

STATUS OF MEDICAL IMAGING IN THE PROVINCE OF TSHOPO: NEED FOR TRAINING OF INTERMEDIARY STAFF AND EQUIPEMENT IN A COUNTRY WITH LIMITED RESOURCES

Abstract

Introduction: Medical imaging is a pivotal specialty, essential in the practice of modern medicine. By 2022, most African countries south of the Sahara already have modern medical imaging equipment and qualified medical personnel in this field. This is not the case in the eastern part of the Democratic Republic of Congo in general, and the Province of Tshopo in particular. The objective of this work was to make an inventory of imaging services in the main health facilities of the different health areas of the province of Tshopo.

Material and methods: This was a cross-sectional descriptive study conducted between June and August 2024 in the form of a survey of health zone heads and radiology practitioners in the main health institutions.

Results: With respect to the distribution of imaging personnel, the results are as follows: 1 radiologist, 3 senior technicians with degrees in radiology, 0 reference personnel in radiation protection and maintenance of radiological installations. In 23 health zones and their main health facilities, 5 X-ray machines, 13 ultrasound machines, 1 CT scan were recorded. Mammography machines, and magnetic resonance imaging (MRI) machines were not included in the imaging equipment.

Conclusion: In the province of Tshopo, medical imaging reflects shortcomings from every point of view. The provision of diversified imaging equipment and the training of dedicated medical and paramedical staff are imperative to guarantee quality care to the population of the Province of Tshopo.

Keywords: *Medical Imaging, Insufficient, Unqualified Staff, Tshopo, Democratic Republic of Congo*

1. Introduction

The German physicist Wilhelm Conrad Röntgen announces the discovery of the rays he names X in December 28, 1895. This date marks the beginning of the practice of radiology that then spread throughout the world (1).

Medical imaging is a pivotal specialty, essential in the practice of modern medicine (2). By 2022, most sub-Saharan African countries already had modern medical imaging equipment and qualified medical personnel in this field (3,4). This is not the case in the eastern part of the Democratic Republic of Congo in general, and the province of Tshopo in particular. No imaging studies have been carried out in this part of the country in terms of equipment and staff.

The objective of this work is to identify the medical imaging facilities available in the main health areas of the different health zones of the province of Tshopo and to study the profile of the imaging staff assigned to them.

2. Materials and methods

This was a cross-sectional descriptive study carried out between June and August 2024 in the form of a survey of the 23 heads of health zones in the Province of Tshopo and imaging practitioners from the main health facilities. The Province of Tshopo with an estimated population of 3,102,477 inhabitants over an area of 197,657 km² (5) is the result of the administrative dismemberment of the former Oriental Province whose sisters provinces are Ituri, Bas-Uélé and Haut-Uélé. The city of Kisangani is the capital of the Province of Tshopo.

Was retained in this study, all staff familiar with the practice of imaging in our context, means, doctors, technicians and nurses working in the main health institutions. Any health staff with no experience in this field were excluded.

Data collection was carried out through the use of two questionnaires:

1. Inventory of the various functional imaging equipment (standard radiography, ultrasound, mammography, scanner, MRI) completed by the leader doctors of those health areas.
2. Profile of personnel assigned to imaging services (age, gender, professional qualification, home institution); This form was delivered in person to the service providers to complete.

Data entry and coding was done using Office Word 2016 applications. During the collection of data, we respected ethical and deontological rules.

3. Results

Professional qualification of staff working in medical imaging departments and identification of equipment in the main health establishments in Tshopo Province

Table I distributed the staff and imaging equipment of the main health facilities in the 23 health zones of the province of Tshopo

N°	HEALTH AREA	Xray	Staff	US	Staff	CT Scan	Staff
1	BAFWAGBOGBO	0	0	0	0	0	0
2	BAFWASENDE	1	0	0	0	0	0
3	BANALIA	0	0	1	0	0	0
4	BASALI	0	0	0	0	0	0
5	BASOKO	0	0	0	0	0	0
6	BENGAMISA	0	0	1	0	0	0
7	ISANGI	0	0	0	0	0	0
8	KABONDO	1	0	1	0	0	0
9	LOWA	0	0	0	0	0	0
10	LUBUNGA	1	0	1	0	0	0
11	MAKISO= KIS	2	3	4	1	1	1
12	MANGOBO	0	0	1	0	0	0
13	OPALA	0	0	1	0	0	0
14	OPIENGE	0	0	0	0	0	0
15	TSHOPO	0	0	1	0	0	0
16	UBUNDU	0	0	1	0	0	0
17	WANIERUKULA	0	0	0	0	0	0
18	YABAONDO	0	0	0	0	0	0
19	YAHISULI	0	0	0	0	0	0
20	YAHUMA	0	0	0	0	0	0
21	YAKUSU	0	0	0	0	0	0
22	YALEKO	0	0	1	0	0	0
23	YALIMBONGO	0	0	0	0	0	0
TOTAL		5	3	13	1	1	1

Table I distributed the staff and imaging equipment of the main health facilities in the 23 health zones of the province of Tshopo. These staff were as follows: 1 radiologist, 3 graduate senior radiology technicians, 0 maintenance technicians. As for the equipment, 5 X-ray machines, 13 ultrasound machines were recorded, 1 CT Scan. Mammography machines and MRIs were not part of the facilities available.

4. Discussion

Like developing countries, the DRC in general and the Province of Tshopo in particular face serious problems of equipment and qualified personnel. Health, a vital sector, is not spared, especially with regard to medical imaging.

With an area of 197,657 km², 7 times larger than Rwanda, and 6 times larger than Belgium, Tshopo Province has only 5 X-ray machines, 13 ultrasound machines, 1 CT Scan and no mammography or MRI machines. It should be noted that these few working tools are handled by a staff consisting of 3 qualified radiology technicians (3 train in the handling of radiography machines and only one of them trained to use a CT Scan) and that the rest of the providers are represented by unqualified personnel.

The Province of Tshopo organizes a Faculty of Health Sciences in the city of Kisangani, capital of the said province. This faculty trains general practitioners and specialists (obstetrician, pediatrician, surgeon and internist). It was only in June 2024 that new departments were officially opened, including the department of radiology and medical imaging. In the same city, there is a Higher Institute of Medical Technique (ISTM) which opened a medical imaging section in 2023. The delay in opening of specific training schools for medical imaging at all levels explains this shortage of qualified staff within the Medical Imaging departments of the main health institutions in this province.

If medical specialists and medical imaging technicians are essential for the performance and interpretation of examinations (6), the availability of a maintenance technician is also in the same way. Indeed, maintaining the technical platform in a state of functionality ensures the durability of imaging examinations. The installation and maintenance of equipment are real challenges for developing countries (7).

A radiation protection referent within an imaging department is also essential. It contributes to the application of the principles of radiation protection, which is a regulatory obligation according to the International Atomic Energy Agency (8). Indeed, radiation protection aims to protect practitioners, patients and the environment from the harmful effects of ionizing radiation.

The contribution of medical imaging in modern medicine is considerable and extends from diagnosis, prevention, treatment monitoring, pharmacology and medical research in terms of understanding diseases (2).

Many Sub-Saharan African countries have made significant progress in modernizing and diversifying their technical platforms (3). They are certainly very expensive, but they can be a source of benefits. Indeed, an accurate and rapid diagnosis allows an appropriate and real-time orientation of patients in their care pathway, thus avoiding unnecessary medical procedures and hospitalizations. It will also make it possible to avoid medical evacuations, which are inappropriate, very expensive or too late. The current state of medical imaging in the Tshopo province of the DRC is very far from meeting the requirements of modern medicine.

Analog imaging is very restrictive. It requires chemical treatment for image development on analog film. The quality of the image depends on the quality of the baths.

Digital imaging has the advantage of being able to process and enhance the image before printing, thus eliminating film scrap (3,9). It would also allow the exchange of medical imaging data between institutions in order to establish a remote and rapid diagnosis without necessarily having to wait for the visit of a specialist doctor (10).

The unavailability of mammography is a handicap for a policy of systematic screening for breast cancer. This lack of means of exploration could be responsible for the late diagnosis of breast cancers (11), mammography being the only means of imaging that allows the diagnosis of precancerous lesions (12). Its effectiveness is proven and cost-effective is acceptable due to its high sensitivity and specificity (13). Ultrasound complements mammography and vice versa, without one replacing the other. It is for this reason that we speak today of the mammo-ultrasound couple.

The use of medical imaging tests such as CT and MRI is increasingly common during the management of patients in all areas. The scanner is a highly solicited examination to such an extent that the number of examinations carried out each year continues to increase (14), which explains the need for this technology in almost all African countries south of the Sahara (15-16-17). The unavailability of this technology (Ultrasound coupled to Doppler, Mammography and MRI) in the province of Tshopo has negative repercussions not only in terms of medical practice, but also in terms of medical training. Indeed, the quality of training of students and the vocation for medical imaging depend on it.

5. Conclusion

This study highlights the alarming weaknesses of the technical platform and the shortage of qualified personnel in medical imaging in the province of Tshopo. The coverage of imaging services in this province involves strengthening the stock of imaging equipment, the strengthening of facilitators of postgraduate imaging training courses in local universities and the organization of medical imaging technique sections and equipment maintenance sections in the higher institutes of medical techniques in Kisangani.

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