Original Article

Learning Environment Assessment on the Pediatric Residency Program at Dr. Moewardi Hospital, Surakarta, Indonesia

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Abstract

Background: The learning environment plays an important role in resident education, and the Postgraduate Hospital Educational Environment Measure (PHEEM) questionnaire is a tool to assess the student's perception of the learning environment. The aim of this study was to assess the perceptions of the learning environment in 2012 and 2017 on the pediatric residency program at Dr. Moewardi Hospital, Universitas Sebelas Maret, Surakarta, Indonesia. **Methods:** A modified PHEEM questionnaire was distributed in April 2012 and September 2017 to all ongoing pediatric residents. The learning environments (sex, grade, perceptions of autonomy, teaching, and social support) in 2012 and 2017 were analyzed by Mann–Whitney test and Kruskal–Wallis test. **Results:** There were 32 and 49 participants in 2012 and 2017, respectively. The overall PHEEM score (mean ± standard deviation) was 105.3 ± 19.1 in 2012 and 116.4 ± 12.1 in 2017. The mean scores for perceptions of autonomy, teaching, and social support were 36.3 ± 6.6, 41.0 ± 7.7, and 27.9 ± 5.7, respectively, in 2012, and 41.0 ± 4.7, 44.7 ± 4.4, and 30.7 ± 3.9, respectively, in 2017. In 2012, 21%, 27%, and 18% of items on perceptions of autonomy, teaching, and social support, respectively, rated >3; in 2017, these values were 35%, 53%, and 36%. **Conclusion:** The perceptions of the learning environment for the pediatric residency program at Dr. Moewardi Hospital Surakarta in 2012 and 2017 were rated more positively, but there remains room for improvement. In 2017, there were more perceived difficulties with autonomy and social support.

Keywords: Learning environment, pediatric residency, postgraduate hospital educational environment measure

Introduction

A hospital is also the most important place for clinical training. Pediatric residents, as part of specialty programs, predominantly use their learning time in a hospital setting, where they must integrate their patient care responsibilities, socioeconomic problems, learning duties, onsite overtime duties, and collaboration with other residents and teaching staff. In this complex learning setting, the environment plays an important role. An appropriate learning environment will encourage a motivation to study and work well in the hospital,[1,2] whereas a poor learning environment becomes a stressor for residents that might lead to burnout.[3,4] Methods have been developed for the assessment of the learning environment in a medical setting. The Postgraduate Hospital Educational Environment Measurement (PHEEM) is an assessment tool for postgraduate students.[5,6] The PHEEM questionnaire assesses the overall learning environment and perceptions of autonomy, teaching, and social support.[5,7] The Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Indonesia, has had a pediatric residency program since 2002. Dr. Moewardi Hospital is the main teaching hospital for the program. Regular assessment of the learning environment was needed to understand environmental changes and identify any persistent and high-priority problems. We aimed to assess the learning environment for the pediatric residency program at Moewardi Hospital, Universitas Sebelas Maret, Surakarta, Indonesia, in 2012 and 2017.

Methods

This analytic observational study was conducted in April 2012 and September 2017. Two versions of a modified PHEEM questionnaire were distributed to all ongoing pediatric residents of Universitas Sebelas Maret during the

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study. The study received ethical approval from the Health Research Ethics Committee, Dr. Moewardi General Hospital, School of Medicine, Sebelas Maret University, approval number 216/II/HREC. We obtained written consent from participants before participation in the study. The first version (distributed in 2012) comprised 40 questions in English based on an Australian PHEEM form, with a Bahasa Indonesia explanation of each question. The explanations were adjusted for the setting of Dr. Moewardi Hospital. The second version (distributed in 2017) included 40 questions in Bahasa Indonesia based on an Australian PHEEM form. The questionnaire had been validated for interns. The responses use a 5-point Likert scale (0–4; 0 strongly disagree, 1 disagree, 2 uncertain, 3 agree, and 4 strongly agree), except for questions 7, 8, 11, and 13, which were scored inversely because these are negative statements.[8,9] Cronbach's α was used as the test of reliability and a score of >0.8 was regarded as indicating reliability.[10] The total PHEEM score was classified as follows: 0–40 very poor, 41–80 many problems, 81–120 more positive than negative but room for improvement, and 121–160 excellent. Perception of autonomy was defined from 14 questions (1, 4, 5, 8, 9, 11, 14, 17, 18, 29, 30, 32, 34, and 40), perception of teaching from 15 questions (2, 3, 6, 10, 12, 15, 21, 22, 23, 27, 28, 31, 33, 37, and 39), and perception of social support from 11 questions (7, 13, 16, 19, 20, 24, 25, 26, 35, 36, and 38).[10] The response rate was calculated based on the number of fully completed questionnaires. The interpretations were classified as follows: perception of autonomy, 0–14 very poor, 15–28 a negative view of one's role, 29–42 a more positive perception of one's role, and 43–56 an excellent perception of one's role; perception of teaching, 0–15 very poor quality, 16–30 in need of some retraining, 31–45 moving in the right direction, and 46–60 model teachers; perception of social support, 0–11 nonexistent, 12–22 not a pleasant place, 23–33 more pros than cons, and 34–44 a good supportive environment.

The data were analyzed using SPSS version 22 software (IBM Corp, Armonk, NY, New York, USA). The results for the PHEEM scores (total and each item) were expressed as means and standard deviations. The results for learning environment (by sex and grade) in 2012 and 2017 were analyzed by Mann–Whitney test and Kruskal–Wallis test. $P < 0.05$ was considered statistically significant. The proportions of items relating perceptions of autonomy, teaching, and social support that were rated >3 were expressed as percentages.

Results

This study assessed the data from 2012 and 2017. Thirty-two of 37 and 49 of 55 residents in those years were enrolled in this study, giving response rates of 86.5% and 89%, respectively. The male-to-female ratios in 2012 and 2017 were 1.0 and 0.63, respectively. The proportions of participants by grade (junior, intermediate, and senior) were 16/9/7 and 15/12/22. Reliability testing showed Cronbach's α values of 0.94 and 0.93, respectively [Table 1].

The total PHEEM score in both years fell within the classification "more positive than negative (learning environment) but room for improvement" (105.3 ± 19.1 and 116.4 ± 12.1). The results for male and female participants and for junior-, intermediate-, and senior-grade participants were also within the same classification [Table 2], although the results for 2017 approached the upper end of this range [Table 3].

The questions and the responses of pediatric residents for each item of the PHEEM questionnaire are shown in Table 4. Items 7, 8, 11, and 13 were scored inversely because they included negative statements, and in the questionnaire, a higher score indicates a more positive response. There were two items in the social support section that scored <2 in 2012 (20 and 26) and one in 2017 (26). The other items all scored >2. The lowest scores for perceptions of autonomy in both years were for items 9 (there is an informative junior doctor's handbook) and 14 (there are clear clinical protocols in this post). A new problem with autonomy emerged in 2017, i.e., item 32 (my workload in this job is fine). The lowest scores for perceptions of teaching in both years were for item 21 (there is access to an educational program relevant to my needs). New problems with teaching in 2017 were items 3 (I have protected educational time in this post) and 31 (my clinical teachers are accessible). The lowest perceptions

Table 1: Baseline characteristics of residents in 2012 and 2017

Characteristics	2012	2017
Response rate, *n* (%)	32/37 (86.5)	49/55 (89.0)
Number of participants	32	49
Sex ratio (male/female), *n* (%)	16/16 (1)	19/30 (0.63)
Grade, *n* (%)		
Junior	16 (50)	15 (31)
Intermediate	9 (28)	12 (25)
Senior	7 (22)	22 (45)
Cronbach's α	0.94	0.93

Table 2: Postgraduate Hospital Educational Environment Measure scores for 2012 and 2017

	PHEEM score	
	2012	2017
All	105.3 (19.1)	116.4 (12.1)
Sex		
Male	106.6 (24.6)	117.6 (13.2)
Female	103.9 (12.0)	115.7 (11.5)
P	0.70*	0.60*
Grade		
Junior	102.8 (19.5)	113.2 (13.0)
Intermediate	100.9 (15.9)	118.3 (7.2)
Senior	116.4 (20.3)	117.6 (13.6)
P	0.25**	0.81**

*Mann-Whitney test; **Kruskal-Wallis test. PHEEM: Postgraduate Hospital Educational Environment Measure

Table 3: Perception of autonomy, teaching, and social support in 2012 and 2017

	PHEEM score (2012)	Items rated >3 (%)	PHEEM score (2017)	Items rated >3 (%)
Perception of autonomy	36.3 (6.6)	3/14 (21)	41.0 (4.7)	5/14 (35)
Perception of teaching	41.0 (7.7)	4/15 (27)	44.7 (4.4)	8/15 (53)
Perception of social support	27.9 (5.7)	2/11 (18)	30.7 (3.9)	4/11 (36)

PHEEM: Postgraduate Hospital Educational Environment Measure

about social support in both years were similar, i. e., items 20 (this hospital has good-quality accommodation for junior doctors, especially when on call), 25 (there is a no-blame culture in this post), and 26 (there are adequate catering facilities when I am on call).

In 2012, three of 14 items in autonomy (5, 11, and 29), four of 15 items in teaching (10, 12, 28, and 37), and two of 11 items in social support (16 and 35) in year 2012 were rated >3 (agree). In 2017, five of 14 items in autonomy (1, 5, 11, 34, and 40), eight of 15 items in teaching (2, 6, 10, 12, 15, 23, 28, and 37), and four of 11 items in social support (7, 13, 16, and 35) were scored >3 [Table 4].

Discussion

Self-assessment in pediatric residency program of Universitas Sebelas Maret Surakarta was periodically performed every 5 years. Self-assessment comprised a strength weakness opportunity thread (SWOT) analysis and a learning environment assessment and then was used to arrange strategic planning for the next 5 years. During 5 years (from 2012 to 2017), there were many priority programs related to teaching methods, the use of Workplace based assessment and also hospital and institutional accreditations that might change perceptions of learning environment. This study assessed the perceptions of pediatric residents about their learning environment in 2012 and 2017. The response rates of our study were quite high (86.5% and 89%); other studies have had response rates of 20%–100%.[8-11] The reliability of this study was more than 0.8, which is consistent with that of other studies.[2,5,7,9,10] The questionnaire had high internal consistency. In our program, there was a change in the male-to-female ratio between 2012 and 2017, in that the proportion of female residents in the pediatric program increased. Although many studies have reported no conclusive differences between men and women, this trend must be investigated further in the context of our patriarchal society.[3,12] Both assessments resulted in scores within the same classification (more positive than negative but room for improvement). Some studies have reported lower scores for pediatric residents, e.g., Saudi Arabia (82.64), Ireland (82.88), and Pakistan (88.16).[1,11,13] Multicenter studies in Saudi Arabia reported a total score of 100.[14] A study by Wall *et al*. compiled data from Brazil, Chile, Netherlands, and the UK and produced a total score of 105.[7] A South African study assessing pediatric interns reported similar findings.[15] Almost all studies reported scores within the same classification. Residents may encounter some difficulties and, in some cases, suffer burnout during their residency. Previous studies have reported the prevalence of difficulties in residency as 3%–10%, and the learning environment has been correlated with burnout in residency programs.[3,16] From the perspective of program directors, these difficulties were related to the workplace and the incidence was higher in university teaching hospitals than in regional hospitals.[16] The prevalence of burnout among pediatric residents itself has been shown to vary (15%–70%).[3,17] Although the present study was not designed to assess difficulties and burnout in our residency program, junior-grade residents reported more stress and heavier workloads than more senior residents. At this level, they also faced problems in adapting to the work/learning environment. In the view of our teaching staff, the junior grade is the toughest stage of the residency. The results for 2012 showed that junior- and intermediate-grade residents reported the lowest scores, although the difference between grades was not significant. However, in 2017 the scores for all grades were almost identical. We cannot explain these differences. They may be the result of different proportions of participants in each grade in 2012 and 2017. The duration of residency was also not a significant influence in multicenter studies in Pakistan and Saudi Arabia.[13,14] As in our study, men and women did not differ in their perceptions of the learning environment.[12,14] Another study reported that anxiety and depression were common during the 1st year of residency, and that female students had greater symptoms of anxiety than men.[12] Further research is needed to assess specifically the workload, the prevalence of and risk factors for anxiety, and burnout in pediatric residency, including factors such as duration of residency and sex.

The perceptions of autonomy, teaching, and social support in our study were positive, which is consistent with those reported in other studies.[8,9] One study in Saudi Arabia found positive responses for autonomy and teaching but negative ones for social support.[11] Our participants gave ratings of <2 only for perception of social support. In 2012, the items that scored low were *this hospital has good quality accommodation for junior doctors, especially when on call* and *there are adequate catering facilities when I am on call*. In 2017, catering facilities were still a problem, but not accommodation. Another study in Saudi Arabia reported that the availability of an informative junior doctor's handbook, workload, a blame culture, and adequate catering facilities when on call all scored <2.[14] Other studies of interns and residents not specific for pediatrics reported that inadequate catering services, performing inappropriate tasks, being paged inappropriately, having suitable access to career advisers, an informative handbook, an informative induction program, and senior staff who effectively utilized learning opportunities were scored <2.[1,5,11,18] The factor common to our

Table 4: Responses of pediatric residents to items of the Postgraduate Hospital Educational Environment Measure questionnaire in 2012 and 2017

Items	Perceptions of learning environment	Mean±SD	
		2012	2017
	Perception of autonomy		
1	I have a contract of employment that provides information about hours of work	2.87 (0.96)	3.06 (0.72)
4	I had an informative induction program	2.58 (0.83)	2.92 (0.53)
5	I have the appropriate level of responsibility in this post	3.03 (0.79)	3.10 (0.47)
8	**I have performed inappropriate tasks**	2.58 (1.00)	2.84 (0.94)
9	There is an informative junior doctor's handbook	2.42 (0.98)	2.78 (0.59)
11	**I am bleeped inappropriately**	3.21 (0.58)	3.14 (0.76)
14	There are clear clinical protocols in this post	2.50 (0.86)	2.78 (0.72)
17	My hours conform to the new deal	2.63 (0.71)	2.88 (0.60)
18	I have the opportunity to provide continuity of care	2.61 (0.86)	2.90 (0.51)
29	I feel part of a team working here	3.00 (0.57)	2.92 (0.40)
30	I have opportunities to acquire the appropriate practical procedures for my year of residency	2.92 (0.59)	2.96 (0.46)
32	My workload in this job is fine	2.61 (0.72)	2.65 (0.63)
34	The training in this postmakes me feel ready to be a specialist	2.97 (0.37)	3.00 (0.29)
40	My clinical teachers promote an atmosphere of mutual respect	2.95 (0.70)	3.06 (0.52)
	Perception of teaching		
2	My clinical teachers set clear expectations	2.79 (0.81)	3.14 (0.41)
3	I have protected educational time in this post	2.74 (0.92)	2.76 (0.75)
6	I have good clinical supervision at all times	2.71 (0.80)	3.04 (0.54)
10	My clinical teachers have good communication skills	3.08 (0.63)	3.14 (0.50)
12	I am able to participate actively in educational events	3.03 (0.37)	3.00 (0.41)
15	My clinical teachers are enthusiastic	2.97 (0.55)	3.12 (0.39)
21	There is access to an educational program relevant to my needs	2.53 (0.86)	2.84 (0.55)
22	I get regular feedback from seniors	2.82 (0.65)	2.92 (0.45)
23	My clinical teachers are well organized	2.87 (0.58)	3.04 (0.41)
27	I have enough clinical learning opportunities for my needs	2.55 (0.69)	2.94 (0.43)
28	My clinical teachers have good teaching skills	3.05 (0.52)	3.12 (0.44)
31	My clinical teachers are accessible	2.79 (0.62)	2.78 (0.51)
33	Senior staff utilize learning opportunities effectively	2.53 (0.69)	2.90 (0.47)
37	My clinical teachers encourage me to be an independent learner	3.08 (0.43)	3.02 (0.32)
39	The clinical teachers provide me with good feedback on my strengths and weaknesses	2.87 (0.67)	2.94 (0.43)
	Perception of social support		
7	**There is racism in this post**	2.53 (1.16)	3.14 (0.91)
13	**There is sex discrimination in this post**	2.79 (0.88)	3.04 (0.76)
16	I have good collaboration with other doctors in my year	3.11 (0.61)	3.10 (0.42)
19	I have suitable access to careers advice	2.68 (0.78)	2.88 (0.53)
20	**This hospital has good-quality accommodation for junior doctors, especially when on call**	1.13 (0.94)	2.33 (0.99)
24	I feel physically safe within the hospital environment	2.97 (0.49)	2.98 (0.38)
25	There is a no-blame culture in this post	2.00 (0.93)	2.41 (0.79)
26	**There are adequate catering facilities when I am on call**	1.24 (0.94)	1.94 (1.07)
35	My clinical teachers have good mentoring skills	3.03 (0.49)	3.06 (0.38)
36	I get a lot of enjoyment out of my present job	2.71 (0.73)	2.88 (0.48)
38	There are good counseling opportunities for junior doctors who fail to complete their training satisfactorily	2.68 (0.62)	2.98 (0.43)

*Bolded texts means negative statements, and scored inversely. SD: Standard deviation

study was the problem with the catering facilities that might have influenced the learning environment. This important issue could prompt the teaching hospital to improve the facilities.

The perception of program directors was that the most common problems in teaching were related to feedback,[16] which differed from the perception of the residents in this study. Specifically, the persistent problems reported in both years were the lack of an informative junior doctor's handbook, clear clinical protocols, access to an educational program, good-quality accommodation for junior doctors, a no-blame culture, and adequate catering facilities. The new problems that emerged in 2017 were related to autonomy and teaching: workload, protected educational time, and accessibility of teachers. Residents' workload in our academic hospital might related to increasing number and complexity

of pediatric cases, lots of administrative tasks due to hospital accreditation, and no officially limitation of working hours for residents. The increased workload had impact on educational time. Accessibility of teachers' problems in 2017 might be caused by increased workload (quantity and complexity) of patients' care in hospital, administrative tasks for medical staff, and some medical staff took an advance education for their subspecialties. Evaluation of these items needs to be performed regularly.

Overall, 35%, 53%, and 36% of items in perceptions of autonomy, teaching, and social support, respectively, were rated >3. This differs from the results of a multicenter study in Saudi Arabia in which the higher scores predominantly related to autonomy.[14] Compared with the data for 2012, in 2017, 3/14 (21%), 4/15 (27%), and 2/11 (18%) of items relating to perception of autonomy, teaching, and social support, respectively, were rated >3. Therefore, the present study shows that, in 2017, our residents faced more difficulties in autonomy and social support than in teaching. Residency program directors should evaluate and develop approaches to change the residents' perceptions of these two aspects.

Our study had some limitations. First, the methods for gathering information from participants differed in 2012 and 2017. In 2012, we used an English-based questionnaire with an explanation in Bahasa, whereas in 2017, a Bahasa translation of an English-based questionnaire was used. Clearly, there is an issue related to internal validity, although Cronbach's α indicated high internal consistency. Hence, we did not compare the observations for the 2 years. However, this study was useful to assess residents' perceptions about their learning environment in 2012 and 2017. There were some changes during that period, not only the participants' characteristics (sex proportion, number of participants, social economic background, and learning environment before), but also the external change (mini and meso-curriculum, the hospital rule, and properties). We suggest the use of a Bahasa Indonesia version of PHEEM for further research to allow valid comparison of different periods and to assess each item specifically.[2] Second, the participants in 2012 and 2017 were not the same individuals. In 2017, the proportion of women was larger and the number of senior-grade participants was greater. Although the results did not differ for men and women, this change in proportion might have introduced a bias in perceptions. The participants' psychological background and other risk factors (age, marital status, family, financial problems, or the origin of university during medical student) need to be explored to understand their perceptions. A cohort study is needed to analyze the changes in the learning environment, the association between the perception of the learning environment and the residents' motivation and burnout, and whether the perception of the learning environment has any correlation with academic achievement. In conclusion, the perceptions of the learning environment of the pediatric residency program at Dr. Moewardi Hospital Surakarta in 2012 and 2017 were rated more positive than negative, but there is room for improvement. By 2017, there were more difficulties with perceptions of autonomy and social support than of teaching. New emerging problems were the workload, educational time, and accessibility of teachers.

Conclusion

The perceptions of the learning environment of the pediatric residency program at Dr. Moewardi Hospital Surakarta in 2012 and 2017 were rated more positive than negative but there is room for improvement. By 2017, there were more difficulties with perceptions of autonomy and social support than of teaching. New emerged problems were the workload, educational time and accessibility of teachers.

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Conflicts of interest

There are no conflicts of interest.

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