

**Assessment and optimization of patient radiation doses in computed tomography examinations in Tanzania**

**Justin Ngaile**

**Degree of Master of Science (physics)**

**University of Dar es salaam, college of Natural and Applied Sciences**

The use of computed tomography (CT) for medical diagnosis is problematic globally due to the high doses delivered to patients. The problem was anticipated to be more severe in developing countries like Tanzania due to lack of optimized protocols and personnel; inadequate skills, and poor maintenance practices. In view of these concerns it was found necessary to assess the radiation doses imparted to patients from CT examinations in Tanzania, and develop methods that could minimize patient doses from examinations without compromising image quality. Large variations of dose among hospitals were observed for similar CT examinations. These variations were largely attributed to use of different CT scanning protocols and scanner types by hospitals. The mean organ and effective doses and the variations in doses between hospitals were mostly comparable to other studies from seven developed countries. The large observed variations of doses among hospitals and relatively high doses in Tanzanian hospitals call for the need to optimize CT scanning protocols. This can be achieved through provision of adequate education to CT personnel on factors affecting patient doses and image quality and optimal selection of scanning parameters based on indication of study, anatomical region of interest and patient variations. The study demonstrates that considerable dose reduction can be achieved for children and adult with small bodies from CT examinations by making appropriate adjustment of scanning parameters based on the patient diameter. The study further demonstrates that use of modified lead shields could reduce the dose to superficial radiosensitive organs significantly without appreciably degrading the image quality.