

Accessing General Health Care Facilities

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Abstract - With the advent of industrialization and globalization a substantial growth of the world's economy and also the manufacturing and the development of various new products and technologies in health sector is observed, and also a tremendous raise in demand for medical equipment is seen which eventually has been one of the major reasons behind the deaths during pandemics like COVID. In a country like India where population is 1.38 billion people, it might be difficult to provide medical facilities to all. But I feel this problem is actually due to Lack of proper information about availability of medical equipment in hospitals and also there's a scarcity in the health-related products. This article comprises of developing an interface between people and hospitals which gives information about the availability of medical equipment to the people and provides facilities like e-health care or virtual medical visit by following health informatics. But before directly jumping into the actual idea this article comprises of the primary research work that includes collection of opinions and responses from the major stakeholders related to the problem through telephonic interview and survey and secondary research work that involves gathering of ample data relevant to the problem. It also comprises of the insights that are gained from the research, various possible solutions to the problem that are thought of and also the description of the best solution that is identified along with the development and testing of the prototype.

Key Words: Health sector, health informatics, e-health, health-related products, interface, virtual medical visit, survey, prototype

1. INTRODUCTION

Be it in terms of revenue or employment, Health care has become one of the India's largest sector. This sector includes medical devices, hospitals, medical tourism, health insurance and. Medical equipment. The Indian health care delivery system is of two types:

- 1) Public health care system
- 2) Private health care system

Coming to Public health care system i.e, Government, Comprises limited secondary and Tertiary care institutions in major cities

Its main aim is to provide basic health care facilities in rural areas in the form of PHC's (Primary health care centres).

Now coming to our second category i.e, Private health care system provides majority of secondary, tertiary and quaternary care institutions that Pays it's full attention in tier 1 and tier 2 and also metros.

As we all know Well-trained Medical professionals are the India's competitive advantage. The cost of surgery in India is less when compared to US or Western Europe it counts about one-tenth of US/ Western Europe.

India became the fastest country in the world to reach 4 million Covid-19 Vaccination mark in 18 days with reference to Feb 3-2021.

2. Literature Survey

A thorough research was carried out to study various problems in Health sector in India. This document presents study findings from primary and secondary sources of data. Primary data is original and unique data, which is directly collected by the researcher from a source such as observations, surveys, questionnaires, case studies and interviews with the stakeholders. Sources of secondary data are websites, articles and internal records. So while secondary research is easily accessible they are not pure as they have undergone through many statistical treatments and editing.

2.1).Primary survey Questionnaire:

Survey questions that were sent to the participants are shown below. We have received almost 125 responses to the survey conducted on General Health Care Infrastructure. Most of the respondents are medical students who belong to the age group 15-25, and remaining are doctors and people recovered from Covid who belong to the age group 26-40. More than half of the respondents are encountered with covid directly or indirectly.

More percentage of the respondents expressed that the current medical infrastructure of India needs improvement and remaining are completely dissatisfied with it.

- On asking about how is the availability of hospitals on their area 73.2% of the people answered that there are good amount of hospitals available in their area and 25.2% people answered that there are not many hospitals in their locality and remaining 1.6% percent people answered that their are no hospitals available for them at all.

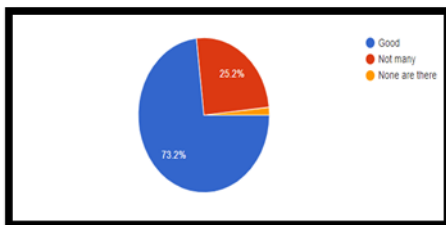


Figure-1

- Next questioning about have any of them encountered covid-19 or any of their family members or friends suffered with covid-19 65.9% of people reported that YES and remaining 34.1% people reported NO.

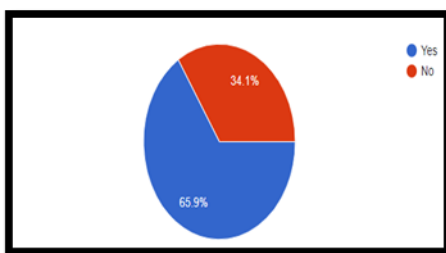


Figure-2

- On questioning if any of them affected with covid-19 , How did they got treatment either by HOME QUARANTINE or HOSPITAL 52.8% people reported they are Home Quarantined , 18.7% people reported that they went to hospitals for getting treatment and remaining 28.5% people never encountered covid-19.

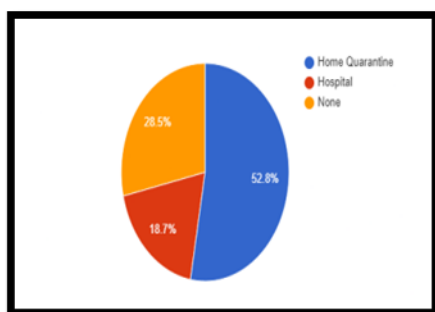


Figure-3

Next on questioning Why do you think many people choose to be Home Quarantined 14.6% people answered that Due to the lack of availability of beds , 29.3% people answered due to mild symptoms and remaining major 56.1% people answered BOTH.

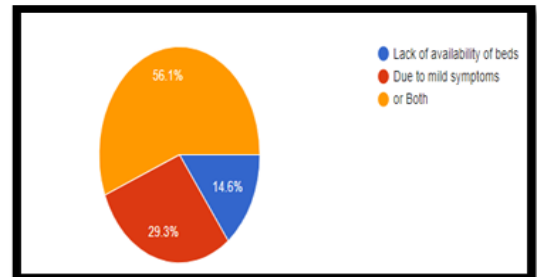


Figure-4

- On questioning In conditions like these are the patients suffering from diseases and covid-19 were able to get required medicines from the pharmacies 76.4% people answered that Yes they are getting and remaining 23.6% people answered that No that they are not able to get the medicines.

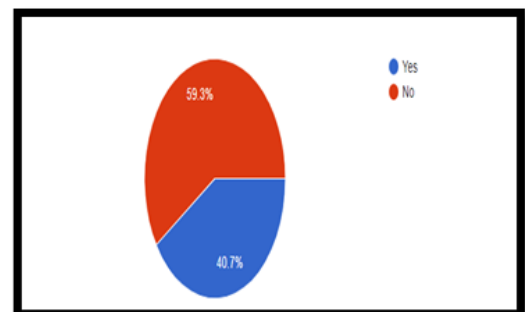


Figure-5

- On questioning them what might be the reasons do they think for increase in the number of deaths related covid-19 and other diseases 35.8% people answered that due to lack of medicines, 15.4% people answered due to less immunity , 17.5% people answered Lack of availability of beds in hospitals and remaining 30.9% people answered that increase in number of deaths are because the patients are not able to get required medicines/blood/plasma on time.

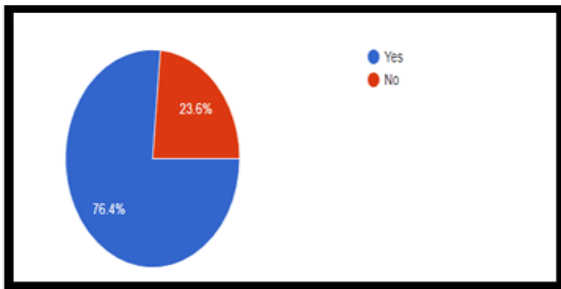


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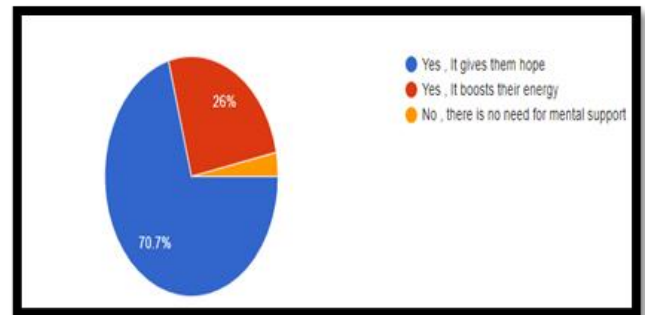


Figure-9

- Next on questioning when a person is in need of blood, is he/she able to get required blood on time 59.3% of people reported No and remaining 40.7% people reported Yes.

- On asking the opinion whether they will help patients in these times 95.9% of people replied Yes they will help and remaining 4.1% of people replied No they can't help.

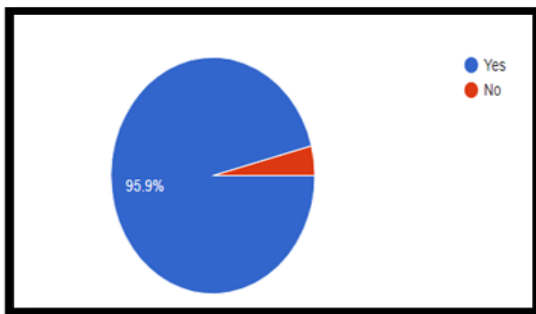


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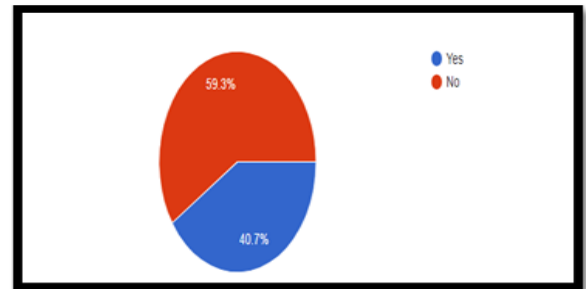


Figure-10

- On questioning them that Do they think all the Home quarantined patients are able to get the required items like medicines, plasma, oxygen cylinders 79.7% people reported No and remaining 20.3% reported Yes

2.2).Secondary Survey:

Analysis and Discussions:

Using our secondary survey we made some analysis and discussions:

PERCENTAGE OF PEOPLE DIE DUE TO LACK OF AVAILABILITY OF BEDS :-

During this COVID-19 Pandemic situation people are suffering a lot that they could not find a bed on hospitals and thus leads to death of thousands of people hospitals in India have been facing an acute shortage of oxygen/ICU beds and ventilators which are decreased by 46% of ICU beds and 36% of oxygen ever since the second wave of Coronavirus infections hit the country with rampaging ferocity. Now government of orders having a way regarding ICU bed availability according to the finding. It has been noted that for every additional ICU bed per COVID-19 case. There was an associated one-fifth decrease in rate of death during this month.

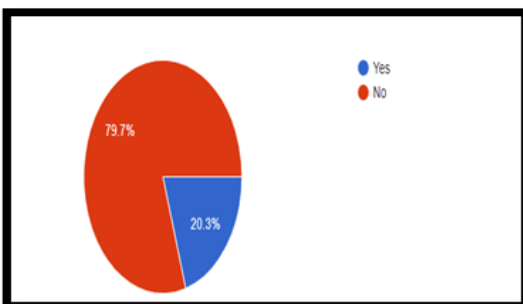


Figure-8

questioning the people whether they think there must be mental support along with physical support 70.7% answered Yes, it gives them hope, 26% people answered Yes, it boosts their energy and 3.3% people answered there is no need for mental support.

States/UTs where ICU beds decreased (in %)

The decrease in ICU beds was mostly in large states that also had a high Covid-19 caseload.

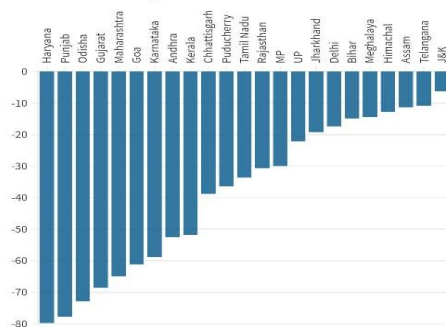


Figure-11

States/UTs where oxygen-supported beds decreased

Between Sept 22, 2020 and Jan 28, 2021 oxygen-supported beds in India fell by 36%. But there were 10 states where the decline was more than the national average.

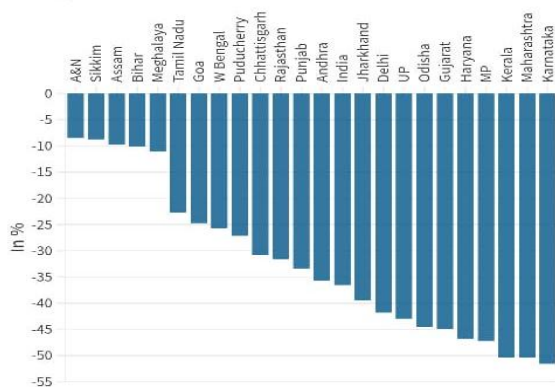


Figure-12

Many hospitals in our country have been facing problems regarding limited supply of oxygen, availability of ICU beds and ventilators due to these limited supply the second wave of corona virus diseases hit the country with more deaths the second wave has been more deadly with over lakh deaths happening. Government showing the data that instead of strengthen hospitals in india before second wave, the country saw a rapid fall in medical facilities i.e fall in health infrastructure.

In our country many cities reporting a chronic shortage of ICU beds. And also in many social media platforms like Instagram, Twitter, Facebook, ... there are spreading and making viral for getting help. Some reports saying that people dying without getting required treatment in time are coming from all over the country. Twenty out of 28 districts in Chhattisgarh, 36 of the 12 districts in Maharashtra, 52 of the 13 districts in Madhya Pradesh and 22 of the 8 districts in Punjab having lack of beds due to lack of availability of beds rise in number of Covid-19 cases takes place.

Change in No. of oxygen beds (April '20 - Jan '21)

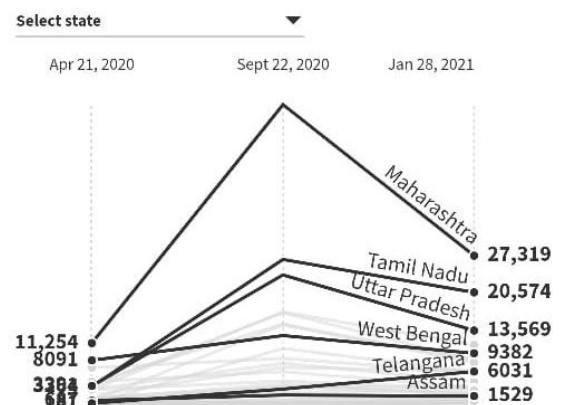


Figure-13

SITUATION IN INDIA AT PRESENT :-

Covid-19 in India: The government is saying that covid situation is stabilizing with daily cases, positive cases are reducing i.e. positivity rate is reducing. The Government also trying to control the active cases.

The percentage of Covid-19 positivity rate is around 24.83 percent on May 10 and it is reduced from 24.83 percent to 12.45 percent on May 22. Among 26 states eight states have more than one lakh active cases while remaining 18 states have the positivity rate of about 15 percent. In a single day 2.57 lakh new active cases have been recorded and the daily increase in covid cases in India remained below the three lakh-mark for the 6th consecutive day.

When we thought first covid-19 wave is decreasing then suddenly the second Covid-19 wave came into picture which has been more deadly, with nearly 1.5 lakh deaths happening in the last one and half months alone, yet there are indications of an reaching peak, including a immersing weekly case fatality rate.

The patients of 18 Maharashtra districts are having no more home isolation.

India reported 1.96 lakhs (1,96,427) new covid active cases over the last 24 hours on Tuesday, it is lowest day to day rise in diseases since 14th April, while deaths caused due to this disease rose by 3,511. The total cases in India now about 26 lakhs (26,948,874) while total fatalities stands at 3 lakh (3,17,527) given by the health ministry in this morning.

In Tamil Nadu about 34,867 cases reported in one day which is leading the state list. Karnataka reported about 25,311 new cases which is next to Tamil Nadu. Followed by Maharashtra reported with 22,122 new active cases next to Karnataka. Kerala reported 17,821

new active cases and Andhra Pradesh reported 12,994 new active cases. The cases of West Bengal is about 17,883. Among 26 states these are the most affected states in India of total cases are Karnataka 25 lakhs (2,550,215), Maharashtra 57 lakhs (57,02,119), Andhra Pradesh 15 lakhs (15,93,827), Kerala 23 lakhs (2,365,787), Uttar Pradesh 16 lakhs, Tamil Nadu 19 lakhs (1,977,218).

State-wise status of health infra and change in it (Sep 22-Jan 28)

Click/tab on state or use search option for details

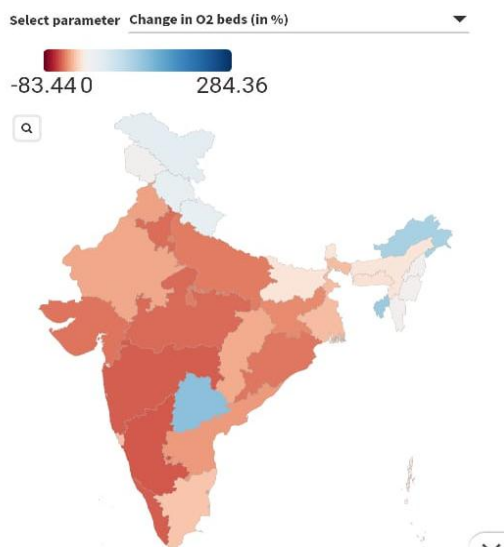


Figure-14

Recent developments:

These are some of the recent developments and initiatives taken by the Indian Government in trying to develop Healthcare industry in India:

- In February 2021, India had given approval to give 24 million doses of vaccines for COVID-19 to 25 countries, where more than 2 times the 10.5 million vaccines were exported during the month January 2021. Some countries like Brazil, Morocco and South Africa were sent more than 10 million doses of vaccine
- During February 2021 the NBCFDC (National Backward Classes Finance and Development Corporation) signed a Memorandum of Understanding (MOU - is a type of non-binding agreement between two or more parties that describes the intention of parties to work in consensus.) with Apollo Medskills Pvt Ltd. This is to co-fund a COVID vaccine administration program for nurses, medical & nursing students and pharmacists.

- As per the data, as of June 19, 7 am, 27,23,88,783 total doses of the vaccine had been administered in India. Of this, 22,19,01,281 were first doses while second doses totalled 5,04,87,502.
- In February 2021, the Minister of Commerce and Industry of India and the UK Secretary of State for International Trade had a meeting together to discuss the bilateral trade and economic relations of India-UK trade and investment relationship. The ministers also discussed a establishment of bilateral health corporation between India and UK countries like vaccines ,which will allow India to grow as global source of strength to overcome COVID-19 imposed challenges
- In February Indian Prime Minister Mr. Narendra Modi established the foundation stones for 2 high-tech hospitals and launched a program 'Asom Mala' for state highways and major district roads in Assam. Mr. Narendra Modi also stated that about 12.5 million people in the state are getting benefits from the Ayushman Bharat Scheme

2.3).Empathy Tools

Empathy Mapping

Based on the data we got from the participants through primary and secondary surveys we created an empathy map about

- what they do,
- what they feel,
- what they think and
- what they say.



Figure-15:EMPATHY MAP

Empathy Map is a main empathy tool and an important part of human-centric design. It tells us about what actually is going on in users' heads is the focal point of user experience (UX) design.

An empathy map is needed majorly for following reasons:

- It is important to understand the user carefully, analyze his thought process, and understand the user needs.
- To connect with users who belong to our domain, it is important to empathize or connect with users.
- To bring the other team members on a single understanding of the user, their needs and intentions.
- To identify key points

Empathy mapping is actually used to understand user frustration, hear their voices and feel their struggle.

Insights:

On carefully observing the empathy map we discovered some important insights:

- Donors who are previously affected with diseases like covid are scared about their safety on returning back to the hospital because there are more chances of getting affected again.
- Many people want to secure a plasma donor for themselves in advance in case of any emergency and are also scared to donate it.
- Also due to lack of knowledge and motivation ,most of them are ready to donate but don't have much knowledge about the therapy.

2.4).DEFINE PHASE

In the define phase of the design thinking process, we design challenges and problems from the data that we collected in the Empathise phase. This allows us to gather and generate ideas to resolve the issues faced in a certain domain.

DEFINE TOOLS

i) POV:

A Point Of view (POV) are meaningful and actionable problem statements, which will allow you to ideate in a result-oriented manner .We developed the following POV statements from the data collected:

1. One of the major problems faced by patients during pandemic is lack of information about availability of medical facilities in hospital ,they need to have the necessary information because during emergencies they can get the necessary health care immediately.

2. For the people who recovered from covid need a medium to donate their plasma because the people who are in necessary are not able to find the plasma donors in time.

3. Many people in the survey said that they chosen to be home quarantined because of lack of information about the availability of beds.

4. Kids and old people are most vulnerable to health problems because they have less immunity

5. Sometimes people need to wait for longer times to get necessary blood donors during emergencies which may also result in loss of life because they don't have the information about the people who are ready to donate their blood and their blood group.

6. Many people said that when a person is not well then he must also need mental support along with physical support because it gives them hope and makes them feel better.

7. Among all the home quarantined people many of them are not able to get the necessary medical facilities like medicines, oxygen cylinders because they are not able to contact the people who are ready to help them.

ii) HOW MIGHT WE

How Might We(HMW) questions helps to come up with the wide range solutions to the challenges statement in POV statements.

1. How might we provide information about availability of medical facilities in hospital during emergencies?

2. How might we be able to provide medium between plasma,blood donors and recievers?

3. How might we provide information about availability of beds in hospitals for home quarantined patients?

4. How might we be able to provide information about immunity boosting techniques to kids and old people?

5. How might we be able to provide mental support to the patients and interact with people who are not well and are in need of help ?

3. Proposed Work

3.1).Ideation phase:

With a strong background understanding of the Empathy and Design phases, team members have to start thinking outside the box and find potential alternatives to the existing issue statement and also start searching for different ways of dealing with the problem. There are plenty of Ideation methods like Brainstorm, the NABC method, the 2x2 matrix method, and many more.

Brainstorm:

It is a process of finding various relevant solutions for the particular problem statement. Brainstorming can generate many wonderful ideas. By this methodsome of the proposed ideas were as follows: -

- 1).Using google map’s API we can provide information about availability of nearby hospitals and facilities available in them.
- 2).By developing an app or webpage and creating an interface between donors and recievers and by maintaining database of the people who are ready to donate blood and their blood groups.
- 3).By contacting the hospitals and check for the availability of beds.
- 4).By providing online doctor consultancies either through chat or call.
- 5).By interacting with people who recovered from any ill-health conditions and knowing their experiences and cure methods.
- 6). Interacting with people and knowing about their health conditions and posting it in an interface like an app where other people can help them.
- 7).By maintaining separate oxygen and blood banks.
- 8).By ensuring everyone to have regular health check-ups so we could detect any symptoms of any disease so then we can get prepared with necessary medical equipments.

9).By forming groups and organisations regarding medical equipments and employing staff to maintain it.

NABC (Need Approach Benefit Competition) method:

The NABC (Need Approach Benefit Competition) method may perfectly help to select the perfect solution of the problem.

Need:- People around the globe are facing many healthcare challenges and in many cases mainly in crucial times like covid-19, the reason for the cause of death of a person is the lack of proper medical facilities provided on time i.e if any person is fell into an medical emergency and if that person is not able to get the required medical equipment at that time beside, then what about his life.

Approach:- We are going to develop an mobile application which connects between donors and recievers i.e. the people who want to donate blood or medical equipments like tablets ,oxygen cylinders can directly contact with the people who are in need of it through the app we design.This app also tells about the availability of beds and medical equipments in nearby hospitals.

Benefit:- Eventhough the implementation of this idea is quite complex but it helps the people In their medical emergencies.The elder people can also easily operate it without any confusion.Eventhough there is no person beside the emergency patient physically,this application does more or equal tasks same like the physical person .Many lives can be saved by this idea.

Competetion:- The existing solutions are also quite useful but the probabilities of the benefits caused by them are less when compared to our solution and the implementations of the existing solutions are also complex in nature

Mindmap:

Mind mapping is used to represent how ideas or other items are linked to a central idea and to each other.

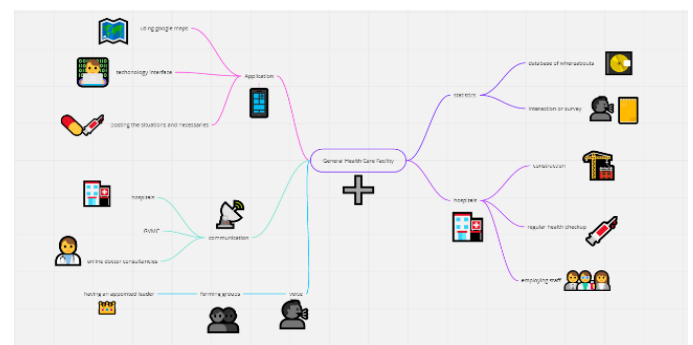


Figure-16: Mind Map

2x2 matrix:

A 2x2 matrix method shown below helps to understand the complexity levels of the above ideas for the solution of the problem and to proceed in a better way.

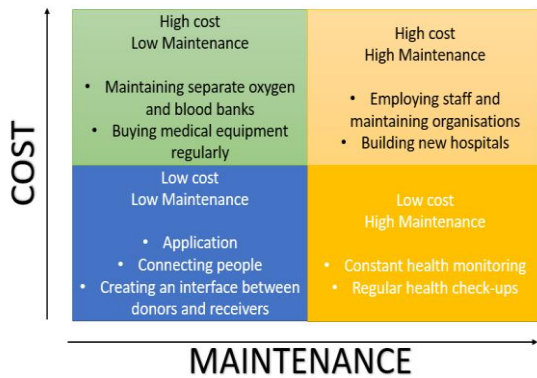


Figure-17:2x2 matrix

Idea chosen:

Finally, after constructing 2*2 matrix we have come up with an idea to design an application. This app includes a GPS system to track availability of beds and medical equipments in nearby hospitals and also acts as an interface between donors and receivers i.e., the people who want to donate blood or medical equipments like tablets, oxygen cylinders can directly contact with the people who are in need of it, this will be very useful for the people who are in emergency and for the people, who have no one to look after them. Maintaining separate oxygen and medical equipments is more costly. Building new hospitals and employing staff and maintaining organizations is also costly and it also needs high maintenance. Ensuring constant health monitoring and regular health check-ups may cost less but maintenance is high because each and every individual must be monitored which is difficult by common sense. So by using an app the person who are in need of any medical facility like for example a patient needs blood donor of blood group b positive then he can post his requirement in that app and the person with that corresponding blood group who is ready to donate blood can directly contact the person who needs it. Therefore, this app will be very useful for the people who require healthcare immediately during an emergency.

3.2).Prototype Phase:

The best way to find out if the solution is reasonable is by creating a minimal version of the product and testing it. So, I sketched a quick lo-fid pen and paper wireframes followed by a simple prototype based on the potential solution. "You can create good experiences without knowing the content. What you can't do is create good experiences without knowing your content structure."

— Mark Boulton It is important to define the skeleton or structure of the page, before filling it up with content and other visual elements. Lo-fidelity wireframes sketches helped me in outlining the structure of the interface, its pages and the basic information architecture of the product.

Wireframes:

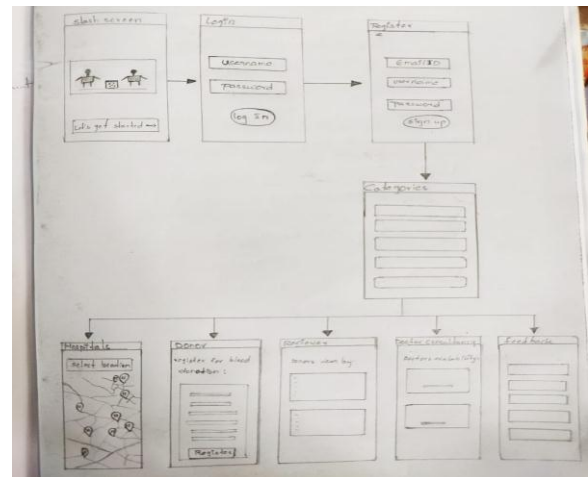


Figure-18:wireframe

Based on the lo-fid sketches, I created a mockup and a basic working prototype using Figma.

4. Analysis and Testing

At First if you have an account then enter your username and password correctly and after that click on log in button and if you doesn't have any account yet then click at the button sign up to create an account which is appearing at bottom. The next step is to create an account which involves entering the details like your personal email id, username and then enter password.so after that click on sign up if you have already an account then click on log in directly. After that the next page contains information which includes the hospitals near by your locality like if you want to see hospitals near by you can click on this button. If you click on hospitals near you can see the google maps location in that you can search the hospital name.so you can aware of hospitals near you. If anyone want to donate blood to some other you can click on this button that contains blood donor as title. After that you have to register for registration you have to fill the name, age, gender, blood group, phone number, address, and if you have any health problems you have to fill that problem and finally register .If anybody need blood in emergency you have to go with emergency blood need. After that the you can see the information of available blood donors. If you need any doctor suggestions you have to click on doctor consultancy. After that you can see the available doctors and next step is to book appointment by clicking on

it. And the last thing is feedback which contains story of some recovered patients ,some immunity techniques and physical support

5. Conclusion

In our research we looked into the different situations that influenced the cause of deaths till date, and investigated the causes of deaths. We base our analysis on the results of a systematic review in order to address our research questions. We also took the public opinion by asking them few questions The results suggest that lack of medical facilities and no quick method to know and access medical facilities is the main cause of deaths that occurred till now. The results demonstrate the different situations that influenced the cause of deaths and percentages of deaths , and reveal certain characteristics of software requirements that decrease the disadvantage present in health infrastructure.

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