

36 - TITLE: A Data visualization tool to enhance registry based surgical quality improvement in a low-middle-income country

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Introduction: To improve the quality of surgical care in Ethiopia, we recently developed an electronic perioperative registry at the Hawassa University Comprehensive Specialized Hospital in Ethiopia. For outcome data to be used effectively for policy decisions and improvement, there is a need to easily visualize data in real-time. In this project we aimed to develop a tool to visualize recently organized patient registry data to facilitate quality improvement efforts and research. There were 3 key challenges that the group faced: (1) the tool would need to be easy to integrate with existing infrastructure; (2) the tool needed to have cross-platform and server stability and allow continuous integration with updated data; (3) the tool needed to be open source; and (4) easily accessible and usable by a clinician.

Methods: Using the open-source Ubuntu distribution (24.04) of the Linux operating system, the basic framework for the data visualization tool was developed to work with available local infrastructure in this LMIC setting. Using the open-source RShiny app and the associated R project, a web-based application was developed that is capable of running on a local area network of computers. This application extracts data downloaded from a RedCap database as CSV file. Through stakeholder meetings and consensus, we decided on the most effective data elements to visualize that would be most beneficial to the department, institution and ministry of health.

Results: The tool graphically displays the following aggregated variables: surgery by date, age, gender, insurance, geographic region, surgical procedure priority, case cancellation, surgical specialty, ASA classification, and hospital length of stay. Additional variables being evaluated include complications, mortality, anesthesia, WHO surgical safety checklist.

Testing demonstrated that the system was successfully installed on a cloud-based environment that replicates local constraints.

A sample graphical user Interface is displayed below demonstrating customizable feature selection to facilitate dynamic data exploration

Conclusions: We have developed a free, simple to use data visualization tool for implementation in LMIC settings. The principal advantages to this system are that is open source and easily customizable to meet local healthcare needs. We would be delighted to share the code and process with colleagues in other LMIC settings to facilitate QI efforts across the healthcare spectrum.