

# Incidental Finding during Lumbar Spine Magnetic Resonance Imaging in a Tertiary Hospital

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## ABSTRACT

**Introduction:** Lumbar spine Magnetic Resonance Imaging not only evaluates vertebral and neural structures but also visualizes abdominal and pelvic organs, often revealing incidental findings. These can range from benign cysts to clinically significant lesions. Reported prevalence varies internationally, but systematic data from Nepal are lacking. The aim is to determine the prevalence of detected incidental extraspinal finding on lumbar spine Magnetic Resonance Imaging at a tertiary hospital.

**Methods:** A descriptive Cross-sectional study was conducted at the Department of Radiology and Imaging between April and June 2025. A total of 261 adults undergoing lumbar spine magnetic resonance imaging were included. Imaging was performed on a Philips Achieva 1.5 T scanner and interpreted by consultant radiologists. Incidental Findings were classified as intraspinal and/or extraspinal. Data was entered and analyzed using IBM SPSS Statistics version 26. Point estimate and 90% Confidence Interval were calculated.

**Results:** Among the total 261 patients, incidental findings were observed in 167 (64.0%) (58.2% to 69.8% at 95% Confidence Interval) patients, with extraspinal abnormalities in 54 (20.70%).

**Conclusions:** Incidental findings are common on lumbar spine MRI with extraspinal abnormalities. This prevalence is higher than that reported in comparable tertiary hospital studies. Structured reporting of extraspinal structures is recommended to improve detection of clinically significant lesions and avoid unnecessary follow-up.

**Keywords:** *extraspinal; incidental; prevalence.*

## INTRODUCTION

Magnetic resonance imaging (MRI) of the lumbar spine is widely used to evaluate low back pain, radiculopathy, and degenerative disc disease. Its superior soft tissue contrast and wide field of view permit detailed visualization of spinal elements while also encompassing abdominal and pelvic organs, frequently leading to incidental findings (IFs) unrelated to the clinical indication.<sup>1</sup> These range from benign entities such as renal or hepatic cysts to potentially serious lesions including renal carcinoma or abdominal aortic aneurysm.<sup>2-4</sup> Reported prevalence of extraspinal IFs on lumbar MRI varies internationally, from 10% to 20%.<sup>2,3</sup>

Although many Incidental Findings (IFs) are insignificant, some require timely follow-up or intervention<sup>4-6</sup>.

Radiologists face the challenge of distinguishing clinically important lesions from trivial abnormalities, since unnecessary follow-up increases costs and patient anxiety.<sup>7,8</sup> Professional guidelines, such as those from the American College of Radiology, recommend risk-based management of Incidental Findings (IFs).<sup>6-10</sup> However, in Nepal, region-specific data are scarce, raising concern for underreporting or over-investigation. This study aimed to determine the prevalence of incidental extraspinal findings on lumbar spine MRI at a tertiary hospital in Nepal.

## METHODS

This was a descriptive cross-sectional study conducted at the Department of Radiology and Imaging, Bir Hospital, a

tertiary care teaching hospital in Kathmandu, Nepal. The study was carried out over a three-month period April 2025-June 2025 and included adult patients referred for lumbar spine MRI. Ethical approval for this study was obtained from the Institutional Review Board (IRB) of NAMS, Bir Hospital. All participants were informed about the purpose of the study, and written informed consent was obtained prior to inclusion. Patient confidentiality was strictly maintained by anonymizing all data, and imaging records were used solely for research purposes.

The sample size was calculated using formula:

$$n = Z^2 \times p \times q / e^2$$

$$= 1.962 \times 0.5 \times 0.5 / 0.072$$

$$= 196$$

Where,

n= required sample size

Z= 1.96 at 95% Confidence Interval

p= prevalence taken as 50% for maximum sample size

e= margin of error 7%

The calculated sample size was 196 patients. However, 261 samples were taken for the study.

A convenience sampling method was employed. The study population consisted of adult patients ( $\geq 18$  years) referred for lumbar spine MRI during the study period.

Patients with age  $\geq 18$  years, referral for lumbar spine MRI, provided written informed consent were included in the study. The patients with prior lumbar spine surgery or radiotherapy, congenital spinal anomalies, diagnosed scoliosis or spondylolisthesis, known spinal or extraspinal malignancies were excluded from the study. All MRI examinations were performed on a Philips Achieva 1.5 Tesla system, using the department's standard lumbar spine protocol. Images were reviewed by consultant radiologist, and both clinical and imaging details were recorded in a structured proforma. Data were entered into Microsoft Excel and analyzed in SPSS version 25.

For consistency, the following definitions were applied:

**Incidental Findings (IFs):** Unexpected abnormalities detected on MRI that were unrelated to the clinical indication, such as renal cysts or uterine fibroids.<sup>1</sup>

**Clinically Significant Findings:** Incidental abnormalities with potential health implications requiring follow-up imaging, diagnostic testing, or clinical intervention.<sup>5</sup>

**Extraspinal Findings:** Pathologies located outside the vertebral column, commonly involving abdominal or pelvic organs, but visible within the lumbar MRI field of view.<sup>2</sup>

## RESULTS

Among the total 261 patients, incidental findings were observed in 167 (64.0%) (58.2% to 69.8% at 95% Confidence Interval). Among them, extraspinal incidental findings were observed in 54 (20.7%) patients. The mean age of the patient was  $47.37 \pm 13.05$  years (range: 18–79 years), with 163 (62.5%) females and 98 (37.5%) males.

The most common extraspinal findings included ovarian cysts (7.3%), renal cysts (5.0%), and hepatic cysts (3.8%). Among intraspinal findings, Modic changes (25.3%), vertebral hemangiomas (18.8%), and Schmorl's nodes (9.2%) were most frequent. A small proportion of findings were potentially clinically significant, warranting further evaluation.

Incidental findings were identified in 167 out of 261 patients (63.98%). These were categorized as:

- Intraspinal findings: 135 cases (51.70%)
- Extraspinal findings: 54 cases (20.70%)
- Both types concurrently: 11 cases (4.20 %)

**Table 1. Distribution of extraspinal incidental findings detected on lumbar spine MRI (n = 261).**

Finding	n (%)
Ovarian cyst	20 (7.66)
Renal cyst	9 (3.45)
Hepatic cyst	8 (3.07)
Ovarian cyst; Endometrioma	5 (1.92)
Uterine fibroid	9 (3.45)
Ovarian cyst; Nabothian cyst	2 (0.77)
Hepatic cyst (single)	1 (0.38)

**Table 2a. Prevalence of incidental findings by age group**

Age group (years)	Total Patients	IF present n (%)
18–30	22	13 (59.09)
31–45	109	59 (54.13)
46–60	70	47 (67.14)
61–75	55	43 (78.18)
≥76	5	5 (100.0)

Percentages denote the proportion within each age bin with at least one incidental finding.

**Table 2b. Prevalence of incidental findings by sex**

Sex	Total Patients	IF present n (%)
Female	182	120 (65.93)
Male	79	47 (59.49)

## DISCUSSION

The major finding of this study was that incidental findings (IFs) were highly prevalent on lumbar spine MRI, affecting 64.00% of patients, with extraspinal abnormalities detected in 20.70%. This indicates that nearly two-thirds of patients undergoing lumbar spine MRI harbored incidental lesions, and one in five had extraspinal abnormalities of potential clinical importance.

This high prevalence highlights the need for radiologists to systematically evaluate extraspinal regions during routine MRI interpretation. Ovarian cysts, renal cysts, hepatic cysts, and uterine fibroids accounted for the majority of extraspinal lesions, while Modic changes and vertebral hemangiomas were the most common intraspinal abnormalities. Although most lesions were benign, a subset carried potential clinical significance, reinforcing the importance of accurate recognition and structured reporting.

Our extraspinal prevalence (20.70%) was somewhat higher than previously reported by Quattrocchi (12.50%), Tuncel (14.30%), and Khasawneh (18.50%).<sup>2,3,12</sup> These differences may be explained by demographic variations (greater proportion of females in our cohort, slightly older mean age), referral bias at a tertiary care hospital, and methodological differences, including stricter scrutiny of extraspinal regions in our protocol. Despite these variations, the

predominance of benign cystic lesions across all studies suggests consistency in the overall spectrum of IFs.<sup>2,3,12</sup>

The significant rise in IF prevalence with age observed in our study mirrors prior work, supporting the role of aging as a key determinant of incidental lesions.<sup>2,12</sup> In contrast, no significant difference by sex was found, indicating that incidental findings are more strongly associated with age-related changes than with biological sex.

From a clinical perspective, these results carry important implications. While most incidental findings were clinically insignificant, certain lesions—including suspicious renal or adnexal masses and vascular abnormalities—require further evaluation. Failure to recognize these could delay diagnosis of life-threatening conditions, while indiscriminate follow-up of trivial findings risks unnecessary cost and anxiety.<sup>4,6,7,8</sup> Structured, guideline-based reporting pathways, such as those recommended by the American College of Radiology,<sup>6–10</sup> provide a balanced approach to management.

This study was single-center, used purposive sampling, and had a short duration, which may limit generalizability. The lack of follow-up imaging or histopathology prevented definitive lesion characterization. Furthermore, use of a single 1.5-T scanner and one reporting radiologist may introduce bias. Incidental findings are common on lumbar spine MRI, particularly with advancing age. Incorporating structured, guideline-based evaluation of extraspinal structures into routine practice is essential to ensure that clinically significant disease is not missed while avoiding unnecessary investigations.

## CONCLUSIONS

Incidental findings were highly prevalent on lumbar spine MRI. Their occurrence increased with advancing age but showed no significant difference between sexes. The most common extraspinal lesions were ovarian, renal, and hepatic cysts, while modic changes and vertebral hemangiomas were the predominant intraspinal findings. These results highlight the need for routine evaluation of extraspinal structures and standardized, guideline-based follow-up protocols to ensure early detection of clinically significant abnormalities while avoiding unnecessary investigations and patient anxiety.

**Conflict of Interest:** None.

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