

## THE RADIATION DOSE MEASUREMENT OF THE COMPUTED TOMOGRAPHY SCAN TO ENSURE THE SAFETY FOR MEDICAL STAFF IN Dr. SARDJITO GENERAL HOSPITAL, YOGYAKARTA, INDONESIA

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### ABSTRACT

**Background:** The Computed Tomography (CT) scan has been recognized as a high radiation dose modality when compared to other diagnostic X-ray techniques, since its launch into clinical practice more than 30 years ago, moreover more than 60 million CT examinations were performed in the United States in 2006, as well as in 2015 the number of CT examinations in Dr. Sardjito General Hospital, Yogyakarta, Indonesia is 5963 scans, the cancer risk associated with radiation exposure due to medical diagnostic imaging has been receiving significant attention in recent years, as well as several studies estimating the risk of cancer induction is provided by situations in which high radiation exposures have occurred.

**Objectives:** This study is to measure the dose rate that reach to medical staff workplace at Dr. Sardjito General Hospital, Yogyakarta, Indonesia from CT scans exposure and compare it with International Commission on Radiological Protection (ICRP) recommendations to ensure that the workplace is safe for medical staff, as well To measure the dose rate in CT department from CT scans exposure in different points, and compare it with other points to define the safest area for patient companion from CT radiation dose inside CT room.

**Methods:** Measurement the radiation dose by taking three different reading from different CT scans; brain, chest and abdomen at different points in CT scan department. Subject in this study is 36 points scattered around CT machine in CT department were it divided into 3 groups: group (I); which represent the radiation dose rate in workplace area and it include ten points (thirty different CT scans), group (II) which Represent the dose rate inside CT room and it include fifteen points (forty five different CT scans), group (III); which represent the radiation dose rate outside the CT room and it include eleven points (thirty three different CT scans), therefore the radiation dose were measured in three groups through one hundred and eight CT scans. A cross- sectional design to determine the radiation dose that maybe exposed to the medical staff who is working in CT department by measured the radiation dose rate. Statistical analysis was performed by using one way ANOVA test and post hoc test of LSD, HSD. RAM ION meter was used to detect the radiation dose rate.

**Results:** Group (I) with the mean dose is (0.0035 mSv/h) and standard deviation (0.00485), group (II) with mean (10.7451 mSv/h) and standard deviation (12.87781) and group (III) with mean (0.008 mSv/h) and standard deviation (0.00185). ( $P < 0.05$ ), thus conclude that there are a difference between the points (the dose rate (mSv/h) value in thirty six dose rate points around the CT machine as well ( $p < 0.05$ ), therefore there are a difference between the three groups (the mean of dose rate (mSv/h) between the three groups in CT scan department.

**Conclusion:** The radiation dose rate from CT scan examinations that reach to medical staff workplace Group (I) at Dr. Sardjito General Hospital, Yogyakarta, Indonesia is safe according to the ICRP recommendations, the research has revealed that the less radiation rate dose inside CT room Group (II) is point number three which equal (0.127 mSv/h), as well as point number twenty seven which equal (1.05 mSv/h).

**Keywords:** Computed Tomography, Dose Rate, International Commission on Radiological Protection.