

Qualitative research of general practitioners' and specialists' expectations of the role of the radiologists

Investigación cualitativa de las expectativas de médicos generales y especialistas sobre el rol del radiólogo



Key words (MeSH)

Radiology
Interdisciplinary
communication
Clinical decision-making
diagnosis

Palabras clave (DeCS)

Radiología
Comunicación
interdisciplinaria
Toma de decisiones
clínicas diagnóstico

Carolina Gómez¹

Luis Felipe Uriza²

Laura Cristina Morales³

Melisa Prieto Peralta⁴

Daniel Sabbag⁴

Isabel del Socorro Moreno⁵

Summary

Objective: There is much uncertainty surrounding the current role of the radiologist in the diagnostic and therapeutic process. The purpose of this study is to obtain information directly from the different medical-surgical specialists, to know their opinion about the role of the radiologist and the aspects to be improved within this specialty. **Material and methods:** Participants were included based on medical-surgical speciality and years of experience. Based on the literature review, a semi-structured and anonymous interview was assembled to be completed by the participants. The custody of the data and anonymity of the information were guaranteed. **Results:** 56 interviews with 21 medical-surgical specialties were conducted and analyzed. Each interview was completed anonymously. According to a thematic analysis of the interviews, some of the most frequently repeated key words were identified, which in turn were grouped into five categories (tailored reports, integration, opportunity, radiologist skills and clinical participation), and finally became part of the overall concept "Teamwork". **Conclusion:** Radiology is recognized by various specialists as a fundamental specialty when it comes to supporting medical decision-making, modification of therapeutic approaches, and support in surgical approaches. Within the practice of the profession, the importance of a detailed report and the ability to propose differential diagnoses was emphasized. It was recognized that to protect the specialty, achieve better performance and to be more efficient, clinical participation and integration with other specialties must be improved.

Resumen

Objetivo: Hay incertidumbre alrededor del papel actual del radiólogo en el proceso diagnóstico y terapéutico. Con el presente estudio se busca obtener información de diferentes especialistas médico-quirúrgicos sobre la opinión que tienen acerca del papel del radiólogo en la práctica médica diaria y los aspectos por mejorar de esta especialidad. **Material y métodos:** Se realizó un muestreo propositivo mediante una inclusión selectiva de los participantes, con base en las variables *especialidad médico-quirúrgica* y *años de experiencia*. A partir de la revisión de la literatura, se ensambló una entrevista semiestructurada y anónima para ser diligenciada. **Resultados:** Se realizaron y analizaron 56 entrevistas a 21 especialidades médico-quirúrgicas. Cada entrevista fue diligenciada de forma anónima. Mediante un análisis temático, se identificaron las palabras clave que se repitieron con mayor frecuencia, posteriormente se agruparon en cinco categorías (informes a la medida, integración, oportunidad, habilidades del radiólogo y participación clínica), y finalmente hicieron parte del concepto global "Trabajo en equipo". **Conclusiones:** La radiología es reconocida por diferentes especialistas como una especialidad fundamental en la toma de decisiones médicas, modificación de conductas terapéuticas y apoyo en abordajes quirúrgicos. En el ejercicio de la profesión se enfatizó en la importancia de un informe detallado y la capacidad de plantear diagnósticos diferenciales. Se reconoce que para proteger la especialidad, lograr un mejor desempeño y ser más eficientes se debe mejorar la participación clínica y la integración con las demás especialidades.

Introduction

Radiology is a relatively new specialty, in constant evolution. During the first half of the 20th century, practically only one diagnostic modality constituted its main focus, X-rays. These studies were very difficult

to interpret for other specialists or general practitioners, as they did not have adequate knowledge (1). Given the need that existed for the interpretation of these studies, between 1920 and 1942, it was consolidated as a specialty of medicine.

¹Physician, radiologist. Master in Business Administration and Telehealth. Pontificia Universidad Javeriana, Hospital Universitario San Ignacio. Bogotá, Colombia.

²Physician, radiologist. Master in Clinical Epidemiology. Pontificia Universidad Javeriana, Hospital Universitario San Ignacio. Bogotá, Colombia.

³Physician, resident of Radiology. Pontificia Universidad Javeriana. Hospital Universitario San Ignacio. Specialist in Clinical Epidemiology. Universidad del Rosario. Bogotá, Colombia.

⁴Physician, radiologist. Pontificia Universidad Javeriana. Hospital Universitario San Ignacio. Bogotá, Colombia.

⁵Psychologist, clinical epidemiologist. Pontificia Universidad Javeriana, Hospital Universitario San Ignacio. Bogotá, Colombia.

Today, there are multiple diagnostic imaging modalities and minimally invasive therapeutic procedures that reduce patient risks and offer different solutions with state-of-the-art technology (2). Consequently, the interest of other areas of medicine in radiology has grown exponentially, and therefore the demand for the radiologist, since this is a key element for diagnosis and therapeutic decision making.

However, there is much uncertainty surrounding the current role of the radiologist in the diagnostic and therapeutic process of patients. Its concept and participation is very variable in the medical field among the different specialties. The present study seeks to obtain direct information from different medical-surgical specialists, in the context of a university hospital, in order to know their opinion about the role of the radiologist and the aspects to be improved in the specialty.

Material and methods

Methodological approach of the research: The study was classified as descriptive in nature, with a qualitative approach (3-5).

Type of study: Descriptive qualitative study of low inference, based on semi-structured interviews, generated from the results of the literature review. The choice of this design is based on the fact that it provides direct answers to questions (6, 7) about how people feel about particular situations, what reasons they have for feeling that way, who and how particular services or functions are used.

Variables to consider: In the literature search it was found that there are some elements that may be relevant to how different specialties perceive radiology and the role of the radiologist. This can generate different imaginaries, expectations, needs and desires of participation and work with the radiologist or with his products (radiological report). Some of the main variables to be considered were the type of medical-surgical specialty and the specialist's level of training (years of experience).

Selection of participants: A purposive sampling was performed by selective inclusion of participants, based on the variables previously described medical-surgical specialty and years of experience: senior more than 10, intermediate from 5 to 10 and junior less than 5 years of experience. Cases were chosen to create a group rich in specific information that could reveal and illuminate important group patterns. Fifty-six semi-structured interviews were conducted with medical-surgical specialists. The selection strategy employed was maximum variation, which purposively selected a wide range of cases to obtain variations in the dimensions of interest for two purposes; first, to document diversity and second, to identify relevant common patterns that are general across the dimensions of interest.

Sample size and stopping point of data collection: The sample size in the qualitative study has the task of obtaining a large quantity and quality of information to see and analyze in depth the topic of interest. This is possible from sample sizes that can vary depending on the depth to be reached. Some authors dedicated to qualitative research have proposed a certain number of subjects with which sufficient information can be obtained to answer the question. Some authors, such as Morse et al. (1998) (8) or Bernard et al. (2000) (9), have proposed a minimum of 30 subjects for an ethnographic study. On the contrary, for phenomenological studies Creswell et al. (1998) (10) and even Morse et al. (5) have proposed a minimum of five to six subjects. Similarly, others, such as Guest et al. (2006) (10), have suggested that with 12 subjects,

results similar to those that will be obtained once the saturation point is reached can be obtained. For the study, the possibility of reaching a saturation point was contemplated, which could occur with fewer than 63 prespecified subjects.

Data collection method: The interview is one of the most commonly used strategies in qualitative studies. From the literature review, a semi-structured and anonymous interview was assembled to be completed by the participants. The custody of these data and the anonymous nature of the information were guaranteed. The interview included 15 open questions, distributed in 5 categories, which were: participation of the radiologist in the diagnosis and treatment, teamwork, use of the reports and interpretation of the images, role of the radiology department and replacement of the radiologist (appendix).

Results

Fifty-six interviews were conducted as follows: 20 to junior, 18 to intermediate and 18 to senior specialists, belonging to 21 medical-surgical specialties at the University Hospital where the authors work (Table 1). The interviews were conducted anonymously by senior medical students.

Table 1. Number of interviews according to medical-surgical specialty

Surgical specialties	Number of specialists	Medical specialties	Number of specialists
Head and neck surgery	2	Neurology	3
Gastrointestinal surgery	3	Neurology	2
Breast surgery	3	Otolaryngology	3
General surgery	3	Pediatrics	3
Thoracic surgery	3	Emergencies	3
Vascular surgery	2	Gastroenterology	2
Gynecology	3	Geriatrics	3
Neurosurgery	2	Critical Care Medicine	2
Orthopedics	3	Internal Medicine	3
Urologia	3	General Medicine	3
		Endocrinology	2
	<i>n</i> 27		<i>n</i> 29

From the analysis of the interviews, some key words were obtained, for example, appropriate reading of the images, treatment orientation, interdisciplinary work, interdisciplinary communication, quality of the radiological report, availability, clinical participation, etc. which, in turn, were grouped into five categories, which finally became part of a key concept: "Teamwork".

The first category to be addressed was the need to have "tailored reports", i.e., reports addressed to the specialist according to what

he “needs” to be reported by the radiologist. Within this category, the need to correlate the imaging findings with the patient’s clinical history was highlighted and, together with this, importance was given to the clinical information provided by the specialist in the request for the study, in order to make a more targeted report. On this aspect, the intermediate specialist in Orthopedics stated: “[...] it would be ideal to provide measurements according to pathology, however, I believe that it would be according to the individual request of each case”. Many specialties raised the importance of having systematic reports according to the specialty that are accurate, i.e., that contain classifications, scales and measurements that are fundamental when making decisions in the medical management of the patient.

Among the most important aspects that the report should contain, according to the specialists, is the ability to bring the clinician closer to a specific diagnosis or to different differential diagnoses. Referring to this, the intermediate specialist of Critical Medicine said: “The main usefulness of the radiograph is to create alternative differential diagnoses”. Finally, it was emphasized that customized reports are closely related to the experience of the radiologist, to which the senior Urology specialist mentioned “[...] it is proven that the experience of the person reading the study is fundamental, the more specialized the better”.

The next category is “clinical participation”, where the radiologist is expected to take an active part in the patient’s management and follow-up, which in turn, will allow for feedback. It is believed and expected that the radiologist will be a fundamental support in therapeutic decision making, guiding surgical conducts, approach and extension of surgery and modifying treatments; the junior specialist in internal medicine stated “[...] the radiologist is a fundamental part of therapeutic decision making”.

As regards “integration”, it is expected and desired that the radiologist will be more than a simple consultant and will integrate with the work teams, through a greater interdisciplinary academic contribution: attending meetings and academic meetings, discussing difficult cases and opening spaces for the training of other specialties through refresher courses and rotations with other residents. Emphasis was placed on the need to have more and better channels of communication, which was referred to by many specialties as “going beyond the report”.

With respect to the above, the intermediate Urology specialist stated: “it is more useful the opinion than the report as such [...]”. Through better integration, the aim is to optimize the approach to the patient and strengthen the multidisciplinary academic contribution. Again, the importance of an expert radiologist to improve integration and communication channels was emphasized; on this point, the intermediate specialist in Orthopedics stated: “an expert radiologist would be ideal, not only for patients, but also for the training of residents and the continuing education of specialists”.

In the category of “skills of the radiologist”, many qualities expected of the radiologist were recognized, among them: experience in reading images; the senior head and neck surgeon stated: “the radiologist has an expert eye on the images and this is transcendental for defining the approach [...]”. In addition to this, the human quality, the ability to associate the findings with the clinical history, the teaching profile taking into account that it is a university hospital, the diagnostic precision, communication beyond the report and availability. Regarding this last aspect, many specialties state that the main weakness of radiology lies in its isolation.

In the category “radiology skills” two subdivisions were found: interventional radiology and the recent concept of artificial intelligence. Interventional radiology is perceived by different specialties as the subspecialty that has the most interdisciplinary communication with the rest of the medical-surgical specialties and the positive impact it has had is emphasized. To this, the intermediate specialist of Critical Care Medicine said: “Through interventional radiology, the impact of radiation therapy has become more important”; likewise, the great contribution of this subspecialty in terms of the versatility of procedures it offers, which, in turn, improves the medical outcome of patients, was highlighted.

The other important aspect that was evaluated is the concept that the specialists have of the possibility of the work of the radiologist being replaced by artificial intelligence; and it was found that most of the specialties considered that the worst disadvantage of this would be the loss of clinical judgment. However, it was emphasized that some aspects of the specialty should be improved to avoid its replacement in the future, among which were greater clinical participation and better interdisciplinary communication, qualities that a machine would not be able to develop. Regarding this issue, the intermediate Nephrology specialist commented: “[...] strengthening communication areas can make the radiologist become part of the team, which a machine cannot do”.

The last category is “opportunity”, in which problems were mentioned when performing interventional procedures and different studies and in the reading of the latter. In the reading of studies, the importance of the availability of the radiologist was highlighted, that is to say, that the specialty can face the great demand for studies that high complexity hospitals currently present. In general, better communication of critical reports in a direct and verbal way was requested; the junior Urology specialist mentioned: “communication is more efficient when speaking directly with the radiologist than with the report”.

Discussion

The perception of physicians from other medical-surgical specialties on various aspects of the radiologist’s work in our hospital is similar to that identified in the literature.

In “customized reports” mentions the importance of clinical information for the interpretation of diagnostic images by means of information systems (2, 8-12) or with other strategies, as in the study by Gunderman et al. (9), where it is described that the provision of clinical information significantly reduces diagnostic times and improves the indication of appropriate studies. Boonn et al. (11) found that radiologists want more clinical information; however, they do not seek the information because of the time involved. Barron et al. (13) concluded that a simple intervention, such as educating the staff requesting the studies, improves the quality of clinical information and, in turn, response times. Other authors, such as Hanna et al. (14), Schreiber et al. (15) and Doubilet et al. (16), also raised the problem of poor or no clinical information in the interpretation of imaging studies, in terms of increased false positives and waiting times.

Other authors, such as Schwartz et al. (17), have stated that structured reports have better content and greater clarity than conventional reports, as well as the perception of the institution’s specialists, who emphasize the importance of more specific reports according to their needs. Also, authors such as Khorasani et al. (18) and Rosenkrantz et

al. (19) have found that understandable terminology in reports is very important, as it benefits therapeutic behaviors. On the other hand, it has been described that mentioning minor incidental findings can generate anxiety in the patient and the request for unnecessary studies; the interviewees of this work mentioned that when structuring the reports, the language should be clear for all parties. Tools such as glossaries made and known by different specialties could facilitate communication, as is the case with the Fleisschner glossary, which allows a uniform language between pneumologists, chest surgeons and radiologists.

In this study, the importance of the alternative diagnoses given by the radiologist in his report and the value of the reading of the studies by a specialized radiologist were highlighted, aspects that favor the work of the non-radiographic physician in his professional practice. On the other hand, regarding the reading of the report by the patient, an orthopedic specialist mentioned that complicated situations can arise when trying to explain to the patient the findings described in a radiological report, the clinical presentation and the appropriate behaviors for his pathology, given the phrases mentioned in the report and the value that the patient gives them.

Regarding “clinical participation” and “integration”, Ramírez et al. (20) consider that adequate communication between treating physicians and radiologists is essential in high quality clinical practice, facilitates the exchange of opinions and makes it possible to obtain necessary clinical information. Wallis et al. (21) encourage the radiologist to strive to improve communication with other specialists. Bosmans et al. (22) consider that non-radiologist physicians expect the radiologist to provide clinical answers by means of the report, but that direct communication is also possible. Similar to what is described by these studies, in our study the different specialties want the radiologist to be part of the therapeutic group, to participate more actively in medical decision-making meetings, to be always ready to answer questions and to dialogue with the rest of the medical staff; this interdisciplinary and active participation is much more important than the preparation of a written report.

Glazer et al. (23) questioned how radiologists become invisible to patients, what factors drive this, and what effect it may have in the long term. Similarly, Kemp et al. (24) found that most radiologists feel that direct communication between patients and themselves is important; however, they report that they are constrained in this by time and workload.

However, when opportunities arise, it is appropriate for the radiologist to introduce him or herself to the patient, explain the imaging findings in simple language, and mention the importance of performing the following behaviors with the appropriate specialist.

In the “skills of the radiologist”, their professional practice is considered to be decisive in clinical and therapeutic decision making. Bosmans et al. (22) found that 85.5 % of the specialists were satisfied with the reports and for the vast majority the detailed radiological report was of great help in medical management. As in this study, the suitability of the radiologists was emphasized, highlighting the moments in which relevant clinical decisions were oriented through discussion. Likewise, great value was placed on the work performed by interventional radiology, which by means of minimally invasive techniques guided by images and in quick times offers therapeutic options for different pathologies that even before had no solution (2).

This strength is recognized and highlighted by the physicians of our hospital, emphasizing that there are better communication channels with this subspecialty.

On the other hand, a challenge also arises as to what artificial intelligence (AI) represents and the role of the radiologist (25, 26). AI is a tool that should be incorporated into clinical radiology practice as a means to improve the extraction of useful information, without being a “replacement”. Regarding this aspect, which was also investigated in the study described here, it was observed that the perception of the specialists was that communication with the radiographer and his interaction cannot be left in the hands of devices.

As for “opportunity”, authors such as Vivas et al. (8) highlighted as errors the failures in the interpretation of the radio logo and others related to the system, in which they emphasized the excessive amount of work. This is the case of developing countries, which have problems with waiting times from the acquisition of the images to their interpretation; in this work these same problems and the need to have expeditious means of communication were identified; in this respect, the non-radiographic physicians gave value to the critical reports commented verbally in a timely manner.

Conclusions

Radiology is recognized by the different medical-surgical specialists as a fundamental specialty when making medical decisions, for the modification of therapeutic behavior or to support surgical approaches. The importance of a detailed report and the ability to make differential diagnoses is emphasized in the practice of the profession. However, it is recognized that in order to protect the specialty, achieve better performance and be more efficient, clinical participation and integration with other specialties must be improved, for which it is essential to have subspecialist radiologists who are experts in each area of medicine.

References

1. Feldman A. A sketch of the technical history of radiology from 1896 to 1920. *RadioGraphics*. 1989;9(6):1113-28. <https://doi.org/10.1148/radiographics.9.6.2685937>
2. Pirnejad H, Niazkhani Z, Bal R. Clinical communication in diagnostic imaging studies: mixed-method study of pre- and post-implementation of a hospital information system. *Appl Clin Inform*. 2013; 4(4):541-55. <https://doi.org/10.4338/ACI-2013-06-RA-0042>
3. Colorafi KJ, Evans B. Qualitative descriptive methods in health science research. *HERD Heal Environ Res Des J*. 2016;9(4):16-25. <https://doi.org/10.1177/1937586715614171>
4. Bernard HR, Harvey R. *Social research methods : qualitative and quantitative approaches*. Sage Publications; 2000.
5. Denzin NK, Lincoln YS. *Handbook of qualitative research*. Thousand Oaks: Sage Publications; 1994.
6. Guest G, Bunce A, Johnson L. How many interviews are enough? *Field methods*. 2006; 18(1):59-82. <https://doi.org/10.1177/1525822X05279903>
7. Doody O, Noonan M. Preparing and conducting interviews to collect data. *Nurse Res*. 2013;20(5):28-32. <https://doi.org/10.7748/nr2013.05.20.5.28.e327>
8. Vivas I. Errores comunes en la interpretación oncológica. *Radiología*. 2018 ; 60:53-63. <https://doi.org/10.1016/j.rx.2018.01.002>
9. Gunderman RB, Phillips MD, Cohen MD. Improving clinical histories on radiology requisitions. *Acad Radiol*. 2001 ;8(4):299-303. [https://doi.org/10.1016/S1076-6332\(03\)80498-1](https://doi.org/10.1016/S1076-6332(03)80498-1)
10. Renfrew DL, Franken EA, Berbaum KS, Weigelt FH, Abu-Yousef MM. Error in radiology: classification and lessons in 182 cases presented at a problem case conference. *Radiology*. 1992 ;183(1):145-50. <https://doi.org/10.1148/radiology.183.1.1549661>
11. Boonn WW, Langlotz CP. Radiologist use of and perceived need for patient data access. *J Digit Imaging*. 2009 ;22(4):357-62. <https://doi.org/10.1007/s10278-008-9115-2>
12. Troude P, Dozol A, Soyer P, Girard D, Martínez F, Montagne B, et al. Improvement of radiology requisition. *Diagn Interv Imaging*. 2014;95(1):69-75. <https://doi.org/10.1016/j.diii.2013.07.002>

13. Barron D, Spiegel T, Katzman GL, Haas K, Ali S. Improving clinical information on head CT requisitions from the emergency department to aid interpretation and billing efficiency. *Am J Roentgenol*. 2018 ;210(1):W18-21. <https://doi.org/10.2214/AJR.17.18558>
14. Hanna TN, Rohatgi S, Shekhani HN, Dave IA, Johnson J-O. Clinical information available during emergency department imaging order entry and radiologist interpretation. *Emerg Radiol*. 2017 ;24(4):361-7. <https://doi.org/10.1007/s10140-017-1488-4>
15. Schreiber MH. The clinical history as a factor in roentgenogram interpretation. *JAMA*. 1963;185(5):399. <https://doi.org/10.1001/jama.1963.03060050077027>
16. Doubilet P, Herman PG. Interpretation of radiographs: effect of clinical history. *AJR*. 1981;137(5):1055-8. <https://doi.org/10.2214/ajr.137.5.1055>
17. Schwartz LH, Panicek DM, Berk AR, Li Y, Hricak H. Improving communication of diagnostic radiology findings through structured reporting. *Radiology*. 2011;260(1):174-81. <http://pubs.rsna.org/doi/10.1148/radiol.11101913>
18. Khorasani R, Bates DW, Teeger S, Rothschild JM, Adams DF, Seltzer SE. Is terminology used effectively to convey diagnostic certainty in radiology reports? *Acad Radiol*. 2003;10(6):685-8. doi: 10.1016/s1076-6332(03)80089-2
19. Rosenkrantz AB. Differences in Perceptions Among Radiologists, Referring Physicians, and Patients Regarding Language for Incidental Findings Reporting. *Am J Roentgenol*. 2017 ;208(1):140-3. <https://doi.org/10.2214/AJR.16.16633>
20. Ramírez J, Rodríguez C, Quiroz Ó, Motta G. La comunicación del radiólogo con médicos tratantes y pacientes. *Acta Médica Grupo Ángeles*. 2007;5(4):228-32.
21. Wallis A, McCoubrie P. The radiology report — Are we getting the message across? *Clin Radiol*. 2011;66(11):1015-22. <https://doi.org/10.1016/j.crad.2011.05.013>
22. Bosmans J, Schrans D, Avonts D, Maeseneer J De. Communication between general practitioners and radiologists: opinions, experience, promises, pitfalls. *J Belgian Soc Radiol*. 2014;97(6):325. <http://doi.org/10.5334/jbr-btr.127>
23. Glazer GM, Ruiz-Wibbelsmann JA. The invisible radiologist. *Radiology*. 2011;258(1):18-22. <https://doi.org/10.1148/radiol.10101447>
24. Kemp JL, Mahoney MC, Mathews VP, Wintermark M, Yee J, Brown SD. Patient-centered radiology: Where are we, where do we want to be, and how do we get there? *Radiology*. 2017;285(2):601-8. <https://doi.org/10.1148/radiol.2017162056>
25. Hosny A, Parmar C, Quackenbush J, Schwartz LH, Aerts HJWL, Edu HH. Artificial intelligence in radiology HHS Public Access. *Nat Rev Cancer*. 2018;18(8):500-10. <https://doi.org/10.1038/s41568-018-0016-5>
26. Thrall JH, Li X, Li Q, Cruz C, Do S, Dreyer K, et al. Artificial intelligence and machine learning in radiology: Opportunities, challenges, pitfalls, and criteria for success. *J Am Coll Radiol*. 2018;15(3):504-8. <https://doi.org/10.1016/j.jacr.2017.12.026>

Correspondence

Laura Cristina Morales Cifuentes
Carrera 67 # 106-60
Bogotá, Colombia
lauracristina25@hotmail.com

Received for evaluation: February 4, 2021

Accepted for publication: May 26, 2021