Original Article

Evaluation of the Prevalence of Incidental Findings of Gynecological Diseases in Hip and Sacroiliac Magnetic Resonance Imaging (MRI) in a Tertiary Hospital in 2022

Hussein Soleimantabar[1]*, Farid Goodarzi[1]

[1]Department of Radiology, School of Medicine, Imam Hossein Hospital, Shahid Beheshti Univarsity of Medical Uiversity(SBMU), Tehran, Iran

Received: 30 December, 2023; Accepted: 27 February, 2024

DOI: 10.22037/nbm.v12i2.44231

Abstract

Background: Incidental findings in imaging are defined as findings that appear accidentally in radiological images, and usually, the patient does not have a complaint related to the desired finding. These findings range from no-risk to high-risk. This study aimed to evaluate the prevalence of incidental findings of gynecological diseases in hip and sacroiliac Magnetic Resonance Imaging (MRI) in Imam Hossein Hospital in 2022.

Materials and Methods: In this cross-sectional descriptive study, all patients referred to Imam Hossein Hospital (Iran-Tehran) during one year (2022) who underwent hip and sacroiliac MRI were evaluated. Hip and sacroiliac MRI images were reviewed. The following pathological findings were recorded: pelvic vascular congestion, ovarian cyst, myoma, and ovarian masses. Patients' information about age and underlying disease were also extracted from patients' files. Hip and sacroiliac diseases were also recorded. Finally, all recorded data were analyzed using the SPSS program.

Results: Hip and sacroiliac MRI of 364 female patients were assessed. The mean age of the patients was 50.18±13.46 years. Discopathy was the most prevalent finding in the MRI (41.76%) as a pathological finding. The prevalence of incidental findings was 32.3%. The most common incidental finding in MRI was free fluid with a prevalence of 12.1%, and ovarian cyst was seen in 6.3% of patients. There was a significant relationship between most of the incidental findings and age (P-values<0.05).

Conclusion: The prevalence of incidental findings of gynecological diseases in women undergoing hip and sacroiliac MRI is considerable and shows the importance of the radiologist's attention to review and report the entire MRI images.

Keywords: Magnetic resonance imaging, Sacroiliac joint, Incidental findings, Hip, Gynecology

***Corresponding Author:** Hussein Soleimantabar, Department of Radiology, School of Medicine, Imam Hossein Hospital, Shahid Beheshti Medical Uiversity(SBMU), Tehran, Iran. Email: Husseintabar@gmail.com

Please cite this article as: Soleimantabar H, Goodarzi F. Evaluation of the Prevalence of Incidental Findings of Gynecological Diseases in Hip and Sacroiliac Magnetic Resonance Imaging (MRI) in a Tertiary Hospital in 2022. Novel Biomed. 2024;12(2):69-74.

Introduction

Incidental findings (IFs) are asymptomatic abnormalities that are incidentally diagnosed during a review of radiological imaging. In recent years, advances in radiologic imaging evaluations (e.g., high-magnification zoom, the ability to focus on individual images, and digital

archiving) have dramatically improved the detection of incidental lesions[1]. Studies assessed the frequency of IF and cost issues depending on additional research requirements[2-6]. Lee et al., reported that 4.6% of clinically significant IFs on lumbar computed tomography (CT) scan included renal mass, aortic aneurysm, and lymphadenopathy. Most IFs (>95%) have a few clinical significance[5]. However, exact observation of anatomic structures outside the region of interest provides opportunities for early detection of potentially life-threatening conditions such as malignancies and aneurysms[7,8]. On the other hand, Quattrocci et al. used the CT Modified Colonography Reporting and Data System (C-RADS) to report a wide variety of incidental extra-spinal pathologies. This study reported a high IF rate of 68.6% when using the C-RADS system[9]. Some studies suggest that localized images (low-resolution series used in the imaging planning process) may be useful in diagnosing IFs[10].

Non-spinal causes that may be discovered incidentally on MRI include vascular (abdominal aortic aneurysm (AAA), aortic dissection, and renal artery dissection or thrombosis), pyelonephritis, retroperitoneal bleeding, gastrointestinal disorders (pancreatitis, peptic ulcer, cholecystitis), epidural or intradural metastatic disease, intramedullary tumors and bone metastasis, infectious causes (spinal epidural abscess, vertebral osteomyelitis, and infectious discitis), spinal epidural hematoma, presacral masses, ovarian pathology, and prostate carcinoma[5]. Limited studies have evaluated incidental findings of gynecologic diseases in lumbosacral MRI in Iran. The current study aimed to determine the prevalence of IFs in hip and sacroiliac MRI in Imam Hossein Hospital in 2022.

Methods

In this cross-sectional descriptive study, all patients referred to Imam Hossein Hospital (Iran-Tehran) from January to December 2022 who underwent hip and sacroiliac MRI were evaluated.

The inclusion criteria were age over 18 and performing hip and sacroiliac MRI. The exclusion criteria were not performing hip and sacroiliac MRI and lack of patient data.

A radiologist evaluated hip and sacroiliac MRI images obtained from the study areas with at least five years of experience. The following pathological conditions were recorded: pelvic vascular congestion (PVC), ovarian cyst, myoma, and ovarian masses. Patients' information, including age and underlying disease (cause of performing MRI), was also extracted from patients' records. Finally, the patient's information was recorded and analyzed using the information obtained from the MRI in the SPSS program.

Mean, standard deviation, range, frequency, and percentage were used to describe the data. Independent t-test coefficient was used to check the relationship between variables. A 2-tailed T-test was used to check the correlation between variables. All analyses were performed by SPSSv.26.0 statistical software. A P-value less than 0.05 was considered statistically significant.

This study was approved by the ethical committee of Shahid Beheshti Medical University (IR.SBMU.MSP.REC.1401.644).

Results

In the mentioned period, three hundred and sixty-four patients were assessed by hip and pelvis MRI. The mean age of the patients was 50.17±13.46 years, with a minimum age of 19 years and a maximum age of 75 years. The prevalence of underlying disorders for which MRI was performed is seen in **Figure 1**.

Figure 2 shows the prevalence of gynecologic findings in the patients. The overall prevalence of incidental findings was 32.3%. The most common finding was free fluid (12.1%), and the least common was hydrosalpynx (0.8%).

We presented some of these incidental findings in lumbosacral MRIs. The images are seen in **Figure 3-5**.

Table 1 shows the prevalence of accidental findings based on different gynecologic disorders.

The prevalence of incidental findings based on age (less than 50 years and more than 50) is seen in **Table 2**. The prevalence of most incidental findings, except PVC and free fluid, had a significant relationship with age ($P<0.05$).

Discussion

In the current descriptive study, which was conducted to determine the prevalence of incidental findings of gynecologic diseases in hip and sacroiliac MRI, 364

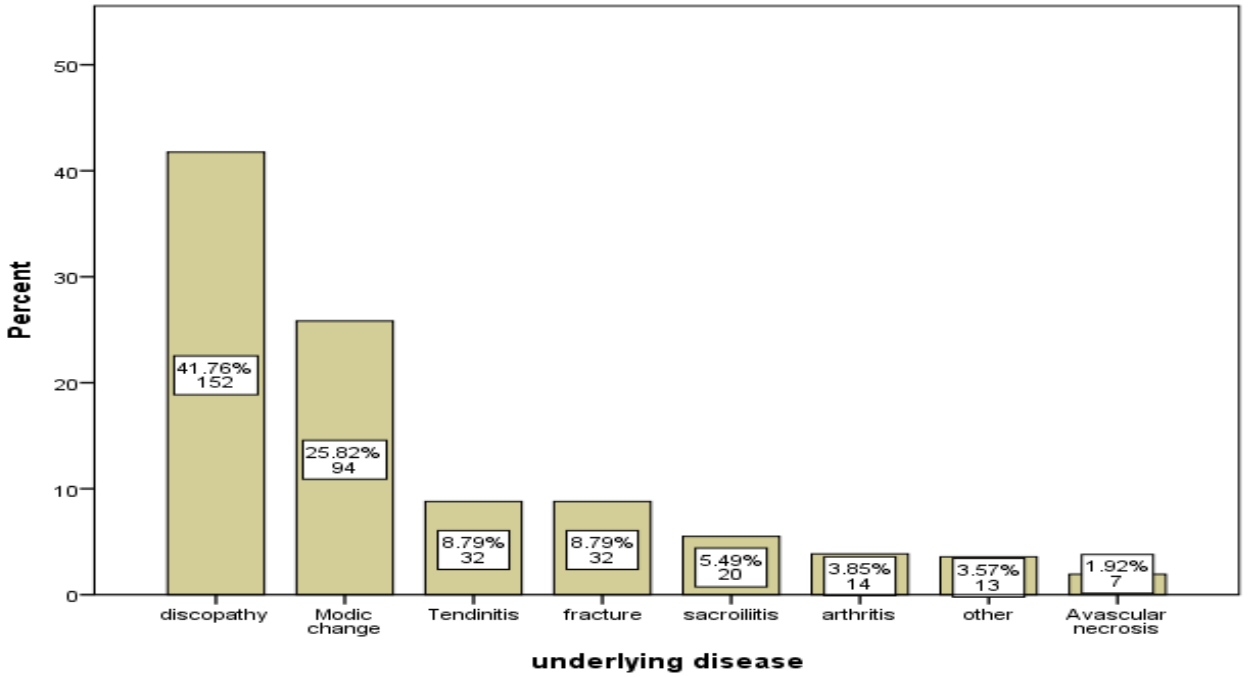

Figure 1. The prevalence of underlying disorders caused performing MRI in all patients.

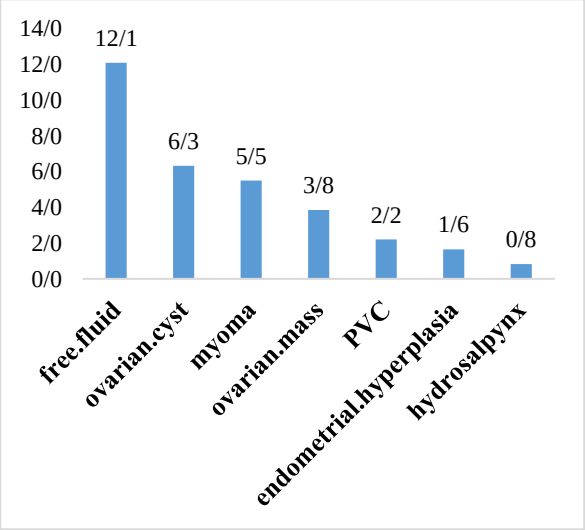

Figure 2. The prevalence of incidental findings in patients.

female patients underwent hip and pelvic MRI, and the mean age was 50.17±13.46 years. Discopathy was the most common finding in the MRI of these patients, with a prevalence of 41.76% of patients.

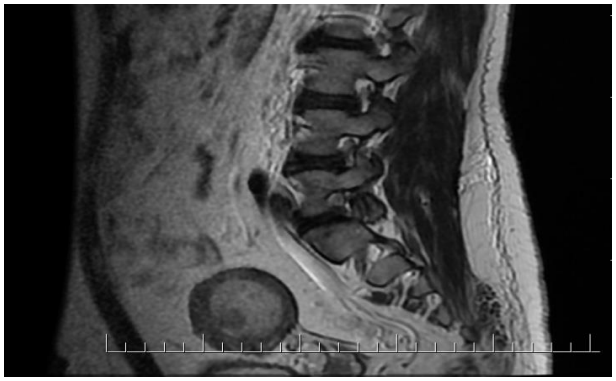

Figure 3. Ovarian mass as incidental findings in lumbosacral MRI in a patient with hip pain.

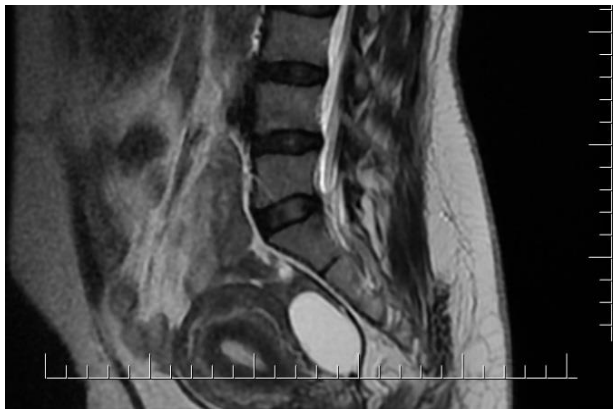

Figure 4. Ovarian cyst as incidental findings in lumbosacral MRI in a patient with radicular pain.

The lowest prevalence was related to avascular

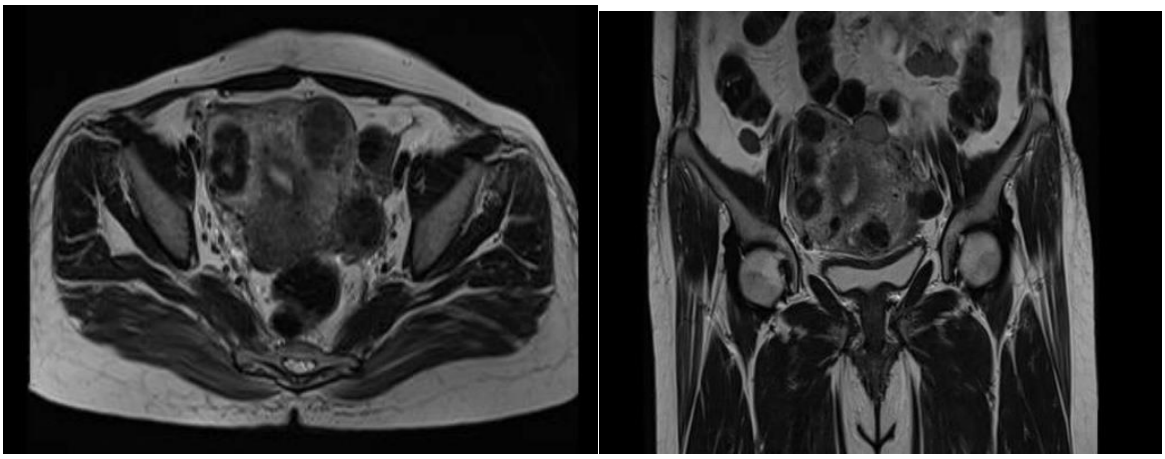

Figure 5. Multiple myomas as incidental findings in lumbosacral MRI in a patient with doubt to discopathy.

Table 1: The prevalence of accidental findings based on gynecologic disorders.

	Underlying Disease (n (%))								
	Total	Sacroiliitis	Modic change	Fracture	Arthritis	Tendinitis	Avascular necrosis	Siscopathy	Other
Myoma	20 (5.5)	1 (5.0)	3 (15)	3 (15)	0 (0.0)	4 (20.0)	0 (0.0)	9 (45.0)	0 (0.0)
Ovarian cyst	23 (6.3)	1 (4.3)	3 (13)	0 (0.0)	0 (0.0)	5 (21.7)	0 (0.0)	12 (52.2)	2 (8.7)
Ovarian mass	14 (3.8)	0 (0.0)	7 (50)	0 (0.0)	1 (7.1)	1 (7.1)	0 (0.0)	5 (35.7)	0 (0.0)
PVC	8 (2.2)	0 (0.0)	2 (25)	1 (12.5)	0 (0.0)	0 (0.0)	0 (0.0)	3 (37.5)	2 (25)
Free fluid	44 (12)	1 (2.3)	16 (36)	4 (9.1)	1 (2.3)	4 (9.1)	1 (2.3)	14 (31.8)	3 (6.8)
Endometrial hyperplasia	6 (100)	0 (0.0)	1 (16.7)	1 (16.7)	1 (16.7)	2 (33.3)	0 (0.0)	1 (16.7)	0 (0.0)
Hydrosalpynx	3 (0.8)	0 (0.0)	3 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Table 2: Assessment the relationship of incidental findings with age. *P-value based on fisher exact test.

		Age (years)		P-value
		<=50 n (%)	>50 n (%)	
Myoma	Yes	13 (9.4)	7 (3.1)	0.01
	No	126 (90.6)	218 (96.9)	
Ovarian cyst	No	120 (86.3)	221 (98.2)	<0.001
	Yes	19 (13.7)	4 (1.8)	
Ovarian mass	No	138 (99.3)	212 (94.2)	0.01
	Yes	1 (0.7)	13 (5.8)	
PVC	No	137 (98.6)	219 (97.3)	0.35
	Yes	2 (1.4)	6 (2.7)	
Free fluid	No	122 (87.8)	198 (88)	0.53
	Yes	17 (12.2)	27 (12)	
Endometrial hyperplasia	No	133 (95.7)	225 (100)	0.003
	Yes	6 (4.3)	0 (0)	
Hydrosalpynx	No	136 (97.8)	225 (100)	0.05
	Yes	3 (2.2)	0 (0)	

necrosis, which was 1.92%. The overall prevalence of gynecologic incidental findings was 32.3%, and the most common was free fluid, with a prevalence of 12.1%. The ovarian cyst was the second most common incidental finding in 6.3% of patients. The lowest prevalence was related to hydrosalpinx (0.8%). There was a significant relationship between the prevalence of incidental findings and age, which seems expected. For example, we found that most patients with ovarian cysts were under fifty years old (19/23, 82.6%), and the rest (4/23, 17.4%) were over fifty years old. Ovarian cysts are often asymptomatic and are found as an incidental finding on imaging[١١]. In studies, it has been reported that ovarian cysts in postmenopausal women can also be seen in imaging. Older studies mention its prevalence at about 18%[١١-١٣]. Incidental findings can be important in routine radiology, and detecting IFs may change a patient's management or treatment

direction[14]. For example, ovarian cysts in women of reproductive age are mostly functional and benign and do not require surgical intervention, but may lead to complications such as pelvic pain, cyst rupture, blood loss, and torsion of the ovary, especially in older age, which require urgent or emergent management[15].

Semaan et al. evaluated the prevalence and rate of non-detected incidental extra-spinal findings (IESFs) in adult patients undergoing lumbar spine MRI. They reported that 859 IESFs were found in 671 out of 3024 patients (22 %). A non-detection rate of 40% was noted. It was concluded that IESF is common on lumbar MRI with a significant non-detection rate of 40%[16]. In our study, it was seen that the prevalence of incidental gynecology in patients who underwent hip and pelvic MRI was 32.3%, which was higher than the study by Semaan et al. This difference between the two studies can be due to the difference in the sample size. However, based on the two studies, it can be said that the prevalence of incidental findings in MRI is significant, and radiologists should consider this issue because it can lead to early diagnosis and treatment of patients.

Tuncel et al. determined the prevalence of IF in adults who underwent lumbar MRI. It was seen that the overall prevalence of IF was 18.8%. Among them, clinically significant IFs (n = 34) included two renal masses (0.15%), two aortic aneurysms (0.15%), 2 cases of hydronephrosis (0.15%), 11 adrenal masses (0.86%), seven lymphadenopathies (0.55%), 6 cases of endometrial or cervical thickening (0.47%), one liver hemangioma (0.08%), 1 case of pelvic fluid (0.08%) and 2 cases of ovarian dermoid cyst (0.15%). About 28% of IFs were included in clinical reports, while significant clinical findings were reported in 41% (14/34) of cases. It was concluded that extra-spinal IFs are commonly detected during routine lumbar MRI, but many of these findings are not clinically significant. However, IFs that are important clinical findings are occasionally omitted from formal radiology reports[24]. According to what was found in Tuncel et al.'s study, 28% of incidental findings were reported by radiologists, but in 59% of cases, important incidental findings were not reported. This finding highlights the importance of reporting incidental findings in radiologists' reports because failure to report cases such as suspicious or malignant masses can have disastrous outcomes for patients in the future. In our study, the prevalence of masses suspected of malignancy was 3.8%, and reporting even this small amount can save the lives of these patients. In our study, it was seen that the prevalence of incidental findings was 32.3%, which was different from Tuncel et al.'s study. This difference can be due to the difference in the sample size and the site of MRI in the two studies because, in our study, MRI of the hip and pelvis was assessed, but in the study of Tuncel et al., lumbar MRI was assessed.

Zidan et al. reported the frequency of incidental extraspinal findings and congenital anomalies or anatomical differences in the lumbar spine on MRI of intervertebral discs. A total of 379 lumbar MRIs were analyzed. Of 379 patients, 90 (23.7%) had incidental findings. Among the incidental findings, 39 (10.3%) renal cysts, 10 (2.6%) retrograde uterus, 5 (1.3%) Nabothian cysts, 4 (1.1%) ovarian cysts, 10 (2.6%) uterine fibroids, 3 (0.8%) endometrial thickening, 11 cases (2.9%) hydronephrosis, 4 (1.1%) prostate enlargement, 2 (0.5%) atrophic kidney, and 1 (0.3%) bladder wall thickening and ectopic kidney were found. It was concluded that a high percentage of extra-spinal pathological findings were detected in the lumbar MRI. Therefore, it is important to know the high percentage of patients with incidental findings, which may need further evaluation[17]. Our study was conducted on hip and pelvis MRIs of women, and this is one of the differences between the two studies. Based on the findings of our study and the study of Zidan et al., it can be said that it is essential to pay attention to and evaluate the incidental findings in MRI. Considering that IFs have a significant prevalence, radiologists should review and report the whole of the image while reporting MRIs.

Ibrahim et al. evaluated the prevalence of Ifs in lumbar MRI. 90/400 of the cases had incidental non-spinal findings; in 30 of these 90 patients, this finding was the only reason for their complaint. It was concluded that radiologists should pay attention to non-spinal findings on MRI of the lumbar spine, because the detected incidental pathologies can be the source of pain or life-threatening conditions[18]. Based on Ibrahim et al.'s study, the prevalence of incidental findings in lumbar MRI was 22.5%. Based on the studies presented in this section, it seems that the prevalence of incidental

findings in lumbar MRI is about 20% to 30% because most studies have obtained prevalence in this range. Assessment of the prevalence of incidental findings in hip and pelvic MRI is limited and evaluation of this issue is one of the advantages of the present study. The prevalence of incidental gynecologic findings in the present study, which was performed on pelvic MRI, was 32.3%, which was higher than the prevalence of incidental findings in lumbar MRI.

Conclusion

It is concluded that the prevalence of incidental findings of gynecologic disease in pelvic and hip MRI is significant, and it was 32.3%. The most common incidental findings in the MRI of this area were free fluid, ovarian cyst, myoma, ovarian mass, pelvic vascular congestion, endometrial hyperplasia, and hydrosalpinx, which shows radiologists' importance of evaluating the whole image. Radiologists should not only review the area that the patient complains about; rather, they should review all the parts of the image, and if there is any accidental finding, they must report it.

Acknowledgment

None.

Conflict of Interest

The authors further declare that they have no conflict of interest.

References

1. Wagner SC, Morrison WB, Carrino JA, Schweitzer ME, Nothnagel H. Picture archiving and communication system: effect on reporting of incidental findings. Radiology. 2002;225(2):500-5.
2. Fileni A, Magnavita N. A 12-year follow-up study of malpractice claims against radiologists in Italy. La radiologia medica. 2006;111(7):1009-22.
3. Magnavita N, Magnavita G, Fileni A, Bergamaschi A. Ethical problems in radiology: medical error and disclosure. La Radiologia medica. 2009;114(8):1345-55.
4. Park H-J, Jeon Y-H, Rho M-H, et al. Incidental findings of the lumbar spine at MRI during herniated intervertebral disk disease evaluation. American Journal of Roentgenology. 2011;196(5):1151-5.
5. Lee SY, Landis MS, Ross IG, Goela A, Leung AE. Extraspinal findings at lumbar spine CT examinations: prevalence and clinical importance. Radiology. 2012;263(2):502-9.
6. Hlatky MA, Iribarren C. The dilemma of incidental findings on cardiac computed tomography. Vol 54: American College of Cardiology Foundation Washington, DC; 2009:1542-3.
7. Xiong T, Richardson M, Woodroffe R, Halligan S, Morton D, Lilford R. Incidental lesions found on CT colonography: their nature and frequency. The British journal of radiology. 2005;78(925):22-9.
8. JW K. Renal cell carcinoma as an incidental finding. J. Urol. 1985;134:1094-6.
9. 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 into Imaging. 2013;4(3):301-8.
10. Kamath S, Jain N, Goyal N, Mansour R, Mukherjee K. Incidental findings on MRI of the spine. Clinical radiology. 2009;64(4):353-61.
11. Mobeen S, Apostol R. Ovarian cyst. 2020.
12. Pavlik EJ, Ueland FR, Miller RW, et al. Frequency and disposition of ovarian abnormalities followed with serial transvaginal ultrasonography. Obstetrics & Gynecology. 2013;122(2 PART 1):210-217.
13. Bottomley C, Bourne T. Diagnosis and management of ovarian cyst accidents. Best practice & research Clinical obstetrics & gynaecology. 2009;23(5):711-24.
14. Jans L, Van Praet L, Elewaut D, et al. MRI of the SI joints commonly shows non-inflammatory disease in patients clinically suspected of sacroiliitis. European journal of radiology. 2014;83(1):179-84.
15. Terzic M, Aimagambetova G, Norton M, et al. Scoring systems for the evaluation of adnexal masses nature: current knowledge and clinical applications. Journal of Obstetrics and Gynaecology. 2021;41(3):340-7.
16. Semaan HB, Bieszczad JE, Obri T, et al. Incidental extraspinal findings at lumbar spine magnetic resonance imaging. Spine. 2015;40(18):1436-43.
17. 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(9).
18. Ibrahim H, Elsadawy MEI. Incidental findings in lumbar spine MRI: their prevalence and potential impact on patient management. Egyptian Journal of Radiology and Nuclear Medicine. 2019;50:1-5.