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Artificial Intelligence For Global Health- Wellness Management To Attain In Sustainable Contexts

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ABSTRACT

One of the most crucial and important things in our life is good health because it directly or indirectly affects our physical, emotional, environmental, and social well-being. It's therefore important to be aware, vigilant, and proactive about health and hygiene to take various steps to prevent different diseases and illnesses. The United Nations Sustainable Development Goal (SDG)-3 focuses on promoting health and wellness for one and all by 2030. This SDG Goal # 3 implies ensuring good health and well-being for one and all, at every stage of life. Different schools have different benchmarks for improving health and wellness, study reveals that United States Agency for International Development (USAID) health programs are specifically well formulated to provide support to countries to strengthen health system functions across multiple sectors, health-related topics, and public health threats. Indulgence of global health programs helped many Americans at the workplace, at home, and abroad to save lives. The World Health Organisation has identified that the use of Artificial Intelligence (AI) has multiple dimensions of health and pharmaceutical development. However, it also recognized the existing risks and ethical challenges associated with the use of AI. AI tools, technology, and machine learning have great power and immense potential to identify and diagnose various acute and chronic ailments with well-developed and improved treatment accuracies with vital data insights. AI has modified and revolutionized healthcare sectors effectively. AI technology and Data Sciences have been also identified for interpreting some major fields of pharmacy like usage and drug discoveries, polypharmacology, and hospital pharmacy with greater therapeutic outcomes. Various AI tools and algorithms can be used to inform and frame public health policies. The need of the hour is to make AI technology accessible and easily available across all the healthcare sectors so that individuals can reap its benefits fully. This article identifies and evaluates the health-related targets as identified in the Sustainable Development Goals (SDGs) adopted and implemented at a September 2015 UN summit for the welfare of humanity.

Keywords: AI Tools; Pharmacy; Health and Pharmaceutical development; Health and Hygiene.

INTRODUCTION

Across the world, the new era of the Sustainable Development Goals (SDGs) has started. Health and wellness are well placed with prime importance in the SDGs. The major health goal (SDG-3) has a broad spectrum: 'To ensure healthy lives and to promote well-being for all at all ages'. The SDG declaration clearly states that to achieve the overall health goal, 'we must emphasize on Universal Health Coverage (UHC) and easy access to health care. Health care and wellness has been identified as core and central to international development for last 20 years, and major steps have been taken to eradicate morbidity and mortality either emphasis on specific sub-groups (e.g. "underprivileged", "women and children") or global [1]. For the accomplishment and achievement of Agenda 2030, proper integrated implementation across SDGs is needed. Nowadays, machine learning and Artificial Intelligence tools are frequently employed to innovate and access in various healthcare sectors. The purpose of this study is to provide AI based facilities to rural areas and implementation of machine learning in the healthcare industry which further leads to progress towards SDGs.

BACKGROUND

Human development is related to good health which further shapes the development of the nation. Healthy individuals are better able to cope and contribute to the political, social, and economic development of their countries. Studies reveal that good health has a great impact on development and that reductions in overall morbidity and mortality can help to enhance and escalate productivity and economic growth [2]. The UN General Assembly formulated the Sustainable Development Goals (SDGs) in September 2015. These SDGs specify all seventeen goals with 169 targets and 230 indicators leading by 2030 which make a commitment to ending diseases like Malaria, AIDS, Tuberculosis etc. Poverty and ill health status goes hand in hand. Poverty leads to malnutrition, undernutrition, unhealthy living and working conditions, illiteracy etc which increases the vulnerability to dreadful diseases and limits the access to basic daily life requirements and health amenities. However, acute and chronic diseases are also one of the major factors that pushes people to reside towards below poverty lines [3]. All the SDGs are interconnected, for holistic development there must be an integrated approach of implementation of health and health-related sustainable development goals (HHSDG) to fulfil the goals and targets [4]. Patient care services and their speedy recoveries can be significantly enhanced and improved using AI based technologies and machine learning. Additionally, AI can be widely used to accomplish and assist better healthcare by increasing efficiencies and cost reductions [5].

AIMS & OBJECTIVES:

Overall health involves physical, mental, spiritual and social well being. Physical health involves optimal body organs functioning through yoga, prayanam, exercise, balanced diet, proper nutrition, following preventive care, reducing the risks of dreadful diseases, proper rest and sleep. Nowadays, usage of multimedia and AI sweep across all NEWS headlines, promising to fulfil revolutionary advancements. But amid all this lies a significant question that can machine learning and AI become a powerful tool for handling and tackling the world's major health issues and eradication of diseases and disorders to attain SDGs. The aim is to understand the usage of positive AI to help us efficiently to achieve SDG goals in near future.

STUDY DESIGN:

A descriptive cross-sectional comparative study was conducted along with a comprehensive literature review.

MATERIALS AND METHODS:

This article envisions a better future where integration of AI and Machine Learning is fully adopted and incorporated with upliftment of community health areas and enhanced health care access across the world for the betterment of the world. This study was conducted post-covid time among health practitioners, nurses, pharmacists, physicians, medicos, chemists and doctors belonging to the Northern part of India from September 2023 to July 2024. A total of 176 respondents participated in the study. A survey questionnaire of 50 questions was framed in Google Form and distributed among all through Gmail and other social platforms to assess the knowledge, understanding and awareness of usage of AI tools and Machine learning in healthcare. Interviews were conducted personally and telephonically. The data was collected, assembled, well examined and assessed on a 5- 5-point unipolar scale. The statistical analysis was done to predict, collect, process and analyze data.

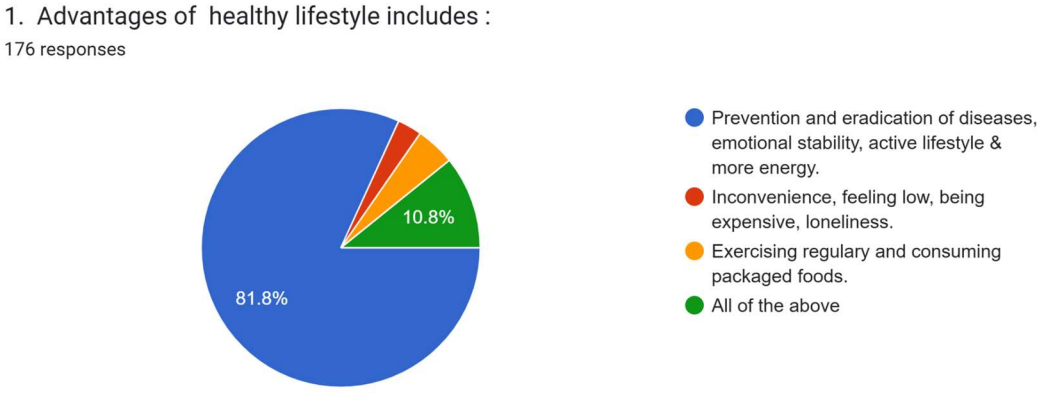

Figure 1.1: (81.8)% participants knew and understands the advantages of healthy lifestyle

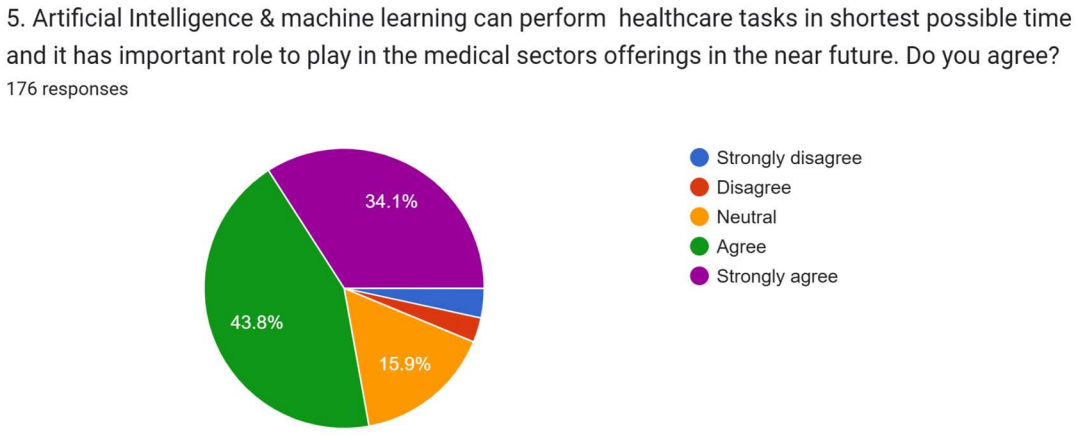

Figure 1.2: (43.8)% participants agree to the importance of AIin healthcare tasks.

DISCUSSION:

AI is extremely helpful in predicting and analysing medical data by predicting outbreaks, suggesting preventive measures and enhancing healthcare facilities for all.

Figure 3: Health signs and logos symbolising to stay healthy.

In the modern healthcare system, the enormous use of AI tools has definitely transformed and uplifted human welfare. Example, various rehabilitative robotics are instrumental and are helpful to patients for re-acquiring motor skills as they are behaving as trainers [6]. In different branches of biomedical health AI is also very relevant for diagnosing patients heredity and genetic algorithm optimization techniques [7]. AI could directly influence and help to advance and promote several SDGs, like those related to health, innovation and inequality. The main aim of Health related applications of AI is to predict and analyse the correlation between prevention or treatment techniques and patients health progress. AI programs are well framed and developed to identify the diagnosis processes, personalised medicines, patient monitoring and care, drug development [8,9,10]. AI is highly useful in analysing and predicting data which helps to formulate results and draws conclusions and support decision making by saving manual and human efforts, finance, time and helps to save many lives. Development of gene databases, pharmacogenomics, industry adoption and their expansion in health records have formulated machines to replicate human certain processes [11]. Many applications of AI are crucial in organising dosages, selecting proper administrations and inoculation pathways and routes or framing treatment policies[12,13]. AI has immense potential to achieve the goals but socio-ethical considerations must be taken into account like data ownership, privacy, and other impacts of AI on sustainable development[14]. All the SDGs are framed with the aim to protect the planet by inspiring actions towards people, prosperity, peace, partnership and planet[15]. Also there is a sudden need that low and middle-income settings groups should get benefits from accelerating developments in digital healthcare and AI[16].

Figure 4: AI in Digital Wellness.

EXPLORING THE OPPORTUNITIES & MINDFUL MANAGEMENT OF AI IN HEALTHCARE:
Several Research findings show that AI empowered management is quite helpful in teamwork and decision making, patient diagnosis and monitoring, prior and virtual health assistance, allergic responses to drugs, drug development etc. For better patient outcomes and to reduce healthcare costs, AI can be well used in personalised medicine and predictive analysis can be done[17,18].

AI in Healthcare & Medicine: Significance and Opportunities

Presently, the rise and advancement in AI is quite prominent and visible in multiple areas, including digital lab, pathology, surgery, robotics, precision medicine, predictive analytics, laser therapies etc.

Precision Medicine: AI can easily monitor and personalise patients' individual and timely care by predicting their responses to various treatments according to their family history, genetic makeup and lifestyle. This can easily reduce time and healthcare costs,treatment efficacy and improve wellness.

Predictive Analytics: Vast amount of patient care data can be generated using AI which can help the health workers to enable proactive measures to cure diseases.

Robotic Surgery: AI trained robots and instruments can perform multiple tasks and complex surgeries with perfection and accuracy in the shortest possible time. This helps in positive outcomes with high precision and improving patient fitness.

Digital Pathology: AI can guide, monitor and assist medicos and pathologists in diagnosing dreadful diseases by predicting and analysing digital images of patients cells and tissues samples.This is highly useful in finding and curing complex diseases like cancer and other reproductive disorders by enhancing diagnostic speed and accuracy.

Health Monitoring & Digital-wellness: One can easily monitor their health and digi-wellness prior to appointment to doctors and medical practitioners and can seek their advice and help to manage their health issues at early stages. Curing any disease is easier in primary stages. AI enables early detection, monitoring and diagnosis of ailments.

AI boon to Pharmacist: AI has efficiently revolutionised pharmacy sectors. With enabling AI-powered data analytics and reports, a patient's future needs of demand and supply of drugs and medicines can easily be predicted. This will further help the Pharmacist & Chemists to interpret and to get proper stock storage and procurement decisions.

AI in Mental Health and Wellness Management

Artificial intelligence (AI) is revolutionizing mental health and wellness management by providing scalable, accessible, and often real-time support to individuals facing emotional and psychological challenges. AI-powered tools, such as chatbots and virtual therapy assistants, are designed to assist in managing stress, anxiety, and depression. These tools utilize natural language processing and machine learning to offer empathetic, conversational support and can help track mood, encourage mindfulness, and provide cognitive-behavioral therapy exercises. For instance, platforms like Wysa and Woebot engage users in guided conversations, offering emotional support and suggesting coping strategies. Such innovations reduce the reliance on in-person therapy, particularly in regions with limited mental health services, providing 24/7 assistance to a wider population.

However, the integration of AI in mental health raises significant ethical concerns, including data privacy and the limitations of AI's understanding of complex human emotions. To address these concerns, it is crucial to prioritize data security, transparency, and continuous improvement of AI algorithms to minimize biases. By mindfully integrating AI into mental health care, we can complement traditional therapy, enhance patient access, promote mental well-being, and support early intervention in a sustainable, widely accessible manner.

CHALLENGES & LIMITATIONS OF AI IN HEALTH & WELLNESS:

Although there are many advantages of AI in healthcare to achieve SDGs, there is also an increased rise in risks and challenges. This includes cybercrimes, patient data privacy and security concerns, algorithmic bias, healthcare workforce adaptations and regulatory frameworks etc. Many researchers have explored the practical applications, principle, usage, difficulties of AI tools in clinical care[19,20]. In various regions the AI's transformative also impact in analytics, diagnostics, treatment and manyfold challenges like limited resources, non availability of equipped infrastructure and accessibility. Barriers like data privacy concerns, mobile-based diagnostic, infrastructure, healthcare workforce training gaps hinders the desirable progress. Hence, it's mandatory to overcome these challenges in the right directions.

The figure below, summarizes this critical aspect of opportunities and challenges with the usage of AI in healthcare and the ways to integrate it into the current healthcare systems to effectively address the present day challenges along with addressing the global SDGs.

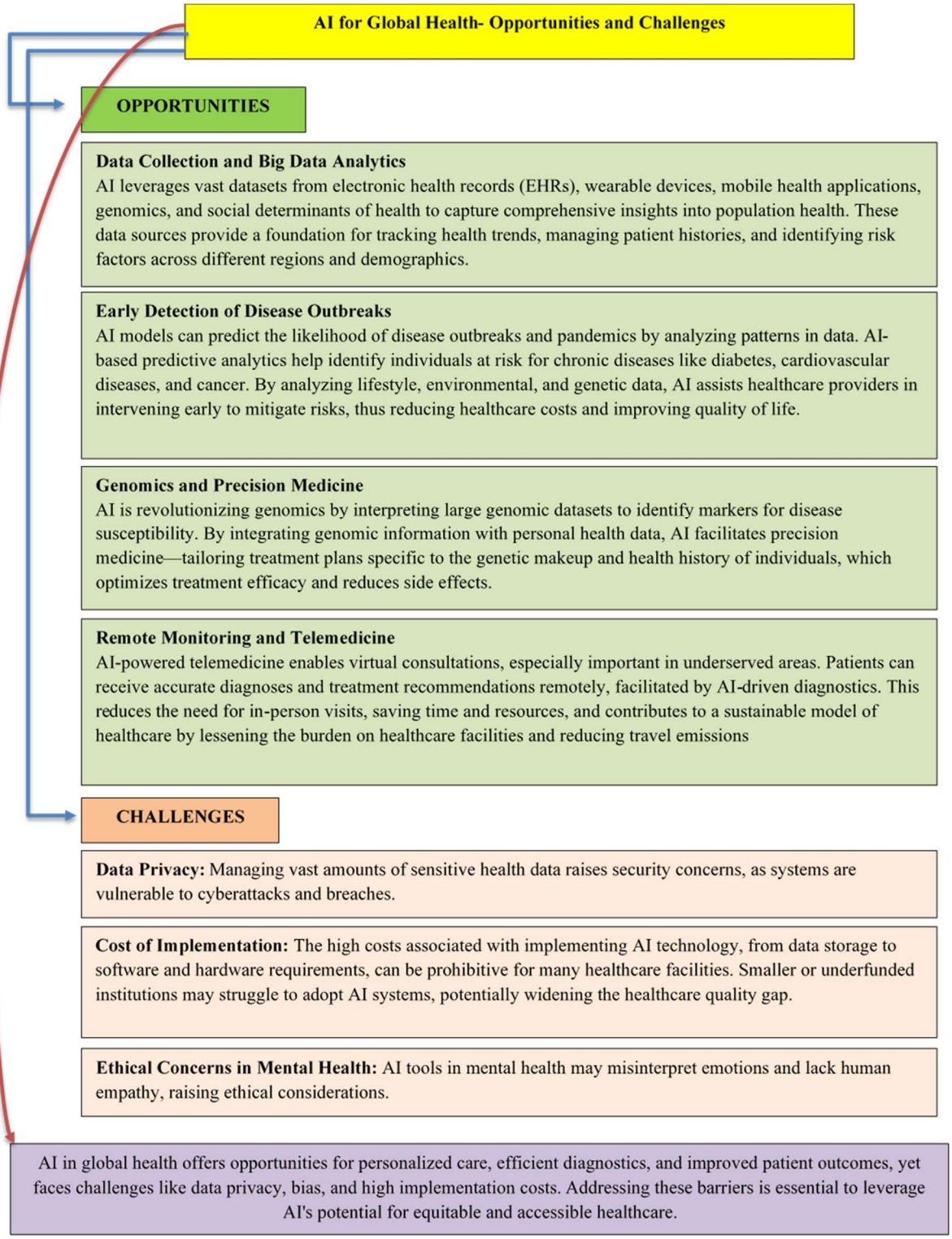

Figure 5: AI for global health- opportunities and challenges

RESULTS:

The study helped to find out the contributions and challenges of AI tools and machine learning in SDG # 3 Good Health and Well-Being which has been framed for the overall health and development of different countries across the globe in the SDGs 2030 era. If used well in the right direction, AI could significantly accelerate growth and progress towards SDGs. The major contribution of AI in the medical sector is very helpful for patients to improve their wellness. Threats and challenges of AI in wellness include technological gaps, algorithm perfections, data privacy, and security. Hence, there should be proper communication and collaboration with AI experts and data scientists to develop suitable strategies to overcome and minimize the threats. The study suggests that the global health community will ensure to implement and incorporate aspects of human-centered design into the right direction for development. The access to AI-driven interventions in global health should escalate human welfare. We need to actively participate, coordinate, and collaborate initiatives from corporate sectors, policymakers, healthcare workers, innovators, etc to accelerate and advance the achievements of UN SDGs. Despite of many limitations and shortcomings of AI and technology, the chief role played by AI inspires us to draw the conclusion that Governments and NGOs must build trust in the positive outcomes of these technologies, to reduce health-related issues and to achieve SDGs.

CONCLUSION:

Artificial Intelligence (AI) is rapidly transforming the healthcare landscape, offering numerous benefits. AI-powered tools, such as machine learning algorithms and natural language processing, can analyze vast amounts of patient data to enable faster, more accurate diagnoses and improve treatment outcomes. These tools can also predict disease outbreaks, aid in preventive care, and optimize resource allocation. Furthermore, AI can enhance healthcare efficiency by automating routine tasks, improving decision-making, and facilitating remote consultations. This is particularly beneficial for underserved populations in rural and urban areas, including women, children, and marginalized groups.

However, the integration of AI in healthcare raises significant ethical concerns, including data privacy, algorithmic bias, and equitable access. To maximize the benefits of AI while mitigating risks, it is essential to prioritize transparency, accountability, and inclusivity in AI development and deployment [21].

By fostering collaboration between healthcare professionals, technologists, policymakers, and industry leaders, we can ensure that AI is used ethically and responsibly to improve patient care and achieve sustainable healthcare goals.

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CONFLICTS OF INTEREST:

All authors declare no conflicts of interest.

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