Impact and Role of Artificial Intelligence in Achieving Universal Health Coverage in India

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Abstract—*Introduction: Artificial Intelligence is a digital technology which has been sneaking into our lives. We find it everywhere in our daily experiences, ranging from auto completing when we type, recommendation while google searches and music suggestion based on our listening history. Universal health coverage (UHC) ensures that everyone, everywhere have access to quality and affordable healthcare. India still faces various challenges to achieve UHC where millions are still abstained from accessing the health services or fall into poverty after heath expenses. This paper will address major challenges of UHC in India and how Artificial Intelligence can facilitate towards achieving its goal.*

Objective: *To study the impact of Artificial Intelligence in healthcare and how helpful it is in achieving UHC in India.*

Methods: *Literature review and secondary research by comparing trends, the impact of AI technology in the past and in future. Also, the use of different AI solutions in different segments of healthcare in India is studied.*

Result: *Technology and digital transformation have potential to enable the accessible, affordable and quality care in many ways. Electronic medical records can streamline and automate the workflow and AI can cut huge amount of paperwork in hospitals, chatbots can handle repeat inquiries. Telemedicine is also effective tool in providing healthcare services to all the individual where healthcare services have not reached due to any reason. AI based solutions are utilized in providing Telemedicine based solutions.*

Conclusion: *Based on our review, AI is currently assisting in augmenting human capacity and helps in reduction of cost. Despite many challenges and barriers, AI can help to address the healthcare issues of affordability, accessibility and quality of healthcare services.*

Keywords: *Artificial Intelligence, Machine Learning, Universal Health Coverage, Healthcare.*

1. INTRODUCTION

Health is a state prior to condition, an indicator and a measure of development. Attainment of health with the highest possible quality is a fundamental right of every individual irrespective of their caste, religion, income level and social condition. Health is an integrated and broad subject. All the micro and macro factors are somewhere directly and indirectly related to health. In order to meet the highest standard of health to every individual, UHC was introduced as part of the Sustainable Development Goals (SDG) which is to be achieved by 2030. To accelerate successfully toward Global goals achievement, UHC is a key to unlock it for many of SDG for example on fighting against gender inequities, poverty and economic growth. We cannot achieve any of these goals without proceeding towards UHC[1].While various challenges are facing by the worldwide countries, India is one of them. As per WHO Half of world's population do not have access to the healthcare, they need[2]. In India, total 1.28 % of GDP is spent on healthcare and due to non-availability of basic health services and people struggling to afford even the most basic healthcare is the biggest challenge. On one hand accessibility of health services, infra structure and health professionals to all is one of the crucial challenges in India while affordability of the services by all is on other hand. In the situational Analysis of Health Workforce in India by PHFI, it was analyzed that distribution of the health worker across urban and rural states of India were not proportionate which remains a serious barrier to UHC[3]. AI, as a powerful tool and has potential to fight with the physical limitation of human resources and capital and provide new opportunity of growth. Adoption in AI can help in addressing multiple barriers and help in accessing the healthcare facilities to everyone[4]**.**

2. OBJECTIVE

To study the impact of Artificial Intelligence in healthcare and to identify how it is helpful in achieving Universal Health Coverage in India.

3. METHODOLOGY

We have adopted the secondary research method and done a detailed review of available literature. Search strategies were used to identify studies regarding UHC challenges in India and use of Artificial Intelligence (AI) in Healthcare. This included searching Google, PubMed, reports from national, government (NITI Aayog) and international agencies like WHO.We have initially identified 30 articles out of which we have considered 10 based on the availability of the full texts and relevance to the study. Search terms used were combination of Artificial Intelligence OR AI, healthcare AND/OR Universal Health Coverage/ UHC. We initially identified major challenges in

achieving UHC Goals in India followed by review of literature based on AI technology solutions in different segments of healthcare in India. Based on the result we have highlighted how AI can help to achieve UHC in Indian context.

4. RESULTS

4.1. Universal Health Coverage

Equitable access of healthcare services to all people - everywhere and anywhere regardless of any discrimination based on gender, caste, religion, social or economic status[5].Healthcare services including rehabilitation, prevention, treatment, health promotion and palliative care. According to WHO, Half of the world do not have access to healthcare services which is the basic need[6]. There are many challenges in Universal Health Coverage -Healthcare Financing, Human Resource Requirements, Access to medicine and devices[7].

4.2. Artificial Intelligence

Artificial intelligence is often defined as 'intelligence' demonstrated by machines that imitate cognitive functions such as "learning" and "problem-solving". It aims to build mature systems that understand external data, learn from it and use those learnings to achieve specific goals. Machine learning is a subset of AI where statistical methods are applied to vast data. Algorithms are developed to predict/solve a specific problem. Deep learning allows machine to ingest vast amount of raw data to understand, learn and discover hidden patterns, associations in the data.AI has potential to provide more advantagesvalue in different sectorsincluding Healthcare, Agriculture, Education, Smart Mobility, Transport, Retail, Manufacturing, Energy[8].

4.3. Artificial Intelligence in Healthcare

AI in Healthcare can help in addressing issues and barriers in achieving UHC in multiple ways by improving quality of care, complementing inadequate number of skilled human resources, reducing cost of healthcareto provide more healthcare facilities[9].

4.3.1. AI Enabled solutions help in providing Quality healthcare to all-One of most precious outcomes of AI in healthcare is "Gift of Time". In India, most of all doctors are overburdened and it leads to medical errors and misdiagnosis. Automation helps in reducing errors, preventing misdiagnosis and save time. Time is essential to quality of care patient receives. As William Osler wrote "A case cannot be satisfactorily examined in less than half an hour. A sick man likes to have plenty of time spent over him, and he gets no satisfaction in a hurried 10-12 minutes examination". AI can help control the spread of infections acquired from caregivers in hospitals due to inadequate hand washing. AI enabled sensors that use infrared light to produce outline images can quantify how clean the hand is. These can be installed in

hallways, operation theatres. In the long run, AI solutions would help cater to large population. AI can streamline the medical workflow. Machine learning programs can read through entire patient electronic records and suggest recommendations based on current symptoms of the patient. This would enable doctors and nurses to devote more time towards quality care.

4.3.2. AI helps in Prediction and Detection of Health Problems- Deep Learning Algorithm used to detect a condition of Diabetic retinopathy in Arvind Eye Hospitals which facilitates increase in the volume of screening which requires a smaller number of Ophthalmologist. Various Companies in India like Tricog Health have developed a cloud-based heart condition diagnosis, Andria Systems have deployed solution for automated detection of cervical cancer via path samples[10].

4.3.3. AI helps in Reducing Cost- Application of AI in healthcare, provide efficient decision making, more accurate diagnosis and Optimizing operations which ultimately reduces cost. Robotic Process Automation (RPA) helps in performing recurring tasks like updating patient information. like Billing, coding and registration of patient.Improvement in administrative workload, lead to further decrease in turn-around time in healthcare; increase in the treatment of number of patients and help reduce cost and improve outcome[11].

5. WAY FORWARD

India is in unique place to be a channel of Artificial Intelligence in National and International Market. Currently in India, There are 44 companies including startups and other healthcare organizations who are working on AIenabled solutions to cater the needs of Healthcare like Niramai,Innov4sight, Microsoft India, Phillips, Google, Ten3T, IQVIA, Price Water Coopers, Ernst and Young, Deloitte. The Government of India has taken steps towards implementation of AI in healthcare in India[12]. An initiative National Artificial Intelligence Mission addresses the uses of AI in improvement of various sectors like agriculture by IoT drones and Satellite imaging technologies, in the field of education, environment with the help of intelligent automation which predicts climatic hazards and natural disasters and in healthcare sectors it improves accessibility of services to rural areas and enhance clinical decision support system creating electronic health data[13]. The Department of Science and Technology and the Department of Biotechnology has taken initiative in providing funds for startups who are actively involved in AI[14]. Artificial intelligence can be a remedy to health goals against UHC Achieving challenges and acts as a catalyst to achieve this unmet goal. There is a huge power in technology to remove the obstacles and challenges and help in having access to healthcare for all.

Although there exist various barriers to UHC goal, AI is solution to many of the major obstacles including inadequate number of skilled human resources, inadequate quality of care,

limited finances, high cost of healthcare services and accessibility of services to all. AI enabled solutions helps in providing quality of care by reducing medical errors and ensuring diagnosis of diseases with high accuracy, prediction of diseases in the early phase. Electronic health records, robotic process automation, chat bots help in work assistance and enhances efficiency with a smaller number of available human resources providing cost effective care.[15] Despite the challenges, it is evident that Healthcare providers are actively pursuing AI opportunities. Many healthcare delivery organizations (HDOs) are keen to leverage first mover advantages and recognize the competitive advantage effective AI can deliver. Adoption of the following AI capabilities are becoming popular: Natural Language Processing (NLP), decision augmentation, computer vision, process augmentation, and AI-Driven Robots. HDOs commonly use cloud platform along with an interesting mix of edge, hybrid and on premises hosting which is helping the demand side to make UHC commonly available service than a privilege to limited population.

6. CONCLUSION

This Paper is based on the concept of AI how it can be used to achieve Universal health coverage to provide best results in healthcare industry. Artificial Intelligence has already started impact different aspects of healthcare and will continue to do so. We conclude that further research in this area can be done as these technologies will have far reaching effects.

7. ACKNOWLEDGEMENT

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