



Spurti Nimbali

spurtinimbali@gmail.com

Delhi Public School R.K. Puram

1. PROBLEM STATEMENT

Epilepsy is the 4th most common chronic neurological disorder characterized by frequent and unprovoked seizures. Nearly 65 million people across the globe irrespective of gender, age and ethnicity suffer from this disorder. An epileptic attack or a seizure is a sudden electric disturbance in the brain and can range from mild to severe. During most seizures, the patients lose their consciousness, are unable to control their body movements and sensations and are thus, extremely prone to injure themselves. Moreover, despite being one of the oldest recognised diseases, fear, social stigma and lack of awareness and understanding still surround epilepsy.

- According to the Epilepsy Foundation, 1 in 26 people develop epilepsy at one or the other point in their lives.
- Globally, about 5 million people are diagnosed with epilepsy each year. Nearly 1,50,000 new cases are recorded annually in the United States itself.
- The risk of premature death is 3 times higher in epileptic patients than that of the general population.
- One in three epileptic patients suffers from unprovoked and uncontrollable seizures despite appropriate medication.
- Only 1 in 25 epilepsy-related deaths occur due to SUDEP (Sudden unexplained death in epilepsy) while the rest are caused due to injury, falling, drowning etc.

A person experiencing a seizure tends to be confused, unaware or in most cases, unconscious. Without proper intervention, seizures tend to cluster, i.e. become repetitive and ultimately fatal. As 6 in 10 persons with epilepsy can't identify their triggers, such patients suffer from seizures that are unexpected and according to them, unprovoked. In such a situation, seizures can occur in public places or in the absence of the patient's caregivers. The reason why this is extremely dangerous is:

1. The person experiencing the seizure is helpless and extremely prone to injury due to a lack of control over body movements.
2. The general public at large lacks even the basic awareness regarding how to respond to such an emergency.
3. A seizure can be quite disturbing and scary to witness, deterring several people from helping out.
4. Those who do want to help tend to respond inadequately or inappropriately. In most cases, they can do nothing more than call an ambulance and wait for medical professionals to arrive.

- Due to a lack of awareness, they may also worsen the situation by trying to restrain the patients or by forcing the patients to drink water. Even the simple crowding of people on the spot can be catastrophic as it can block the air passage and cause the patient's trachea to collapse.

The results of a survey conducted to check public awareness about epilepsy are as follows. The survey reinforced the fact that very limited people have knowledge about this disorder or know how to respond to a related emergency.

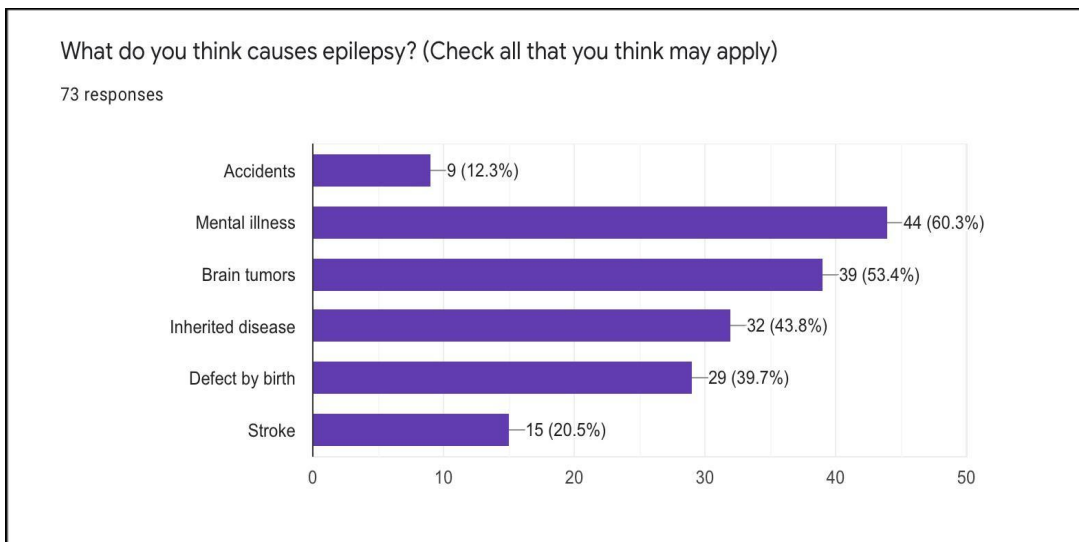


Figure 1: Results of awareness survey regarding epilepsy

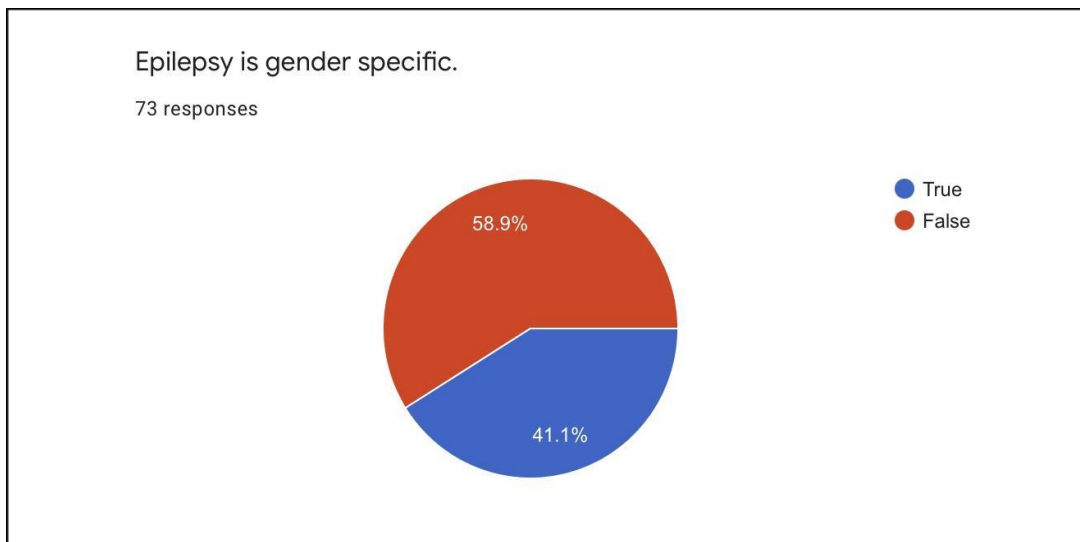


Figure 2: Results of awareness survey regarding epilepsy

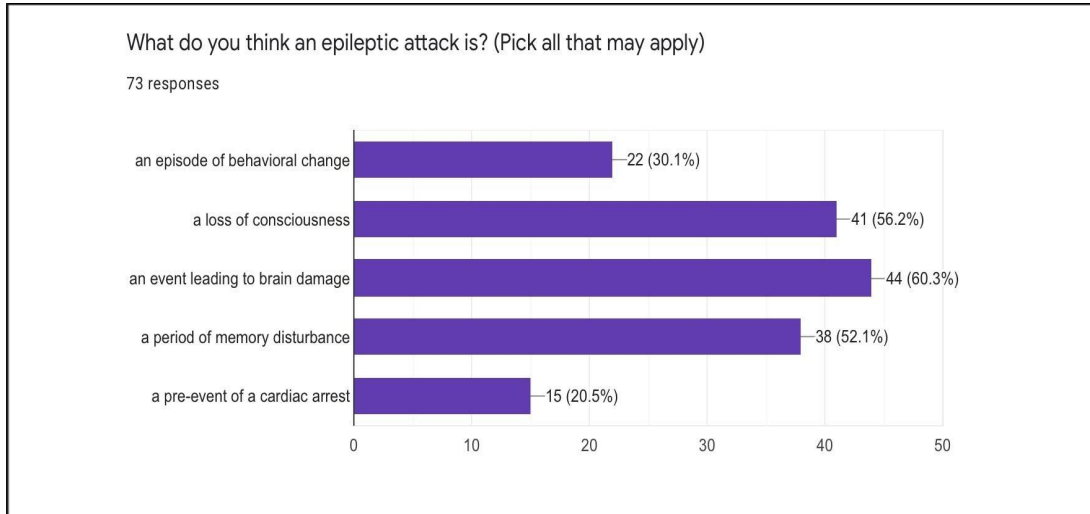


Figure 3: Results of awareness survey regarding epilepsy

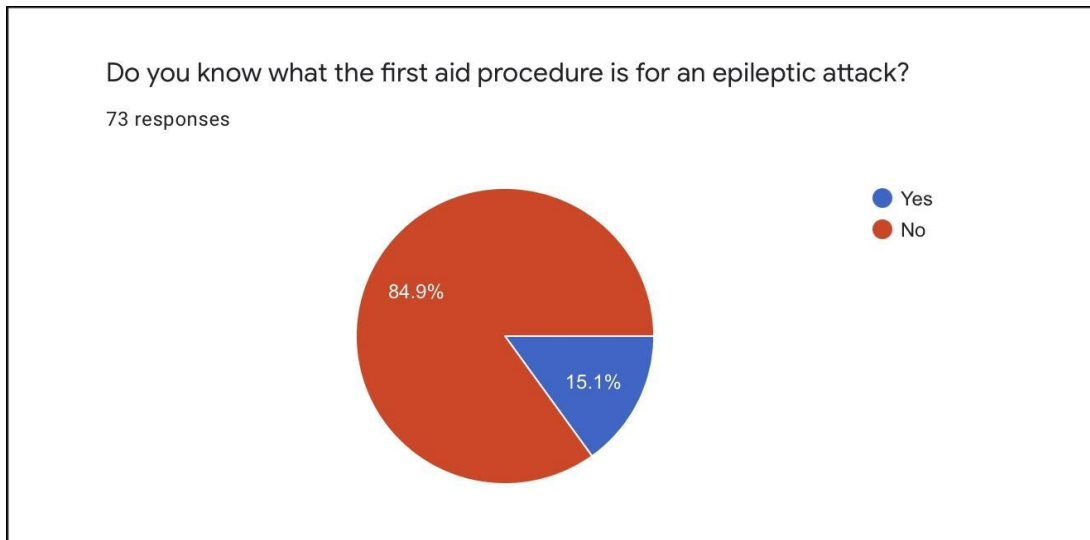


Figure 4: Results of awareness survey regarding epilepsy

About 70% of seizures can be prevented with adequate precautions. However, about 2/3rd of the global epileptic population lives in low or middle income countries. Here they lack access to immediate healthcare which ultimately results in a lack of proper diagnosis or management of the disorder on a daily basis.

2. SOLUTION

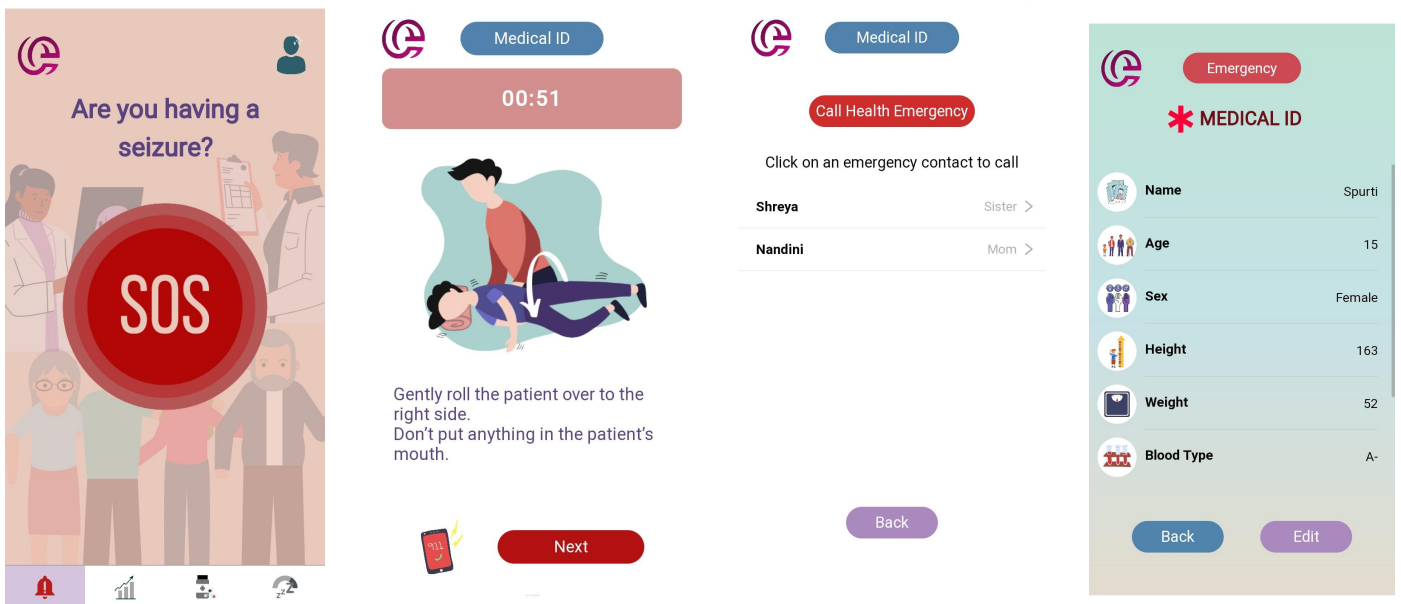
The solution to the aforementioned problems is EpiCare, a first-of-its-kind mobile application programmed to aid people with epilepsy and their caregivers. The objective of developing EpiCare is as follows:

1. Helping epileptic patients to receive immediate assistance during emergencies.
2. Aiding towards the easy yet efficient management of epilepsy on an everyday basis.
3. Helping raise awareness regarding the disorder and dissolve the prevailing connotation surrounding it.

EpiCare's features are as follows:

➤ **SOS**

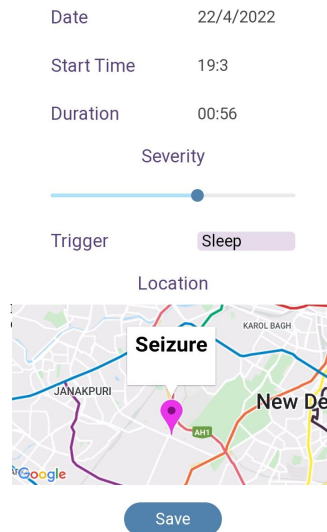
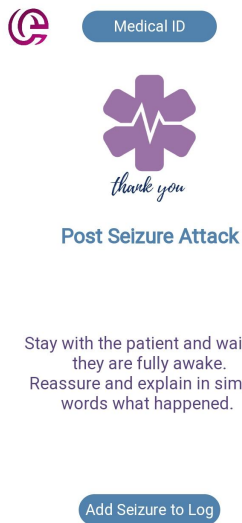
During emergencies users can use EpiCare's SOS feature to initiate an emergency protocol. This protocol is initiated either upon automatic detection of jerking movements or when the user uses the SOS button. In such a situation EpiCare alerts the user's caregivers and surroundings. An alert email containing the location of the user is sent instantaneously to the user's emergency contacts. Further, EpiCare seeks help from bystanders by delivering step-by-step aural instructions reinforced with visual graphics to guide the lay bystanders in providing immediate first aid. When administered correctly, in the absence of the user's caregivers or emergency medical services, this first-aid can prove life-saving. It also provides the bystanders with the facility of calling emergency medical services or calling the user's caregivers. EpiCare also keeps the user's medical ID accessible to be used by the medical services in the absence of the caregivers.



➤ **Health Log**

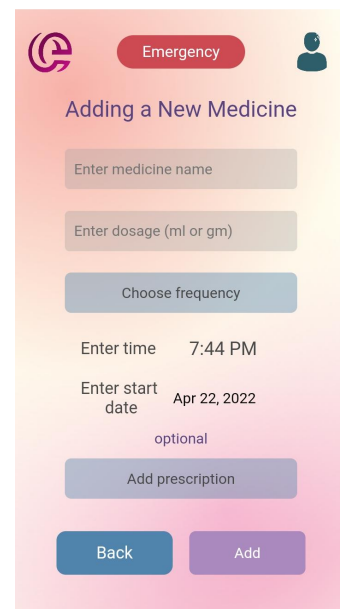
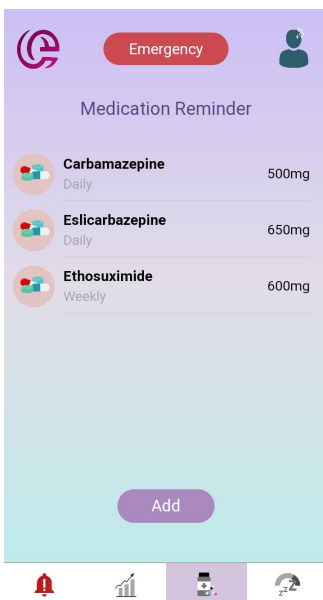
Each seizure episode is timed and stored with other details such as date, severity and trigger in a health log. The health log stores the user's seizure history and provides a graphical

representation of the same in order to facilitate the simple tracking of trends and patterns. The entire health log is directly shareable with the user's doctor in the form of the user's health record. In case the location is what triggered a user's seizure, EpiCare also provides a location wise history of all the past seizures.



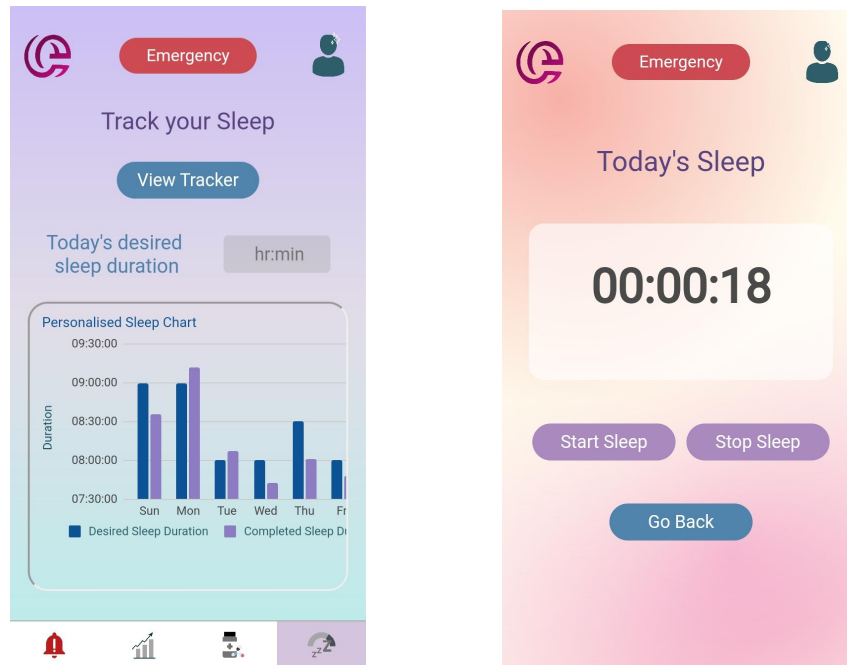
➤ **Medication Reminder System**

As epilepsy is a chronic disease, it lacks a definite, permanent cure. The only way patients can manage and prevent seizures is through anti-seizure medication. The medication reminder system issues personalized reminders with details such as medicine name and dosage at user designated times and dates. Thus, EpiCare ensures that users never forget to take the only proven prevention against future attacks. Users can also add, edit and delete their medicines at any point of time.



➤ Sleep Tracker

The lack of quality sleep has been proved to trigger seizure attacks. Users, especially young and working patients tend to ignore their sleep routine. Thus, EpiCare's in-app sleep tracker tracks and records the user's daily sleep and provides a graphical representation of the user's weekly sleep routine. It also alerts the user if their sleep routine is off track or if they are lacking adequate sleep.



3. KEY ADVANTAGES

1. EpiCare's interface is extremely user-friendly. An emergency button is present on every app screen to prevent any inconvenient traversing during a seizure.
2. EpiCare is an app that acts on the spot by seeking help from lay bystanders. It dissolves the need to wait around for the user's caregivers or emergency medical services. '
3. In case a patient fails to press the SOS button during a seizure, EpiCare can automatically initiate the emergency protocol after detecting jerking movements which are characteristic of epileptic attacks.
4. EpiCare's user interface is epilepsy friendly. Research states that bright colors can trigger seizures (photoepileptic seizures). Hence, EpiCare's UI has been designed with gradients of pastel colors.

5. EpiCare not only provides oral instructions to the bystanders during emergencies but also provides graphical representation of all the first-aid steps to facilitate easy following, despite a situation of panic or chaos.
6. EpiCare keeps the user's medical ID accessible during emergencies, which is extremely useful for emergency medical services, in the absence of the user's caregivers.
7. EpiCare automatically logs all seizure details in the health log, thus ensuring hassle-free documentation of the patient's history.
8. EpiCare's SOS feature is completely free and its premium model is highly affordable when compared to its market competitors.
9. EpiCare is highly accessible and can be used by any patient, even ones from low income countries. EpiCare's only dependency is the availability of a smartphone. It can even function offline, without a stable internet connection.
10. EpiCare provides a location wise history of the user's past seizures unlike any of the available epilepsy apps.

4. TECHNOLOGY STACK

The various softwares utilized to support EpiCare's functioning are :

1. FireBase: Create the app's authentication system.
2. Zapier: Issue SOS alerts and schedule medication reminders.
3. Google Calendar: Create calendar and issue reminders for medications
4. Google Maps API: Store the location of the epileptic attacks
5. Adobe Illustrator and Sketch: Creating graphics for the SOS first-aid steps
6. Google Sheets: Backend database for the application
7. Cloudinary: Cloud Storage for any pictures (prescriptions and emergency contacts photographs)

The sensors utilized by EpiCare are:

1. Camera: To capture photos of prescription
2. Speaker: To give aural instructions to bystanders in case of emergency
3. Accelerometer: To detect any severe jerking movements to initiate the alert system.
4. Location Sensor: To detect location of epileptic attacks to alert caregivers.

EpiCare also deploys the AI component of text to speech to provide aural first-aid instructions to the bystanders.

5. USER ADOPTION PLAN

5.1 USER DEMOGRAPHICS

Our target population consists of the 65 million people who suffer from epilepsy worldwide. Our Three tiers of non-consumers include:

CURRENT MARKET:

- Epileptic patients with frequent and recurrent seizures
- Patients living/working/staying away from caregivers

TIER-1 (Soon-to-be Users) :

- Epileptic patients looking for alternate apps to track and manage their seizures
- Persons with epilepsy from low-income countries who lack immediate access to healthcare.

TIER-2 (Refusing Users) :

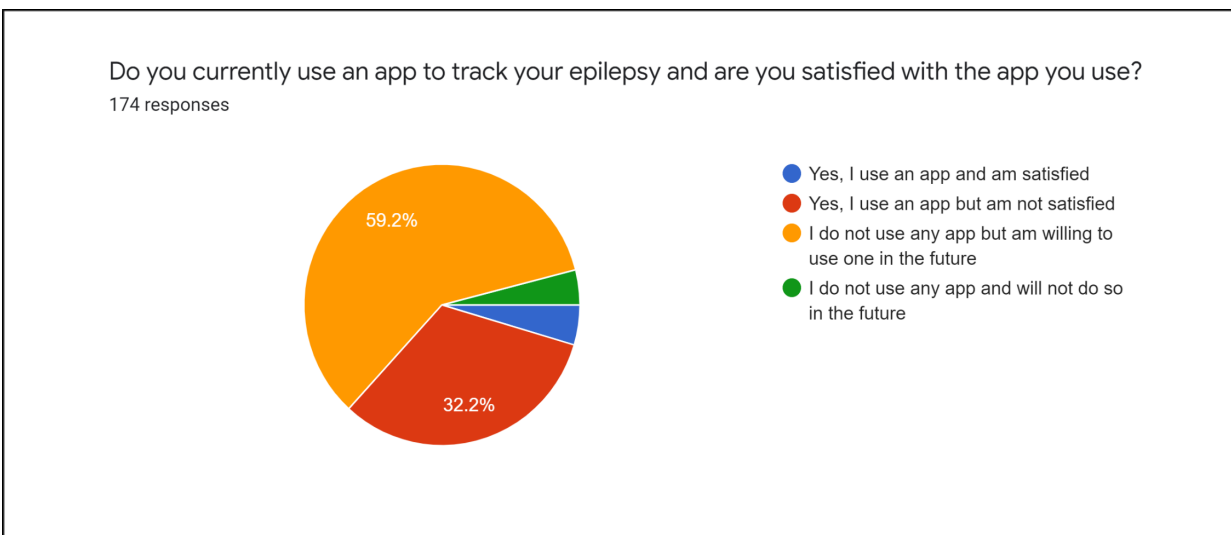
- Epileptic patients who lack interest in technology-oriented solutions
- People with mild or undiagnosed epilepsy

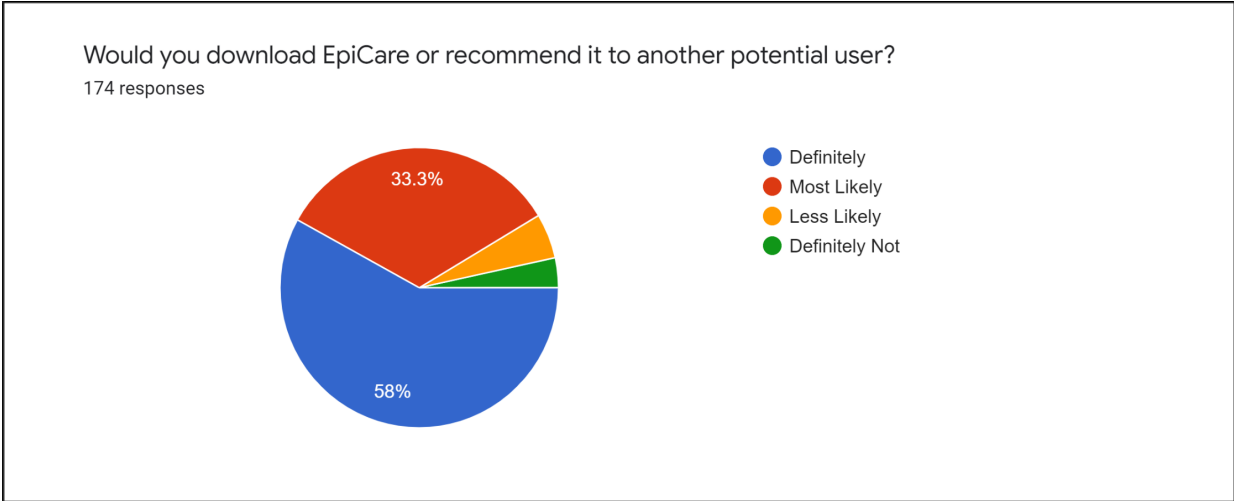
TIER-3 (Unexplored Users):

- People suffering from narcolepsy, Tourette's syndrome and arrhythmias who tend to experience occasional seizures.

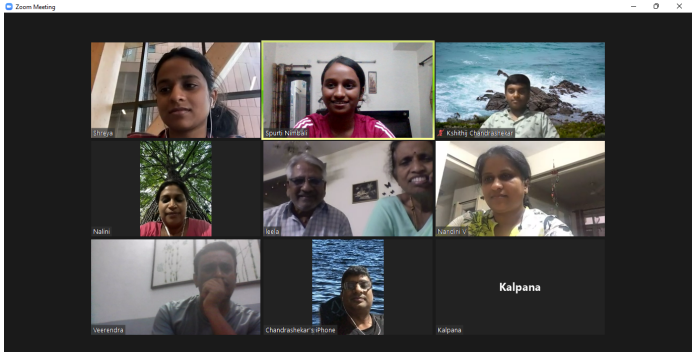
5.2 MARKET RESEARCH

In order to conduct research of the potential market and users, I created a google form survey which collects the user's feedback regarding the app's functionality, efficiency and efficacy. It also entailed questions regarding whether the person would download such an app or recommend it to a potential user. The form recorded 174 responses from people of all ages.





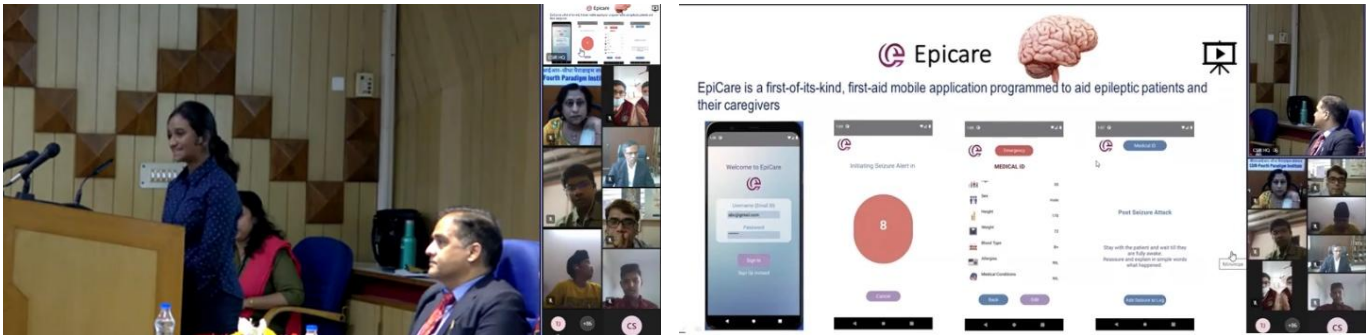
Due to the COVID19 pandemic, I got the opportunity to virtually interact with some epileptic patients (all of varying ages). The functionality of EpiCare was demonstrated to all the patients and their respective feedbacks were also recorded. Nearly all the patients termed the app as “life-saving” or “a must have”.



EpiCare is the perfect app for people like us. Extremely useful! A thoroughly thought of and researched app. EpiCare will definitely save countless lives in the future.

**~ Mallikarjun Horadi
(an epileptic patient)**

I also got the opportunity to present EpiCare in front of the Honorable Minister for Science and Technology of the Government of India, Dr Jitender Singh, several senior scientists from the Council of Scientific and Industrial Research (CSIR) of India and nearly 700 people (offline and online combined). The app was highly appreciated by the Minister for Science and Technology as well as by the audience.



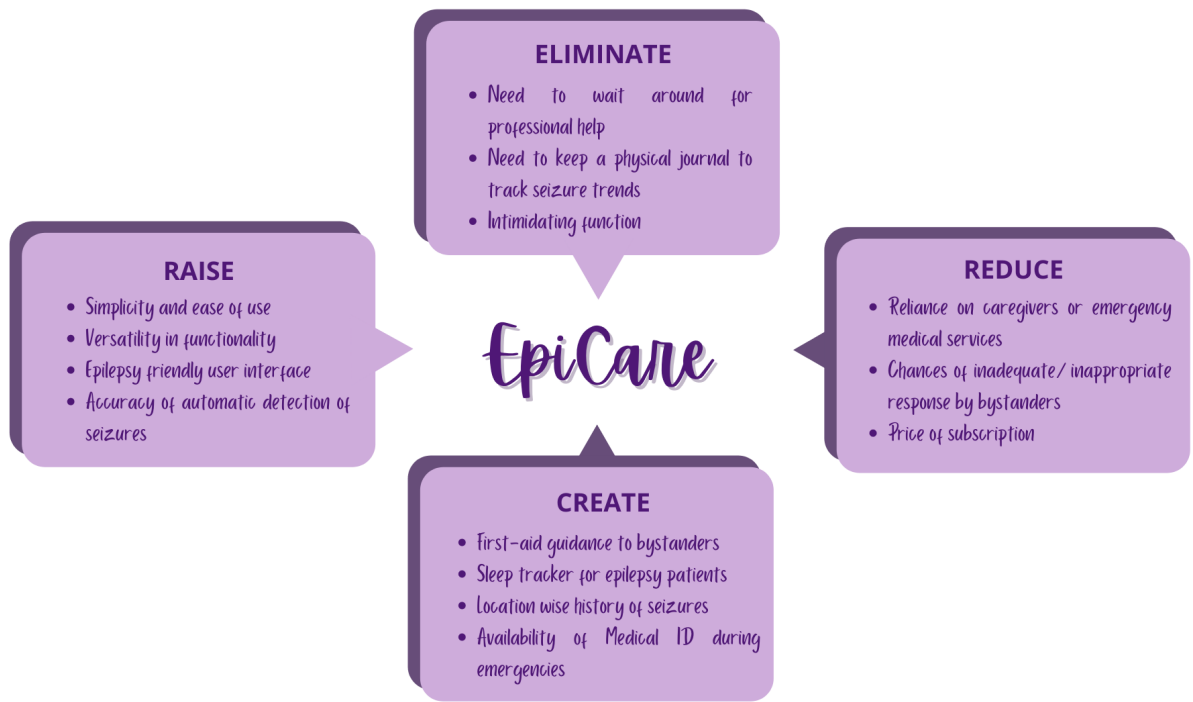
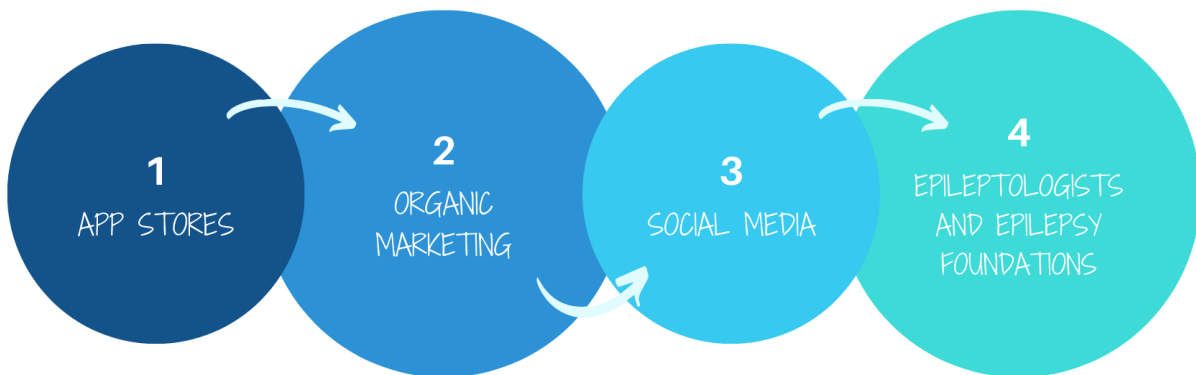


Figure: EpiCare's ERRC Grid

5.3 FUTURE GOALS

1. In the future, we hope to add other features such as stress management (as stress is a proven trigger for seizures) to EpiCare.
2. We are also currently working on making EpiCare multilingual so that it can be used by people from all around the globe.

5.4 MARKETING AND DISTRIBUTION



- 1) After completion of its beta testing, EpiCare would be released on various App stores such as Google Playstore, Apple App Store and Microsoft Store where its freemium model would be available for download.
- 2) EpiCare would primarily be marketed organically through its own website, advertisements on other epilepsy-oriented websites, email-campaigns, newsletters, blogs and SEO.
- 3) The second step of EpiCare's marketing would involve digital marketing via social media such as Instagram, Facebook, YouTube etc. This would allow EpiCare to reach the younger generation of epilepsy patients and help spread the word throughout the world.
- 4) EpiCare would also partner with epileptologists and epilepsy foundations to increase its reach to the target audience

6. APPENDIX

