

## A SOS Heart Smart Wrist Watch App for Heart Attack Patients

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### ABSTRACT

Heart disease is one of the main causes of death around world, claiming approximately 17.3 million lives annually, 43% are of cardiovascular disease. Heart ailment can be drastically curtailed by new innovations like with SOS Heart app patients receive immediate emergency assistance in inaccessible areas by performing CPR (Cardio Pulmonary Resuscitation) & AED (Automated External Defibrillator) and other medications. In Heart attack, proper care in first 2 to 3 hours after an incident can increase the rate of survival. The purpose of this field SOS Heart app is to provide quick assistance to the victim in public places by Smart wrist watch which measures physiological parameters and mobile which connected to smart watch via Bluetooth. [1][15][16]

**Key Terms:** SOS Heart app, Smart Wrist Watch, Bluetooth, Heart Attack, CPR, AED.

### 1 Introduction

Cardiovascular disease is one of the leading causes of death all over the world, claiming 17.3 million lives in a year. In United States due to increased ratio of cardiovascular disease people die after every 33 seconds. In Pakistan each year, 200,000 people die only due to cardiovascular disease. Up to 2030 expected cardiovascular deaths rate will be 23 million annually. Every year 7, 85,000 Americans have first coronary heart attack. And by 2020, heart disease will be the leading cause of death throughout the world. [14]

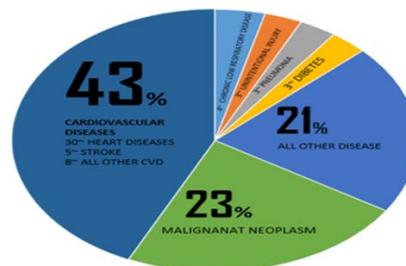


Figure 1: Disease statistics in America

Mostly Heart Attack occurs at remote areas like shopping malls, on roads etc. where no medical facility is available. In medical terminology heart attack referred as Acute Myocardial Infarction (AMI). The major cause of Heart Attack is High Blood pressure, hypertension and atherosclerosis (hardening of arteries). When Heart Attack occurs heart stop rhythm, irregular beats are appeared which is also called as arrhythmia (dysrhythmias) and body temperature of victim also varies at that moment. Heart Attack is Coronary Heart Disease (CHD) caused to fatty acid deposition in the inner walls of arteries become narrowing and flow of oxygen-rich blood to section of heart is stopped. So heart is unable to restore normal function and muscles die off, sometimes heart attack symptoms last for 30 minutes or longer. But immediately after Heart Attack first 2 to 3 hours are very important for the survival of the patient. Quick treatment is essential to open blocked arteries and reduces the muscle damage. If quick treatment is not provided to person then chances of death are very high. In remote areas AED, CPR is quick treatment for Heart Attack victims, drugs also used for immediate response to prevent blood clot like Aspirin and other anti plateletes. [17][8]

Yet, there are so many applications available but SOS Heart smart wrist watch app give correct assistance. Artificial intelligence is used which reduce the ratio of mortality due to arrhythmias or heart attack. This app is also useful when a person is on a visit to remote areas and heart attack occurs and suffers from Heart Attack complications. Smart wrist watch sends information to mobile via Bluetooth, and mobile sends an emergency text message to health care centre and other saved contacts in this app like family members and doctors. Health care centre automatically trace patient location and reach to rescue that person. This type of app will bring a great impact for CHD patients in the world so they can spend their lives easily without any danger.

## 2 Procedure

Smart wrist watch SOS heart app intelligence base work deliberately. When a person get heart arrhythmias at place where no any emergency health care is available. This app save the life by sensing patient's present physiological condition then collect the data/ Information and send to mobile via Bluetooth. This information is send to persons saved contacts i.e family member, doctor and emergency health care centre through mobile. This app also trace the location of patient and prevent the longer risk of patient critical condition.



Figure 2: SOS Heart App for Heart Attack Patients

### 3 Methodology

How can the iPhone or mobile detect heart attack? The app works with a sensor connected to smart wrist watch. This smart wrist watch uses low energy 4.0 Bluetooth technology. SOS Heart app can also detect changes in pulse (heart) rate, respiratory rate, body temperature and body movement position in case of patient falls down. If any change detected in parameters, smart watch send a signal to mobile, then mobile will automatically send a message to particular saved contacts in app via text or an emergency alert. In this app patient can save data related to disease which can be very useful for health care professionals in case of he / she may have allergy of any drug.

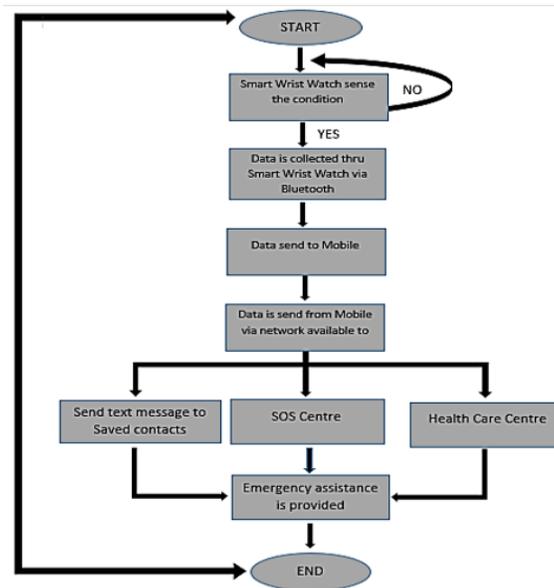


Figure 3: is shown How Chart of Victim Critical Condition occurs and how emergency assistance is provided

### 4 Sensor Technology

The heart rate monitor includes a Bluetooth technology, which means it requires a Bluetooth 4.0 capable Phone it is difficult on a simple android. It requires a hand set that has a BT 4.0, as well as android 4.3 or higher. This Smart watch runs on a battery cell CR2032 coin. Battery life duration is about 6 to 11 months depending on its usage.

#### 4.1 Supported Sensor

For Smart wrist watch supported sensors are: Nuubo's, nECG, Zephyr's Bio Harness, Smartphone internal sensors (accelerometer, gyroscope, light) Bluetooth and mobile network.



Figure 4: Is showing Smart wrist watch with sensor and SOS app on Mobile

## 5 Advantages

- SOS Heart smart wrist watch accessory have been designed to benefit peoples in heart attack and other cardiovascular diseases.
- This app gets location of patient and sent a short message alert to patient's contacts and health care center via a text message or calling an emergency number.
- SOS Heart app that allows the user to add vital details like Blood group, medical history and details of patient that can be helpful in an emergency situation. [18]

## 6 Disadvantages

- SOS Heart app does not send any text if network is not available.
- In some cardiovascular disease symptoms are not appear, so Smart wrist watch does not sense any change and can't send data to mobile.
- SOS Heart smart wrist watch have limited range of Bluetooth.
- Due to improper functioning of Smart wrist watch sensor accuracy will be limited.

## 7 Conclusion

In order to prevent the person from heart arrhythmias at remote areas. This research is based on emergency SOS Heart app Smart wrist watch. This SOS Heart app provides quick assistance to the victims by Smart wrist watch via Bluetooth, to the mobile. This app will reduce the mortality ratio due to arrhythmias or Heart attack. SOS Heart app also detects changes in pulse rate, respiratory rate, body temperature and body movement positions in case of incidence. This app also allows the user to add vital details and medical history related to patient that can be fruitful in an emergency situation. It is expected through this app in limited time, quality of life can be improved.

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