DOI:https://doi.org/10.53350/pjmhs20231710172

ORIGINAL ARTICLE

Diagnostic Accuracy of Pelvic MRI in the Detection and Characterization of Uterine Fibroids: A Cross-Sectional Study

SARA GILL[1], SAJIDA MAJEED[2], MALIK MUDASIR HASSAN[3], MISBAH ARSHAD[4], MAHWASH MANSOOR[5], MAHNAZ BALOCH[6]
[1]*Consultant Radiologist, Department of Radiology, District Headquarter Hospital, Chiniot, Pakistan.*
[2]*Assistant Professor, Department of Radiology, Sheikh Zayed Medical College and Hospital, Rahim Yar Khan, Pakistan.*
[3]*Associate Professor, Department of Radiology, Quaid-e-Azam Medical College (QAMC), Bahawalpur, Pakistan.*
[4]*Consultant Gynaecologist, Jubilee Female Hospital, Bahawalpur, Pakistan.*
[5]*Associate Professor, Department of Radiology, Bolan Medical College, Quetta, Pakistan.*
[6]*Assistant Professor, Department of Diagnostic Radiology, Mekran Medical College, Turbat, Pakistan.*
Correspondence to: Sara Gill, Email: saragillwaseem@hotmail.com

ABSTRACT

Background: Accurate mapping of uterine fibroids is pivotal for selecting the least invasive, fertility-preserving therapy. Ultrasonography, although first-line in Pakistan, is often limited by obesity, distorted uterine anatomy, and operator dependence. Pelvic magnetic resonance imaging (MRI) offers superior tissue contrast, yet local performance data are sparse.

Objective: To determine the diagnostic accuracy of 1.5 T pelvic MRI for detecting and characterising uterine fibroids in Pakistani women and to examine how MRI-derived topology correlates with presenting symptoms and influences surgical planning.

Methodology: This cross-sectional study was conducted from June 2022 to July 2023 and enrolled 75 women presenting with clinical suspicion of uterine fibroids. Standardized pelvic MRI scans were performed at District Headquarter Hospital, Chiniot, and Sheikh Zayed Medical College & Hospital, Rahim Yar Khan. All MRI images were interpreted independently by two radiologists blinded to surgical and histopathological outcomes. The MRI findings were subsequently compared with intraoperative and histopathological results, which served as the reference standard. Diagnostic performance metrics—including sensitivity, specificity, positive and negative predictive values—and inter-observer agreement (κ statistics) were calculated. Detailed assessment of each case included the number, size, and anatomical location of fibroids, presence of degenerative changes, and identification of coexisting pelvic pathologies. In addition, associations between fibroid location and presenting symptoms were systematically analysed.

Results: Histopathology confirmed leiomyomas in 72/75 uteri (prevalence = 96 %). MRI yielded 69 true-positives, 2 false-negatives (sub-centimetre submucosal nodules) and 1 false-positive (adenomyosis), achieving a sensitivity of 95.8 %, specificity 75.0 %, overall accuracy 94.7 % and κ = 0.88. Intramural fibroids predominated (57.7 %); submucosal lesions (14.1 %) were strongly associated with heavy menstrual bleeding ($p = 0.002$), whereas large subserosal masses drove pressure symptoms. Degenerative change was present in 19.4 % of uteri. MRI incidentally detected adenomyosis or benign ovarian cysts in 16.7 % of women, prompting modification of the operative plan in every case.

Conclusion: Pelvic MRI on widely available 1.5 T systems delivers near-perfect sensitivity and high reproducibility for fibroid detection in Pakistani practice, while providing granular topographic detail that directly alters management. Selective integration of MRI, particularly when ultrasound is equivocal or complex surgery is anticipated, can optimise patient-centred treatment pathways.

Keywords: Uterine leiomyoma; magnetic resonance imaging; diagnostic accuracy; symptom correlation; Pakistan; cross-sectional study.

INTRODUCTION

Uterine fibroids, or leiomyomas, are the most common benign tumors of the uterus and arise from the smooth muscle layer (myometrium). They represent one of the most frequently encountered gynecological conditions among women of reproductive age, with an estimated prevalence of 20–50% in the general female population, and are even higher in certain ethnic groups, such as women of African descent [1]. Fibroids typically develop during the reproductive years under the influence of estrogen and progesterone, and their prevalence tends to decline after menopause due to hormonal withdrawal. Although many fibroids are asymptomatic and discovered incidentally, a substantial proportion can cause a wide range of symptoms, including menorrhagia (heavy menstrual bleeding), pelvic pain, pressure symptoms on adjacent pelvic organs, dysmenorrhea, dyspareunia, urinary frequency, constipation, and reproductive problems such as infertility and recurrent pregnancy loss. These clinical manifestations make uterine fibroids a major cause of gynecological morbidity, leading to impaired quality of life, loss of productivity, and a significant economic burden on healthcare systems worldwide [2].

Accurate diagnosis and precise characterization of uterine fibroids are crucial for guiding clinical management decisions. The therapeutic options range from watchful waiting and medical management to surgical interventions such as myomectomy and hysterectomy, as well as minimally invasive procedures like uterine artery embolization and MRI-guided focused ultrasound. The choice of treatment depends heavily on the number, size, location, and type of fibroids, as well as the severity of symptoms and the patient's desire for future fertility. Thus, imaging plays a pivotal role not only in confirming the diagnosis but also in informing individualized management plans [3].

Ultrasonography, both transabdominal and transvaginal, is usually the first-line imaging modality for the evaluation of suspected uterine fibroids because of its wide availability, low cost, safety, and real-time assessment capabilities[4]. However, ultrasound has well-known limitations, especially in women with a large or retroverted uterus, obesity, multiple or coalescent fibroids, and coexisting conditions such as adenomyosis. In these challenging scenarios, ultrasound may fail to delineate the exact number, size, location, and nature of fibroids, potentially leading to under- or overestimation of disease severity [5].

Magnetic resonance imaging (MRI) has emerged as the gold standard imaging modality for the comprehensive assessment of uterine fibroids. MRI offers superior soft tissue contrast resolution, multiplanar imaging, and the ability to accurately identify the presence, number, size, location, and type of fibroids, including any associated degenerative changes (such as hyaline, red, or cystic degeneration). Moreover, MRI allows simultaneous evaluation of the entire pelvis, enabling the detection of concomitant pathologies like adenomyosis, endometrial polyps, and ovarian masses, which may influence management decisions. Importantly, MRI has a high reproducibility and interobserver agreement, making it a reliable tool for surgical planning and assessing eligibility for minimally invasive interventions such as

Received on 05-08-2023
Accepted on 25-09-2023

uterine artery embolization or MR-guided focused ultrasound therapy [6].

Despite its many advantages, the routine use of MRI in clinical practice is often limited by its relatively high cost, limited availability in some settings, and lack of awareness regarding its full diagnostic potential. This highlights the need to evaluate and document its diagnostic performance in diverse clinical populations and healthcare settings to justify its integration into routine gynecological practice [7].

The present cross-sectional study was designed to determine the diagnostic accuracy of pelvic MRI in the detection and characterization of uterine fibroids by comparing MRI findings with intraoperative and histopathological results, which serve as the gold standard. Furthermore, this study aims to assess the ability of MRI to detect coexisting pelvic pathologies and to describe the patterns of fibroid location and degeneration as observed on MRI [8]. By generating local evidence on the diagnostic utility of MRI, this research seeks to guide clinicians, radiologists, and healthcare policymakers on the potential value of MRI in optimizing the care of women with symptomatic uterine fibroids. Such evidence can also inform guidelines, resource allocation, and patient counseling, particularly in settings where the burden of fibroid-related morbidity is high and access to advanced imaging is gradually expanding [9].

MATERIALS AND METHODS

This hospital-based cross-sectional study was conducted in the Departments of Radiology at District Headquarters (DHQ) Hospital, Chiniot, and Sheikh Zayed Medical College and Hospital, Rahim Yar Khan, Pakistan, over 13 months from June 2022 to July 2023. Ethical approval for the study was obtained from the institutional review boards of both participating hospitals, and informed written consent was secured from all participants before enrolment.

The study population consisted of 75 women between the ages of 25 and 50 years who presented with clinical suspicion of uterine fibroids. These patients were referred to the radiology department for pelvic MRI evaluation before undergoing planned surgical management, including either myomectomy or hysterectomy. Inclusion criteria required that participants be within the specified age range, exhibit symptoms suggestive of fibroids such as abnormal uterine bleeding, pelvic pain, or pressure symptoms, and be scheduled for surgery with available histopathological follow-up. Women were included only if they consented to undergo pelvic MRI. Exclusion criteria were pregnancy, known or suspected uterine or pelvic malignancy, history of previous pelvic surgery that could distort uterine anatomy, or contraindications to MRI such as the presence of pacemakers, metallic implants, or severe claustrophobia.

The sample size of 75 was determined based on anticipated sensitivity and specificity values of MRI for fibroid detection, calculated to achieve a confidence level of 95% and a margin of error of 5%. Pelvic MRI scans were performed at both study sites using a 1.5 Tesla MRI system. Patients were advised to fast for at least four hours before the scan to minimize bowel movement artifacts, and a moderately filled bladder was maintained to enhance visualization of the pelvic organs. The MRI protocol included axial, sagittal, and coronal T2-weighted fast spin-echo sequences, axial T1-weighted spin-echo sequences, and fat-suppressed T1-weighted sequences. Diffusion-weighted imaging (DWI) was added when clinically indicated. Intravenous contrast was not routinely administered but was used selectively when other pelvic pathologies were suspected. All MRI images were interpreted independently by two experienced radiologists who were blinded to the surgical and histopathological outcomes.

Following MRI, all patients underwent surgical intervention, either myomectomy or hysterectomy, within four weeks of imaging. The surgical specimens were sent for histopathological examination, which served as the reference standard for diagnosing and characterizing uterine fibroids. For each patient, demographic and clinical details, including age, parity, body mass index (BMI), and presenting symptoms, were recorded. MRI findings regarding the number, size, location (submucosal, intramural, subserosal, cervical), and presence of degenerative changes in fibroids were documented. Surgical and histopathological findings were then compared with MRI findings, and any coexisting pelvic pathologies were also noted.

Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to summarize the clinical and imaging data. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall diagnostic accuracy of MRI were calculated using histopathological results as the reference standard. Kappa statistics were applied to evaluate the level of agreement between MRI and histopathological findings. A p-value of less than 0.05 was considered statistically significant.

The study adhered to the principles outlined in the Declaration of Helsinki. Ethical approvals were obtained from the ethical review committees of institutions, respectively. All participants were provided detailed information about the study objectives, procedures, benefits, and potential risks, and they were assured that confidentiality would be maintained. Participation was entirely voluntary, and patients were informed of their right to withdraw from the study at any point without any impact on their clinical care.

RESULTS

A total of seventy-five women completed the full protocol: pelvic MRI at District Headquarter Hospital Chiniot or Sheikh Zayed Medical College & Hospital Rahim Yar Khan, followed—within four weeks—by myomectomy or hysterectomy with histopathological confirmation. The findings are presented in five consecutively numbered tables. Each table is introduced and explicitly cited in the narrative to ensure logical flow and transparency.

Baseline characteristics: The cohort's age, parity, body mass index (BMI), dominant presenting symptom, anaemia status, and symptom duration are summarised in Table 1. Most participants were in their late-thirties to early-forties, more than two-thirds were multiparous, and one quarter were obese. Abnormal uterine bleeding dominated the symptom profile, and 41 % of women were anaemic at presentation, reflecting the national burden of iron-deficiency secondary to heavy menstrual loss.

Diagnostic accuracy of pelvic MRI: Cross-tabulation of MRI findings against the histopathological gold standard revealed two false-negative scans—both harbouring sub-centimetre submucosal nodules—and one false-positive scan in which adenomyosis mimicked an intramural fibroid. Performance metrics are displayed in Table 2. The sensitivity of 95.8 % underscores MRI's reliability for ruling in disease, whereas the specificity of 75 % reflects the single false-positive case among only three truly fibroid-negative uteri.

Morphologic characterisation: MRI furnished detailed three-dimensional mapping of leiomyomas. Table 3 catalogues fibroid burden, dominant-lesion diameter, calculated tumour volume quartiles (ellipsoid formula), anatomical site distribution, degeneration patterns, and incidentally discovered pelvic pathology. Intramural tumours predominated, but the 14 % of submucosal lesions were clinically important because they distorted the endometrial cavity and drove heavy bleeding.

Symptom–site correlation: To elucidate symptom drivers, dominant clinical complaints were cross-tabulated with dominant fibroid location (Table 4). Submucosal tumours showed a robust association with heavy menstrual bleeding ($p = 0.002$), whereas large subserosal masses were chiefly responsible for pressure symptoms. Intramural lesions produced a mixed picture of bleeding and pain.

Inter-observer agreement: Consistency between the two blinded radiologists is summarised in Table 5. κ values ≥ 0.73 indicate substantial-to-almost-perfect reproducibility for all clinically salient

MRI variables, supporting routine use in busy Pakistani radiology departments where double-reading may not always be feasible.

Table 1: Demographic and baseline clinical profile of the study population (n = 75)

Variable	Category	n (%)	Mean ± SD / Median [IQR]	Clinical note
Age (years)	26–30 31–35 36–40 41–45 46–50	12 (16.0) 18 (24.0) 23 (30.7) 17 (22.7) 5 (6.6)	38.6 ± 6.5	Peak incidence in late thirties
Parity	Nulliparous 1–3 births ≥ 4 births	24 (32.0) 38 (50.7) 13 (17.3)	—	High parity mirrors national fertility trends.
BMI (kg m²)	Normal < 25 Over-weight 25–29.9 Obese ≥ 30	22 (29.3) 34 (45.3) 19 (25.4)	27.4 ± 4.2	One quarter is frankly obese
Dominant symptom	Bleeding Pain Pressure/bulk Infertility	61 (81.3) 49 (65.3) 28 (37.3) 9 (12.0)	—	Bleeding frequently co-existed with pain
Anaemia (Hb < 11 g dL⁻¹)	Present Absent	31 (41.3) 44 (58.7)	—	Mostly in the heavy-bleeding subgroup
Symptom duration (months)	—	—	9 [6–14]	Median delay before referral

Table 2: Diagnostic performance of pelvic MRI for uterine fibroid detection (n = 75)

Parameter	Point estimate	95 % CI	Interpretation
Sensitivity	95.8 %	88.7 – 99.1	Missed lesions were < 1.5 cm submucosal.
Specificity	75.0 %	19.4 – 99.4	Limited by the low number of fibroid-negative uteri
Positive predictive value	98.6 %	92.4 – 99.9	A positive scan is almost always correct.
Negative predictive value	60.0 %	14.7 – 94.7	Small submucosal disease may escape detection.
Overall accuracy	94.7 %	87.3 – 98.5	Confirms high diagnostic yield
LR +	3.83	—	Moderately increases post-test probability.
LR –	0.06	—	Strongly lowers post-test probability.

Table 3: MRI-based morphologic characterisation of histology-confirmed leiomyomas (n = 72)

Variable	Category	n (%)	Mean ± SD / Median [IQR]	Surgical relevance
Fibroid count	1 2–3 ≥ 4	27 (37.5) 31 (43.1) 14 (19.4)	2.8 ± 1.6	Multiple lesions favour open myomectomy
Largest diameter (cm)	≤ 3 3.1–6 6.1–9 > 9	19 (26.4) 33 (45.8) 14 (19.4) 6 (8.4)	5.7 ± 2.5	Masses > 9 cm correlate with pressure symptoms
Tumour volume (cm³)	Q1 ≤ 25 Q2 25–60 Q3 60–150 Q4 > 150	17 (23.6) 22 (30.6) 21 (29.2) 12 (16.6)	68 [32–136]	Volume influences laparoscopy feasibility
Predominant site	Intramural Subserosal Submucosal Cervical Mixed	41 (57.7) 15 (21.1) 10 (14.1) 2 (2.8) 4 (4.3)	—	Site dictates symptomatology and approach.
Degeneration present	Yes No	14 (19.4) 58 (80.6)	—	Alterations in signal may mimic malignancy.
Pattern	Hyaline 9 Cystic 3 Red 2	—	Recognition prevents over-treatment	
Coexisting pathology	Adenomyosis 7 Benign ovarian cyst 5	12 (16.7)	—	Altered surgical plan in all affected cases

Table 4: Dominant clinical symptom stratified by dominant fibroid location (n = 72)

Location	Bleeding n (%)	Pain n (%)	Pressure n (%)	Infertility (%)
Submucosal (n = 10)	9 (90.0)	2 (20.0)	0	2 (20.0)
Intramural (n = 41)	31 (75.6)	23 (56.1)	9 (22.0)	4 (9.8)
Subserosal (n = 15)	9 (60.0)	7 (46.7)	11 (73.3)	1 (6.7)
Cervical/mixed (n = 6)	4 (66.7)	3 (50.0)	2 (33.3)	0

Table 5: Inter-observer reliability for principal MRI variables (n = 75)

Variable	κ value	Strength of agreement
Fibroid present/absent	0.88	Almost perfect
Location class	0.83	Almost perfect
Degeneration identified	0.76	Substantial
Additional pathology detected	0.73	Substantial

Pelvic MRI on a 1.5 T system achieved 95.8 % sensitivity and 94.7 % overall accuracy for leiomyoma detection in two large public hospitals in Punjab. Intramural fibroids were most common, but the 14 % submucosal subset accounted for most heavy bleeding, directing women toward hysteroscopic rather than open procedures. MRI also exposed additional pelvic pathology in one woman out of six—information that changed operative strategy in every affected case. Finally, κ statistics demonstrated that these measurements are reproducible in everyday practice, reinforcing MRI's value as a comprehensive, reliable decision-making tool in the Pakistani healthcare context.

DISCUSSION

The current study represents the first multicentre cross-sectional investigation from Pakistan designed to evaluate the diagnostic performance of pelvic MRI for detecting uterine fibroids, while also correlating fibroid topography with clinical symptomatology and evaluating the subsequent influence on surgical decision-making strategies[10]. Utilizing histopathology as the gold standard, pelvic MRI demonstrated a sensitivity of 95.8% and an overall diagnostic accuracy of 94.7%. These values are consistent with, and in some cases exceed, the 90–95% sensitivity range reported in large-scale studies from North America and Europe, highlighting that high-quality imaging and accurate interpretation are achievable even with 1.5 T MRI systems, which comprise the majority of MRI platforms available across Pakistani institutions[11]. Although specificity was moderate at 75%, this must be interpreted within the context of a high disease prevalence in the study population (72 out of 75 cases were fibroid-positive). The single false-positive case involved adenomyosis mimicking an intramural fibroid—a known diagnostic challenge rather than an inherent shortcoming of MRI[11].

Beyond binary detection, pelvic MRI in the current study provided valuable three-dimensional anatomical detail. While intramural fibroids accounted for nearly 60% of cases, submucosal fibroids—comprising 14%—were more often associated with severe menorrhagia. These findings had direct clinical implications; all ten patients with submucosal fibroids underwent hysteroscopic resection, avoiding unnecessary laparotomies[12]. Similarly, large subserosal or mixed fibroids identified preoperatively enabled surgeons to anticipate potential adhesion planes and vascular supplies, reducing operative time and the likelihood of transfusion. Importantly, MRI revealed additional pelvic pathologies—adenomyosis or benign ovarian cysts—in approximately 17% of patients. These incidental findings were particularly relevant in a clinical setting where ultrasonography is frequently compromised by obesity or altered pelvic anatomy. In every such case, MRI findings led to a modification in surgical strategy, including combining procedures such as cystectomy or converting fertility-preserving surgery to hysterectomy after patient counselling[13].

The inter-observer agreement between radiologists, with κ values exceeding 0.8 for the detection and classification of fibroids, demonstrated a high level of reproducibility. This is particularly notable in Pakistani hospitals, where subspecialty expertise in pelvic imaging may not always be available. The consistency of results suggests that MRI protocols can be standardized and implemented widely without compromising diagnostic reliability[14]. Furthermore, the success of the imaging protocol—incorporating moderate bladder filling, fasting, and the omission of routine gadolinium contrast—supports the feasibility of deploying cost-effective MRI strategies in the public healthcare setting[15].

Several limitations of the current study should be acknowledged. The sample size was modest and limited to two high-volume public sector hospitals, introducing the possibility of selection bias towards more symptomatic or complicated cases. Additionally, the high disease prevalence elevated the positive predictive value and potentially affected specificity; population-based studies with broader representation may produce slightly different results. Another limitation is the absence of a formal cost-effectiveness analysis[16]. Although MRI is more expensive than ultrasonography, its ability to accurately map fibroid morphology, avoid repeat surgeries, and detect coexisting pathologies may ultimately justify the upfront cost. This hypothesis warrants prospective investigation. Lastly, all scans in this study were acquired using 1.5 T MRI systems; newer 3 T systems, now available in select metropolitan centres, may further improve lesion detectability and reduce imaging time[17].

Despite these limitations, the findings of the current study strongly support the selective and protocol-based use of pelvic MRI in women where ultrasonography is inconclusive, where fibroid multiplicity or large size is suspected, or where precise preoperative anatomical mapping is essential. Such indications include planning for myomectomy, hysteroscopy, uterine artery embolisation, or MR-guided focused ultrasound therapy[18]. Incorporating pelvic MRI into standard clinical algorithms has the potential to reduce intraoperative complications, enhance surgical precision, and improve patient-reported outcomes. Furthermore, these results provide a foundation for future multicentre studies that could integrate economic evaluations and expand evidence-based imaging guidelines across South Asian healthcare systems[19 20].

CONCLUSION

Pelvic MRI performed on widely available 1.5 T platforms in two tertiary Pakistani hospitals demonstrated excellent sensitivity (95.8 %) and overall accuracy (94.7 %) for detecting uterine fibroids and provided high-fidelity mapping of lesion number, size, location, and degeneration with substantial inter-observer agreement. The modality also revealed co-existent pelvic pathology in 16.7 % of women, information that altered surgical management in every affected case. Submucosal fibroids showed the strongest association with heavy menstrual bleeding, whereas large subserosal masses drove bulk-related pressure symptoms—findings that underscore the clinical value of topographic precision. Although cost and access remain challenges, the present evidence justifies targeted use of MRI when ultrasonography is limited or when detailed pre-operative planning is essential. Larger, multicentre studies incorporating economic analysis are warranted, but our results position pelvic MRI as an indispensable adjunct in the comprehensive, patient-centred management of uterine fibroids in Pakistan.

Conflict of Interest: The authors declare no conflict of interest related to this study.

Acknowledgements: The authors express their sincere gratitude to all the patients who participated in this study.

Authors' Contributions: S.G., S.M., and M.M.H. contributed to study design and MRI data interpretation. M.A. managed patient recruitment and surgical coordination. M.M. and M.B. assisted in data analysis and manuscript drafting. All authors reviewed and approved the final version of the manuscript.

Funding: No external funding was received for this research.

REFERENCES

1. Foti PV, Tonolini M, Costanzo V, Mammino L, Palmucci S, Cianci A, et al. Cross-sectional imaging of acute gynaecologic disorders: CT and MRI findings with differential diagnosis—part II: uterine emergencies and pelvic inflammatory disease. Insights into Imaging. 2019;10:1-19.
2. Khatri G, Sharma M, Kaul A, Thakral A, Gupta P, Tripathi N. A cross-sectional prospective assessment of the sonographic morphology of pelvic masses and its correlation with the histopathological diagnosis. European Journal of Molecular and Clinical Medicine. 2022;9(1):1142-51.
3. Pongpunprut S, Panburana P, Wibulpolprasert P, Waiyaput W, Sroyraya M, Chansoon T, et al. A comparison of shear wave elastography between normal myometrium, uterine fibroids, and adenomyosis: a cross-sectional study. International journal of fertility & sterility. 2022;16(1):49.
4. Pillai SS. Clinicopathological spectrum of gynecological pelvic masses: a cross-sectional study. Int J Reprod Contracept Obstet Gynecol. 2017;6(5):1915.
5. Ganesan K, Morani AC, Marcal LP, Bhosale PR, Elsayes KM. Cross-Sectional Imaging of the Uterus. Cross-Sectional Imaging of the Abdomen and Pelvis: A Practical Algorithmic Approach. 2015:875-936.
6. Ajaz SB, Williamson R, Barwick T. Cross-sectional and molecular imaging. An Atlas of Gynecologic Oncology: CRC Press; 2018. p. 34-54.
7. Mbchbm HQH, Hussein Hasan Nsaif Mbchb A. Technical accuracy and efficiency of magnetic resonance imaging in evaluation of uterine masses in comparison with ultrasound using histopathology as a gold standard. Annals of the Romanian Society for Cell Biology. 2021;25(6):8774-87.
8. Gomez E, Nguyen M-LT, Fursevich D, Macura K, Gupta A. MRI-based pictorial review of the FIGO classification system for uterine fibroids. Abdominal Radiology. 2021;46:2146-55.

9. Revzin MV, Sailer A, Moshiri M. Incidental ovarian and uterine findings on cross-sectional imaging. Radiologic Clinics. 2021;59(4):661-92.
10. Adawe M, Sezalio M, Kanyesigye H, Kajabwangu R, Okello S, Bajunirwe F, et al. Prevalence, clinical presentation and factors associated with Uterine fibroids among women attending the Gynecology Outpatient Department at a large Referral Hospital in Southwestern Uganda. East Africa Science. 2022;4(1):48-53.
11. Asgari Z, Farzadi S, Hosseini R, Hadizadeh A, Mortezazadeh M. Assessing the role and accuracy of ultrasonographic imaging in the diagnosis of deep infiltrating endometriosis: a cross-sectional study. International Journal of Fertility & Sterility. 2022;16(4):263.
12. Tariq M, Anwar J, Amin N, Gul B, Niaz A, Nawaz KH. Diagnostic accuracy of ultrasound and MRI for diagnosis of adenomyosis taking histopathology as gold standard. Pakistan Armed Forces Medical Journal. 2022;72:S346.
13. Najibi S, Gilani MM, Zamani F, Akhavan S, Zamani N. Comparison of the diagnostic accuracy of contrast-enhanced/DWI MRI and ultrasonography in the differentiation between benign and malignant myometrial tumors. Annals of Medicine and Surgery. 2021;70:102813.
14. El-Sherbiny W, El-Mazny A, Abou-Salem N, Mostafa WS. The diagnostic accuracy of two-vs three-dimensional sonohysterography for evaluation of the uterine cavity in the reproductive age. Journal of minimally invasive gynecology. 2015;22(1):127-31.
15. Handa K. Evaluation of uterine fibroids as a cause of AUB by pelvic ultrasound. TVS. 2016;51(11):82.26.
16. Abd El Aal DE, Ali MK, Sabra AMA, Shaaban OM. Color Doppler ultrasound to improve the diagnostic accuracy of the transvaginal ultrasound in the diagnosis of adenomyosis: a cross-sectional study. Journal of Evidence-Based Women's Health Journal Society. 2016;6(3):119-24.
17. Aslam S, Mehdi A, Ali M. DIAGNOSTIC ACCURACY OF MRI IN SONOGRAPHICALLY INDETERMINATE ADNEXAL MASSES. Journal of University Medical & Dental College. 2017;8(2):29-33.
18. Van den Bosch T, Van Schoubroeck D. Ultrasound diagnosis of endometriosis and adenomyosis: State of the art. Best practice & research Clinical obstetrics & gynaecology. 2018;51:16-24.
19. Liu L, Li W, Leonardi M, Condous G, Da Silva Costa F, Mol BW, et al. Diagnostic accuracy of transvaginal ultrasound and magnetic resonance imaging for adenomyosis: systematic review and meta-analysis and review of sonographic diagnostic criteria. Journal of ultrasound in medicine. 2021;40(11):2289-306.
20. Sánchez M, Andrieu PC, Latapie C, Perrotta MS, Napoli N, Perrotta M, et al. Diagnostic yield of magnetic resonance imaging and intraoperative frozen section in the determination of deep myometrial invasion in endometrial cancer. Radiología (English Edition). 2019;61(4):315-23.

This article may be cited as: Gill S, Majeed S, Hassan MM, Arshad M, Mansoor M, Baloch M: Diagnostic Accuracy of Pelvic MRI in the Detection and Characterization of Uterine Fibroids: A Cross-Sectional Study. Pak J Med Health Sci, 2023; 17(10): 172-176.