Opinion

The Future of Healthcare

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Introduction

The COVID-19 pandemic has changed the face of healthcare for at least the next generation [1]. In the next 20 years changes brought about by the severity of dealing with COVID-19 beginning with the after-effects to the population, the multiplier effect on complexity of disease conditions and the emotional stresses brought about by isolationism and taxing of the healthcare system has led to innovations. The future of healthcare is likely to be shaped by several emerging trends and technologies [2]. Here are some of the key developments that may shape the future of healthcare: Diagnostics, Genomics and precision medicine, Artificial Intelligence and Robotics, Electroceuticals, Wearables/Sensors, Patient-Centered Care, Telemedicine, Nutritional Support/Functional Foods, and Beverages. Healthcare has changed dramatically because of technological developments, from anesthetics and antibiotics to magnetic resonance imaging scanners and radiotherapy [3]. The impact of the Internet of Things (IoT) on the advancement of the healthcare industry is immense [4]. As policymakers and business practitioners across the globe expend extraordinary effort toward the field of e-health, the thriving development of healthcare-wearable technology is creating great opportunities and posing a remarkable future for healthcare services [5].

Diagnostic

Changes affecting healthcare include [3]. Social and economic changes in society (aging population, isolationism, and increased pathogen load) [4]. Changes in how health care is provided, and [5]. Advances in healthcare technology [6]. Medical Research has also become more related to observational data and metadata analysis based to give similar answers to more invasive clinical and case studies with the same effectiveness [7].

Genomics and Precision Medicine

Advances in genomics are leading to more personalized treatments based on an individual's genetic makeup. Precision medicine considers a patient's genes, environment, and lifestyle to create personalized treatment plans [8].

Artificial Intelligence

Artificial intelligence (AI) is poised to play a significant role in healthcare in the coming years. AI can help with diagnosis, drug discovery, and personalized medicine. It can also be used to analyze patient data and identify patterns that can help providers make better decisions [9].

3D Printing

Three-dimensional (3D) printing is a rapidly emerging manufacturing technology that has found its way into drug delivery and medical sectors [10]. 3D printing allows for creating special and hard to find equipment, sometimes complicated devices.

Robotics

Robotics technology is being used to assist with surgeries and other medical procedures. Robots can provide more precise and less invasive surgeries, which can lead to faster recovery times and better outcomes. Robotics can also be very efficient at homes and unload the pressure on home-assisted care. Drones can be used for delivery and emergency access to remote or hard-to-reach places.

Treatment Technology

Electroceuticals

Innovations such as Electrocyte allow for pathogens to be eliminated based on the electrical polarity and destroying them triggering natural immune responses that aid the patient in healing faster and having on-going immunity [10].

Wearables and Sensors

Wearable devices attached to cellphones or proprietary devices and sensors are becoming increasingly popular, allowing professionals patients to monitor health in real-time [11]. These devices

can track and create clinical references for everything from heart rate and blood pressure to sleep patterns and physical activity [12]. The data from these devices also can become the basis for not only monitoring but also giving direction through algorithms for treatment [13].

Care

Patient Centered Care

Overall, the future of healthcare is likely to be characterized by greater patient-centered care, increased access to care through technology, and more personalized treatments based on an individual's unique needs [14]. Tech and Service Companies like Apple, Microsoft, Amazon, Samsung, Nokia, and others innovating on-screen, artificial intelligence, and database storage technology solutions towards efficiencies in person-based care [15]. Healthcare is undergoing a revolution with the availability of wearable sensors. Hospitals have exploited the development of the Internet of Things (IoT) sensors to create remote patient monitoring models that observe patients at their homes and in assisted living conditions [16]. With the long-term monitoring of patients this generates big data for which further diagnostic tools can be developed [17].

Telemedicine and Remote Monitoring

The COVID-19 pandemic has accelerated the adoption of telemedicine and remote monitoring technologies [18]. These tools allow healthcare providers to monitor and treat patients from a distance, which can increase access to care and improve health outcomes, but also come with data access and privacy issues [19].

Nutritional support, Functional Foods, and Beverages

Foods and beverages with claimed health benefits based upon scientific research. Beverages can bring energy, much needed vitamins and minerals for health maintenance, and happiness [20]. Foods as nutrition is basic, but what are the elements of the diet can eventually lead to disease states. Balancing fats, protein, potential allergens, and beneficial foods which help immunity, mental functioning and growth are vital to health and longevity [21].

Moving Forward

Artificial intelligence (AI) in healthcare is becoming increasingly important, given its potential to generate and analyze healthcare data including genomics to improve patient care and reduce costs and clinical risk while enhancing administrative processes within organizations [22]. Using new tools such as Electroceuticals and functional foods which functionally target wellbeing has become a societal trend. Wearables will allow for more personalization and tracking along with metadata analysis for better planning and actions for successful health outcomes [23].

Possible advantages of the technological advances in healthcare

As we have seen in the past, new technology is oftentimes faster and more encompassing than the predicted development.

a) Reducing costs, improving quality of care, increasing efficiency, decreasing preventable deaths, enhancing patient well-being, and providing access to the latest research and information.

b) Reducing the risk of errors, automating administrative tasks, and facilitating telehealth and telemedicine services.

c) Improving education and awareness for patients and providers.

d) Improving emergency response and saving lives.

e) Empowering patients to take control of their health and wellness.

f) Reducing stress levels of the health care profession.

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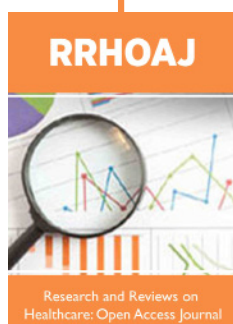
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