AJNR

Prevalence of Incidental Extraspinal Findings on MR Imaging of the Lumbar Spine in Adults: A Systematic Review and Meta-analysis

Philip J. Broadhurst, Eileen Gibbons, Amy E. Knowles and Joe E. Copson

AJNR Am J Neuroradiol 2024, 45 (1) 113-118
doi: https://doi.org/10.3174/ajnr.A8065
http://www.ajnr.org/content/45/1/113

Prevalence of Incidental Extraspinal Findings on MR Imaging of the Lumbar Spine in Adults: A Systematic Review and Meta-analysis

Philip J. Broadhurst, Eileen Gibbons, Amy E. Knowles, and Joe E. Copson

ABSTRACT

BACKGROUND: Low back pain is common worldwide. MR imaging may identify extraspinal findings that are not related to the proposed clinical question. The prevalence of extraspinal incidental findings and their clinical significance has not been well-established.

PURPOSE: This review aimed to evaluate the prevalence of extraspinal findings on MR imaging of the lumbar spine in adults and the prevalence of clinically significant incidental findings.

DATA SOURCES: A systematic search of MEDLINE and EMBASE was performed, including studies published before June 14, 2023.

STUDY SELECTION: Studies presenting a prevalence of extraspinal findings in patients 16 years of age or older were included.

DATA ANALYSIS: A random effects meta-analysis was used to generate composite prevalence measures of extraspinal findings, patients with extraspinal findings, and clinically significant findings.

DATA SYNTHESIS: Sixteen studies were included in this meta-analysis, with a total of 19,593 patients and 6,006 extraspinal incidental findings. The overall prevalence of extraspinal findings was 19.9% (95% CI, 11.1%–30.7%). Overall, 26.7% of patients had an extraspinal finding identified (95% CI, 14.8%–40.6%). The most common subgroup of extraspinal findings was genitourinary findings in males (27.1%; 95% CI, 25.6%–28.8%). Data from 8 studies demonstrated the prevalence of clinically significant findings at 5.4% (95% CI, 3.2%–8.1%).

LIMITATIONS: Retrospective populations with small numbers of participants in clinically relevant subgroups may result in heterogeneity and imprecision within composite outcome measures.

CONCLUSIONS: Extraspinal findings are common, detected in more than one-quarter of patients. Five percent of findings are clinically significant and may require further action.

ABBREVIATIONS: C-RADS = CT Colonography Reporting and Data System; ESIF = extraspinal incidental finding; LBP = low back pain

Low back pain (LBP) is a commonly reported symptom globally and, owing to an ever-growing and aging population, prevalence is rapidly increasing. The lifetime prevalence of LBP internationally is approximately 80%–85% and accounts for 7.4% of global years lived with disability, the highest of any disease.[1,2] MR imaging of the lumbosacral spine is the recommended technique for investigation of LBP.

Received June 26, 2023; accepted after revision October 18.

From the Department of Radiology (P.J.B.), Wythenshawe Hospital, Manchester, UK; Department of Medicine (E.G.), Salford Royal Hospital, Manchester, UK; Barts Health London National Health Service Trust (A.E.K.), London, UK; and University of East Anglia (J.E.C.), Norwich, UK.

Please address correspondence to Philip J. Broadhurst, MBChB (Hons), Department of Radiology, Wythenshawe Hospital, Southmoor Rd, Manchester, United Kingdom, M23 9LT; e-mail: pbroadhurst@doctors.org.uk

Indicates article with online supplemental data.
http://dx.doi.org/10.3174/ajnr.A8065

Although most causes of LBP will represent neuromusculoskeletal pathologies, other findings may be identified on imaging. Extraspinal incidental findings (ESIFs) on MR imaging of the lumbar spine are those detected on a study which does not relate to the clinical question of LBP. ESIFs detected on lumbar spine imaging will commonly be found within the abdomen or pelvis, relating to the gastrointestinal, genitourinary, and gynecologic systems. The detection of these findings will vary depending on the imaging protocols, namely, FOV sampled, the use of saturation banding, and imaging sequences acquired. With the development of modern imaging software and improvement of imaging techniques and quality, diagnostic opportunity has increased.[3] Subsequently, it follows that with more MR imaging examinations being performed, more ESIFs will be identified. ESIFs pose a challenge for clinicians. Some of these findings may allow earlier diagnosis and treatment of a significant pathology. However, some findings may not be of clinical significance or remain indeterminate. Insignificant incidental findings may lead to unnecessary follow-up diagnostic tests. Patients may be exposed to unnecessary procedures that may have inherent risks, in addition to the psychological impact of diagnostic uncertainty in the interim period. Insignificant incidental findings may culminate in an unnecessarily increased burden on global health systems.

This systematic review aimed to determine the prevalence of ESIFs in adults who underwent MR imaging of the lumbar spine. The prespecified secondary outcomes of this review were to determine the prevalence of clinically significant ESIFs and the prevalence of ESIFs stratified by age, sex, and body region.

MATERIALS AND METHODS

The protocol for this systematic review and meta-analysis was published on the PROSPERO database (CRD42023430740). The review has been reported in accordance with published Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[4]

Search Strategy

Published articles and abstracts were identified following comprehensive searches of the MEDLINE and EMBASE databases using the Ovid platform. The search strategy (Online Supplemental Data) used the following search terms (and related synonyms): "spine," "MR imaging," "incidental," and "extraspinal." No date restrictions were applied. Search results were updated to include studies published before June 14, 2023.

Studies were considered eligible for inclusion in the systematic review if they satisfied the following criteria: 1) patients 16 years of age or older, 2) patients referred for lumbar spine MR imaging with LBP, and 3) studies reporting a prevalence of ESIFs. Studies were considered ineligible if prevalence data could not be extracted, the patients were derived from disease cohorts, or the article was published in a language other than English. Two reviewers (P.J.B. and J.E.C.) independently screened abstracts and identified full-text articles for review. All reference and citation lists of included full-text articles were interrogated using Google Scholar to identify further potential records. In the event of any discrepancies, these were resolved through consensus agreement between reviewers.

Data Extraction

Three reviewers (P.J.B., E.G., and A.E.K.) independently extracted data from each included study. Study characteristics extracted included the following: 1) study design, 2) study population, 3) setting, 4) geographic location, 5) recruitment period, 6) sample size, 7) imaging protocol, 8) exclusion criteria, 9) interpretation definition, 10) extraspinal finding definition, 11) clinically significant finding definition, 12) number of patients with extraspinal findings, 13) number of extraspinal findings, 14) number of clinically significant findings, and 15) number of patients who underwent imaging follow-up. The number of extraspinal findings was stratified by body systems, when outlined by the original study. Participant characteristics extracted included sex, age, and ethnicity.

Quality Assessment

Two reviewers (P.J.B. and J.E.C.) independently performed a risk of bias assessment of all included studies using a modified risk of bias assessment tool designed for prevalence studies (Online Supplemental Data).[5] Studies were scored across 9 domains with a total score of 9. Studies with a low risk of bias had a score of 0–3; moderate risk, 4–6; and high risk, 7–9. Discrepancies between reviewers were resolved through consensus discussion.

Statistical Analysis

The primary outcome was a composite of the prevalence of extraspinal findings identified on MR imaging of the lumbar spine. Secondary outcomes included the percentage of patients with extraspinal findings, extraspinal findings within each body system, and the number of clinically significant findings identified. Statistical analyses were performed using STATA, Version 17.0 (StataCorp). The STATA program metaprop was used to perform a random effects meta-analysis of proportions extracted from each study.[6] The random effects model was used on the basis of the assumption of heterogeneity among studies. The Freeman-Tukey double arcsine transformation was used to stabilize the variances of the reported proportions, with confidence intervals calculated using the Wald method. Univariate and multivariable (sex- or age-adjusted) meta-regression was performed to explore the effects of participant characteristic on the prevalence of extraspinal findings. Heterogeneity across studies was estimated using the I^2 statistic. I^2 values of >75% suggested substantial heterogeneity. Publication bias and small study effects were evaluated through visual inspection of the Doi plot and Egger test.[7]

RESULTS

Following the database search, 782 articles were identified and screened for eligibility. Of these, 26 full-text articles were assessed for inclusion, and 6 studies were selected.[8-13] Twenty studies were excluded, on the basis of data presented being insufficient to meet the aims of the review ($n = 16$), patients included derived from a known disease cohort ($n = 2$), and the study population not including imaging of the lumbar spine ($n = 1$). One study was excluded because it was not published in English. Following a search of reference and citation lists, 16 full-text articles were screened for eligibility and 10 of these were selected for inclusion.[14-23] In total, 16 studies were included in this review (Online Supplemental Data).[8-23]

Study Characteristics

The characteristics of the 16 studies are summarized in the Online Supplemental Data. Eight studies were from Europe,[10,13,15-18,20,22] 5 were from Asia,[9,11,14,19,21] 2 were from the United States,[12,23] and 1 was from Africa.[7] All were retrospective cross-sectional studies. All 16 studies reported the number of ESIFs.[8-23] Ten studies reported the number of patients with ESIFs.[8-13,15,19,22,23] Eight studies reported the number of clinically significant ESIFs.[10-13,15,18,22,23] Studies that provided data for body system subgroup analysis can be found in the Online Supplemental Data. Four studies used a minimum imaging protocol consisting of axial T2WI, sagittal T1WI, and T2WI sequences.[10,13,14,21] Ten studies included additional sequences as part of their imaging protocol.[8,9,11,12,15,17,19,20,22,23] Two studies did not report the imaging protocol used.[16,18] Six studies operationalized the nomenclature for extracolonic findings from the modified CT Colonography Reporting and Data System (C-RADS) classification to report clinically significant findings.[10,12,13,15,18,22]

Table 1: Estimated prevalence for extraspinal findings, patients, and clinically significant findings

Groups	Studies	Total	Events	Proportion (95% CI)	I^2 (%)[a]
All extraspinal findings					
Overall	16[8-23]	19593	6006	19.93 (11.05–30.65)	99.7
Men	3[10,12,15]	4344	1463	33.28 (24.50–42.69)	97.7
Women	3[10,12,15]	5692	2722	55.05 (12.72–93.22)	99.9
Men and women (<40 years)	1[19]	269	5	1.86 (0.61–4.28)	–
Men and women (≥40 years)	4[11,19,21,23]	1261	150	13.81 (0.80–37.82)	98.9
All patients with extraspinal findings					
Overall	10[8-13,15,19,22,23]	14992	5215	26.65 (14.76–40.57)	99.7
Men	3[8,10,12]	2934	902	24.34 (11.03–40.81)	98.7
Women	3[8,10,12]	3490	1919	51.04 (2.91–97.76)	99.9
Men and women (<40 years)	2[12,19]	540	55	8.29 (6.09–10.79)	–
Men and women (≥40 years)	4[11,12,19,23]	3961	785	16.23 (4.78–32.67)	99.0
All clinically significant findings					
Overall	8[10-13,15,18,22,23]	12778	901	5.35 (3.15–8.08)	97.1
Men	3[10,12,15]	4344	260	5.92 (4.61–7.39)	74.2
Women	3[10,12,15]	5692	533	9.77 (4.67–16.48)	98.3
Men and women (≥40 years)	2[11,23]	672	67	9.96 (7.80–12.36)	–

Note:— Subgroups not stated if no studies reported data for such.
[a] I^2 not estimable for some individual subgroups and marked as en dash.

The C-RADS reporting method numbers both colonic (C) and extra-colonic (E) findings. Findings labeled E3 and E4 are defined as "likely unimportant finding, incompletely characterized– subject to local practice and patient preference, work-up may be indicated" and "potentially important finding," respectively.[24] One study defined clinically significant findings as "findings with MR appearance characteristics of significant diseases, indeterminate lesions requiring further assessment by clinical lab/correlation, or findings requiring further imaging studies or histopathological or surgical confirmation after a discussion with the relevant physician."[11] One study defined clinically significant findings as the detection of an abdominal aortic aneurysm of ≥3 cm.[23]

Participant Characteristics

A summary of the participant characteristics is presented in the Online Supplemental Data. The age of participants was between 16 and 95 years. Eleven studies reported the distribution of sex in their total cohorts, with 44% of participants being males. Participant ethnicity was not recorded in any of the studies. Common reasons for participant exclusion in studies included a history of recent trauma, known malignancy, previous spinal surgery, or nondiagnostic images acquired.

Prevalence of All Extraspinal Findings

The total prevalence of all ESIFs identified from MR imaging of the lumbar spine, comprised 19,593 participants from 16 studies, was 19.9% (95% CI, 11.1%–30.7%) (Table 1). The prevalence of ESIFs in females from 3 studies was 55.1% (95% CI, 12.7%–93.2%). The highest proportion of ESIFs was identified in the genitourinary system in males (Table 2). Incidental genitourinary findings were more common in males compared with females 27.1% (95% CI, 25.6%–28.8%) versus 17.5% (95% CI, 16.3%–18.7%). The prevalence of gastrointestinal and urinary tract findings was 2.0% (95% CI, 0.3%–5.2%) and 8.7% (95% CI, 4.7%–13.8%), respectively. Studies that included additional sequences as part of their imaging protocol did not demonstrate a higher reported prevalence of findings (22.0%; 95% CI, 13.2%–32.4%) compared with studies that performed the minimal imaging sequences (24.5%; 95% CI, 2.9%–57.9%).

Prevalence of All Patients with Extraspinal Findings

The total prevalence of all patients with ESIFs identified on MR imaging of the lumbar spine, comprised of 14,992 participants across 10 studies, was 26.7% (95% CI, 14.8%–40.6%) (Table 1). The prevalence in females from 3 studies was 51.0% (95% CI, 2.9%–97.8%). The prevalence in patients older than 40 years of age from 4 studies was 16.2% (95% CI, 4.8%–32.7%). There was no difference in the prevalence of patients with ESIFs when stratified by sex or age.

Prevalence of Clinically Significant Findings and Imaging Follow-Up

The total prevalence of clinically significant ESIFs, comprised of 12,778 participants from 8 studies, was 5.4% (95% CI, 3.2%–8.1%) (Table 1). There was no difference in the prevalence of clinically significant findings in patients stratified by sex. No studies reported the prevalence of clinically significant findings in patients younger than 40 years of age. Two studies reported the prevalence of clinically significant findings in patients 40 years of age or older (10.0%; 95% CI, 7.8%–12.4%). Only 1 study reported the number of patients who underwent imaging follow-up; 32.6% of patients with extraspinal findings required further imaging.[8]

Meta-Regression Analysis

Following univariate meta-regression, no predefined characteristics (sex, age, or continent) demonstrated a significantly higher proportion of extraspinal findings (Online Supplemental Data). In univariate analysis, the risk difference for males was −18.4% (95% CI, −61.8%–25.0%). The risk difference for patients 40 years of age and older was 15.5% (95% CI, −32.6%–63.4%). These findings persisted in the multivariable analysis performed, with no predefined characteristic demonstrating a statistically significant difference in the percentage risk difference.

Table 2: Estimated prevalence of extra-spinal findings by body region

Body Regions	Studies	Total	Events	Proportion (95% CI)	I^2 (%)[a]
Gastrointestinal					
Overall	12[8,10-18,20,21]	16592	929	2.04 (0.29–5.22)	99.2
Men	2[10,15]	2993	254	6.90 (6.02–7.84)	–
Women	2[10,15]	4019	460	8.15 (7.33–9.02)	–
Men and women (≥40 years)	2[11,21]	330	8	2.31 (0.82–4.38)	–
Genitourinary					
Overall	14[8,10-22]	17689	2631	8.74 (4.73–13.81)	99.1
Men	2[10,15]	2993	814	27.14 (25.56–28.75)	–
Women	2[10,15]	4019	725	17.49 (16.33–18.68)	–
Men and women (<40 years)	1[19]	269	0	0.19 (0.00–0.56)	–
Men and women (≥40 years)	3[11,19,21]	866	82	8.93 (0.00–35.57)	98.7
Gynecologic					
Women	3[8,10,15]	4289	1004	24.03 (9.44–42.70)	99.3
Vascular					
Overall	13[8,10-18,20,22,23]	16941	296	1.41 (0.73–2.30)	94.0
Men	2[10,15]	2993	55	1.79 (1.34–2.30)	–
Women	2[10,15]	4019	60	1.42 (1.08–1.82)	–
Men and women (≥40 years)	2[11,23]	672	53	7.76 (5.84–9.92)	–
Musculoskeletal					
Overall	8[8,12,14-17,20,21]	11537	54	0.52 (0.13–1.14)	91.1
Men	1[15]	1540	5	0.32 (0.11–0.76)	–
Women	1[15]	2472	6	0.24 (0.09–0.53)	–
Metastases					
Overall	7[8,14-17,20,21]	8513	20	0.28 (0.01–0.77)	86.9
Men	1[15]	1540	0	0.03 (0.00–0.53)	–
Women	1[15]	2472	1	0.04 (0.00–0.23)	–
Miscellaneous					
Overall	7[12,14-17,20,21]	11137	6	0.05 (0.00–0.13)	21.6
Men	1[15]	1540	0	0.03 (0.00–0.53)	–
Women	1[15]	2472	0	0.02 (0.00–0.52)	–

Note:— Subgroups not stated if no studies reported data for such.
[a] I^2 not estimable for some individual subgroups and marked as en dash.

Study Quality and Small Study Effects

Following an assessment of risk bias using an adapted tool for prevalence studies, total scores ranged from 1 to 7 (Online Supplemental Data). All studies scored in domain 2 due to single-center study design. All studies scored zero in domain 9, given that sufficient data to extract prevalence proportions formed part of the inclusion criteria for this systematic review. Eight studies were assessed as a low risk of bias.[9-11,13,15,17,18,20] Seven studies were evaluated as having a moderate risk of bias,[8,12,14,16,19,21,23] with only 1 study evaluated as having a high risk of bias.[22] Post hoc analysis showed that the prevalence of ESIFs in the study evaluated as having a high risk of bias was 36.3% (95% CI, 30.8%–42.1%) versus 27.6% (95% CI, 12.9%–45.2%) in studies evaluated as having a low risk of bias. Therefore, no studies were excluded from analysis on the basis of risk of bias assessment. Visual inspection of the Doi plot demonstrated lateralizing asymmetry with a LFK index value of −1.71, suggesting small study effects (Egger test, $P = .059$) (Online Supplemental Data).

DISCUSSION

In summary, this systematic review consisted of 16 studies including 19,593 participants with 6,006 extraspinal findings identified on MR imaging of the lumbar spine. In 10 studies, including 14,992 patients, 5,215 patients had extraspinal findings. The overall prevalence of an extraspinal finding was 19.9%, and the prevalence of a patient having an extraspinal finding was 26.7%. Clinically significant findings were identified in 5.4% of participants. The prevalence of ESIFs was most pronounced in patients 40 years of age or older.

To the best of our knowledge, this is the first systematic review and meta-analysis to assess the prevalence of ESIFs on MR imaging of the lumbar spine in adults. Incidental findings on MR imaging of the lumbar spine in asymptomatic pediatric patients have previously been reported and subsequently included in an umbrella review of incidental findings across multiple imaging modalities.[25,26] Our reported composite prevalence is similar to the prevalence reported in the pediatric population and the prevalence across other imaging in the umbrella review. Studies that were excluded from our review because they included some patients younger than 16 years of age also reported similar prevalence figures.[27,28] When one considers multitechnique evidence, the prevalence of extraspinal findings on outpatient lumbar spine CT in a cohort of 400 adults was 40.5%, with 14.8% of patients having indeterminate/clinically significant findings, which required further clinical assessment or follow-up imaging.[29] The higher percentage of ESIFs on CT may be explained by technical factors relating to image acquisition (for example, contiguous section interval and section thickness) and the differential sensitivity of detecting findings with fat or air densities through this technique.

The findings of this review have both clinical and research implications. Our results demonstrate that extraspinal findings are common, with more than one-quarter of examinations having identified ESIFs. Our analysis showed that there was a pronounced difference in the percentage of genitourinary findings in males compared with females. The proportion of genitourinary incidental findings in males was calculated from 2 studies.[10,15]

These studies included renal cysts, some of which were classified as clinically important. Our analysis is similar to previously reported studies evaluating the prevalence of renal cysts, which demonstrated more prevalent cystic disease in males.[30,31] The clinical implications pertain to the responsibility of the radiologists to identify these ESIFs and, if appropriate, notify referring clinicians of clinically significant findings. Radiologists should consider revising routine search patterns to place a greater emphasis on the genitourinary tract in males. This change could be made by including such review areas in standard reporting templates. Five percent of findings were deemed clinically significant. This translates to a sizeable proportion of examinations that may include actionable findings that require further work-up. Both radiologists and referring clinicians should be equipped to appropriately manage detected extraspinal findings and manage the uncertainty of suspected significant findings. This recommendation is important to minimize overlooking significant diagnoses but also to avoid unnecessary further imaging or procedures, which may bring their own physical risk and elevated patient anxieties.

This review has also highlighted the relative paucity of evidence when stratifying for participant characteristics. Only 1 study included in this review reported the number of patients who underwent follow-up on the basis of the extraspinal findings detected. There is a need for further observational studies designed to capture the prevalence and impact of extraspinal findings in clinically relevant subgroups. Another future research question is the potential impact of technical imaging factors on the prevalence of ESIFs. Technical differences, namely, FOV, section thickness, and the use of saturation bands are likely to influence the detection of ESIFs. Inclusion of saturation banding will limit assessment of the prevertebral structures. This phenomenon is explained by the reduced detection of lymphovascular disease on MR imaging of the lumbar spine compared with CT.[29,32] Anecdotally, localizer images could identify ESIFs, and their utility could be quantified. The included studies did have variance in their predetermined imaging protocols. Studies that included additional imaging sequences did not report a higher proportion of ESIFs; however, this observation seems counterintuitive.

Strengths and Limitations

This review has multiple strengths. First, the review protocol was preregistered and the review used a robust and comprehensive search strategy to exhaustively ensure that all relevant studies from the published literature were included. Second, we intentionally included studies without a prespecified definition of extraspinal findings. We thought that during data extraction, extraspinal findings could be pragmatically identified among all documented findings. This idea has allowed us to generate stratified analyses for clinically relevant patient characteristics, body regions, and clinically significant findings. Third, we excluded studies reporting data from pre-existing disease cohorts because this would introduce bias.

One limitation of this systematic review is that only 2 databases were included. However, this has been mitigated by using a third database when reviewing the reference and citation searches. Other limitations of this review arise from the included studies. First, most studies are from single centers and demonstrate marked heterogeneity with small study effects, limiting the generalizability at a population level. However, there was global geographic coverage from the studies, and this will likely mitigate the former. Second, the estimated proportions, particularly in subgroup analysis and univariate analysis, are limited because few studies reported extraspinal findings stratified by clinically relevant subgroups. This may result in some imprecision in the composite prevalence calculations. Third, there was heterogeneity in the interpretation and definition of imaging findings across studies, with multiple subspecialty radiologists reporting studies. This will introduce subjective bias in the reporting rate across studies. Last, there were differences in the reporting of an extraspinal finding and a clinically significant finding, with some authors having lower or higher thresholds. For example, in 1 study, pelvic free fluid was documented as a positive finding; this influenced the prevalence of findings in females.[10] Another study only reported the presence of an abdominal aortic aneurysm of ≥ 3 cm as clinically significant, which will introduce bias into the vascular subgroup.[23] However, there was a relative consensus among the remaining studies on how to document a finding as clinically significant, improving the external validity, with most studies adopting the modified C-RADS classification.

CONCLUSIONS

ESIFs detected on MR imaging of the lumbar spine are common and were reported in approximately one-quarter of studies. Clinically significant findings were reported in 5%. Incidental genitourinary findings were more prevalent in males compared with females. Both referring clinicians and reporting radiologists should be aware of the implications of incidental findings and how to manage them in their routine clinical practice. There is a relative paucity of evidence in some patient subgroups, and future population-based studies should address this.

ACKNOWLEDGMENTS

We thank Dr Leo Alexandre, for his thorough teaching in systematic review methods, without whom this review would not be possible.

Disclosure forms provided by the authors are available with the full text and PDF of this article at www.ajnr.org.

REFERENCES

1. World Health Organization. **Low Back Pain.** https://www.who.int/news-room/fact-sheets/detail/low-back-pain. Accessed June 4, 2023
2. Wu A, March L, Zheng X, et al. **Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017.** *Ann Transl Med* 2020;8:299 CrossRef Medline
3. Wagner SC, Morrison WB, Carrino JA, et al. **Picture archiving and communication system: effect on reporting of incidental findings.** *Radiology* 2002;225:500–05 CrossRef Medline
4. Page MJ, McKenzie JE, Bossuyt PM, et al. **The PRISMA 2020 statement: an updated guideline for reporting systematic reviews.** *BMJ* 2021;372:n71 CrossRef Medline

5. Hoy D, Brooks P, Woolf A, et al. **Assessing risk of bias in prevalence studies: modification of an existing tool and demonstration of interrater agreement.** *J Clin Epidemiol* 2012;65:934–39 CrossRef Medline
6. Nyaga VN, Arbyn M, Aerts M. **Metaprop: a Stata command to perform meta-analysis of binomial data.** *Arch Public Health* 2014;72:39–203 CrossRef Medline
7. Furuya-Kanamori L, Barendregt JJ, Doi SA. **A new improved graphical and quantitative method for detecting bias in meta-analysis.** *Int J Evid Based Healthc* 2018;16:195–203 CrossRef Medline
8. Ibrahim H, Elsadawy ME. **Incidental findings in lumbar spine MRI: their prevalence and potential impact on patient management.** *Egypt J Radiol Nucl Med* 2019;50:59 CrossRef
9. Khasawneh RA, Mohaidat Z, Khasawneh FA, et al. **Extraspinal findings prevalence and clinical significance in 4250 lumbar spine MRI exams.** *Sci Rep* 2021;11:1190 CrossRef Medline
10. Quattrocchi CC, Giona A, Di Martino AC, et al. **Extra-spinal incidental findings at lumbar spine MRI in the general population: a large cohort study.** *Insights Imaging* 2013;4:301–08 CrossRef Medline
11. Rashid SA. **Prevalence and clinical potential of extraspinal incidental findings in lumbosacral spine MRI of patients with suspected disc diseases.** *Medical Journal Indonesia* 2021;30:256–63 CrossRef
12. Semaan HB, Bieszczad JE, Obri T, et al. **Incidental extraspinal findings at lumbar spine magnetic resonance imaging: a retrospective study.** *Spine (Phila Pa 1976)* 2015;40:1436–43 CrossRef Medline
13. Tuncel SA, Çaglı B, Tekataş A, et al. **Extraspinal incidental findings on routine MRI of lumbar spine: prevalence and reporting rates in 1278 patients**. *Korean J Radiol* 2015;16:866–73 CrossRef Medline
14. Abdullah AR, Odish HY, Mohamedamin HA. **Incidental findings on magnetic resonance imaging of lumbosacral spine in patients with back pain and/orradiculopathy.** *Zanco Journal of Medical Scencesi* 2018;22:300–06 CrossRef
15. Dağıstan E, Coş gun Z. **Extraspinal findings on routine lumbar spinal MR imaging: prevalence and etiologies in 4012 patients**. *Experimental Biomedical Research* 2020:3;110–16 CrossRef
16. Eroglu A, Yilmaz I. **Coincidental lesions that have been seen in patients with lumbar discopathy at spinal MR examination.** *Medical Science and Discovery* 2018;5:137–40 CrossRef
17. Kahraman AN, Vural A. **Added value of coronal-T1W sequence to the lumbar MR imaging protocol for low back pain** [Article in English, Spanish]. *Biomedica* 2022;42:33–40 CrossRef Medline
18. Kaya S, Hatirli H, Sahin M, et al. **Incidental findings detected on magnetic resonance imaging scans of the cervical, thoracic and lumbar spine of patients prediagnosed with discopathy.** *Marmara Medical Journal* 2023;36:210–14 CrossRef
19. Qasim H, Al-Bayati H, Mahmood NA. **Incidental finding during MRI evaluation of lumbosacral disc prolapse in adults in Al-Hilla Teaching Hospital.** *Medical Journal of Babylon* 2017;14:537–49
20. Romeo V, Cavaliere C, Sorrentino C, et al. **Clinical impact of coronal-STIR sequence in a routine lumbar spine MR imaging protocol to investigate low back pain.** *Medicine (Baltimore)* 2018;97:e10789 CrossRef Medline
21. Sobhan M, Samiee M, Asgari Y, et al. **Incidental findings of the lumbar spine at MRI in patients diagnosed with discopathy.** *International Journal of Medical Imaging* 2016;4:44–47 CrossRef
22. Zeh OF, Goujou EG, Awana AP, et al. **Extraspinal incidental findings at lumbar spine magnetic resonance imaging in two hospitals: prevalence and clinical importance.** *Open J Radiol* 2017;07:241–48 CrossRef
23. Zucker EJ, Prabhakar AM. **Lumbar spine MRI: missed opportunities for abdominal aortic aneurysm detection.** *Curr Probl Diagn Radiol* 2020;49:254–59 CrossRef Medline
24. Zalis ME, Barish MA, Choi JR, et al; Working Group on Virtual Colonosco. **CT colonography reporting and data system: a consensus proposal.** *Radiology* 2005;236:3–9 CrossRef Medline
25. Ramadorai U, Hire J, DeVine JG, et al. **Incidental findings on magnetic resonance imaging of the spine in the asymptomatic pediatric population: a systematic review.** *Evid Based Spine Care J* 2014;5:95–100 CrossRef Medline
26. O'Sullivan JW, Muntinga T, Grigg S, et al. **Prevalence and outcomes of incidental imaging findings: umbrella review**. *BMJ* 2018;361:k2387 CrossRef Medline
27. Zidan MM, Hassan IA, Elnour AM, et al. **Incidental extraspinal findings in the lumbar spine during magnetic resonance imaging of intervertebral discs.** *Heliyon* 2018;4:e00803 CrossRef Medline
28. Dilli A, Ayaz UY, Turanli S, et al. **Incidental extraspinal findings on magnetic resonance imaging of intervertebral discs.** *Arch Med Sci* 2014;10:757–63 CrossRef Medline
29. Lee SY, Landis MS, Ross IG, et al. **Extraspinal findings at lumbar spine CT examinations: prevalence and clinical importance.** *Radiology* 2012;263:502–09 CrossRef Medline
30. Chang CC, Kuo JY, Chan WL, et al. **Prevalence and clinical characteristics of simple renal cyst.** *J Chin Med Assoc* 2007;70:486–91 CrossRef Medline
31. Mensel B, Kühn JP, Kracht F, et al. **Prevalence of renal cysts and association with risk factors in a general population: an MRI-based study**. *Abdom Radiol (NY)* 2018;43:3068–74 CrossRef Medline
32. Gouliamos AD, Tsiganis T, Dimakakos P, et al. **Screening for abdominal aortic aneurysms during routine lumbar CT scan: modification of the standard technique.** *Clin Imaging* 2004;28:353–55 CrossRef Medline