

INVESTIGATION RADIOLOGY



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1. INTRODUCTION

There are several reasons why doctors request patients to undergo various types of X-rays. X-rays are often part of a routine check-up to look for changes in the patient's health. They also help doctors establish a medical diagnosis, plan or assess treatments, and monitor diseases. Based on radiological imaging, decisions are made regarding the prescription of therapy or necessary interventions. The reasons for referring patients for X-ray procedures are diverse:

- Patients' self-requests and insistence on having X-rays due to fear of potential illnesses;
- A high number of patients during medical visits;
- Referrals from other healthcare providers in secondary and tertiary public and private sectors;
- Doctors may lack sufficient knowledge about the costs of X-rays, specifically the cost of the films used.
- The lack of protocols and guidelines for the criteria of referrals for radiological examinations.

Should we respond to why doctors refer so many patients for X-rays, overloading the radiology service and equipment, causing chaos in the X-ray department, wasting films and reagents unnecessarily? The accumulation of patients in a small space increases the risk of transmission and spread of infections, a situation particularly relevant in the context of the ongoing COVID-19 pandemic.

Unnecessary exposure of patients to X-rays without indications increases the risk of damage to healthy cells or tissues.

The noticeable discrepancy between pathological or positive X-ray results and the total number of patients examined in the radiology service has prompted the Audit team to evaluate the appropriateness of patient referrals for examination in the radiology department. This assessment aims to create a baseline overview of the referral rates, which will be discussed with doctors and serve as a comparative measure for future re-audits.

2. PURPOSE

- To assess the extent of the overload on the

Table 1 - Tabular overview of x-ray graphs

Description	No.	%
Total number of radiographs	904	100.0%
Number of graphs with normal values	836	92.5
The number of graphs with pathological values	68	7.5%

radiology service due to requests for radiological examinations and to evaluate the results of the requested X-rays by comparing them to the total number of patients referred for radiological investigation.

3. OBJECTIVES

- Determining the extent of requests for radiographic imaging that confirm the guiding diagnosis and result in positive (pathological) findings.

- Creating a baseline overview of findings, the results of which will serve as a comparative value for future audits and will contribute to the improvement of the quality of radiological diagnostic services.

4. CRITERION

25% of patients referred for X-rays have pathological findings¹

5. STANDARD

Up to 20% of the radiological examinations requested by doctors in primary healthcare are positive, meaning pathological.

6. MATERIAL

The collection of material and data was conducted prospectively for the quarter of April, May, and June 2022. The material was gathered from the patient protocol of those who underwent radiological examinations in the Radiology Sector of the Family Medicine Center in Lipjan.

7. METHODOLOGY

For this audit, data was prospectively utilized over a three-month period from April 1, 2022, to June 30, 2022, with the information sourced from the register of the Radiology Sector of the Family Medicine Center and the referral forms from doctors.

8. OVERALL RESULT

The total number of patients referred for X-rays during the three-month period of April, May, and June was 904.

From Table No. 1, it can be seen that for the period of April to June 2022 in the diagnostics sector, specifically in Radiology for radiological

examinations, a total of 904 patients were referred for X-rays. Out of the total of 904 X-rays performed, only 68 (7.5%) resulted in positive or pathological findings, while 836 X-rays (92.5%) were normal or without pathological findings. A graphical representation of these findings is presented in Chart No. 1.

Table No. 2 presents the audit findings for X-rays performed during the three-month period of April to June 2022, along with a summary of pathological findings for each type of X-ray. Analysis of the data shows significant variations in the pathological rates among the different types of X-rays performed. The lowest rate of pathological findings is observed in hand X-rays, with only 2% (1 pathological finding out of a total of 60 X-rays requested), while the highest rate of pathological findings, at 15%, is noted in X-rays requested for neck rings, T/C joints, and R/C joints.

From Chart No. 2, it can be seen that the largest number of X-rays performed during the three-month period of April to June 2022 pertains to lung X-rays, which account for nearly one-third of the requested X-rays. Specifically, out of 339 requested lung X-rays, only 14 resulted in positive or pathological findings, while 325 were normal.

Among the other X-rays performed, those of the musculoskeletal system constitute the majority, while the fewest were performed for the paranasal sinuses, with a total of 39 X-rays, of which 5 were pathological and 34 were normal. X-rays of the urinary tract were also minimal, totaling 18, with only 1 pathological finding and 17 normal results.

From Chart No. 3, expressed as a percentage, the highest rate of X-rays that resulted in positive or pathological findings is observed in cervical vertebra X-rays, T/C and R/C joint X-rays at 15%, followed by paranasal sinus and knee joint X-rays at 13%, and elbow joint X-rays at 11%. Meanwhile, the pathological findings for all other types of X-rays are below 10%.

9. DISCUSSION OF THE RESULTS

Analysis of the performed X-rays indicates a high rate of referrals for radiological examinations of the musculoskeletal system, accounting for nearly two-thirds of all X-rays performed. This aligns with the large number of patients presenting with musculoskeletal complaints, although the results of the X-rays for this system do not exceed 15% for pathological findings (cervical vertebra X-rays, T/C, and R/C joint X-rays).

Despite the fact that many patients' complaints are related to the musculoskeletal system in daily practice, the X-rays conducted in these cases primarily serve a diagnostic purpose and do not provide therapeutic benefits. Therefore, it is essential to work more on health education and raising awareness among patients who insist on undergoing X-rays related to this system. They should be informed that unnecessary exposure to X-rays increases the risk of damage to healthy cells or tissues and does not yield therapeutic advantages.

X-rays of the lungs were requested in 339 cases over the three-month period, which accounts for nearly one-third of the requested X-rays, while the pathological findings do not exceed 4% of those referred.

The overall average of pathological findings over the three months does not exceed 7.5% of the X-rays requested by doctors, thereby validating and justifying the Audit team's assumption of a high rate of referrals for X-rays that result in no positive or pathological findings.

The results of the audit support the conducted investigation and highlight the need for initiating a collegial review regarding the appropriateness of requests for radiological examinations!

10. CONCLUSIONE

The overall rate of pathological results for 13 types of X-rays requested during the three-month period of April to June 2022, as evaluated by this audit, is only 7.5%. This means that out of 904 patients who underwent radiological examinations, only 68 (7.5%) resulted in pathological findings, while 836 (92.5%) were normal.

The results derived from the audit indicate that the predetermined standard set by the audit team, which aimed for up to 20% of radiological examinations to yield positive or pathological results, has not been met.

Based on the analyzed data, we conclude that a significant percentage of requested X-rays were performed routinely, without a comprehensive medical history taken prior to the decision to refer for X-rays. The results show that most requested X-rays are unnecessary and do not contribute to improving the quality of healthcare services; rather, they incur high costs for the institution. Additionally, frequent exposure to X-rays increases the risk of damage to healthy cells or tissues and does not provide therapeutic benefits, a fact that should also be communicated to patients who insist on such examinations.

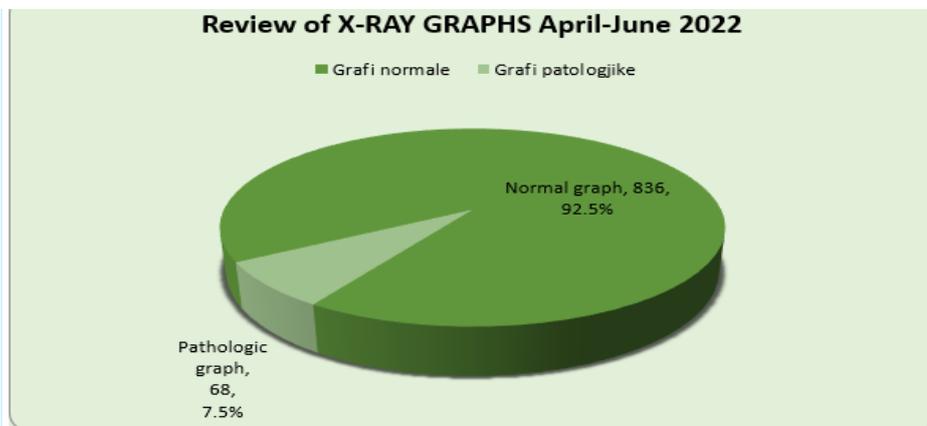


Chart 1 - Graphical representation of X-ray results between normal and pathological findings.

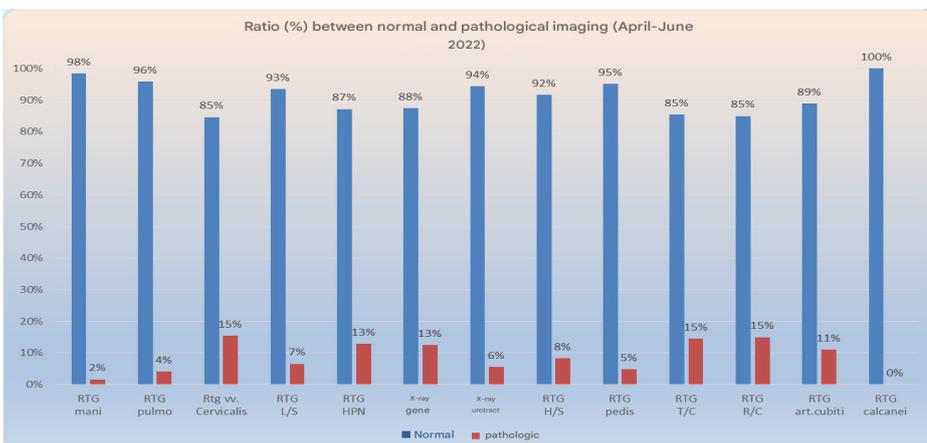


Chart 2 - Numerical ratio between normal and pathological X-rays (April-June 2022).

11. PROPOSED MEASURES

1. Presentation and Discussion of Audit Results: The findings from the audit should be presented and discussed with all physicians at the Family Medicine Center (QKMF) and in the field, in the form of a collegial review.

2. Use of Health Records: During medical consultations/visits, health records and results from X-rays should be used chronologically. After each consultation, findings should be documented in the patient's health record.

3. Avoid Frequent X-rays: Avoid repeating X-rays within short time intervals for radiological parameters that have been within normal limits, especially for chronic conditions of the musculoskeletal system.

4. Thorough Patient Examination: Before prescribing X-rays or referring patients for radiological examinations, physicians should conduct a more thorough examination and gather comprehensive medical history. This will enable them to make informed decisions regarding referrals rather than relying solely on patient requests or desires, particularly when X-rays are repeated in short intervals, even when previous results were normal.

5. Use of Clinical Guidelines: Implement clinical guidelines for family medicine to standardize referral practice

6. Patient Education: Work more with patients to educate them that it is the physician who decides on the need for X-rays based on the clinical assessment of

their condition.

7. Informed Consent for Persistent Requests: For patients who insist on X-rays, provide explanations regarding the potential harm of exposure to X-rays. Involve patients in the decision-making process after offering information about the risks associated with unnecessary radiation.

8. Justification for Referrals: When referring for X-rays, request additional parameters or examinations that align with and justify the guiding diagnosis.

9. Cost Consideration: Take into account the cost of performing X-rays, especially if they are repeated within short and unjustifiable time intervals

Table 2 - Tabular overview of graphs made by type and month

The type of Imagery RTG	April 2022		May 2022		June 2022		TOTAL	April-June 2022			
	Normal	pathologic	Normal	pathologic	Normal	pathologic		Normal		pathologic	
								No.	%	No.	%
RTG mani	16	1	21	0	23	0	61	60	98%	1	2%
RTG pulmo	102	4	110	8	113	2	339	325	96%	14	4%
Rtg vv. Cervicalis	8	1	27	8	42	5	91	77	85%	14	15%
RTG L/S	12	0	5	2	54	3	76	71	93%	5	7%
RTG HPN	7	1	18	2	9	2	39	34	87%	5	13%
RTG Genie	19	3	20	5	31	2	80	70	88%	10	13%
X-ray urotract	4	1	5	0	8	0	18	17	94%	1	6%
RTG H/S	7	1	17	2	9	0	36	33	92%	3	8%
RTG pedis	9	1	30	3	40	0	83	79	95%	4	5%
RTG T/C	11	2	10	5	20	0	48	41	85%	7	15%
RTG R/C	2	1	9	2	6	0	20	17	85%	3	15%
RTG art. cubiti	1	0	4	1	3	0	9	8	89%	1	11%
RTG calcanei	0	0	2	0	2	0	4	4	100%	0	0%
in total	198	16	278	38	360	14	904	836	92.5%	68	7.5%

Referencat:

1. Graham Cherryman; " Imaging in primary care", British Journal of General Practice 2006; 56 (529): 563-564. Accessed: June 2022 , <https://bjgp.org/content/56/529/563>

2. Referral guidelines for imaging, In conjunction with the UK Royal College of Radiologists, European Commission Directorate-General for the Environment 2000 Accessed: June 2022, https://deputyprimeminister.gov.mt/en/forms/Documents/radiation_protection.pdf

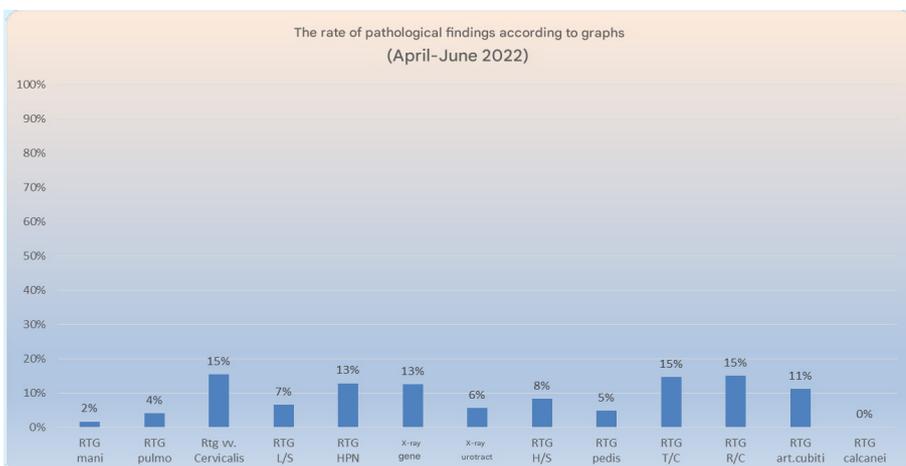


Chart 3 - Rate of pathological findings by type of X-ray performed.