

Routine Medical Check-Up and the Indifference of Potential Patients: Wearable Technology Advocacy

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ABSTRACT

This work is within the ambit of health informatics. It is a position paper centered on justifying the need for wearable technologies advocacy in order to induce the culture of well being awareness among potential Nigerian patients. Wearable technologies make it possible to monitor human physical activities, physiological and biochemical parameters, on a daily basis. Wearable technologies come in the form of devices attached to shoes, eyeglasses, earrings, clothing, gloves, watches, skin attachable devices, apps on smart-phones, sensors which could be embedded on car seats, chairs and mattresses. Oftentimes it may seem that we are healthy and there is no need for medicals, this may engender an indifferent attitude to routine medical checks and avoidable health conditions. Routine medical checks serve as early warning. This can help to advance longevity among the populace. A higher percentage of citizens in advanced societies appear to prioritize routine medical checks and this may be one factor which accounts for their higher longevity. We used secondary data by way of literature reviews to establish the situation in Nigeria with regards to routine medical checks among potential patients. These reviews showed that there are a lot of factors inhibiting the practice of periodic medicals among Nigerians across different age brackets. Chief among these factors was indifference. We also noted that Nigerians are lovers of new technologies, among these wearable technologies. We therefore suggested that there should be wearable technologies advocacy by medical NGOs and government to leverage technology to induce the culture of continuous health monitoring among the populace.

Keywords: Routine medical check-up, Wearable technologies, Health condition

INTRODUCTION

Routine medical checkup is the periodic medical evaluation of apparently healthy individuals with the view to detect abnormalities. It is also known as periodic health evaluation, annual physical comprehensive medical exam, general health check or preventive examination (Oguntoye & Durowade, 2018). Routine medical check-up can detect diseases at their early stage which invariably provides better treatment for the patients. It is a preventive medicine practice serving as a superior strategy to decrease the mortality and morbidity of different diseases in communities (Abdullah et al., 2019).

As the growing young, aged-population and increasing chronic diseases lead to ongoing changes in health care industry. Wearable technology is prevalent in the field of health as Patients explore the use of wearable technology to check their health data and determine the next diagnostic approach to use that is engaging in self health care. Wearable technology can be innovative solutions for health care problems. Some wearable technology applications are designed for the prevention of chronic diseases and maintenance of health such as weight control and physical activity monitoring (Wu & Luo, 2019). In low income or developing country which Nigeria is inclusive, the practice of routine medical checkup is low despite the glowing increase of chronic and non-communicable diseases in the country. Patients delay or

indifferences about routine medical checkup are due to some challenges such as money, privacy, time and laziness which might hinder medical appointments on routine medical checkup. Thus this is where the evolution of wearable health technology has its potency to mitigate the doctor- patient conversations or appointments at hospitals and health care centers.

It is on this ground that this study sought to elucidate that wearable technology can directly impact clinical decision making in which gives patients the opportunity to take charge of their health and act upon it. The concept of wearable technology could improve the quality of patients care while reducing cost of care such as patient's rehabilitation outside of hospitals and also keep patients engaged and updated with their health status which gives health a more personal touch. This feeling also contributes to the reason people tend to forget doctor's appointments, particularly when it is just a routine checkup.

METHOD OF THE STUDY

We used secondary data by way of literature reviews to establish the situation in Nigeria with regards to routine medical checks among potential patients. The aim was to provide an arguable and convincing description and interpretation of existing attitude in the regard of medical checks in order to justify our wearable technology advocacy.

LITERATURE REVIEW

Concept of Wearable Technology

Wearable technologies are electronic computers that can be worn on the body either as an accessory or as part of clothing. Wearable technology has a substantial impact and benefits for different industries such as military, entertainment but it plays a key role at the center of health care innovation (Nasir & Yurder, 2015). Wearable devices enhance patients to track movements and make medical measurements such as heart beat, blood pressure, blood sugar level, cholesterol and physical movement, electrical activity of the heart, muscles, brain and skin.

Wearable can also empower patients to better engage in self care and the health eco system. Additionally, wearable could also support personalized care delivery and facilitate delivery of care in place where the patient is most comfortable. It can assist in real time detection of a fall incident. Wearable technologies can be innovative solutions for healthcare problems. Some wearable technology applications are designed for the prevention of diseases and maintenance of health such as weight control and physical activity monitoring (Wu & Luo, 2019). Wearable technology in no doubt assists patients healing on certain health issues. This is as a result of the fact that immediate checkup are achieved through these health wearable.

These wearable devices are designed to provide real-time vital and diagnostic information to health care providers, patients in such a manner as to improve quality care, reduce the cost of care and allow patients greater control over their own health.

Role of Wearable Technology in Health Care Sector

Over the years wearable technology has been in use in so many industries but one sector that has been deeply impacted by wearable technology is the health domain. These wearables have their maximum perspective in healthcare. The increase in diseases have emerged a growing importance of wearable technology in the medical field as these wearables help to address healthcare costs, time, help aging populations and assist in solving the complexities of many chronic diseases.

According to Falcone (2015), wearable technology depends on diverse sensor styles. The standard versions of wearable technology are smart watches and wrist bands. Such wearables take an entirely innovative level of tracking, monitoring, diagnosis and medical treatment.

Some wearable technology such as fitness trackers, wearable blood monitor devices, bio sensors over time have key roles and have helped patients in self health care and health management.

- **Fitness trackers:** fitness trackers are some of the straight forward and most unique examples of wearable technology. These wrist bands have sensors to calculate and measure the physical activities. Thus users of this fitness tracker will from time to time check their fitness whether obsessed and the effective measures to take in order to keep fit. They also measure the heart levels of the device user. This device provides users with medical, health as well as fitness suggestions.
- **Wearable blood pressure monitor devices:** this wearable device looks to be a popular smart watch which can effectively monitor blood pressure and day to day activities. Most patients suffering from high blood pressure use this device to check the optimal of their heart beat and the level of their bloodpressure without waiting for slated date of appointment from the hospital. It could be used to determine the distance travelled and how many calories you burned in a definite period.
- **Bio sensors:** Biosensors are wearable devices that are budding and utterly devise from wrist bands as well as smart watches. The wearable bio sensor comes in use as auto-adhesive patch that enables patients to move around while calculating pulse, breathing rate, heart rate and temperature details.

Benefits of Wearable Technology in Health Domain

With wearable technology and its constant updates and suggestions, users are involved in their well being all the time and that is a huge advantage (Billy, 2018). This new technology has the potential to save costs and enhance patient's safety. Wearable technology enables patient to check regularly their health status at any point in time without any form of administrative costs for health care that is doctor- patient appointment. According to Falcone (2015), a nationwide Pew Research Center survey in 2012 found that 69 percent of adults monitor at least one health indicator, such as weight, diet or exercise and 21 percent said they used some form of technology to keep track.

Many patients utilize wearable health technologies to update their health data such as patients suffering from diabetes mellitus usually carry their glucose monitor with a pen like insulin medication. This device provides the patient with her health history information and immediate feedback which invariably help the patient to make better decisions at that moment. Various benefits derived from the use of wearable health devices are as follows:

- **Advantages to patients:** The advanced wearable smart watches are not only utilized to ask track heart rate, sleeping patterns but come with many more health statistics that are helpful for patients. It is specially developed for offering support, and patients gain from such devices. This wearable is predominantly the precise technology for people with persistent chronic conditions needing uninterrupted monitoring and tracking of their health conditions. The wearable devices make it simpler to collect health and medical data on a regular basis so that the primary disease can be tracked correctly. If a patient requires monitoring or tracking in quick time intervals or every few hours the use of such wearable devices is a substitute to frequent or continuous hospitalization.
- **Help controlling medical expenses:** Trips to the hospital will take efforts, time and money for the patient. It not only involves treatment fees, but they are also heavily charged with periodic medical consultation fees. These wearable devices trim down costs for health treatments. This scenario applies more than ever to patients with medical conditions such as diabetes, hypertension.
- **Doctors and Medical staff assistance:** Doctors are assisted with the regular diagnosis of the patients' issues if they have access to quick and real time data. The gathering

information helps determine the sternness of the patient's condition and thus facilitates doctors and medical cases easily. In many cases, wearable applications like Google glass have been found to be extremely helpful for some health care surgeries. The device assists to do ultra sound images to get a correct picture of health related targeted zones.

According to Wu and Luo, (2015), wearable technology can make disease management more effective as outlined below:

- Heart Disorders: wearable devices have been developed to do cardiovascular monitoring and can assess patient heart activity outside of a laboratory or clinical environment. It is possible to perform heart assessments during a wide range of everyday conditions without interfering with a patient's activity tasks.
- Blood Disorders: Some wearable devices are used for evaluating and monitoring of blood pressure. These wearable devices such as wireless smartphone are designed for upper arm blood pressure and they have the capacity to monitor and control hypertension.
- Diabetes care management: Patients with diabetes manage this chronic disease through medication, diet but the need for assessing the level of glucose is of utmost importance. Wu et al. (2019) stated that one well known example is the wearable artificial endocrine pancreas for diabetes management, which is a closed loop system formed by a wearable glucose monitor and an implanted insulin pump.

Factors that Promote Patient's Utilization of Wearable Technologies

- TIME: People are always busy with everyday activities and challenges of life and this takes most ample of their time. Most people do not have time to visit the hospital for checkup. Out of experience, a patient suffering from hypertension once visited the hospital and was given the diagnosis for his illness. The patient was advised to come for routine medical checkup. But because the patient is aware of the wearable device for blood pressure prefers to intervene and improve his health with this wearable technology rather than ever seeing a doctor. The time being wasted to see a medical personnel or doctor for check up is time consuming too. This prolonged time could be bridged by wearable health technology.
- COST: This is one of the factors that affect patients set back to routine medical checkup. Due to the economic instability of the country, the burden of hospital bills usually falls on the patient who is already dealing with the rising cost of health care treatment. Health wearable technology has reduced the erratic cost of patients visiting the hospital based on routine medical checkup. With the health information provided by these wearable technologies, it enhances the patient to administer the treatment required for the illness thereby saving costs.
- PRIVACY: More and more patients are interested in easier access to health care in order to become more involved in their own health plans. Patients might want their health information to be confidential to them. Privacy matters a lot in a situation whereby the concerned patient is going for routine medical checkup in a teaching hospital. Most teaching hospitals have medical students and doctors who are in their internship. Patients with chronic cases are given treatment and at the same time medical students are there to learn from the situation. This invariably determines patient's inability to visit the hospital.

The Attitude towards Routine Medical Checks: Global Perspective

People all over the world pay varying levels of attention to health conditions and give differing levels of priority regarding routine medical checkup. In the view of many scholars and practitioners, routine medical checkup serve as an early warning and can help to advance longevity, reduce morbidity and mortality among the populace. Thus the attitudes of people

towards routine medical checkup in some countries will be discussed in the study among the following headings.

European attitude towards routine medical checks

In a research done in San Francisco, CA by the West Health institute/NORC (2018), observed that about 40% of Americans do prioritize routine medical checkup and 44% could be seen of not having the need to visit a doctor when they were sick in the last year because of cost. The high cost of healthcare has become a public health crisis that cuts across all ages as more Americans are delaying or going without recommended medical tests and treatments.

In the survey, it was observed that about 30% said that they prefer meeting the bills of other basic necessities rather than medical bills. Americans are scared of the exorbitant medical bills that come with a serious illness than the illness itself. According to the CEO of West Health, Shelley Lyford who described that Americans does get lesser diagnosis that they deserve and invariably pay more on health bills than they should. In a research conducted by a national survey in United states of America cited by Smiley (2022) that one third of men do not think that they need annual health screenings. Most men believe that they are naturally healthy. It was observed that almost two out of five of the participants shared that they often turn to social media for medical advice.

Asians' attitude towards routine medical checks

Godsani et al. (2022) citing Alkahil et al. (2022) observe that the research conducted on 414 respondents comprising males and females with the age range of 36 and above in Riyadh Saudi Arabia made the report that most of the respondents 67.5% do not go for routine medical checkup despite being aware of its necessity. In the study, there are some prevailing factors influencing the patients from routine medical checkup which has to do with lack of time and laziness. The authors pointed out that the incidence of chronic conditions in Saudi Arabia is influenced by several non-modifiable and behavioral risk factors identified in the Saudi community. Furthermore, the World Health survey in Saudi Arabia observed that most of the participants have high physical inactivity and unhealthy diet habits and this suggests high prevalence of behavioral risk factors for chronic diseases especially with the aged in the country. These behavioral risk factors influence their participation on routine medical checkup.

According to Liu (2012), routine medical checkup is still very much limited to the populace in China because of some factors: time, cost and belief. In his opinion people in China only go for medical checks based on chronic health condition which must have gone to the extreme. Saifullah and Li (2019) note that people at work place spend most of their time at workplace without bothering to go for medical checkup when they feel ill and this has become a serious problem which increases the death rate of people that are working. They stated that many governments encourage self-care through the treatment of small illnesses with self-medication and checks on health condition. Encouragement of self-care from this point of view is referred to as patient empowerment which includes providing patients the opportunity to take responsibility and build confidence in their ability to manage their own health. The authors add that the growth of workplace illness is increasing because of lack of health care awareness perception by employees and the organization, including regulations. It can be perceived that health records of employees currently working are not available, and this indicates poor physical checkup for the employee.

Furthermore, Ali (2015) asserted that there are some precipitating factors that affect performance of routine checkups in a study he conducted in the Eastern region of Saudi Arabia. According to the author the sample size of the adults was 721 in which 28.4% were males and 71.6% were females. The study suggested that only 22.5% of the sample perform routine medical checkups. While the majority of them 77.5% do not perform medical checkups. In the study, the analysis of the data was based on the impending factors affecting the participation of routine medical checkups, which has to do with age, gender and marital status. Most people

in his analysis performed routine checkups out of personal conviction and belief in its benefits. Thus the commonest reasons for avoiding it were not having enough time and a perception of medical checkups being a long and boring process.

Consequently, Ngo et al. (2021) conducted a study to evaluate the routine medical checkup and self treatment behaviors of people living in Northern Vietnam. The authors administered a structured questionnaire to 175 sample size, results show that 24% had routine medical checkups in the last 12 months while 33.7% of the people had self treatment in the past three months. Their conclusion was that people who did not have routine medical checkup were more likely to have self treatment or self assessment of their health condition.

The attitude of Nigerians towards routine medical checkups

Ojong et al. (2020) in the study carried out on routine medical checkup knowledge, attitude and perception in a health facility in Calabar revealed that out of 318 sample size, 92.8% of the majority of the respondents had good knowledge of routine medical checks. Also 64.5% of the respondents had positive attitude towards it but few respondents practiced 46% routine medical checkup. The findings from their study also show high level of knowledge of routine medical checkup although the actual practice was poor by nurses.

Olayinka et al. (2015) stated in their study on routine medical checkup: knowledge and practice in Owo a community in Ondo state south west Nigeria revealed that more than half of the respondents have heard of routine medical checkup but not all are willing to practice or had it done. Most of the respondents felt it was not needed since they are not sick. Some had barriers of not having money and had no time for it. From the findings, they observed that though many have heard about routine medical checkup, the prevalence of its uptake is low. The authors revealed that some respondents imbibe some healthy lifestyle thinking that it can be substituted for routine medical checkup.

Usman and Akintayo-Usman (2016) explain in their study carried on periodic medical checkup among residents of Osun, Ondo and Ekiti states of Nigeria that there is high level of awareness of periodic medical checkup in all three states but the level of practice of routine medical checkup is low. They observed that majority of the respondents do not practice it because of the fact that their health insurance plan does not cover the medical checkup or due to individual and organizational financial constraints,

THEORETICAL FRAMEWORK

The study was anchored on Innovation Diffusion Theory. This theory was propounded by B. Ryan and N. Gross in 1943 and Everett, M. Rogers in 1960. This theory is to show how ideas and discoveries spread to members of a social system. The theory centers on how innovations, new ideas and practices can become popular, fashionable and pervasive throughout a system. They mainly center on creating awareness of innovations.

Diffusion refers to the process by which an innovation is rested overtime among members of a social system while innovation is an idea, practice or object perceived as new by an individual or other unit of adoption. Relating this theory in this study, it shows that wearable technology is a new innovation and the utilization is based on people's decisions regarding to their health situation and how pervasive the innovation is to them.

The Case for Wearable Technology

It is important to state that wearable technologies take an entirely innovative level of tracking, monitoring, diagnosis, medical treatment and over time, it has helped patients in self health care and health management. Wearable technologies are electronic computers that can be worn on the body either as an accessory or as part of clothing. It enhance patients to track movements and make medical measurements such as heart beat, blood pressure, blood sugar level, cholesterol and physical movement, electrical activity of the heart, muscles, brain and

skin. In view of this, wearable technologies can be innovative solutions for healthcare problems. Thus immediate checkup are achieved through these health wearable.

From the findings in the research conducted by Godsani et al. (2022) it could be seen that 67.5% respondents do not go for routine medical checkup despite being aware of it due to the fact that they do not have time for medical checks. This time factor can contribute to the high increase of sickness among people. Therefore, health wearable can help meet the gap for patients to check their health status anywhere without mapping out a stipulated time to visit a hospital for medical checkups. In a study by Liu (2012) established that people in China only go for routine medical checkup based on chronic condition when it has reached to its peak. From the analysis, he concluded that people belief that going for routine medical checks is costly and time consuming too. In this situation, wearable has the potential to save cost for patients. People with chronic health conditions with the help of health wearable should be able to keep a close watch on their health status at any point in time without the fear of going to the hospital whereby the time to embark on it might not be convenient for them. People access their physical fitness and prevent chronic diseases from escalating to a serious health condition via health wearable technology.

Ngo et al. (2021) in a study titled routine medical checkup and self treatment behaviors of people in Vietnam. The findings from the study show that 24% had their checkups in the last 12 months while 33% of the people had self treatment in the past 3 months. From the researchers' analysis, people belief in self treatment than doctor-patient appointment. In order words, the use of wearable technology assist patients in solving the complexities of many chronic diseases at the early stage. Consequently, it can also empower patients to engage in self care and where the patient deemed comfortable. This wearable is predominantly the precise technology for people with different health conditions. It makes it simpler to collect health and medical data on a regular basis so that the primary disease can be tracked correctly.

In developing countries like Nigeria, there are some factors that inhibit the observance of routine medical checks. According to Usman and Akintayo (2016) explain that majority of the respondents do not prioritize routine medical checkups due to individuals financial constraints. Thus, the burden of hospital bills usually falls on the patient. Wearable technology could be a substitute to reduce the erratic cost of health care treatment on patients if they visit the hospital for medical checkup. With the information by these health wearable technologies, the patient can administer the treatment required for the illness thereby saving costs. It could be noted that Nigerians are lovers of technology and it buttress the fact that they engage in new technologies. In view of this, health wearable has a lot of benefits to its users who or who do not prioritize routine medical checkup as earlier discussed in this study.

CONCLUSION

This paper looked at the use of wearable technology as a substitute for routine medical checkup where potential patient's indifference negates medical checks. Based on review of literature, it found that there are some factors that mitigate people's observance on routine medical checkup which could be as a result of medical cost, time, and privacy. This is why the paper provides an insight and advocated for the use of medical wearable technology which will invariably be helpful in accessing health status before a health condition is developed thereby reducing the morbidity and mortality of the populace. In this wise, the researchers recommend that there should be wearable technologies advocacy by medical NGOs and government to leverage technology to induce the culture of continuous health monitoring among the populace.

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