

Assessment of Educational Environment in Cardiology Residencies

Evaluación del ambiente educacional en residencias de cardiología

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ABSTRACT

Background: The “educational environment”, which is the combined result of physical environment, interpersonal relations, stressing factors and the reward and penalty system, among others, influences student motivation, readiness to study and academic achievement. Educational environment assessment focuses on student perception of the context beyond what might be “objectively” appreciated by an external observer.

Objective: The aim of this study is to present results obtained from the application of a local version of the PHEEM questionnaire to cardiology residents to explore whether their perception differs according to hospital public or private condition.

Methods: We applied the PHEEM (Postgraduate Hospital Educational Environment Measure) questionnaire, developed by S. Roff, S. McAleer and A. Skinner, which is a specific tool to assess educational environment in the hospital setting.

Results: One hundred and forty eight residents from 31 Buenos Aires City and Greater Buenos Aires hospitals, who attended the 2012 Biennial Cardiology Course, completed the questionnaire: 71 residents from public hospitals, 75 from private hospitals and 2 who did not identify hospital condition. Private hospital residencies showed significantly better learning conditions. Differences were found in supervision availability, sanitation facilities and resting / meeting rooms for doctors on call, the sense of physical security inside the hospital and the adequate number of patients and studies for learning. There were no differences regarding the high level of exigency, poor feedback and lack of “protected” time to study during working week hours.

Conclusions: It would be necessary to evaluate other specialty residencies and programs implemented in other jurisdictions, to analyze whether this is a general conclusion or it only applies to cardiology residencies in the metropolitan area.

Key words: Education, Medical - Educational Measurement - Internship and Residency.

RESUMEN

Introducción: El “ambiente educacional”, producto del ambiente físico, de las relaciones interpersonales, de los factores estresantes y del sistema de reconocimientos y sanciones, entre otros, influye en la motivación de los estudiantes, en la disposición hacia el estudio y en el rendimiento académico. La evaluación del ambiente educacional se focaliza en la percepción que los estudiantes tienen del contexto más allá de lo que podría ser apreciado “objetivamente” por un observador externo.

Objetivo: Presentar los resultados obtenidos de la aplicación de una versión local del cuestionario PHEEM a residentes de cardiología para explorar si la percepción de los residentes es diferente según la condición pública o privada del servicio hospitalario.

Material y métodos: Se utilizó el cuestionario PHEEM (Postgraduate Hospital Educational Environment Measure), desarrollado por S. Roff, S. McAleer y A. Skinner, el cual es un instrumento específico para evaluar el ambiente educacional en el contexto hospitalario.

Resultados: Respondieron 148 residentes de 31 hospitales diferentes de la Ciudad de Buenos Aires y el Conurbano Bonaerense, asistentes al Curso Bienal de Cardiología en 2012: 71 residentes de hospitales públicos, 75 de hospitales privados y 2 no identificaron la condición del hospital. Se encontraron diferencias significativas que indicarían mejores condiciones para el aprendizaje en las residencias privadas. Las diferencias se refieren a la disponibilidad de supervisión, a las instalaciones sanitarias y sala de reuniones/descanso para los médicos de guardia, a la sensación de seguridad física dentro del hospital y a la cantidad de consultas y de estudios suficientes para el aprendizaje. No se registraron discrepancias en cuanto al alto nivel de exigencia, al escaso feedback y a la falta de tiempo “protegido” para estudiar dentro del horario de trabajo semanal.

Conclusión: Sería necesario evaluar residencias de otras especialidades y en otras jurisdicciones para analizar si se trata de una conclusión general o si aplica solo a la especialidad cardiología en el área metropolitana.

Palabras clave: Educación - Evaluación educacional - Internado y Residencia.

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INTRODUCTION

Educational “*environment*” or “*climate*” is the group of conditions and feelings that students have and/or perceive in a certain institutional context. (1)

The “*educational environment*” is the result of physical environment and interpersonal relations, the prevailing communication style, pressures and stressing factors and the reward and penalty system. Many of these conditions constitute the “*culture of the place*”, are not explicitly stated, and are part of an unplanned “*hidden curriculum*”.

Lizzio et al (2) have pointed out that the environment or climate significantly influences student motivation, the attitude towards study and the academic achievement at a cognitive and affective level. These authors state that student perception of the environment is a true predictor of their academic success. Other authors (3, 4) indicate that certain negative contextual conditions, such as discriminating attitudes from the tutors, an inadequate workload and/or adverse physical environmental conditions, may interfere with learning. Some educational environment conditions could predict learning outcomes. (5, 6) For example, a clear definition of the resident rights and duties could help the acquisition of an autonomous and responsible conduct.

Educational environment assessment focuses on the perception students have of a certain setting beyond what can be “*objectively*” perceived by an external observer. (7) It aims to know how students feel in class and/or in their clinical practice setting, to identify the conditions that should be encouraged or favored so that the environment -context- contributes to the learning process of values and competences defined as desired results.

The educational environment is closely linked to teaching quality, and should be considered both in undergraduate and postgraduate medical education, given its acknowledged influence in motivation, learning processes and cognitive and attitudinal results. (8, 9)

Educational environment studies started in the 1930s using qualitative methods such as interviews and observations. This were followed by the incorporation of quantitative techniques and instruments. Soemantri et al. (1) performed a systematic review in 2010, identifying 31 instruments used in different educational programs of healthcare personnel. In general, the instruments consist of lists of not very long statements using a Likert scale, which are answered by participants in a short period of time (approximately half an hour). Many of them have been applied in English-speaking countries and have been translated to other languages. Some of the most used questionnaires/surveys/inventories in the field of medical education (undergraduate and postgraduate) are:

- Dundee Ready Education Environment Measure –DREEM- created by Roof et al. in 1977. (10) It inquires about five educational environment categories through 50 items included in five domains:

learning, teaching, climatic, academic and social perceptions. DREEM has been used in undergraduate schools of medicine of many countries. (9, 11-13)

- Postgraduate Hospital Educational Environment Measure (PHEEM) which was also elaborated by Roff et al. in 2005. (14) It postulates 40 items and explores three domains: autonomy, social support and academic perceptions. Similarly to DREEM, it has been applied in different countries. (15-17)
- Ambulatory Clinical Learning Educational Environment Measure (ACLEEM), designed by Riquelme et al. in 2012, to analyze postgraduate educational environments in ambulatory settings. It contains 50 items organized in three domains. (18)
- Clinical Learning Environment (CLE) and Supervision, developed by Saarikoski in 2002 and applied in nursing students in Finland and the United Kingdom. (19)

The purpose of this communication is to present the results obtained applying a local version of the PHEEM questionnaire to cardiology residents to explore whether resident perception is different according to public or private hospital condition.

There is a certain degree of consensus in the medical community regarding the different conditions in which medical residences are developed. (20) As acknowledged by PHO (21) a healthy working environment is essential to support labor motivation, spirit at work, satisfaction for the work performed and general quality of life. The work in healthcare services is closely linked to healthcare professional training.

METHODS

Instrument

Postgraduate Hospital Educational Environment Measure (PHEEM).

It is a self-administered, voluntary, anonymous questionnaire.

PHEEM was created in the United Kingdom in 2005 and has been used in Great Britain and other countries to evaluate postgraduate hospital educational environment. Its psychometric properties, measurements in different hospitals and specialties, indicate that reliable results can be obtained interviewing only 11 residents from a specific department.

PHEEM, translated into Spanish, was validated in Chile (22) and, in a local application, it was again validated in Hospital Italiano residencies (Cronbach’s alpha of 0.878). (23)

The version used in this study was provided by Dr. Arnoldo Riquelme from the Universidad Católica de Chile (personal communication, 2012). The version received was reviewed by cardiology residency program directors and teachers of the Biennial Course in Cardiology at the Argentine Society of Cardiology, who analyzed the precision and pertinence of the items and adjusted some terms (e.g. professors was changed for instructors). Reviewers were invited for their experience in the direction and supervision of residency programs and were included according to their willingness to participate.

PHEEM has 40 items that measure three domains or subscales (Table 1):

Table 1. Results for each statement, overall and according to public or private residencies

Statement	Dimension	Question score			P value
		Overall	Public	Private	
		N = 146	N = 71	N = 75	
1. I have a contract of employment that clearly specifies the hours of work.	Autonomy	2.39	2.21	2.58	0.0650
2. There is a program with defined expected results.	Teaching	2.45	2.59	2.32	0.1049
3. I have "protected" time to study during the weekly working hours.	Teaching	3.14	3.16	3.12	0.7691
4. When I entered the residency, I participated in an induction-orientation program.	Autonomy	3.05	3.18	2.93	0.1638
5. My responsibilities are in accordance with my Grade.	Autonomy	2.25	2.45	2.05	0.0182
6. I have good clinical supervision at all times.	Teaching	2.24	2.60	1.89	0.0001
7. There is a certain degree of racial prejudice.	Social Support	1.76	1.85	1.66	0.2522
8. I have to perform some inappropriate tasks, which do not correspond to my job description.	Autonomy	2.64	2.78	2.44	0.0271
9. There is an informative document – instructions handbook for Junior Doctors.	Autonomy	3.06	3.28	2.84	0.0137
10. Staff doctors and/or instructors have good communicational abilities.	Teaching	2.05	2.30	1.80	0.0010
11. I feel highly demanded.	Autonomy	2.73	2.73	2.73	0.9948
12. I have facilities to actively participate in courses and other educational events.	Teaching	2.07	2.19	1.96	0.1399
13. There is a certain degree of sex discrimination.	Social Support	1.71	1.61	1.81	0.1809
14. Rules and/or regulations are clear and well defined	Autonomy	2.41	2.61	2.21	0.0089
15. Staff doctors / clinical instructors are enthusiastic and know how to motivate	Teaching	2.41	2.66	2.17	0.0013
16. I have the opportunity of working in collaboration with other doctors in my Grade	Social Support	1.78	1.80	1.77	0.8142
17. My working hours are in accordance with the current legislation.	Social Support	2.82	2.87	2.77	0.6012
18. I have the opportunity of providing continuity of care.	Autonomy	2.02	2.02	2.01	0.9280
19. I receive adequate professional orientation.	Social Support	2.27	2.43	2.10	0.0184
20. The facilities (bathrooms, bedrooms, meeting room) are adequate especially for residents on call.	Social Support	2.85	3.50	2.20	0.0001
21. The educational program is relevant and adequate to my learning needs.	Teaching	2.15	2.40	1.89	0.0007
22. I get regular feedback from staff doctors and other professionals.	Teaching	2.73	2.94	2.52	0.0123
23. Educational activities are well organized.	Teaching	2.32	2.36	2.29	0.6584
24. I feel physically safe within the hospital environment.	Social Support	2.12	2.76	1.49	0.0000
25. There is a tolerant, no-blame culture.	Social Support	2.11	2.42	1.80	0.0002
26. There is easy access to food and drinks in on call days.	Social Support	2.14	2.46	1.82	0.0005
27. The number of consultations and studies are adequate for my learning needs.	Teaching	2.00	2.33	1.68	0.0000
28. Staff doctors and/or instructors have good teaching skills.	Teaching	2.05	2.30	1.80	0.0004
29. I feel part of a working team.	Autonomy	1.85	1.94	1.77	0.2431
30. I have enough opportunities to learn and practice procedures.	Autonomy	1.70	1.90	1.50	0.0035
31. My instructors and other professionals are accessible and answer questions.	Teaching	1.75	1.98	1.52	0.0006
32. My workload is adequate.	Autonomy	2.74	2.77	2.70	0.7027
33. Staff doctors use all teaching and learning opportunities effectively.	Teaching	2.40	2.57	2.22	0.0159
34. The training I receive makes me feel confident to practice my profession.	Autonomy	1.85	2.00	1.70	0.0214
35. The chief resident and senior residents have enough skills to be good tutors.	Social Support	1.88	1.91	1.85	0.6898
36. I enjoy other activities outside my work.	Social Support	2.11	2.30	1.92	0.0332
37. I am encouraged to become an independent-autonomous student.	Teaching	2.03	2.18	1.88	0.0367
38. There is good counseling and more time to practice for residents who have difficulties until they perform satisfactorily.	Social Support	2.38	2.54	2.21	0.0292
39. The feedback provided by staff doctors and/or the chief resident helps me to identify my strengths and weaknesses.	Teaching	2.40	2.60	2.21	0.0097
40. There is an atmosphere of mutual respect.	Autonomy	2.03	2.22	1.85	0.0133
General average	-----	2.32	2.48	2.17	p < 0.0001

The instruction to complete the form is: According to the predominant environment in your residency, indicate your degree of agreement or disagreement with each statement. SOURCE: Personal design.

- Perception of the role of autonomy (items 1, 4, 5, 8, 9, 11, 14, 17, 18, 29, 30, 32, 34 and 40);
- Perception of teaching (items 2, 3, 6, 10, 12, 15, 21, 22, 23, 27, 28, 31, 33, 37 and 39);
- Perception of social support (items 7, 13, 16, 19, 20, 24, 25, 26, 35, 36 and 38).

The statements offer four response options: total agreement, partial agreement, partial disagreement and total disagreement. It is possible to present results of each question,

each domain and the total survey. For items with negative statements (7, 8, 11 and 13) the scale score is reversed. The score for each item can vary between 1 and 4 and the following criteria were applied to interpret results: between 1 and 2 means a good learning climate, between 2.01 and 3 refers to an educational climate with significant limitations that should be corrected and greater than 3 expresses unacceptable conditions that have to be modified in order to generate a favourable educational environment.

Data

Third and fourth year residents from public and private Buenos Aires City and Greater Buenos Aires hospitals, who attended the Biennial Cardiology Course at the Argentine Society of Cardiology within the cardiology specialist career framework. The study was carried out in a convenience sample.

Statistical Analysis

Cronbach's alpha was used to test instrument reliability and Student's t test to compare mean differences between public and private hospitals. A factorial analysis was not performed because the study does not aim to find groups of variables with common significance or reduce the number of dimensions necessary to explain subject's answers.

RESULTS

One hundred and forty-eight residents, 100% of the residents attending the Biennial Cardiology Course, responded the questionnaire in November 2012. Thirty-one hospitals were represented: 71 residents from public hospitals and 75 from private hospitals. Two residents did not identify whether they belonged to a public or private hospital. The questionnaire was answered in an average of 40 minutes. No resident expressed difficulty in completing it. The following values were obtained:

- Cronbach's alpha = 0.919 expresses instrument reliability
- General average (40 statements, 31 hospitals): 2.32. This result expresses a poorly satisfactory educational environment, and some conditions should be modified to favour the learning processes.

Table 1 shows the values obtained for each question.

In nine items (22.5% of the questionnaire) values range from 1 to 2, indicating good learning conditions. For example: there are no racial or gender prejudices, I have the opportunity of working with other doctors in my Grade; I feel part of a working team. Conversely, in other twenty-eight items (70% of the questionnaire), values are between 2.01 and 3, indicating not completely satisfactory conditions which should be modified to improve the educational climate. For example: I feel demanded; I have to perform inappropriate tasks; I have poor feedback. Only three items (7.5% of the questionnaire) have a value over 3, marking conditions that hamper the learning process: lack of "protected" time to study during the weekly working hours; absence of an orientation program on admission to the residency, lack of clear rules or regulations for the resident.

Differences between residencies

There is a highly significant difference between publicly and privately managed residencies. Overall response averages and Student's t value were:

- Public residencies: 2.48 and private residencies: 2.17 (p = 0.000001).

Both subgroups agree in pointing out favourable

conditions such as: I have opportunities of working in collaboration with other doctors in my Grade; I have plenty of opportunities to learn and practice procedures; my instructors and other professionals are accessible and answer questions; the training I am receiving makes me feel confident to practice my profession; the chief resident and other senior residents are skilled enough to be good tutors.

Fifteen out of 40 questions (37.5% of the questionnaire) showed that public and private residencies are not different regarding the tolerance atmosphere, absence of sex and/or racial discrimination; ability of the chief resident or senior residents to act as tutors; high level of exigency; poor feedback and lack of "protected" time to study during the weekly working hours.

In 25 of the 40 questions (62.5% of the questionnaire) there were significant differences indicating better conditions for learning in private residencies. The differences are related to having a good clinical supervision at all times, the good sanitary conditions and meeting/resting rooms for doctors on call, the feeling of physical security within the hospital and to the adequate number of patient consultations and studies for learning.

DISCUSSION

Instrument application showed its easy administration. Cronbach's alpha points out the internal consistency of the instrument, and values higher than 0.7 are considered as evidence of acceptable reliability. In this study, Cronbach's alpha was 0.919, which is consistent with others reported in different publications: 0.787 obtained by Lleras and Durante (24) and 0.934 by Herrera et al. (24). In instruments containing 30-40 or more items (such as PHEEM), coefficients over 0.9 can be normally observed, as the coefficient is directly affected by the number of items in the scale.

The number of residency programs denoted in the study group and the high response rate provides good reliability to representativeness of results.

The total average of 2.32 indicates that the educational environment of cardiology residencies is more positive than negative. The results obtained for each statement identifies conditions that should be modified to improve the educational climate and favor learning in the desired direction (autonomy, responsibility). These general results are very similar to those reported by Gough et al (25) referred to a great number of residencies in Australia.

Resident perception is positive regarding learning opportunities and interpersonal relationships, but some "formal" issues as unspecified working hours or lack of expected results, no orientation program at the time of incorporation to the residency and lack of adequate facilities could be interfering with learning.

The perception residents have of the educational environment in private hospitals is more favorable than in public ones. It would be interesting to evaluate this point in other specialty residencies and in

other jurisdictions to see whether it is a conclusion for residencies in general or it applies only to cardiology residencies in the metropolitan area.

Considering that residencies have a strong pyramidal structure and that, in the medical community, prevails the idea that the first-year resident has to “pay his/her dues”, it would be interesting to find out if first-year resident perceptions are different from those of fourth-year. It would also be worthwhile to make a study in a healthcare institution carrying out various residency programs and analyze whether there are differences between specialties. For example, it is frequently heard and read (26) that surgery residencies are “harder” than clinical ones. Could the PHEEM questionnaire detect these differences? What would these differences be?

In a very recent publication, Lleras and Durante (23) present results obtained from assessing the correlation between educational environment and professional burnout syndrome in residents from a university hospital. They applied the PHEEM questionnaire and the Maslach Burnout Inventory to 92 residents and found that the better the educational environment the less the burnout and depersonalization syndrome and the better the feeling of personal achievement.

Finally, it should be mentioned that PHEEM is a tool based in the absolutely subjective perception of residents at a defined time and place. The results presented in this work show the residents’ opinions; they do not describe an “objective reality” on department and/or equipment conditions or professionals’ teaching performance. The work is focused on getting insight into “students’” perspective about the environmental conditions in which they develop their teaching-learning activities. The perspective of other parties involved in the educational process is not considered, a point that would be particularly interesting to contemplate, analyzing coincidences and discrepancies among the different actors participating in a training process. To date there is no tool similar to PHEEM for professionals in a department where a Residency Program takes place.

Lack of an age and gender difference analysis is another limitation of this work. These data were not collected because as it was a known and homogeneous group –they were all third and fourth year residents, 46% women–, the authors assumed there would be no differences. When results were analyzed, it was seen that the study was weakened by focusing only in differences between public and private hospitals.

In conclusion, PHEEM is a reliable, easily administered assessment tool based on resident perception, allowing the evaluation of the educational environment where a healthcare training program is developing. As shown in other studies, (14-16, 24-27) the systematic use of its findings would provide significant information in the evaluation and improvement processes of postgraduate medical education programs.

Conflicts of interest

None declared.

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