World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:14, No:06, 2020

Big Data and Cardiovascular Healthcare Management: Recent Advances, Future Potential and Pitfalls

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Abstract : Intro: Current cardiovascular (CV) care faces challenges such as low budgets and high hospital admission rates. This review aims to evaluate Big Data in CV healthcare management through the use of wearable devices in atrial fibrillation (AF) detection. AF may present intermittently, thus it is difficult for a healthcare professional to capture and diagnose a symptomatic rhythm. Methods: The iRhythm ZioPatch, AliveCor portable electrocardiogram (ECG), and Apple Watch were chosen for review due to their involvement in controlled clinical trials, and their integration with smartphones. The cost-effectiveness and AF detection of these devices were compared against the 12-lead ambulatory ECG (Holter monitor) that the NHS currently employs for the detection of AF. Results: The Zio patch was found to detect more arrhythmic events than the Holter monitor over a 2-week period. When patients presented to the emergency department with palpitations, AliveCor portable ECGs detected 6-fold more symptomatic events compared to the standard care group over 3-months. Based off preliminary results from the Apple Heart Study, only 0.5% of participants received irregular pulse notifications from the Apple Watch. Discussion: The Zio Patch and AliveCor devices have promising potential to be implemented into the standard duty of care offered by the NHS as they compare well to current routine measures. Nonetheless, companies must address the discrepancy between their target population and current consumers as those that could benefit the most from the innovation may be left out due to cost and access.

Keywords : atrial fibrillation, big data, cardiovascular healthcare management, wearable devices
Conference Title : ICDHC 2020 : International Conference on Digital Health and Care
Conference Location : Toronto, Canada
Conference Dates : June 18-19, 2020