

# **Dedication**

**TO:**

**MY FAMILY,**

**Yousif   Braa   Mohammed**

**MY teachers**

**And**

**MY FRIENDS**

## **Acknowledgement**

*First and foremost, I would like to express my deepest gratitude to **Dr.Abdelmoneim Adam** for his support and guidance. Without his help, this work could not have been accomplished. I also would like to thank **Dr. Mohammed Alfadel** for his invaluable comments on the work.*

*My thanks also go to **Dr. Mohammed Khalil** for his help on TLD measurement .I also would like to thank **Mr. Hamed Osman** for help in quality control tests.*

*I also would like to thank all my colleagues in that centers for their kind help.*

*Finally I would like to sincerely thank my parent, my husband, brothers and sisters for their consistent mental support.*

*My thanks extend to all those who helped me in different ways to make this work possible.*

## **ABSTRACT**

Nowadays it is noticed that increasing attention has been paid to radiation protection. There were many studies on evaluating radiation protection in Sudanese hospital and there was protection defect in most of them.

This thesis is concerned with evaluate the radiation protection status in Omdurman health centers and was conducted in Aldaw-Hajoj Abo-Sed Wad-Nobawi and Alrakha centers.

The study has been carried out during the period from February 2009 up to October 2009. The data was collected by the way of measuring patient dose using TLD. Radiation exposure surveys was carried out using survey meter and quality control test using its tools .Finally collect other data using questionnaires.

The patient dose was measured to 108 patients in four centers in Omdurman city. The patient data, dose and questionnaires were statistically analyzed and were computed and graphically represented.

The mean ESD in this study found to be 0.29 mSv was the mean kV was 59.9 the mean mAs was 9.6 the mean age was 42.6 years the mean BMI was 27.1.

For chest exam the mean ESD was 0.25mSv and for upper limbs 0.3mSv while in lower limbs exams was 0.4 mSv.

The results of this study intended to evaluate the current status of radiation protection in different centers in Omdurman. The lowest radiation dose was on Abo-Sed (mean 0.22 mSv) and the highest dose was on Aldaw-Hajoj(mean 0.33).In Wad-Nobawi(0.26) Alrakha (0.30).

There was multiple cases dose on the four centers was higher than the DRL according to NRPB on Abo-Sed (10%) Aldaw-Hajoj (55%).In Wad-Nobawi(45%) Alrakha (55%).

The protection status associated with co-patient was good in three centers and high on Aldaw-Hajoj center (reception dose 100 $\mu$ Sv). The dose for technologist was acceptable in two centers as recommended by (ICRP) and high in one center (Alrakha 21.12mSv per year).

The knowledge of medical doctors in the field of radiation protection concepts was very shallow. Therefore, unnecessary exposure and optimization and justification principles are hard to be applied.

## ملخص الدراسة

تزايد في الآونة الأخيرة الاهتمام بالوقاية من الإشعاع متمثل في العديد من البحوث التي أجريت في هذا المجال نسبة للآثار الكبيرة والمخاطر التي ينطوي عليها استخدام الإشعاع. بعض تلك الدراسات أجري في المستشفيات السودانية وقد أظهرت بعضها منها بعض جوانب الخلل في الوقاية من الإشعاع .

هدف هذا البحث لتقويم الوقاية من الإشعاع بمراكز الضوحجوج ,ابوسعدي, ودنوباوي والرخا بمدينة ام درمان في الفترة من فبراير الى اكتوبر 2009. تم جمع البيانات عن طريق قياس الجرعة السطحية لعدد 108 مريض بواسطة مقياس الجرعة الحراري وذلك لفحوصات الصدر والاطراف العليا والسفلى والراس وكذلك تم قياس الاشعة المتسربة في تلك المراكز بواسطة الماسح الاشعاعي كما تم عمل قياسات ضبط الجودة بالنسبة للاجهزة الموجودة وكذلك تم ملء استبيانات للتقنين في تلك المراكز وكذلك الاطباء لمعرفة كفية ممارسة وقاية المرضى من الإشعاع.

كان متوسط الجرعة السطحية لكل الفحوصات 0.29 ملي سيفرت بينما كان متوسط عوامل التعريض 59.9 كيلوفولت و 9.6 ملي امبير كان متوسط الاعمار 42.6 سنة بينما كان متوسط مؤشر كتلة الجسم 127.

بالنسبة لفحوصات الصدر كان متوسط الجرعة السطحية 0.25 مل سيفرت بينما كان لفحوصات الاطراف العليا 0.3 ملي سيفرت وبالنسبة للاطراف السفلى 0.4 ملي سيفرت. كانت اعلي الجرعات الاشعاعية في الضوحجوج 0.33 ملي سيفرت بينما كان اقلها في ابوسعدي 0.22 ملي سيفرت بالنسبة لودنوباوي كانت 0.26 ملي سيفرت وكانت في الرخا 0.30 ملي سيفرت.

بينما كانت هنالك العديد من الجرعات اعلى من المستوى المسموح به عالميا حسب المستوى المحدد بواسطة المنظمة العالمية للوقاية من الاشعاع (NRPB) في كل المراكز الضو حجوج 55% ابوسع 10% ودنوباوي 45% الرخا 55%.

اما عن مستوى الوقاية المتوفرة بالنسبة المرافقين فكانت جيدة ما عدا استقبال الضوحجوج الذى به بعض التسرب 100 مايكروسيغرت في الساعة وبالنسبة للعاملين كانت الجرعات اقل من الجرعة السنوية المسموح بها عدا في مركز الرخا حيث كان معدل الجرعة السنوية اعلى بقليل من المعدل (لمسموح به عالميا) 21,12 ملي سيفرت اوضحت الاستيوانات عدم كفاية معرفة الاطباء بتلك المراكز عن مخاطر الاشعاع الناتجة عن الفحوصات الطبية الاشعاعية مما يؤدي الى فحوصات غير مبررة.

## LIST OF ABBREVIATIONS

QC	Quality control.
QA	Quality assurance.
IRR	Ionizing radiation regulation.
ALARP	As low As Reasonably Practicable.
DAP	Dose area product.
MCU	Micturating cystourethrography.
TLD	Thermo luminescence dosimetry.
ESD	Entrance surface dose.
VUR	Vesicoureteric reflux.
CT	computed tomography.
Gy	Gray.
KV	kilo voltage.
mAs	Mili impairs second
mSv	Mili severt
Mev	Mega electron volt.
PM	Part per million
FFD	Film focus distance.
CF	Correction factor.
PMT	Photo multiplayer tube.
TTP	Time and temperature profile.
SPSS	Statistical package for social studies.
DRL	Diagnostic reference level .
ICRP	International Commission for Radiological Protection.

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