

Clinical sessions in Radiology: Evaluation and future outlook from the perspective of residents and radiologists

Las sesiones clínicas en Radiodiagnóstico: evaluación y mirada hacia el futuro desde la perspectiva de residentes y adjuntos

Amalia Aranaz-Murillo¹
M. Eugenia Guillén-Subirán²

DOI: <https://doi.org/10.53903/01212095.248>



Key words (MeSH)

Education, medical
Internship and residency
Clinical conference
Quality of health care

Palabras clave (DeCS)

Educación médica
Internado y residencia
Conferencia clínica
Calidad de la atención de salud

Summary

Introduction: Clinical sessions are a crucial component for learning and updating knowledge in diagnostic radiology. **Material and Methods:** The objective is to provide, from a resident's perspective, guidelines for improving clinical sessions at a Third-Level University Hospital. This is based on a descriptive analysis of data obtained from an open and anonymous survey conducted in the Diagnostic Radiology Department. **Results:** The opinions revealed that both groups acknowledge the importance of clinical sessions; however, discrepancies emerged in the structure, content, and methodology. **Discussion:** It is suggested to incorporate interactive clinical cases and thematic reviews that encourage the participation of both residents and attending physicians. Additionally, the use of learning technologies is recommended to enrich the educational experience. Finally, the importance of creating an environment conducive to constructive feedback and knowledge exchange is emphasized. **Conclusion:** Clinical sessions are a fundamental element in the training journey of our specialty. The survey conducted highlights the main strengths and areas for improvement in the session program, emphasizing key ideas such as balancing clinical work, interpersonal collaboration, or the use of alternative formats. The results obtained demonstrate that residents and attending physicians perceive clinical sessions as valuable, although there is room for improvement to optimize their educational impact and promote greater participation.

Resumen

Introducción: Las sesiones clínicas son un componente crucial para el aprendizaje y la actualización de conocimientos en radiodiagnóstico. **Material y métodos:** El objetivo es proporcionar, desde la perspectiva de un residente, unas directrices para mejorar las sesiones clínicas en un hospital universitario de tercer nivel. Todo ello, a partir del análisis descriptivo de los datos obtenidos en una encuesta abierta y anónima realizada en el Servicio de Radiodiagnóstico. **Resultados:** Las opiniones revelaron que ambos grupos reconocen la importancia de las sesiones clínicas; sin embargo, surgieron discrepancias en la estructura, contenido y metodología. **Discusión:** Se sugiere incorporar casos clínicos y revisiones temáticas interactivas, que fomenten la participación tanto de los residentes como de los adjuntos, así como la utilización de tecnologías de aprendizaje para enriquecer la experiencia educativa. Por último, se destaca la importancia de crear un ambiente propicio para la retroalimentación constructiva y el intercambio de conocimientos. **Conclusión:** Las sesiones clínicas constituyen un elemento fundamental en el itinerario formativo de la especialidad. La encuesta realizada pone de manifiesto las principales fortalezas y áreas de mejora en el programa de sesiones, destacando ideas clave como la conciliación con la actividad asistencial, la colaboración interpersonal o la utilización de formatos alternativos. Los resultados obtenidos demuestran que residentes y adjuntos perciben que las sesiones clínicas son valiosas, si bien se pueden implementar mejoras para optimizar su impacto educativo y promover una mayor participación.

Introduction

Training sessions constitute, together with research and clinical practice, one of the three pillars in Diagnostic Radiology (1). Not only for new residents, who find in this format one of their main educational sources from the moment they join the hospital, but also for all

physicians, who need to be constantly updated in their specialty. Furthermore, clinical sessions go beyond the acquisition of knowledge, insofar as they involve active collaboration and the development of synergies between different members of the Department (2).

¹Resident of the Radiology Service. Miguel Servet University Hospital. Zaragoza, Spain. <https://orcid.org/0000-0003-2137-440X>

²Specialist Physician in the area of Radiology Service. Miguel Servet University Hospital. Zaragoza, Spain. <https://orcid.org/0000-0003-4954-7982>

Having established the basis of their importance, it is worth asking whether they are effective. *Do they adequately train residents for the future practice of the profession? Are they an activity that is well valued by the adjuncts?* These questions have already been addressed at the meeting of the Intersociety Commission of the American College of Radiology (ACR) in 1998 (3) and in subsequent articles (1), which shows that this is a relevant topic closely linked to the growth of the specialty.

The aim of this article is to provide, from the perspective of a resident, guidelines for improving clinical sessions in a tertiary level university hospital. This is based on the descriptive analysis of the data obtained in an open and anonymous survey carried out in the Radiodiagnosis Department.

1. Material & Methods

1.1. Current methodology of sessions

The main characteristics of the organization, preparation, development and attendance of clinical sessions at the hospital are detailed below.

Regarding organization, the calendar is divided into two large blocks separated by a holiday break in July and August. The sessions take place every Monday and Thursday from early in the morning, with a duration of 30 minutes. In addition, at least one Wednesday a month, there is an additional session on cross-cutting issues including legal aspects, social behavior, administrative and management problems, etc., always given by a specialist in the area. Finally, coordinated sessions are also organized with other specialties, which are held at a timetable adjusted to the availability of the physician in charge.

The sessions are given by both residents and attendings in a balanced manner. For the preparation of the sessions, the resident is always supervised by an attending. In addition, the calendar is provided at least one to two months in advance, in order to allow sufficient time to prepare a quality session.

In terms of development, the subject matter and format of the sessions is varied. Clinical cases, thematic training on a specific pathology, bibliographic reviews, research studies, updates or protocols, etc. are dealt with. Adjuncts choose subjects of their own choice, while residents are assigned a specific topic, usually directly related to the section in which they are rotating. However, third and fourth year residents occasionally have the ability to propose the content of the session, its format and the attending physician.

Finally, the objective is to achieve maximum attendance, except for those attendings or residents who are out on call, on vacation, sick or on rotations that prevent attendance.

1.2. Data evaluation and analysis

An anonymous survey was conducted to obtain the opinion of attendings and residents on the clinical sessions and thus identify areas for improvement in the current format. The survey was sent by corporate e-mail and was available during May 2023. It was elaborated using Google forms with twenty questions divided into three large blocks of responses: one mandatory, one voluntary and a section for free-response suggestions.

The data were organized in Microsoft Excel, and the Jamovi 2.2.5 program was used. In addition, a word cloud was created to capture

the main suggestions for improvement of the survey. This graphic representation was designed using a freely available online program.

2. Results

The survey was answered by 29 people, of which 12 (41 %) were residents and 17 (59 %) attendings. Overall, the participation of residents was 75%, while that of attendings was 36% (16 residents and 47 attendings make up the staff). The results obtained, grouped by thematic blocks, are detailed below.

2.1. Level of attendance

Regarding the degree of attendance, 11 of the 12 residents (91.7 %) reported having attended more than half of the sessions and none of them less than half; meanwhile, 3 of the 17 attendings (17.6 %) attended more than half, compared to 13 (76.5 %) who acknowledged having attended less than half. In aggregate terms, 78.6% of the regular attendees were residents compared to 21.4% of the attendings (Figure 1a).

In the analysis of the causes of non-attendance, it is observed that the main impediment consists of appointments coinciding with sessions (34 %), followed by shift work (25 %) and days off duty (23 %). Cumulatively, these three causes account for 82% of the reasons for absence (Figure 1b).

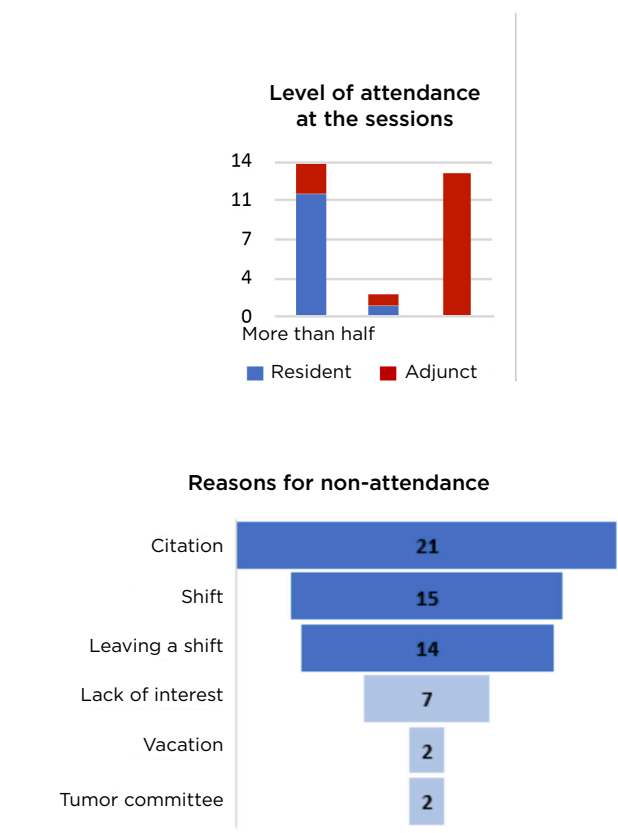


Figure 1. a) Degree of attendance at resident and attending sessions. b) Reasons for non-attendance. It should be noted that the latter is a multiple-choice question, which explains why there is a higher number of responses than the number of people surveyed.

2.2. Internal organization

Regarding internal organization, in the five questions asked, the differences in the answers obtained between the group of residents and attendings are immaterial, so the data are presented in aggregate form (Table 1).

Table 1. Summary of questions and answers on the internal organization of the sessions

Is the schedule adequate?		Is the duration adequate?	
Sí	21 (72.4 %)	Always	2 (6.9 %)
Not always	5 (17.2 %)	Almost always	18 (62.1 %)
DK/DNR	3 (10.3 %)	Sometimes	8 (27.6 %)
		Never	0 (0.0 %)
Advance notice required for preparation		DK/DNR	1 (3.4 %)
More than 3 months	22 (75.9 %)		
More than 1 month	5 (17.2 %)		
Less than 1 month	2 (6.9 %)	The ideal frequency per week is	
		1 day	2 (6.9 %)
Sessions per person per year are		2 days	20 (69.0 %)
Many	1 (3.4 %)	3 days	6 (20.7 %)
Adequate	24 (82.8 %)	4 days	0 (0.0 %)
Few	0 (0.0 %)	5 days	0 (0.0 %)
DK/DNR	4 (13.8 %)	DK/DNR	1 (3.4 %)

The schedule is correct for 72.4% of respondents, while 17.2% consider it inadequate. The duration is mostly correct (62.1%), although only occasionally for a not insignificant percentage (27.6%) of participants. On the other hand, more than three quarters (75.9%) show a preference for knowing the topic of their session more than three months in advance for preparation.

The vast majority of respondents (82.8%) consider the current number of sessions per year to be adequate, although 69.0% agree that the ideal frequency of weekly sessions is also the current one (two days per week). Some 20.7% would even prefer to increase this number to three sessions per week.

2.3. Format & Theme

With regard to the subject matter, half of the residents prefer a free choice, compared to 64.7% of the attendings. On the other hand, up to 41.7% of the residents would like the Section to assign the topic and 35.3% of the Attendings would be willing to have the topic proposed by the residents or agreed upon by both.

In terms of collaboration, half of the residents prefer to conduct the sessions on an individual basis, compared to 25% who prefer to

prepare them jointly with the attendings and another 25% who consider a hybrid model under certain circumstances. As for the attendings, up to 64.7% prefer individual work.

In addition, the preferred format is clinical cases (48%), followed by literature reviews/monographs (40%). Only 12% opt for research studies.

2.4. Motivation & Alternatives

As for the level of motivation, half of the residents state that they are interested in being a speaker, compared to 41% of the attendings. As many as four residents state that their interest depends on the topic of the session, compared to seven attendings in the same situation (Figure 2a).

The approach of grading systems, attendance records or prizes to incentivize higher motivation is viewed positively by eight residents and four attendings. However, almost half of the attendings have doubts about this possibility and five believe that it would not improve motivation (Figure 2b).

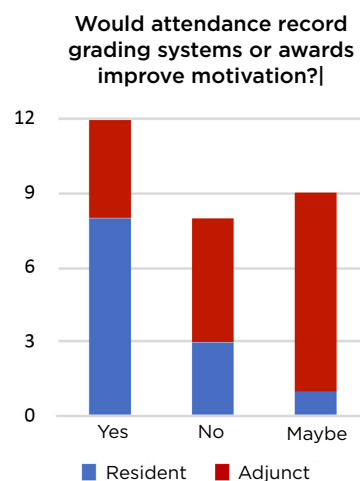
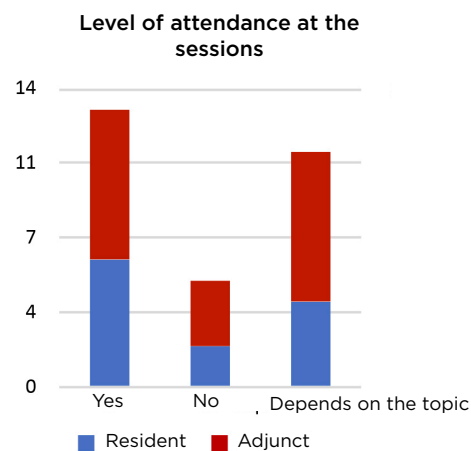


Figure 2. a) Interest of residents and attendings in being a speaker. b) Responses on whether the incorporation of grading systems, attendance registry or the use of prizes would improve motivation.

Faced with the alternatives of holding joint sessions with other hospitals or specialties, both residents and attendings show a high preference for trying both proposals (82.8% and 89.7%, respectively).

2.5. Overall assessment and suggestions for improvement

Respondents show an average satisfaction rating of 6.93 out of 10 and 7 in terms of median. The score of the residents is slightly higher than that of the attendings using the mean and they show less dispersion of the results (Figure 3).

Figure 4 graphically summarizes the main ideas for improvement and suggestions obtained.

Summary of results	Total	Adjunct	Resident
Mean	6,93	6,71	7,25
Standard deviation	1,60	1,93	0,83

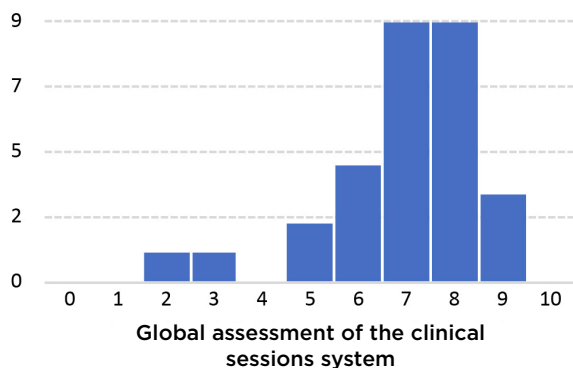


Figure 3. Frequency of responses to the overall evaluation of the sessions on a scale of 1 to 10, accompanied by a summary table of measures of central tendency and dispersion.



Figure 4. Word cloud of survey suggestions.

Median	7,00	7,00	7,00
Interquartile range	2,00	2,50	1,00

3. Discussion

Clinical sessions are an essential tool in any hospital center and for any specialty (4), and the participation of all members of the service is key: residents, specialists and management. Not only does it provide teaching and learning value for the specialty, but it also involves developing communication skills. In fact, some authors (5) suggest that these have been neglected in medical schools and in daily hospital practice, particularly in specialties with less physician-patient relationships.

Although it is recognized that participation in the survey could have been higher, the involvement of residents, attendings and service chiefs shows that awareness of the importance of this tool, so useful and at the same time cohesive, in a sometimes individualistic specialty such as Diagnostic Radiology, is progressively growing.

3.1. Level of attendance

The difference in attendance between residents and attendings is striking. However, what lies behind this is the coincidence with appointments, shifts or on-call duty. In other words, lack of interest is not the main reason for low attendance; even though some of the sessions are probably less useful for the attendings, as they are more focused on the learning of less experienced residents. These results invite reflection on the burden of care. Many articles already showed decades ago that the demand for radiological studies was multiplying (6). The work of Lu et al. (7), which showed a statistically significant increase of 15% in the workload and an increase in its complexity, is worth mentioning. In the particular case of the hospital under study, the 5 CT scanners available start their citation at 8:20 a.m. and the 3 MRI equipment start between 8:10 and 8:30 a.m. depending on the type of study. Likewise, the eight ultrasound scanners in the hospital are scheduled from 8:15 to 8:45 a.m. In addition, two additional ultrasound scanners are located outside the hospital. For all these reasons, it is imperative to have a protected time for the sessions, since they should be considered part of the radiologist's daily work and not a voluntary activity.

Although in the survey described here it was not considered as one of the main reasons for non-attendance at the sessions, the scheduling of the tumor committees at early hours should also be taken into account, among which the colon, esophagogastric, hepatobiliary, lung, gynecologic, urologic and breast tumor committees and, sporadically, the inflammatory bowel disease committee stand out. The rest of the committees are held at different times from the sessions. In them, radiologists play a key role and it is a space that promotes proper clinical management and multidisciplinary collaboration, and is an additional learning tool (8).

3.2. Internal organization

Despite the reasons given for non-attendance, it is surprising that the majority of respondents consider the schedule to be adequate. This is perhaps due to the fact that early in the morning is when there is the least interference with the appointment. Therefore, if the duration of the session were always adequate (only 7% of respondents think so),

or even less, it would allow combining both activities: clinical session and appointment.

Scientific evidence shows that it is difficult to maintain the level of attention after the first ten minutes of exposure, especially if it is more based on passive learning than on active learning, more focused on participation and interaction with the audience (9, 10). Therefore, the search for active and dynamic learning based on multiple radiological examples that try to capture the attention of the audience seems to be coherent. There is also the possibility of reducing the duration of those sessions that, due to their subject matter or difficulty, require it, teaching them on several days a week or in blocks. This is a way of improvement proposed for the hospital, in order to encourage attention and try to increase the number of participants, although there is no single solution, since Radiodiagnostic services and clinical session systems differ greatly from one hospital to another (2).

3.3. Format and subject matter of the sessions

The format of the sessions can be grouped into five different types: reading of cases, thematic, bibliographic, proposal and discussion of protocols, and information on topics of the Service (2). In the survey, the balance between clinical cases and bibliographic reviews is striking, to the detriment of research studies. In any case, between the first two, there is no single winning theme, which is in accordance with the literature, since each typology has advantages and limitations (2, 5). Therefore, a varied format would allow greater learning to be achieved, both at the time of preparing and preparing the session and at the time of the presentation and subsequent discussion.

The survey also showed that residents are willing to choose the topic to be presented. In this sense, if the resident progressively acquires greater healthcare responsibility as his or her training program progresses, it is logical to think that he or she should also have greater freedom to choose the topic of his or her clinical sessions.

Regardless of the authorship and type of study, an attractive format could be 30 minutes of exposition and 30 minutes of case-response (11). The authors report an improvement in attention and retention, in the short and long term, supported by the benefits of the interactive component of the session. With these ideas in mind, but adapting them to the time available for the sessions, a format with interaction with the attendees could be tried, using cases or images about which questions are posed. It is recognized, however, that this format would require more synthesis of the topic from the speaker, as well as more effort in preparing dynamic audience response systems. In December 2022, a clinical session on cardiac anatomy was carried out through the Kahoot! platform, which was very well received.

3.4. Motivation & Alternatives

In line with the above, a recent article (12) states that gamification fosters motivation and participation during learning. Therefore, for the next schedule of sessions, a virtual Escape Room is planned for another session, with the support of Breakoutedu.com.

Competitions, both individual and team-based, can also be considered to encourage interpersonal collaboration (12). The latter competitive format could be a good complement to the individuality intrinsic to the radiologist's work. In addition, the survey warns that residents in

particular would be more motivated if there were prizes or a system for recording attendance and grading sessions. Some North American authors even point to systems of monetary compensation and awards to enhance training (6, 13).

Finally, the participation of the attendings is key to improving workflow and knowledge (6). In the case of the hospital analyzed, both residents and attendings show a high percentage of interest in being speakers and actively participating in the sessions. This interest increases even more depending on the subject matter. This cooperation should also be encouraged at the interdisciplinary level, through joint sessions that allow for improving interpersonal relationships, adopting new points of view, introducing new techniques and updating clinical knowledge (2).

3.5. Overall assessment and suggestions

Feedback that diagnoses the current system and translates into suggestions plays a key role, according to the scientific literature (13). In the word cloud, aspects such as timetable, preparation, attendance and interest in the sessions are highlighted, which should be a fundamental part of the improvement process in the hospital.

On the other hand, the overall assessment is positive, as evidenced by an average grade of notable, although it is true that it is based on an internal assessment made mostly by residents. Despite the youth and inexperience of the residents, the authors of this text consider their opinion to be relevant, since they are the ones who should be trained in excellence and it is important that the residents believe that they are on their way to it. However, there is still a long way to go to achieve a clinical session program of outstanding quality, and an external assessment by an independent third party would also be an important tool for improvement.

The main limitation of this study is the difficulty of extrapolation, given that it is limited to a single center, which has a specific program of sessions, different from the majority, and that, in addition, its survey was answered mainly by residents, which may bias the results. In addition, the sample size is small, which reduces the statistical power of the study. However, this is an issue of considerable relevance, since clinical sessions are the main non-practical training tool of the teaching services.

Conclusion

Clinical sessions are a fundamental element in the training itinerary of the specialty. The survey carried out highlights the main strengths and areas for improvement in the program of sessions, highlighting key ideas such as reconciliation with clinical activity, interpersonal collaboration or the use of alternative formats. The results obtained show that residents and attendings perceive the clinical sessions to be valuable, although improvements can be implemented to optimize their educational impact and promote greater participation.

References

1. McLoud TC. Education in radiology: Challenges for the new millennium. *Am J Roentgenol.* 2000;174(1):3-8. <https://doi.org/10.2214/ajr.174.1.1740003>
2. Del Cura JL. The importance of diagnostic imaging sessions. *Radiologia.* 2005;47(3):145-51. [https://doi.org/10.1016/S0033-8338\(05\)72820-4](https://doi.org/10.1016/S0033-8338(05)72820-4)
3. Vydayeny KH. Radiology 1998: Are today's residents ready for (tomorrow's) practice? *Am J Roentgenol.* 1999;173(3):537-8. <https://doi.org/10.2214/ajr.173.3.10470875>

4. Common program requirements [Internet]. Acgme.org. [citado: 2023 jun 14]. Disponible en: <https://www.acgme.org/programs-and-institutions/programs/common-program-requirements/>
5. Pino-Postigo A, Domínguez-Pinos D, Lorenzo-Álvarez R, Pavia-Molina J, Ruiz-Gómez MJ, Sendra-Portero F. Improving oral presentation skills for radiology residents through clinical session meetings in the virtual world second life. *Int J Environ Res Public Health*. 2023;20(6):4738. <https://doi.org/10.3390/ijerph20064738>
6. Huang BK, Lubner M, Resnik CS. Balancing clinical service and education in the radiology residency. *Acad Radiol*. 2009;16(9):1161-5. <https://doi.org/10.1016/j.acra.2009.03.005>
7. Lu Y, Zhao S, Chu PW, Arenson RL. An update survey of academic radiologists' clinical productivity. *J Am Coll Radiol*. 2008;5(7):817-26. <https://doi.org/10.1016/j.jacr.2008.02.018>
8. Cizman Z, Hammer M, Mollard B, Morgan R, Ballenger Z, Runner GJ, et al. A resident perspective on adding value as radiologists. *Acad Radiol*. 2016;23(4):517-20. <https://doi.org/10.1016/j.acra.2015.12.006>
9. Farley J, Risko EF, Kingstone A. Everyday attention and lecture retention: The effects of time, fidgeting, and mind wandering. *Front Psychol*. 2013;4:1-9. <https://doi.org/10.3389/fpsyg.2013.00619>
10. Prince M. Does active learning work? A review of the research. *J Eng Educ*. 2004;93(3):223-31. <https://doi.org/10.1002/j.2168-9830.2004.tb00809.x>
11. Pamarthi V, Grimm L, Johnson K, Maxfield C. Hybrid interactive and didactic teaching format improves resident retention and attention compared to traditional lectures. *Acad Radiol*. 2019;26(9):1269-73. <https://doi.org/10.1016/j.acra.2019.02.018>
12. Aguado-Linares P, Sendra-Portero F. Gamificación: conceptos básicos y aplicaciones en Radiología. *Radiología*. 2023;65(2):122-32. <https://doi.org/10.1016/j.rx.2022.10.002>
13. Collins J. The needs of an educator. *J Am Coll Radiol*. 2005;2(11):914-8. <https://doi.org/10.1016/j.jacr.2005.02.010>

Correspondence

Amalia Aranaz-Murillo
 Servicio de Radiología
 Hospital Universitario Miguel Servet Pº de Isabel la Católica
 1-3, 50009
 Zaragoza, España
aaaranaz@salud.aragon.es

Received for evaluation: September 20, 2022
 Accepted for publication: November 30, 2022