

Abstract

The evidence is now incontrovertible that healthcare is not as safe as it is presumed. Medical errors harm patients worldwide, the majority of which occur in low and middle income countries. Hospitalized neonates are at higher risk of harm from medical errors than adults due to their physiological limitations, immature immune systems, inability to communicate with caregivers, and the complexity of drug dosage calculations. Available patient safety solutions for high income countries are often not feasible in low resource neonatal care settings.

The origin of medical errors in neonatal care settings are multiple and complex. Standardization of medical procedures and removal of system fragility can minimize errors and improve patient safety. In this thesis, we focused on quality improvement in processes of patient handover, hand hygiene, hospital linen management, neonatal apnea detection, and feed-fluid calculation.

This thesis reports five research projects done in resource limited neonatal care settings. The first project was generating patient handover documents from electronic health records for doctors, containing all relevant medical information to prevent communication failure during doctors' duty handover in the Neonatal Intensive Care Unit (NICU). The second project was measuring healthcare providers' compliance to hand hygiene protocols, and developing a conceptual framework to increase hand hygiene compliance, in a NICU. The Third project was implementing colour batching of hospital bed linens in a Special Newborn Care Unit, and measuring its impact on linen change compliance, and nosocomial infections. The fourth project was automated detection of neonatal apnea from contact-less video monitoring, by a novel method. The fifth project was developing an android application for neonatal feed and fluid calculation, with integrated safety features.

Overall this dissertation adds to our knowledge of how patient safety culture can be improved using a systems approach. We reported five strategies of quality improvement in low resource neonatal care, using principles and methods of ergonomics. Future research needs to assess the impact of such strategies. on patient outcomes in more detail, while continuing to develop more solutions for ensuring patient safety in neonatal care.