ABSTRACT

A syringe pump is a medical device for accurate, continuous, and long-term administration of medications. *Syringe pumps* have an expensive price so they are only owned by large health agencies, it can cause human error in administering drugs and is inefficient because it is done manually. In addition, commercial *syringe pumps* are not equipped with an integrated system, so medical personnel cannot monitor the work of the device in *real-time*, receive notifications when the liquid will run out for patient safety, and remotely control the equipment for the efficiency of medical personnel. Based on this, syringe pump research needs to be carried out. The research aims to make *syringe pumps* with accuracy according to tolerances, build a data communication system with the internet without interfering with syringe pump drives, integrate *mobile applications* to improve the work efficiency of medical personnel and patient safety by providing a monitoring, control, data recap, and notification system when the liquid will run out. The syringe *pump test* was carried out at a volume of 1-5 ml and *a flow rate* of 50, 40, 30, and 20 ml/h. The volume and time test results were 99.18% and 99.8% with an error of 0.82% and 0.2%, this is still within a tolerance of +-5%, with a calibration parameter of 246 steps. The *mobile application* functions well and the average feature response time is 0.67 seconds (*start*), 0.62 seconds (*stop*), 3.13 seconds (notification), and the data recap and monitoring features can run very quickly, so that the work efficiency of medical personnel and patient retention can be increased. Volume mismatch in accuracy testing due to position and pressure mismatch between calibration and data retrieval. Meanwhile, the injection time is caused by manual measurement tolerances and *delay* commands that do not work on decimal numbers. In addition, research shows that FreeRTOS makes data communication with the internet run without interfering with the syringe pump drive.

Keywords: *Syringe pump, Mobile Application, Work Efficiency, Patient safety*