2. LITERATURE SURVEY

Fundamentals of convalescent Plasma therapy and its historical background with a review of the recent Ebola outbreak are studied . These papers have pointed out the advantages, uncertainties, and limitations of this therapy for COVID-19 or any other future similar situations indicating the employability. This therapy has got employed in many countries as an investigational therapy for COVID- A detailed review of a few such trials done so far studied by K. Rajendran et al. in is analyzed. The paper has evaluated 5 CP therapy studies early in China: The Clinical details, Survival rate, Antibody titer changes after therapy, and limitations of the clinical trials gets examined in this paper. Another study in [concurs with it.

Eligibility criteria, Pre-screening tests, and plasma transfusion guidelines for CP therapy are discussed in The study is significant in determining who is eligible to donate. The study of antibody titer, and how it is impacted by various clinical factors form the ground of the proposed system. In , Xuemei Li et al. compare antibody response patterns and observes that IgG is the antibody that persists for a long period] and the level of IgG varies vigorously in severe and mild cases. According to Geoffrey J Gorse, Mary M Donovan, and Gira B Patel , the Coronavirus antibody is found increasing in older people than adults. At the same time, other factors such as height and weight don’t have any significance in the antibody level variance . The different serological tests available and interpreting the positive and negative values of these tests are described .

All the above ideas are incorporated when a synthetic donor dataset is built using random number generation . Blood glucose level prediction using data driven methods are attempted and implemented with better results by various researchers . The task in hand of “predicting the best plasma donors in data driven method” is not found to have investigated in any previous researches. The domain of convalescent plasma therapy is quite less explored using data science. The major reason for this could be the unavailability of data. The idea of implementing classification and regression algorithms for a problem is demonstrated

2.1 Existing problem

A potential donor with consent can approach any of the plasma donation centers if he fulfills the eligibility criteria like history of confirmed COVID positive test result age between [18-55] being symptomless for at least last 14 days etc. The donor will go through a screening process during which he gets inquired about his/her health history. Plasma donation selection criteria can be slightly modified according to local requirements and standards but should be in line with the World Health Organization (WHO) guidelines. Those who have fulfilled the initial criteria have to go through screening tests like Antibody testing – to determine whether antibodies exist or not Antibody titer test – to determine the presence and the antibody concentration in the body. The threshold antibody level for donation varies slightly in different countries.

In the initial period of the outbreak, there was no proper channel for inviting plasma donors. As the cases went high, the demand for plasma grew, and very few recovered patients were willing to donate. There were cases where the health authorities could not arrange a donor and hence the family was encouraged to do the job. People were in a desperate chase, trying every possible way to locate a donor. Even after finding a donor, chances are there for the donor to fail any of the eligibility criteria or not to have a threshold antibody level. Since, Plasma therapy is done only for critically ill patients, the above scenario can create stress and panic. An appropriate and efficient method is necessary for not just finding donors but the most efficient one. Studies and research show that the level of antibodies is influenced by many donor-related factors, such as the severity of the disease, age, and many more. It is not easy to set a rule-based system for the prediction of antibody level. Hence, the best and feasible way is to use data-driven methods.

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