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WEARABLE SENSORS IN HEALTH CARE MONITORING: HOW EFFICIENT ARETHEY AND WHAT IS THEIR SCOPE?

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Abstract

This paper aims to check the reliability of emerging wearable healthcare sensors. We do this by comparing the results gained by monitors versus that of sensors claimed to record data such as Blood pressure, heartrate, oxygen meter etc. We also compare to see if famous brands do provide the reliability they claim to provide.

Keywords: *Healthcare sensors, Blood pressure, Heartrate, Oxygen meter, Claim.*

INTRODUCTION

Tracking health is vital. Technologies have allowed us to do this hassle free in hospitals, clinics and at the comfort at our homes! Tracking health has become a necessity in the lifestyle people have adopted today. As today's lifestyle is based on convenience and speed, healthcare has also had to revolutionize its methodologies in tracking their patients' health. Wearable sensors in healthcare track and monitor a person's health. These devices can be worn directly or indirectly on a person's body. Heart rate, blood pressure, and calories are a few things that they can track. Diseases and illnesses like atrial fibrillation, high blood pressure, respiratory issues, stress, sleep apnea, and even a sedentary lifestyle are also taken account of. We use these trackersin our life in forms of a fitness bands such as the famous apple watch and Fitbit. People also use wearable Electrooculographic (ECG) monitors and Blood Pressure monitors. With the help of cloud computing, our data gets recorded, which is convenient for users equipped by smartphones.The data can be viewed by third-party apps.

The demand of such devices is increasing by the day, as consumers realize the significance of thesedevices. According to an article by Markets and Markets [1], the **wearable sensors market** was valued at USD 189.4 million in 2015 and is expectedto grow to USD 1,654.0 million at a CAGR of 30.14% between 2016 and 2022.With such a rapid growth in this market, it clearly indicates that there has been a booming success in its sales and usage. However, the question that arises here is that, whether despite the increasing sales, can the reliability of these devices be trusted?

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With many emerging brands producing technologies convenient for their users in terms of healthcare sensors and monitoring, is their reliability of the devices being compromised? In this paper, we will highlight the reliability of these wearable devices in healthcare, and test to see if the data being collected by these gadgets is consistent.

Experimental

In order to test the efficiency of emerging wearable sensors, one of the best ways to do this is by comparing common tracking such as the ECG, heart rate, and Bp monitor to the actual devices.

A research study conducted by National Library of medicine, wanted to investigate the accuracy and precision of heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and oxygen saturation (SpO_2) measurements of 2 novel all-in-one monitoring devices, the BodiMetrics Performance Monitor and the Everlast smartwatch [2]

In the study, they recruited 127 participants that were aged 18 years and older from the Thomas Jefferson University Hospital Preadmission testing Centre. HR and SBP was measured using both the investigative variables, and in addition, the Everlast watch was also utilized to measure DBP, and the BodiMetrics Performance was used to measure the SpO_2 . Four hospital grade standard and three investigational vital sign measurements were taken after 5 minutes of quite sitting, with 60 seconds between each measurement. The results for this were that the accuracy guideline was only met for the HR measurements for both the devices. SBP measurements deviated 16.9 (SD 13.5) mm Hg and 5.3 (SD 4.7) mm Hg from the reference values for the Everlast and BodiMetrics devices, respectively. The mean absolute difference in DBP measurements for the Everlast smartwatch was 8.3 (SD 6.1) mm Hg. The mean absolute difference between BodiMetrics and reference SpO_2 measurements was 3.02%.

RESULT

According to the result of the study, even though both the devices met the accuracy guideline for HR measurements, they failed to meet the predefined accuracy guidelines for the other vital sign measurements.

CONCLUSION

Wearable technologies have proven to be accurate in terms of a few vital measurements, however, it cannot yet show full precision in data as compared to a medical equipment found in hospitals.

The reason being, is that different brands and companies are still emerging in terms of technology, funds, research and inventions. Depending on the type of brand selection, the quality of data collected differs the result achieved. Even though The Apple watch was cleared by the Food and Federal Administration (FDA) it still showed accuracy less than 50 [3].

Emerging technology such as wearable devices in healthcare monitoring, are a great tool to help observing a person's health, but it cannot always give in-depth results as those found in a clinical setting. With better resources, the usage of devices as such can prove to be useful to its users. As mentioned above, with the increasing sales in the market, there certainly is a scope for them.

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