

Organ Donation System Using Blockchain

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Abstract - Organ transplantation is a critical medical intervention that saves countless lives each year. However, the demand for organs far exceeds the available supply, leading to a significant gap and prolonged waiting times for patients in need. To address this challenge, an advanced Organ Donation System (ODS) is proposed, aiming to streamline and optimize the entire organ donation and transplantation process. The Integrated Organ Donation System incorporates several key features to enhance efficiency and increase the availability of organs for transplantation. The system integrates seamlessly with healthcare institutions, donor registries, and transplant centers, fostering a collaborative environment that facilitates timely organ allocation and transplant procedures. Real-time data sharing and communication between involved entities are prioritized to ensure accurate and up-to-date information.

Key Words: Organ Donation, Deceased Donor, Promotion, Donor, Transparency, Transplantable Organs.

1.INTRODUCTION

Organ transplantation is the only option to save live in patients affected by organ failure and improve their quality of life. However, there is stress gap between the donor and recipient or between the supply and demand of organ, which make visible to death rates. For that some of the main reasons are lack of awareness, religious and superstitious beliefs, and strict laws. The universal issue of organ shortage is prevalent in Asia, particularly in India, where the situation is worse compared to other countries in the continent, many factors attribute to this problem, such as religious myth, lack of knowledge or awareness, and efforts of government not reaching the root level. Though government is coming up with "Ayushman Bharath", Swachh Bharat Healthy Bharat, ABHAA etc. schemes were limited to health improvement only NOTTO which is statutory government body under Ministry of Health &

Family Welfare is working singularly to improve the conditions. Transplantation of Human Organ Act has been passed in 1994 by Indian Government which Some people are interested in this social cause but don't have enough knowledge as to what to do and how to donate. Another factor is people are not literate enough to know the importance of this cause. So, we are providing our Country with an Organ Donation Management system to spread awareness and give an easy service to our people to recover life. Because the era of internet technology opens the window with application/software/website. The Indian Society of Organ Transplantation was established in 1987 with a goal to provide a common forum to all involved in the transplant activity. The society initiated from CMC Vellore and its inaugural meeting was held at Institute of Kidney Disease and Research Centre, Civil Hospital, Ahmedabad in 1988. The society has over 650 members which include clinicians, basic scientists and others involved in the field of transplantation.

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credentials. If login credentials are equal as member credentials, then admin portal will open. In basic user credentials the user

can donate or seek for organs through proper guidelines displayed in the app. User will put his/her information and submit the response. The information will be monitored by admin. User will also share his number of government id proof during submission. All these data will be stored in google cloud database. Along with this user information will be kept confidential. Admin will access the user information and do the verification process. Admin can accept or delete user request. Admin will manage the data handling process in firebase. When the user will request any organs through this app information of user will be stored in cloud. Admin will fetch that information and provide it to doctors in hospitals and from there the official verification and other formalities will be done. However, doctor will have a member account through which he can observe the database. User requirements will be forwarded to government hospitals through doctors and NGO to manage the guidelines of donation system. User will also Agree to terms and conditions of this app.

2. Body of Paper

Organ transplantation and organ donation: an overview

Organ transplantation involves the surgical implantation of an organ or section of an organ into a person whose own organ is failing. The donor organ may come from both deceased individual as well as from a living donor. The patients psychological and behavior aspect as well their emotional response and mental health and adherence to medical regimen should be assessed before and after organ transplantation. The living donor's psychological response towards organ donation (most commonly for kidney and liver segment transplantation) is an important aspect to consider in the transplantation process.

Asian Indians are more likely to have higher rates of having obesity and diabetes when compared with other Asian subgroups which make them at an increased risk of needing a donated organ [35]. These conditions can lead one to develop coronary artery disease and hypertension which then can lead to chronic kidney disease and other chronic illnesses. Patients who suffer from chronic kidney disease need regular dialysis which can ultimately lead them to organ transplantation to improve one's quality of life. Also, conditions such as diabetes and obesity can be detrimental to one's life and can lead to fatty liver disease which can lead to chronic liver disease requiring liver transplantation if the liver decompensates.

Organ donation is defined as "giving an organ or part of an organ to be transplanted into another person" (Organ procurement of Transplant Network (OPTN), 2015), organ donation has the potential to save lives. The organs donated from one single donor can save up to eight lives. Organ transplantation may be one of the options left to sustain someone's life. However, the disparity that exists between the supply and demand of donated organs, leads to a loss of many lives. Based on recent OPTN data, approximately 21 people will die each day while waiting for a transplant in the United States (US). Currently, 123, 358 people are awaiting organs and on the transplant list in the US with this number growing and the number of donated organs declining.

The number of patients in need of organ transplantation has increased at a rapid pace; in contrast, the number of available

organs has increased only slightly. Expanded criteria for donor selection, such as older age, have resulted in more people who meet the criteria for brain death becoming organ donors although fewer organs are transplanted from each donor. Improvements in automobile and highway safety, as well as increased enforcement of gun control laws, have also contributed to a plateau in the number of young, healthy donors. Public education efforts that encourage organ donation may be effective in getting more people to sign organ donor cards, but most individuals who do so will never be in a position to become organ donors.

The development of organ transplantation in the second half of the 20th century has been a remarkable achievement. Recently; organ transplantation is one of the most effective options for those with an end-stage organ failure. Its success has been basically dependent on public awareness, support and active participation. Without these factors, the efficiency of organ transplantation and the consequent saving or extension of lives would have undoubtedly suffered adversely.

Faced with increasing numbers of patients who need transplantation, deaths on the waiting list, and a fixed number of available organs, some transplant programs are working to increase the number of transplants from living donors. Although living donation has always been an option for some types of transplants, many programs have been reluctant to promote it, as living donation requires invasive surgery on a healthy person with associated risks of morbidity and mortality. For example, since dialysis is an option for patients with end-stage renal disease, surgery on a healthy donor may be difficult to justify, despite the dialysis patient's diminished quality of life. The most important in organ donation is to maximize the psychological status and well-being of the donors before and after transplantation has become the foremost goal of all transplantation centers. The psychological issues that mainly concern with the living organ donation includes prevention of psychological harm, ensuring the donors are fully informed and decide to donate without coercion, monitoring donor psychosocial outcomes are intimately linked to the factors that historically served as barriers to use of organs from living donors.

Organs that can be transplanted from the living donor includes one kidney, part of intestine, pancreas, islets of Langerhans, bone, part of liver, one testis, bone marrow and blood. The organ that can be transplanted from the deceased donor are heart, kidney, pancreas, stomach, hand, skin, blood vessels, lungs, liver, intestine, testis, cornea and heart valve.

Types of donors: -

1. Live donors: A living person, mentally and physically healthy can donate one of a paired organ, part of an organ or a tissue. The organs donated are kidneys, part of liver, one of the lung, part of small intestine, skin, bone marrow, one of the testis and one of the ovaries. Live donor can either be related or unrelated.

2. Unrelated donors: For altruistic reasons, a person can donate one of his organs to an unrelated donor. According to TOHO act, the unrelated donor should be known to the recipient and have some obligation to him. It has to be established that there is no monetary transaction between them. But in many other

countries, even a stranger can donate one of his organs to a needy person on altruistic grounds.

3. Deceased donors: Organs are harvested from brain dead person whose respiration and circulation are maintained artificially. Brain dead has to be certified by a team of doctors nominated by Government I every organ retrieval centers.

4. Paired exchange: When a living donor is not compatible with the related recipient, but may be compatible for another recipient. That second recipient related donor is compatible to the first recipient, then permission can be granted for transplantation. The surgery for all four donors and recipient is conducted simultaneously and anonymity is kept until after the transplant.

5. Spousal donation: A spouse can donate an organ to the partner. It has to be recorded that the couple is legally married.

6. Paired Donation (or Swap Donation): In situations where a donor is incompatible with their intended recipient, they can enter into a paired exchange program. In such programs, the incompatible donor and recipient are matched with another incompatible pair to facilitate compatible matches.

7. Expanded Criteria Donors (ECD): These are deceased donors who may not meet the standard criteria for organ donation due to factors such as age, medical history, or other risk factors. Organs from ECDs may be used in certain cases where the benefits outweigh the risks.

8. Pediatrics Donors: Donors who are children or infants.

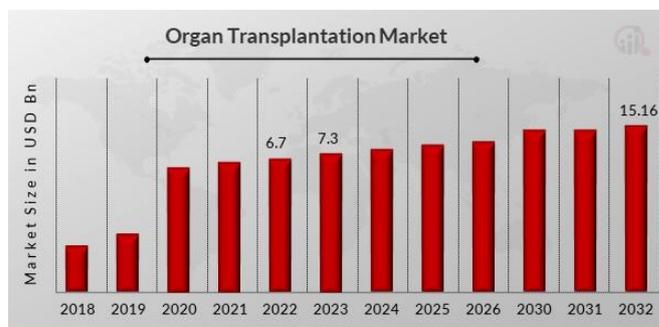
The real reason behind a living person’s interest in donating one’s organ is important to determine but it is often difficult. Now days, money has become the motivation for donation. The relationships also have played a great role in increasing donation rates. The shortage of available organs can be reduced if; people choose to donate their organs after they die. If more people did that the issue regarding organ shortage can be minimized.

Despite advances in medicine and technology, and increased awareness of organ donation and transplantation, the gap between supply and demand continues to widen. Each year, the number of people in the waiting list are increasing in both donor and transplant. The donation statistics according to OPTN Annual report shows that in 2016, total of 41,335 organs were donated. It can be either deceased or living and four out of five donations came from deceased donors and four out of ten from living donors. According to the report by OPTN 2018, 115,033 people need life-saving organ transplant, of those 74,926 people are the active waiting list candidates.

According to U.S Department of Health and Human Services, more than 1,23,000 men, women and children currently needed life-saving organ transplants every 10 minutes and another name is added to the national organ transplant waiting list. In 2014, more than 8500 deceased donors made possible approximately 24,000 organ transplants. In addition, there were

nearly 6000 transplants from living donors. In India, nationally with a population of 1.2 billion people, the statistics stands 0.08 persons as organ donor populations. Kerala network of organ sharing which began in 2012, also states that the need for organ transplantation is high as the patients in waiting list is increasing day by day who requires organ transplantation.

Charts



3.0 CONCLUSIONS

The organ donation decision is a complex one, based strongly on personal beliefs. There are some factors, such as religious and cultural beliefs, that are seemingly intractable and are often cited as reasons for a refusal to donate. In this chapter, it is shown that these have often been found to be tied in with more complex issues such as a distrust of the medical system, misunderstandings about religious stances and ignorance about the donation process. Interventions to better engage the community, including disadvantaged and minority groups, to foster trust and provide information represent promising opportunities of promoting organ donation in the future.

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