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The report of annual occupational dose at King Chulalongkorn Memorial Hospital

Background and Objective: As the tertiary hospital, King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Bangkok, Thailand, has been providing extensive radiation diagnostic and therapeutic services. The aim of this study was to monitor and assess the occupational radiation exposure in the department of radiology. Methods: For the total of 580 radiation workers, the optical stimulated luminescence dosimeters (OSL) from Bureau of Radiation and Medical Device (Bangkok, Thailand) were employed to monitor the Hp(10), Hp(3), and Hp(0.07) for effective dose, equivalent dose of lens of eye, and skin, respectively. These personal doses were collected from October, 2020 to September, 2021. The workers were separated into the group of diagnostic, nuclear medicine, radiation oncology, and radiation worker in other departments with the number of 298, 33, 129, and 120, respectively.

Results and discussion: With the OSL minimum dose report of 0.1 mSv per reading, 103 from 580 workers received the doses lager than this value, at least one recording, were stated. For diagnostic group, about 10 percent of worker in this group received maximum occupational dose range up to 1.03 mSv per month. The maximum annual occupational dose was recorded from technologist who worked in Interventional unit with the value of 8.41, 8.80 and 8.96 mSv for Hp(10), Hp(3), and Hp(0.07), respectively. For nuclear medicine group, 26 from 33 workers had the maximum occupational dose range up to 0.5 mSv per month. The maximum annual effective dose, equivalent dose of lens of eye, and skin were equal at 1.47 mSv from one technologist. For radiation oncology group, the optical stimulated luminescence neutron dosimeter (OSLN) was used to expand the field of neutron measurement due to the operation of five 10 MV and one 15 MV linear accelerators and one proton therapy system. There were 14 from 129 workers received the maximum doses range up to 0.17 mSv per month. The maximum annual occupational dose of this group was about 1.15 mSv for each of Hp(10), Hp(3), and Hp(0.07). For radiation worker in other departments group, the maximum effective dose from gastrointestinal nurse was 1.29 mSv per month which contributed to the annual occupational dose of Hp(10), Hp(3), and Hp(0.07) as 5.73, 5.73, and 5.57 mSv, respectively. The reasonable reason was found in the investigation without potential emergency situations. The descending order of the annual occupational dose was diagnostic (interventional unit), radiation worker in other departments, nuclear medicine, and radiation oncology.

Conclusion: The annual occupational dose within the occupational dose limit was reported. We enduring the radiation protection training and education in our hospital. The radiation safety officers (RSO) have been monitoring and assessing the radiation exposure for both occupational and public.

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