BYJU'S

Gist of YOJANA

VOL.01 May 2020

UNIVERSAL HEALTH

Benchmarking Healthcare System

COVID-19: The Novel Threat

Yoga for Stress Management

Strengthening Health Systems

Artificial Intelligence in Healthcare

INCREDIBLE RESULTS

CSE 2018 Results

11 Ranks in Top 50 | **28 Ranks in Top 100** | **183 Ranks in the Final List**


Rank 11
Pujya Priyadarshni


Rank 16
Dhodmise Trupti Ankush


Rank 21
Rahul Jain


Rank 24
Anuraj Jain

CSE 2017

5 Ranks in top 50 | **34 Ranks** in top 100 | **236 Ranks** in the final list


Rank 3
Sachin Gupta


Rank 6
Koya Sree Harsha


Rank 8
Anubhav Singh


Rank 9
Soumya Sharma


Rank 10
Abhishek Surana

CSE 2016

8 Ranks in top 50 | **18 Ranks** in top 100 | **215 Ranks** in the final list


Rank 2
Anmol Sher Singh Bedi


Rank 5
Abhilash Mishra


Rank 12
Tejaswi Rana


Rank 30
Prabhash Kumar


Rank 32
Avdhesh Meena

CSE 2015

5 Ranks in top 50 | **14 Ranks** in top 100 | **162 Ranks** in the final list


Rank 20
Vipin Garg


Rank 24
Khumanthem Diana Devi


Rank 25
Chandra Mohan Garg


Rank 27
Pulkit Garg


Rank 47
Anshul Agarwal

CSE 2014

6 Ranks in top 50 | **12 Ranks** in top 100 | **83 Ranks** in the final list


Rank 4
Vandana Rao


Rank 5
Suharsha Bhagat


Rank 16
Ananya Das


Rank 23
Anil Dhameliya


Rank 28
Kushaal Yadav


Rank 39
Vivekanand T.S

CSE 2013

5 Ranks in top 50 | **62 Ranks** in the final list


Rank 9
Divyanshu Jha


Rank 12
Neha Jain


Rank 23
Prabhav joshi


Rank 40
Gaurang Rathi


Rank 46
Udita Singh

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Stay safe and Keep Learning!

Team BYJU'S

YOJANA – MAY 2020 ISSUE

UNIVERSAL HEALTH

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Chapter 1: Introduction

World over, people are facing the worst ever pandemic in their living history. COVID-19 is a novel virus, with very little is known about it. Therefore, currently the treatment being given is not very specific. The outbreak of corona virus is alerting the world about global public healthcare. The challenges before the Indian health care case system are manifold. Now is time to think of building a healthcare network with national buffer and global pump house for public health services.

- Government of India is committed to achieving a transformational shift in Indian healthcare wherein technology plays a crucial role.
- The National Health Policy (NHP), 2017 aims to double the government healthcare spending from the existing 1.2% of the GDP to 2.5% by 2025.
- The Coronavirus crises also create an opportunity of adopting E-health technologies that can create a transformational shift in Indian healthcare and can ensure efficiency.
- There are potential uses of Artificial Intelligence (AI) for the current situation created by COVID-19 and the potential exponential spread amongst the populations.
- The war against Corona also demands to have a suitable response to the increased fear, stress and apprehension among society due to the mortality and morbidity resulting from the COVID-19 pandemic.
    - Thus, an intervention such as yoga which reduces psychological stress may have important role to play in strengthening the immune system thereby reducing spread of infections and preventing complications.

Chapter 2: Benchmarking Healthcare System

The right to health has so far not been accorded the status of a Fundamental Right to the Indian citizens. It is not even a statutory right, unlike education.

- Health is a State subject.
- About 2/3rd of the total governmental expenditure on health comes from the State Governments and the balance by the Centre.
- Despite this, the Central Government has significant influence in the healthcare policy space with path-breaking schemes such as the National Health Mission, Ayushman Bharat and Pradhan Mantri Jan Arogya Yojana.
- India is also a signatory to the 2030 Agenda for Sustainable Development, whereby it has committed as a nation to “ensure healthy lives and promote well-being for all”.

Concerns:

- There are huge variations across States in their health outcomes and health systems’ performance.
- By and large, health has not received the kind of political and administrative salience that this vital sector deserves.

NITI Aayog Health Index:

- In order to address the issue of variations across the states, NITI Aayoga, in collaboration with the Ministry of Health and Family Welfare and the World Bank, has crafted a Health Index.
- The NITI Aayog has established the Health Index as an annual systematic tool to leverage cooperative and competitive federalism to accelerate the pace of achieving health outcomes and encourage cross-learning among states.

- The Health Index can be a gamechanger as it can shift the focus from budget spends, inputs and outputs to outcomes.
- Tracking incremental performance ensures that there is no room for complacency among historically better performing states, while at the same time providing opportunity to states that have lagged in performance to demonstrate perceptible improvement.

About the Index

- It is the first ever systematic exercise for tracking the progress on health outcomes and health systems' performance across all the States and UTs on an annual basis.
- The Health Index is a weighted-composite Index based on select indicators in three domains: a) Health Outcomes; (b) Governance and Information; and (c) Key Inputs and Processes,
    - Health outcomes carry the most weight across the different category of States/UTs.
- For generation of ranks, the States are classified into three categories (Larger States, Smaller States and UTs) to ensure comparability among similar entities.
- A range of indicators such as the neo-natal mortality rate (deaths occurring in the first 28 days of life), full immunisation coverage, treatment success rate of confirmed tuberculosis cases, stability administrators, of tenure of key vacancy of doctors and specialists in health facilities, and functionality of primary health centres, first referral units and cardiac care units, are included in the Index.
- In February 2018, the first round of the Health Index report on ranks and scores was released.

Significance:

- The index will propel States towards undertaking multi-pronged interventions and drive efforts towards achievement of SDG 3.
- The State Governments will be able to identify parameters in which States have improved, stagnated, or declined.
- The Health Index report provides the direction and magnitude of change at a composite level as well as for each of the indicators of the Health Index.
- An analysis of this can help States in focusing attention on better targeting of interventions and improving the delivery of health services and also an opportunity of sharing best practices.
- The Index is an innovative tool as it not only fosters competition among states by comparing similar states to each other but also nudges them to better their own performance in the previous year.
- It is envisaged that tracking progress on incremental performance will also help shake complacency among "Healthiest Large States" such as Kerala, Punjab, and Tamil Nadu that have historically done well.
- At the same time, it will nurture hope and optimism among large states such as Haryana, historically lagged in performance.

Scope for Improvement:

- Based on the composite Health Index scores range for the reference year (2017-18), the States are grouped into three categories: Achievers, Aspirants, and Front-runners.
- Aspirants are the bottom one-third States and six of the eight Empowered Action Group States fall in this category. Given the substantial scope for improvement, these States require concerted efforts.
- Achievers represent the middle one-third States.
- Front-runners, the States falling in top one-third score range are the best performing States.

Variable Progress Across States Towards Achieving SDGs:

- Several States have made good progress towards achieving SDGs included in the Index.
- Kerala and Tamil Nadu have already reached the 2030 SDG goal for Neonatal Mortality Rate (which is 12 neonatal deaths per 1000 live births).Maharashtra and Punjab are also close to achieving the goal.

- Kerala, Tamil Nadu, Maharashtra and Punjab have already achieved the SDG goal on Under-Five Mortality Rate, (25 deaths per 1000 live births).

Way forward:

- The Health Index can shift the focus from budget spends, inputs and outputs to outcomes by shining the light on States that have shown most improvement.
    - The MoHFW's decision to link the Index to incentives under the National Health Mission sends a strong signal to States in the shift towards outcome based monitoring and performance linked incentives.
    - In 2019-20, it was decided to link 70% of the NHM incentives to the incremental performance of the states and UTs on the Health Index.
- The process highlighted the large gaps in data availability on health outcomes and health systems performance.
- The need of the hour is to make outcome data available for smaller states and UTs more frequent and updated outcomes for non-communicable diseases, financial protection, and other priority areas.
- The robust programmatic data can be used for continuous monitoring.

Conclusion

- The Health Index is an important instrument in understanding the variations and complexity of the nation's performance in health.
- The critical factors that contributed to the success of the Health Index include: a) Timelines of the report so that it stimulates action; b) Provision of financial incentives based on the annual incremental performance of states under the National Health Mission; and; c) Verification of self-reported data by states by a third party.
- However, there are limitations to the Index as no single index can purport to comprehensively capture the complex story of evolution of health system.
- Also, due to constraints of availability of quality data critical areas such as non-communicable diseases, mental health, and private sector service utilisation could not be captured.
- Thus, the Health Index is a work in progress and continuous refinements have to be made as additional quality data becomes available and data systems improve.

Chapter 3: COVID-19: The Novel Threat

The World is experiencing one of the greatest pandemic in history. COVID -19 is novel virus, very little is known about it. It was first identified in December 2019 from Wuhan, Hubei province of China. WHO declared the 2019-20 Corona Virus outbreak, a Public Health Emergency of International Concern on 30 January, 2020 and a pandemic on 11 March, 2020.

What are Viruses?

- Viruses are on the borderline of living and dead beings. They are much tinier than bacteria.
- Their size ranges from 18 nm-400 nm.
- They do not grow on routine laboratory media. Because of this, specific laboratory diagnosis of viral infections is not easy.
- Viruses are host cell-dependent particles, they use host cell machinery to build their structure. That is why, specific antiviral drugs which don't damage host cells are very limited.
- Mutations occur during every viral infection, either spontaneously or may be induced with chemicals or physical agents.

- A hybrid or recombinant virus will have new genes and new characteristics as well.

Corona Viruses:

- All Coronaviruses are large (120-160 nm) enveloped RNA viruses which have single stranded genome.
- The name “coronavirus” is derived from Latin corona, meaning “crown” or “wreath”.
- The virus possesses a club shaped or crown like peplomer spikes giving appearance of solar corona.
- High rates of genetic mutations are shown by the corona viruses.
- Most of these infect animals and birds.
- Human infection is caused by only those which can adapt to human conditions.
    - There are already known six corona viruses involved in human infections.
    - Most of them are widespread, affecting people of most parts of the world and are known to produce mild upper respiratory tract infection and occasional diarrhea.
- In 2003 there was an outbreak of SARS-CoV (Severe Acute Respiratory Syndrome coronavirus).
    - It originated from China and spread to around 29 countries causing 8098 cases and 774 deaths.
    - The source was believed to be monkeys, raccoon dogs, cats and rodents.
- Another member of corona viruses, MERS-CoV (Middle East Respiratory Syndrome coronavirus) emerged in 2012.
    - First reported from Saudi Arabia, MERS-CoV has affected more than 2143 cases and 750 deaths from 27 different countries.
    - Here, the source was thought to be camels and bats.

COVID 19:

- This is the latest terminology being used as per the WHO guidelines.
- It represents COrona VIrus Disease, first case being registered in 2019 (COVID-19).
- Previously used names for COVID 19 are: SARS-CoV-2, 2019-nCoV acute respiratory disease, Novel coronavirus pneumonia, Wuhan pneumonia.

Challenges due to COVID 19:

- It is a novel virus, very little is known about it. That’s why currently the treatment being given is not very specific.
- Some antivirals, some anti-parasitic drugs are being tried.
- It is a highly contagious disease. The transmission rate of SARS-CoV-2 is higher than SARS-CoV and the reason could be genetic recombination.
- Asymptomatic carriers as well as convalescent individuals can transmit the virus.
- The progression of the disease is very unpredictable.
- Mortality rates are very high in some parts of the world compared to others.

Transmission:

- There are two main routes of transmission of the COVID-19 virus: respiratory and contact.
- The virus is mainly spread by small droplets produced by coughing, sneezing or even talking to an infected person.
- These droplets may also be produced during breathing; however, since the virus is large (as compared to other viruses), they rapidly fall to the ground or surfaces and are not generally spread through the air, over large distances.
- People may also become infected by touching a contaminated surface and then their face.
- The virus can survive on surfaces for a few hours to a few days, depending upon the nature of surface.
- It is most contagious during the first three days after onset of symptoms.

- Spread is possible before symptoms appear and in later stages of the disease as well. That makes it more dangerous.
- The time from exposure to onset of symptoms is typically around five days, but may range from two to fourteen days.
- There have been no reports of fecal–oral transmission of the COVID-19 virus.

Clinical Outcome:

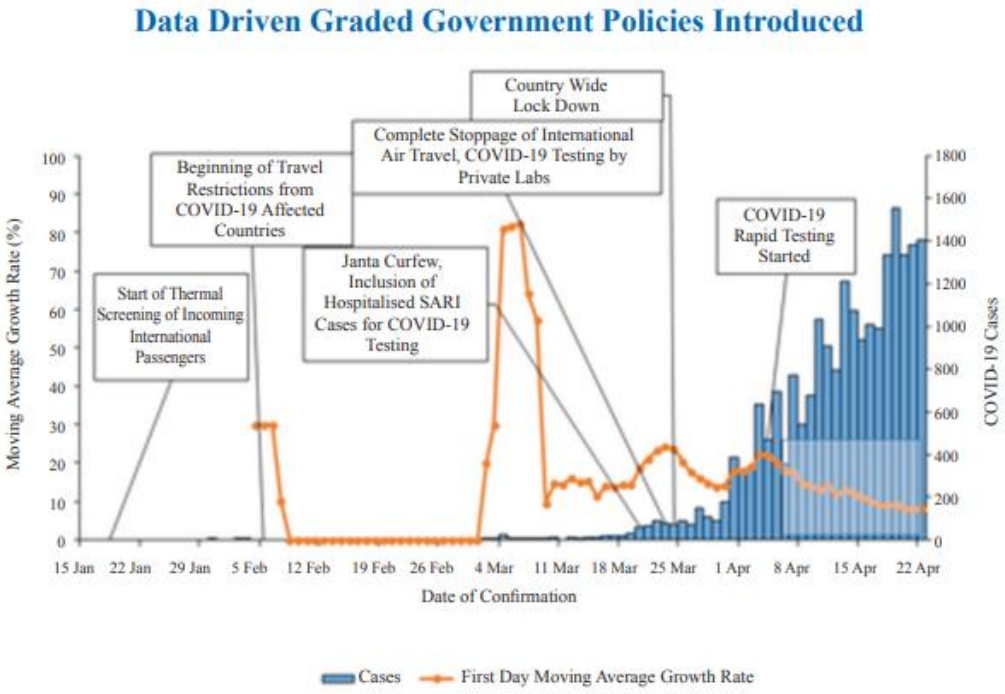
- Common symptoms include fever, cough (mostly dry cough) and shortness of breath.
- Other symptoms may include fatigue, muscle pain, diarrhea, sore throat, loss of smell and abdominal pain.
- While the majority of cases result in mild symptoms (about 80%), some progress to viral pneumonia and multi-organ failure.
- Older people and people with other medical conditions (such as asthma, diabetes, hypertension or heart disease), are more vulnerable to becoming severely ill. Severity also depends on pollution levels in that area.
- Unfortunately corona virus infections produce short and brief immunity, leaving a chance of reinfection.

Diagnosis:

- Real-time reverse transcriptase PCR (rRT-PCR) testing is the most useful test and currently the only reliable one.
- Blood antibody testing and viral antigen testing methods are being tried but are not specific.

Treatment:

- Currently, there is no uniform policy for treatment.
- Several drugs such as chloroquine, hydroxychloroquine, arbidol, remdesivir, and favipiravir are undergoing clinical studies to test their efficacy and safety in the treatment.
- In the initial phase of the disease where symptoms are mild, it can be treated by supportive therapy.
- In case of major lung damage, ventilator support might be required.
- Good immunity of individual may prevent further complications.
- At this point of time, prevention is the best possible treatment.



Chapter 4: Yoga for Stress Management

Stress is fight or flight response to a demanding situation. There is increased fear, stress and apprehension among society due to the mortality and morbidity resulting from the COVID-19 pandemic. Thus, an intervention such as yoga which reduces psychological stress may have important role to play in strengthening the immune system thereby reducing spread of infections and preventing complications.

Introduction to Lifestyle:

- Yoga-based lifestyle involves lifestyle modification based on the concepts of right living from Indian ancient scriptures.
- According to yoga principles, there are four components of the lifestyle namely- diet, physical activity, habits and emotional well-being. Irregularity of these lifestyle factors is considered as a major cause which affects the integrity of the immune system and increases the risk for infections.
- The lack of adherence to proper lifestyle (junk food consumption, physical inactivity, improper sleep-wake cycle, addictions) is all traceable to the speed of thought patterns in the mind.
- Hence, the entire concept of yoga-based lifestyle is to reduce the speed of mind (by the practices of physical postures with mindfulness, breath regulation, chantings, and relaxation techniques) and thus, manage it efficiently so that the individual is able to adhere to a proper lifestyle.
- Calming down of the mind provides deep rest and rejuvenation to the system which enhances homeostasis and immunity.

Read more about "Yoga" covered in Chapter 5 of Gist of Yojana Magazine June 2019 Issue.

Chapter 5: Strengthening Health Systems

Over the past seven decades, since independence, India has made a phenomenal progress in access and availability of health services.

India's Progress:

- India has achieved reduction in:
    - Infant Mortality Rate (IMR) from 74 per 1000 live birth in 1994 to 33 in 2017;
    - Maternal Mortality Ratio (MMR) from 600 per one lakh live births to 122 per one lakh live births in 2015-2017.
    - Crude Death Rate (CDR) and Crude Birth Rate (CBR) to 6.3 and 20.2 per 1000 population.
- The life expectancy at birth has increased from 58 years to 69 years from 1990 to 2017.
- India has successfully eliminated diseases like small pox, guineaworm, neonatal tetanus and polio.
- It has effectively controlled many communicable diseases like leprosy, malaria, filariasis, kalaazar and progressing well towards ending tuberculosis by 2025.
- Deaths due to infectious and communicable diseases have also been significantly reduced.
- India has largely achieved Millennium Development Goals (MDGs) and is committed to Universal Health Coverage (UHC) which is one of the targets of Sustainable Development Goals (SDG) by 2030.
    - The SDG 3 targets to achieve UHC, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality and affordable essential medicines and vaccines for all.

Challenges:

- Overcoming the growing incidence of non-communicable and lifestyle diseases like cancer, diabetes, chronic kidney diseases, cardiovascular diseases, chronic lung diseases and mental health disorders etc.
- Achieving universal health coverage with indigenous, affordable and cost-effective innovations.
- Non-Communicable Diseases (NCD) account for 55.4% of the diseases burden and 62% of death in India and is expected to rise further to over 70%.
- The approaches for reducing NCD mortality and morbidity are very different than India's health system had been implementing for prevention and control of communicable diseases, and strategies for reducing maternal and child mortality.
- While the emerging new challenge of NCDs and the challenge of fighting malnutrition and communicable disease still continue, India is facing double disease burden.

Health Financing in India:

- Public expenditure on health is at 1.2% of the GDP and remaining is met by Out-of-Pocket expenditure (OOPE) by the households which is exorbitant and puts extra pressure on low socioeconomic population.
- State health spending is around 2% of SGDP on average with variations across the States.
- According to National Health Accounts Estimates (2016-2017), the total spending on health in India is 3.8% of the GDP.
- Reports of several National Sample Survey Organisation (NSSO) Rounds (Round 60-2004, Round 71-2014 and Round 75th – 2017-18), show that the households largely depend on private providers for healthcare services.

Government Commitments:

- The National Health Policy (NHP), 2017 aims to double the government healthcare spending from the existing 1.2% of the GDP to 2.5% by 2025.
- To achieve the goals of Universal Health Coverage, the Government should aim to raise healthcare spending to the level of 4-5% of the GDP over a period of 7 to 8 years from 2019.

What is the Rationale for Spending on Health, especially Public Health?

- Health is not only a goal in itself, but also vital for improved developmental outcomes.
- Health outcomes and financial protection depend on public spending on health.
- In 2014, India had highest OOPE (62.4%), almost double of China (32%) and 4.5 times of Japan.
- A study by Public Health Foundation of India (PHFI) has estimated that about 55 million Indians are pushed into poverty in a single year because of catastrophic health expenditure.
- Public health care system in India needs to address the issue of critical regulation systems on food, drugs and diagnostic etc; life saving vaccines; preventive, promotive, palliative and rehabilitative health care, which will not be addressed by market forces requires government interventions.
- Primary healthcare can potentially deal with 90% of healthcare demands.
- Investment in primary healthcare including prevention and health promotion proves better health & developmental outcomes at a much lower cost – it helps to reduce the need for more costly, complex care by preventing illness and promoting general health.
- Comprehensive primary health care reduces morbidity and mortality at much lower costs and significantly reduces the need for secondary and tertiary care. It also addresses preventive, promotive curative rehabilitative and palliative aspects of care.

Need for Reprioritization:

- In India, to generate more resources for health, commodities that harm health have been suitably taxed but taxes need to be earmarked for preventive and promotive healthcare.
- Subsidies need to be reviewed periodically.

- Raising taxes on harmful commodities may not only improve health but can generate more fiscal space for health.
    - Taxes on alcohol, tobacco, salt and sugar will not only generate additional resources but would be preventing non-communicable diseases and contribute to easing burden on health systems.
    - Similarly, taxes generated from alcohol, may also be used for health.
- Subsidies on commodities such as sugar, diesel, kerosene and coal should be reviewed and savings diverted to nutritious food and clean renewable energy sources.
- The Government needs to subsidise LPG heavily instead of diesel, kerosene and coal for cooking and fruits, dairy products and protein sources should be promoted for healthy lifestyle.
- Turning point in the era of taxation would be when these taxes, labelled sin tax, are levied to move towards assuring healthy behaviour which act as preventive health providers.
- At the policy level, marginal increase in taxes may not yield desired outcomes. In a country like India, inflation suppresses small increases; hence inflation needs to be adjusted to avoid tax ineffectiveness.
- Formulation of a policy on raised taxes may not achieve defined results unless its implementation and enforcement is monitored effectively and coordinated till it yields desired outcomes to reduce transport and trade illegally.
- The design of taxes must take into account all products leading to obesity and further diabetes and cardiovascular disease.
- Production and consumption of pulses have stagnated in India while the output of food grains and sugar has increased.
- Hence, the food subsidy can be used towards subsidies on pulses, fruits, vegetables and milk which will have a far more beneficial impact on nutrition.
- Farmers of tobacco and sugarcane do well as these crops are cash crops in India. But they should be assisted to switch over to such crops that are not harmful to human health by allocating part of earmarked revenue collected through taxes for the orientation of these farmers.
- Taxes should be imposed on specific industrial commodities causing air water and soil pollution.

Way forward:

- The health sector needs to focus on “more health for money” turning towards innovative financing by striving to do more with less.
- The health sector has tremendous potential to use digital technology using application of machine learning, artificial intelligence, internet of things and virtual reality in making quality healthcare accessible and affordable to the people.
- Health sector in India is facing shortage of infrastructure and manpower especially specialists.
- India must use technology in the re-organisation of healthcare and evolve a new class of care delivery models.
- Initiations such as liability gap funding for setting up hospitals under PPP mode in aspirational districts offer an opportunity to innovate limited health allocation.
- Health cess of about 1% on direct tax, raising funds of approximately Rs. 10,000 each year need to be diverted to health.
- There is a need to develop partnership with the private health sector for co-financing secondary and tertiary health care, and with the corporate sector for allocating CSR funds in health care.
- Health insurance to finance hospitalisation to reduce OOPE and catastrophic health expenditure must be introduced.
- Improving efficient budget utilisation and health systems performance would make available massive unspent funds for all envisaged growth plans.

Chapter 6: Artificial Intelligence in Healthcare

Artificial Intelligence(AI), is intelligence demonstrated by machines, unlike the natural intelligence displayed by humans and animals. AI increases the ability for healthcare professionals to better understand the day-to-day patterns and needs of the people they care for, and with that understanding they would be able to provide better feedback, guidance and support.

Opportunities and Applications:

AI in Assistance to Physicians

- AI can relieve highly-skilled medical professionals from routine activities, freeing up doctors to concentrate on the higher-value cognitive application of medical practice.
- AI-based technologies can offer improvements with speedy diagnosis and therapy selection, reducing medical errors, improving productivity, assessing and modelling risk and stratifying disease.

AI in Diagnostics

- AI based diagnosis can be especially helpful for radiology, pathology, skin diseases, and ophthalmology.

AI for Optimising Treatment Plans

- AI can also be used for assisting doctors and patients to choose an optimal treatment protocol.
- Such technology is in use in India, China and Thailand to provide appropriate recommendation plans for cancer treatment using patient's details linked to medical literature.

AI for Monitoring/Ensuring Compliance

- The potential for AI application in remote monitoring has enhanced manifolds via the use of wearables.
- Devices can be used for helping people exercise and adopt healthy eating.

AI in the COVID-19 Pandemic

- The COVID-19 pandemic highlights the need for an AI based epidemic monitoring system that can model and predict outbreaks and help optimise scarce resources.
- AI can help fight the virus via Machine Learning-based applications including population screening, notifications of when to seek medical help and tracking how infection spreads across swathes of the population.
- A Chinese tech firm uses AI systems to flag anyone who has a temperature above prescribed levels within Beijing's Qinghe Railway Station.

Challenges and Controversies

Healthcare Industry Issues:

- Traditional healthcare personnel may resist new innovations.
- Patients may question AI-based decision-making.
- Medical staff could view the changes as disenfranchising them from their key roles and decision-making powers.
- The key challenge for policy makers is the engendering of confidence in the outcomes and trust that a human medical practitioner has an active role within the AI system.
- The challenge for the training of doctors is to address the transformational nature of AI-based healthcare, whilst not elongating the period for learning and qualification to integrate these new systems alongside

everyday working practices.

Technology-related Issues:

- AI systems and the underlying algorithms are reliant on the quality of data to perform the necessary processing and decision-making.
- The challenge within India is the disparate nature of health care related data. Each state has its own system and working process.
- This is complicated by the mass worker migration between states, and highlights the need for solutions at a national level.

Socio-cultural Issues in Technology Implementation:

- Within India, access to internet is primarily undertaken via mobile phones. While the penetration of mobile phones would at face value seem to be a positive factor for the adoption of AI, it could inadvertently amplify the gender disadvantage as research shows that women are less likely to own a mobile phone than men.
- Solutions need to take account of the Indian context where pockets of the population are socially and educationally challenged, culturally marginalised and economically disadvantaged.

Regulatory and Ethical issues:

- Data security and privacy is especially important with the increasing use of wearables which can potentially cause identity theft through hacking of devices and data.
- AI is set to alter the traditional relationship between the doctor and the patient as technology plays the role of a third substantial actor.
- Under these circumstances, the regulators need to provide clear and concise user agreement and privacy policies to enhance widespread and safe adoption of these devices.

Way Forward

- AI and its applications should be incorporated within curriculum for medical & paramedical training.
- The technology design and implementation should take into account cultural practices and address the gender divide in India.
- Ethical guidelines regarding security and privacy of data should be protected. The data should be strictly used for clinical purposes only.
- The AI system must be explainable and auditable.
- All decisions made in the context of diagnosis or recommendations can impact on human lives.
- Underlying algorithms must be transparent and explainable to ensure ease of audit rather than acting as a black-box based system.
- AI systems should not exhibit bias. It must not exhibit any racial, gender or such biased decision- making that disenfranchise or favour any population groups.
- AI healthcare systems must conform to human values and ethics.

Chapter 7: Artificial Intelligence in Healthcare

The Internet of Things (IoT) is a scalable and automated solution that has seen exponential growth in other industries such as automated manufacturing, wearable consumer electronics, and asset management. The COVID-19 outbreak has shown the new emerging benefits of smart manufacturing, saying Industry 4.0 drives capabilities for remote operations, monitoring and maintenance of production lines and manufacturing plants.

What is Internet of Things (IoT)?

- The Internet of things is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.
- IoT consists of several functional components: data collection, transfer, analytics, and storage. Data is collected by sensors installed on mobile, end-user hardware like phones, robots, or health monitors.
- Then, the mobile data is sent to the central cloud server for analytics and decision-making, such as if a machine requires proactive maintenance to prevent unexpected breakdown or if a patient needs to come in for a check-up.
- The primary challenge is to integrate and streamline digital infrastructure at various stages of the public health response.

IoT in Hospitals:

- Connecting health systems together can reduce a huge amount of manual admin tasks by consolidating Electronic Medical Records (EMRs), scheduling systems, and patient monitoring into one place.

Connected Medication & Home Care:

- By giving patients regular alerts to take their medication and encouraging them to stick to the full course, doctors and caregivers have a real-time record of patients taking medication and can track the patient's progress by connecting with other medical records.
- Using connected medication could also help to develop a vaccine faster. Researchers could conduct dispersed remote trials and potentially speed up development of a vaccine that would work on a wider base of individuals.

Maximising Output and Minimising Stress:

- Simply by maximising the number of patients that can be attended to by doctors in the hospitals, and reducing the number of people that need to come into the hospital for regular appointments, IoT could take a huge weight off the shoulders of medical staff.

IoT to Manage Patient Care:

- The scalability of IoT also comes in handy for monitoring all the patients who are high-risk enough to warrant quarantine but not serious enough to warrant in-hospital care.
- With IoT, the patients can upload the data with their mobile devices to the cloud for analysis.

Mapping of Technologies:

- The Department of Science and Technology (DST) has set up a COVID-19 task force for mapping of technologies to fund nearly market-ready solutions of diagnostics, delivery supplies.
- The taskforce will map technologies from research and development labs, academic institutions, start- ups, and MSMEs.
- The task force will identify the most promising start-ups that are close to scale-up their production in these areas.

Conclusion

- Use of digital technologies in healthcare include the internet of things (IoT) with next-generation big-data analytics, artificial intelligence (AI) that use deep learning and blockchain technology. They are highly inter-related.
- It is now the moment for countries to fast-track the construction of new digital infrastructure, such as IoT along with AI, in addition to hastening of vital projects and major infrastructure construction that's already included in countries' financial stimulus plans.

Chapter 8: Redesigning Public Health

The outbreak of corona virus is alerting the world about global public healthcare. The WHO has calle for boldest actions to fight against the pandemic in association with UNO. The leaders of G-7 industrial power house have pledged to halt this pandemic. There is a proposal to launch COVID-19 Solidarity Response Fund. The Asian Development Bank announced $6.5 billion package to its member countries to fight against the pandemic. The Prime Minister of Indian has given a call to SAARC nations for joint strategy to save people of this region.

Weak Public Healthcare System:

- The public healthcare system is not equipped with intensive care unit and ventilators, pathology and clinical laboratories, surgical instruments with sufficient medical and paramedical forces.
- It has resulted in hard healthcare (like pharmaceuticals, surgical instruments etc.) and soft healthcare (like service of doctors, specialists, nurses) supply constraints.
- There is a total failure on the part of global public healthcare system in consolidating and deploying the health force to combat corona and safeguard the global community.

China's Public Healthcare Model:

- China dealt with the pandemic using national buffer and pump house of medical and paramedical forces as defence force.
- The trained medical and paramedical forces were pooled for public healthcare service using a network is called national buffer and the healthcare service was provided by operating this buffer as pump house during the time of health emergency.
- China is the first country to adopt the strategy of national buffer and pump house for public healthcare service during the outbreak of COVID-19.

Global Trade In Health Services

- The careful examination of global public healthcare system keeping the global trade in health services in view is the need of the hour.
- The WHO in association with WTO is drawing the attention of its members towards the global public healthcare system and promoting global trade in health services.
    - World Band and IMF can further identify ways to support this mechanism.
- WTO has made provision for trade in services under general agreement on trade in services (GATS).
    - Serious discussions are going on at international level to bring healthcare under its ambit and promote global trade in health services.
    - They are working out strategy to promote global trade in health service covering medical education under different modes of general agreement on trade in services and to operate trade in health service of consumption abroad (Mode-1), cross border consumption (Mode2), commercial presence (Mode-3) and presence of natural persons (Mode-4).

Re-engineering of Healthcare System – the way forward:

- It is time to think of building a healthcare network with national buffer and global pump house for public health services.
- The proposed national buffer can be operated as a global pump house for healthcare and to save global population.
- The World Trade Organisation in association with its member countries can work out a plan to build national buffer for health service by supporting and standardising medical education.

Conclusion:

- The careful examination of population cartogram shows that large countries of the world with small population shrink in size if public healthcare system is not sound enough to protect their population.
    - This is a serious warning to all developed nations to work out some strategy.
- A good strategy for global trade in health services increases export earnings of member countries besides acting as an engine of economic growth.
- The strategies should aim at exploiting country's comparative advantage in niche areas of health sector with regional and international cooperation.

Chapter 9: Resilience And National Spirit

In India, natural disasters are a common phenomenon. Cyclone Fani wreaked havoc in Odisha. The preparedness of disaster management authorities was well appreciated across the world, when the coastal authorities in Odisha moved more than a million people from the area within Cyclone Fani's projected path onto higher ground, significantly reducing the death toll. India's preparedness for natural disasters has increased a lot in recent times, but there is still a long way.

Japan- a leading example:

- Indian delegation for 11th India-Japan Joint Working Group Meeting on Urban Development reached Japan just 3 days after super Typhoon Hagibis, one of the most powerful in the last six decades, hit Japan.
    - Despite this, Japan had not changed the schedule and events were organised according to the plan.
    - This reflects resilience in Japan's approach towards disasters.
- Japan is not new to disasters. The most devastating being Great Hanshin earthquake 1995, Great East Japan earthquake 2011 and Tsunami which triggered the Fukushima Daiichi nuclear disaster.
- Japan's political and economic commitment to disaster risk reduction and resilience has been a leading example for the whole world to see.

Japan's History:

- In the 1950s, Japan, still ravaged by the war, aimed to become modern, peaceful and part of the world's economic elite.
- One of the key elements in the construction of this renewed Japanese society was building of a monument to symbolize Japan's ascendancy as a global economic powerhouse.
- This led to the planning of Tokyo Tower by Hisakichi Maeda, to be taller than Empire State Building and Eiffel Tower.
    - The project attracted thousands of Japanese construction workers and instilled a greater sense of nationalism in the hearts of Japanese people.
- In 1964, Japan became the center of attention when it hosted the Tokyo Olympics.
- Simultaneously, completion of many large-scale infrastructure projects was timed to coincide with the 1964 Olympics, including the launch of the globally famous Shinkansen bullet train. Tokyo Station was rebuilt as a heritage building.

Making use of India's potential:

- India too has a rich history and culture. To realise Sardar Patel's vision, 'Statue of Unity' was unveiled as world's tallest statue in 2018, taller than the Statue of Liberty.
    - The monument has witnessed high tourist footfalls, making it one of the most visited destinations across the country.

    - Like Tokyo Tower of Japan, the 'Statue of Unity' of India will serve as a symbol to imbibe a sense of national purpose.
- India is working towards the holistic achievement of the global SDGs.
- It is running world's biggest health assurance scheme as well as world's biggest financial inclusion scheme opening over 370 million bank accounts for the poor.
- India has been able to implement the world's largest sanitation programme under Swachh Bharat Mission, building 110 million toilets in just 5 years.
- India is committed to achieving the target of 450 GW of renewable energy and on the other hand India is leading the initiatives like International Solar Alliance, Coalition for Disaster Resilient Infrastructure.
- India has jumped 79 positions in the World Bank Ease of Doing Business (EoDB) rankings, currently ranked at 63, being the only large country in the world to witness such monumental progress.
    - The jump of 25 places in EoDB in Construction Permits this year is unprecedented.
- Reforms and policy measures in the country have ensured commitment towards a "one nation one belief" approach, charting its way towards realising the vision of a $5 trillion economy.

Way forward:

- A lot of lessons can be taken from the Japanese national spirit of collectivism and unity.
- India needs to address the challenge of engaging with modernity and economic development with cultural preservation, learning from Japan.
- Japanese people have always leaned on their own unique culture, despite the global wave of westernisation.
- The advanced, precision manufacturing and kaizen quality control principles are leading examples for the rest of the world.
- India can realise its vision for equitable growth by incorporating a sense of national pride amongst its citizens through projects of national integration, ensuring that each one of us contributes towards the natural goal of meeting the aspirations of New India.

Chapter 10: Extraordinary Virtual G20 Leaders' Summit

An Extraordinary Virtual G20 Leaders' Summit was convened to discuss the challenges posed by the outbreak of the COVID-19 pandemic and to forge a global coordinated response.

- India's PM called on the G20 to come out with a concrete action plan to fight the global pandemic.
- PM underscored the need to put human beings at the centre of our vision of global prosperity and cooperation, freely and openly share the benefits of medical research and development, develop adaptive, responsive and humane health care systems, promote new crisis management protocols and procedures for an interconnected global village, strengthen and reform intergovernmental organisations like WHO and work together to reduce economic hardships resulting from COVID-19 particularly for the economically weak.
- PM called on the Leaders to help usher in a new globalisation, for the collective well-being of humankind and have multilateral fora focus on promoting the shared interests of humanity.

Outcomes of the Virtual G20 Summit:

- The extraordinary G20 Summit was a culmination of the Finance Ministers and Central Bank Governors Meeting and G20 Sherpas Meeting on the COVID-19 pandemic.
- At the meeting, G20 Leaders agreed to take all necessary measures to contain the pandemic and protect people.
- They also supported strengthening of the WHO's mandate in the fight against pandemics, including delivery of medical supplies, diagnostic tools, treatments, medicines and vaccines.

- Leaders also committed to use all available policy tools to minimize the economic and social cost of the pandemic and to restore global growth, market stability and strengthening resilience.
- G20 countries committed to inject over USD 5 trillion into the global economy to counter the social and economic impact of COVID-19.
- Leaders also agreed to contribute to the WHO led COVID-19 Solidarity Response Fund on a voluntary basis.
- At the end of the Summit, a G20 Leaders' Statement was issued which called for a coordinated global response to fight the pandemic, adopting measures to safeguard the global economy, minimising trade disruption and steps to enhance global cooperation.

Chapter 11: RBI Announces Relief Measures

The Governor of the Reserve Bank of India Shaktikanta Das announced a set of nine measures to revive the struggling domestic economy.

Liquidity Management:

1. **Targeted Long-Term Operations (TLTRO) 2.0:**

TLTRO 2.0 is being carried out to facilitate funds flow to small and mid-sized corporates, including NBFCs and MFIs. The funds availed by banks under TLTRO 2.0 should be invested in investment grade bonds, commercial paper, and non-convertible debentures of nonbanking financial companies (NBFCs), with at least 50 per cent of the total amount availed going to small and mid-sized NBFCs and micro finance institutions (MFIs).

2. **Refinancing Facilities for All India Financial Institutions:**

Special refinance facilities for a total amount of Rs. 50,000 crore will be provided to National Bank for Agriculture and Rural Development (NABARD), the Small Industries Development Bank of India (SIDBI) and the National Housing Bank (NHB) to enable them to meet sectoral credit needs.

3. **Reduction of Reverse Repo Rate under Liquidity Adjustment Facility:**

Reverse repo rate has been reduced by 25 basis points from 4.0% to 3.75% in order to encourage banks to deploy surplus funds in investments and loans in productive sectors of the economy.

4. **Raising Limit of Ways and Means Advances of States and UTs:**

Ways and Means Advances (WMAs) Limit of states and union territories has been increased by 60% over and above the limit as on March 31, 2020, in order to provide greater comfort to states for undertaking COVID-19 containment and mitigation efforts, and also to help them plan their market borrowing programmes better.

Regulatory Measures

1. **Asset Classification:**

With respect to recognition of Non-Performing Assets (NPAs), the central bank has decided that the payment moratorium period will not be considered while classifying assets as NPAs. i.e., the moratorium period will be excluded while considering 90-day NPA norm for those accounts for which lending institutions decide to grant moratorium or deferment and which were standard as on March 1, 2020.

2. **Extension of Resolution Timeline:**

The period for implementation of resolution plan has been extended by 90 days. Currently, scheduled commercial

banks and other financial institutions are required to hold an additional provision of 20 per cent if a resolution plan has not been implemented within 210 days from the date of such default.

3. **Distribution of Dividend:**

Scheduled commercial banks and cooperative banks shall not make any further dividend payouts from profits pertaining to FY 2019-20.

4. **Lowering of Liquidity Coverage Ratio Requirement:**

To improve the liquidity position for individual institutions, Liquidity Coverage Ratio requirement for scheduled commercial banks has been brought down from 100% to 80% with immediate effect.

5. **NBFC Loans to Commercial Real Estate Projects:**

The treatment available for loans to commercial real estate projects with respect to the date for commencement for commercial operations has been extended to NBFCs, in order to provide relief to both NBFCs and the real estate sector.

TID-BITS

Covid India Seva' - An Interactive Platform for Citizen Engagement on COVID-19

- Covid India Seva is an interactive platform to establish a direct channel of communication with millions of Indians amid the pandemic.
- This initiative is aimed at enabling transparent e-governance delivery in real-time and answering citizen queries swiftly, at scale, especially in crisis situations.
- It works on a dashboard at the backend that helps process large volumes of tweets, converts them into resolvable tickets, and assigns them to the relevant authority for real-time resolution.

Revival of Post- COVID-19 Indian Economy

- The Technology Information, Forecasting and Assessment Council (TIFAC), an autonomous technology think-tank under the Department of Science & Technology (DST), is preparing a white paper to strategise revival of post-COVID-19 Indian economy.
- This document would mainly focus on strengthening Make in India initiatives, commercialisation of Indigenous technology, developing a technology-driven transparent PDS, efficient rural health care delivery, reduction of import, adoption of emerging technology domains like AI, Machine Learning, Data Analytics and many more.

E-Learning Sees Upsurge During COVID-19

Owing to the COVID-19 lockdown, e-learning in the country has witnessed an appreciable upsurge. Both schools and higher education institutions have started various modes of online classes and sharing of study material depending on the resources available with them and with the students.

- E-learning ranges from structured online classes through various platforms to teachers uploading lectures and class notes, sharing links of digital learning resources like SWAYAM and NPTEL, providing access to

online journals.

- The Education portals of NCERT like DIKSHA, e-pathasala, National Repository of Open Educational Resources, Senior Secondary Courses of NIOS, IGNOU Courses, UGC MOOCS courses, Shodhganga, and the other ICT initiatives like Robotics education (e-Yantra), Open Source Software for Education (FOSSEE), Virtual experiments (Virtual Labs) and Learning programming are also experiencing very large access rates.
- SWAYAM PRABHA group of 32 DTH channels is devoted to telecasting of high-quality educational programmes on 24X7 basis using the GSAT-15 satellite.

Challenges:

- Lack of internet connectivity and other required digital infrastructure with students is proving to be an impediment to e-learning in many cases.
- Computer literacy, adaptability struggle and technical issues are other major challenges.

iGOT e-learning Platform

The Department of Personnel and Training has launched a learning platform to combat COVID-19 for all front-line workers to equip them with the training and updates in coping with Pandemic.

- By giving COVID-19 training to other potential second line workforce, India will be better prepared for the emergent situations.
- The platform delivers curated, role-specific content, to each learner at his place of work or home and to any device of his choice.
- iGOT platform is designed to population scale, and will provide training to around 1.50 crore workers and volunteers.

Aarogya Setu App

The Government of India has launched a mobile app developed in public-private partnership to bring the people of India together in the fight against COVID-19.

- The App, called 'AarogyaSetu' joins Digital India for the health and well-being of every Indian.
- It will enable people to assess themselves the risk for their catching the Corona Virus infection.
- It will calculate this based on their interaction with others, using cutting edge Bluetooth technology, algorithms and artificial intelligence.
- The personal data collected by the App is encrypted using state-of -the-art technology and stays secure on the phone till it is needed for facilitating medical intervention.

Read more about Aarogya Setu App.

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