

# STRUCTURED REPORTING OF MRI PELVIS FOR FIBROIDS: REFERRING PHYSICIANS PREFERENCES REGARDING TREATMENT AND SURGICAL PLANNING

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## ABSTRACT

**OBJECTIVE:** The aim of the present study was to explore clinician's views with respect to current reporting practices and assess the preferred reporting style in MRI pelvis for fibroids of the referring gynecologist to establish whether there is a perceived requirement for structured reports. **METHODS AND MATERIALS:** Institutional review board approval was obtained. Four hypothetical radiology reports, two structured and two unstructured reports, were created for the purpose of this study by two experienced consultant radiologists. Each set of report was identical in terms of content. The reports, each followed immediately by a multiple-choice questionnaire listing possible diagnoses from the report, were distributed to the consultant gynecologists/fellows of a tertiary care hospital. The referring physicians were to rank their level of satisfaction for structured and unstructured reports and state the reasons for their responses. **RESULTS:** Of the 80 questionnaires distributed to the referring physicians, a total of 73 responses were received. Structured text rated highest readability, time saving and helpfulness in terms of style and content. The average rate of preferences was 80% for structured reports and 20% for unstructured reports. The average percentage of clarity and completeness of report for structured compared with unstructured reports was 90% and 10% respectively. Structured reports were opted by 68 respondents as compared to narrative for surgical planning of fibroid treatment. Reasons cited by the referring physicians for preference of conventional reporting included ease of comprehension and enhanced clarity of radiology report. **CONCLUSION:** Structured radiology reports were considered significantly superior to that of unstructured reports. A structured radiology report format can positively impact the referring clinician's ability to recall the critical findings with statistical significance. Structured reports were more helpful and easier to understand by clinicians and can provide essential information for fibroids treatment planning.

**Keywords:** Structured, Fibroids, Clarity, Report, Physician

## Introduction

The radiological report is considered both as the primary means of communication between clinician and radiologist as well as a medicolegal proof.<sup>1</sup>

Effective communication is an important component of diagnostic imaging to achieve quality patient care and management. Clinicians orders imaging studies,

interpret the reports given by the radiologists and then plan according to the imaging findings and opinion given in the radiology report. Therefore the radiology report should be formatted to meet the needs of the clinicians to achieve effective communication and understanding. It should be complete in

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terms of clarity, content, format and recommendations. However every radiologists has an individual and different reporting style that often fails to meet the expectations of the referring clinicians.<sup>2</sup>

There is an increasing interest seen recently in the reporting practices of radiology as radiologists looking to make reports more valuable. Radiologists based initiatives by the Radiological Society of North America (RSNA) and American College of Radiology (ACR), have aimed to eliminate the communication gap between radiologists and the referring physicians. Despite these initiatives, there remains disagreement among the end users with radiology reports being considered inconsistent in the report format, language and nomenclature.<sup>3</sup>

Several published work have been seen in the recent past focused on the reporting style preference for both radiologist and clinicians, but no consensus has yet established on the report style and format , which advocates for both traditional narrative and modern structured reporting styles. Structured reporting has gained importance in the medical field with successful adaptation through BiRADS, within radiology.<sup>4</sup>

The RSNA's recent effort to introduce radiology reporting initiative is a step to improve reporting practices by developing a library of report templates which are clear and consistent. The RSNA has developed a standardized lexicon, RADLEX to provide standardized worldwide radiological terminology. This effort describes the importance of radiologic reports in assessing disease severity and outcomes to therapy. The quality of the radiologic reports undoubtedly affects the patient outcome. There is a need to improve reporting practices which is the main aim of radiology reporting initiative of the RSNA.<sup>5</sup>

There are multiple studies that have attempted to explain the ideal report. The suggestions from the American College of Radiology are that radiology report should include demographics, clinical information, technique and procedure, imaging findings, limitations, request of initial imaging, comparison with previous reports, final diagnosis, essential differential diagnosis and follow-up recommendations.<sup>7</sup>

Much of the literature to date has been focused on the effect report format has on radiologist performance. In this latter study, researchers recruited gynecologists to review 4 radiology reports, half of which were structured and the other half of which followed a free-

text format. The respondents were asked to mention their preferred style of reporting. The participants expressed a preference for the structured format. To our knowledge, no study has analyzed a physician's recall of structured vs an unstructured format. In this study, therefore, we aim to measure recall of diagnoses after reading structured compared with unstructured radiology reports.<sup>6,8</sup>

Referring physicians usually prefer structured reports over free text narrative reports for radiology procedures because they consider structured reports can provide improved information and clarity. However, the benefits of structured reports over non structured reports has not been demonstrated. The non-structured report allows the radiologist to use his unique reporting style, language and format. The key elements necessary for a structured report are section headings with modular report formatting, consistent presentation of radiological observations and using a standard lexicon. Structured reporting has been shown to confer a benefit in both treatment, surgical and pathological reports thus improving consistency and communication.<sup>9</sup>

To take the reporting templates to a level that is being useful to the end user i.e. the referring physician, it is important that the reporting templates be made in collaboration with physicians from the individual disciplines that are specifically involved in the treatment and management of the patient. This will lead to the use of mutually agreed terminology between the radiologist and the referring physicians therefore eliminating any confusion.<sup>10</sup>

To our knowledge, relatively little has been published regarding the effect of structured reporting on physician interpretation of radiology reports. Our study evaluated a uniform group of reports of MRI examinations in the setting of a tertiary care center of Pakistan.

## Methods and Materials

The study received ethical board approval and respondent consent was obtained.

The study was a questionnaire-based study. Two consultant radiologists devised four hypothetical radiology reports: two structured and two unstructured of MRI fibroid uterus. Each set of report was identical

in terms of content. Structured reports were made by following the template of structured reports which are freely available on the Radiologic Society of North America radiology reporting. The radiologist selected typical radiologic findings in common clinical scenarios ensuring that each report had four positive findings. Each respondent reviewed 2 conventional and 2 structured radiology reports MRI pelvis examinations of fibroids from which all patient identifiers had been removed.

Questionnaire were distributed among the gynecology and obstetrics consultants as well the trainees. Of the 80 clinicians surveyed, 73 responded (91% reply rate).

On the basis of prior work addressing clinician satisfaction with radiology reports respondents were asked the following six questions: (a) How satisfied are you with the content of this radiology report (b) How satisfied are you with the clarity of this radiology report (c) How helpful is structured report in surgical planning (d). Which one is better for research purpose (e) which one is easily interpretable (f) For follow up of patients after medical and surgical treatment which style is preferred. To answer each question, respondents were asked to opt for either format in front of the content of the questionnaire.

## Results

Majority of the participants had basic medical degree comprising of 54 % while minor and major degree holders made 16 % and 30 % respectively. Most of them had less than 5 years of experience and in their mid-career stage either as registrar or medical officer. The gynecologists having more than 10 years of experience in the field preferred structured report.

For satisfaction with content, structured reports received the approval of 62 (85%) and conventional reports received a mean rating of 11 (15%) by the referring gynecologist.

Structured reports were graded as complete in terms of content and style and easier to understand than narrative reports by gynecologists getting the favor of 70 respondents.

Structured reports were graded as more helpful for surgical planning compared to narrative reports with average grading by gynecologists of 93.2%.

For research purpose again structured report was the choice of report with 97% respondents voted in favor.

In respect to the ease of obtaining information again structured reports were preferred by the majority, however many respondents believe that unstructured reports were easy to extract and interpret information as compared with the structured one. For this reason the unstructured reports received the response of 17.2% and structured reports 82.2 %.

For follow up of the patients of uterine fibroid 64 (81%) respondents considered structured reporting better than unstructured while 9 (19%) respondents preferred unstructured.

## Discussion

The radiology report holds vital place in patient management. Radiologists has an important role in the care of patients through interpretation of imaging studies accurately and communicating appropriately the imaging findings to the physicians. A report prepared by a radiologists is considered more accurate in interpreting the findings, resulting in better patient care.<sup>11</sup>

The face to face interaction between radiologists and attending physicians is diminishing in the recent past with the use of picture archiving and communication systems. Thus, the quality of written radiologic reports is more important and paramount for patient care.<sup>12</sup>

There is no consensus yet related to the amount of information that a radiology report should contain as requested by the referring physicians.

A Radiology report is usually presented as a free text non structured form. The inconsistency and variability in form and language result in differences in the style and content of radiological reports. Non structured reporting may result in relevant and important information for the management of a patient being difficult to understand and missed in the report. Such information has to be discussed and communicated in multidisciplinary meetings and tumor boards which proves to be a time-consuming process. It is therefore desirable that all relevant information to be provided in the primary report.<sup>13</sup>

It is important that the radiology report be structured in such way that maximum information can be trans-

ferred to the requesting physician. Knowing the preferences of the physicians is quite crucial, in that it can help in promoting effective communication between radiologists and attending physicians.<sup>14</sup>

Clarity is one of the important component of radiology reports, because it assures that the information being transferred is accurate and precise. This directly benefits in the patient care. Therefore, we choose to evaluate the technical language used by radiologists. A considerable proportion (85%) of the referring physicians surveyed in the present study believe that structured reporting provide reports with, thus helping in better clinical decision.<sup>15</sup>

Our data showed that the use of Structured reports provided improved report quality and significantly higher completeness in all aspects (96 % vs. 4%). Structured report standardizes the radiology report by making it into an easily readable and to look for important findings thus ensuring completeness of contents. This significantly improves communication between radiologists and attending physicians.<sup>16</sup>

Structured reporting of pelvic MRI in patients with uterine fibroids facilitates surgical planning and leads to a higher satisfaction level of referring surgeons in comparison to non-structured reports. Surgeons were more confident about report correctness and further clinical decision making on the basis of structured reporting. Previous study showed that structured report provided more superior details of imaging findings important for clinical decision making than the non-structured reports.<sup>17</sup> The physicians also found that structured reports described the key features of uterine fibroids and provided sufficient information to enable treatment planning more frequently, when compared to narrative reports. More importantly, structured reports were more helpful for surgical planning and easier to understand by gynecologists compared to non-structure reports as seen previously.<sup>18</sup>

The data provided in the reports should be in a suitable format that makes it easily accessible to extract the desired and appropriate information. Standardized the template reports successfully enhances the value of language processing which have been shown to easily extract relevant information from the reports.<sup>19</sup>

Radiology reports are crucial for patient care and management as referring physicians depend upon

them for deciding patient treatment. Non structured reports are associated with variability in the language, format and style which can reduce report clarity, thus making it difficult for referring physicians to identify vital information necessary for patient care. Structured reporting has been considered important for improving the quality of radiology reports.<sup>20</sup>

There is variability and lack of standardization in the traditional text reports by the radiologists despite identical interpretation on the same images which leads to inconsistency. To improve outcome while reducing inconsistency and variability of radiology reports is thought to improve report quality. A way to standardize reports would be the use of a structured report with standardized radiological lexicon. Consistent interpretation and terminology will successfully improve communication, reducing errors and improving the clarity of the radiology report.<sup>21</sup>

Structured reports are more useful to analyze data for quality improvement and research than are non-structured reports. An important factor of quality improvement initiatives for reporting is reducing inconsistency and variability.<sup>22</sup>

The study by Franconeri and colleagues found that structured reports described the key features of uterine leiomyomas and provided relevant and sufficient information to for better treatment planning when compared to non-structured reports. The structured reports were more beneficial and helpful for surgical planning and easier to understand by gynecologists compared to non-structured reports. In fact, the study by Franconeri and colleagues proved that structured reports developed in consultation with referring gynecologists and radiologists reduce the chances of missing important features, are more easier to understand with enough information for the treatment planning in patients with uterine fibroids.<sup>23</sup>

Both American College of Radiology (ACR) and European Society of Radiology (ESR) recommends that radiology reports should be structured and introduce standard terminology in order to improve the quality and way in which the results of a radiological reports are conveyed, as well as to make information easier to interpret and apply. In the present study, we evaluated the opinion of referring physicians regarding the way in which reports are structured and found that the vast majority of those physicians (89%) prefer structured reports to free-text reports,

which were preferred by only (11%) of the respondents. Other studies have reported similar findings.<sup>24</sup> The European Society of Radiology has recently endorsed that the future of radiology reporting lies in structured reporting and that we should not fear as it will not turn radiologists into machines. It will not make worse radiologists rather it will make many of us better and will help to standardized and homogenize radiology work output in a positive way.<sup>25</sup>

Qualification	N	%	Experience	N	%	Career Stage	N	%
MBBS	40	54	<5 years	32	43	Residents/fellows	22	30
MCPs/DGO	11	16	5-10 years	23	31.5	Registrar/medical officers	24	32
FCPS	22	30	>10 years	18	24	Consultants	20	27.3
						Total	73	100

**Table 1:** Qualification, experience and career stage of the participants.

		Structured Report	Unstructured Report
1	Clarity	85%	15%
2	Completeness	96%	4%
3	Surgical Planning	93.2%	7%
4	Research	97.2%	4%
5	Ease of extracting information	82%	17%
6	Follow up	64%	36%

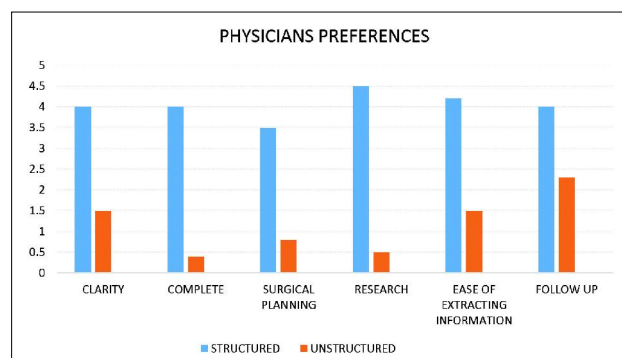
**Table 2:** Preferences of the physicians regarding the content of a radiological report.

UNSTRUCTURED REPORT FORMAT MRI PELVIS	
<b>CLINICAL DATA</b>	
<ul style="list-style-type: none"> <li>Fibroids on USG pelvis.</li> </ul>	
<b>EXAMINATION TECHNIQUE:</b>	
<ul style="list-style-type: none"> <li>Multi-planar imaging done through pelvic region acquiring T1/T2 weighted sagittal and axial sequences. T1 weighted sequences were repeated after IV injection of Magnevist.</li> </ul>	
<b>FINDINGS:</b>	
<ul style="list-style-type: none"> <li>Uterus is enlarged measuring 12x10x8cm. It is anteverted. Endometrium appears normal measuring 6mm. Junctional zone measures 4mm. Multiple intramural homogeneously enhancing mass lesions are seen in uterine body and in uterine fundus. These appear hypointense on T1 and T2WS. Largest of these measures 6x5x5cm is noted in anterior uterine myometrium.</li> <li>Urinary bladder shows normal wall thickness. No abnormal signal mass is seen inside the bladder lumen.</li> <li>Rectal wall thickness is normal. Pre-sacral space is normal. Peri-rectal fat appears normal.</li> <li>Bilateral ovaries are normal without any evidence of mass lesion. Multiple growing follicles are seen in both ovaries.</li> <li>No evidence of any enlarged pelvic lymph node. No free fluid is noted.</li> </ul>	
<b>CONCLUSION</b>	
<ul style="list-style-type: none"> <li>Multiple homogeneously enhancing lesions in uterine myometrium ----Findings are suggestive of uterine leiomyomas.</li> </ul>	

**Figure 1:** Unstructured reporting format

STRUCTURED REPORT FORMAT MRI PELVIS	
<b>UTERUS:</b>	
<ul style="list-style-type: none"> <li>Uterus is (anteverted /retroverted / mid position) measuring 12x 10 x8 cm.</li> <li>Endometrial thickness: 6mm</li> <li>Junctional zone: 4mm (normal &lt; 8mm).</li> </ul>	
<b>FIBROIDS:</b>	
<ul style="list-style-type: none"> <li>Fibroids seen: number is between 1-5cm/ 6-10/ 11-15, &gt; 15/ too many to count(diffuse leiomyomatosis)</li> <li>Fibroid enhancement (non enhancing / homogenous/ heterogenous enhancement)</li> <li>Signals on T1: Hypointense / isointense/ hyperintense</li> <li>Signals on T2: Hypointense / isointense/ hyperintense</li> <li>Signals on FS T1WS: fatty component/ haemorrhagic component(red degeneration). Non fatty , non-haemorrhagic</li> </ul>	
<b>Submucosal fibroids</b>	
<ul style="list-style-type: none"> <li>none</li> </ul>	
<b>The three dominant / largest fibroids are</b>	
<ul style="list-style-type: none"> <li>Size 6 x5x5cm. enhancement is homogenous, intramural, anterior uterine body, not distorting the endometrium.</li> <li>Size 5 x4 x4.1 cm. homogenous enhancement, intramural, posterior uterine body, not distorting the endometrium.</li> <li>Size 3x2.2x2.1cm. homogenous enhancement, intramural, posterior uterine body and fundal region, not distorting the endometrium .</li> <li>No evidence of cornual / cervical fibroid.</li> </ul>	
Vascular supply to the uterus (uterine arteries / uterine and ovarian arteries)	
<b>OVARIES:</b>	
<ul style="list-style-type: none"> <li>Normal ovarian size with normal follicular activity. dominant follicle measuring 2.8cm.</li> <li>No evidence of free fluid in pelvis.</li> </ul>	
<b>IMPRESSION:</b>	
<ul style="list-style-type: none"> <li>Multiple homogeneously enhancing lesions in uterine myometrium ----Findings are suggestive of uterine leiomyomas.</li> </ul>	

**Figure 2:** Structured reporting format



**Graph 1:** Preferences of the physicians regarding the content of a radiological report

## Limitations

The limitations of this study included the relatively small number of gynecologists, the fact that all of the respondents were recruited from a single center and the fact that we focused on only MRI excluding other imaging methods. Although the study was conducted at a public university hospital, the vast majority of the respondents also work in private clinics, suggesting that our results could be extrapolated to such facilities. We believe that the use of a more

comprehensive questionnaire, addressing the other imaging methods typically used in clinical practice, such as ultrasound, CT scan, conventional radiography and contrast-enhanced examinations, might generate response rates sufficient to form truly representative results. Multicenter studies involving larger patient samples and a large respondent reply is needed in order to get more better results.

## Conclusion

Structured reporting has been concluded the preferred format of report by the referring physicians, because of its ease of comprehension and clarity of the radiology report.

Gynecologists found it easier to extract information from structured reports for surgical planning and were more confident about their assessment on the basis of structured reports. Majority of them believed that structured reports of MRI for uterine fibroids provided improved description of imaging findings and better facilitated surgical planning in patients with than do non structured reports.

**Conflict of Interest:** Declared none

## References

1. Wallis A, McCoubrie P. The radiology report - are we getting the message across?. *Clinical radiology*. Nov 2011; **66(11)**: 1015-22.
2. Eskander MG, Leung A, Lee D. Style and content of CT and MR imaging lumbar spine reports: radiologist and clinician preferences. *American Journal of Neuroradiology*. Nov 2010; **31(10)**: 1842-7.
3. Radiology Reporting: Current Practices and an Introduction to Patient-Centered Opportunities for Improvement. *American Journal of Roentgenology*; **210(2)**.
4. Marina I. Mityul<sup>1</sup>, Brian Gilcrease-Garcia<sup>1</sup>, Mark D. Mangano, Jennifer L. Demertzis Langlotz, Curtis P. "Structured radiology reporting: are we there yet?." (2009): 23-25.
5. Brook OR, Brook A, Vollmer CM, Kent TS, Sanchez N, Pedrosa I. Structured reporting of multiphase CT for pancreatic cancer: potential effect on staging and surgical planning. *Radiology*. Oct 2014; **274(2)**: 464-72.
6. Buckley BW, Daly L, Allen GN, Ridge CA. Recall of structured radiology reports is significantly superior to that of unstructured reports. *The British journal of radiology*. Jan 2018; **91(40)**: 20170670.
7. Eskander MG, Leung A, Lee D. Style and content of CT and MR imaging lumbar spine reports: radiologist and clinician preferences. *American Journal of Neuroradiology*. Nov 2010; **31(10)**: 1842-7.
8. Siström CL, Honeyman-Buck J. Free text versus structured format: information transfer efficiency of radiology reports. *AJR Am J Roentgenol* 2005; **185**: 804-12.
9. Leslie KO, Rosai J. Standardization of the surgical pathology report: formats, templates, and synoptic reports. *Semin Diagn Pathol* 1994; **11**: 253-7.
10. Francis IR, Al-Hawary MM, Kaza RK. Using structured reporting templates in staging pancreatic malignancies. *Cancer Imaging*. Dec 2015; **15(1)**: O7.
11. Camilo DM, Tibana TK, Adôrno IF, Santos RF, Klaesener C, Gutierrez Junior W, Marchiori E, Nunes TF. Radiology report format preferred by requesting physicians: prospective analysis
12. Schwartz LH, Panicek DM, Berk AR, Li Y, Hricak H. Improving communication of diagnostic radiology findings through structured reporting. *Radiology*. Jul 2011; **260(1)**: 174-81.
13. Dos Santos DP, Hempel JM, Mildemberger P, Klöckner R, Persigehl T. Structured reporting in clinical routine. In *RöFo-Fortschritte auf dem Gebiet der Röntgenstrahlen und der bildgebenden Verfahren* 2018 Aug 13. © Georg Thieme Verlag KG.

14. Camilo DM, Tibana TK, Adôrno IF, Santos RF, Klaesener C, Gutierrez Junior W, Marchiori E, Nunes TF. Radiology report format preferred by requesting physicians: prospective analysis in a population of physicians at a university hospital. *Radiologia brasileira*. 2019 (AHEAD).
15. Ignácio FD, Souza LR, D'Ippolito G, Garcia MM. Radiology report: what is the opinion of the referring physician?. *Radiologia brasileira*. Oct 2018; **51(5)**: 308-12.
16. Schwartz LH, Panicek DM, Berk AR, Li Y, Hricak H. Improving communication of diagnostic radiology findings through structured reporting. *Radiology*. Jul 2011; **260(1)**: 174-81.
17. Sala E, Freeman S. Structured reporting of pelvic MRI leads to better treatment planning of uterine leiomyomas. *European radiology*. Jul 2018; **28(7)**: 3007-8.
18. Brady AP. Radiology reporting - from Hemingway to HAL?. *Insights into imaging*. Apr 2018; **9(2)**: 237-46.
19. Integrating Natural Language Processing and Machine Learning Algorithms to Categorize Oncologic Response in Radiology Reports. Chen PH, Zafar H, Galperin-Aizenberg M, Cook T J *Digit Imaging*. Apr 2018; **31(2)**: 178-184.
20. Ganeshan D, Duong PA, Probyn L, Lenchik L, McArthur TA, Retrouvey M, Ghobadi EH, Desouches SL, Pastel D, Francis IR. Structured reporting in radiology. *Academic radiology*. Jan 2018; **25(1)**: 66-73.
21. H LW, Teh HS, Sarmiento AR. Itemised or Prose Radiology Reports? A Survey of Referring Physicians' and Radiologists' Preferences. *Annals of the Academy of Medicine, Singapore*. Apr 2016; **45(4)**: 165.
22. European Society of Radiology (ESR). ESR paper on structured reporting in radiology. *Insights into imaging*. Feb 2018; **9(1)**: 1-7.
23. Franconeri A, Fang J, Carney B et al (2017) Structured vs narrative reporting of pelvic MRI for fibroids: clarity and impact on treatment planning. *Eur Radiol*. 10.1007/s00330-017-5161-9
24. Ignácio FD, Souza LR, D'Ippolito G, Garcia MM. Radiology report: what is the opinion of the referring physician?. *Radiologia brasileira*. Oct 2018; **51(5)**: 308-12.
25. Brady AP. Radiology reporting - from Hemingway to HAL?. *Insights into imaging*. Apr 2018; **9(2)**: 237-46.