra-cold supply chains.

Remote medical device development is rising as we cut down on physical contact. The outsourcing industry saw a rapidrise, and more and more companies started expanding manufacturing.

A company named Colorimetrix has developed experiments in which a single drop of blood is combined with a solution in a test tube and scanned using a mobile application. An algorithm is used to interpret the blood sample, and antibodies are formed against

COVID-19, which means the person has tested positive. A saliva test kit was developed by a company known as Digid. The saliva is washed in a test liquid and then put on a biosensor chip. A small reader processes the chip, and the data is immediately transferred to the server.

Venture capital investments in health diagnostic startups were 4.8 billion dollars in 2020. This coincides with the COVID-19 peak in 2020. In San Francisco, a firm located ixLayer, created a cloud technology infrastructure for test scalability.

DuringCOVID-19, many MedTech companies have been researching new ways to improve medical treatment to improve the survival rate of patients battling the virus. Advitos is a medical technology company that uses the ADVOS method. This is the world's first method of combining multi organ support for liver, lung, kidney, and acid-base balance. In patients with severe illness or on life support, ADVOS technology proved effective in treating COVID-19.

MedTech supply chain problems became a major roadblock in COVID-19 mitigation plans.

There was a rapid rise in audio-only interactions for medical consultations and treatment. Telehealth has now expanded to rural areas as well. Telehealth visits shot up from 840,000 in 2019 to 52.7 million in 2020. This shows the impact the virus had on Telehealth technology. Regulations are released on multiple Medicare rules regarding technology-enabled care.

In developing countries such as India, the government focused on improving the manufacturing of Personal protective equipment. India became an exporter of personal protective equipment from being an importer before the pandemic. This was possible because of improved medical technology adopted to speed up the manufacturing process.

Adopting digital medical technology has several benefits, such as better Healthcare, cost reduction, and more focused patient treatment. However, a vast digital divide, especially in developing countries, is proving a massive challenge in adopting such technology. Only some people have access to a fast and reliable internet connection. Adopting such digital technology can only be effective if adopted on a vast scale and benefits the masses. As of April 2023, only 64.4% of the world's population has Internet access compared to 49% in 2020. Although this is an improvement; millions of people still need access to the internet.

COVID-19 affected not only the lungs but many other organs of the body, most notably the heart. With the onset of COVID-19, cardiovascular equipment suffered a delay of several months. Demand for hospital supplies rose several times. Various surgeries were postponed in 2020, so demand for general surgery devices declined to some extent. However, demand for many hospital supplies increased dramatically. Some of the leading companies in the medical device industry are Abbott Laboratories, Boston Scientific, Bracco, and Dragerwerk. Artificial Intelligence has also been used to predict future demand for devices and equipment. The FDA- Food and drug administration, USA, gave emergency authorization to medical devices of several manufacturers. With such advancements in medical technology due to COVID-19, it is estimated that medical technology will also rise rapidly in other non-infectious diseases. A lot amount has been invested in the development of Artificial Intelligence based medical technology. Artificial intelligence can absorb and analyse large amounts of data and draw meaningful conclusions.

Healthcare and Technology companies are collaborating. Cloud technology enables storing large amounts of data in this field.

Conclusion

In 2022 spending on medical devices, has varied from region to region. The The Asia-Pacific region showed a decline in COVID-19 spending. Ukraine – Russia's conflict has also impacted this industry. Due to worsening economic conditions placed by sanctions, the market in Russia declined. Russia was facing a shortage of such medical devices, as the Russian Federal Service for Surveillance in Healthcare noted. Due to the conflict, Russia has reduced imports and is now relying more on the domestic device industry, which is seeing expedited approvals.

In developing countries such as India, the digital market is estimated to rise from 252 billion dollars in 2022 to 882 billion dollars in 2027. The government has created missions such as National Digital Health Mission and Ayushman Bharat Health Account.

As per the World Health Organisation, health systems worldwide have started to recover. After almost three years since the beginning of the pandemic, we can see that normalcy has returned almost everywhere. However, minor isolated outbreaks still occur, so we cannot deny the importance of medical technologies. The COVID-19 pandemic has also shown us where our health system is vulnerable to such rapid medical emergencies. Humans need to be ready for the following health crisis. This pandemic has taught us a lot. Better Infrastructure and better health management tools can prepare us much more for the upcoming pandemic. The technology we have discovered while fighting the pandemic will benefit us in the future for treating other diseases. There has also been a considerable focus on mental health since the onset of the pandemic. Thousands of people suffered from mental health crises. Researchers are trying to invest their time and money into discovering new technologies that could help people deal with their mental health problems. Production should also be done so that it is user-friendly and reliable. Innovative technologies will help people solve their problems. Overall COVID-19 pandemic has had a significant impact on digital as well as medical technologies.

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