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Integrating portable wearable health technology in patients care

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REVIEW

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ABSTRACT

Wearable healthcare technologies are gaining in popularity around the world. Smart watches and fitness trackers are being worn by an increasing number of people. Innovative technology will undoubtedly play a vital part in the optimal running of future societies, including applications in health care. The purpose of this essay is to introduce the concept of portable technology.

Key Words
H antigen, Bombay phenotype, Fucosyltransferase 1

Introduction

In March 2010, the United States Congress passed, and President Barack Obama signed, the most comprehensive and ambitious health-care legislation in decades. The Protecting Patients and Affordability Care Act (S.P. 111-148), as amended by the Department of Health and Educational Matters Legislation (S.P. 111-152). The Affordable Care Act, or combined legislation, is widely regarded as a success[1].

Specifications and Types of Portable Health Technology (PHT)

Various factors, such as the start-up of wireless communications, were assigned to the development of cost-effective and portable sensor nodes. Because these nodes are capable of detecting, treating, and communicating various signs, they can be used for health surveillance. This has resulted in technological advancements such as portable, electronic, or data-processing devices[1,2].

One of the most appealing aspects of portable health technology is that it is hands-free and has a function that allows users to view their personal health data while going about their everyday activities. Accessibility, portability, comfort, portability, versatility, practicality, reliability, and feasibility are also highlights. Some of these devices, such as insulin and pacemakers, have been approved by the Food and Drug Administration (FDA). Physical activity monitors, insulin pumps, defibrillators, and vital sign monitors are all examples of portable health technology. The portable health technology can match by employing an accelerometer and a micro-electromechanical system. Tracking and monitoring physical activity and vital indicators has been linked to improved fitness and well-being[2,3].

Heart rate, blood pressure, pulse rate, muscular activity, blood sugar, sleep patterns, ECG, core temperature, oxygen saturation, pressure levels, and eating habits are some of the characteristics that can be assessed. Each of these functions has its own type of sensor, which is implanted in a specific region of the human body. There are three main components to these devices:

1. Sensors and record-keeping equipment,
2. Communication means for sending records to remote locations

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1. Sensors and record-keeping equipment,
2. Communication means for sending records to remote locations
3. Archive analytic tools or procedures for extracting and analysing essential health data in order to determine patterns of health and happiness.

The goal of portable health technology is to collect data mechanically and evaluate it in real time basis[2,3].

Fitbit fitness band, for example, as a tool supporting TED's data-gathering objectives. It keeps track of steps done, pace, speed, calories burned, stroke, distance travelled, pores and skin temperature, heart rate, sweat level, food information, and sleep hours. Although Sports and Fitness is primarily geared at athletes and others interested in fitness, it can be used to encourage obese and diabetic people to exercise and track their daily meal intake. Investigate the information gathered by the trainer or nutritionist to gain a better understanding of the client's health and establish methods to enhance it[4].

Uses of Portable Health Technology in Healthcare

These multi-parameter physiological sensing systems are useful for more than just personal health and fitness. It can be used to determine and measure vital signs in order to help doctors with therapy and intervention. Patients who are discharged from the hospital after surgery or who are at danger of cardiac arrest, for example, should have their vital signs monitored remotely by a portable health technology is important. Patients with disabilities such as paralysis, deafness, blindness, or memory loss benefit from specialised electronic stimulators that deliver controlled electrical impulses tailored to their specific needs. By tracking and manipulating data, portable health technology devices can be used for preventative medicine and telemedicine. By tracking and monitoring data, portable health technology can play a role in health prevention and

telemedicine. Research can also benefit from the usage of portable health technology equipment. It has been used by scientists to better understand the physiology of harmful disorders. One study, for example, looked at the possibilities of sensors that may be used to monitor gait quality and balance levels in people suffering from debilitating syndrome, a condition marked by physical weakness. The researchers were able to discern three levels of weakness using wearable sensors and internal monitoring. Another experiment looked at the sensor's capacity to predict falling rhythms in dementia patients. Doctors can use a multi-parameter physiological detection device to help them engage with patients in remote places. Wireless healthcare is being used by 11,000 patients in remote rural locations in China as part of an initiative dubbed the Wireless Heart Health Program. You will be connected to 96 local doctor's numbers in the future, and you will be able to send messages, make calls, and view and send reviews using your smartphone and a heart rate monitor. Doctors then stated that 11,000 patients in the experimental group who were tested with the health sensor had major cardiovascular issues, necessitating more clinical research. Automatic medicine infusion pumps are another key application of delivery technology. Controls the amount of drugs or nutrients given to the patient, as well as the length of time they are given. These pumps are commonly used to treat chronic illnesses like diabetes (insulin pumps) and infections (antibiotic pumps) Similarly, transdermal drug devices (TDDs) are advancements in wearable technology. This gadget increases medicine distribution into the systemic circulation by using heat, electricity, and sound waves. TDD is currently in its early stages of development, but it intends to increase patient comfort and quality of life[4,5].

Benefits of Integrating Portable Health Technology into Electronic Medical Records (EMR)

Translational bioinformatics technologies have made great progress in the deployment of genetic medicine at the highest level of care, with seamless integration with electronic medical records, in recent years (EMR). Patient-generated physical forms or health data are very well integrated with big data, such as popular health data in the EMR with other biological and genetic data. For clinical diagnosis and medical research, this integration can be a valuable, comprehensive, and dependable data source. This integration provides clinical diagnostics and medical research with a valuable, comprehensive, and dependable data source. Clinical decision-making is aided by data mining of all integrated data. Informed decisions can be made by examining the patient's overall health and transitioning from a clinically significant morbidity to a convalescent state. Cohort studies can also be utilised for this. User data, on the other hand, is more promising for portable health technology for the following reasons[6]:

1. To begin with, portable health technology devices capture data automatically without disturbing the patient, whereas patients in research studies visit the clinic multiple times and spend hours measuring, recording, and checking parameters, drawing blood, and so on.
2. Second, data from health wearable technology devices is more systematic and timely than data from studies that rely on manual reports since it gathers and analyses all the facts directly. Reviewers can use manual reports, which are prone to errors.
3. Third, make improvements. How can I teach my patients about eHealth literacy? Making use of a monitoring gadget Encourage more people to participate Self-management participation Reliable information Medical service provider Furthermore, patients are motivated to take precautions and communicate their concerns to clinicians. This technique is generally safe and affordable[6].

Challenges of Integrating Portable Health

Portable health technology is undeniably beneficial for tracking and monitoring your health and daily activities. However, there are numerous obstacles to incorporating this technology into healthcare systems, including cost, weight, inconvenient conditions, ambiguity, reliability, and relevance. Because it is one of the most advanced technologies in the world today, the average individual perceives portable health technology to be pricey.

Portable health technology is, for all intents and purposes, expensive because to the complexity necessary to develop computers, which necessitates a high level of ability. Patients with chronic conditions must wear health-related technology equipment on a daily basis for the rest of their lives. Portable health equipment requires frequent maintenance, and when these gadgets are no longer functional, they must be replaced. Similarly, due to the high expense of setting up LANs to facilitate data synchronisation with health technology, portable health technology is expensive[7].

Within the health care system, cost is a problem for both users and providers of portable health technology services. As more data is collected, more storage space is required, necessitating the addition of more servers and backup systems[8].

Despite technological advancements, portable health equipment is still quite heavy due to the multiple hardware

wearable components that must be attached to the body. This means that the computer will require a central processing unit (CPU), as well as various peripherals and monitors, in order to collect data. These components are bulky and can be difficult to transport. As a result, customers will be able to get over the inconvenience of having to wear them every day. In hot and humid weather, consumers may suffer more than just heaviness, pain, and irritation. Although it includes built-in cooling, portable health technology components tend to dissipate heat, producing health problems such as headaches and dizziness[8,9].

Members report that these trackers are uncomfortable to wear even while exercise, according to Shih et al. in hurdles to wearable business use and deployment followers, because they are large and invasive for everyday wear Activities. HWT and devices are concerned about the privacy and security of personal data generated by users. Users of these gadgets do not control their data, which raises privacy concerns. Manufacturers, on the other hand, collect and store this information. Some manufacturers claim to be willing to reveal personal information about their customers, such as their age, email address, social media accounts and profiles, gender, and location, as well as other GPS monitoring activities. Complex algorithms that could send biometric data created by wearable devices as digital footprints of another user's activity are also a source of concern. As a result, your personal information is provided to third parties, increasing the risk of unauthorised data use. Furthermore, if left unattended, portable health equipment can be easily hacked, posing a security risk[9].

This is because it connects to the corporate server and allows data to be sent between the user and the office where he works. The advantages of combining personal, health, and activity data into a single system are numerous, yet insufficient biosafety systems may allow individuals inside or beyond the state of the health care provider to access this information[10].

As a result, consumers dilute portable health technology in half and reject the idea of employing it. The dependability and efficiency of bandwidth are two potential challenges. The assumption behind most portable health technology marketing is that it plays a critical role in promoting human well-being (health and well-being). Most producers, on the other hand, are unable to provide “real” proof of the usefulness of their products. A recent study comparing the accuracy intervals of several portable health technology for measuring physical activity found considerable disparities in accuracy intervals amongst devices. The maximum declared uncertainty for this device is 25 per cent. This distinction is crucial because it reflects the difficulties that can occur in medical applications. One study, for example, looked at how portable health technology could be used to identify melanoma by processing and analysing photos of skin lesions. This application does not meet the reliability standards, according to research. The instrument's accuracy is set to 30 per cent by default[10].

As a result, before putting a portable health device on the market as a medical or medical product, it must be rigorously examined for reliability. Electromagnetic impacts and microtrauma have been noted as potential issues in the literature. Most physicians feel that portable health devices minimise microtraumas that generate very little radiation and offer no health danger. Our constant goal will be to improve technology's safety and efficiency. Developing the safest and most secure gadgets to improve healthcare will remain a problem as the use of portable health technology develops[11].

Future applications of portable wearable technology

Portable health wearable technology should have specialised capability in the future to suit these integration requirements. System compatibility is one of these features. Distinct firms that manufacture portable health equipment utilise varying calculation algorithms with different functions and qualities, making it difficult for EMR to be compatible with all of them. Portable health care is simple to integrate into EMR since devices use consistent and standard computing procedures. Furthermore, these computational techniques must be created by both computer and data professionals. The purpose is to collaborate with doctors to improve a variety of health issues. It should also increase performance by resolving the portable heater's dependability and usability concerns[12].

Increased interoperability of portable health wearable devices is another future opportunity. Portable health technology is already available in smartphones such as Google Now and Microsoft Cortana, making it possible to integrate it into existing interactive computer systems.[12]

Similarly, the interactive interface of portable health technology provides an educational environment in which clinicians can send educational notifications and messages to their patients. The majority of portable health technologies on the market today are designed and manufactured to function as stand-alone solutions, particularly as medical devices. Future portable health technology should be capable of dealing with multidimensional data. This reduces the number of portable health technology patients who must be worn in order to monitor, track, and control data. Patients with heart disease, for example, must have their blood pressure, cortisol, and cholesterol levels constantly monitored. The

multi-point portable health technology addresses the previously mentioned cost, weight, and inconvenience concerns. As a result, you should think about your design in light of these factors[13].

As a result, you should think about your design with these facts in mind. The development of a comprehensive, precise, and manageable portable health technology encourages insurers to adopt it and cover the costs of wearable technologies used in clinical practise. There will also be additional FDA regulations and standards in place to monitor the use of portable wearable health technology and ensure its safety and accurate use[14-20].

Conclusion

Finally, portable health technology refers to small electronic devices that are integrated into mobile articles and have a high computing power capability. These technologies have features such as accessibility, portability, multi-function, and the ability to practise, among others. Above all, portable health technology has several advantages over fitness tracking and monitoring as well as independent daily medical activities. Collecting these functions in a single device and integrating the collected data into DME will undoubtedly result in significant advancement potential. Using electronic medical records makes sense. This integration will provide a long-term picture of a patient's overall health by filling data gaps and enabling evidence-based care. Overall, portable health technology is smart because it improves both patient engagement and preventive care, saving time and money.

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