

Profile of Radiological Examinations in the Radiology and Medical Imaging Department of the Medical Clinic “KALALE” in Mali

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Abstract

Introduction: Radiology and medical imaging examinations bring together the means of acquiring and restoring images of the human body from different physical phenomena such as the absorption of X-rays, nuclear magnetic resonance, reflection of ultrasound waves or radioactivity, with which we sometimes associate optical imaging techniques such as endoscopy. The objective of our study was to study the profile of radiological examinations in the radiology and medical imaging department of the “KALALE” medical clinic. **Methodology:** This was a descriptive, prospective study that took place over a period of six (6) months in the radiology and medical imaging department of the “KALALE” medical clinic and the centers of health of communes III and IV of Bamako in Mali. Data collection was carried out on a survey form. The parameters studied were sociodemographic data, clinical data, radiological data. **Results:** We recorded 6030 radiology examinations of which 19% of the examination frequency cases came from the “KALALE” medical clinic and 81% of the cases were referrals from the reference health centers of communes III and IV. There were 1500 X-rays or 24.9% of cases including 54% cases of bone X-rays; 5% of cases of skull and face X-rays; 5% of cases of Intravenous Urography (IVU); 4% of cases of Hysterosalpingography (HSG); 3% of cases of Retrograde Uterocystography (UCR) and 1% of cases of X-ray of the Abdomen without preparation (ASP). We found 4530 ultrasounds or 75.1% of cases. **Conclusion:** Medical imaging has

become essential in the study of the human body and now constitutes an essential tool for the detection and treatment of most pathologies, from simple fractures to the most serious tumors.

Keywords

Profile, Radiological Examinations, KALALE Clinic, Mali

1. Introduction

Radiology and medical imaging examinations bring together the means of acquiring and restoring images of the human body from different physical phenomena such as the absorption of X-rays, nuclear magnetic resonance, the reflection of ultrasonic waves or radioactivity, with which we sometimes associate optical imaging techniques such as endoscopy [1]. Medical imaging continues to evolve and improve using innovative technologies that are increasingly precise and efficient. It is now possible not only to observe an organ, but also to see it function, thanks to still or animated images [1] [2]. Medical imaging is increasingly used for diagnosis, in addition to a clinical examination and other investigations, such as biological examinations or neuropsychological tests [1] [3]. Technological advances in recent years have given medical imaging a growing place in the diagnosis and treatment of pathologies. To be useful to patients, these radiological examinations must be relevant or justified otherwise, they will constitute a source of irradiation and unnecessary medical expenses. The justification for a medical imaging examination requires a good formulation of the clinical indication with the radiological examination requested [4]. A useful radiological examination is one whose positive or negative result will modify the patient's management. Currently, a significant number of imaging requests do not obey this rule [5]. The objective of our study was to study the profile of radiological examinations in the radiology and imaging department of the "Kalale" medical clinic, the Reference Health Centers and Community Health Associations in commune III and commune IV of Bamako.

2. Materials and Methods

This was a descriptive, prospective study lasting from December 1, 2021 to May 31, 2022, *i.e.* a duration of 6 months in the radiology and medical imaging department of the KALALE Medical clinic in commune III of district of Bamako in Mali. The study involved patients of both sexes and all ages who were referred to the imaging department for radiological examination. Data collection was carried out on a survey form and data entry and statistical analysis was carried out on Epi Info version 7. fr. The equipment used was a remote-controlled X-ray machine with SI LOGIQ prestige table and a VOLUSONS E8 ultrasound ma-

chine equipped with three multi-frequency probes. A scanner with a console for processing digital images. Radiographic, scanner and ultrasound examination techniques are carried out according to the department's protocols with respect for radiation protection standards. The images were read by the radiologists, specialist doctors, and departmental interns. The parameters studied were sociodemographic data, clinical data, radiological data. The difficulties encountered during the completion of this work were linked to the most frequent breakdowns of the devices and difficulties linked to the absence of an image archiving system and power outages.

3. Results

This was a descriptive, prospective study that took place in the Radiology and Medical Imaging department of the KALALE clinic and which extended from December 1, 2021 to May 31, 2022, *i.e.* a duration of 6 months. During this period, we recorded 6030 examinations including 1500 X-rays or 24.9% of cases, among which 52% of cases were bone x-rays (osteo-articular and spine) (**Figure 1**). 24% of cases were chest X-rays (**Figure 2**). 5% of cases were head and profile radiographs, 5% of cases were Intravenous X-rays (IVX), 4% of cases were hysterosalpingography (HSG), 3% of cases were retrograde cystography urography (UCR). And 1% of cases of abdominal radiography without preparation (ASP). Ultrasound examinations represented 4530 ultrasounds or 75.1% of cases (**Figure 3** and **Figure 4**).

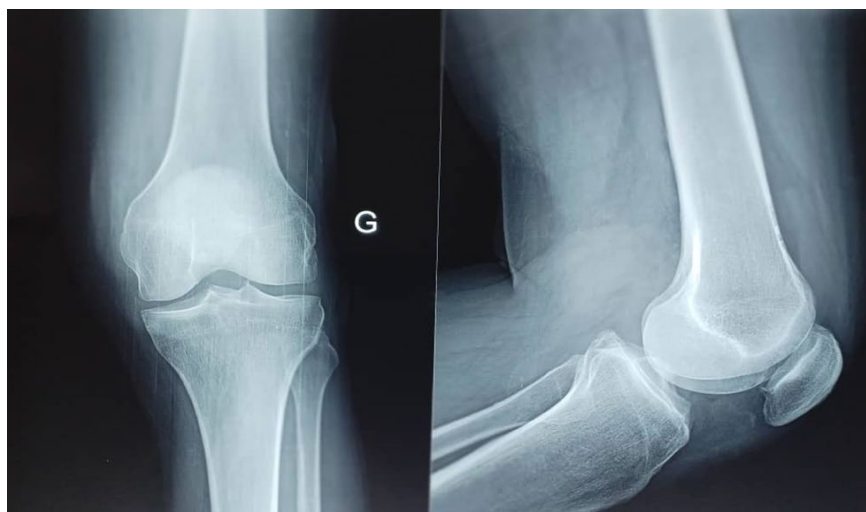


Figure 1. Standard x-ray of the left knee in profile.

Sociodemographic aspect: The patients were female in 57.7% of cases (or 3180 cases) and the mean age was 31.64 ± 13.28 years, with extremes ranging from 0 to 80 years. The age group from 31 to 45 years was the most represented with 44.8% of cases (or 2700 cases). The patients were housewives in 31.3% of cases (or 1890 cases) and they were married in 71.1% of cases (or 4290 cases) (**Table 1**).

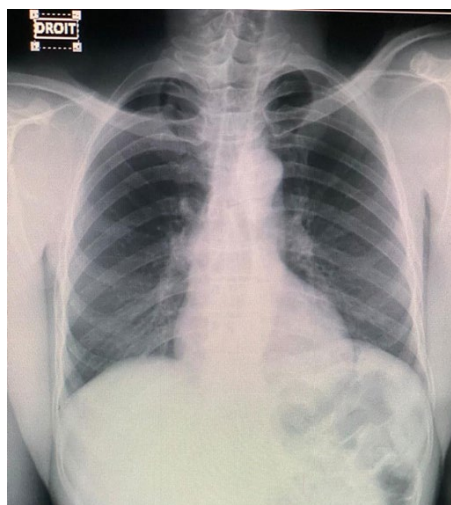


Figure 2. Front chest X-ray.

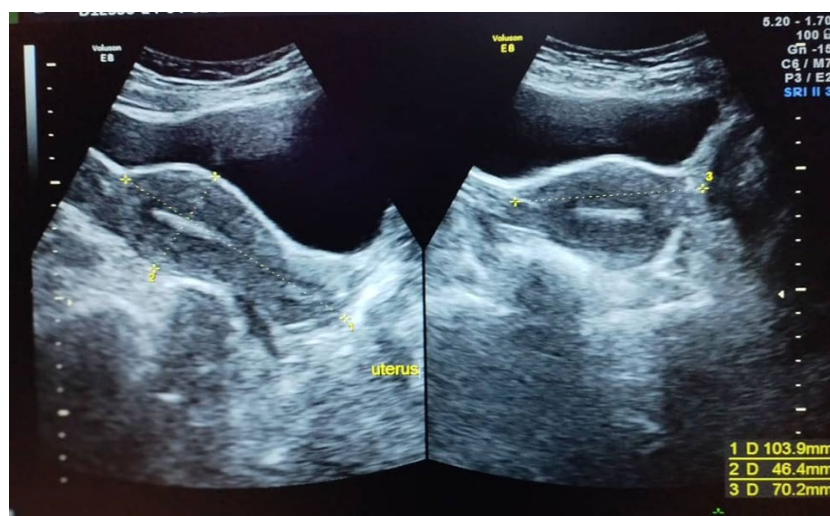


Figure 3. Pelvic ultrasound shows the uterus in the longitudinal and transverse sections.



Figure 4. Transfrontal ultrasound with color and pulsed Doppler.

Table 1. Distribution of patients according to sociodemographic profile.

Sociodemographic profile	Frequency	percentage
Sex		
Male	2975	42.3
Feminine	3180	57.7
Total	6030	100
Age		
0 - 15 years	510	8.8
16 - 30 years	2310	38.3
31 - 45 years	2700	44.8
46 - 60 years	270	4
Sup à 60ans	240	4
Total	6030	
Occupation		
Others	1590	26.4
Traders	600	10
Pupils/Students	1170	19.4
Housewife	1890	31.3
Military	780	12.9
Total		
Marital status		
Married	4290	71.1
Single	1740	28.9
Total	6030	100

Clinical aspect: In our study, 19% of the cases of radiological examinations came from our clinic and 81% of the cases were referred from other health centers in Commune III of the Bamako district [Figure 5].

In our series, the first level reference structures of the health pyramid were the community health associations of Dravela (ASACODRAB) in 12.3% of cases; from Tomkorobougou (ASACOTOM) in 11.7% of cases; of Hamdalaye (ASACOHAM) in 3.7% of cases; of Darsalam (ASACODAR) in 3.1% of cases; ASACOBACON in 1.8% of cases; from ASACODEs in 1.2% of cases; the guard camp in 8% of cases; the Camp1 Maternity in 3.1% of cases and the Mosque Medical office in 2.5% of cases. The second level structures which were the reference health centers of commune III in 29.5% of cases and OF Commune IV in 8.6% of cases. The structures at the third level of the health pyramid concerned by the summary examinations were the Point “G” University Health Center in 2.5% of cases and the Gabriel Toure University Health Center in 1.2% of cases.

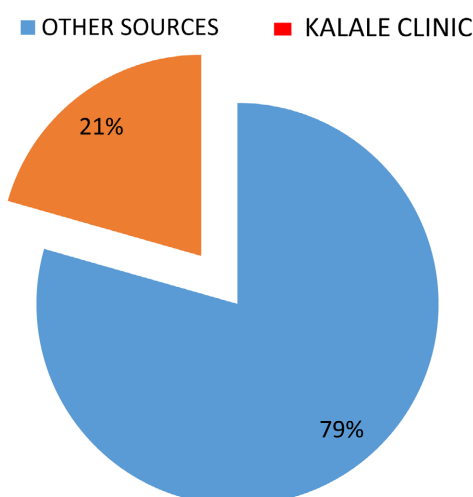


Figure 5. Distribution of radiological examinations according to place of origin.

Public road accidents were the clinical information most represented among the radiological examinations, *i.e.* 51.0% of cases, followed by cough in 14% of cases and among the ultrasound examinations, the Prenatal Assessment was predominant, *i.e.* 41.6% of cases. Cases followed by abdominal pain in 27.9% of cases.

Radiological aspect: Frontal and lateral thorax radiography was the most performed with 24.0% of cases in our study. Abdominal ultrasound and pelvic ultrasound were the most performed with 33.1% each in our series. Fracture of the nasal bones itself was the most common finding during radiographic examinations of the skull and face in 40.0% of cases followed by sinusitis in 20% of cases. Pneumonitis was found during chest X-rays in 56.0% of cases, followed by pleurisy and rib fractures in 8.7% and 8.5% of cases, respectively. Bone fractures were the most predominant, with 56.4% of cases followed by osteoarthritic lesions in 20% of cases among the osteoarticular radiographs taken. In specialized radiographic examinations with contrast product in our study: In IVU, lithiasis and hydronephrosis were the pathologies most found in 60.0% of cases. In UCR, urethral stenosis and vesicovaginal fistula were the most represented in 33.3% of cases. In HSG: hydro-salpinx was the dominant pathological finding in 25% of cases and tubular obstructions were in 50% of cases. Among the ultrasound examinations, gallbladder lithiasis, renal and bladder lithiasis were most often found. And obstetric ultrasound was the most performed in 55.4% of cases. For the time of production and interpretation in our series, most of the standard radiographic and ultrasound examinations were within 24 hours and the time limit of 72 hours was predominant for specialized radiography. Most of our examinations were carried out during the office, *i.e.* 5880 patients.

4. Discussion

During our study period, we recorded 6030 examinations, *i.e.* 24.9% of x-ray cases and 75.1% of ultrasound cases. This result was different from that of Fofana A. [2], who found 70.45% of cases from standard radiographic examina-

tions and 11.70% of cases from ultrasound examinations. This result could be explained by the predominance of the female sex and the predominance of prenatal assessment as a reason for examination in our study.

Sociodemographic aspect: In our study, the age group of 31 to 45 years was the most represented, *i.e.* 44.8% of cases. This result was similar to that of Traoré B. [3] who found 42.27% of cases between 16 - 35 years old. This could be explained by the fact that the age group from 16 to 50 is more active in our society. The female gender was predominant with 57.7% of cases. LK AGODA-KOUSSEMA *et al.* [6] in Lomé, found 71.15% of female gender differs from ours. This result could be explained by the predominance of ultrasound in our study, which was used by women of childbearing age as part of the pregnancy assessment. Housewives were the majority, *i.e.* 31.3% of cases. Doumbia F [7] and Kalilou BA [8] found respectively 16% of cases and 23.18% of cases in our study. This result, which is different from ours, can be explained by the predominance of women in our study.

Clinical aspect: More than half of our standard radiographic examinations were sent for trauma indications, *i.e.* 55.0% of cases. Kalilou BA at Niamankoro FOMBA Hospital in Ségou found 48.32% of standard radiographic examinations sent with trauma indications [8]. This result was similar to ours and can be explained by the fact that our society records a large number of traumas and especially in the unsafe school environment of the country. The prenatal assessment predominated, with 41.6% of cases being clinical information in ultrasound examinations. This result was higher than that of Fofana A. [2] who found 30.43% of ultrasound examinations sent with gynecological signs which can be explained by the sampling and the study framework.

Radiological appearance: Bone fractures predominated with 56.4% of cases in osteoarticular radiography examinations. This result was similar to that of Fofana A. [2] who found 45.36% of fracture cases in osteoarticular radiography examinations. On chest radiography, pneumonia was the most represented, *i.e.* 56.0% of cases. Traore B. [3] in Luxembourg reported 30.38% of cases of pneumonia, slightly different from our study. The normal result was the majority in specialized radiographic examinations. The examinations were interpreted in accordance with department protocol. Almost all of the examinations, *i.e.* 93.2% of the standard radiographic examinations, were returned on the same day and 6.8% of the cases were returned 42 hours after the examination. This result was similar to that of Camara M *et al.* [9] who found 82.68% of standard radiographic examinations performed on the same day. The time taken to carry out and interpret the examination within 72 hours predominated exclusively at the level of specialized examinations with contrast because these examinations were generally carried out outside of any emergency. All of our ultrasound exams were returned on the same day. This result was similar to that of Traore B [3], in whom the ultrasound examinations were performed the same day, 5 to 10 minutes after the examination was performed. The majority of examinations were carried out during duty, *i.e.* 81.8% of cases for standard radiography and

100.0% of cases for specialized radiography and ultrasound. These findings were similar to those of Fofana A. [2] in whom the majority of examinations had been carried out during duty with 60.46% of cases for standard radiographic examinations, and 74.73% of cases for ultrasound and exclusively for specialized examinations with contrast. These results can be explained by the fact that care is not ensured for the performance of non-urgent imaging examinations, especially those using the contrast product.

5. Conclusion

Medical imaging has become essential in the study of the human body and now constitutes an essential tool for the detection and treatment of most pathologies, from simple fractures to the most serious tumors. Our study allowed us to collect radiological examinations including ultrasound and x-rays. Specialized examinations with contrast and ultrasounds were the most performed in women because they play an important role in the assessment of urogenital examinations. The standard radiographic examination was most often performed for osteoarticular reasons and the fracture was the most frequently found in the results.

Ethical and Professional Conditions

The study involved patients who gave their informed consent to participate in the study.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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