

1 INTRODUCTION

1.1 OBJECTIVES

This project's main goal is to develop, build, and test the machine on lab subjects that automates the neonatal exchange transfusion procedure. The machine will then be used in clinical settings and intended for commercial purposes as well.

All the information utilized in the manual procedure is included in the device's functionality.

A motor will be programmed to move the syringe at a constant speed in order to draw and inject blood. Motors will also take the role of the doctor manually switching valves throughout the exchange operation. By doing this, human interference in the process will be eliminated.

The automatic shut-off would turn the machine off when the process was complete using the alarm system.

1.1.1 SPECIFIC OBJECTIVES

The following are the project's specific goals:

1. Use programming, classical electronics, and mechanics to virtually automate the exchange transfusion procedure.
2. Include all the information from the manual procedure in our design III. Create an educational user interface
3. Produce a cost-effective effective and energy-efficient device.
4. Adding an alarm system to give a signal when the process is done.

1.2 SCOPE OF STUDY

This project aims to further previous studies on the ANET and help address other issues with the device that were raised by carefully bringing out the resolution of ANET 2.0 and ANET 3.0 challenges. Although ANET 2.0 was successful in automating the full exchange transfusion procedure, there were still some difficulties. Additionally, ANET 3.0 enhanced the rotation of the valve and handle, however, there were some issues with the valve's movement.

These problems will be solved, and an alarm system will be installed to notify the technician when the procedure is complete, so that additional testing and animal tests may be conducted on the device.

1.3 SIGNIFICANT OF THE STUDY

The automation of this technique used saves time that is less dependent on humans and has more assurances of consistency, precision, efficiency, and fewer human mistakes.

This may arise as a result of improper calculations due to tiredness or fatigue. Automation of the ANET will take these factors to be decreased throughout the procedure, enabling it to be carried out at a more steady and regular pace. Additionally, the automation of the neonatal exchange transfusion procedure will free up physicians to focus on their other responsibilities.

Additionally, compared to many other medical gadgets, its price is quite modest, making it affordable for the typical hospital in Ghana.

This will significantly improve neonatal lifesaving efforts in both urban and rural settings and help save these neonates in an appreciable time.